Kaho`olawe Ordnance Identification Guide Book

UXO Clearance Project
Kaho`olawe Island Reserve, Hawaii
Contract No.: N62742-95-D-1369
Prepared by:
Parsons-UXB Joint Venture
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The information contained within was compiled by Denis Warner, UXO Demolition Supervisor, and is provided to UXO supervisors on island as visual guide in the identification of ordnance found on the Island of Kaho`olawe Hawaii.

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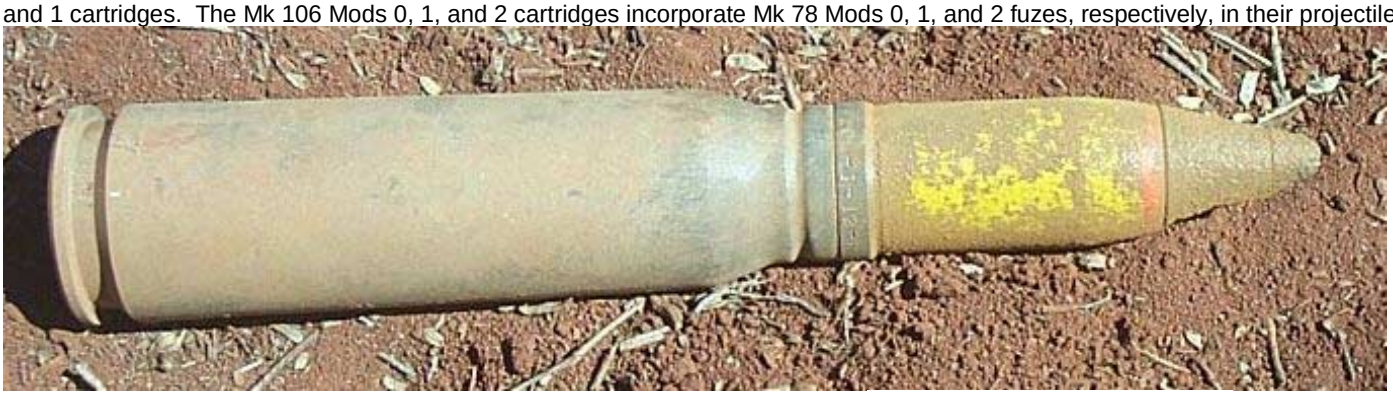
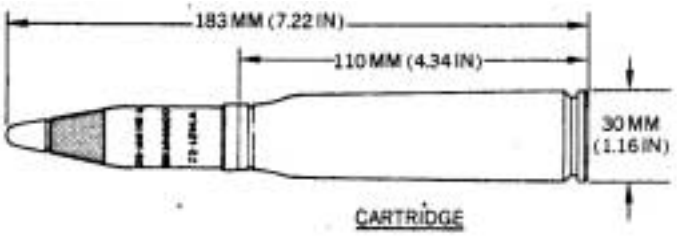
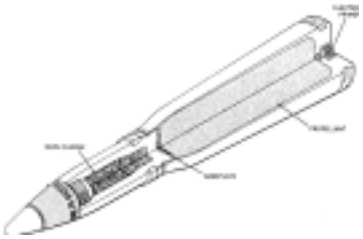
PROJECTILES

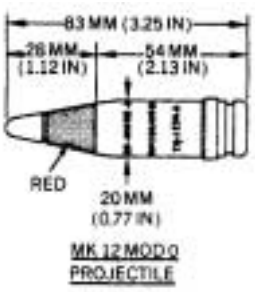
MK 106 20-MM WITH PROJECTILE, MK 12 HEI AND MK 78 FUZE, US.

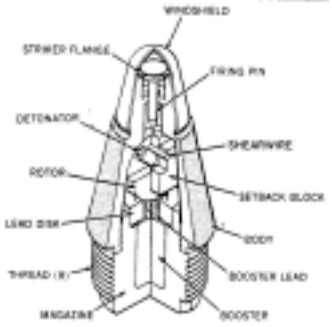
Description: This is an electrically primed cartridge with a high explosive incendiary projectile incorporating a setback- and centrifugally armed, point detonating fuze. The unpainted cartridge case is zinc plated and chromate treated. The projectile body is painted yellow, with nomenclature and manufacturing information stenciled in black on the side and stamped in the rotating band. The fuze body (**Mod 2 fuze only**) is anodized red. Fuze nomenclature and manufacturing information are stamped in the fuze body. **NOTE:** Projectiles painted in accordance with previous color codes have either a red body with a yellow band below the fuze seating surface, or a yellow body with a red band below the fuze seating surface, and uncolored fuzes (Mods 0 and 1 fuzes). The cartridge case is steel; the projectile is steel with a copper rotating band; and the fuze has an aluminum body with an aluminum or steel windshield. The figure shows the general arrangement of the Mk 106 Mod 2 cartridge, which incorporates a Mk 12 Mod 0 projectile, as do the Mk 106 Mods 0 and 1 cartridges. The Mk 106 Mods 0, 1, and 2 cartridges incorporate Mk 78 Mods 0, 1, and 2 fuzes, respectively, in their projectiles.











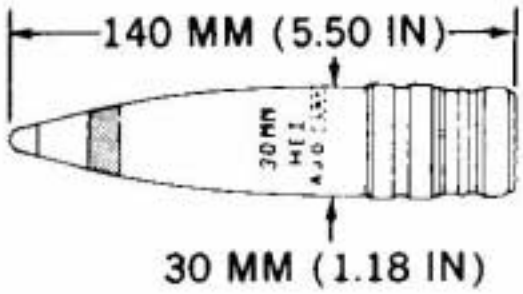
Cartridge case: electric primer and 41 grams (1.4 ounces) of propellant.
Projectile: 6-gram aluminized tetryl main charge.
Fuze: Detonator weighing less than one gram, and a tetryl booster lead and booster of unknown weights.

Diameter: 20mm
Length w/o Fuze: 2.13 Inches
Length w/Fuze: 3.25 Inches
Length w/ Cartridge: 7.22 Inches

Fuzing:
Only the MK78 Fuze is used on this Projectile.

Transport: Safe to move.

PGU 13/B HEI and PGU 15 TP, US, PROJECTILE, 30mm



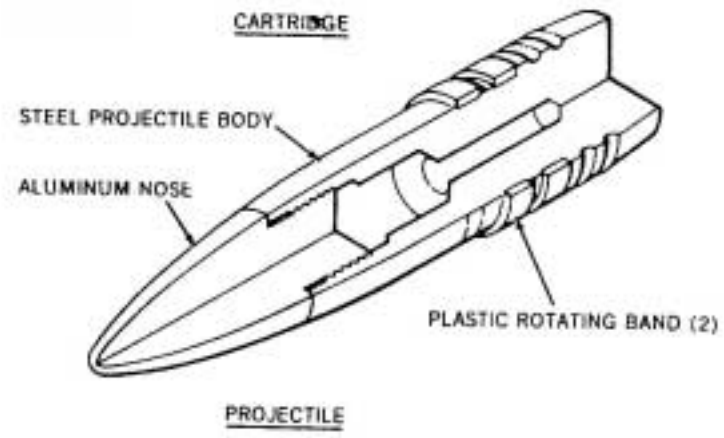
PGU 13: This is a percussion-primed cartridge with a high-explosive-incendiary projectile incorporating a centrifugally armed, impact-fired point-detonating fuze. The projectile body is painted yellow with either a red band below the fuze or a (single) red plastic rotating band. The fuze and rotating band(s) are unpainted. The projectile has either one wide or two narrow, rotating bands, depending on the manufacturer. The projectile is metal with plastic rotating band(s). The fuze is steel. The cartridge case is aluminum.

FUNCTIONING: Striking the percussion primer ignites the propellant in the cartridge case. Generated gas propels the projectile through the gun barrel. Setback locks the ball rotor in place. As setback ceases, centrifugal force expands the U-shaped rotor detent spring and turns the rotor to align the detonator with the fuze axis. Impact drives the firing pin into the detonator, initiating the explosive train.

HAZARDOUS COMPONENTS: The cartridge case contains a percussion primer and a flash tube assembly containing black powder, each weighing less than 1 gram, and a maximum of 156 grams (5.5 ounces) of single- or double-base propellant. The projectile contains a 58-gram (2.0-ounce) RDX and aluminum main charge. The fuze contains a detonator and a booster of HMX or RDX, each weighing less than 1 gram. This projectile is Safe to transport

PGU 15: The PGU-15/B TP Target Practice projectile simulates the exterior ballistics and provides a ballistic match to the HEI round and is used for pilot training.

HAZARDOUS COMPONENTS: NONE

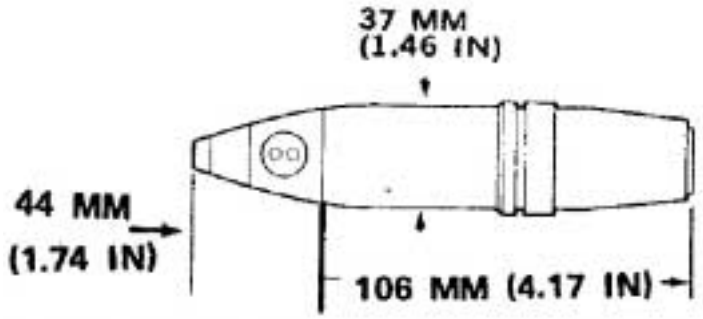


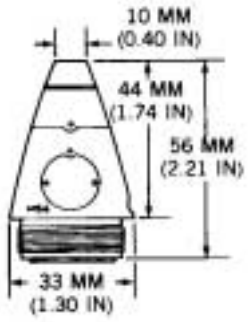
U.S. PROJECTILE, 37-MM, GUN, HE, M54A1W/M56 PD FUZE

DESCRIPTION: These are general-purpose projectiles used for blast and fragmentation effect against personnel, unarmored material targets, and aircraft. They contain a substantial HE main charge and consequently have relatively thin to medium body-wall thickness. The fragmentation effect results from fracture of the body wall when the main charge functions. The complete round of M54, H.E. Shell can be identified for the Antiaircraft Gun M1A2 by the extracting groove in the cartridge case. The presence of the M56 Fuze identifies the round as H.E. M54. The only other 37-mm round for the M1A2 Gun that has a fuze is the practice round. The fuze for the practice shell is a dummy made of cast aluminum.

COLOR AND MARKINGS: The M54 is painted olive drab with yellow stenciling.

HAZARDOUS COMPONENTS: The projectile has 0.10 pounds of tetryl in addition to the fuze.





U.S. FUZE, PROJECTILE, PD, M56

DESCRIPTION: These are centrifugally armed, impact-fired, point-detonating, instantaneous fuzes. The fuze designation, lot number and loading data is stamped in the body. The head of the M56 is coated with orange-tinted lacquer. The retaining screw is made of brass; the remainder of the fuze is aluminum.

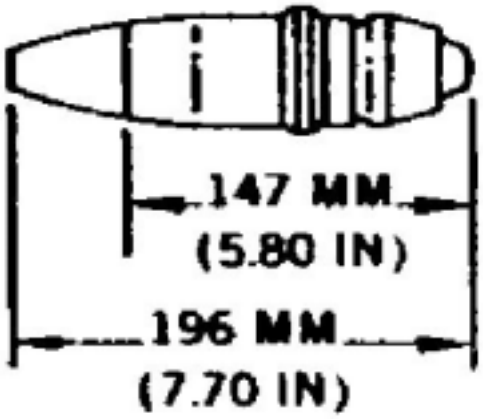
FUNCTIONING: On munition firing, the firing pin sets back, locking the firing pin half-block detents. When setback ceases, centrifugal force moves the detents outward against the springs, camming the firing pin forward. Simultaneously, centrifugal force moves the eccentrically weighted slider interrupter outward against its spring, aligning the relay with the detonator and booster, and arming the fuze. On fuze impact, the firing pin forced into the detonator initiating the explosive train.

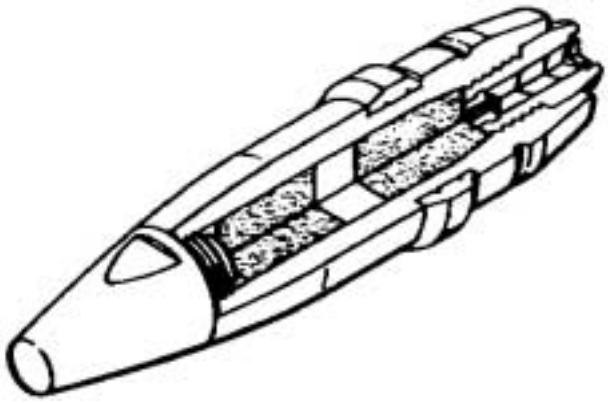
HAZARDOUS COMPONENTS: The detonator contains less than 1 gram of initiating explosive, and the relay contains less than 1 gram of tetryl. The booster in the M56 contains approximately 14 grams of tetryl.
Transport in a horizontal attitude to a disposal area.

U.S. PROJECTILE, 40-MM, AA, MK 1and MK 2

DESCRIPTION: These are spin-stabilized. Gun fired high explosive (HE) projectiles.

CONSTRUCTION: The projectiles are metal.





FUNCTIONING: When the weapon firing pin strikes the primer, flame from the primer black powder ignites the propelling charge. The burning propellant generates rapidly expanding gases to propel the projectile through the rifle barrel and to the target. The rotating band engages on the bore rifling to spin the projectile for stability in flight. On impact, fuze functioning detonates the high explosive, producing blast and fragmentation.

HAZARDOUS COMPONENTS: Projectiles of early manufacture contain a 68-gram (2.4-oz) TNT or TNT with incendiary filler. If of recent manufacture, they contain 88 grams (3.1 oz) of TNT or TNT and an incendiary pellet.

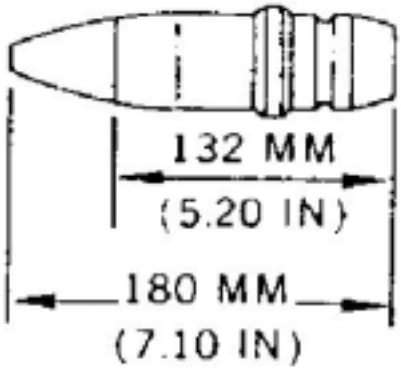
Fuzing MK 27 PD Fuze.

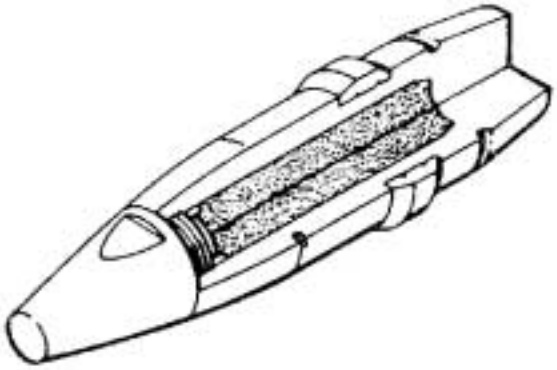
U.S. PROJECTILE, 40-MM, AA, HE-P, MK 3

DESCRIPTION: These are spin stabilized, gun fired projectiles.

COLOR AND MARKINGS: The HE-P type contains the ALN prefix UA stenciled in black. If of early manufacture, the projectile and fuze or nose plug is green. If of recent manufacture, the projectile is yellow with black body stenciling.

CONSTRUCTION: The projectile is made of steel.





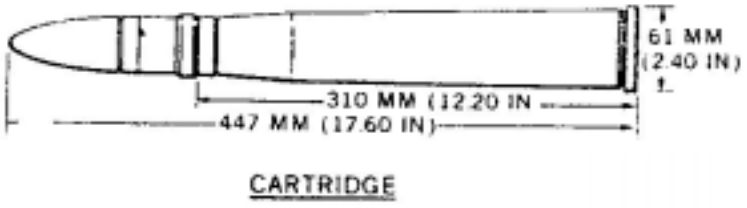
FUNCTIONING: The primer ignites the propellant when struck by the weapon firing pin, and the burning propellant generates gases to propel the projectile through the barrel. Recoil is eliminated because the design of the cartridge case permits controlled escape of some gas pressure through apertures in the rifle breechblock. The rotating band engages the rifling in the barrel to spin the projectile for stability in flight. The point-detonating fuze functions either on direct impact or on graze. When the fuze functions, the firing pin strikes a detonator to initiate the explosive train in the fuze, and subsequently detonates the explosive charge producing blast and fragmentation.

HAZARDOUS COMPONENTS: Projectiles of early manufacture contain a 68-gram (2.4-oz) TNT or TNT with incendiary filler. If of recent manufacture, they contain 88 grams (3.1 oz) of TNT or TNT and an incendiary pellet.

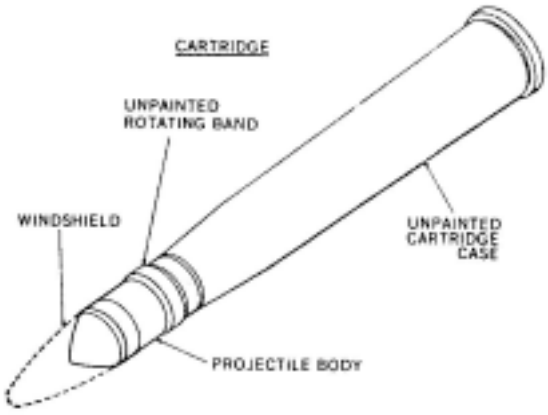
FUZING MK27 PD Fuze.

M81 40mm AP Projectile, US

M81 & M81A1 Projectiles. NOTES: The M81 cartridge differs from the M81A1 in that an adapter attaches its windshield to the projectile body. Cartridges procured by the Army are black, with identification and manufacturing information stenciled in white. Some projectiles, used for training, have a vapor-trail-producing dip-coating compound applied to the windshield. Cartridges procured by the Navy have an ammunition lot number (ALN) stenciled in black on the side of the case. The ALN prefixes for the AP and APT are "UC" and "UD", respectively. The AP projectiles are black except for the rotating band. They have white identification stenciling only if of recent manufacture. The APT projectiles additionally have a white band around the ogive, if of early manufacture or the red letter "T" stenciled on the ogive, if of recent manufacture.



HAZARDOUS COMPONENTS: The APT projectile has a 0.02 pound red tracer.



Diameter: 40mm
Length w/windshield: 6.20 Inches
Length w/o Windshield:

Fuzing: None, Solid Metal

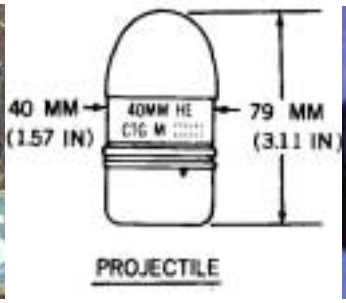
Transport: Safe to Transport

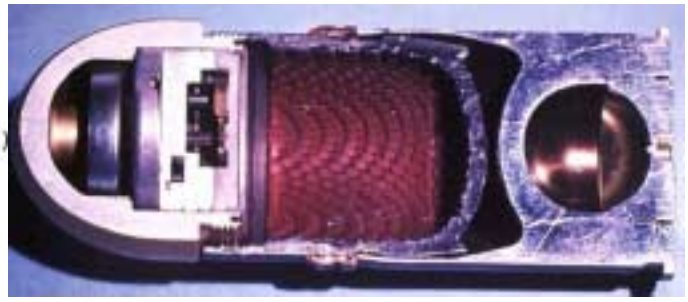
M383, M384 40mm HE Projectile, US

M383

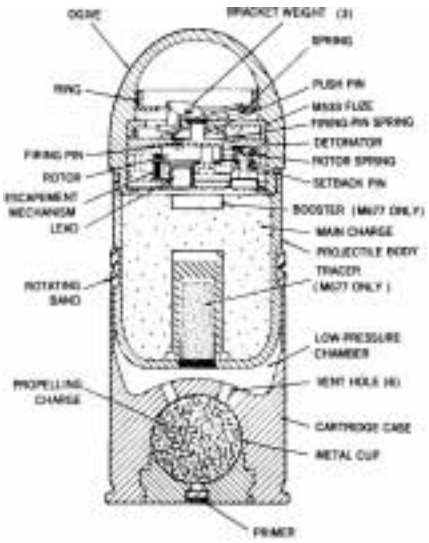
M384

Description: These are Army, high explosive, and antipersonnel, ground-burst projectiles. The projectiles are olive drab with anodized gold ogives. The M383 has white markings; the M384 have yellow markings. The projectiles are aluminum and steel. The M383 has a skirt Base and the M384 has a flat base.





HAZARDOUS COMPONENTS: The **M383 and M384** cartridges contain a main charge of approximately 57 grams (2.0 ounces) of composition A-5 (RDX and desensitizer). The **M533 fuze** contains a detonator and an RDX lead weighing less than 1 gram. Each **cartridge case** contains a percussion primer and approximately 5 grams of M2 propelling charge.



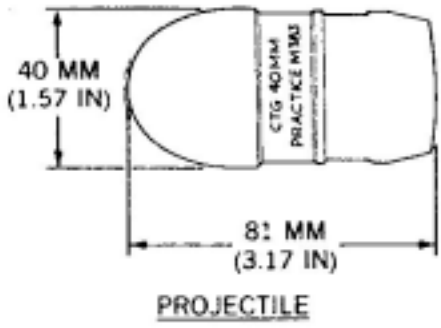
Diameter: 40mm
Length: 3.11 Inches

Fuze: M533

Transport: Blow in Place

M385 40mm Practice Projectile, US

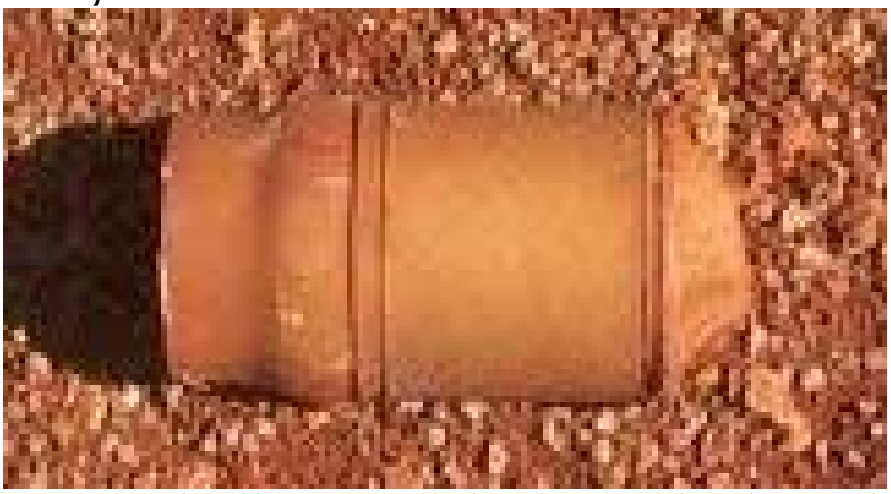
This is a spin-stabilized projectile fired from 40-MM automatic Grenade Launchers. The projectile is anodized blue with black markings. The projectile is solid aluminum with a copper rotating band. The M385 practice rounds are connected by M16A1 OR M16A2 links, B490.



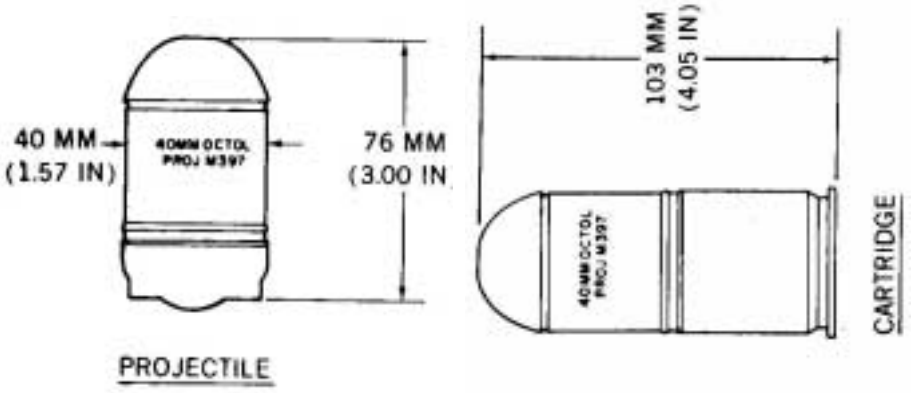
HAZARDOUS COMPONENTS: Projectile**:** None. Each **cartridge case** contains a percussion primer and approximately 5 grams of M2 propelling charge.

Diameter: 40mm
Length: 3.17 Inches
Fuzing: None
Transport: Safe to Transport

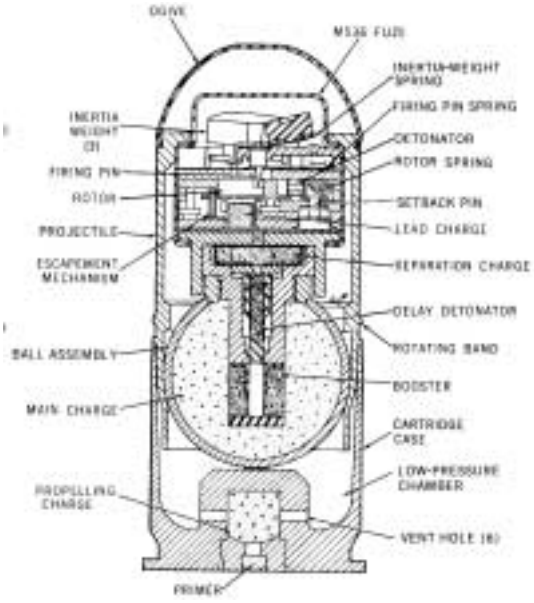
M397 40mm HE Projectile, US



The M397 cartridge, which uses the M536 fuze, is a high explosive (HE), antipersonnel (apers), ground-impact, and airburst cartridge. The fuze is setback- and centrifugally armed, point initiating, and graze-sensitive. The ogive is anodized gold; the projectile body and cartridge cases are olive drab with yellow markings. The cartridge case is aluminum; the projectile is aluminum and steel.



HAZARDOUS COMPONENTS: Projectile contains a main charge of approximately 32 grams (1.1 ounces) of octol. **Fuze** M536 contains an RDX lead, a detonator, separation charge, delay detonator, and booster, each weighing less than 1 gram. **The cartridge** case contains less than 1 gram of propelling charge and a percussion primer. **WARNINGS do not disturb an armed projectile. The fuze has a graze-sensitive feature. Blow an armed projectile in place only. There is no render safe procedure for this item in the armed condition.**



Diameter: 40mm
Length: 3.00 Inches

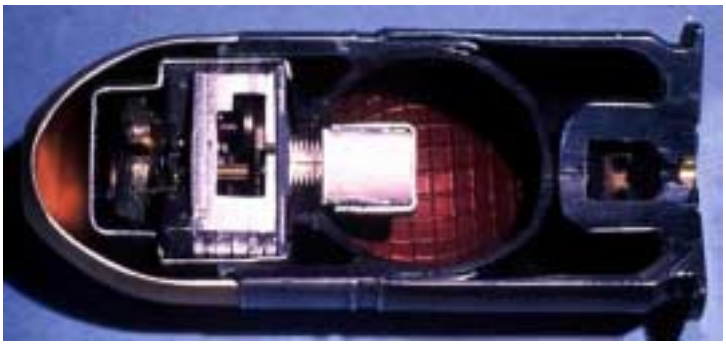
Fuze: M536

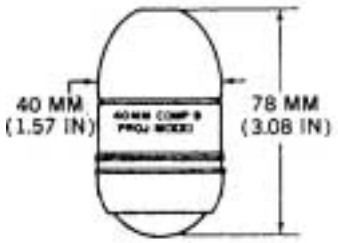
Transport: Blow in Place

M386 and M406 40mm HE, US


M386 **M406**

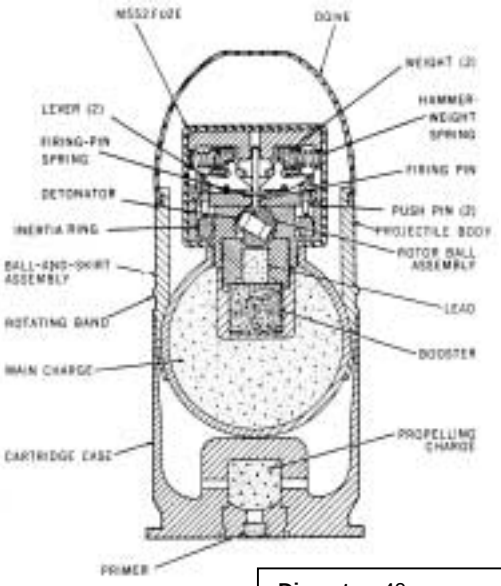
These are Army, high explosive (HE), antipersonnel (apers), and ground-burst projectiles. The projectile body is chemically finished to obtain an olive-drab color. The ogive is anodized gold. Identification markings are yellow. The projectiles are steel and aluminum. It arms between 14 and 27 meters, and it produces a ground burst that causes casualties within a 5-meter radius





PROJECTILE

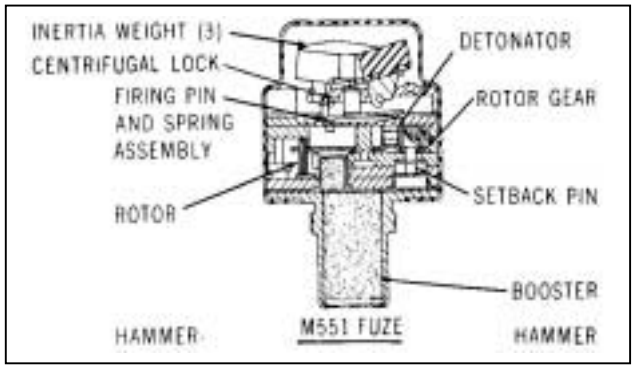
HAZARDOUS COMPONENTS: Each projectile contains a main charge of approximately 32 grams (1.1 ounces) of composition B. **M551 fuze:** contains an M55 detonator, a lead of tetryl or RDX, and a 2-gram RDX booster. **M552 fuze:** contains an M59 detonator, a lead of tetryl or RDX, and a 1-gram RDX booster. **Cartridge case**: contains less than 1 gram of propelling charge and a percussion primer. **WARNING do not disturb an armed projectile**. The fuze has a graze-sensitive feature. Blow an armed projectile in place only. There is no render safe procedure for this item in the armed condition.

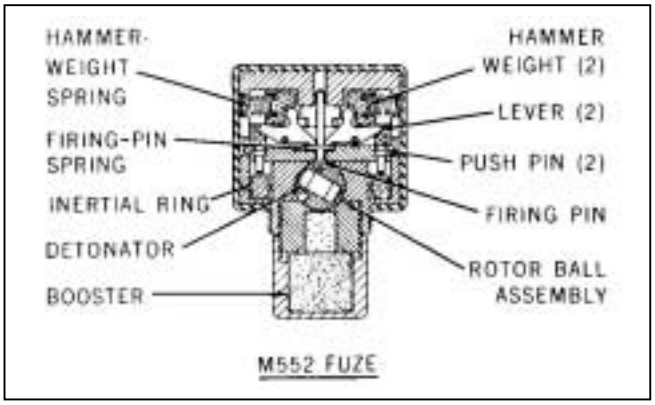


Diameter: 40mm
Length: 3.08 Inches

Fuze: M386 Projectile: M551
M406 Projectile M552

Transport: Blow in Place.



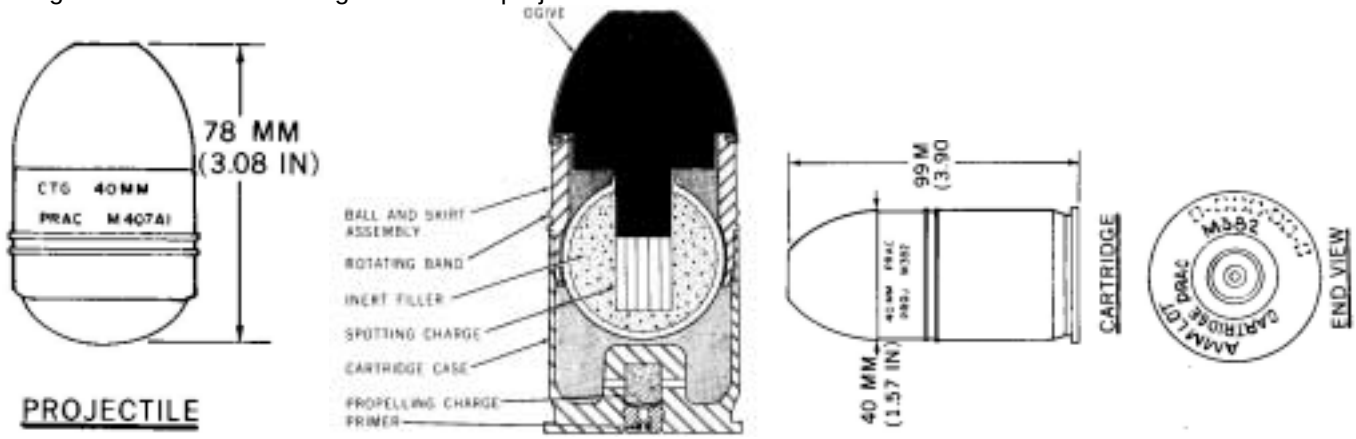


M382 and M407 40mm Practice Projectile, US

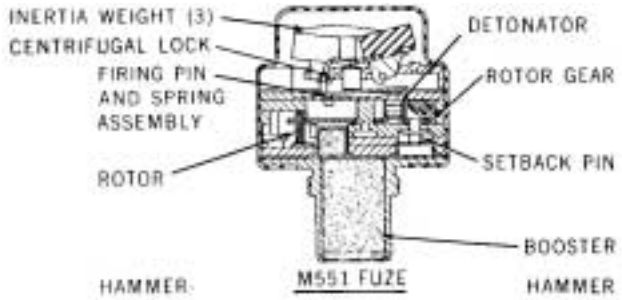
M407

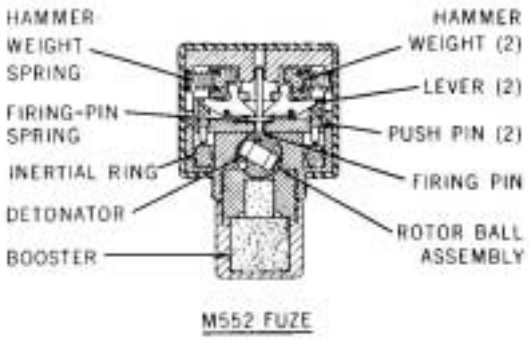
M407

The M382 uses the M552 fuze; the M407A1 uses the M551 fuze. These are practice rounds with smoke spotting charges. The fuzes are point detonating (PD) and graze-sensitive. The M551 is setback and centrifugally armed; the M552 is centrifugally armed. The M382 cartridge case and projectile are chemically finished to obtain an olive-drab color. The ogive is gray. Identification markings are yellow. The M407A1 cartridge case is olive drab; the projectile is blue. Markings are white. The cartridge cases and projectiles are aluminum.



HAZARDOUS COMPONENTS: Each cartridge contains approximately 4 grams of yellow smoke powder and less than 1 gram of propelling charge initiated by a percussion primer. The **M551 fuze** contains an M55 detonator, a lead of tetryl or RDX, and a 2-gram RDX booster. The **M552 fuze** contains an M59 detonator, a lead of tetryl or RDX, and a 1-gram RDX booster.





Diameter: 40mm
Length: 3.08 Inches

Fuzes: M382 Projectile: M551
M407 Projectile M552

Transport: Blow in Place

MK27 3 Inch Projectile, US

This projectile is produced in AA, HC (High Capacity) and Blind Loaded with Tracer used by the Navy. This Projectile is used in 3" 50 Caliber Guns and is Identical to the MK23 and MK26 3 Inch Projectiles.

HE Projectile With MK4 Tracer. Explosives and NEW: Cast TNT .74 Lbs.

Blind Loaded with Dummy Fuze

Base of Projectiles

Possible Fuzing:

PD	MK30			
MT	MK22	MK51		
ADF	MK17	MK46	MK54	

A Dummy Fuze is used in the Practice Version.

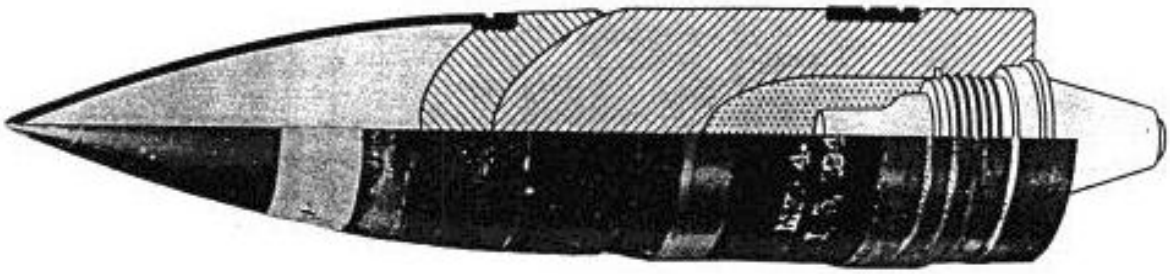
Dimensions:
W/Fuze: 12.13 Inches
W/O Fuze: 8.11 inches
Base to Band: 1.35 Inches
Width of Band: 1.00 Inches

Transport: See transport for fuzing used on projectile.

MK29 APHE 3 Inch Projectile with M66A1 BDF

DESCRIPTION: 3-inch AP Mk 29. Guns used in; 3"/50. Overall length inches; with cap and windshield is 12.16, Without cap and windshield is 6.91. Diameter of base, inches is 2.98. Distance base to band, inches is 1.35. Width of band, inches is 1.0.

COLOR AND MARKINGS: Its overall color is black



HAZARDOUS COMPONENTS: These projectiles are filled with 0.3 pounds of Explosive D. Tracer; Integral

Fuzes: Army M66A1 in base (B.D.F.). This projectile was previously issued without explosive fillers or Tracer Mk 4 element. It is now being loaded with HE and at present is fuzed with the Army Base Fuze M66A1.

The left and right base shows a M66 BDF. The Center has an adapter with a MK 4 Tracer

MK33 3-Inch Projectile, US

HAZARDOUS COMPONETS: This projectile when equipped with PD fuze is considered a high capacity projectile and contains 1.27 Lbs. of A3 explosives. When the projectile has a VT fuze, it contains .99 Lbs. of A-3.

Fuzing High Capacity: MK 30 PDF and MK54 ADF.
VT: MK 72 VTF and MK44 ADF or Booster.

MK33 MOD NC1 3 Inch HE, Practice and Non-Frag, Canada

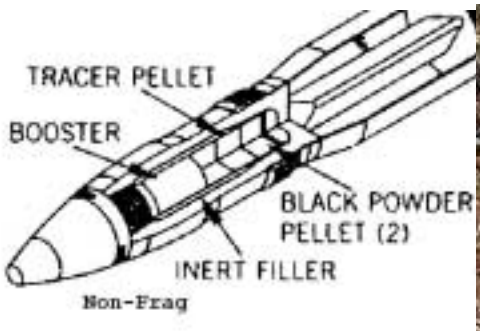
MK33 Mod NC1 HE with VT Fuze

COLOR AND MARKINGS

HE: The projectile is painted olive drab with yellow markings.

Non-Frag: The projectile is painted light blue. All stenciling on the projectile is in white if there is yellow stenciling; a tetryl booster will be present.

Practice: The projectile, including the dummy nose plug, is painted light blue. All stenciling on the projectile is in white.



FUNCTIONING: When the weapon if fired, the burning propellant charge generates rapidly expanding gases to propel the projectile through the barrel with the velocity required to reach the target. The soft alloy-rotating band engages the barrel rifling to impart spin to the projectile for stability in flight. If a point detonating fuze or time fuze is employed, the fuze detonates the supplementary charge on impact (PD) or after the preset time (MT), and the supplementary charge detonates the projectile filler. When a proximity fuze is used, detonation occurs on approach to the target. The proximity fuze contains its own booster element to initiate the warhead filler.

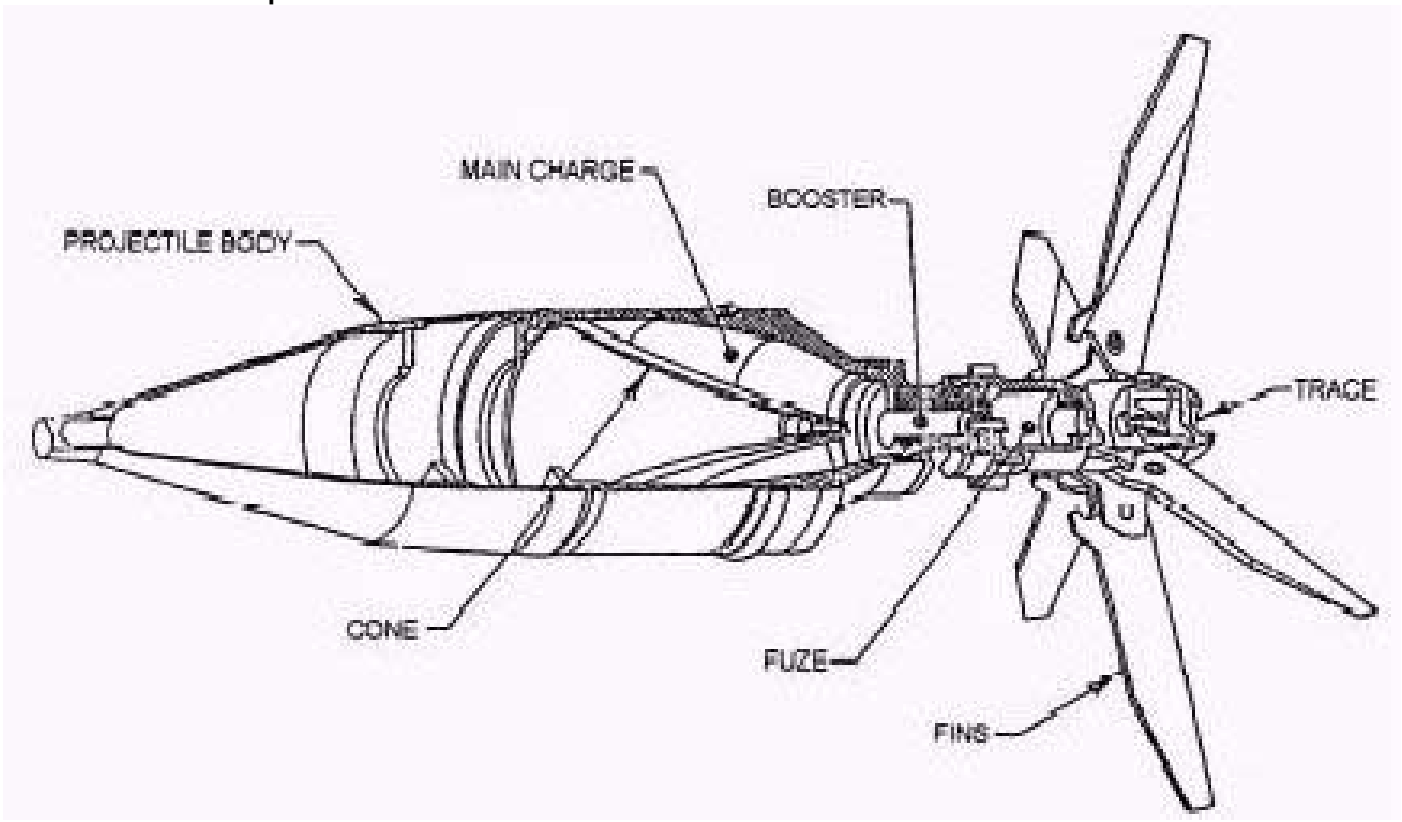
HAZARDOUS COMPONENTS:
HE: This item contains 449 grams (15.8 oz) of Composition A-3. The projectile contains 1.86 kilograms (4.1 lb.) of propellant.

Non-Frag: This item contains two black powder pellets each weighing 63 grams. A tracer pellet of unknown composition weighing 59 grams, and 259 grams (0.57 pound) of an inert filler. If there is yellow stenciling, a 128-gram (4.5-ounce) Tetryl booster will be present.

Practice: There are no explosive hazards in the 3-inch practice projectile.

M136 84mm AT4 HEAT Rocket

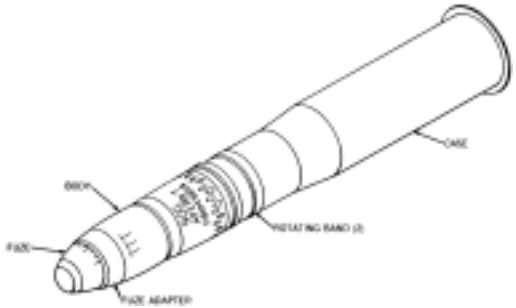
NEW: .969 Lbs. of Explosive

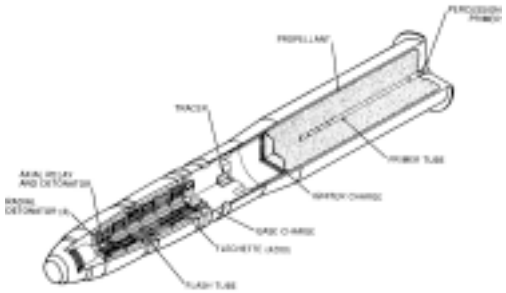


The Fuzing on this projectile is PIBD. The tail fin section contains a tracer element.

M594 90mm Apers-T Flechette, US

A spin-stabilized, antipersonnel-with-tracer projectile containing flechettes. The Projectile is gun fired for antipersonnel effect at close or long ranges and in dense foliage. The projectile body is painted olive drab, with a yellow band around the front and a staggered row of white diamonds above the rotating bands. Identification information stenciling in white on the body, and red Ts are on the ogive. The fuze adapter and ogive are aluminum; the remainder of the projectile and the flechettes are steel.

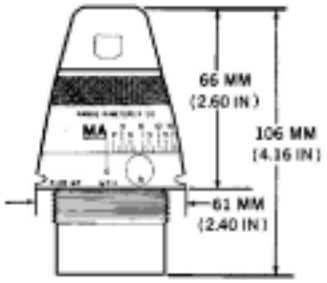


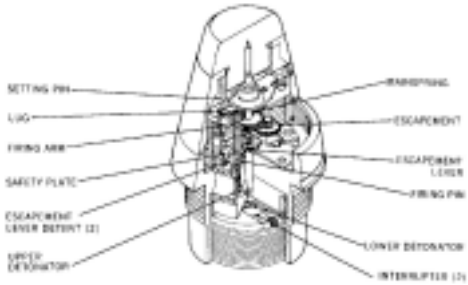


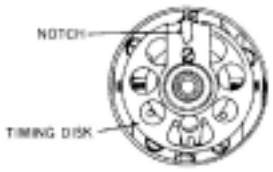
HAZARDOUS COMPONENTS: cartridge **case** contains 4.0 kilograms (8.8 pounds) of double-base propellant, a 57-gram (2.0-ounce) black powder igniter charge, and a percussion primer with 26 grams of black powder. The **projectile** contains four M86 radial detonators, an axial relay, an M87 detonator, and a flake propellant base charge, each weighing less than 1 gram, and an M13 tracer weighing 8 grams.

Fuze M711 MTF:

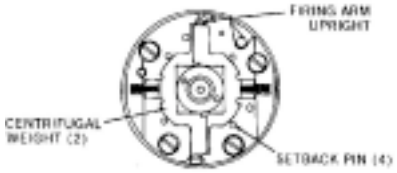
This is a setback- and centrifugally armed, mechanical time fuze used in an antipersonnel (Flechette) projectile. It is used for muzzle action or to provide variable time delays corresponding to ranges of 200 to 4,400 meters in 100-meter intervals (downrange action). The maximum running time is 6.7 seconds. The fuze is aluminum.







TIMING DISK

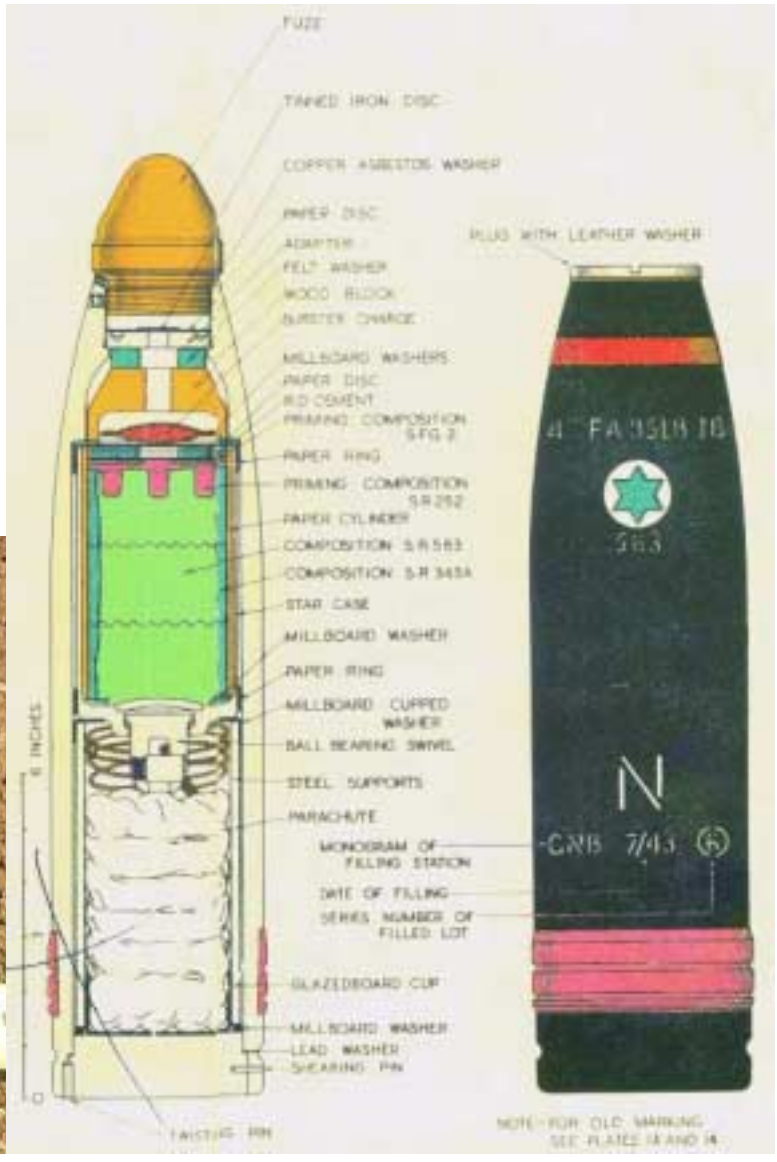


MUZZLE ACTION MECHANISM
UNDER TIMING DISK

Diameter: 90mm
Length: 17.73 Inches
Fuzing: M711 MTF
Transport: Blow in Place

HAZARDOUS COMPONENTS: The fuze contains two detonators (M47 and M87) and a relay (M11), with a total explosive weight of less than 1 gram.

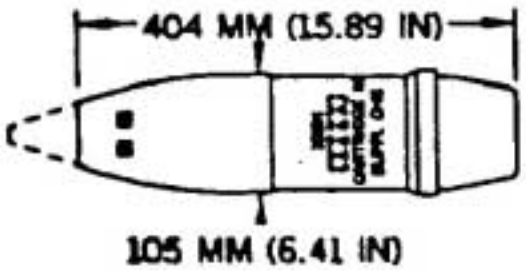
4 Inch British Illumination Projectile, Model Unknown



M1 105mm HE Projectile

This is a spin stabilized, howitzer fired, high explosive projectile used by the Army. The projectile is olive drab with yellow markings. The projectile consists of hollow steel forging with a boat tail base, a streamlined ogive, and a gilding metal rotating band. A base cover is welded to the base of the projectile for added protection against the entrance of hot gases from the propelling charge during firing. A fuze cavity is drilled or formed in the filler at the nose of the projectile.

NEW: Comp B 5.08 pounds or **TNT 4.8 pounds**



Diameter: 105mm
Length without Fuze: 15.89 Inches

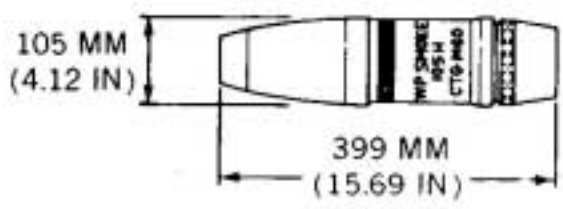
Possible Fuzing:

CP	M78				
MTSQ	M500	M520	M564	M577	M582
PD	M51	M557	M572	M739	
VT-Proximity	M732	M513			

Transportation and Handling: Blow Projectile In Place

M60 Series 105mm WP Projectile, US

These are spin-stabilized, bursting smoke projectiles fired from howitzers to produce screening smoke; the WP also has a limited incendiary effect. The projectile is painted light green with a yellow band and light red markings, older manufactured rounds were painted gray with yellow markings. The Base is solid and smooth with no welds. A Burster Adapter is present on the nose of the Projectile.



NEW: 3.9-pound WP filler 3.4-ounce tetryl or composition B burster charge.

Diameter: 105mm
Length without Fuze: 15.69 Inches

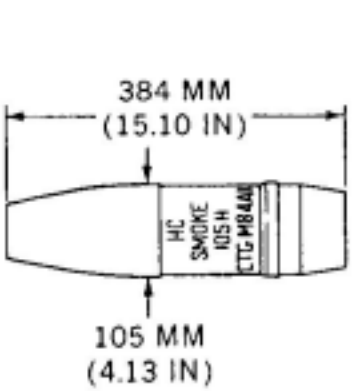
MTSQ	M564	
PD	M557	M572

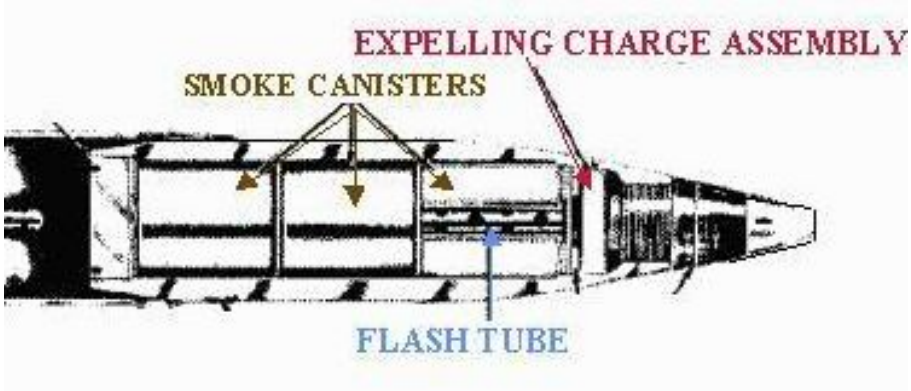
Transport: Verify Fuzing

M84 Series 105mm HC Smoke Projectile, US

These are semi-fixed howitzer-fired cartridges with spin-stabilized base-ejection smoke projectiles. They contain three smoke canisters, which emit white, red, yellow, green, or violet smoke upon ejection. These are used for screening, spotting, or signaling purposes. Projectiles of earlier manufacture are painted gray, with one yellow band and yellow-stenciled identification and manufacturing markings. Newer projectiles are painted light green, with black-stenciled identification and manufacturing markings.

The projectile contains a 2.4-ounce black powder expelling charge and three smoke canisters.





Each canister contains a central igniter core, consisting of cotton cloth impregnated with a potassium-nitrate and charcoal mixture, blended with gum arabic solution. A first-fire mix consisting of 2.65 ounces of potassium nitrate and charcoal, with an HC either (white) or colored smoke mixture

NEW: M84 and M84B1: 7.5 pounds of HC or Colored Smoke
M84A1: 12.3 pounds of HC or Colored Smoke

Diameter: 105mm
Length without Fuze: 15.10 Inches

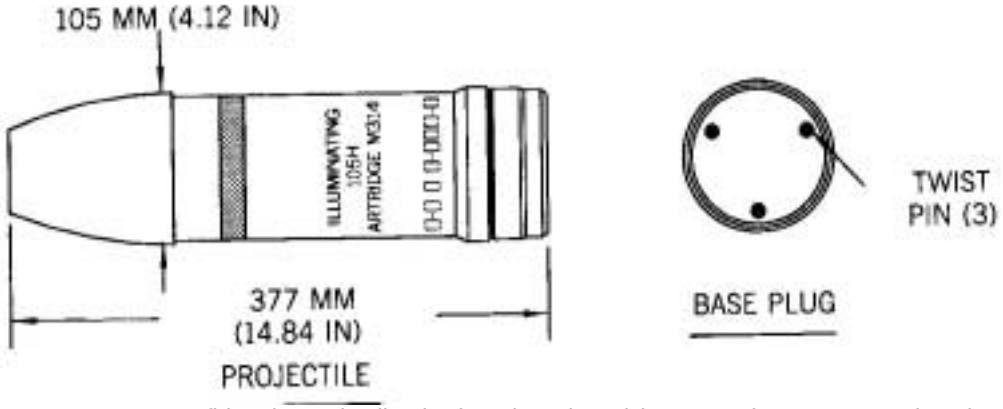
Possible Fuzing:

MT	M565			
MTSQ	M501	M548	M577	M582
ET	M724			

Transport: Verify the Fuzing Present in Projectile.

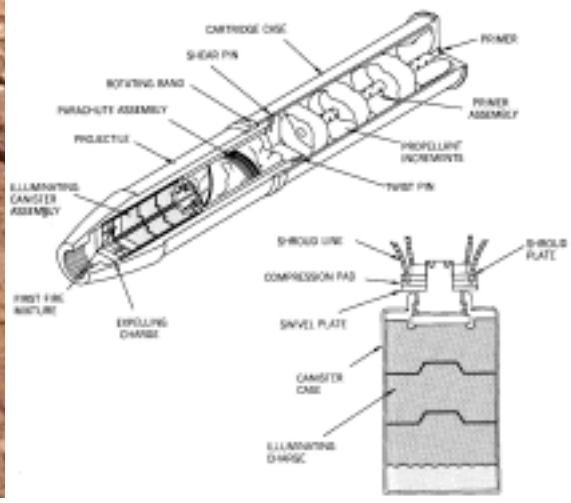
M314 105mm Illumination Projectile, US

These are base-ejection cartridges with a parachute-retarded illuminating canister installed. The M314-series projectile could have a gray body with white band and white marking, or a white body with black markings. The caliber, shell designation, lot number, and date of manufacture is stamped into the projectile bodies, just forward of the rotating band. The projectile body, nose adapter (used on some models) and base plug are steel. The rotating band is gilding metal. The M314A3 projectile uses the M565, M577, or the M724 fuzes. The M314, M314A1, & M314A2 use the M501 series fuze.



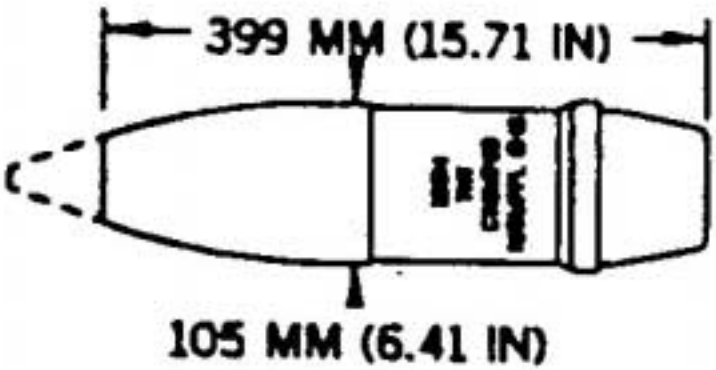
FUNCTIONING: Upon firing the projectile, the fuze (not shown) is actuated. At a preset time the fuzes functions, igniting the expelling charge and, in turn the first-fire mixture. The expelling charge ejects the illuminating canister assembly and parachute assembly from the base of the projectile. The parachute deploys and the first-fire mixture ignites the illuminating charge. The illuminating charge burns for approximately 60 seconds, with an average luminosity of 450,000 candlepower.

HAZARDOUS COMPONENTS: The M314, M314A1, and M314A2 projectiles contain a 51-gram (1.8-ounce) black powder expelling charge and a 772-gram (1.7-pound) illuminating charge. The M314A3 projectile contains an 81-gram (2.9-ounce) black powder expelling charge and 907-gram (2.0-pound) illuminating charge. The M314-series projectiles contain a 68-gram (2.4-ounce) first fire mixture, a 1.3-kilogram (2.8-pound) propellant charge and a primer assembly weighing less than one ounce.



M760 105mm HE Projectile, US

Description: This is a spin stabilized, howitzer fired, high explosive (HE) projectile. The projectile is olive drab with yellow markings. The projectile is steel.



FUNCTIONING: The projectile is fitted with one of the authorized fuzes and rammed into the weapon chamber. When deep cavity projectiles are fitted with a proximity fuze, the supplemental charge is removed. Fuze arming occurs after firing, during projectile flight downrange. Depending on the type of fuze fitted, functioning will occur upon impact, after an elapsed time or upon sensing the target.

HAZARDOUS COMPONENTS: The projectile contains TNT filler weighing approximately 2.1 kilograms (4.6 pounds). The cartridge case contains 1.9 kilograms (4.3 pounds) of M30 propelling charge.

Possible Fuzing

PD	M739	
MTSQ	M577	M582
Proximity	M732	

M344 106mm Recoilless Rifle HEAT Projectile with M530 Base Detonating Fuze

This is an Army, recoilless rifle fired, fin-stabilized high-explosive antitank projectile used in anti-material, armor-defeating roles.

NEW: 2.8 Lbs. of Comp B Explosive

Fin Section containing the M530 or M509 Base detonating Fuze. The wire leads to a Piezoelectric Crystal located in the nose and when stressed sends a charge of electricity to the base fuze which will detonate the projectile. The M530 Base fuze has a graze sensitive element that will detonate the projectile on glancing blows with out the nose crystal being stressed. Always assume that this projectile contains the M530 Base Detonating Fuze.

Diameter: 106mm
Length with fins: 28.11 Inches
Length Cone: 8.81 Inches

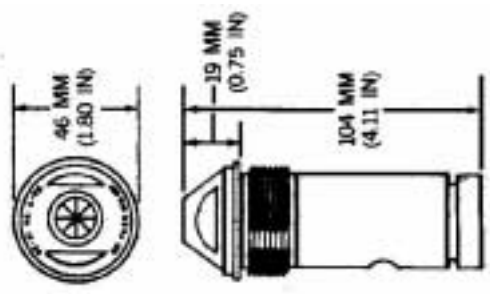
Transportation: Blow in Place.

M346 106mm Recoilless Rifle HEP Projectile with M91 Base Detonating Fuze

This is an Army, spin stabilized, recoilless rifle fired, high explosive plastic (HEP) projectile used against armored or hardened targets. The projectile is painted olive drab with yellow markings and a black band. The projectile is a thin-walled steel cylinder with a short ogive and flat base. There are two indexing buttons, spaced 180 degrees apart on the forward burley.

NEW: 7.72 Lbs. of Comp A3 Explosive

This thin walled projectile easily deformed on impact with a hard target. The rotating bands are pre-engraved. This projectile only uses the M91 Base Detonating Fuze



Diameter: 106mm
Length: 16.10 Inches

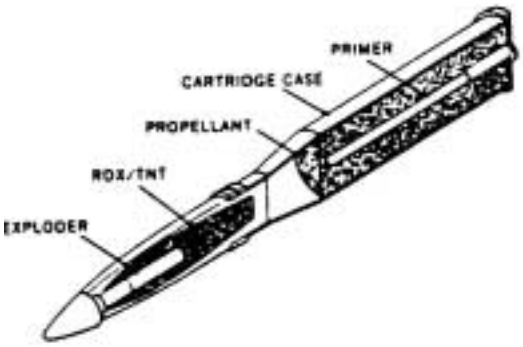
Fuzing: Only the M91 Base Detonation Fuze is used in this Projectile.

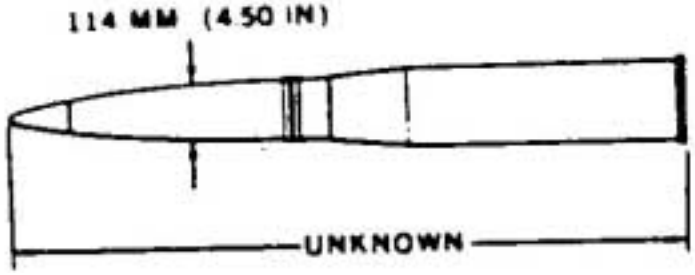
Transportation: Transport in Horizontal Attitude if Projectile is fuzed.

N1A2 4.5 Inch HE Projectile, UK

This is a spin stabilized artillery high explosive projectile. The length, color and markings are unknown. The total weight and NEW are estimated based on size/caliber. The projectile is steel.

NEW: seven Lbs. of Comp B.

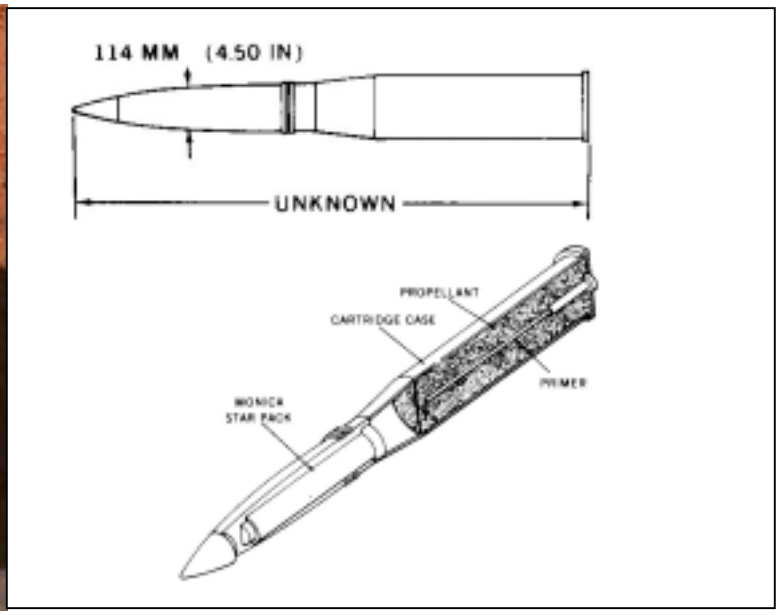


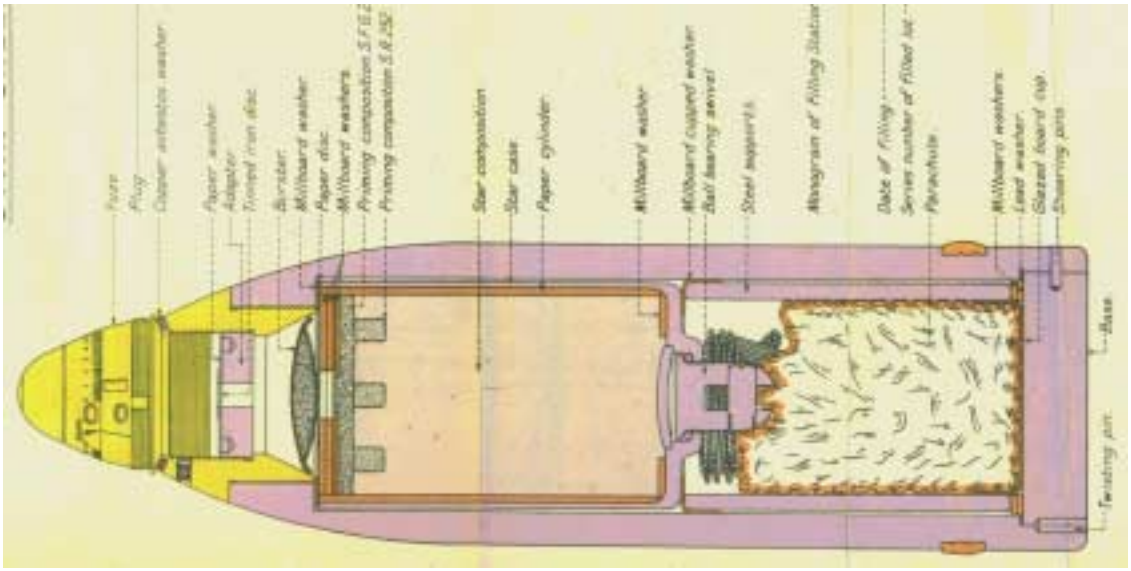


Diameter: 4.5 Inches
Length: Unknown
Possible Fuzing: Unknown
Transportation: Verify Fuzing

N1A1 4.5 Inch Star Projectile, UK

This is a spin stabilized, gun fired projectile used for tactical illumination and signaling. The NEW, total weight and length are unknown. The color, markings and material are unknown.





Typical British Star Projectile

U.S. PROJECTILE, 5-IN, ILLUM, MK 30

Description: The 5-inch Illuminating Mk 30 are used in 5"/38 guns. The projectiles over-all length, with its nose fuze is 20.0 inches; without it, 15.8 inches. The distance from the base to the band is 2.43 inches and the width of the band is 2.25 inches. These projectiles are for illuminating targets by a parachute flare.

Figure 37. 5-inch Illuminating Mk 30 Mods 1—8

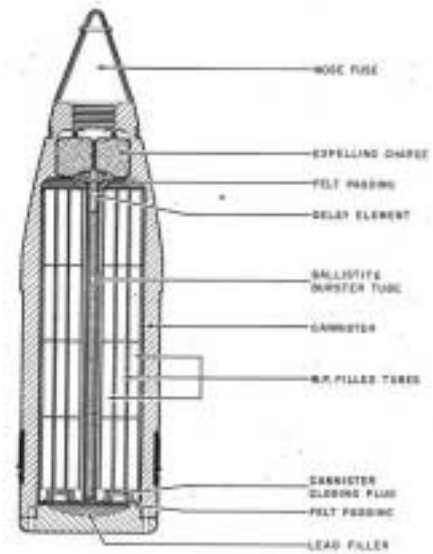
FUNCTIONING: The illuminating projectile is a thin case with a very small expelling charge just behind the fuze and an interior assembly of a star or candle with a parachute and a very lightly held base plug. Explosion of the expelling charge forces out the base and the interior assembly. When the nose time fuze functions, it ignites the black powder expelling charge, which in turn ignites the star or candle. The star or candle is a steel container that is packed under heavy pressure an illuminating compound. The closed end of the star container is attached to the wires of the parachute. The parachute is folded, the strand wires are rolled so that upon expulsion it opens easily, suspending the candle or star below it. Because of the high velocity at which the projectile is traveling when ejection takes place, it is necessary to slow the star-parachute assembly before the parachute becomes fully open. This is done by a center wire. One end of which secures the center of the parachute nearer to the star than when the parachute is in full release and causes the parachute to spill air, thereby preventing too great an initial strain on the parachute. After the star has burned for a few seconds, the center wire is released from its attachment on the star can. This permits the parachute to open fully.

HAZARDOUS COMPONENTS: These projectiles have a 2.5-ounce black powder expelling charge and an 8.2-Lb magnesium flare. The Illuminating Contents Mk 4 or MK 11are used in this projectile.

Fuzing: This projectile uses a nose fuze, Mk 18 Mods 2, 3, & 4, Mk 50, all Mods, or Mk 63 Mod 0.

U.S. PROJECTILE, 5-IN, SMOKE, MK 30

DESCRIPTION: The projectile body, base plate, and expelling charge are the same as those for the 5 inch Illuminating Projectile Mk 30. The canister holding the WP filled tubes is of 0.03-inch thick sheet steel and measures 12.03 inches long by 3.9 inches in diameter. Through the center of the canister is inserted a burster tube containing the ballistite burster charge, with a black powder delay fitted to the upper end of the tube. The canister contains 168 tubes in all. The canister is filled through the base with molten WP and closed with two 1/2-inch pipe plugs.



FUNCTIONING: These projectiles contain WP filler, which ignites spontaneously on exposure to air to produce smoke and has an incendiary effect. Navy projectiles contain a BE, bursting type canister which bursts after ejection from the projectile. The black powder expelling charge, ignited by the fuze, initiates the delay element at the upper end of the burster tube and forces off the base plate, ejecting the canister rearward. The delay initiates the burster, which ruptures the canister and scatters the WP filled steel tubes. The smoke cloud thus formed is about 30-40 yards in diameter. The projectile combines screening, antipersonnel, and slight incendiary effect.

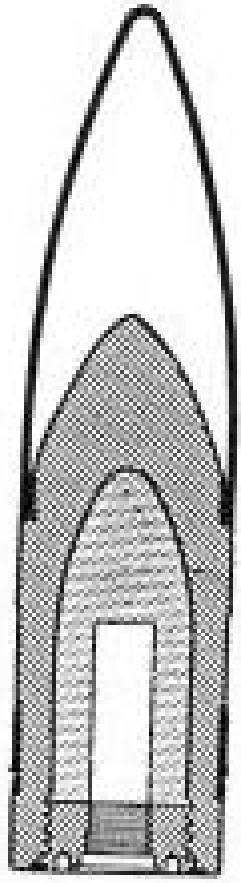
HAZARDOUS COMPONENTS: In addition to the fuze, the smoke projectile contains a 2 oz. black powder expelling charge, a 14 gram ballistite charge, and 7.06 pounds of white phosphorus. The Canister used is the M5.

U.S. Projectile, 5 Inch, MK 32 Common (APHE)

Description: This is a 5 inch 38 caliber Navy Common Projectile (APHE). The overall length with nose cap is 20.7 inches. With out nose cap the overall length is 13.6 inches. Base to band distance is 2.43 inches and the bandwidth is 2.25 inches.

Hazardous Components: This projectile contains 2.58 Lbs. of Explosive D.

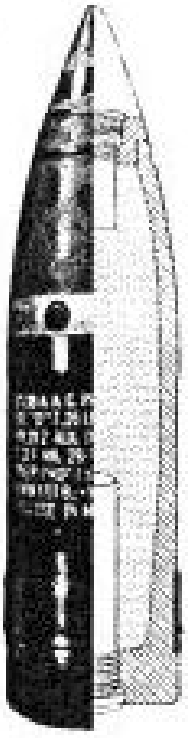
Fuzing MK 20 BD Fuze.



U.S. PROJECTILE, 5-IN, MK 35

Description: In many cases, the same projectile body is used for many of the different specific types by being assembled with different types or combinations of types of fuzes. For example, body is assembled as an AAC, HC, HE-CVT, HE-IR, HE-PD, HE-VT-NSD, BL&P and HE-VT-SD projectile. Projectiles are painted to prevent rust, and to provide identification, and, in some cases, camouflage. Most nose fuzes and rotating bands are not painted. Markings are stamped and stenciled on projectiles to provide complete identification information. Projectiles are stamped on or near the rotating band and/or on the base with their nomenclature and manufacturing information. The projectile is 16 5/8 Inches without fuze. The base to band is 1.9 inches and the bandwidth is 2.25 inches. The Fuze well in the base is 1.5 inches at the threads and measures 1.6 inches across the base.

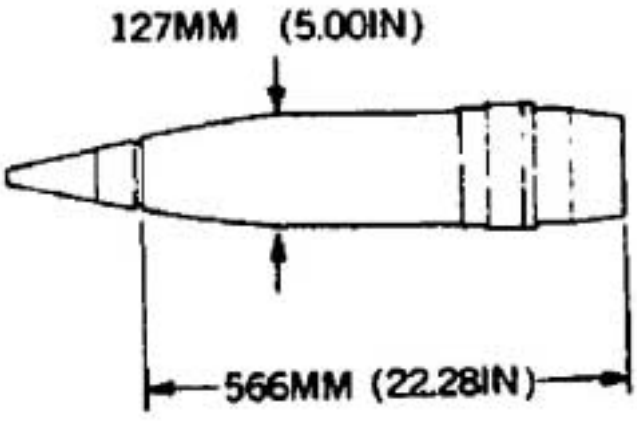
HAZARDOUS COMPONENTS: These projectiles have 7.25 pounds of Explosive D.



U.S. PROJECTILE, 5-IN MK 41 MOD 0

The 5-inch projectile, Mk 41 Mod 0 is used in 5"/54 guns. Its over-all length is 26.0 inches; without the nose fuze, it is 22.28 inches long. The diameter of the base is 4.26 inches the distance from the base to the band is 3.75 inches and the band itself is 2.25 inches wide. The base fuze well is 1.5 inches wide at the threads and the plug or fuze will measure about 1.6 or 1.7 inches across the base. This Projectile body comes in different configurations: HC, AA, Puff, BL&P.
PUFF: The smoke-puff projectile is blue in color. The rotating band is unpainted. There is a 70-MM (2.75-inch) wide light-green band and a 32-MM (1.25-inch) wide brown band on the forward end of the projectile. The base will have a plug installed.
High-Capacity (HC): The projectile will have a base plug and nose fuze only.
AA: The projectile will have a base fuze and nose fuze.
Blind Loaded: This projectile will have a base plug or tracer and a dummy fuze in the nose. The projectile will be painted Blue.

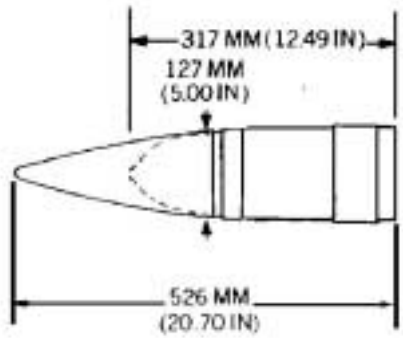
HAZARDOUS COMPONENTS: HC**:** These projectiles are filled with 7.59 pounds of Explosive D. **Puff:** The Mk 41 projectile contains 65 milliliters (2.20 ounces) of a liquid smoke producing chemical agent (titanium tetrachloride and vanadium oxytrichloride). The liquid agent is a skin irritant. Upon exposure to humid air, the agent forms a highly irritant, poisonous cloud (hydrochloric acid, titanium dioxide and vanadium pentoxide). When completely spent or reacted, the residues are relatively nontoxic.

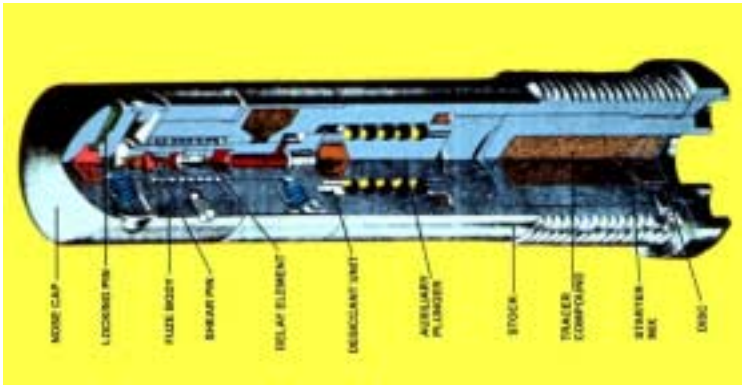


MK46 5 Inch Common (APHE) Projectile, US

The 5-inch Special Common Mk 46 Mods 1 & 2 are used in 5"/38 guns. The projectiles over-all length with cap is 20.70 inches; without its cap, it is 12.485 inches long. The distance from the base to the band is 1 inch and the width of the band is 2.25 inches. This projectiles over-all color is slate gray. It is filled with 2.04 pounds of Explosive D. Total weight of the loaded projectile is 55.18 pounds. This projectile uses a BD fuze, the Mk 20 Mods 0 - 2. **Note:** A dye can be present in windshield for marking when used in water. The side plug in the windshield ejects the dye.

Projectile: 2.04 pounds of Explosive D. **Fuze:** Mk 20 Mods 0 – 2 Base Detonating Fuze Tracer**:** Mk 9 tracer.

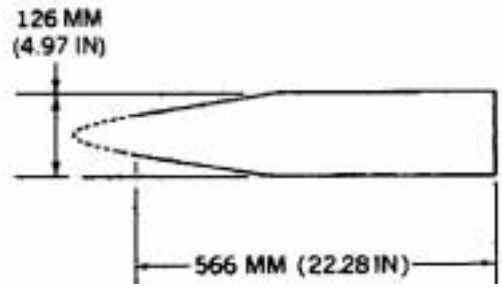




Diameter: 5 Inch **Length with Cap and Windshield:** 20.7 Inches **Length w/o Cap and Windshield:** 12.48 Inches **Band Width:** 2.25 Inches **Base to Bandwidth:** 1 Inch **Fuzing:** MK20 BDF **Transport:** Transport a Fired fuzed Projectile in a base down attitude

U.S. PROJECTILE, 5-IN/54, MK 48, ILLUMINATING or WP

These are Navy, gun fired, base-ejection illuminating or White Phosphorus projectiles. The projectiles are olive drab, with white markings and two bands painted on the ogive. The projectiles are steel. Mk 48 projectile is used in 5"/54 gun. Its over-all length is 26.0 inches; without the nose fuze, it is 22.28 inches long. The projectile is identical in all respects to the Mk 43, except that it has a double rotating band. The letters **SS** will be present on the base if the projectile is an illumination round.



FUNCTIONING: Upon firing the projectile, a fuze and auxiliary detonating fuze (ADF) are armed. At a preset time, the fuze functions initiating the ADF. The ADF initiates the ejection charge. The resulting heat and pressure ignites the illuminating charge or WP Charge and applies pressure against the ejection canister and base plug, shearing the four stake pins, ejecting the parachutes and ejection canister.

HAZARDOUS COMPONENTS: The Mk 48 projectiles contain an 11-gram black powder ejection charge, 8.2-pound illuminating charge MK4, 11.2 illuminating charge MK11, or a white phosphors canister of unknown weight with a bursting charge of unknown weight.

MK 48 body loaded with White Phosphorus Canister MK14.

U.S. Projectile, 5 Inch, MK 50 Illumination or White Phosphorus

Hazardous Components:
MT fuzing if fitted. **DO NOT MOVE!**
White Phosphorous or illumination. Smoke and fire.
Base plate ejection hazard

U.S. Projectile, 5 Inch, MK51

The MK51 is a HE round and may be fitted with either a PD or MT fuzing. MT fuzing is a BIP item.
DO NOT MOVE!

U.S. PROJECTILE, 5-IN/38, MK 52

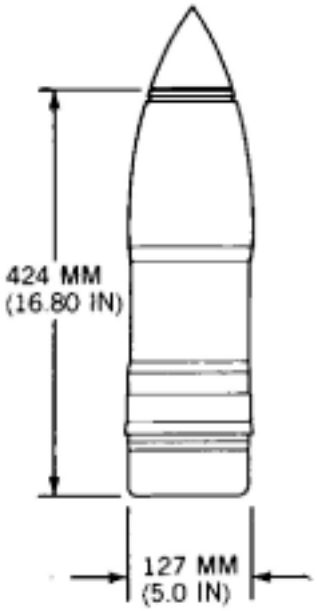
This Projectile body can be configured as a HC, AA, BL&P, and a Puff projectile. The Base fuze well has a 2-inch Diameter measured at the threads and 2.1 inches across the face of the fuze or plug. Only one fuze is used in the 2-inch fuze well projectiles, the MK83 BDF.

PUFF: This is a Navy spotting-marker smoke-puff projectile. This projectile is blue, except for an unpainted rotating band. There is a 70-MM (2.75-inch) wide light-green band and a 32-MM (1.25-inch) wide brown band on the forward end of the projectile.

HC: This projectile uses a plug in the base and a nose fuze.

AA: this projectile uses a base fuze and a nose fuze.

Blind loaded: this projectile uses a plug in the base and a dummy fuze.



MK 52 MOD 0

HAZARDOUS COMPONENTS:

Puff: projectile contains 65 milliliters (2.20 ounces) of a liquid smoke producing chemical agent (titanium tetrachloride and vanadium oxytrichloride). The liquid agent is a skin irritant. Upon exposure to humid air, the agent forms a highly irritant, poisonous cloud (hydrochloric acid, titanium dioxide and vanadium pentoxide). When completely spent or reacted, the residues are relatively nontoxic.

AA/HC: 7.4 Lbs. of A3 or Explosive D.

U.S. Projectile, 5 inch, MK61

The 5-inch projectile, Mk 61 is used in 5"/54 guns. Its over-all length is 26.0 inches; without the nose fuze, it is 22.28 inches long. The diameter of the base is 4.26 inches the distance from the base to the band is 3.75 inches and the band itself is 2.25 inches wide. The base fuze well is 1.5 inches wide at the threads and the plug or fuze will measure about 1.6 or 1.7 inches across the base. This Projectile body comes in different configurations: HC, AA, Puff, BL&P.

PUFF: The Navy spotting-marker smoke-puff projectile is blue, except for an unpainted rotating band. There is a 70-MM (2.75-inch) wide light-green band and a 32-MM (1.25-inch) wide brown band on the forward end of the projectile. The base will have a plug installed.

High-Capacity (HC): The projectile will have a base plug and nose fuze only.

AA: The projectile will have a base fuze and nose fuze.

Blind Loaded: This projectile will have a base plug or tracer and a dummy fuze in the nose. The projectile will be painted Blue.

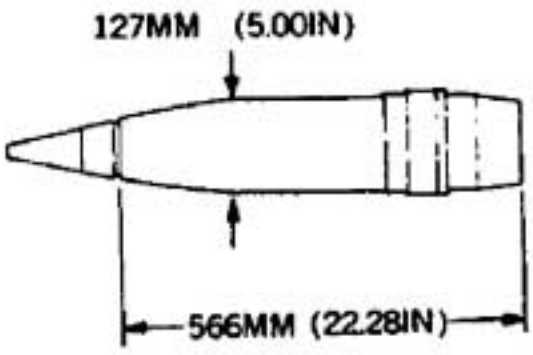
Base Plug

Base Plug

HAZARDOUS COMPONENTS:

HC: These projectiles are filled with 7.59 pounds of Explosive D.

Puff: The Mk 61 projectile contains 65 milliliters (2.20 ounces) of a liquid smoke producing chemical agent (titanium tetrachloride and vanadium oxytrichloride). The liquid agent is a skin irritant. Upon exposure to humid air, the agent forms a highly irritant, poisonous cloud (hydrochloric acid, titanium dioxide and vanadium pentoxide). When completely spent or reacted, the residues are relatively nontoxic.



MK64, 5 inch 54 caliber Naval Gun Ammunition

The MK64 5 inch 54 caliber naval projectile is the basic round of ammunition used by the main armament systems of the Navy. The family of projectiles includes a high explosive version with various fuses, training rounds with Dummy fuzes. The projectiles primary use is against naval or other surface targets; this projectile can also be used as an anti-aircraft projectile. The Practice projectiles are blue. The rounds are of a modern design with a provision for deep intrusion fuses. The forges steel projectiles have a long and streamlined outline, especially the ogive, together with a distinctive boat tail and flat base. The single, wide rotating band is made of copper.

Hazardous Components:
High Capacity: 8.74 Lbs. of A3.
HE with PD Fuze: 7.87 of A3 or Explosive D.
Blind loaded or dummy: Inert, No hazardous fillers.

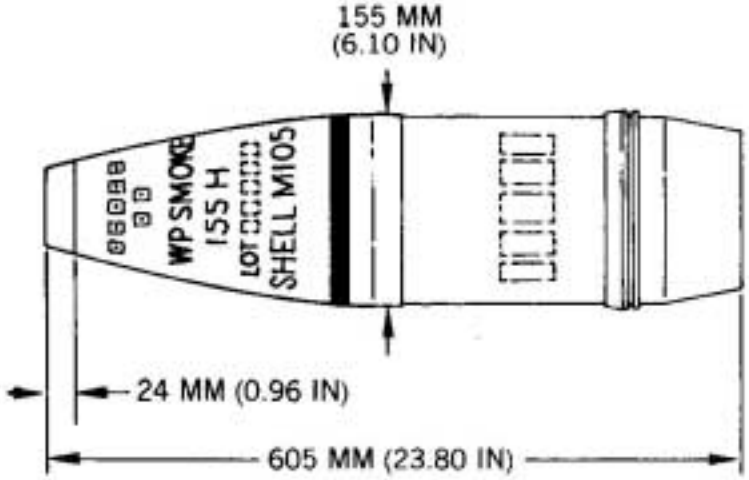
MK64 Dummy Projectile with Dummy fuzes.

N3 5.25 Inch HE British Projectile

Distinguishing features are the distance from base to band and the band width.

U.S. PROJECTILE, 155-MM, SMOKE, WP, M105

This is a howitzer fired, spin-stabilized, bursting smoke projectile containing white phosphorus filler. It is used for screening and spotting targets. The projectiles are light green, with a yellow band and light red markings. Older versions of this projectile are gray with a yellow band, and yellow markings. The projectile is steel with a copper rotating band.

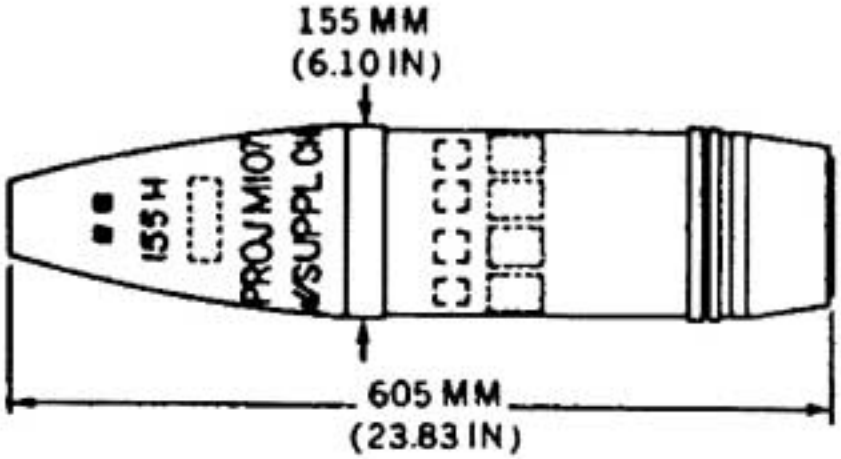


FUNCTIONING: Functioning of the fuze initiates the burster, which ruptures the projectile body and disperses the filler. The WP ignites spontaneously on exposure to the air, with some incendiary effect, and creates a dense white smoke.

HAZARDOUS COMPONENTS: The projectile contains a 7.1-kilogram (15.6-pound) WP filler and a 376-gram (13.3-ounce) tetryl burster.

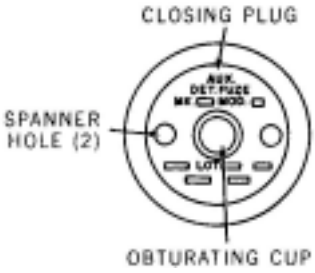
U.S. PROJECTILE, 155-MM, HOWITZER, HE, M107

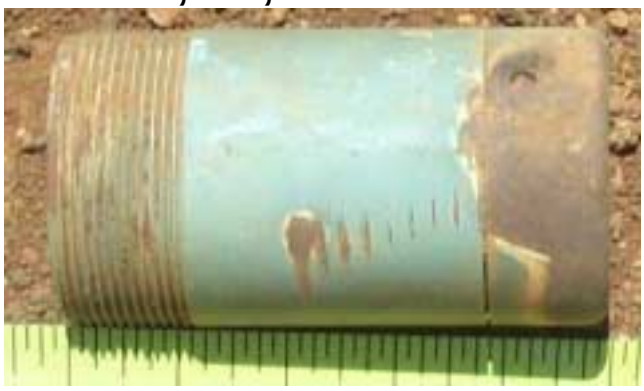
This is a spin stabilized, howitzer fired, high explosive (HE) projectile. The projectile is olive drab with yellow markings. The projectile is steel.

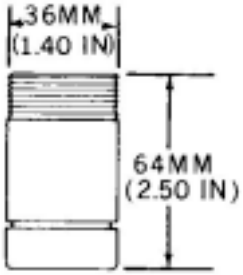


HAZARDOUS COMPONENTS: This projectile contains 7.0 kg (15.4 lbs.) of Comp B and 6.6 kg (14.6 lbs.) of TNT.

U.S. FUZE, PROJECTILE, AD, MK 54





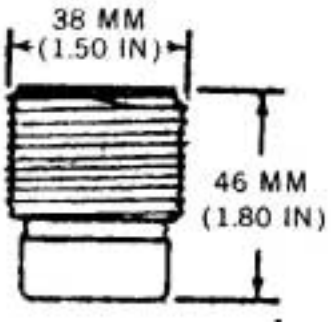


These are centrifugally armed, auxiliary detonating (AD) fuzes. The AD fuze is functioned by gas pressure and/or shock wave generated by the firing of the nose fuze. They are installed in projectiles in conjunction with a nose fuze to provide an extra safety element in the projectile explosive train. The fuzes are unpainted. The remaining fuzes have this information stamped on the body. The remaining fuzes have this information stamped on the closing plug or disk.

FUNCTIONING: The functioning of the Mk 54 is also applicable to its counterparts. When acceleration ceases, the firing pin detent and rotor detent are moved outward by centrifugal force, unblocking the firing pin and freeing the eccentrically weighted rotor. The rotor turns to align the detonator with the firing pin and booster lead. Gas pressure and shock, produced by the firing of the nose fuze, forces the obtruding cup down, driving the firing pin into the detonator and initiating the explosive train.

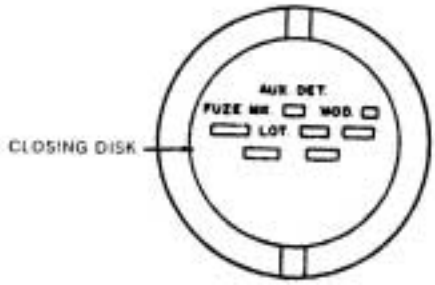
HAZARDOUS COMPONENTS: The Mk 54 fuzes have a 15 g Tetryl Booster; a less than 1 g detonator; no hazardous components in the expelling charge; and a less than 1 g Lead.

U.S. FUZE, PROJECTILE OR ROCKET, AD, MK 52



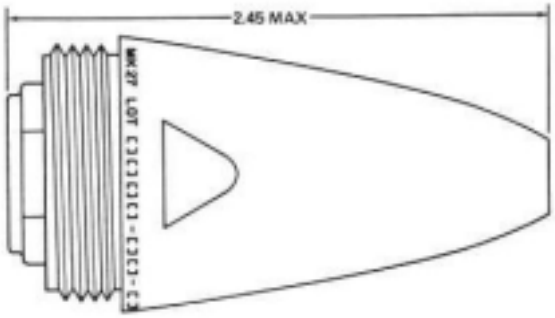
These are centrifugally armed, auxiliary detonating (AD) fuzes. The AD fuze is functioned by gas pressure and/or shock wave generated by the firing of the nose fuze. They are installed in projectiles in conjunction with a nose fuze to provide an extra safety element in the projectile explosive train. The fuzes are unpainted and have steel bodies. Nomenclature and loading data is located on the closing plug or disk.

HAZARDOUS COMPONENTS: The Mk 52 fuze has a 28 g Tetryl booster; a less than 1 g detonator; no hazardous components in the expelling charge; and a less than 1 g Lead.



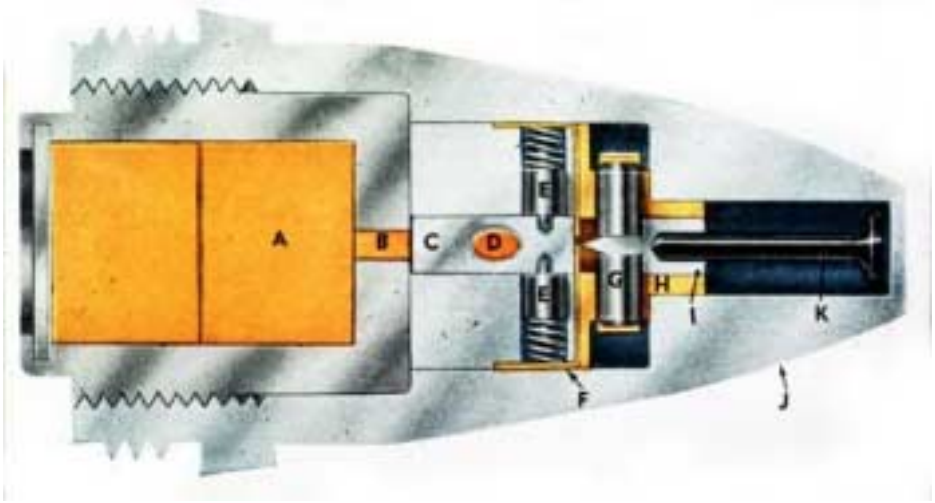
U.S. FUZE, PROJECTILE, PD, MK 27

These are centrifugally armed, impact-fired, instantaneous, point-detonating fuzes. The fuzes are either unpainted, or are painted one or two colors as part of a projectile-type identification color code. The colors, which have no fuze significance, are listed in the applicable 60-series manual for 40-millimeter antiaircraft projectiles. The fuze designation and loading information are stamped into the body. These fuzes are used with the MK1, MK2, and MK3 Navy 40mm AA projectile.

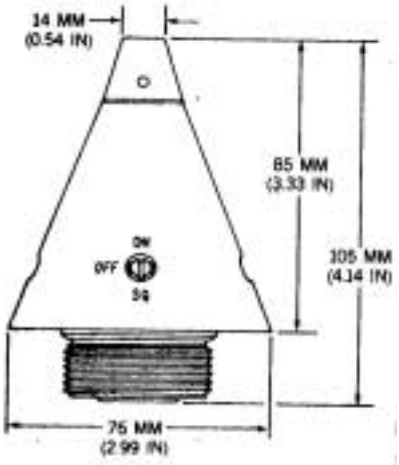


FUNCTIONING: On projectile firing, setback presses the firing pin rearward against the detents, immobilizing them until, as setback ceases, the firing pin creeps forward. Centrifugal force moves the firing pin detents and rotor detents outward, unblocking the firing pin and freeing the rotor, respectively. Centrifugal force turns the freed rotor to align the detonator between the firing pin and booster lead. Impact crushes the nose of the fuze, driving the striker and firing pin rearward into the detonator, initiating the explosive train.

HAZARDOUS COMPONENTS: Each fuze contains a detonator and a booster lead, each weighing less than 1 gram, and a tetryl booster weighing approximately 5 grams.



U.S. FUZE, PROJECTILE OR ROCKET, PD, MK 29



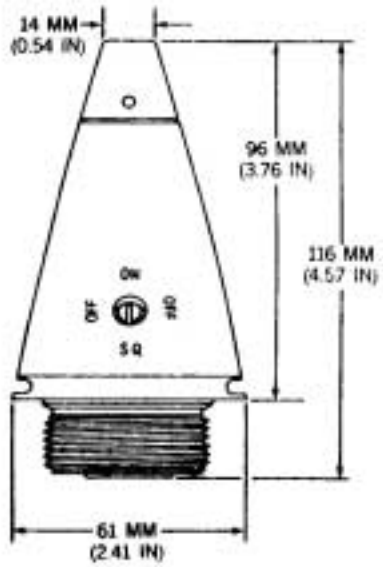
These are centrifugally armed, impact-fired, instantaneous point-detonating fuzes. The fuzes are unpainted. The ogive is dark green, yellow, or brown plastic. The designation, manufacturing and loading information and selector settings are stamped or stenciled on the ogive. The head is made of brass with an aluminum closing disk in the Mk 29 Mods 0 through 3 fuzes. The Mod 4 fuze has an aluminum head and rain baffle; the Mod 5 fuze has an aluminum head and steel rain baffle. The ogive is asbestos-bonded plastic, resin-impregnated cloth, or plastic-impregnated fabric. The body is steel.

FUNCTIONING: MK29 and MK30 PDF: Before firing, the selector is turned to align its slot with the ON-SQ or ON position. After munition firing, as setback ceases, centrifugal force moves the interrupter outward against its spring to clear the flash channel. Impact drives the firing pin into the nose detonator, initiating the explosive train

HAZARDOUS COMPONENTS: MK29 and MK30 PDF: Each fuze has a nose detonator and a relay detonator, each containing less than 1 gram of explosive.

PHOTO REQUIRED

U.S. FUZE, PROJECTILE, PD, MK 30



These are centrifugally armed, impact-fired, instantaneous point-detonating fuzes. The fuzes are unpainted. The ogive is dark green, light green, or brown plastic, or unpainted steel. The designation, manufacturing and loading information and selector settings are stamped or stenciled on the ogive. The head is brass with an aluminum-closing disk in the Mk 30 Mods 0 through 4 fuzes. The Mod 5 fuze has an aluminum head and steel rain baffle. The ogive is asbestos-filled plastic, resin-impregnated cloth, plastic-impregnated fabric, or steel. The body is steel.

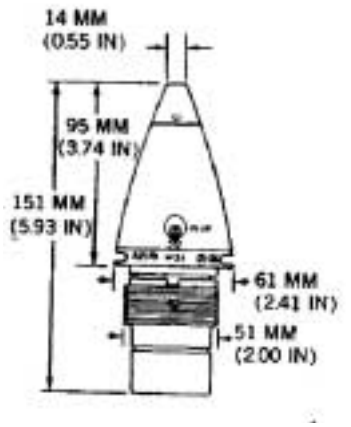
PHOTO REQUIRED

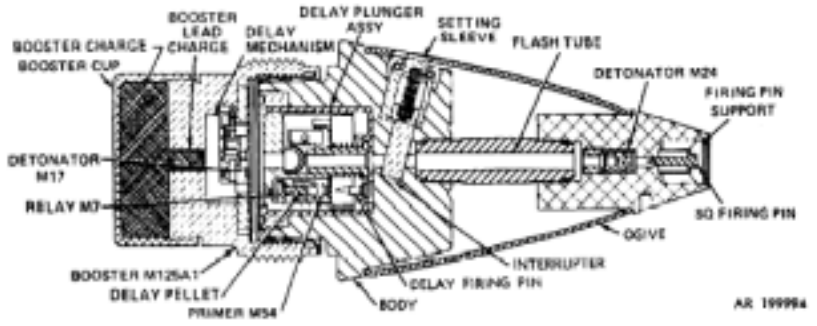
U.S. FUZE, PROJECTILE, PD, M557

These are centrifugally armed, impact- or impact-inertia-fired point-detonating projectile fuzes. The M557 provides either SQ or delay action.

FUNCTIONING: Fuzes. Before the projectile loaded for firing, the selector is set on SQ or DELAY. After it is fired, centrifugal force moves the interrupter outward to clear the flash channel if the fuze is set on SQ. Simultaneously, centrifugal force moves the plunger pins outward, and pivots the plunger pin lock to lock the pins in the outward position. This leaves the plunger held rearward only by the creep spring. On fuze impact, the superquick firing pin is driven rearward, crushing the crush cup, to initiate the detonator. If the fuze is set on SQ, the flash from the detonator passes through the cleared flash channel to initiate the explosive train. Simultaneously on fuze impact, the plunger slides forward, driving the delay element primer onto the delay firing pin. If the fuze is set on DELAY and the flash channel is blocked, or if the superquick firing components should fail, the explosive train will be initiated by the delay element. M125A1 Booster. When the projectile is fired, centrifugal force moves the centrifugal detents outward, freeing the rotor which, slowed by the escapement, rotates to align the detonator with the lead. The rotor locks in this position either by a centrifugal lockpin and creep-operated lockball, or by a spring-loaded lockpin

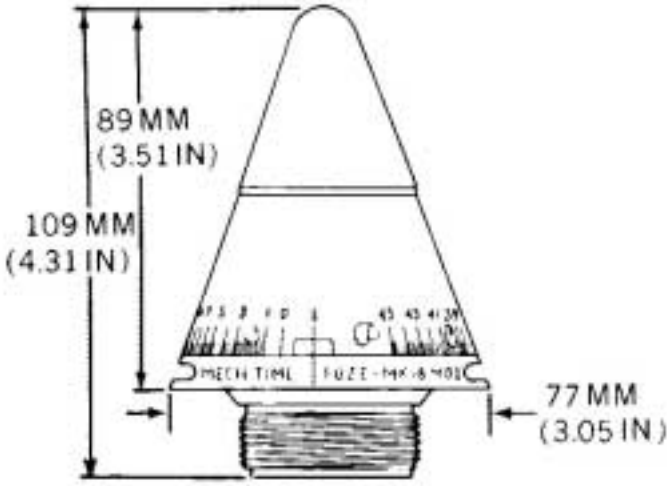
HAZARDOUS COMPONENTS: Each fuze contains a detonator and a delay element consisting of a primer, delay charge, and relay, each weighing less than 1 gram. The booster contains approximately 22 grams of Tetryl or Composition A-5/RDX.

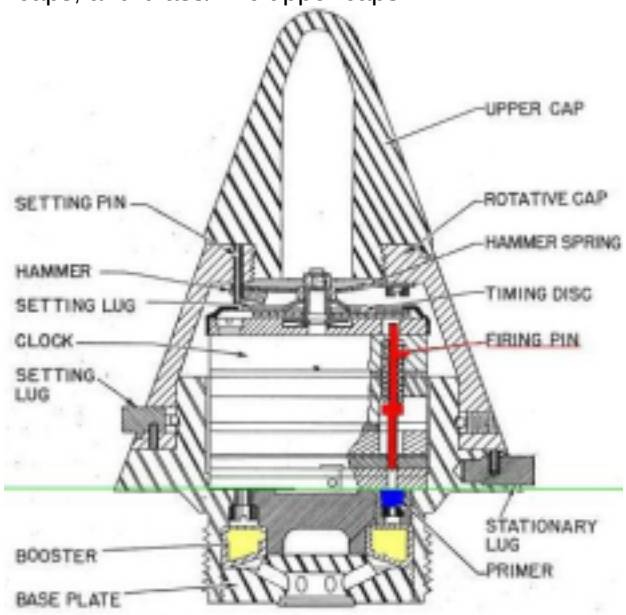




U.S. FUZE, PROJECTILE, MT, MK 18, MK 42, & MK 63

These are setback and centrifugally armed mechanical time fuzes. The Mk 42 fuze operates by a pre-wound driving spring; all these operate by centrifugal force. The fuzes are unpainted, but may be coated in part with varnish or lacquer. Each fuze has its designation and manufactures information stamped on the body. The fuze time setting graduations are stamped on the lower cap. The fuzes have brass bodies, lower caps, and brass/zinc upper caps.





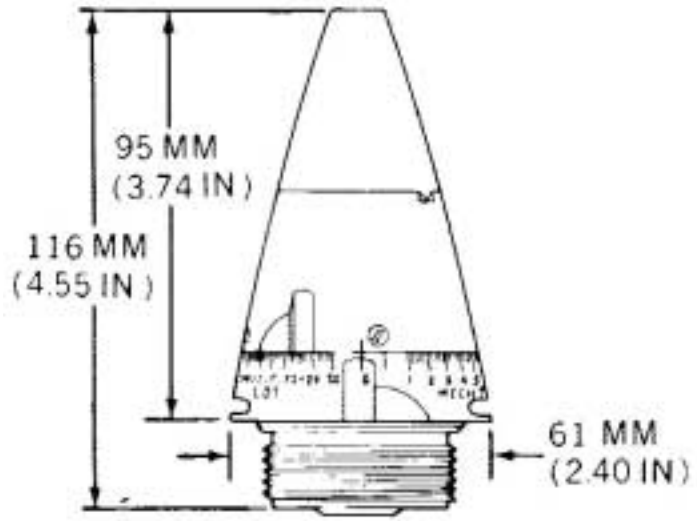
FUNCTIONING: Before projectile firing, the fuze is set for the desired time delay. Upon firing, setback causes the hammers to strike the setting lug, freeing the timing disk from the setting pin. Simultaneously, the setback pin moves rearward, removing a rotational block from the firing arm shaft. Centrifugal force swings the firing pin safety block and safety lever detent outward, disengaging the safety lever. The safety lever pivots, unlocking the escapement and permitting the centrifugal weights (assisted by the kickoff springs), to drive the centrifugal gears. The escapement controls the rate at which the spindle rotates. A safety disk and timing disk rotate with the spindle. The solid edge of the timing disk holds a firing arm outward until the set time has lapsed. A firing notch rotates into alignment with a firing arm elbow. Centrifugal force (assisted by a spring) acts on a firing arm weight to move the firing arm elbow into the firing notch and rotate a firing arm shaft. A cutout in the shaft aligns with the firing pin safety plate and releases a cocked firing pin. The firing pin is driven into a primer, igniting a black powder charge. NOTES the kickoff springs alone are strong enough to drive the centrifugal gears for approximately 45 seconds. In the Mk 42 fuze, centrifugal force moves the center arbor outward, freeing the driving spring. The driving spring rotates the spindle.

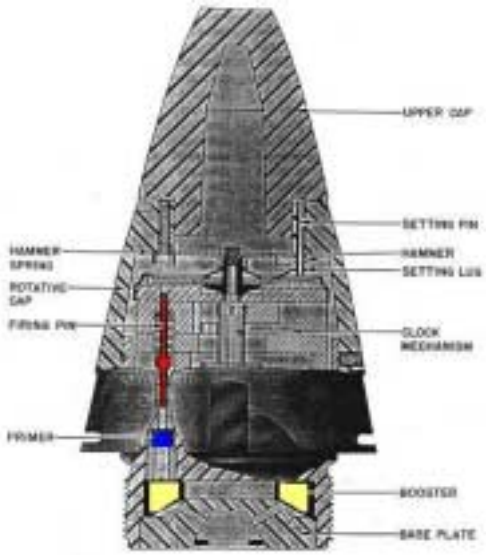
HAZARDOUS COMPONENTS: Each fuze contains a percussion primer weighing less than 1 gram, and a 3-gram black powder charge.

PHOTO REQUIRED

U.S. FUZE, PROJECTILE, MT, MK 22

These are setback and centrifugally armed mechanical time fuzes. The Mk 22 is operated by centrifugal force. The fuzes are unpainted, but may be coated in part with varnish or lacquer. Each fuze has its designation and manufactures information stamped on the body. The time setting graduations and safe setting marks are stamped on the body of the Mk 22 fuze. The remaining fuzes are stamped on the lower cap. The Mk 22 fuze has an aluminum body, a brass lower cap, and a zinc/aluminum upper cap.



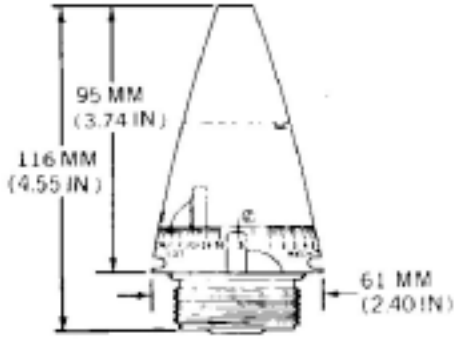


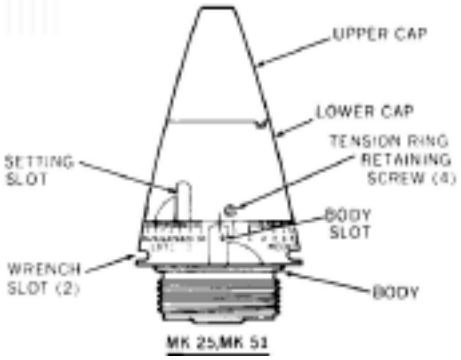
FUNCTIONING: Prior to projectile firing, the fuze is set for the desired time delay. Upon firing, setback causes the hammers to strike the setting lug, freeing the timing disk from the setting pin. Simultaneously, the setback pin moves rearward, removing a rotational block from the firing arm shaft. Centrifugal force swings the firing pin safety block and safety lever detent outward, disengaging the safety lever. The safety lever pivots, unlocking the escapement and permitting the centrifugal weights (assisted by the kickoff springs), to drive the centrifugal gears. The escapement controls the rate at which the spindle rotates. A safety disk and timing disk rotate with the spindle. The solid edge of the timing disk holds a firing arm outward until the set time has lapsed. A firing notch rotates into alignment with a firing arm elbow. Centrifugal force (assisted by a spring) acts on a firing arm weight to move the firing arm elbow into the firing notch and rotate a firing arm shaft. A cutout in the shaft aligns with the firing pin safety plate and releases a cocked firing pin. The firing pin is driven into a primer, igniting a black powder charge. NOTE The kickoff springs alone are strong enough to drive the centrifugal gears for approximately 45 seconds.

HAZARDOUS COMPONENTS: Each fuze contains a percussion primer weighing less than 1 gram, and a 3-gram black powder charge.

U.S. FUZE, PROJECTILE, MT, MK 25 & MK 51

These are setback and centrifugally armed mechanical time fuzes. All the fuzes are unpainted, but may be coated in part with varnish or lacquer. Each fuze has its designation and manufactures information stamped on the body. The time setting graduations and safe setting marks are stamped on the bodies of the Mk 25 and Mk 51 fuzes. The Mk 25 and Mk 51 fuzes have aluminum bodies, brass lower caps, and zinc/aluminum upper caps.



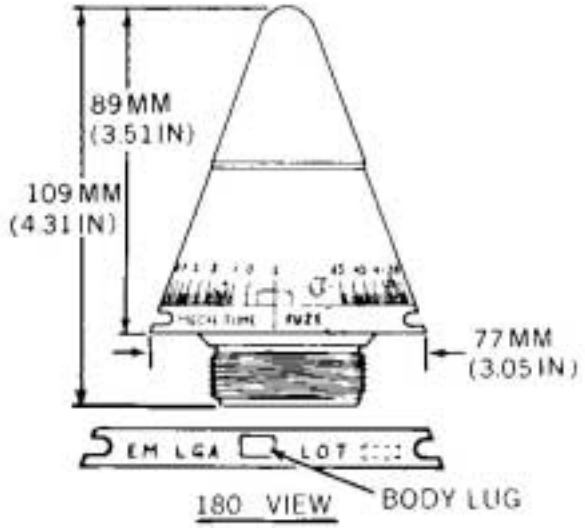


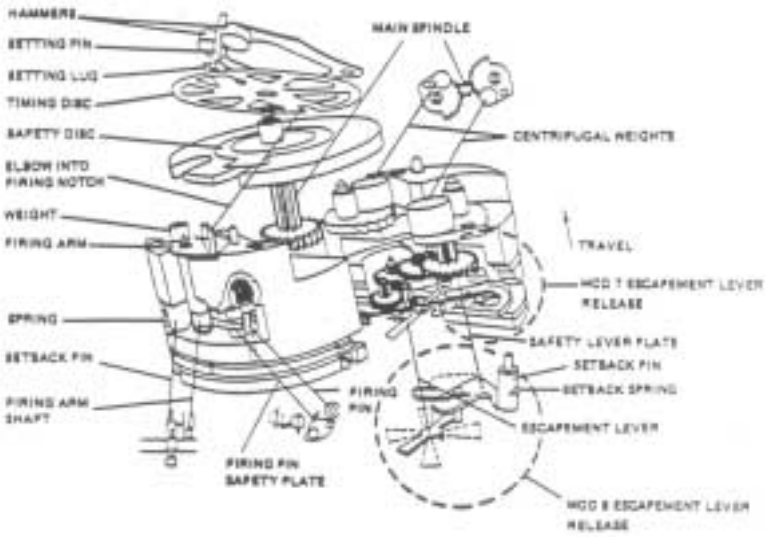
FUNCTIONING: Before projectile firing, the fuze is set for the desired time delay. Upon firing, setback causes the hammers to strike the setting lug, freeing the timing disk from the setting pin. Simultaneously, the setback pin moves rearward, removing a rotational block from the firing arm shaft. Centrifugal force swings the firing pin safety block and safety lever detent outward, disengaging the safety lever. The safety lever pivots, unlocking the escapement and permitting the centrifugal weights, assisted by the kickoff springs, to drive the centrifugal gears. The escapement controls the rate at which the spindle rotates. NOTE: The kickoff springs alone are strong enough to drive the centrifugal gears for approximately 45 seconds. The safety disk and timing disk rotate with the spindle. The solid edge of the timing disk holds the firing arm outward until the set time has elapsed. The firing notch rotates into alignment with the firing arm elbow. Centrifugal force, assisted by a spring, acts on the firing arm weight and moves the firing arm elbow into the firing notch, rotating the firing arm shaft. A cutout in the shaft aligns with the firing pin safety plate, releasing the cocked firing pin. The firing pin is driven into the primer, igniting the black powder charge.

HAZARDOUS COMPONENTS: Each fuze contains a percussion primer weighing less than 1 gram, and a 3-gram black powder charge.

U.S. FUZE, PROJECTILE, MT, MK 50, MK 61, MK 62 AND MK 349

These are setback and centrifugally armed mechanical time fuzes. All the fuzes, except the Mk 61, are unpainted, but may be coated in part with varnish or lacquer. The top half of the upper cap of the Mk 61 fuze is painted white. Each fuze has its designation and manufacturers information stamped on the body. The time setting graduations and safe setting marks are stamped on the lower cap. The fuze has a brass body, brass lower caps, and zinc/aluminum upper caps.



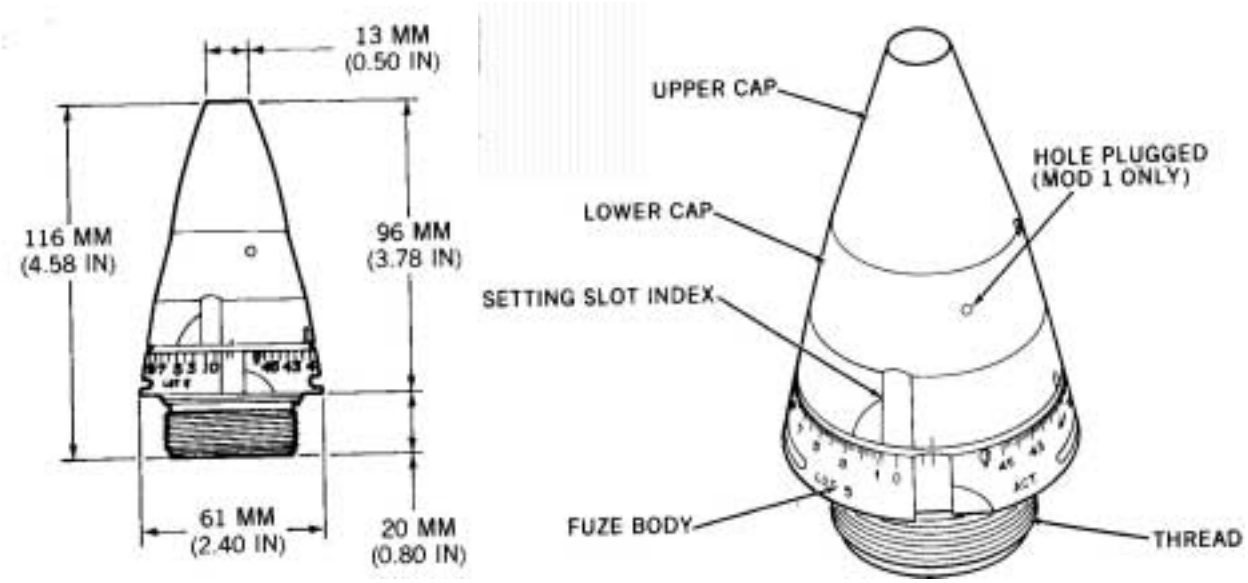


FUNCTIONING: Before projectile firing, the fuze is set for the desired time delay. Upon firing, setback causes the hammers to strike the setting lug, freeing the timing disk from the setting pin. Simultaneously, the setback pin moves rearward, removing a rotational block from the firing arm shaft. Centrifugal force swings the firing pin safety block and safety lever detent outward, disengaging the safety lever. The safety lever pivots, unlocking the escapement and permitting the centrifugal weights, assisted by the kickoff springs, to drive the centrifugal gears. The escapement controls the rate at which the spindle rotates. NOTE: The kickoff springs alone are strong enough to drive the centrifugal gears for approximately 45 seconds. The safety disk and timing disk rotate with the spindle. The solid edge of the timing disk holds the firing arm outward until the set time has elapsed. The firing notch rotates into alignment with the firing arm elbow. Centrifugal force, assisted by a spring, acts on the firing arm weight and moves the firing arm elbow into the firing notch, rotating the firing arm shaft. A cutout in the shaft aligns with the firing pin safety plate, releasing the cocked firing pin. The firing pin is driven into the primer, igniting the black powder charge.

HAZARDOUS COMPONENTS: Each fuze contains a percussion primer weighing less than 1 gram, and a 3-gram black powder charge.

U.S. FUZE, PROJECTILE, MT, MK 342

This is a setback- and centrifugally armed, mechanical time fuze. The fuze is unpainted. Markings and time graduations are stamped in the body and lower cap. The fuze body is brass with a zinc upper cap and an aluminum lower cap.

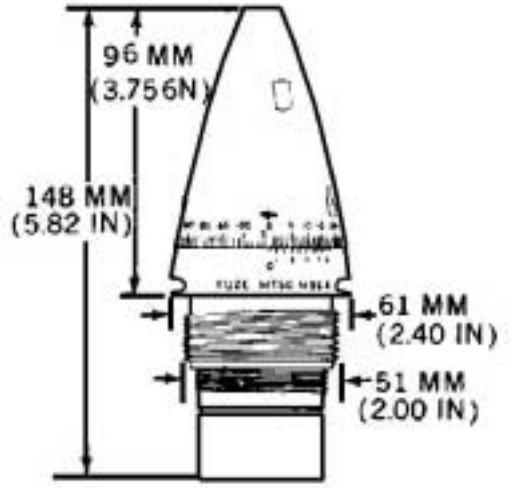


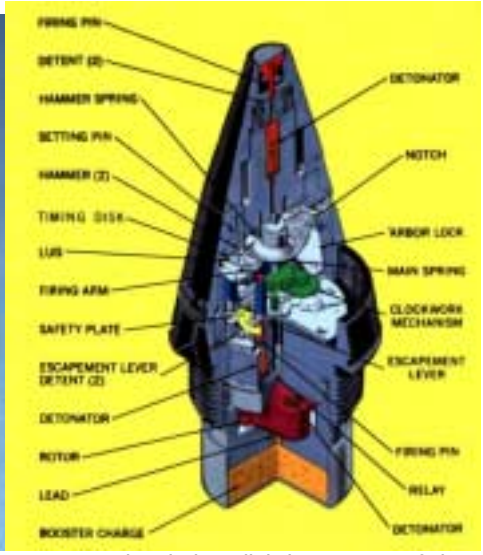
FUNCTIONING: Prior to firing, the fuze is manually set to the desired functioning time by rotating the lower cap until the setting slot index is aligned with the desired time mark. When the lower cap is rotated, the timing disk rotates so the firing notch in the timing disk is a calibrated distance from the firing arm. Motion of the lower cap is transmitted to the timing disk by the setting fork on the disk, which engages the setting pin. Upon projectile firing, setback causes the hammers to flatten the setting fork, freeing the timing disk from the setting pin. Simultaneously, the setback pin overcomes its spring and drops away, freeing the firing arm shaft and safety lever. Centrifugal force moves the safety lever outward, unlocking the escapement. The two kickoff springs and centrifugal force rotate two gear segments, which rotate the timer pinion. The pinion turns the attached timing disk, governed by the escapement. Centrifugal force rotates the safety block away from the firing pin. When the firing notch aligns with the firing arm, the spring-loaded firing arm snaps into the notch. The cutout in the firing arm shaft aligns with the safety plate, which pivots past the firing arm shaft, freeing the firing pin. The firing pin spring drives the firing pin into the percussion primer, initiating the explosive train.

HAZARDOUS COMPONENTS: The fuze contains a percussion primer weighing less than 1 gram, and a 3-gram black powder booster.

U.S. FUZE, PROJECTILE, MTSQ, M564

These are setback and centrifugally armed, mechanical time superquick fuzes used to provide airburst or impact functioning. Pre-wound mainsprings operate the M564. These fuzes have their designation, loading information, and a vernier scale stamped on the body. Time graduations, the letter S, and an arrow indicating the direction of rotation for setting the fuze are stamped on the lower cap. The fuze is anodized black, with all stampings painted white. The M548 fuze is identical to the M564 except for lacking a booster cup. The M548 and M564 fuzes have brass bodies and aluminum upper and lower caps.





FUNCTIONING: In the Mechanical time assembly, turning the lower cap rotates the timing disk by means of the setting pin, which engages the upraised lug. On projectile firing, setback drives the hammers rearward, flattening the lug on the timing disk and releasing the disk from the setting pin. Simultaneously, setback frees the firing arm to turn. In the M564 fuze, centrifugal force moves the arbor lock and the escapement lever detents outward, freeing the mainspring and the escapement lever, respectively. In these fuzes, the mainspring rotates the timing disk at a rate controlled by the escapement. Centrifugal force moves the weighted gear segments outward, causing rotation of the timing disk at a rate controlled by the escapement. When the notch in the rotating timing disk comes opposite the upright of the firing arm, the firing arm turns. This allows the firing pin safety plate to swing out from under a flange on the firing pin. The cocked firing pin strikes the primer or detonator, initiating the explosive train. Centrifugal force moves the detents outward. This frees the firing pin and unblocks the passage between the detonator and lead in the remaining fuzes. If impact occurs before the time for which the fuze is set, or if the fuze is set at S, the firing pin is driven into the detonator to initiate the explosive train. The M564 fuze uses a modified M125 booster. When the projectile is fired, centrifugal force moves the centrifugal detents outward. This frees the rotor, which, slowed by the escapement, rotates to align the detonator with the lead. The rotor locks in this position either by a centrifugal lockpin and creep-operated lockball, or by a spring-loaded lockpin (neither shown). The M125 booster is similar to the modified M125, except that it has internal and external threads, and screws onto a fuze. The modified M125 has external threads of smaller diameter than those of the M125, and screws into a fuze.

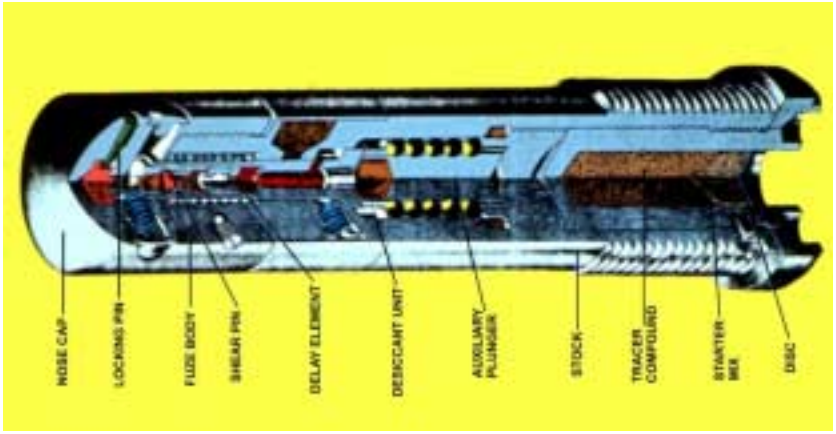
HAZARDOUS COMPONENTS: The M564 has a detonator in the SQ firing train; a detonator in the MT firing train; a Lead Azide relay; a modified M125 booster; and a 22 g. tetryl charge.

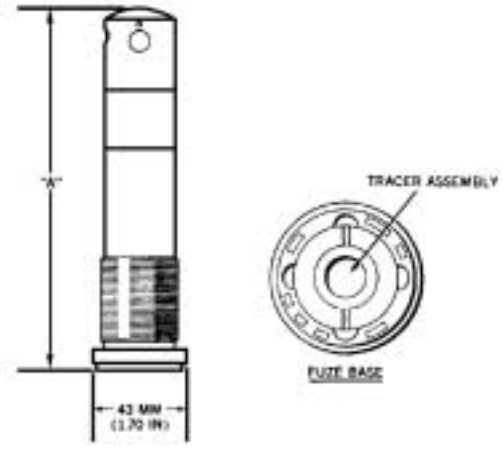
U.S. FUZE, PROJECTILE, BD, MK 19, MK 20, MK 21, MK 28, MK 48, & MK 64 SERIES

In the Mk 19 Mod 3, Mk 20 Mod 5, Mk 21 Mod 3, Mk 28 Mods 17 & 18, and Mk 64 Mod 3, there is an addition of four auxiliary boosters. The Mk 20 Mod 5 has right-hand threads and a plug in the fuze body to seal the base-closing plug. The Mk 48 Mod 3 replaces the flange with a one-piece flange and plug to fill the tracer cavity. The Mk 64 Mod 2 replaces the flange with a solid base-closing plug and changes the body threads to right-hand threads. The Mk 21 Mod 0 replaces the flange with a plug incorporating a 0 ring. These are base-detonating (BD) centrifugal arming, impact-firing projectile fuzes. The Mk 28, Mk 31, and Mk 39 fuzes are instantaneous-firing; each of the remaining fuzes has a delay of less than 1 second. The fuzes are unpainted and have the Mark and Mod, the manufacturers and loading plants initials or symbol, and loading data die stamped into the base. The fuzes are steel.

FUNCTIONING: Upon firing of the projectile, the fuze firing pin sets back, locking the firing pin detents in place. When setback force ceases, centrifugal force moves the firing pin detents and detonator plunger outward. The detonator plunger and attached detonator, now locked, are restrained only by the creep spring. Upon projectile impact, the detonator plunger of the fuze, aided by the momentum of the auxiliary plunger, moves forward, driving the primer against the firing pin. Gas from the exploded primer builds up pressure in the inner cup. Expansion of the inner cap, resulting from pressure buildup, locks the detonator plunger in the forward position. The detonator-plunger leads are aligned with the booster leads. Simultaneously, detonation of the primer drives the plunger firing pin against the secondary primer. Detonation of the secondary primer ignites the delay element, which, in turn, initiates the explosive train.

HAZARDOUS COMPONENTS: Each fuze contains a lead Azide detonator, primers, and tetryl booster components. In addition, the Mk 19-series fuzes have a black powder delay element and a tracer compound. The approximate weights of these explosive components range from 3 to 6 grams.

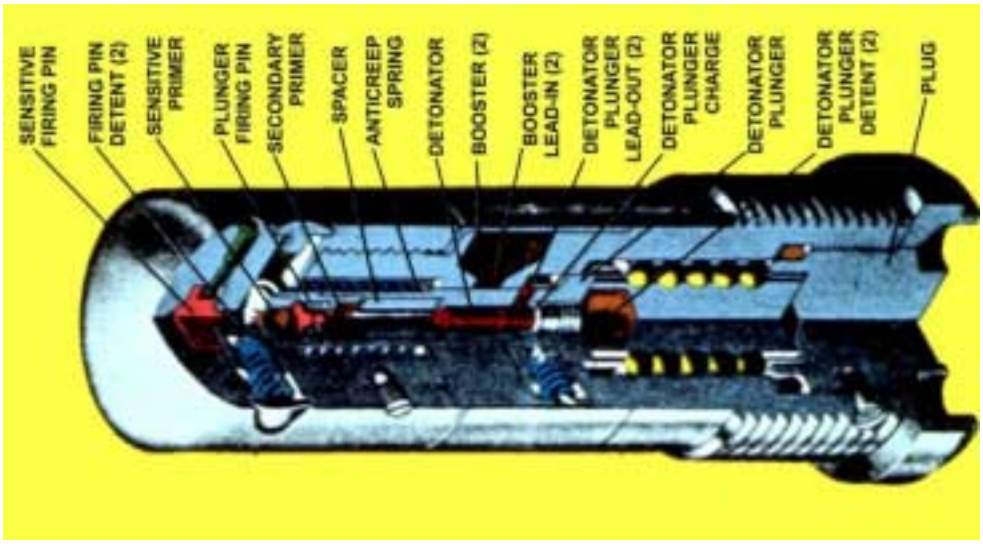


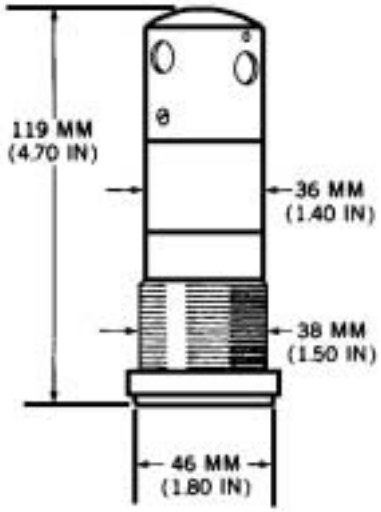


	"A"
MK 19, MK 20, MK 28, MK 64	170 MM (6.70 IN)
MK 21, MK 39, MK 48	173 MM (6.80 IN)

U.S. FUZE, PROJECTILE, BD, MK 31 AND MK 36 SERIES

These are base detonating centrifugal arming, impact-firing projectile fuzes. The Mk 31 fuze is instantaneous-firing; the remaining fuzes have a delay of less than 1 second. The fuzes are unpainted and have the mark and mod, the manufacturers and loading plants initials or symbol, and loading data die stamped into the base. The fuzes are steel. WARNING: Do not attempt to remove these fuzes from projectiles. Some projectiles do not employ fuze liners, and explosive salts may have formed around the fuze body and/or fuze threads.



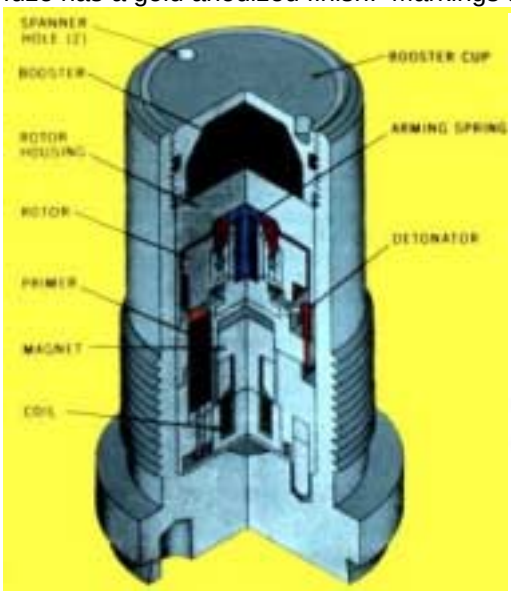


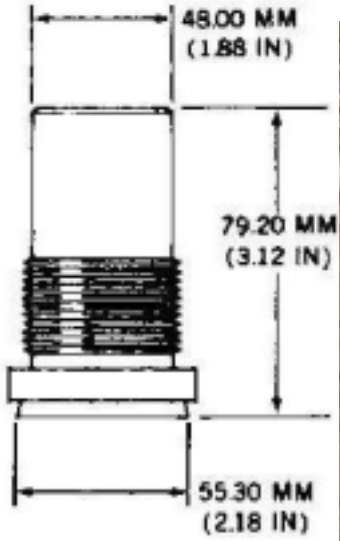
FUNCTIONING: Upon firing of the projectile, the fuze firing pin sets back, locking the firing pin detents in place. When setback force ceases, centrifugal force moves the firing pin detents and detonator plunger outward. The detonator plunger and attached detonator, now locked, are restrained only by the creep spring. Upon projectile impact, the detonator plunger of the fuze, aided by the momentum of the auxiliary plunger, moves forward, driving the primer against the firing pin. Gas from the exploded primer builds up pressure in the inner cup. Expansion of the inner cap, resulting from pressure buildup, locks the detonator plunger in the forward position. The detonator-plunger leads are aligned with the booster leads. Simultaneously, detonation of the primer drives the plunger firing pin against the secondary primer. Detonation of the secondary primer ignites the delay element, which, in turn, initiates the explosive train.

HAZARDOUS COMPONENTS: Each fuze contains a lead Azide detonator, primers, and tetryl booster components. The approximate weights of these explosive components range from 3 to 6 grams. WARNING- - Do not attempt to remove these fuzes from projectiles. Some projectiles do not employ fuze liners, and explosive salts may have formed around the fuze body and/or fuze threads.

U.S. FUZE, PROJECTILE, BD, MK 83

This is an electromechanical, spin-acceleration and centrifugally armed, non-delay, base-detonating projectile fuze. The fuze has a gold anodized finish. Markings are on the base.



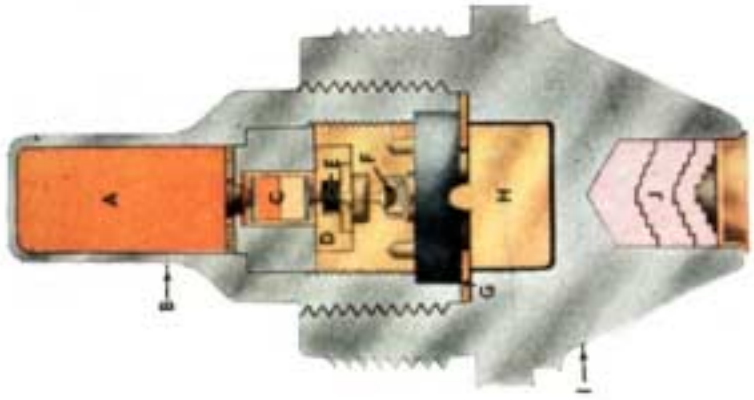


FUNCTIONING: Arming. Upon projectile firing, spin acceleration causes the rotor to turn 90 degrees counterclockwise (when viewed from the base of the fuze) against the action of the arming spring. This action unlocks the two rotor detonates, which are then moved outward and held in this position by centrifugal force. When a spin of 5,400 revolutions per minute is achieved, centrifugal force causes the safety detonate to move outward. When spin acceleration ceases, the preloaded arming spring turns the rotor 270 degrees clockwise (180 degrees from the unarmed position), aligning the detonator with the primer and the booster lead. Before the detonator reaches the inline position, the cleaver pin cuts the shorting wire that is fastened between the two support posts. The shorting wire forms a shunt on the primer bridge wire. The fuze is now armed. NOTE: If a spin of 5,400 revolutions per minute is not achieved, clockwise rotation of the rotor is stopped by the safety detent before the shorting wire can be cut. In this situation, the fuze fails to arm. **Firing:** Upon projectile impact, the magnet in the MIG is thrown forward, separating it from the coil. This motion induces a current through the coil, which initiates the electric primer 3 to 5 milliseconds after impact with the target.

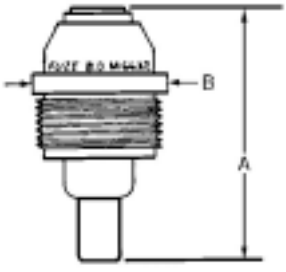
HAZARDOUS COMPONENTS: The primer is lead styphnate and lead Azide, the detonator is tetryl and lead Azide, and the booster lead is tetryl. Each of these components weighs less than 1 gram. The booster is 18 grams of tetryl

U.S. FUZE, PROJECTILE, BD, M66, M66A1, & M66A2

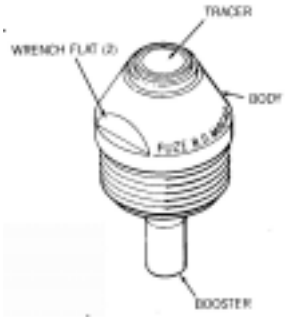
These are base-detonating (BD), impact-inertia-delay-firing, projectile fuzes. No arming sequence is required. The fuzes are unpainted; some may have a black parkerized finish. The bodies are steel. Tracer elements are usually contained in an aluminum cup with a gilding-metal closure disk. Consider these fuzes always armed. They contain aligned explosive trains with no safety devices.



FUNCTIONING: The firing pin and firing train are always in line. When the fuze impacts, inertia drives the firing pin forward, shearing the teeth of the washer. The firing pin strikes the primer, initiating the firing train.



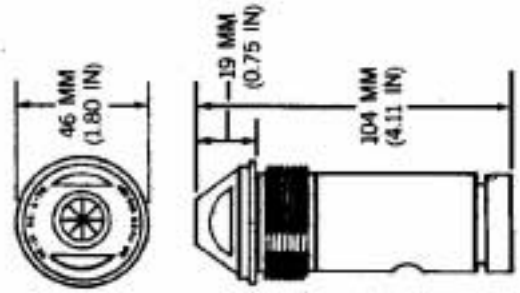
	M66	M66A1	M66A2
A	88 MM (3.46 IN)	88 MM (3.46 IN)	90 MM (3.53 IN)
B	42 MM (1.65 IN)	42 MM (1.65 IN)	45 MM (1.79 IN)



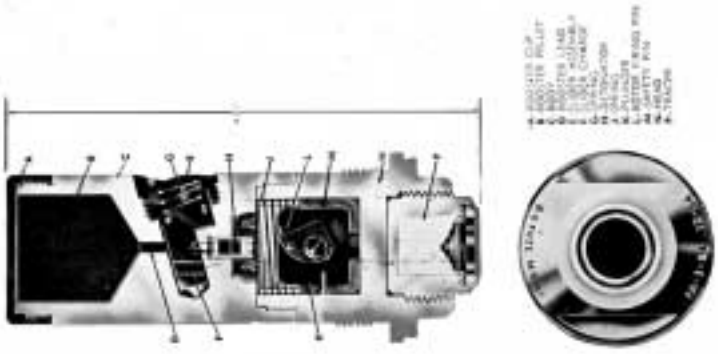
HAZARDOUS COMPONENTS: Each fuze in the M66 series has a primer, a delay element, and a detonator, each of which weighs less than 1 gram. The booster contains 4.4 grams of tetryl. Each fuze in both series has a tracer.

U.S. FUZE, PROJECTILE, BD, M91, M91A1, & M91A2

These are centrifugally armed, impact-inertia-fired, non-delay, base-detonating fuzes. They were designed for use in HEAT projectiles, but were later used in HEP projectiles. The M91-series fuzes have tracers; otherwise, they are the same as the M62-series fuzes. The M91 has a fixed tracer. The M91A1 and M91A2 have a removable tracer. The fuzes are either unpainted or gold anodized. The head and body are steel. The booster cup is brass. The tracer element on the M91A1 and M91A2 fuzes is contained in either aluminum or a steel cup sealed with a gilding-metal disk.



FUNCTIONING: On projectile firing, centrifugal force moves the firing-pin detents outward. This frees the eccentrically weighted firing pin, which pivots to align with the detonator. Centrifugal force also moves the slider outward, aligning the slider charge with the booster lead. On projectile impact, inertia moves the plunger forward, overcoming the force of the creep spring. The firing pin is driven into the detonator, initiating the explosive train.



HAZARDOUS COMPONENTS: Each of the fuzes has a detonator, slider charge, and booster lead, each of which weighs less than 1 gram. The booster charge in each fuze is 20 grams of tetryl. Each of the M91-series fuzes has a tracer.

No. 230 MK IV, British Point Detonating Fuze

N1 Point Detonating Fuze, British

ROCKETS

MK3 2.25 Inch Practice Rocket, US

This rocket was designed to simulate in training the flight of the 3.5-inch and 5 inch navy rockets.

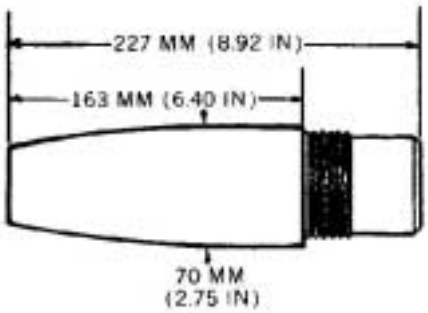
There are no hazards associated with this rocket.

There is a MK1 and MK2 of this rocket that were used in testing and not adopted, but all the 2.25 inch rockets were the same dimensions containing no hazardous components.

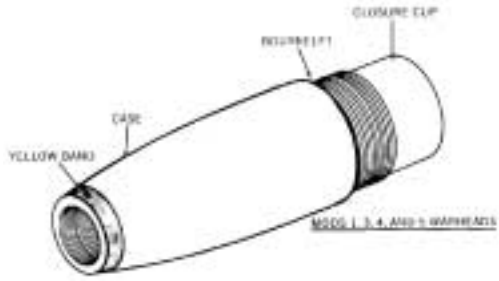
2.75-Inch Rocket WP Cups

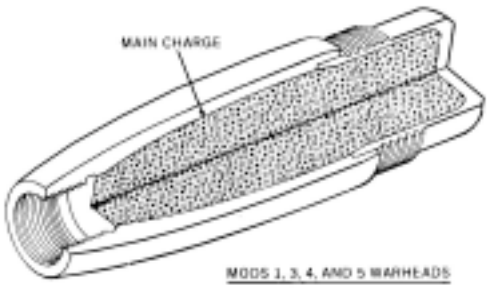
MK1 2.75 Inch HE Frag Rocket Warhead, US

Mk 1 Mods 1, 3, 4, 5, & 7 warheads. These are high-explosive fragmentation (HE-frag) warheads. The warheads are olive drab. Designation and other information are stenciled in yellow. A yellow band is painted around the nose of the warhead. The warhead is steel. The weight of the warhead is 2.6 kilograms (5.7 pounds).

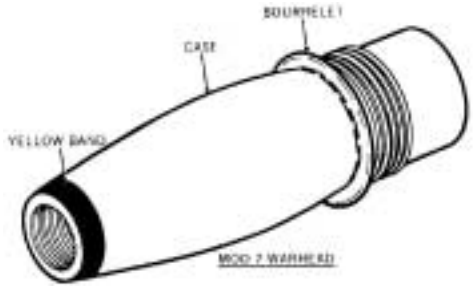


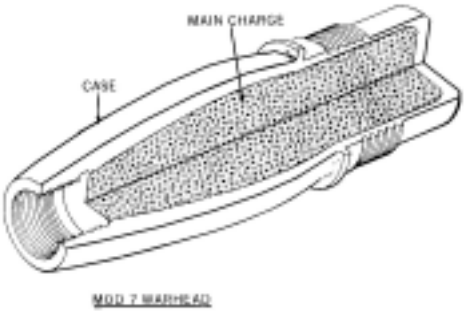
HAZARDOUS COMPONENTS: The warheads, with the exception of the Mod 7, contain 635 grams (1.4 pounds) of HBX-1. The Mod 7 warhead contains 635 grams (1.4 pounds) of composition B.





MK1 except MOD 7

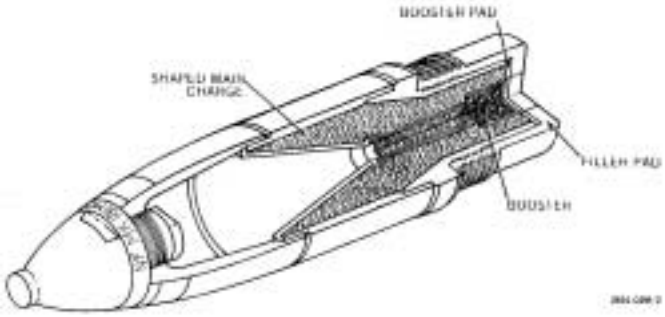




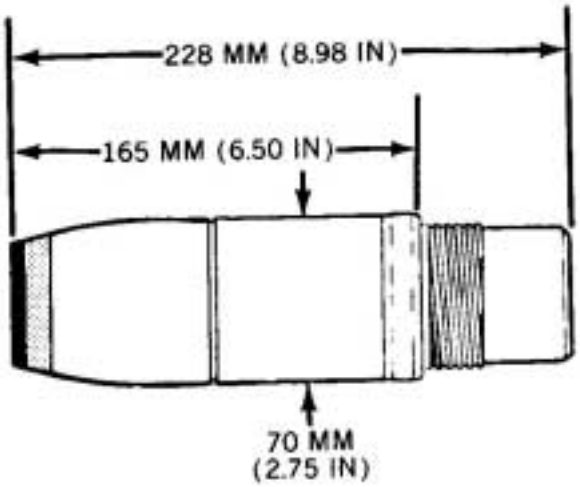
MK1 Mod 7

MK5 HEAT 2.75 Inch Rocket Warhead, US

This is a high-explosive antitank (HEAT) warhead with a shaped main charge. The warhead is olive drab. Designation and other information are stenciled in yellow. A black band is painted around the nose of the warhead, and a yellow band is painted to the rear of the black band. The warhead is steel.



FUNCTIONING: On impact, the fuze fires, sending a jet of high-temperature gases rearward to the warhead booster. This jet detonates the booster, initiating the shaped main charge.

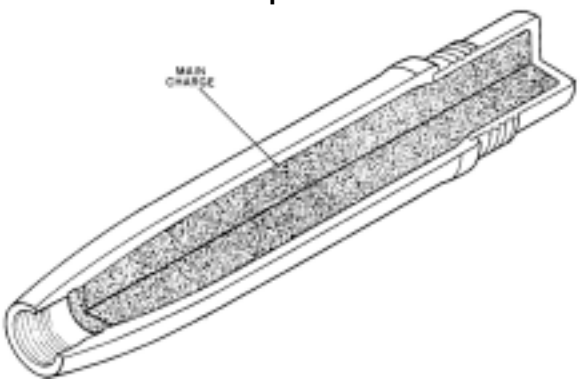


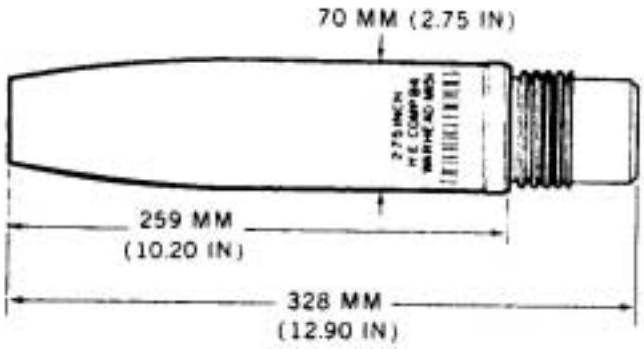
HAZARDOUS COMPONENTS: The warhead contains a main charge consisting of 404 grams (14.2 ounces) of composition B. The booster consists of 14 grams of tetryl.

U.S. WARHEAD, ROCKET, 2.75-IN, HE-FRAG, M151

This is a high-explosive fragmentation warhead. The warhead is olive drab. Designation and other information are stenciled in yellow. Early models do not have a fuze liner; warheads with a fuze liner are marked W/LINER

NEW: 2.3 Lbs. of Composition B M151 shown with M423 PD Fuze and remains of rocket motor (White)

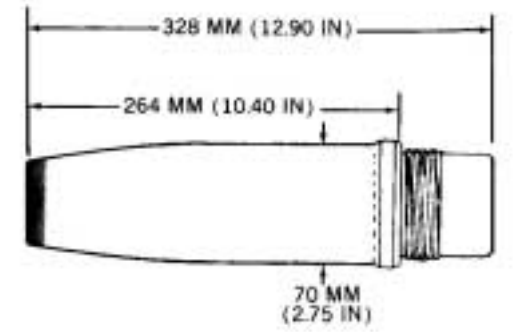


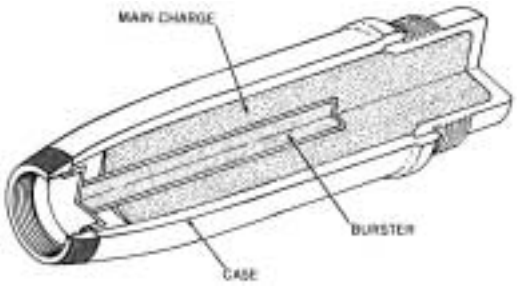


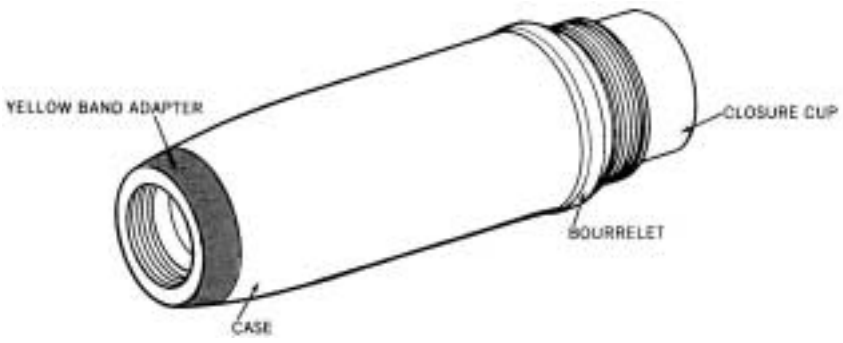
M156 2.75 Inch White Phosphors Rocket Warhead, US

This is a white phosphorus smoke warhead used primarily for target marking. The warhead is painted and marked in either of the following methods: (1) New color coding is light green overall, with a yellow band around the nose, and nomenclature and loading information stenciled on the side in light red. (2) Older color coding is olive drab overall, with either a light-green band around the nose or the entire nose area painted light green, and a yellow band directly behind the light-green area. The letters WP are stenciled in light red on the light-green area, and nomenclature and loading information stenciled on the side, in black.

HAZARDOUS COMPONENTS: The warhead contains a main charge consisting of 999 grams (2.2 pounds) of white phosphorus. The burster consists of 55 grams (1.9 ounces) of composition B



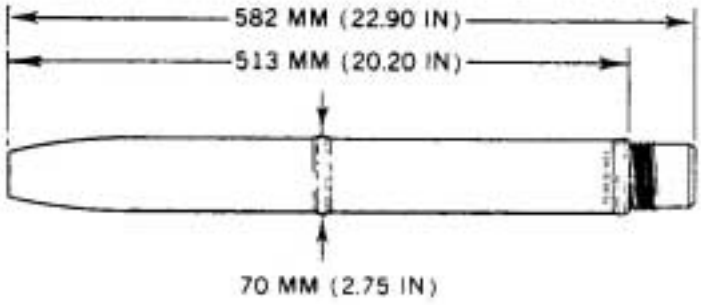


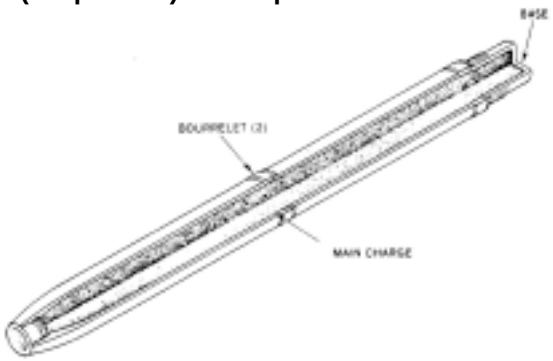


M229 2.75 inch HE Rocket Warhead, US

This is a high-explosive general-purpose warhead. The warhead is olive drab; designation and other information are stenciled in yellow. Early models do not have a fuze liner. Warheads with a fuze liner are marked W/LINER. The forward section, rear section, and base are brazed together. There is an alternate two-piece design consisting of a long forward section and a base.

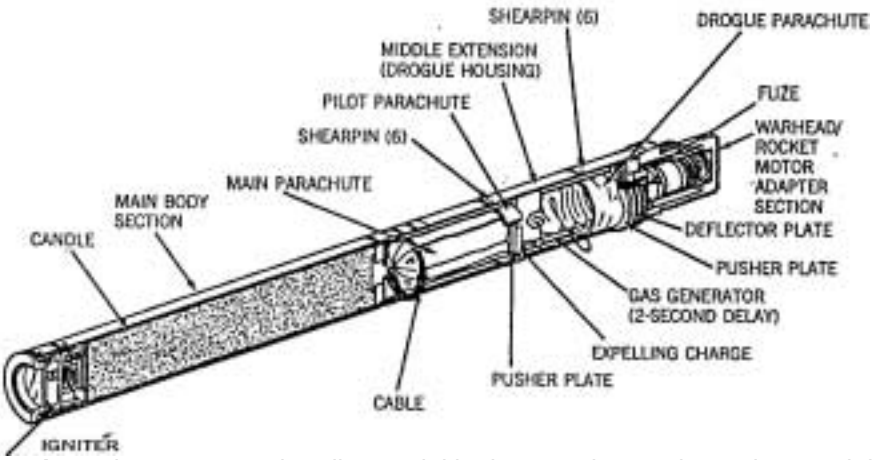
HAZARDOUS COMPONENTS: The warhead contains 2.2 kilograms (4.8 pounds) of composition B.



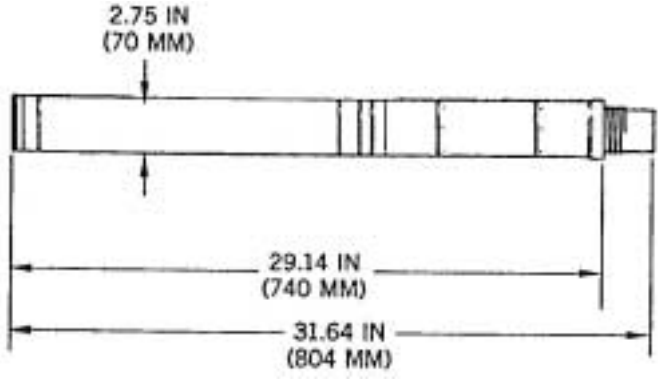


M257 2.75 Inch Rocket Flare, US

The M257 flare warhead is used to illuminate target areas Externally, the M278 infrared (IR) warhead differs only in color and markings. Both warhead employ the same integral M442 base-detonating (BD) fuze, which is setback, armed and deceleration fired. The M257 flare warhead is olive drab with the designations and other information stenciled in white. The M278 IR flare warhead is black with the designations and other information stenciled in white. Both the current M257 and the M278 warheads have a dual-safe candle igniter with a clear plastic end cap. Earlier M257 warheads without the dual-safe igniter have a black plastic cap. The warhead is aluminum; the end cap is plastic. The warhead weighs 10.81 pounds (4.90 kilograms).



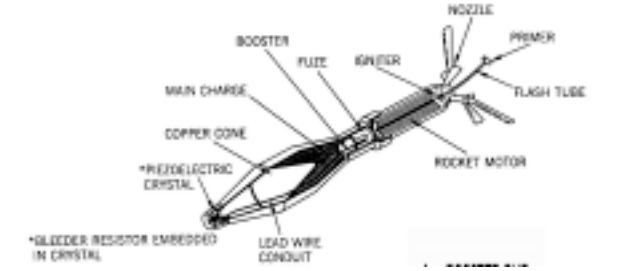
HAZARDOUS COMPONENTS: Nose **Section**. The current and earlier model igniters each contain a primer weighing less than 1 gram, and an ignition wafer and boron potassium nitrate pellets whose total weight is 6 grams. **Main Body Section**. The M257 warhead contains a **candle with 4.74 pounds** (2.15 kilograms) of **magnesium and sodium nitrate**. The M278 warhead contains an infrared candle with 4.74 pounds (2.15 kilograms) of potassium nitrate, cesium nitrate, silicon, and haxamine. **Middle Extension**. The middle extension houses a gas generator containing a 2-second delay weighing less than 1 gram, and an expelling charge of 6 grams of M9 propellant and black powder. **Warhead/Rocket Motor Adapter Section**. This section houses the BD fuze, which contains a detonator and a 9-second delay each weighing less than 1 gram, and a 6-gram M9 propellant/black powder expelling charge.

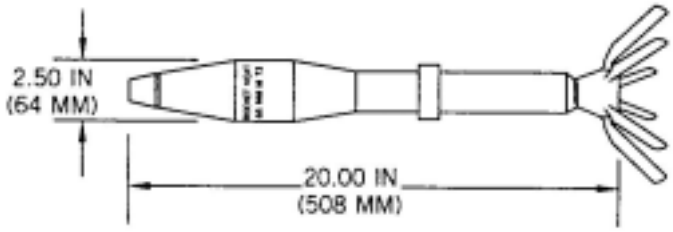


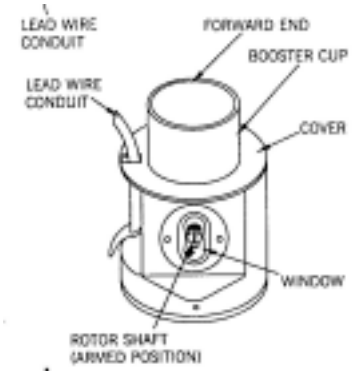
M72 66mm LAW (Light Anti-Tank Weapon) with M412 Fuze, US

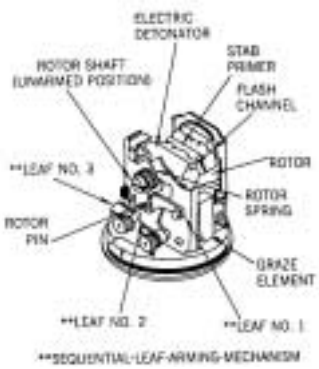
Shoulder-fired, fin-stabilized, high explosive light antitank weapons used primarily to penetrate armored targets. The rockets use a M54 rocket motor. The manufacturing information is printed in white. The rocket motor is brown and the warhead is black with yellow markings.

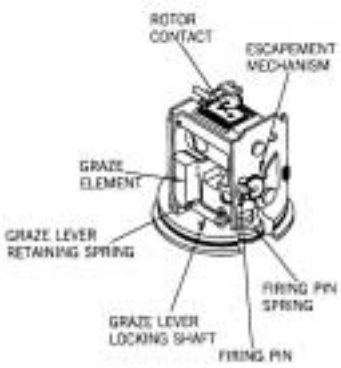
HAZARDOUS COMPONENTS: The M54 rocket motor contains approximately 2 ounces (57 grams) of M7 propellant, a 2-gram black powder igniter, and a 1-gram black powder primer. The M18 warhead contains 11.0 ounces (312 grams) of octol (HMX/TNT). The M18A1 warhead contains approximately one pound (454 grams) of octol. **Fuze**: The M412 and M412A1 fuzes contain a primer, detonator, and tetryl booster, each weighing less than 1 gram. The front sight of the launcher may contain promethium 147, which is a 3-millicurie source of radiological material.











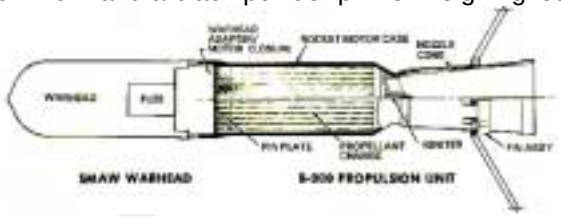
MK1 Dual Mode SMAW and MK2 Practice 83mm Rockets, US

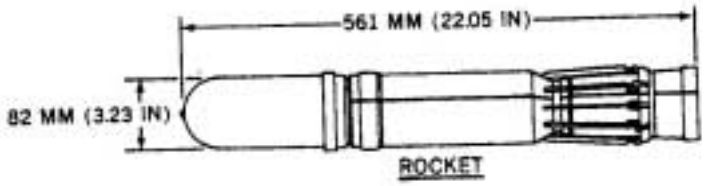
MK2 Practice Warhead (Shoulder-Launched Multipurpose Assault Weapon (SMAW)
There are two training configurations, a practice rocket and a trainer. The practice rocket is identical to the tactical rocket, except for an inert warhead. The trainer is externally like the tactical rocket case, except it contains only a noise cartridge. This is a folding-fin high-explosive (HE) surface-to-surface rocket and launcher. The rocket is black; the rocket case, olive drab with yellow markings and manufacturing data, and a 38-millimeter (1.50-inch) yellow band. The launcher is fiberglass, with metal end rings, bipod, and sights. The rocket case is fiberglass coated with steel mesh. The rocket cases rear cap is rubber. The rocket motor is steel with a fiberglass exhaust cone. The warhead and fins are aluminum.

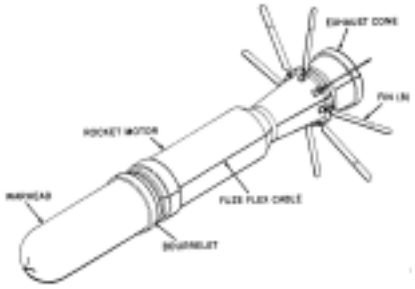
Rocket Motor

MK2 Practice Warhead

HAZARDOUS COMPONENTS: The rocket motor contains 406 grams (14.3 ounces) of propellant, a 29-gram (1.0-ounce) black powder igniter, and a boron potassium nitrate primer weighing less than 1 gram. The warhead contains 1.0 kilogram (2.2 pounds) of aluminized composition A-3 explosive. The fuze contains a 15-gram booster of composition A-5, and a PBXN-5 booster lead, two pyrotechnic delays, two primers, and a piston actuator, all having a combined weight of less than 1 gram. The noise cartridge in the trainer contains a 14-gram explosive charge of potassium nitrate, sulfur, and aluminum and a black powder primer weighing less than 1 gram. The Practice Warhead contains no Hazardous Material.



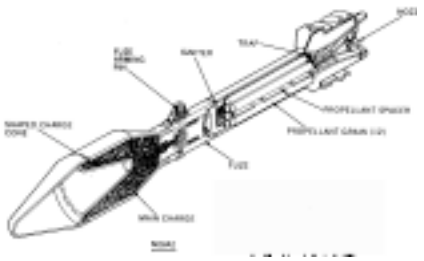
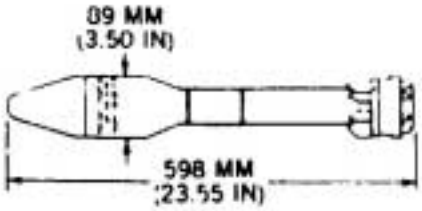


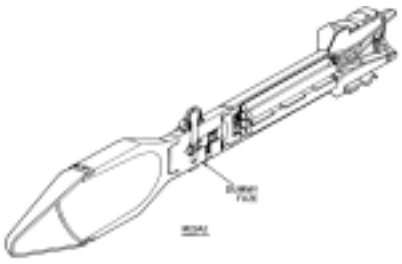


3.5 Inch M28 HEAT and M29 Practice Rockets, US


These are ground-fired fixed-fin rockets, which use a setback-armed, base detonating (BD), non-delay, impact-inertia-fired fuzes, and a high-explosive antitank (HEAT) shaped-charge warhead. The M29-series rockets are inert and are used for training. The fuzes are painted olive drab or black, and have the designation and loading information stamped in the body. The M28 warhead is olive drab with yellow markings; the M28A2 may have an olive drab or black warhead with yellow markings. Some M28A2 warheads with fuzes may be inserted and painted blue. The rocket motor may be brown, or olive drab with a brown band. The M29 warhead and rocket motor are blue. The M29A1 and M29A2 warheads are blue, and the rocket motors are brown, or olive drab with brown bands. The M29-series practice heads have white markings. The contact ring and groove or notches, on all the rockets, are unpainted.

FUNCTIONING: The operation of the M404, M404A1, and M404A2 fuzes is the same. The M405 dummy fuze simulates the handling and arming pin ejection of the M404A2 fuze. Arming. Before rocket launch, the safety band and shorting clip are removed. The arming pin spring moves the arming pin outward (approximately 10-MM (0.38 inch)) until the shoulder on the arming pin engages the setback sleeve. As the rocket is loaded into the launcher tube, the tube forces the arming pin inward, disengaging the setback sleeve. When the rocket is launched, the setback sleeve compresses the creep spring, clears the arming pin path, and is locked in this position by the spring-loaded detent. The arming pin bears against the inner wall of the launcher tube until the rocket leaves the launcher, at which time the arming pin spring ejects the arming pin, arming the rocket. Firing. Upon rocket impact, the inertia plunger moves forward, striking the firing pin lever. This action forces the firing pin into the detonator, initiating the explosive train.



HAZARDOUS COMPONENTS: Except for the M405 dummy fuze, the fuzes contain a detonator with less than 1 gram of explosive and, depending on the fuze, a maximum booster charge of 5 grams of tetryl. The M28- and M29-series rocket motors contain 159 grams (5.6 ounces) of M7 propellant and an electric igniter that contains less than 1 gram of black powder. The M28-series rocket warheads contain 853 grams (1.9 pounds) of composition B.

3.5 Inch MK 8 Rocket, SAP

The head is of solid steel and contains no high explosives or fuze. The round was developed to give better underwater travel and is used as a Semi-Armor piercing projectile. This projectile replaces the 3.5inch MK 2 head.

4.5 inch Barrage Rocket, MK3

This is a light demolition rocket intended for launching from landing boats, amphibious trucks, or from portable launchers of one or more rails. The head and motor are coupled by a threaded means. The head is hemispherical while the body and tail is reduced.

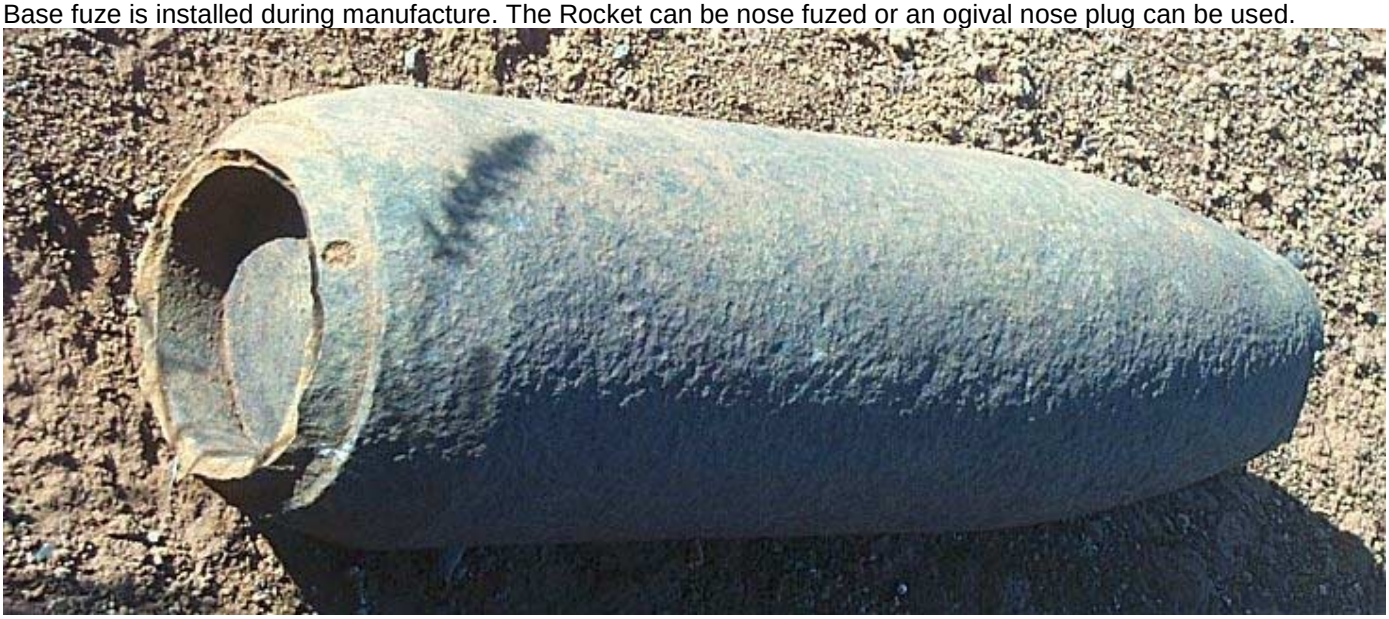
Head Length: 13 Inches **Overall Length with motor**: 30 Inches.

Fuzing: MK137 or MK145 Nose fuze.

Hazardous components: The rocket contains about 6.5 Lbs. of TNT. The rocket motor consists of a single grain of ballistite 11 inches long and about 1.7 inches in diameter.

5 Inch A.R MK1

This rocket warhead uses a 3.25-inch Rocket motor. The base is tapered and the rocket warhead is made of steel. The Base fuze is installed during manufacture. The Rocket can be nose fuzed or an ogival nose plug can be used.



Fuzing: Nose: MK148, MK149
Base: MK146, MK157 and MK165.

Hazardous Components: The rocket Warhead contains 8.6 Lbs. of TNT.

5 Inch A.R. MK2 HE

The MK2 Rocket Warhead is 14 Inches long and is made of steel. The MK2 Head is designed to penetrate 3 inches of homogeneous armor plate.

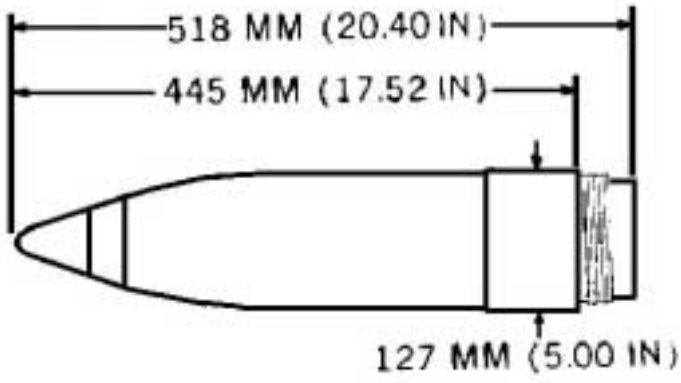
Fuzing: MK166 BD Fuze

Hazardous Components: 2.66 Lbs. of Explosive D.

U.S. WARHEAD, ROCKET, 5.0-IN, MK6 Practice and HE

The MK6 HE Rocket Warhead is issued from the manufacture with a Base fuze. A nose fuze can be installed or used with an ogive nose plug.

BASE FUZE



Hazardous Material: The MK 6 Rocket warhead has 7.5 Lbs. of TNT.

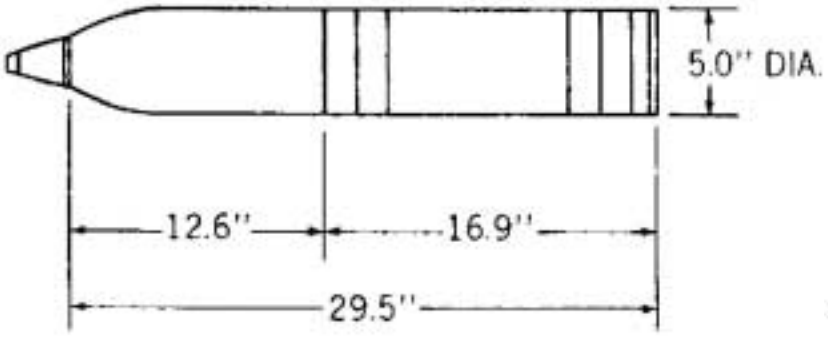
PRACTICE:

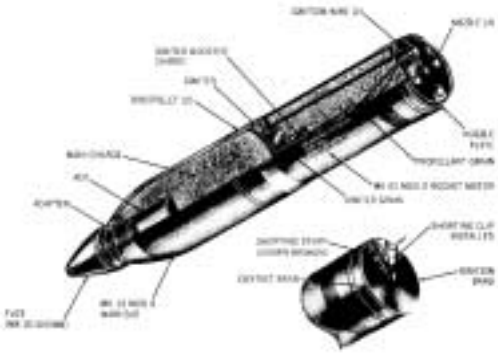
These are practice warheads used to simulate a live warhead for training purposes. They are inert filled to give them the same ballistic characteristics as an explosive loaded service warhead. The ogive nose plug is designed for use against hard targets. The blunt nose plug is designed as a shipping plug; however, this plug may be left installed on practice warheads used against water-based targets to prevent ricochets. The warheads are painted blue, with the nomenclature stenciled on the warhead body in white. The Mk 6 Mod 7 practice warheads are steel. The approximate warhead weight is 21.4 kilograms (47.1 pounds).

HAZARDOUS COMPONENTS: These warheads are inert loaded, and contain no hazardous components.

U.S. ROCKET, 5.0-IN, BOMBARDMENT, MK 50 (BOMBROC) with WARHEAD, MK 10

This is a solid propellant, spin-stabilized surface-to-surface, bombardment rocket with a high-explosive (HE) warhead. The rocket is painted olive drab with a yellow band around the nose. Identification markings on the warhead are stenciled in 1/4-inch-high white letters. Identification markings on the rocket motor are stenciled in 1/4-inch yellow letters. The shorting assembly tag is red with white letters. The fitting and features of this rocket are shown in the figure. The four nozzles are canted at an angle of 12 degrees. The rocket motor and warhead are steel. The ignition band is phenolic-asbestos, with a tin-plated steel contact band. The loaded rocket weighs 52.5 pounds. After rocket motor burnout, the rocket weighs approximately 39 pounds.



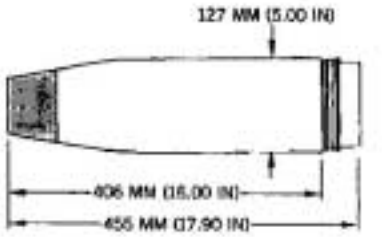


FUNCTIONING: Before the rocket is fired, the shorting tab, which is hooked to the shorting strap on the ignition-band, is pulled. This breaks the shorting straps allowing the rocket motor to be launched on electrical command. Current from the launcher passes through the contact band and ignition wires to the igniter. Two squibs ignite the booster charge and igniter grain, which ignites the propellant grain. The propellant gas is expelled through the nozzle, blows off the ignition band, and propels the rocket. The canted nozzles impart spin in flight. FUZING: The rocket uses the Mk 30 Mods 3, 4, and 5 point-detonating (PD) fuzes. The Mk 44 Mod 2 and Mk 52 Mod 3 auxiliary detonating fuzes (ADF) are used with the Mk 30 nose fuzes.

HAZARDOUS COMPONENTS: The warhead contains 10 pounds of composition B. The rocket motors contain 13.9 pounds of fluorocarbon-base propellant. The igniter contains a booster charge and two Mk 2 Mod 0 squibs each containing less than 1 gram of explosive and a 7.5-gram magnesium-teflon-viton igniter grain.

U.S. WARHEAD, ROCKET, 5.0-IN, GP, MK 24 (ZUNI) WITH BD FUZE, MK 191

The figure shows the appearance and dimensions of the Mk 24 Mods 0, 1, & 2 warheads. These are general-purpose (GP) warheads. They use the Mk 191 Mod 0 & 1 fuzes which are sustained-acceleration-armed, impact-inertia-fired, electromechanical, base-detonating (BD) fuzes. The Mk 191 Mod 1 fuze has an acceleration-discrimination feature that prevents the fuze from arming if the rocket is accidentally released. The Mod 0 fuze does not have this feature. When the Mk 24 Mod 0 warhead is fitted with an ogival nose plug, it is used to penetrate hard targets. When the Mk 24 Mod 0 warhead is fitted with a nose fuze, it is used against personnel and light-material targets. The Mk 191 Mod 1 BD fuze is permanently installed in the Mk 24 Mod 0 warhead. The warheads are painted olive drab, with a yellow band around the forward end. The nomenclature and manufacturing data are stenciled in yellow on the cases. The mark and mod of the base fuze is stenciled in yellow on the side of the Mk 24 Mod 0 warhead. Fuze nomenclature and loading data are stenciled in black on the fuze baseplug. The warheads are steel. The warheads weigh approximately 20.4 kilograms (45.0 pounds).

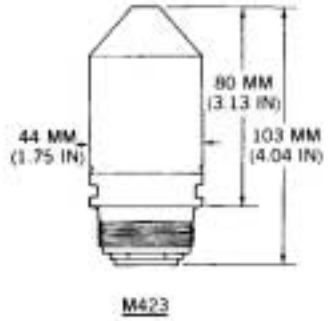


FUNCTIONING: Arming. Acceleration of at least 20 Gs, normally attained when the rocket is fired, causes the setback weights in both the forward and rear arming mechanisms to move rearward. The unbalanced rotors in the arming mechanisms are released and rotate to the armed position after sustained acceleration for a distance of between 122 and 305 meters (400 and 1,000 feet). The following are the result of rotor alignment. NOTE. Under conditions of low acceleration or tumbling action resulting from accidental release, the acceleration discriminator prevents the forward arming mechanism of the Mod 1 fuze from moving to the armed position. The Mod 0 fuze, having no acceleration discriminator, may arm under these conditions. The detonator in the rotor of the forward arming mechanism is aligned with the booster lead. The flash channel in the rear arming mechanism is aligned with the electric primer and the detonator in the forward arming mechanism. In addition, the flat side of the half-round rotor shaft is presented to the narrow part of the arming-plunger key slot, releasing the arming plunger. When released, the arming plunger and the connected striker assembly are moved rearward by the plunger spring to a place where the striker release balls are cammed into a cavity in the base assembly. This releases the cocked striker, which is driven rearward, cutting the shorting wire to remove the short from the electric primer. The fuze is now armed. Firing. On impact, the ALNICO magnet in the MIG breaks away from the keeper and moves forward. This separation induces a current in the coil, which fires the electric primer, and, in turn, the warhead main charge.

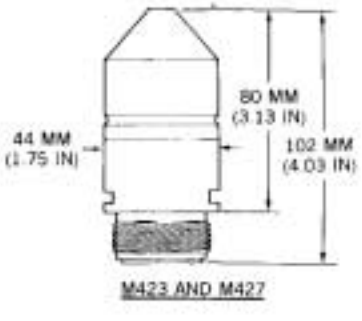
HAZARDOUS COMPONENTS: The Mods 0 & 1 warheads contain a main charge of 4.1 kilograms (9.1 pounds) of Composition B. The Mod 2 warhead contains 4.3 kilograms (9.5 pounds) of Composition B. The fuzes contain an electric primer, a tetryl-lead Azide detonator, and a tetryl booster lead, each weighing less than 1 gram. The fuze booster contains approximately 22 grams of tetryl.

U.S. FUZE, ROCKET, NOSE, PD, M423 & M427

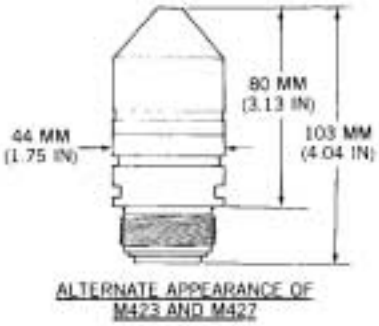
These are setback- and acceleration-delay-armed, super quick, point detonating, rocket nose fuzes. The fuzes are designed to function at impact angles of 5 degrees or more. The M423 fuze is painted olive drab. The M427 fuze is anodized olive green. The tip of an M423 fuze with a crimped-on striker pin body may be painted black. The tip of the M427 fuze is painted red. The nomenclature, type, and loading information are stenciled on the side of the fuze in yellow. The M423 fuze may have a screwed-on or crimped-on striker pin body. The M427 has only the crimped-on striker pin body. The fuze bodies are aluminum. Positively identify the fuze. Other fuzes, which are similar in appearance, may require different procedures. The safety and arming device forward of the booster housing (explosive charge) contains an unbalanced rotor. Upon acceleration of the rocket at firing, a weight setback occurs in the unbalanced rotor assembly that houses the primer and detonator. This setback places the fuze into an armed condition when the rocket has traveled approximately 43 to 92 meters from the launcher.



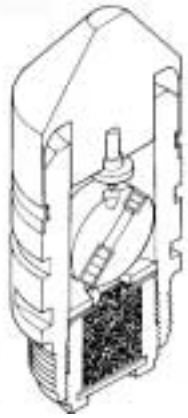
M423



M423 AND M427



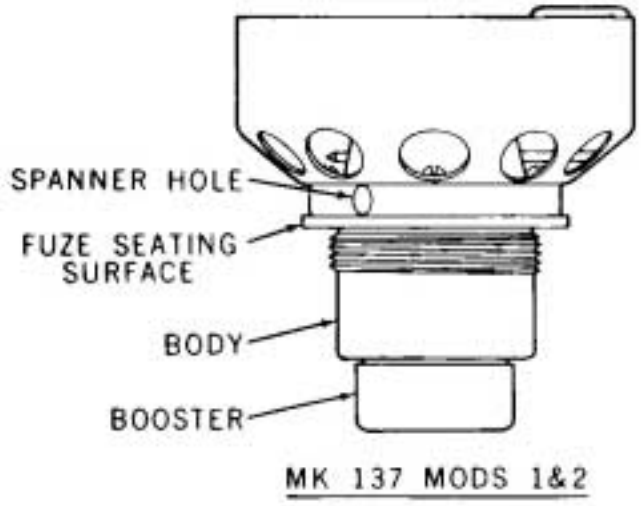
ALTERNATE APPEARANCE OF
M423 AND M427

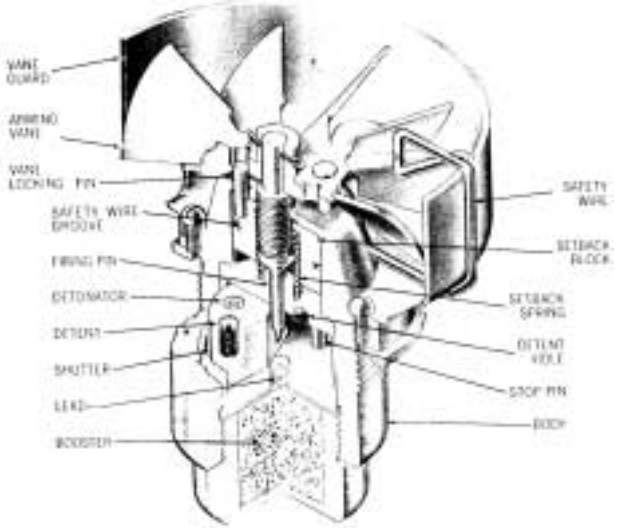


FUNCTIONING: Except for arming delay time, the two fuzes are identical in functioning. Arming: When the munition is fired, inertia causes the setback weight of the rotor mechanism to travel rearward, overcoming the resistance of the setback-weight springs. The rearward movement of the setback weight frees the lock roller, and releases the rotor. On release, the unbalanced rotor, under the force of acceleration, rotates, slowed by the escapement mechanism, until the explosive train is aligned. At this position, the spring-loaded detent locks the rotor in place. The fuze is now armed. If acceleration is not sustained until the rotor is locked, the setback-weight springs force the setback weights forward, driving the rotor back to its original unarmed position. Firing: On impact of the fuze, the striker pin drives the hammer and firing pin rearward. This action shears two tabs from the setback washer, allowing the point of the firing pin to strike the primer, initiating the firing train.

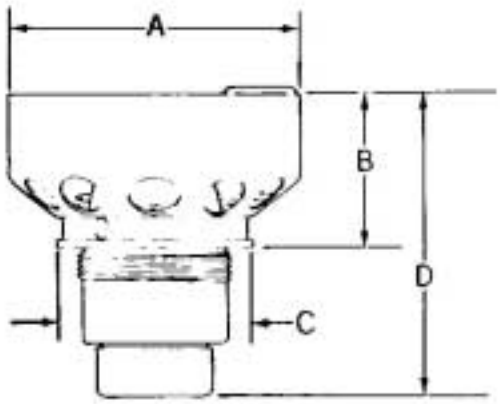
HAZARDOUS COMPONENTS: The fuzes contain a stab primer and a detonator of lead Azide, and a tetryl lead, each weighing less than 1 gram, and a 9-gram tetryl booster.

U.S. FUZE, ROCKET, NOSE, MK 132; MK 137; MK 145; & MK 154





These are vane-armed, impact-instantaneous-fired fuzes. The fuzes are unpainted. The nomenclature and manufacturing markings are stamped into the body. The bodies are brass with steel vane guards. The arming vanes are either steel or aluminum. The figure shows the appearance and dimensions of the Mk 137 Mods 1 and 2, and Mk 154 Mods 0, 2, and 3 fuzes, and the dimensions of the similar appearing fuzes.



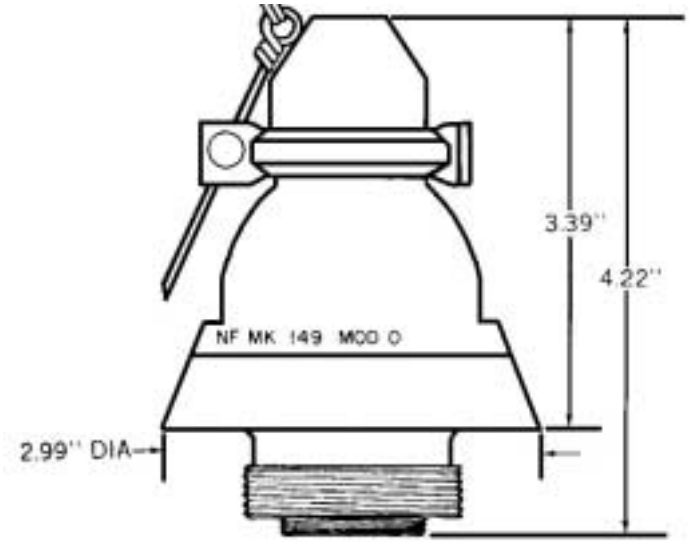
FUZE	DIMENSIONS				NO. OF BLADES
	A	B	C	D	
MK 132 MOD 0	71 MM (2.80 IN)	33 MM (1.30 IN)	46 MM (1.80 IN)	495 MM (1950 IN)	8
MK 137 MOD 0	71 MM (2.80 IN)	38 MM (1.50 IN)	46 MM (1.80 IN)	74 MM (2.90 IN)	8
MK 137 MODS 1 AND 2	71 MM (2.80 IN)	38 MM (1.50 IN)	46 MM (1.80 IN)	74 MM (2.90 IN)	10
MK 145 MOD 0	71 MM (2.80 IN)	38 MM (1.50 IN)	46 MM (1.80 IN)	76 MM (3.00 IN)	8
MK 145 MOD 1	71 MM (2.80 IN)	38 MM (1.50 IN)	46 MM (1.80 IN)	76 MM (3.00 IN)	10
MK 154 MODS 0,2 AND 3	71 MM (2.80 IN)	35 MM (1.40 IN)	46 MM (1.80 IN)	414 MM (16.30 IN)	10

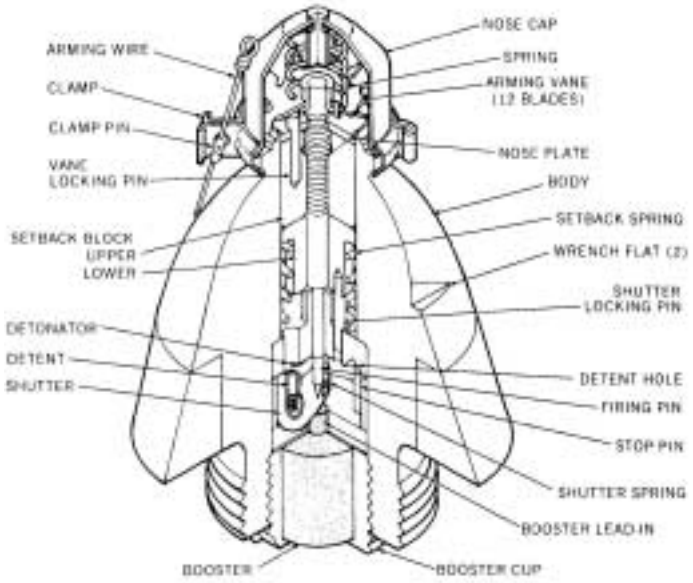
FUNCTIONING: Before firing the rocket, the safety wire is removed. Upon firing the rocket, setback causes the setback block to move rearward, compressing the setback spring and withdrawing the vane-locking pin, freeing the arming vane to rotate. The air stream causes the vane to rotate, which screws the firing pin forward freeing the shutter. The shutter spring (not shown) moves the shutter detonator in line with the firing pin. The spring-loaded detent locks the shutter in the armed position. Upon impact, the vane and firing pin are driven rearward, shearing the threads in the body and driving the firing pin into the detonator, initiating the explosive train.

HAZARDOUS COMPONENTS:
Each fuze has a shutter detonator and a tetryl lead, weighing less than 1 gram each.
The Mk 132 Mod 0 contains a tetryl burster of an unknown weight
The Mk 137-series fuze has a 9-gram tetryl booster;
The Mk 145-series fuzes have an approximate 12-gram tetryl booster.
The Mk 154-series fuzes contain a 65-gram (2.3-ounce) tetryl burster.

U.S. FUZE, ROCKET, POINT DETONATING, MK 149

These are setback- and vane-armed, impact-fired, instantaneous, point-detonating fuzes. The fuzes are unpainted. Their designation and manufacturing information are stamped around the body. The fuzes are issued with the nose cap clamped in place to protect the arming vane from icing during aircraft flight at high altitude.



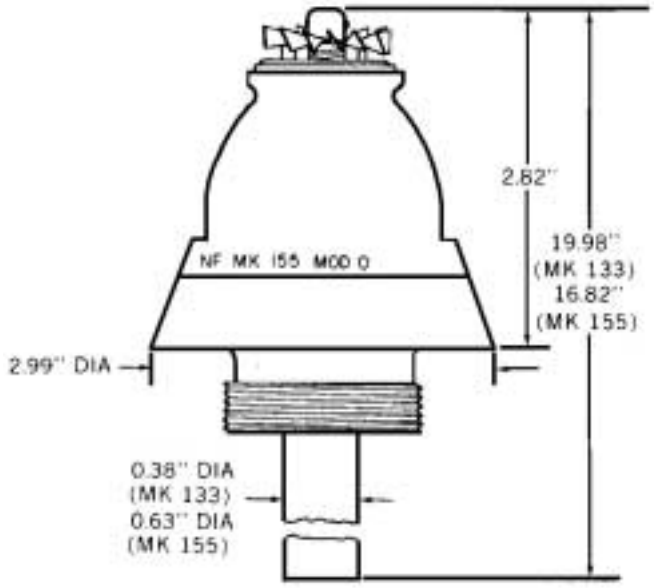


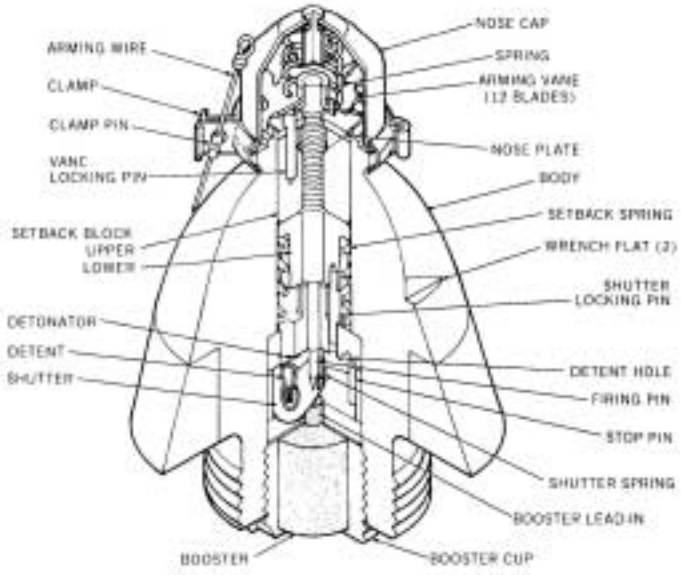
FUNCTIONING: When the rocket is fired, the arming wire is withdrawn from the clamp pin, allowing the clamp halves to separate as the spring forces the nose cap forward and off the fuze. Simultaneously, setback drives the upper and lower setback blocks rearward against the setback spring. The vane-locking pin disengages from the arming vane, and the shutter locking pin moves into the path of the shutter. The air stream rotates the freed arming vane, screwing the firing pin forward. After approximately eight vane revolutions, the firing pin clears the shutter, which is then forced by its spring against the shutter-locking pin. The firing pin continues to screw forward until its shoulder contacts the nose plate. When rocket acceleration ceases, the setback spring forces the setback blocks forward, retracting the shutter locking pin. This allows the shutter spring to force the shutter against the stop pin, aligning the detonator with the booster lead-in. The spring-loaded detent locks the shutter in the armed position. Impact drives the vanes and firing pin rearward, shearing the threads in the nose plate and driving the firing pin into the detonator to initiate the explosive train.

HAZARDOUS COMPONENTS: Each fuze has a detonator weighing less than 1 gram and a tetryl booster lead-in of unknown weight. The Mk 149 has a 9-gram tetryl booster.

U.S. FUZE, ROCKET, POINT DETONATING, MK 133 & MK 155

These are setback- and vane-armed, impact-fired, instantaneous, point-detonating fuzes. The fuzes are unpainted. Their designation and manufacturing information are stamped around the body. The fuzes are issued with the nose cap clamped in place to protect the arming vane from icing during aircraft flight at high altitude.



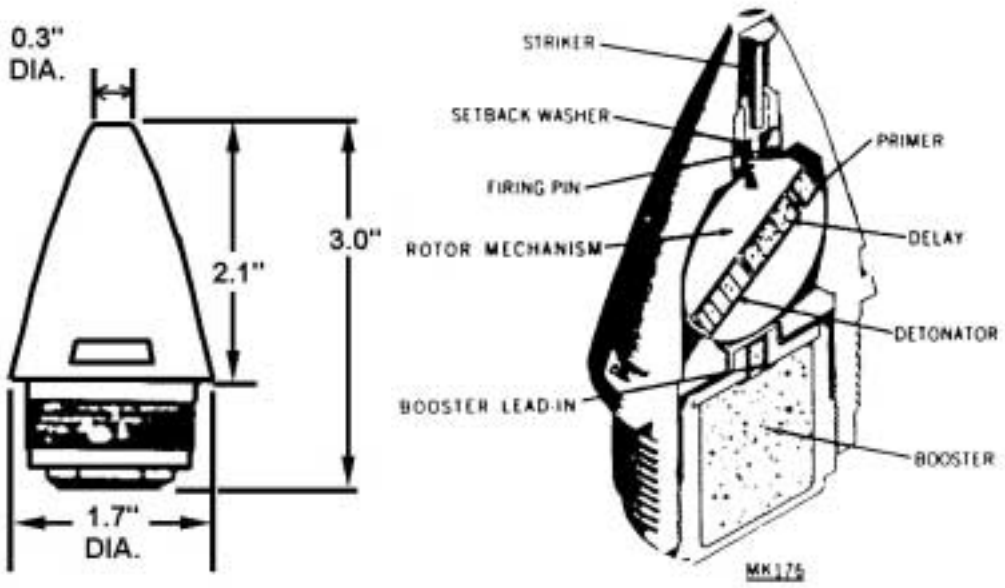


FUNCTIONING: When the rocket is fired, the arming wire is withdrawn from the clamp pin, allowing the clamp halves to separate as the spring forces the nose cap forward and off the fuze. Simultaneously, setback drives the upper and lower setback blocks rearward against the setback spring. The vane-locking pin disengages from the arming vane, and the shutter locking pin moves into the path of the shutter. The air stream rotates the freed arming vane, screwing the firing pin forward. After approximately eight vane revolutions, the firing pin clears the shutter, which is then forced by its spring against the shutter-locking pin. The firing pin continues to screw forward until its shoulder contacts the nose plate. When rocket acceleration ceases, the setback spring forces the setback blocks forward, retracting the shutter locking pin. This allows the shutter spring to force the shutter against the stop pin, aligning the detonator with the booster lead-in. The spring-loaded detent locks the shutter in the armed position. Impact drives the vanes and firing pin rearward, shearing the threads in the nose plate and driving the firing pin into the detonator to initiate the explosive train.

HAZARDOUS COMPONENTS: Each fuze has a detonator weighing less than 1 gram and a tetryl booster lead-in of unknown weight.
The Mk 133 has a tetryl burster of unknown weight.
The Mk 155 has a 2.3-ounce tetryl burster.

U.S. FUZE, ROCKET, NOSE, (PD), MK 176 AND MK 178

These are setback and acceleration delay armed, impact-fired, point detonating rocket nose fuzes. The Mk 178 is a superquick fuze. The Mk 176 has a 0.0004-second firing delay. The fuze designation and loading information are stamped on the body. The fuzes are unpainted. The fuzes are steel.

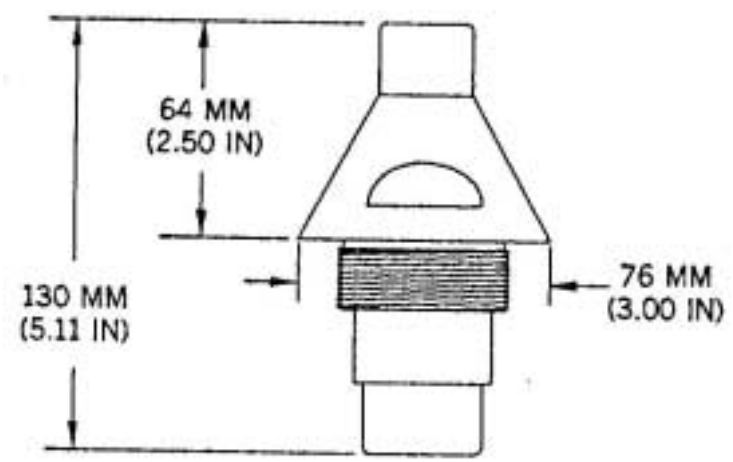


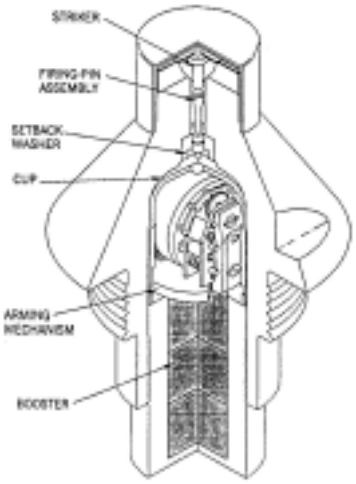
FUNCTIONING: ARMING. When the rocket is fired, inertia causes the setback weight of the rotor mechanism to travel rearward, overcoming the resistance of the setback-weight springs. The rearward movement of the setback weight frees the lock roller and releases the rotor. On release, the unbalanced rotor, subjected to forces of acceleration, rotates at a predetermined rate imposed by the escapement mechanism delays fuze arming. With sustained acceleration, the rotor revolves until its explosive train is aligned between the firing pin and the booster lead-in. At this position, a spring-loaded detent locks the rotor in place, and the fuze is armed. NOTE: If acceleration is not sustained until the rotor becomes locked in the armed position, the setback-weight springs force the setback weight forward, driving the rotor back into its original unarmed position. FIRING: On impact, the striker drives the firing pin rearward. This action shears two tabs (not shown) from the setback washer, allowing the point of the firing pin to strike the primer, initiating the explosive train.

HAZARDOUS COMPONENTS: The Mk 176, and Mk 178, fuzes contain a primer, a delay (except in the Mk 178), a detonator, a booster lead-in, and a 9 gram tetryl booster. All explosive components except the boosters weigh less than 1 gram.

U.S. FUZE, ROCKET, NOSE, PD, MK 188

This is an acceleration-armed instantaneous impact-fired point-detonating rocket nose fuze. The fuze is unpainted. Fuze designation, type, and loading information are stamped or stenciled on the fuze body immediately forward of the seating surface. When installed in some rocket warheads, an adapter is used to reduce the thread diameter of the fuze. The fuze is aluminum, with a steel nose cap.



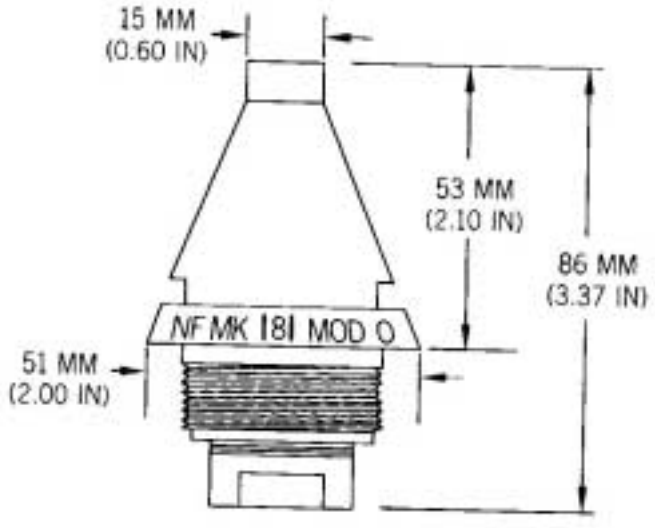


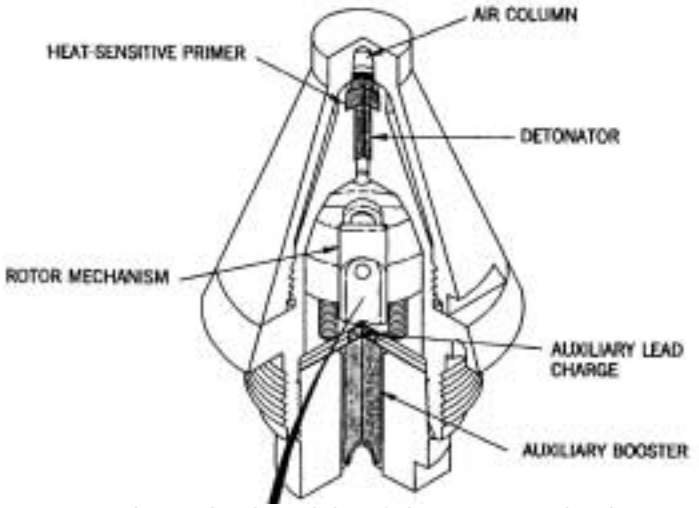
FUNCTIONING: Arming. When a rocket is fired, acceleration of 13 to 15 gs moves the setback weight of the arming mechanism rearward against the action of the setback-weight springs. This movement releases the lock roller on the rotor, freeing the unbalanced rotor to rotate. Under the force of sustained acceleration, the unbalanced rotor rotates at a rate imposed by the escapement until the primer is aligned between the firing pin and booster lead. At this position, a spring-loaded detent locks the rotor in place. NOTE: If acceleration is not sustained until the rotor locks in the armed position, the setback-weight springs force the setback weight forward, driving the rotor back into its original (unarmed) position. Firing: On impact, the striker drives the firing pin assembly rearward. This action shears two tabs from the setback washer, allowing the point of the firing pin to penetrate the copper cup and strike the primer. The primer fires the detonator, which, in turn, detonates the booster.

HAZARDOUS COMPONENTS: The fuze contains a stab primer, a detonator, and a lead each with less than 1 gram of explosive, and a 27-gram tetryl booster.

U.S. FUZE, ROCKET, NOSE, PIBD, MK 181 AND M406

The figure shows the appearance and dimensions of the Mk 181 Mod 0 fuze. Except for minor design changes, the other fuzes are very similar. The M406 fuze is obsolete and was replaced by the Mk 181 series fuzes, and Mk 181 Mod 3 has replaced the now obsolete Mk 181 Mods 0, 1, and 2 fuzes. These are set back and acceleration delay armed, impact fired, point initiating base detonating (PIBD) nose fuzes. The fuze designation and loading information are stamped or stenciled on the fuze body. The fuzes are unpainted. The fuzes are steel.



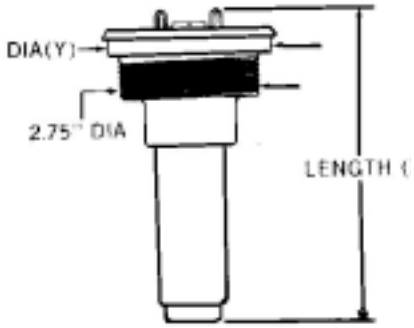


FUNCTIONING: Inertial force resulting from acceleration causes the setback weight of the rotor mechanism to travel rearward, overcoming the resistance of the setback-weight springs. The rearward movement of the setback weight frees the lock roller, which releases the rotor. On release, the unbalanced rotor, under the force of acceleration, rotates at a predetermined rate imposed by the escapement. The escapement delays fuze arming. During sustained acceleration, the rotor revolves until the rotor-lead charge is brought into alignment with the other components of the fuze firing train. In this position, the spring-loaded detent engages the detent hole and locks the rotor in place. The fuze is now armed. NOTE: If acceleration is not sustained until the rotor becomes locked in the armed position, the setback-weight springs force the setback weight forward, driving the rotor back into its original unarmed position. On impact, the fuze windshield is crushed, the air column is compressed, and the heat generated by compression initiates the heat-sensitive primer. In an armed fuze, action of the primer is transmitted to the auxiliary booster through the detonator, rotor lead charge, and auxiliary lead charge. The auxiliary booster has a shaped charge at its base. When initiated, the shaped charge sends a jet of high-temperature gases rearward to detonate the warhead base booster.

HAZARDOUS COMPONENTS: The fuzes contain a primer, detonator, rotor-lead charge, and an auxiliary lead, each containing less than 1 gram of explosive, and an 8 gram RDX auxiliary booster.

U.S. FUZE, ROCKET, BASE, MK 146, MK 157, MK 159

These are gas pressure and setback-armed, impact-inertia-fired, base detonating fuzes. The Mk 146 fuzes are non-delay. The Mk 157 fuzes have a 0.02-second firing delay. The Mk 159 fuzes have a 0.015-second firing delay. The fuzes are unpainted. The fuzes have their designation and manufacturing information stamped in the flat upper surface of the head. The inlet shield is not present on all of the fuzes. These fuzes are issued installed in the base of rocket warheads. All of the fuzes are concealed by the motor, which screws into or over the base of the warhead in which they are installed. The fuzes are steel. The tip of the firing pin maintains the spring-loaded shutter so that the detonator is out-of-line with the booster lead. The other fuzes are similar except that the Mk 146, Mk 157, Mk 159, and Mk 161 fuzes do not have the setback block, setback spring, and shutter lockpin that provide a positive, setback-operated, arming delay.



MK 146 FUZE GROUP

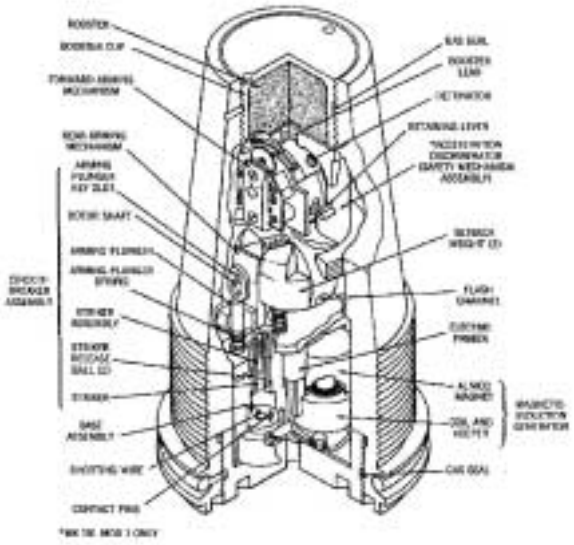
MARK	146	157		159		163	164
MODS	0,1	0,1	2	0	1	0,1	0
X(IN.)	6.17	6.17	6.20	5.81	5.81	6.49	6.18
Y(IN.)	2.88	2.94	3.20	2.97	3.20	3.20	3.20

FUNCTIONING: When the rocket is fired, gas generated by the burning propellant in the rocket motor enters the pressure chamber in the fuze head through the inlet. The inlet filter prevents debris from clogging the inlet. Simultaneously, setback drives the setback block rearward against its spring, forcing the shutter lockpin into engagement with the shutter against the spring-loaded detent. Rapid pressure buildup in the pressure chamber is prevented by the small diameter of the inlet. When the pressure reaches a predetermined value (after approximately half the propellant burning time), the diaphragm collapses, forcing the arming plunger forward and breaking the shear wire. This frees the lock ball to move inward, which allows the firing pin body to move rearward due to the force of the creep spring and the setback of sustained acceleration. The firing pin is withdrawn from the shutter, leaving it held out-of-line only by the shutter lockpin. As acceleration ceases, the setback block is moved forward by its spring, withdrawing the shutter lockpin from the shutter that is snapped into alignment by its spring. The spring-loaded locking detent locks the shutter in the armed position. The firing pin is held rearward only by the creep spring. Impact drives the firing pin forward into the detonator to initiate the explosive train.

HAZARDOUS COMPONENTS: Each of the fuzes contains either an instantaneous detonator or delay detonator assembly weighing less than 1 gram, a tetryl lead of unknown weight, and an approximately 12-gram tetryl booster.

MK191 Base Detonating Fuze for the MK24 HE Rocket Warhead

The Mk 191 Mod 0 & 1 fuzes which are sustained-acceleration-armed, impact-inertia-fired, electromechanical, base-detonating (BD) fuzes. The Mk 191 Mod 1 fuze has an acceleration-discrimination feature that prevents the fuze from arming if the rocket is accidentally released. The Mod 0 fuze does not have this feature. The Mk 191 Mod 1 BD fuze is permanently installed in the Mk 24 Mod 0 warhead. Fuze nomenclature and loading data are stenciled in black on the fuze baseplug



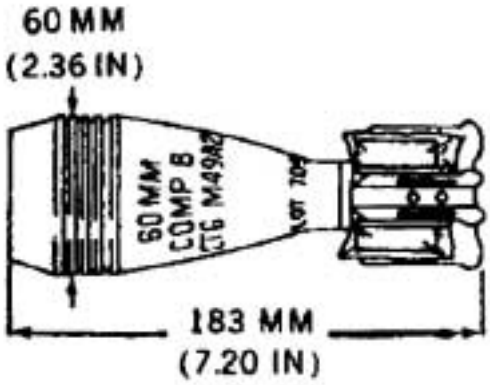
FUNCTIONING: Arming. Acceleration of at least 20 Gs, normally attained when the rocket is fired, causes the setback weights in both the forward and rear arming mechanisms to move rearward. The unbalanced rotors in the arming mechanisms are released and rotate to the armed position after sustained acceleration for a distance of between 122 and 305 meters (400 and 1,000 feet). The following are the result of rotor alignment. NOTE. Under conditions of low acceleration or tumbling action resulting from accidental release, the acceleration discriminator prevents the forward arming mechanism of the Mod 1 fuze from moving to the armed position. The Mod 0 fuze, having no acceleration discriminator, may arm under these conditions. The detonator in the rotor of the forward arming mechanism is aligned with the booster lead. The flash channel in the rear arming mechanism is aligned with the electric primer and the detonator in the forward arming mechanism. In addition, the flat side of the half-round rotor shaft is presented to the narrow part of the arming-plunger key slot, releasing the arming plunger. When released, the arming plunger and the connected striker assembly are moved rearward by the plunger spring to a place where the striker release balls are cammed into a cavity in the base assembly. This releases the cocked striker, which is driven rearward, cutting the shorting wire to remove the short from the electric primer. The fuze is now armed. Firing. On impact, the ALNICO magnet in the MIG breaks away from the keeper and moves forward. This separation induces a current in the coil that fires the electric primer and, in turns, the warhead main charge.

HAZARDOUS COMPONENTS: The Mods 0 & 1 warheads contain a main charge of 4.1 kilograms (9.1 pounds) of Composition B. The Mod 2 warhead contains 4.3 kilograms (9.5 pounds) of Composition B. The fuzes contain an electric primer, a tetryl-lead Azide detonator, and a tetryl booster lead, each weighing less than 1 gram. The fuze booster contains approximately 22 grams of tetryl.

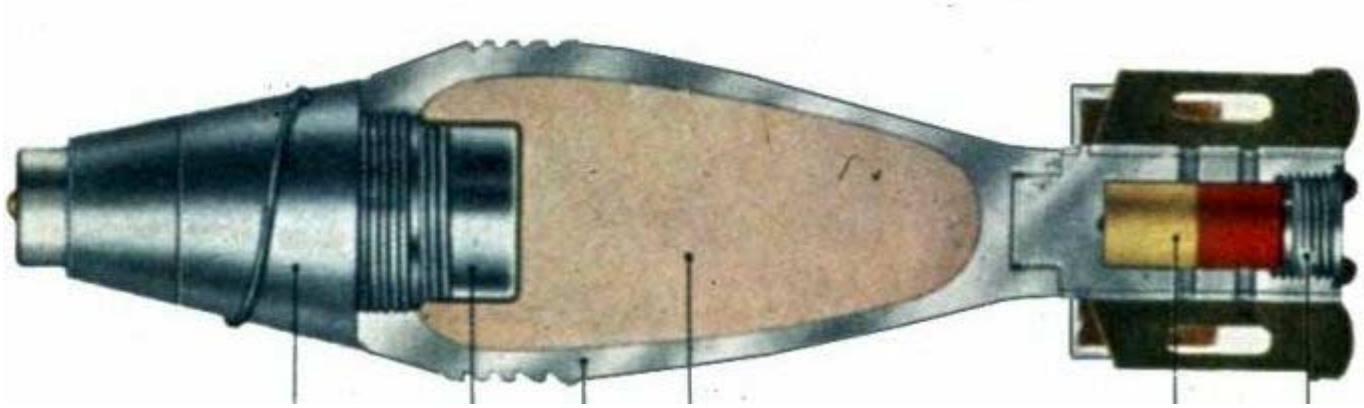
MORTARS

M49A2 and M49A3 60mm HE Mortar, US

Description: These are Army, fin stabilized, mortar fired, high explosive projectiles. The projectiles are painted olive drab with yellow identification markings. The body is malleable iron. The fins are made of mild steel.



FUNCTIONING: Projectiles in this general category produce their intended effect by blast and/or fragmentation. They contain a substantial HE main charge and consequently have a relatively thin to medium body-wall thickness. Their fragmentation effect results from the fracture of the body wall on detonation of the main charge. They are or may be fitted with a variety of fuzes for effective use in engaging different types of targets. When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer ignites the ignition cartridge, and the cartridge ignites the propellant charge. Rapidly expanding gases from the burning propellant expel the projectile from the tube and propel it toward the target. The projectile is fin stabilized in flight. The fuze functions on impact, detonating the fuze booster charge and, in turn, the high explosive charge.

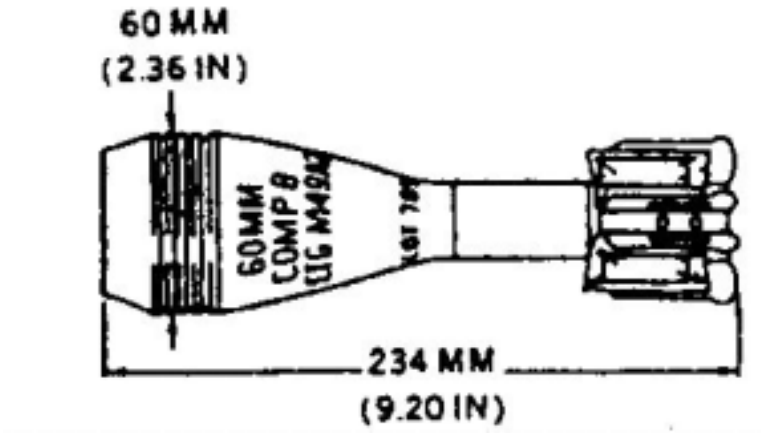


HAZARDOUS COMPONENTS: The M49A2 projectile contains a main charge of 153 grams (5.4 oz) of flake TNT. The M49A3 contains 190 grams (6.7 oz) of Composition B.

M49A4 and M49A2E2 60mm HE Mortar, US

Description: These are Army, fin stabilized, mortar fired, high explosive projectiles. The projectiles are painted olive drab with yellow identification markings. The body is malleable iron. The fins are made of mild steel. The Difference from This projectile is that the M49A2 and M49A3 is the addition of a 2-inch extension boom. Existing Stocks of M49A2 and M49A3 were converted by the addition of the 2-inch boom and Stenciled with the new nomenclature.

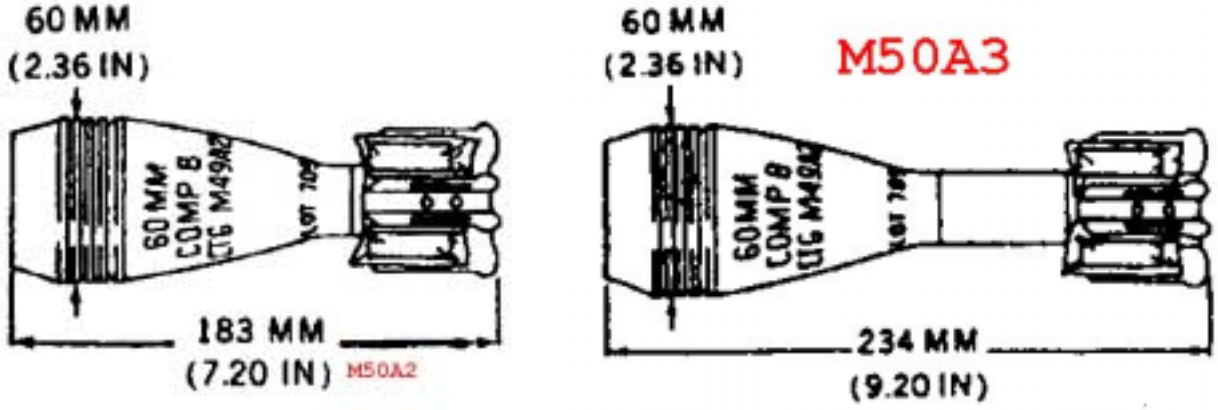
This Photo is of a M49A3 Stamped in the body and M49A4 Stenciled on after adding the 2-inch Boom.



Hazardous Components: NEW: 6.7 Ounces of Comp B

M50A2 and A3 60mm Practice Mortar, US

Description: This is an Army, fin stabilized, mortar fired, target practice projectile. Currently manufactured projectiles are painted blue with a brown band around the top of the projectile body and white identification markings. Projectiles of earlier manufacture lack the brown band. The body is forged steel or malleable iron, the tail boom and fins are made of steel. Body can be stamped with M49A3.

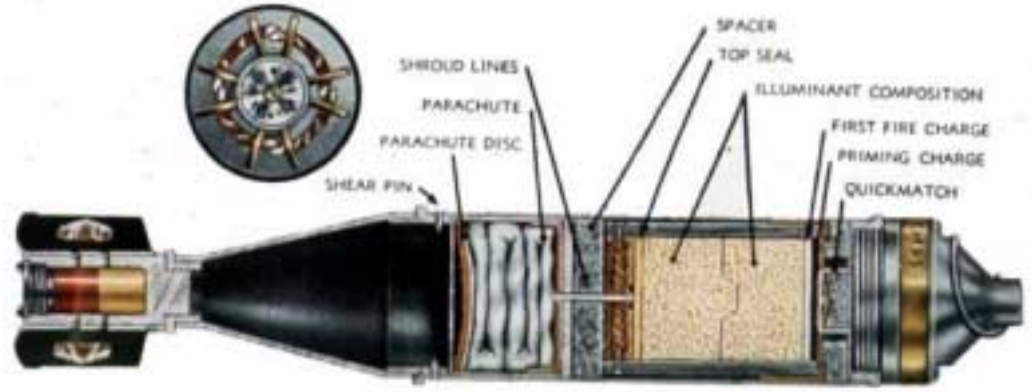


Most of this projectile is inert filler but it does have a 26-Gram (0.9-OZ) black powder spotting pellet, fuze, and fuze booster.
NEW: .9 Ounces of Black Powder.

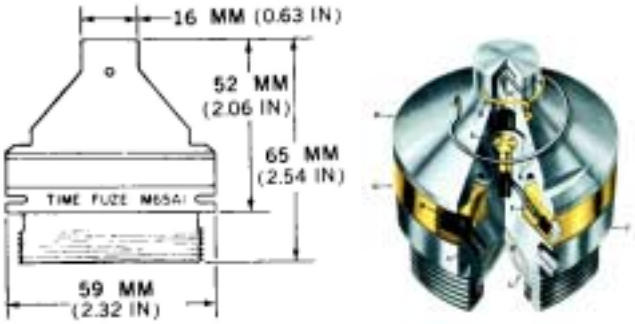
M83A1, A2 and A3 60mm Illumination Mortar, US

DESCRIPTION: These are mortars fired, fin-stabilized projectiles containing a base-ejected, parachute-suspended illuminant charge. Currently manufactured cartridges are painted white, with black identification markings. Cartridges of earlier manufacture are gray, with one white band and white identification markings. Except for the aluminum tail cone, the projectiles are steel. Only the M65 Fuze is used in this Projectile.

Each cartridge contains a 222-gram (7.8-ounce) illuminant charge, an 11-gram first-fire charge, a quickmatch and a black powder priming charge of unknown weights, an ignition cartridge containing 3 grams of double-base propellant, and a percussion primer.



These are setback-initiated, powder-train time (PTT), mortar-fired projectile fuzes which provide a fixed time delay of approximately 15 seconds. The fuzes are unpainted. The nomenclature and manufacturing information are stamped on each fuze. The M65 fuze differs from the M65A1 and M65A1E1 only in that it has two wrench holes in the body rather than wrench slots, and a cotter pin rather than a safety pin. The M65A1E1 is waterproof. The others are not. The head and body are zinc or aluminum, and the time ring is brass. WARNING Wait 30 minutes before approaching an armed fuze. Dampness or deterioration

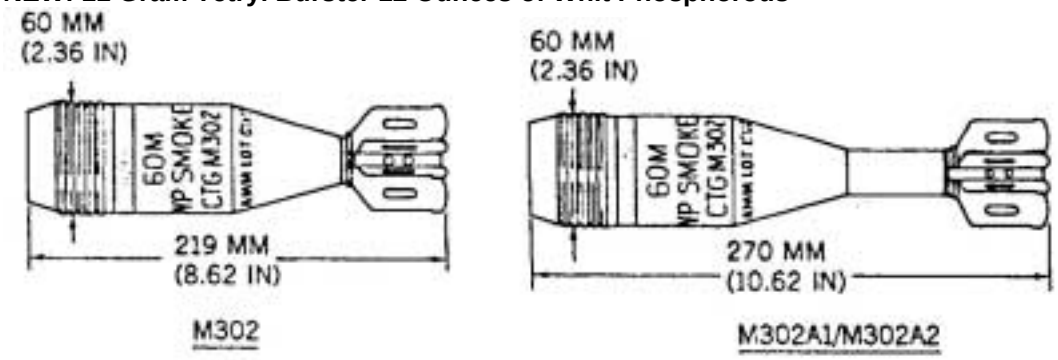


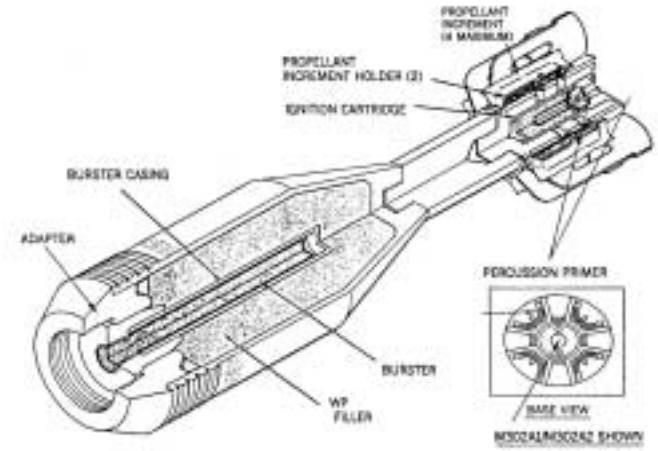
Each fuze contains a percussion primer, ignition pellet, time ring charge, body pellet, and black powder expelling charge. The combined weight of these components is 6 grams. May prolong the burning time of the time ring charge.

M302, M302A1 and A2 60mm WP Mortar, US

Description: These are mortar fired, fin-stabilized projectiles. The projectiles contain white phosphorus filler to produce screening or spotting smoke. Currently manufactured projectiles have a light-green body with one yellow band below the gas-check bands. Identification markings appear in light red. Projectiles of earlier manufacture have a gray body, with one yellow band and yellow markings. The fin extension and fins are unpainted aluminum the projectiles are steel.

NEW: 11 Gram Tetryl Burster 12 Ounces of Whit Phosphorous

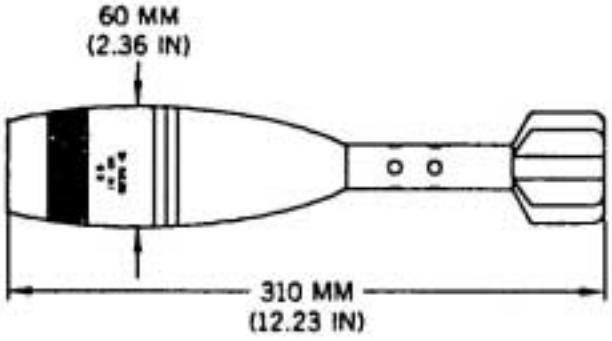




M720 60mm HE Mortar, US

This is an Army, fin stabilized, mortar fired projectile. The body is painted olive drab green with yellow markings. The body is steel, the tail boom and fins are unpainted aluminum. The M720 High Explosive Cartridges are designed for use with the M224 60mm Mortar System and are used against personnel, bunker and light materiel targets. The M720 consists of the following major components: Projectile Body Assembly, M204 Propelling Charge, M702 Ignition Cartridge, M27 Fin Assembly and a M935 Point Detonating Fuze or M734 Multi-Option Fuze

The projectile contains 359 grams (12.7 ounces) of composition B

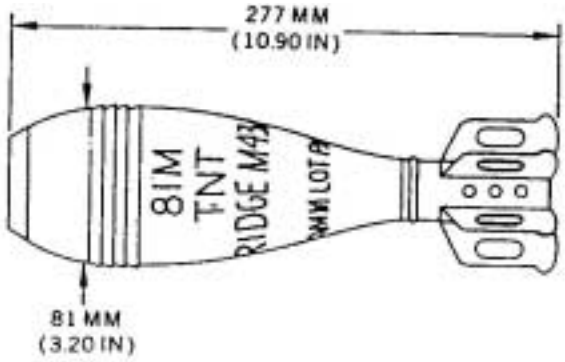


NOTE: This Projectile is Identical to the M888 HE 60mm Mortar.

M43A1 and M43A1B1 81mm HE Mortar, US

This is a fin stabilized mortar projectile used by the Army. The projectile is painted olive drab with yellow markings. The body and fins are steel.

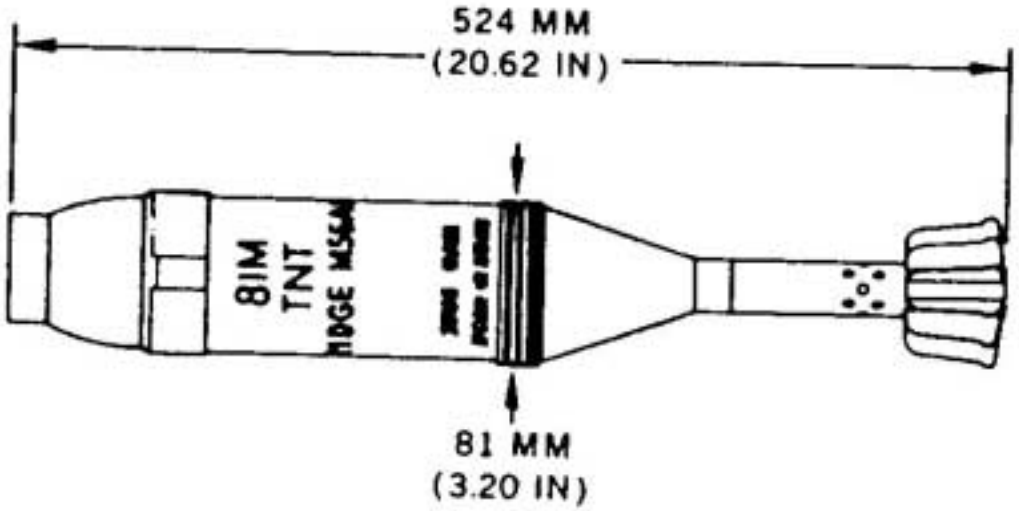
NEW of M43A1: 1.3 LBS of TNT
NEW of M43A1B1: 1.3 LBS of Composition B.



M56 81mm HE Mortar, US

These are fin stabilized, high explosive mortars used by the Army. The bodies are painted olive drab with yellow markings. The bodies are steel, the tail boom and fins are aluminum. Fuze Shown in Both Field Photos is the M77 TSQ Powder Time Train.

This projectile contains 2.0 KG (4.3 lbs.) of TNT.



M68 81mm Training Mortar, US

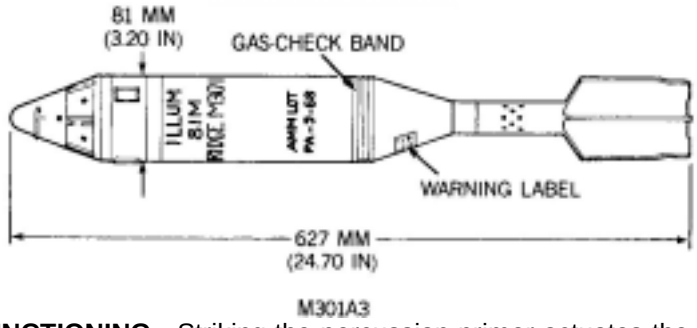
This is an Army, fin stabilized, mortar fired projectile, used for training on the loading and firing of the mortar. Currently manufactured projectiles are painted blue, earlier manufactured projectiles are painted black. The body is cast iron and the fins are unpainted aluminum. There is no provisions made for a fuze.

There is no Hazardous Material associated with this Projectile.

Length of Projectile including fins: 11.10 inches.

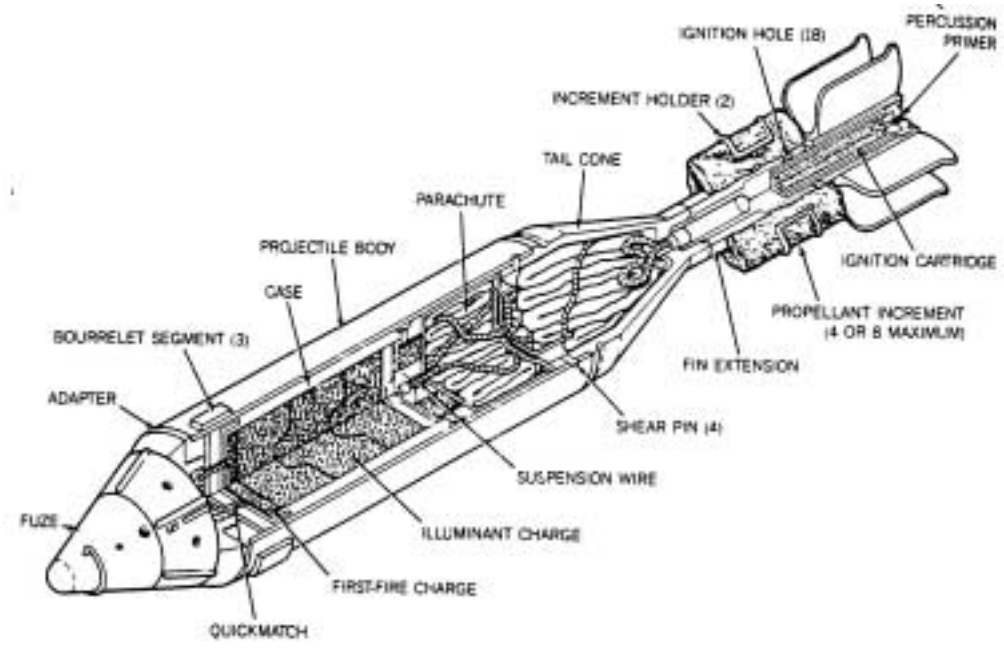
U.S. CARTRIDGE, 81-MM, ILLUMINATING, M301A3

These are Army fin stabilized, illuminating projectiles containing a base-ejected, parachute-suspended illuminant charge. The projectiles are painted white with stenciled black identification markings on the projectile bodies. Projectiles also may be gray with a white band and white markings. The projectiles are steel, with aluminum fin extensions and fins. The M301A3 cartridge tail cone has a warning label noting firing restrictions.



M301A3

FUNCTIONING: Striking the percussion primer actuates the ignition cartridge, igniting the propellant increments through the ignition holes. Gas generated by the burning propellant propels the projectile. Fuze functioning drives the tail cone rearward. This action shears the pins, ejects the illuminant charge and parachute, and ignites the quickmatch. The quickmatch ignites the illuminant charge, which burns for at least 60 seconds with a minimum candlepower of 500,000 candles

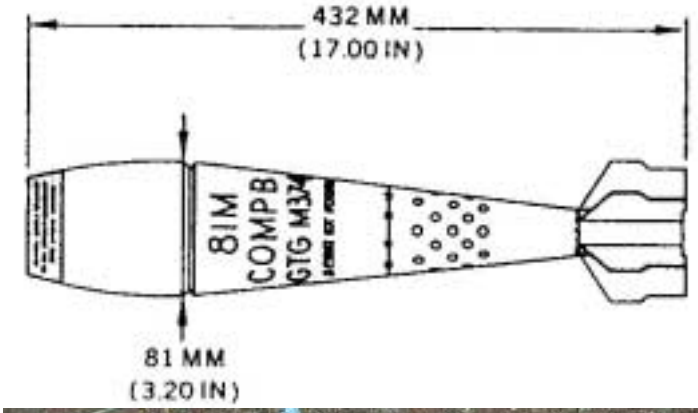


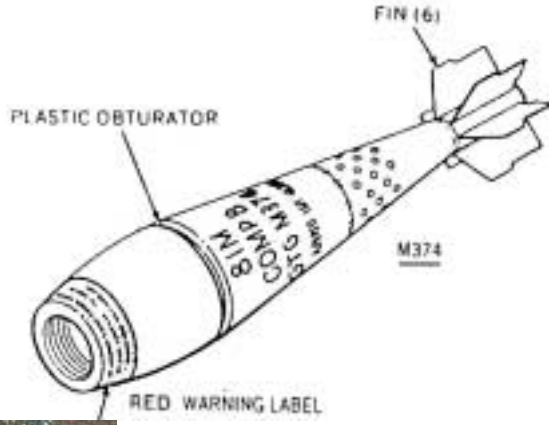
HAZARDOUS COMPONENTS: Each cartridge contains a 621-gram (1.4 pound) illuminant charge, a 23-gram first-fire charge, a quickmatch weighing less than 1 gram, and an ignition cartridge containing 8 grams of double-base propellant and a percussion primer weighing less than 1 gram. The unfired M301A3 cartridge may have a maximum of eight double-base propellant increments with a total weight of 108 grams (3.8 ounces).

M374 81mm HE Mortar, US

This is a fin stabilized high explosive mortar used by the Army. The body is painted olive drab with yellow markings and a red warning label. The body is steel, the tail boom and fins are un-painted aluminum.

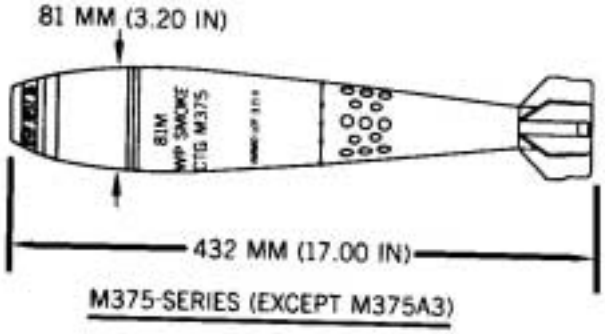
HAZARDOUS COMPONENTS: The projectile contains a 1.0-KG (2.1-LB) Composition B main charge.

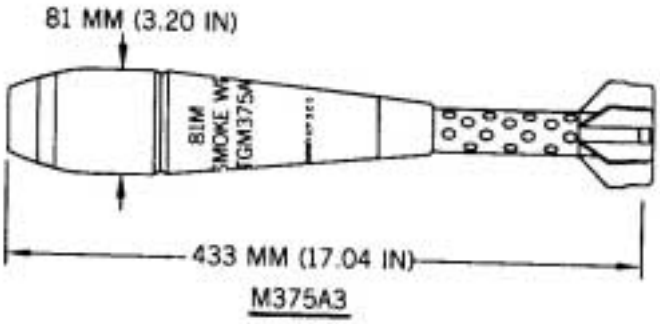


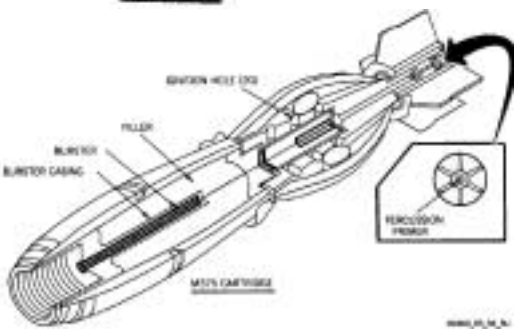


M375 81mm White Phosphorus Mortar, US

These are percussion-primed, fired, white phosphorus smoke mortar cartridges. They are used for screening or spotting targets. The projectile bodies are painted light green with one yellow band and light red markings. The fins are unpainted. The M375A1 and M375A2 cartridges are modifications of the M375, incorporating a moisture-proof ignition system and a moisture-resistant propellant. The M375A3 has a straight fin extension with horseshoe-shaped propellant increments forward of the fins. The M375-series cartridges have either steel or iron projectile bodies with plastic obturators, aluminum fin extensions, and fins.





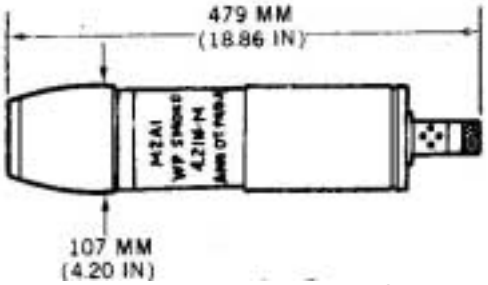


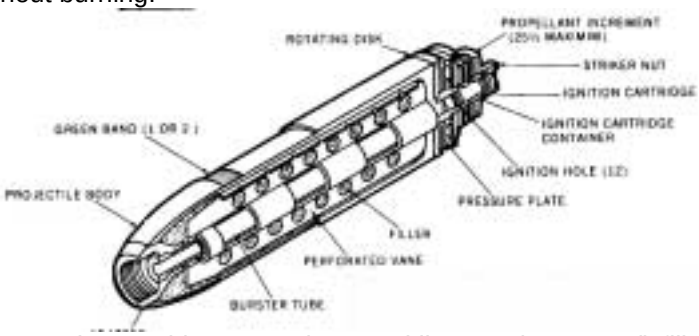
HAZARDOUS COMPONENTS: These contain a 12-gram RDX burster, a 739-gram (1.6-pound) WP filler, and an 8-gram double-base ignition cartridge with a percussion primer. The cartridge may have eight or nine double-base propellant increments weighing 11 grams each The M375A3 cartridge may come fitted with up to four horseshoe-shaped propellant increments, each containing approximately 25 grams of M10 propellant.

M2 4.2 Inch White Phosphorus Mortar, US

These are Army, spin-stabilized projectiles fired from mortars, to produce screening or spotting smoke and incendiary effects. The projectiles are filled with white phosphorus (WP); some obsolete M2-series smoke cartridges have substitute filler of titanium tetrachloride (FM) or sulfur trioxide-chlorsulfonic acid (FS). Current manufactured projectiles have light green projectile bodies with one yellow band and light red identification markings. Projectiles of earlier manufacture have gray bodies with one yellow band and yellow markings. The pressure plate and extension are aluminum, the rotating disk is brass, and the remainder of the cartridge is steel. WARNINGS: Protect the ignition cartridge primer while transporting an unfired cartridge. The primer is percussion-fired. Do not transport a leaking WP smoke cartridge unless it is immersed in water or embedded in wet sand. White phosphorus ignites spontaneously on exposure to air.

FUNCTIONING: Striking the striker or pin drives the striker into the percussion primer, actuating the ignition cartridge that ignites the propellant increments through the ignition holes. Gas generated by the burning propellant propels the projectile. Pressure exerted by the pressure plate expands the rotating disk that engages the rifling in the tube and rotates the projectile for stability. The perforated vane aids in stability by forcing the filler to rotate with the projectile. Functioning of the fuze initiates the burster that ruptures the projectile body and disperses the filler. WP ignites spontaneously on exposure to air to create a dense white smoke with some incendiary effect. FM and FS combine with moisture in the air to create a smokescreen without burning.

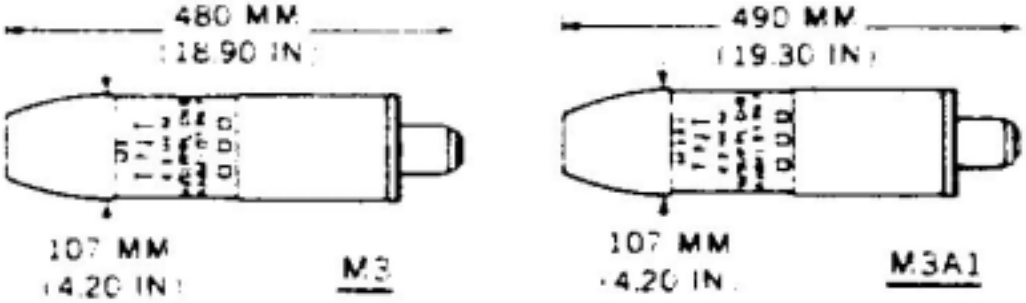




HAZARDOUS COMPONENTS: The M2-series smoke cartridges contain a 3.4-kilogram (7.5-pound) filler of WP, FM, or FS, 7-gram tetryl burster initiator, and a 95-gram (3.4-ounce) tetrytol or composition B-4 burster. Each cartridge contains an ignition cartridge with a percussion primer and less than 1 gram of black powder or double-base propellant. The total weight of double-base propellant increments is 272 grams (9.6 ounces).

U.S. PROJECTILE, 4.2-IN, 107-MM, HE, M3 & M3A1

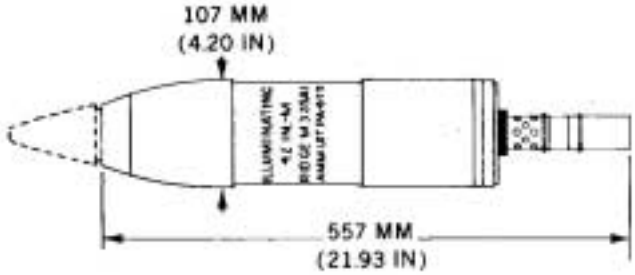
These are Army, spin stabilized, mortar fired high explosive projectiles. The projectile body is painted olive drab with yellow markings. The projectile is steel with an aluminum base and steel tail boom. The complete round consists of a projectile body, a fuze, and a tail assembly. The steel body is designed to accommodate an impact, delay, or proximity fuze. A deep fuze well in the nose is fitted with a supplementary charge TNT. This charge is removed to accommodate certain proximity fuzes. The tail assembly consists of a pressure plate and rotating disc, a propelling charge, a cartridge container and ignition cartridge, and a striker nut assembly.

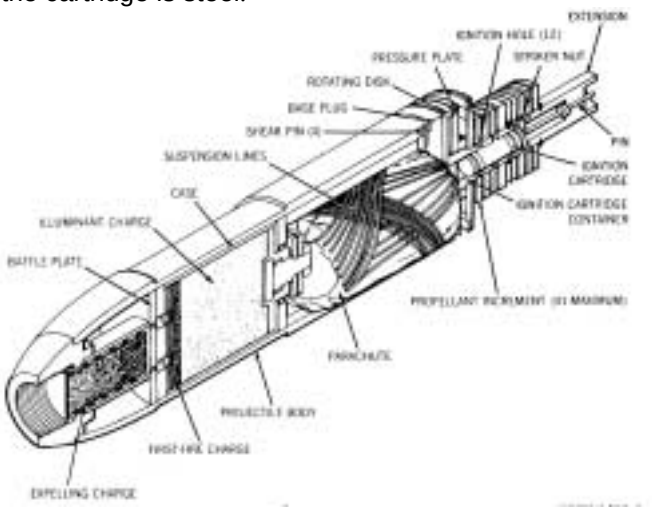


HAZARDOUS COMPONENTS: The projectile contains a 3.5-kilogram (7.8-pound) TNT main charge. A 164-gram (5.8-ounce) TNT supplementary charge and an ignition cartridge containing a percussion primer and 8 grams of black powder or double-base propellant. The total weight of double-base propellant increments is 196 grams (6.9 ounces).

M335 4.2 Inch Illumination Mortar, US

These are Army, spin-stabilized projectiles containing a base-ejected, parachute-suspended illuminant charge. They are fired from mortars when illumination is required. Cartridges have either white projectile bodies with black identification markings or are painted gray, with one white band and white identification markings. The pressure plate and extension are aluminum, the rotating disk is brass, and the remainder of the cartridge is steel.



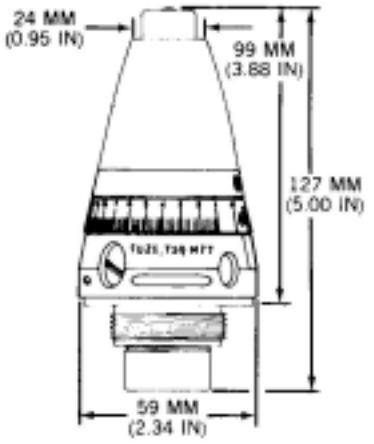


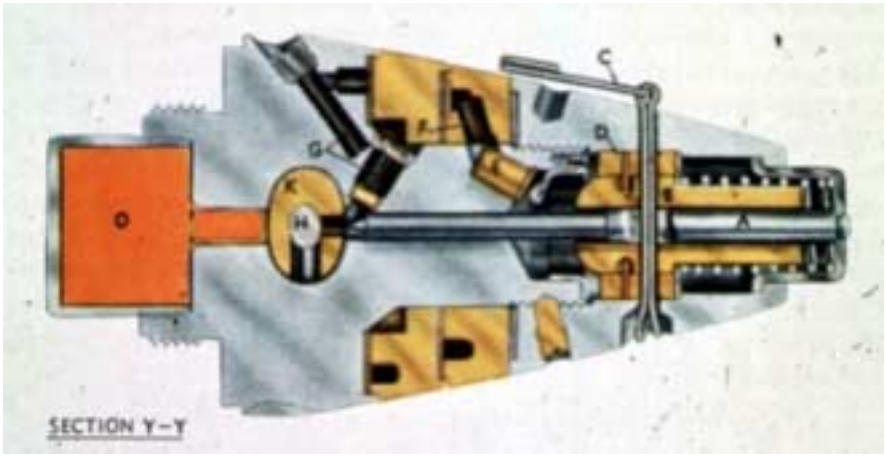
FUNCTIONING: Striking the striker (M335 only) or pin (M335A1 and M335A2) drives the striker into the percussion primer, actuating the ignition cartridge, which ignites the propellant increments through the ignition holes. Gas generated by the burning propellant propels the projectile. Pressure exerted by the pressure plate expands the rotating disk, which engages the rifling in the tube (not shown), and rotates the projectile for stability. Functioning of the fuze (not shown) ignites the expelling charge, which drives the baffle plate, illuminant charge, and base plug rearward, shearing the shear pins. The first-fire charge is ignited through holes in the baffle plate, and the illuminant charge and parachute are ejected from the projectile body. The first-fire charge ignites the illuminant charge which, while suspended from the deployed parachute, burns for approximately 70 seconds with 500,000 candlepower (M335 and M335A1), or for 90 seconds with 850,000 candlepower (M335A2).

HAZARDOUS COMPONENTS: Each cartridge contains an 82-gram (2.9-ounce) black powder expelling charge, and an ignition cartridge containing a percussion primer and 8 grams of double-base propellant or 11 grams of black powder. The illuminant charge with first-fire charge weighs 1.5 kilograms (3.3 pounds). The total weight of double-base propellant increments is 272 grams (9.6 ounces).

U.S. FUZE, PROJECTILE, TSQ, M77

This is a setback-armed powder-train time and superquick (TSQ) mortar projectile fuze. The fuze is unpainted. The designation and manufacturing information are stamped in the body. The time rings are brass, the striker, slider plug, and bore-riding safety pin are steel, and the remainder of the fuze is aluminum.



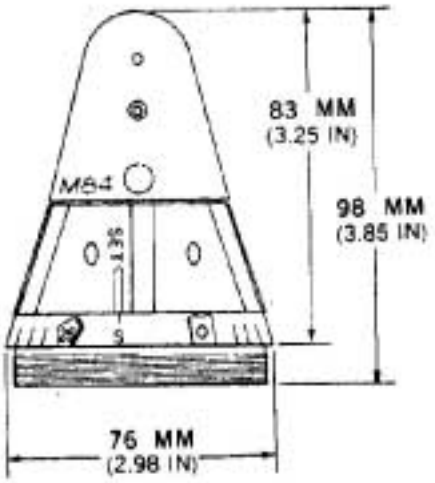


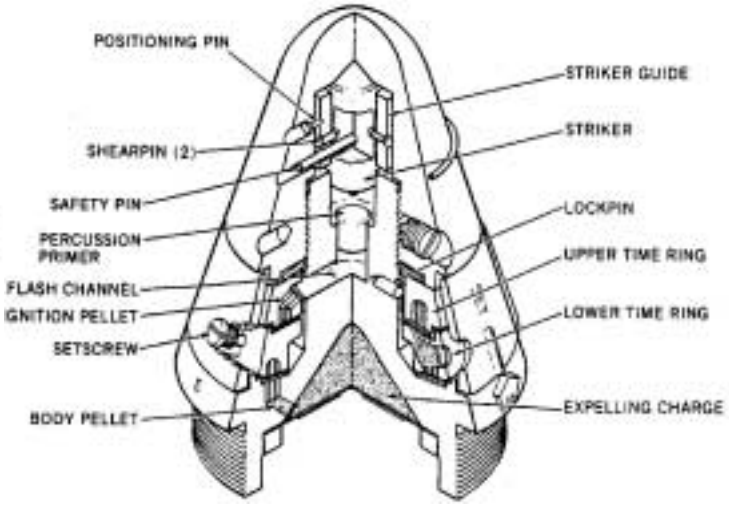
FUNCTIONING: Arming. Before projectile firing, both safety cotter pins are removed. The fuze is set for time action by rotating the lower time ring until the desired time graduation is aligned with the setting index. If superquick action is desired, the S graduation is left aligned with the setting index. On projectile firing, setback drives the setback plunger rearward, shearing the shearpins. The plunger drives the primer striker onto the primer, initiating the powder train. Simultaneously, setback drives the setback pin rearward against its spring. This frees the spring-loaded, bore-riding safety pin, which is forced outward until it strikes the inner wall of the mortar tube. As the fuze emerges from the mortar tube, the bore-riding safety pin is ejected. This frees the slider, which is driven by the slider spring until the detonator is aligned with the firing pin. Firing. If the fuze is set for time action, the powder train burns for the preset time and then ignites the relay pellets, initiating the explosive train. If the fuze is set for superquick action, or the time setting exceeds the time of flight, impact drives the striker rearward, driving the firing pin into the detonator to initiate the explosive train.

HAZARDOUS COMPONENTS: The fuze contains a primer and a detonator, each weighing less than 1 gram, a powder train and four relay pellets consisting of 7 grams of black powder, and a booster lead and booster consisting of 17 grams of tetryl.

U.S. FUZE, PROJECTILE, PTT, M84 & M84A1

These are setback-initiated, powder-train time (PTT), mortar projectile fuzes. The M84 and M84A1 provide a variable time delay of up to 25 seconds and 50 seconds, respectively. The fuzes are unpainted. Nomenclature and manufacturing information are stamped on each fuze. The fuze bodies are also stamped with an "S", indicating the safe setting position, and a graduated time scale. The M84 scale is graduated in 1-second intervals from 0 to 25, with the 5-second intervals stamped on raised bosses. The M84A1 scale is graduated in 2-second intervals from 0 to 50, with the 10-second intervals stamped on raised bosses. The word "SET" is stamped on the time setting sleeve above the setting indicator rib. The fuzes have brass heads, aluminum time setting sleeves, and aluminum or brass bodies.



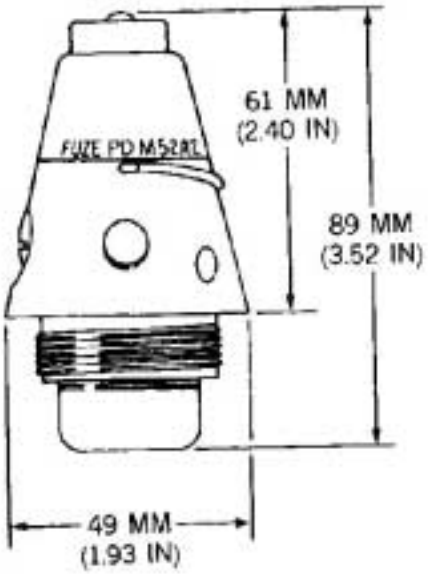


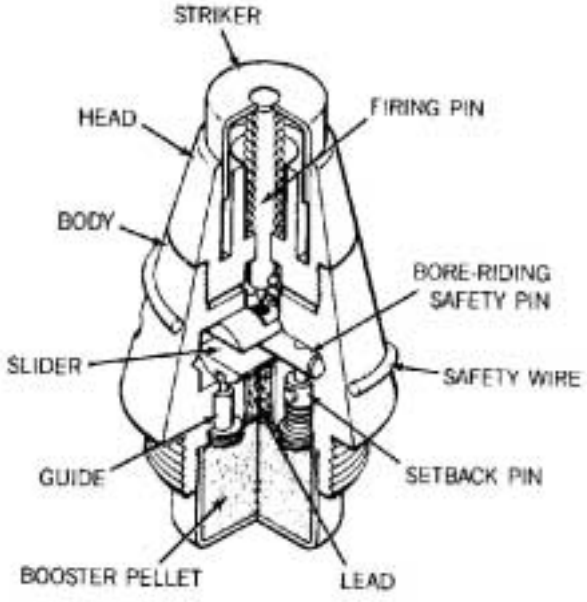
FUNCTIONING: Preparation. Rotating the time setting sleeve until the setting indicator rib is aligned with the desired time delay graduation sets the fuze. The safety pin is removed before firing. Firing: On projectile firing, setback causes the striker to shear the shearpins and strike the percussion primer. The flash from the primer ignites the ignition pellet that ignites the time ring charge. After burning along the length of the time ring(s), the burning charge ignites the body pellet that ignites the expelling charge.

HAZARDOUS COMPONENTS: Each fuze contains a percussion primer, ignition pellet, time ring charge(s), body pellet, and black powder expelling charge. The combined weight of these components is approximately 12 grams.

U.S. FUZE, PROJECTILE, PD, M52, M52A1, M52A1B1, M52A2, M52A2B1, M52B1, M52B2, & M52B10

These are setback-armed, impact-fired point-detonating (PD) mortar projectile fuzes. The fuzes are unpainted. Designation and manufacturing information are stamped on the fuzes. The striker is aluminum; the body is aluminum or plastic; and the head is aluminum, plastic, brass, or zinc.

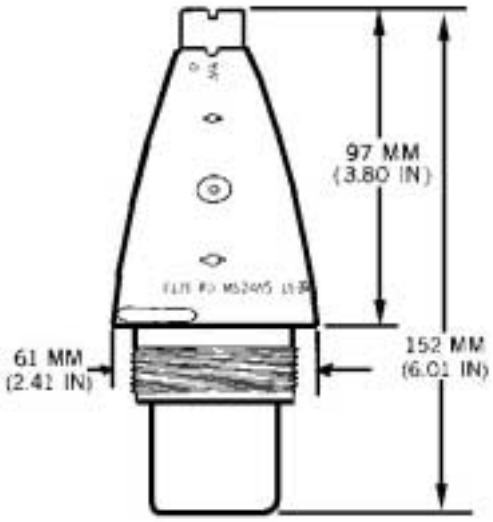




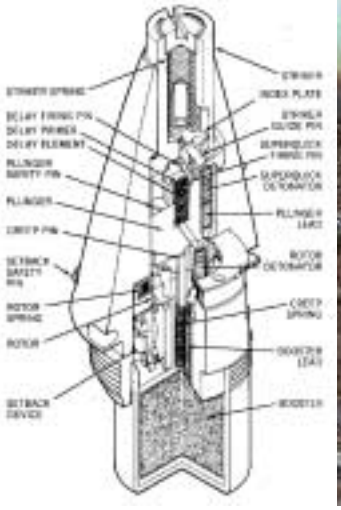
FUNCTIONING: The safety wire is removed before firing. On projectile firing, setback drives the setback pin rearward against its spring. This frees the spring-loaded bore-riding safety pin, which is forced outward until it strikes the inner wall of the mortar tube. As the fuze emerges from the mortar tube, the safety pin is ejected. This frees the slider, which is driven by the slider spring until the detonator is aligned with the firing pin. Impact forces the striker rearward, driving the firing pin into the detonator to initiate the explosive train.

HAZARDOUS COMPONENTS: Each fuze contains a detonator and a tetryl lead weighing less than 1 gram, a tetryl booster weighing approximately 2 grams. The tetryl auxiliary booster pellets and tetryl booster pellet in the fuze adapter of the M519 and M716 fuzes weigh a total of 40 grams (1.4 ounces).

U.S. FUZE, PROJECTILE, PD, M524



These are setback-delay-arming, point detonating, direct-impact or impact-inertia-firing (graze-sensitive) projectile fuzes with selectable superquick or delay action. The fuzes are unpainted. Fuze designation, loading information, index settings, and delay positions are on the fuze bodies. The fuzes are aluminum. The index plate maintains the orientation of the striker and firing pins (delay and superquick). When the striker is set for delay action, the superquick firing pin does not align with the superquick detonator. The delay firing pin is always aligned with the delay primer. The plunger is held away from the firing pins and against the rotor by the creep pin (staked to the plunger) and creep spring. The raised portion of the plunger lies beneath the striker lug in the unarmed position.

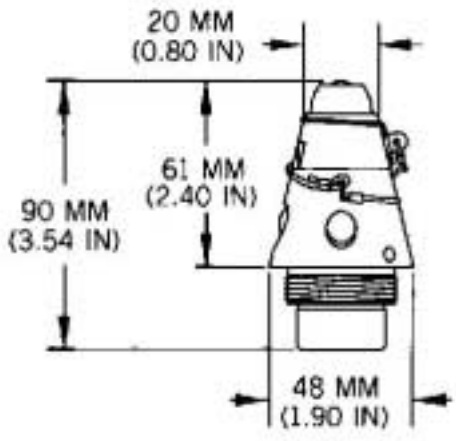


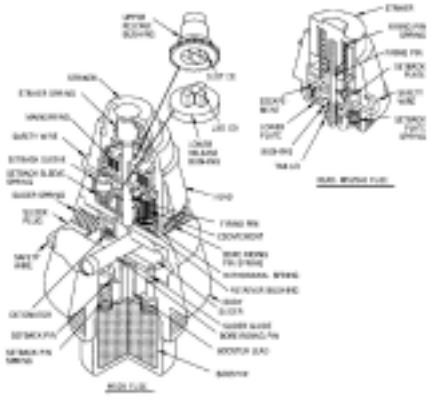
FUNCTIONING: Before projectile firing, the safety pin(s) are removed from the fuze, freeing the fuze setback device and plunger. Upon projectile firing, the fuze setback device releases the rotor. The rotor and attached plunger, slowed by an escapement (not shown), are rotated to the armed position by the rotor spring. In the armed position, the rotor detonator is aligned with the booster lead, and the cut out portion of the plunger lies beneath the striker lug. In addition, the superquick firing pin is aligned with either the firing pin escape hole or the superquick detonator, depending on the striker setting (delay or superquick). Impact forces the striker rearward, driving the delay firing pin into the delay primer, causing a 0.06-second delay in initiating the explosive train. If the striker is set for superquick action, the superquick firing pin simultaneously strikes the superquick detonator, immediately initiating the explosive train. If impact occurs at an angle at which the striker is not driven rearward, inertia forces the plunger forward, driving the delay primer (and superquick detonator, if applicable) into the firing pin(s) to initiate the explosive train(s). If impact occurs before arming is completed, the striker lug bears against the raised portion of the plunger, preventing relative movement between the firing pins and the primer or detonator. If the rotor continues to turn after such an impact, the cut out portion of the plunger will align with the striker lug, arming the fuze.

HAZARDOUS COMPONENTS: The delay element with primer, superquick detonator, plunger lead, rotor detonator, and booster lead each weigh less than 1 gram. The booster contains 40 grams (1.4 ounces) of tetryl.

U.S. FUZE, PROJECTILE, PD, M525 & M525A1

These are setback-armed, impact-fired (superquick) point-detonating fuzes incorporating a delay-arming feature. The fuzes are unpainted. The nomenclature and loading information are stamped on each fuze. The round-shouldered striker and wrench slot in the head are unique to the M525 fuze. The A1 versions are distinguished by the square-shouldered striker and wrench flats on the head. These fuzes have aluminum or zinc heads. The delay-arming mechanism located in the head differs between these two versions. The body is identical for both fuzes. The general arrangement of the M526, M527, and M527B1 fuzes is similar to the M525. The A1 versions of these fuzes use the same head as the M525A1.



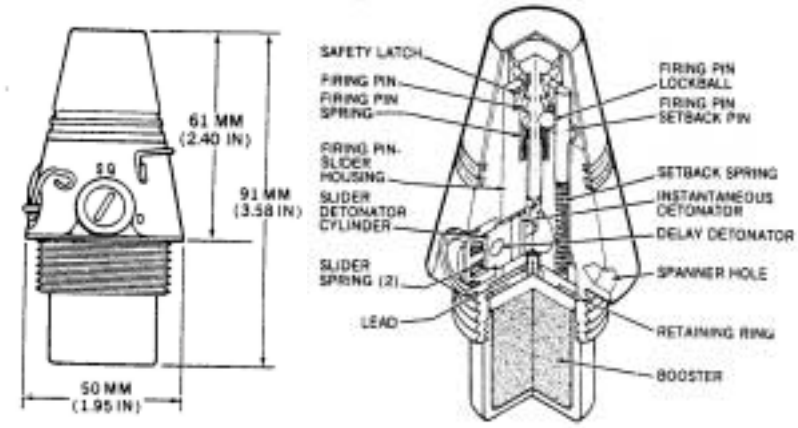


FUNCTIONING: The functioning of the M525 and M525A1 fuzes is alike except for the operational of the delay-arming mechanism in the head. The functioning of the M526, M527, and M527B1 fuzes is identical to the M525, while the functioning of the A1 versions is identical to the M525A1. The safety wires are withdrawn from the fuze before a projectile is fired, freeing the setback pin in the body and the setback sleeve or setback plate in the head. Upon projectile firing, the fuze setback pin moves rearward, releasing the bore-riding pin, which is, forced outward by its spring against the wall of the mortar tube. As the fuze clears the muzzle, the bore-riding pin is ejected, leaving the slider restrained only by the tip of the firing pin. The delay-arming mechanism, in the head, withdraws the firing pin from the slider after a delay of 2 to 4 seconds. This is accomplished in the different fuze versions as follows. For M525, M526, M527 and M527B1 fuzes, the setback sleeve, driven rearward by setback, releases a detent pin (not shown) which frees the escapement. The mainspring rotates the upper release bushing, slowed by the escapement, until the slots are aligned with the lugs of the lower release bushing. The lower release bushing and retainer bushing with attached firing pin are forced forward by the withdrawal spring, freeing the slider. For A1 fuze versions, the setback plate is driven rearward by setback, releasing the escapement. The firing pin and bushing, slowed by the escapement, rotate until the bushing tabs are aligned with slots in the lower plate. The firing pin spring forces the striker and firing pin forward, freeing the slider. Upon firing the freed slider is snapped into the armed position by the slider spring, aligning the detonator with the firing pin and booster lead. Impact forces the striker rearward, driving the firing pin into the detonator, initiating the explosive train.

HAZARDOUS COMPONENTS: Each fuze contains an M44E1 detonator and a booster lead, each weighing less than 1 gram, and a tetryl booster. The booster weighs 17 grams in the M525- and M526-series fuzes, and less than 1 gram in the M527-series fuzes. The adapter-booster in the M526-series fuzes consists of 85 grams (3.0 ounces) of tetryl.

U.S. FUZE, PROJECTILE, PD, M935

These are setback-delay-armed, impact-fired, selective-action (superquick or delay) point-detonating fuzes except the M936, which has no delay. The M935 fuze is an M567 fuze modified for use with 60-millimeter projectiles. The fuzes are unpainted. The windshield is roll crimped to the body with two cannelures. The fuze is issued with the selector set on SQ. Except for the plastic selector, the fuze is aluminum. The firing pin-slider housing, which contains all arming and firing components of the fuze, is held in the upper body by the retainer plug in the M567 fuze and by the retaining ring in the other fuzes. The safety latch is an unrestrained, pivoting wedge, which rests in a cavity beside the grooved firing pin. The firing pin is locked to the firing pin-slider housing by the firing pin lockball, which is held in place by the firing pin setback pin. The striker, poised over the delay-arming element, is immobilized by the striker lockball, which is held in place by the striker setback pin. The spring-loaded slider consists of two cylinders connected by an axial pin.



FUNCTIONING: Prior to munition firing, the selector on the M567 and M935 fuzes may be set for delay action, if desired, and the safety wire is withdrawn. On firing, setback drives the firing pin setback pin and striker setback pin rearward and pivots the safety latch inward toward the firing pin. As the firing pin setback pin passes below it, the firing pin lockball rolls outward into the cavity in the upper body, freeing the firing pin. The safety latch engages a groove on the firing pin, preventing it from moving rearward. Simultaneously, as the striker setback pin passes below it, the striker lockball rolls sideways into a cavity in the firing pin-slider housing, freeing the striker. The striker slides rearward, striking the primer of the delay-arming element that ignites the pyrotechnic delay. When setback ceases, the firing pin spring forces the firing pin forward, disengaging the safety latch. After 2 to 6 seconds, the burning pyrotechnic delay initiates the expelling charge which drives the arming pin rearward, disengaging the shoulder on the slider guide cylinder. The freed slider is driven laterally by the slider springs until the longitudinally oriented detonator is aligned with the firing pin. Impact drives the firing pins into the aligned detonator, initiating the explosive train either instantaneously or, if selected, after a 0.05-second delay.

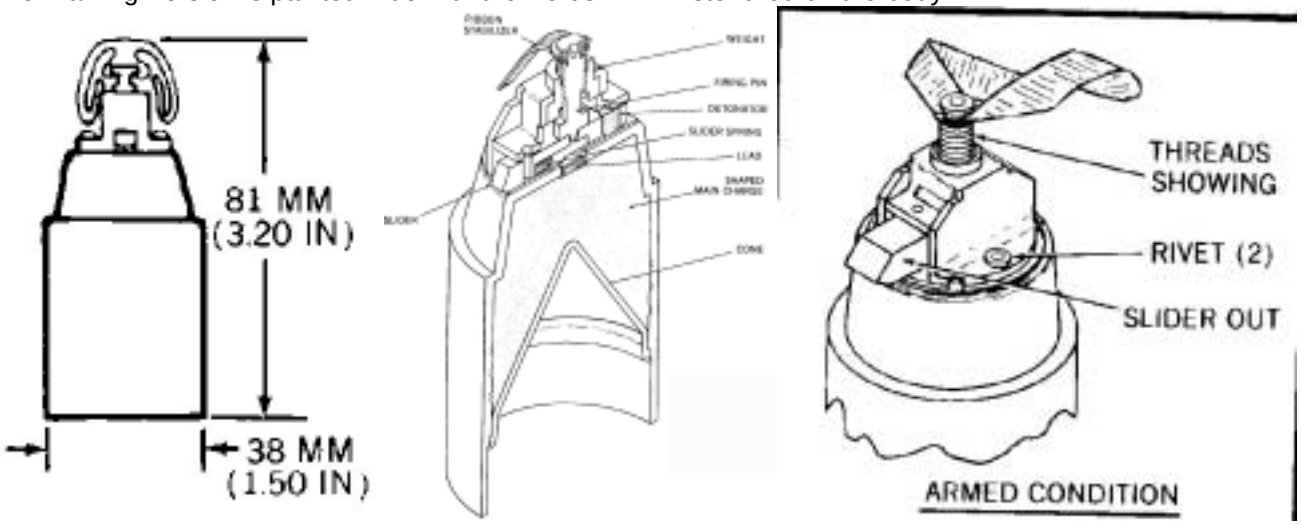
HAZARDOUS COMPONENTS: The M935 fuze has a delay arming element which consist of a primer, delay, expelling charge, and lead each having less than 1 g of RDX. It also has an instantaneous detonator with less than 1 g of RDX; a delay detonator of less than 1 g of RDX; and a 1-gram RDX auxiliary booster. The M935 fuze has a 13 g Comp A5 booster.

SUBMUNITIONS, FLARES, SIGNALS, MARKERS, AND EXPLOSIVES

M42 Dual Purpose HE and Training Grenade Submunitions, US

These are dual-purpose (DP), high-explosive (HE) grenades containing a shaped main charge, and incorporating an impact-inertia fuze. The grenade is stabilized, and the fuze is armed in flight, by a ribbon stabilizer. These grenades are armor defeating, antipersonnel submunitions delivered by projectile or rocket warhead. The grenades are steel, die-cast metal, and plastic. The ribbon stabilizer is nylon. The M42 and M77 grenades are dull gray. The M46 grenade is silver, reddish brown, or dull gold. There are no markings on these grenades.

The Training Version is painted Blue with the words INERT stenciled on the body.

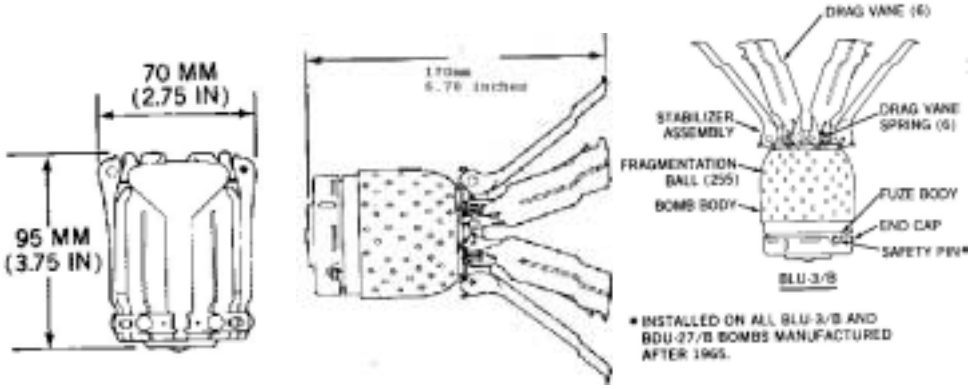


FUNCTIONING: When the M77 grenade is ejected from a projectile or rocket warhead, a plastic slider lock cap is removed by the air stream, freeing the slider and ribbon stabilizer. When the M42 or M46 grenade is ejected, a plastic tape stiffener is removed freeing just the ribbon stabilizer. The ribbon stabilizer unfolds and orients the grenade as it falls. Additionally, rotation of the ribbon stabilizer screws the firing pin upward into the weight, disengaging the point of the firing pin from the slider. The slider is forced outward by its spring and centrifugal force, aligning the detonator with the firing pin and lead. Upon grenade impact, inertia drives the weight and firing pin into the detonator, initiating the lead, which then initiates the main charge.

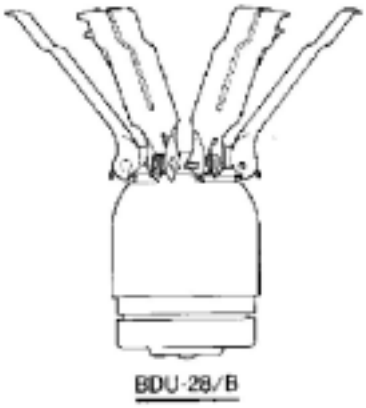
HAZARDOUS COMPONENTS: Each grenade contains a 31-gram (1.1-ounce) composition A-5 shaped main charge and an RDX lead weighing less than 1 gram. The fuze contains a detonator weighing less than 1 gram.

There are no hazards associated with the training version.

U.S. BOMB UNIT, FRAG, BLU-3/B and BDU-28/B



BLU-3/B: This is a small, aerial dispensed, drag-vane-stabilized, impact fired, antipersonnel (apers), fragmentation bomb. The body of the BLU-3/B is painted bright yellow and the end cap is anodized gold. The drag vanes are usually anodized, but may be painted. The vane keeper is black plastic. The bomb body of the BLU-3/B is aluminum embedded with steel fragmentation balls. The above Drawing and photographs show the BLU-3/B. **BDU-28/B**: This is a small, drag-vane stabilized, inert dummy bomb used for training ground handling and loading crews. The bomb body of the BDU-28/B is steel.



FUNCTIONING:

BLU-3/B: Arming. Upon release of the bomb, the spring-loaded bore rider safety pin (if present) extends outward and releases the arming slide. The wind tab is stripped off by the airstream and unfastens the vane-keeper strap, which is ejected by the drag vanes as they spring open. Opening of the drag vanes stabilizes the bomb as it drops and allows the spring-loaded end cap to move forward and withdraw the firing pin from the arming slide. The drive spring moves the arming slide, aligning the detonator with the firing pin and booster. An escapement regulates the movement of the arming slide, providing a 1.5- to 2.5-second arming delay. Firing. On impact, the end cap drives the firing pin into the detonator, initiating the explosive train.

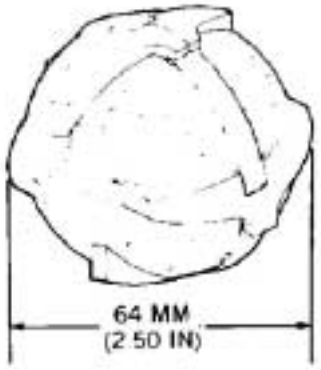
BDU-28/B: This bomb is inert; its only functional parts are the stabilizer assembly and the end cap.

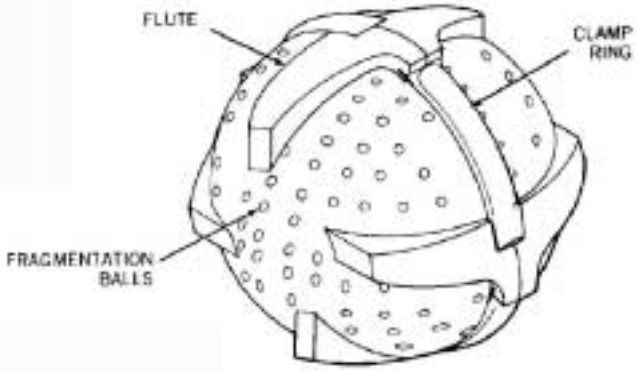
HAZARDOUS COMPONENTS:

BLU-3/B: Contains a main charge of approximately 165 grams (5.8 ounces) of RDX (70:30 cyclotol) and a booster and detonator, each weighing less than 1 gram. **BDU-28/B**: This Bomb is inert.

U.S. BOMB UNIT, BLU-26/B, BLU-36/B, BLU-59/B, BLU-26T-1/B, & BLU-36T-1/B WITH M219, M218 FUZES

These are all small, aerial dispensed, centrifugal armed, high explosive fragmentation bombs. The bombs all consist of two hemispheres held together by a crimp ring. The bodies of the BLU-26/B, BLU-36/B, and BLU-59/B are aluminum, embedded with steel fragmentation balls. The BLU-26/B bombs are impact-fired and the BLU-36/B and BLU-59/B bombs are time-delay-fired. The BLU-26 (T-1)/B and BLU-36 (T-1)/B are training versions of the BLU-26/B and BLU-36/B, respectively. These training bombs contain a live fuze but no main charge, and are used for fuze reliability testing and establishing delivery tactics. The outer wall has a weakened area that ruptures when the fuze functions. These bombs are olive drab with a small yellow dot on one hemisphere. Designation and loading data may be stenciled in yellow on all the bombs. The BLU-26 (T-1)/B and BLU-36 (T-1)/B are painted blue with white markings.



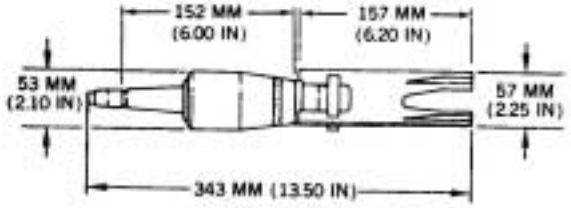


FUNCTIONING: As each bomb is released from the dispenser, the air-stream catches the flutes spinning the bomb to provide the centrifugal force required to arm the fuze. Each fuze requires from 2400 to 3200 rpm to arm. M219 Fuze: When the required rpm is attained, centrifugal forces moves the hammer weights away from the firing hammer and retracts the rotor lockweights into the rotor housing. This action frees the rotor and permits the rotor drive spring to move the rotor to the armed position. Impact stops the spinning motion of the bomb and allows one or more of the spring-loaded hammer weights to cam inward and drive the firing hammer into the firing pin to initiate the detonator. M219E1 Fuze: The arming sequence of this fuze is similar to the M219 except that the M219E1 contains an inertial weight and push ball instead of the three hammer weights. The same centrifugal force retracts the rotor lockweights into the rotor housing, allowing the rotor to align the detonator with the firing pin. Impact moves the inertial weight and cams the push ball against the firing pin to drive it into the detonator.

HAZARDOUS COMPONENTS: The BLU-26/B, BLU-36/B, and BLU-59/B bombs each contain a main charge of approximately 85 grams (3.0 ounces) of cyclotol. Each bomb fuze contains a detonator with less than 1 gram of explosive, and a booster of 1.5 grams of RDX. The BLU-26 (T-1)/B and BLU-36 (T-1)/B bombs contain a live fuze only.

MK 118 Rockeye Practice and HEAT Submunitions, US

These are aerial dispensed, antitank (AT) shaped charge, target discriminating, in-stabilized bombs that use the Mk 1 fuzing system. The fuzing system provides for impact firing after contact with either a soft or hard target. An inert loaded bomb, containing a live fuze but no main explosive charge, is used for fuze reliability testing and establishing delivery tactics. The impact sensing element (Mods 0 and 1 bomb) and base fuze vanes are unpainted. The standoff probe, bomb body, and base fuze element cover are anodized gold. The fins are white plastic. A 15-millimeter (0.60-inch) yellow band is stenciled around the base of the bomb body. A metal foil decal, with the words SAFE and ARM in silver letters on a green and red background is affixed to the base fuze element cover just above the safe/arm indicator window. On some bombs, the decal is replaced with the words ARMED WHEN RED stenciled in black in the same location. The assembly drawing number and loading data is stenciled in black on the base fuze element cover and the forward portion of the bomb body.



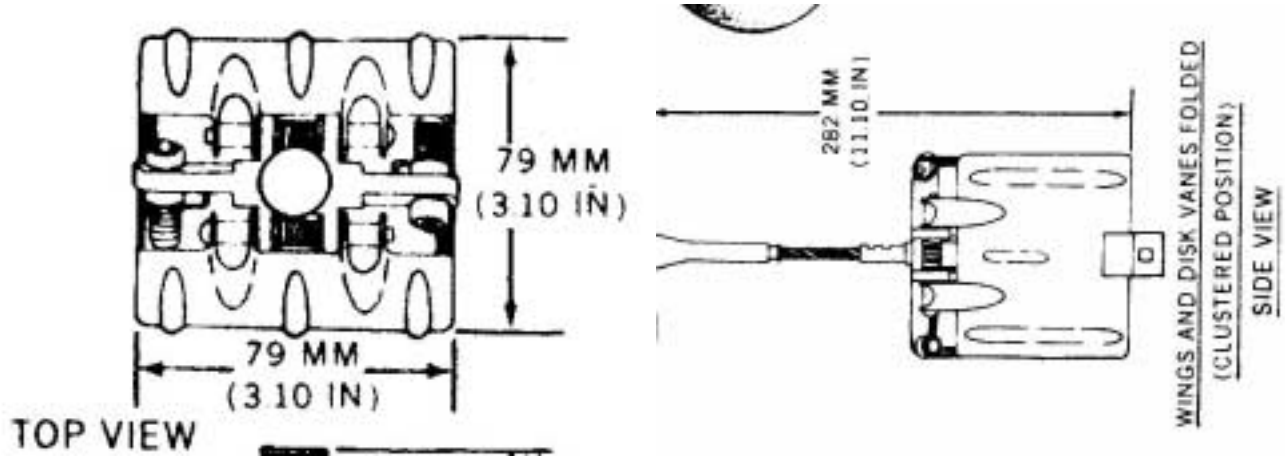
FUNCTIONING: Arming. Upon release of the bomb from the dispenser, the fuze-arming vane rotates in response to a 200-knot-or-greater airstream. Two centrifugally operated detents open and a spring-loaded arming pin moves through the opening between the detents. The forward end of the arming pin clears and unlocks the rotor containing the electric detonator. The rotor is driven into a partially armed position (approximately 40 degrees from safe) by a cam that is governed by an escapement. This escapement delays the movement of the rotor until 0.9-second has elapsed. At the end of the 0.9-second escapement time, the rotor is engaged by a friction drive, which is driven by rotation of the arming vane, and is rotated the remaining distance (50 degrees) completing the arming cycle. At this time, the electric detonator (Mods 0 and 1 bomb only) is in the circuit with the piezoelectric crystal of the impact-sensing element. Simultaneously with final rotor alignment, the rotor removes a lock on the inertia-operated firing pin, permits forward movement of the impact inertia firing pin next to the primer of the stab detonator (VECP modified bomb only), removes the short on the electric detonator (Mods 0 and 1 bomb only), and completes the ground circuit between the piezoelectric circuit and electric detonator (Mods 0 and 1 bomb only). The Mk 1 fuzing system is now armed. Firing. At impact, the bomb fuze initiates one of two modes of functioning. (1) Soft target. If the bomb strikes a soft target, such as light foliage, soft ground, sandbags, or water, the shear washer will resist failure. Under these conditions, the impact-inertia firing pin in the base fuze element initiates the explosive train. The explosive force of the stab detonator in the base fuze element blows through a hole in the rotor to initiate the electric detonator and the remainder of the explosive train. In the Mods 0 and 1 bomb, the impact-inertia firing system not only acts as a backup for the electrical firing system, but also as a target discriminating feature to prevent superquick (premature) fuze initiation when the bomb encounters a soft target. (2) Hard target. If the bomb is a Mod 0 or 1 bomb, and strikes a hard target, such as armor plate or thick, reinforced concrete, the striker in the impact-sensing element is driven inward. The shear washer fails, allowing the firing pin, which is fixed to the striker, to pierce and initiate the detonator. The resulting shock of the explosion drives the wave shaper rearward to stress the piezoelectric crystal, producing an electric current. This current is sufficient to initiate the electric detonator in the base fuze element to detonate the bomb.

HAZARDOUS COMPONENTS: The main charge is 170 grams of Octol. The booster is 5 grams of tetryl. The impact-sensing element is less than 1 gram of lead Azide. The base fuze element is less than 1 gram of lead Azide. The Mk95/0 Detonator is less than 1 gram of lead Azide. The Lead is less than 1 gram of Tetryl. The Practice Version contains no hazardous material (Inert).

M83 4Lb Butterfly Bomb, US

Description: the M83 fragmentation bomb, commonly referred to as the Butterfly bomb may be internally fuzed with any one of these fuzes; **M129 series**, **M130 series**, **or M131 series**. A loaded bomb cluster usually contains bombs with fuzes from each of the three series. This is an aerial delivered fragmentation (frag) cluster bomb, which functions by the type of fuzing employed. The M83 bomb is olive drab with a yellow band. Identifying nomenclature is stenciled in yellow or black. The markings GROUND and AIR are on the top surface of the fuze cap near the selector on the M129 and M129A1 fuzes. The M130 series and M131 series fuzes have no markings. Once the fuze is installed in the bomb, there are no features to distinguish between the M130 series clockwork-long-delay fuzes and the M131 series anti-disturbance fuzes. The fuzes are aluminum. The bomb body, arming cable, butterfly wings, and disk vanes are steel.

Hazardous Components: A main charge of approximately 227 grams (0.5 pound) of TNT, composition B, or ednatol.
Fuzes: The explosive train of each fuze consists of; a primer containing less than 1 gram of priming mixture and lead Azide; a detonator containing less than 1 gram of ignition mixture, lead Azide, and tetryl; and a booster containing approximately 10 grams of tetryl.



AN-MK5 and AN-MK6 Drift Signals / MK25 Marine Marker

AN-MK5 Drift Signal Length: 19 Inches Diameter: 3 Inches

AN-MK6 Drift Signal 20.25 inches long by 5.125 Inches Square

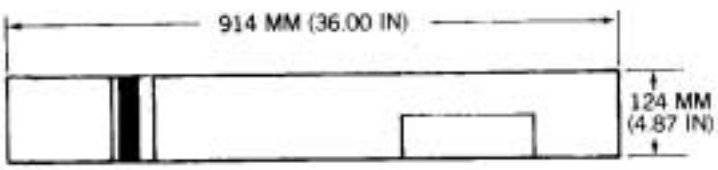
The AN-MK5 Drift signal contains 3 pyrotechnic pellets that are 4 inches long and 1.25 inches in diameter connected together by a delay fuze through a hole in the center of the pellets. The AN-MK6 contains four each of the pellet assemblies.

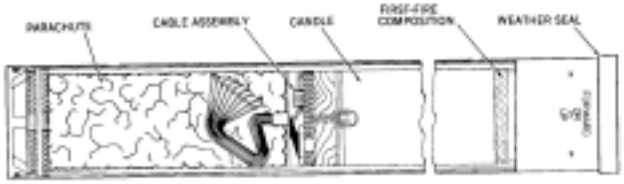
MK25 Marine Marker: No Data Available.

U.S. FLARE, AIRCRAFT, PARACHUTE, MK 24 MODS 1, 2, 2A, 3, & 4

The figure shows the appearance and dimensions of the Mk 24 aircraft flare. These are air-launched, parachute-retarded flares used to provide intense illumination of large areas. The flare case is unpainted. It is marked in black with nomenclature, national stock number, lot number, loading date, loading facility, location of suspension bands, and fuze setting and safing information. The ejection-delay settings are 5 to 30 seconds for all Mods. The ignition-delay settings are 10 to 30 seconds for the Mods 2A & 3; and 5 to 30 seconds for all other mods. The Mod 1 case is approximately 38 millimeters (1.50 inches) shorter than the flare, and the fuze extends beyond the end of the case. In all other mods, the fuze is enclosed by the case. The Mods 1 & 2 do not have a safety pin to prevent the lanyard from being accidentally pulled and igniting the flare. The thumbscrew, which is used to lock the ejection- and ignition-set dials, is removable from all mods, except the Mod 4. The ejection-set dial must be depressed for setting all mods, except the Mod 4. The ignition-set dial must be depressed on all mods. The flare case is aluminum, the lanyard is steel, and a weather cap for the dial assembly is plastic. The flares weigh approximately 12.2 kilograms (27.0 pounds).

FUNCTIONING: When the lanyard is pulled, it lifts the sleeve, releasing the spring-loaded striker against the percussion primer. The primer ignites black powder in the ejection plunger and drives the perforated point of the ejection plunger into the ejection-delay fuse at a position determined by the ejection-set dial setting. Flame through the perforation ignites the ejection-delay fuse, which ignites the ejection disk. The ejection disk ejects the parachute, the candle, and the ignition section of the fuze from the case and ignites the ignition powder. This ignites the black powder in the ignition plunger, which then strikes the ignition-delay fuse at a point determined by the ignition-set dial setting. The ignition-delay fuse ignites the ignition disk, which ignites the first-fire composition and thus the candle. NOTES: In SUU 40/A and SUU 44/A dispensers, flares are loaded in drogue trays, to which the lanyards are attached. Functioning begins when a flare and drogue tray separates after ejection from the dispenser. In SUU-25-series and SUU-42-series dispensers and LAU-74/A launchers, flares are fitted with plastic adapter caps to which the lanyard is attached. Functioning begins when the flare is ejected but the adapter cap is held by the dispenser or launcher. On bomb racks, the lanyard is attached to the rack.

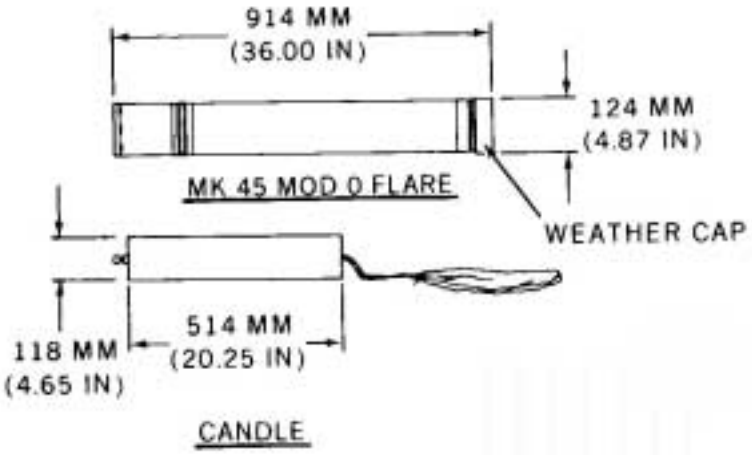




HAZARDOUS COMPONENTS: The flare contains a percussion primer with less than 1 gram of explosive. A 22-gram smokeless powder ejection disk, an ejection plunger with two black powder pellets weighing less than 1 gram. An ignition plunger with one black powder pellet weighing less than 1 gram, and a 3-gram ignition disk consisting of gauze impregnated with a mixture of potassium perchlorate, ammonium dichromate, iron oxide, and nitrocellulose; and a candle containing 7.3 kilograms (16.2 pounds) of illuminating composition for the Mods 3 and 4, and 6.0 kilograms (13.2 pounds) for all other mods. The ignition-delay fuze, ejection-delay fuze, and ignition powder are of unknown weights and compositions.

U.S. FLARE, AIRCRAFT, PARACHUTE, MK 45 MOD 0

The figure shows the appearance (without weather cap) and dimensions of the Mk 45 Mod 0 aircraft flare. This is an aircraft-launched or dropped, or ground-launched, parachute-retarded illumination flare. It is capable of producing 2 million candlepower for 2-1/2 to 3 minutes. When launched from the XM-19 flare dispenser, a special adapter is used to activate the flare fuze. The case is unpainted and has an instructional decal, black identification stenciling, and a brown band. An operating instruction decal replaces the warning decal when the flare fuze is equipped with the adapter for the XM-19 flare dispenser. The case is aluminum. The flare weighs 12.7 kilograms (28.0 pounds).

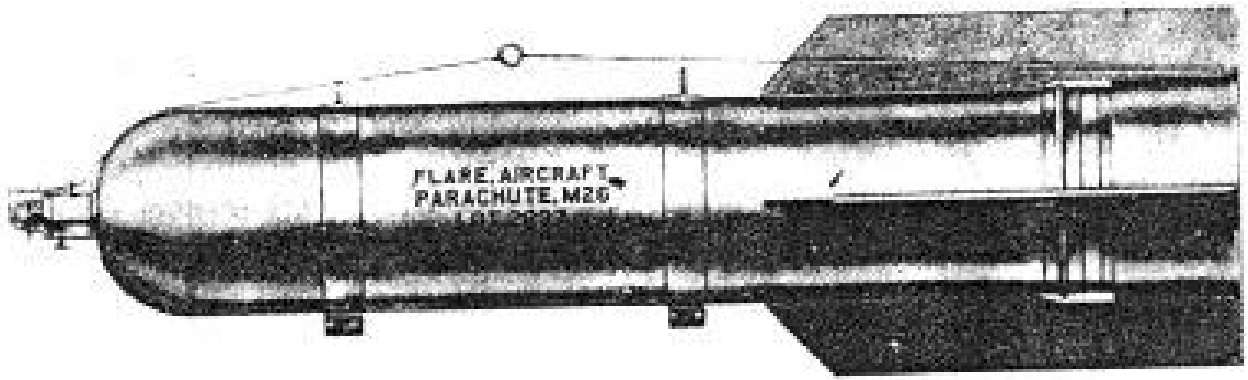


FUNCTIONING: The weather cap is removed to prepare and set fuze before launching flare. After the fuze is set and the flare is launched, the lanyard removes the lanyard retainer, pulls out the safety clip, and exerts a pull on the attachment loop. A force of 8.2 to 15.9 kilograms (18.0 to 35.0 pounds) pulls the internal disconnect pin completely out of the fuze. NOTES Some of the Mk 45 Mod 0 flares are manufactured and shipped in drogue trays (a cylindrical container with one side of its case cut out to accommodate the flare) for launching exclusively with the SUU-40/A and SUU-44/A parachute flare dispensers. Flares assembled in this way have a modified lanyard, which connects to the flare and drogue tray. The modified lanyard serves to initiate fuze action when the flare and drogue tray separates after launch from the dispenser. When launched from the XM-19 dispenser, the safety pin must be removed by hand. The adapter separates from the flare at launch, removing the internal disconnect pin from the fuze. As the internal disconnect pin is withdrawn, the spring-loaded striker fires the primer. The primer ignites the 2-second delay, and drives the perforated sharp end of the plunger into the time fuse at a point determined by the selected setting. After 2 seconds, the black powder pellet is ignited and, in turn, ignites the time fuse. After expiration of the time fuse, the ejection charge is ignited, separating the candle and parachute from the flare case. As the parachute is deployed, the shroud lines via parachute lanyards exert a pull on the firing pin, cocking and releasing the spring-loaded firing pin. This fires the primer, which ignites the pellet and, in turn, the candle. After approximately 3 minutes, the candle approaches burnout, and heat from the candle fires the explosive bolt. This releases one of the two parachute suspension cables, collapsing the parachute.

HAZARDOUS COMPONENTS: The candle contains 8.0 kilograms (17.6 pounds) of illuminating compound, an igniter containing an igniter pellet having approximately 2 grams of explosive and a primer having less than 1 gram of explosive, and an explosive bolt containing a detonator having less than 1 gram of explosive. The fuze contains a primer, a 2-second delay, a black powder pellet, and a time fuse, each containing less than 1 gram of explosive. The fuze also contains an ejection charge having 10 grams of black powder.

U.S. FLARE, M26

These flares are used to provide illumination for night bombardment; also may be used to blind antiaircraft defenses. The flare is enclosed in a metal cylindrical case with a rounded nose and tail fins. In the nose is a mechanical time fuze. The tail end is closed with a shipping cover that has a handle attached and sealed by a strip of tape. The case is equipped with two suspension lugs 14 inches apart.

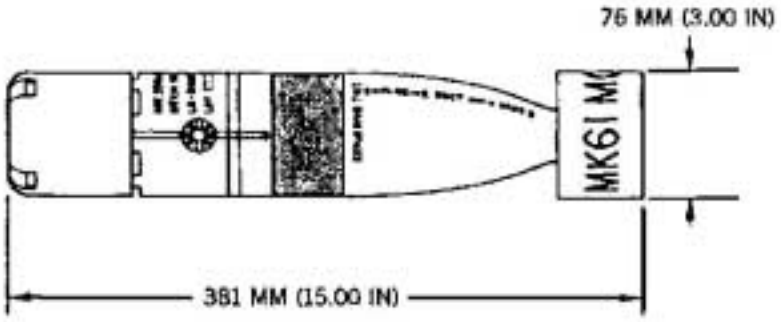


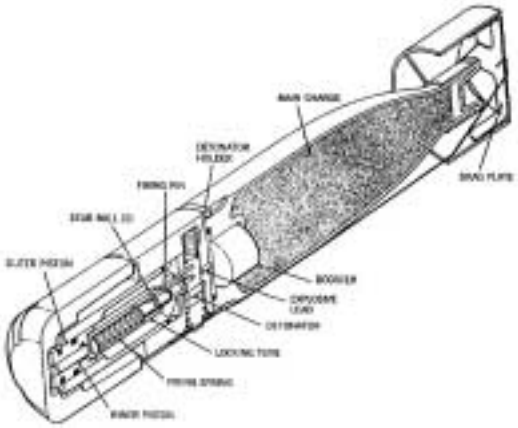
FUNCTIONING: When the flare is dropped, the arming wire is pulled, allowing the vanes of the nose fuze to rotate. The hang wire is retained and pulls off the cover of the stabilizing sleeve compartment. As the flare continues to drop, the tear wire and tear-wire cord pull out the stabilizing sleeve, and the cover-lock cord attached to the shrouds of the stabilizing sleeve unlocks and pulls out the cover lock. When the sleeve is fully extended, the tear wire breaks, allowing the flare to fall free, stabilized in flight by its fins and stabilizing sleeve. When the nose fuze functions, the gases of the black-powder booster force the releasing-cup cover out of the detachable cover, releasing the retaining pins from the groove in the flare case and freeing the detachable cover. As the detachable cover is pulled out by the stabilizing sleeve, a pullout cord pulls out the parachute. When the parachute opens, the flare stops with a jerk, breaking the pullout cord (which allows the stabilizing sleeve assembly to fall free) and pulling the entire flare assembly out of the flare case (which then falls away). The sudden stop also pulls the friction wires through the igniters, starting the six-second delay through the center of the candle, which allows full opening of the parachute. The shock caused by the opening of the parachute is taken by the shock absorbers, made of copper tubing in a spiral or coiled shape. They straighten out in absorbing the shock. After the parachute is opened, the delay ignites the first fire, which ignites the candle. When the first fire is ignited, the gases formed by burning force the rib retainer down, and the spring-loaded ribs jump out, opening the glass-cloth shade. Remarks: The Flare AN-M26 can be dropped at air speeds up to 240 knots, but above that the stabilizing sleeve is apt to tear away. The Flare M26 cannot be dropped at air speeds greater than 130 knots, for the same reason.

HAZARDOUS COMPONENTS: These flares burn at 800,000 candlepower for 3 to 3.5 minutes. The fuzes used are the AN-M146, M155, and M144.

U.S. SIGNAL, UNDERWATER SOUND, (SUS), MK 61 MOD 0

The figure shows the appearance and dimensions of the Mk 61 Mod 0 underwater sound signal. These are underwater sound signals which are dispenser launched from aircraft or hand launched from aircraft or surface craft. The Mk 61 Mod 0 is an antisubmarine signal. These signals are unpainted with nomenclature stenciled on the arming and firing mechanism section and the explosive section. EXPLOSIVE TNT is stenciled on or near the yellow band that encircles the explosive section of the Mk 61 Mod 0 signal. The signals are aluminum. DO NOT subject an armed sound signal to rough treatment. It may contain a cocked firing pin.



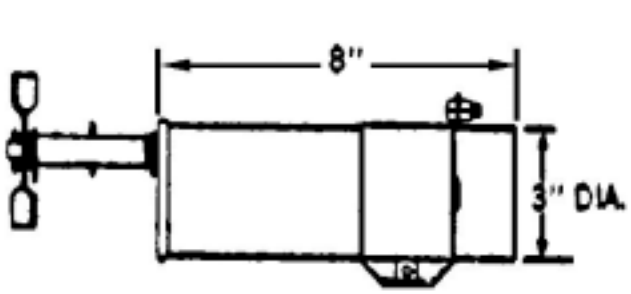


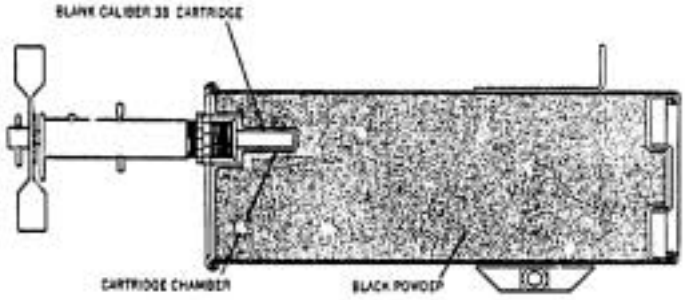
FUNCTIONING: The Mk 61 Mod 0 will fire at a deep depth of 244 meters (800 feet). The signal can be set to fire at a shallow depth of 18 meters (60 feet). The shallow option is selected by removal of the depth wire before launch. For hand launching, the safety cotter pin is removed before the signal is launched. When the signal is dispenser launched, the safety cotter pin is replaced by an arming wire attached to a drag plate. The air stream or water impact withdraws the arming wire. As the signal sinks, hydrostatic pressure aligns the detonator with the explosive lead and the firing pin. Complete arming occurs at a depth of 5.49 meters (18.0 feet). If the depth wire is in place, hydrostatic pressure moves the inner piston to delay firing until the signal reaches the deeper setting. As hydrostatic pressure moves either the inner or outer piston, compressing the firing spring, a groove in the locking tube moves over the sear balls. This releases the firing pin and initiates the explosive train.

HAZARDOUS COMPONENTS: The Mk 61 Mod 0 signal has the Mk 4 Mod 0 explosive section with a 816 gram (1.8 pound) TNT main charge and a 31 gram (1.1 ounce) Tetryl booster. The arming and firing mechanism (Mk 33 Mod 0) has a less than 1 gram Tetryl lead and the Mk 43 Mod 1 or Mod 2 detonator with less than 1 gram of explosive.

U.S. SIGNAL, PRACTICE BOMB, MK 6 MOD 0

The figure shows the appearance and dimensions of the Mk 6 Mod 0 practice bomb signals with the Mk 247 Mod 0 fuze installed. The Mk 6 Mod 0 signals are smoke-producing devices used for observing bombing accuracy. The practice bomb signals are painted red with a yellow band around the forward end. Identification markings are located on the side of each signal. The fittings and features of the Mk 247 fuze and the Mk 6 signals are shown in the figure. The fuze body and arming vane assembly are steel. The blank caliber .38 cartridge case is brass. The practice bomb signals are steel. The Mk 247 fuze with the Mk 6 signal is used with Practice Bomb Mk 65 Mod 0 (500 pound) and Practice Bomb Mk 66 Mod 0 (1000 pound). The Mk 247 fuze with the Mk 7 signal is used with Practice Bomb Mk 15 Mod 3 and Mod 4 (100 pound).





FUNCTIONING: The figure shows the general arrangement of the Mk 6 Mod 0 practice bomb signals. ARMING when the bomb is dropped, the arming wire is withdrawn from the fuze, freeing the arming vane that rotates in the airstream. As the arming vane rotates, it causes the arming screw to unscrew from the firing plunger. This extends the arming vane upward from the fuze. The firing plunger is prevented from rotating or extending upward by the firing plunger pin. At completion of 13 revolutions, the plunger can move inward far enough to allow the firing pin to strike the blank cartridge. Continued rotation of the arming vane causes the arming screw to free itself from the firing plunger. Both the arming vane and the arming screw are released into the air stream. FIRING when the bomb impacts, the inertia of the firing plunger compresses the anti-creep spring and drives the firing plunger toward the blank cartridge. The firing pin strikes the blank caliber .38 cartridge that ignites the signal.

HAZARDOUS COMPONENTS: The MK 247 fuze after removal from the signal, is inert and presents no hazard. The Mk 6 and Mk 7 signals contain 2 pounds and one pound, respectively, of black powder. The blank caliber .38 cartridge contains approximately 1 gram of E.C. blank powder.

RAW EXPLOSIVES

A3

COMPOSITION B

EXPLOSIVE D

H6

TNT

M3 Demolition Block C-3 and M456 Detonating Cord, US

Demolition Block, M3 Composition C-3

IGNITERS AND IGNITER FUZES

M13, M14, M15 and M16 Fire Bomb Igniters, US

Internal and External Igniters for use with FireBombs. The Igniter Body is a M15 WP Grenade.

M15 External Mounted Igniter (M13 is Identical)

M16 Internal Mounted Igniter (M14 is Identical)

White Phosphorous Filler: The M13, M14, M15 and M16 igniter have 14.4 ounces of White Phosphorus (WP) filler.
Igniter Body Burster: two Gams of Tetryl **Transport:** Verify Fuze installed in Igniter.
M157 Igniter Fuze

M157 Fuze with C8R1 Burster Attached

M157 Fuze
NEW: 2 Grams of Black Powder. Transport: Hand Carry to disposal Site.

M23 White Phosphorus Igniter, US

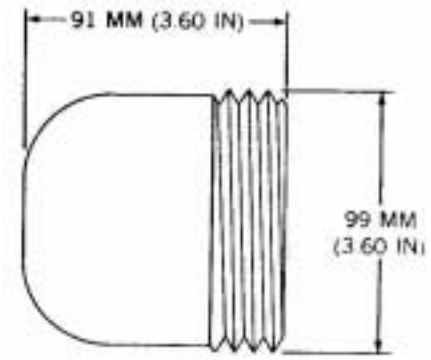
The igniters are internally mounted on the bomb. A single band, matching the color of the markings of the fuze installed in the igniter, may be painted around the igniter body. A yellow band on the igniter indicates that the fuze and igniter have been assembled and stored as a unit.

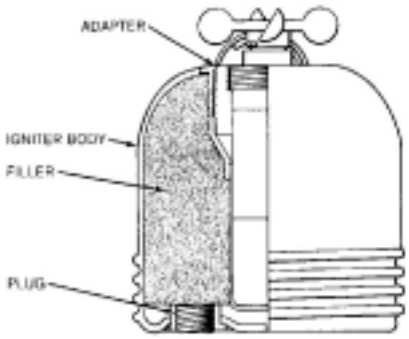
M23 Igniter still attached to the end plate of a firebomb.

Fuze end View
NEW: 1.25 Lbs. of White Phosphorous

Igniter in a Fire bomb Transverse well

end view of a m23 igniter
AN-M173 Fuze





MK 273 Fire Bomb Igniter, US

The Mk 273 igniter has a red anodized finish with black markings. A yellow band on the igniter indicates that the fuze and igniter have been assembled and stored as a unit. The body of the igniter is aluminum.

NEW: 1.6 pounds) of Magnesium Teflon Pellets and Powder.
Fuzes Used: AN-M173 and M918

AN-M173 Bomb Fuze, US

AN-M173A1: 14 Grams Tetryl
M918: 8 Grams Tetryl

BLU-73 and BLU-73A/B Cloud Detonator

U.S. Bomb unit FAE, BLU-73 and BLU-73A/B

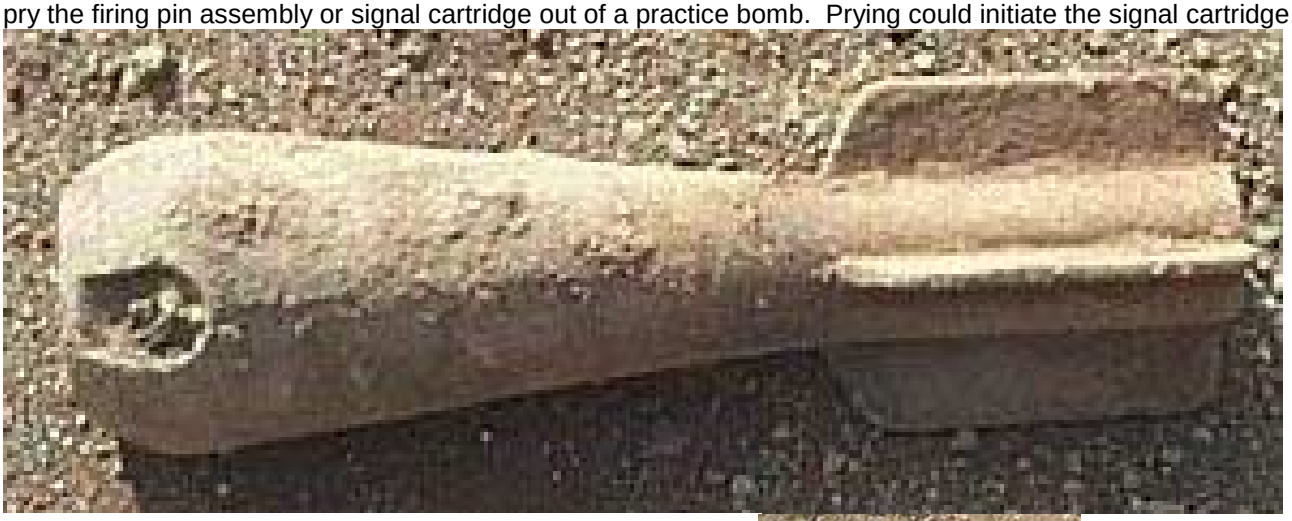
CLOUD DETONATORS

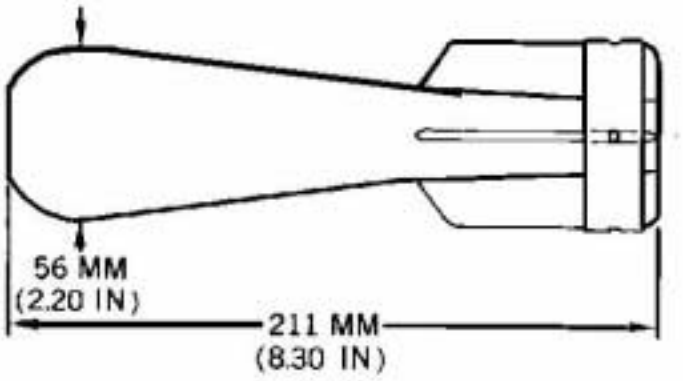
Each contains a percussion primer delay element, each weighing less than one gram, and a 28-gram PBXN-5 booster. The body is a light stainless steel. During ejection, upward as well as outward force is imparted to the detonator. The upward force causes the slider out of line to shear its retaining pin and move to the inline position held in place by lock springs. The outward motion forces the detonators out into the F/A mixture and detonates 160 milliseconds later. Igniting the

BOMBS AND BOMB FUZES

AN-MK23 MOD 0 & MOD 1, U.S. BOMB, PRACTICE, 3 LB

WARNINGS: Do not drop or jar a loaded practice bomb. These bombs contain no positive safety features. Keep hands clear of the flash tube and emission holes. Accidental firing of the signal cartridge could cause injury. Do not attempt to pry the firing pin assembly or signal cartridge out of a practice bomb. Prying could initiate the signal cartridge.





Description: These bombs are impact fired signal-generating, practice bombs used for training aircrews.

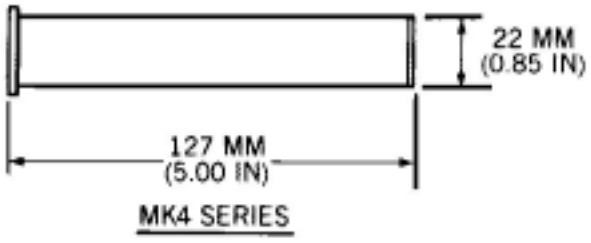
Markings and Color: The AN-Mk 23 Mods 0 & 1 bombs are unpainted with markings cast or stamped into the bomb body.

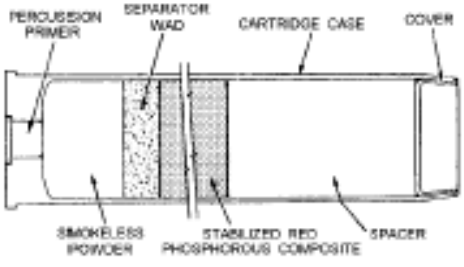
Construction Material: The AN-Mk 23 Mods 0 & 1 bombs are cast iron.

FUNCTIONING: Upon impact, the firing pin assembly is driven into the signal cartridge primer. This initiates the expelling charge producing a flash and ejecting the marker charge. The marker charge provides a visual indication of the impact point

HAZARDOUS COMPONENTS:

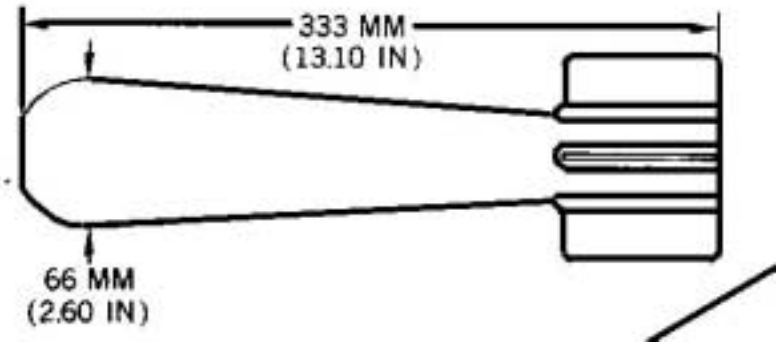
MK 4 Signal Cartridge: Contains an explosive primer, a 3-gram black powder expelling charge, and a 10-gram red phosphorus marker charge or 10 grams of Zinc Oxide (inert) marker charge.





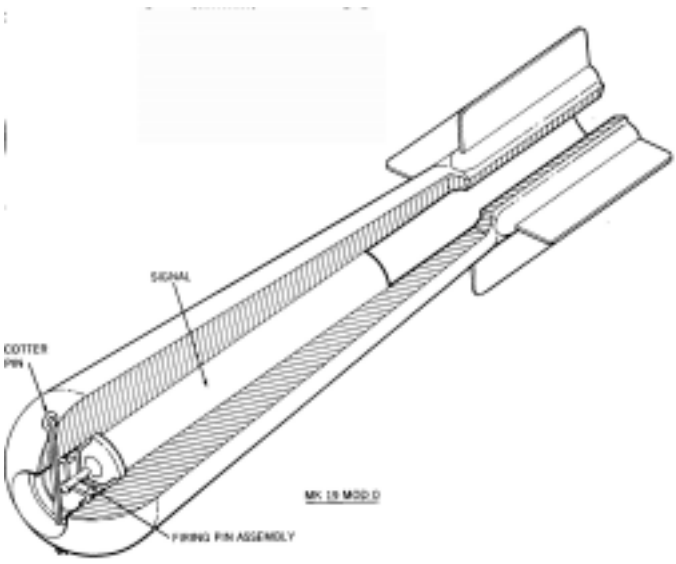
MK19 13 LB Practice Bomb, US

These bombs are impact fired signal-generating, practice bombs used for training aircrews. The Mk 19 Mods 0 and 1 bombs are cast lead antimony.



FUNCTIONING: Upon impact, the firing pin assembly is driven into the signal cartridge primer. This initiates the expelling charge producing a flash and ejecting the marker charge. The marker charge provides a visual indication of the impact point. The Mk 5 Mod 0 signal cartridge functions upon impact with water. The impact force of the water on the nose of the bomb breaks the weak discs, forcing the dye out of the flash tube, the dye dissolves with the water revealing the impact point.

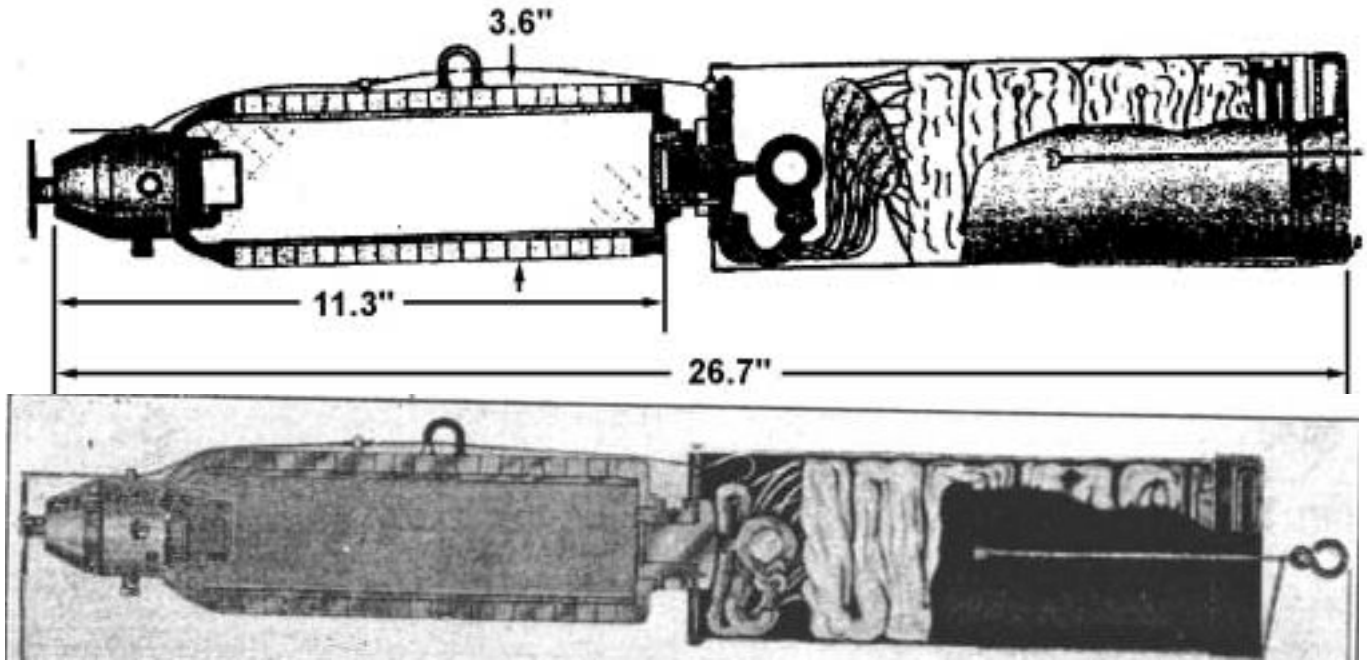
HAZARDOUS COMPONENTS: The Mk 4 signal cartridge contains an explosive primer, a 3-gram black powder expelling charge, and a 10-gram red phosphorus marker charge or 10 gram Zinc Oxide (Inert) marker charge



AN-M40A1 23-LB PARA FRAG BOMB, U.S

Description: These bombs are constructed of cast-steel nose and tail pieces, a seamless steel inner tube, and a helical-wrapped drawn steel wire wrapping around the inner tube. The tube is threaded to hold the nose and tail sections. For individual suspension of these bombs, a U-shaped eyebolt of steel is welded to bomb at the center of gravity. The 23-pound Para.-Frag. Bomb AN-M40 are always clustered, three of the bombs with the Cluster Adapter AN-M3 forming the cluster AN-M4. The 23-pound Para.-Frag. Bomb M72 is a slightly modified version of AN-M40. It is adapted for individual suspension and can be carried in vertical cellular racks. **Tail construction**: The 23-pound Para.-Frag, Bombs AN-M40 and M72 are fitted with cylindrical sheet-steel parachute housings which have end caps at the rear end and contain a white silk parachute. The Parachute Unit M3 is used in the Para.-Frag. Bombs AN-M40 and AN-M40A1; the Parachute Unit M4 in the Para.-Frag. Bombs M72 and M72A1.

The bomb contains 2.7 pounds of TNT. .



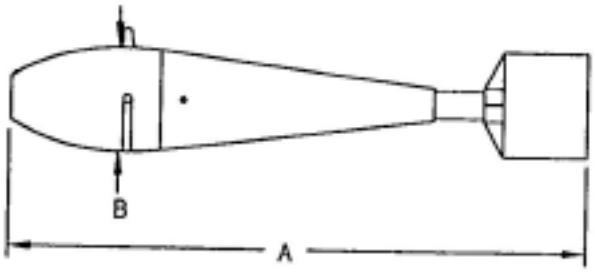
Diameter: 3.6 Inches
Length Bomb Body: 11.3 Inches
Length with fins: 26.7 Inches
Possible Fuzing

Nose Fuzing	M170	AN-M120	AN-M104

Transport: Verify Fuzing.

Mk 76 Practice Bomb

The Mk 76 is a 11.3-kilogram practice bomb used for training purposes as a low-cost low-risk alternative to live munitions. The Mk 76-series and BDU-33-series bombs are cast iron with sheet steel fin assemblies.



BOMB	A (LENGTH)	B (DIAMETER)
MK 76 MOD 0, 1, 2, AND 3	22.50 IN (572 MM)	4.00 IN (102 MM)
MK 76 MOD 4	25.07 IN (637 MM)	4.00 IN (102 MM)
MK 76 MOD 5	24.70 IN (627 MM)	4.00 IN (102 MM)

FUNCTIONING: Mk 76-Series and BDU-33/B Bombs with the Mk 4-Series, CXU-3/B or CXU-3A/B Signal Cartridge. Upon impact, the firing pin assembly is driven into a signal cartridge primer, initiating the cartridge.

HAZARDOUS COMPONENTS: The bomb contains no hazardous components. Hazardous components are contained in the signal cartridge or spotting charge. The spotting Charge contains an explosive primer of less than 1 gram, a 3-gram black powder expelling charge, and a 10gram red phosphorus or inert marker charge.

U.S. BOMB, PRACTICE, 56-LB, MK 89 MODS 0 & 1

These are signal-generating practice bombs that function on impact, producing a flash and/or a puff of smoke. The Mk 89 Mods 0 and 1 are cast iron with a sheet steel or aluminum fin assembly.

All Cartridges Contain one gram and 3 grams of black powder in the primer and expelling charge.
NEW: .009 Lbs.

Diameter: 4 inches (102mm)
Length with tail fins: 31.30 inches (795mm)

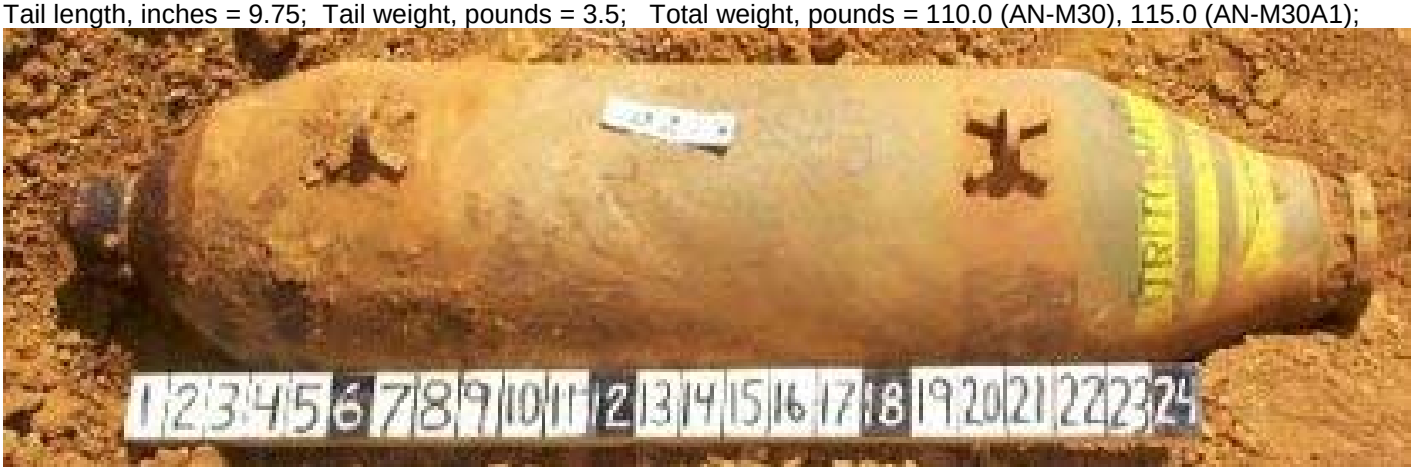
Possible Spotting Cartridges:

CXU 3/B	.7 Ounces Titanium Tetrachloride (FM Smoke)
MK4 Mod 0&3	10grams Red Phosphorus
MK 4 Mod 1&2	10grams Unknown Composition
MK 4 Mod 4	10grams Inert Mixture of Zinc Oxide
MK 5	No Hazardous Components

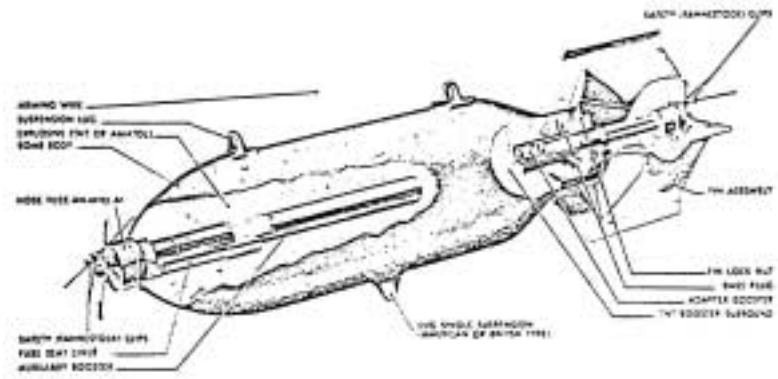
Transportation: All Cartridges are safe to transport

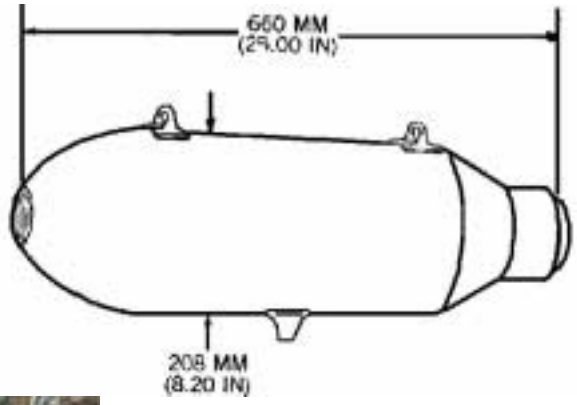
AN-M30 100Lb Bomb, US

Description: two lugs located on one side 14 Inches apart and a single lug on opposite side. For Amatol and TNT filled bombs a single 1 inch yellow band located at nose and tail. Two bands indicate Comp B and three bands indicate Tritonal. Over-all length, inches = 36.0; Body length, inches = 29.0; Body diameter, inches = 8.2; Wall thickness, inch = 0.16; Tail length, inches = 9.75; Tail weight, pounds = 3.5; Total weight, pounds = 110.0 (AN-M30), 115.0 (AN-M30A1);



Explosive Filler: 50/50 TNT/Amatol: 54 Lbs. TNT: 57 Lbs. Tritonal: 62 Lbs.





MK1 M4 100 LB Bomb, US

This is a general-purpose demolition bomb. The body is formed by welding three cast steel sections together. The tail is a cast steel sleeve secured to the body by a fin-locking nut, it has four fins or vanes, and internal box type struts. The suspension is two u-shaped bar steel eyebolts welded to the body along the longitudinal axis. Prior to March 11, 1942 this bomb would be painted yellow all over with black manufacturers markings, but since that date it will be painted olive drab all over with one inch yellow bands around the nose and base and a 1/4 inch yellow band around the center of gravity. This particular series of bombs was not satisfactory for war use and has been abandoned, except for a few of these bombs which are used for target practice and training purposes. They are intended for target use and general bombardment.

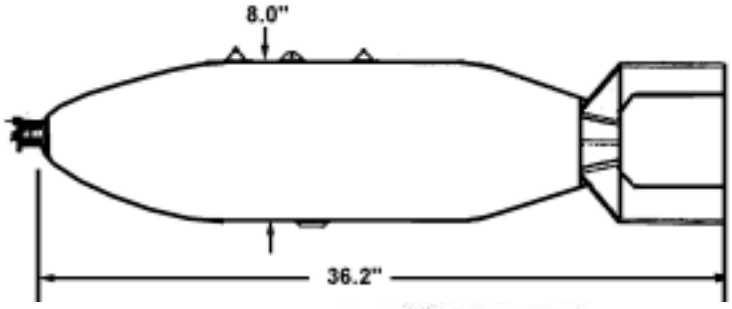
HAZARDOUS COMPONENTS: This bomb contains 65 lbs. of cast TNT.

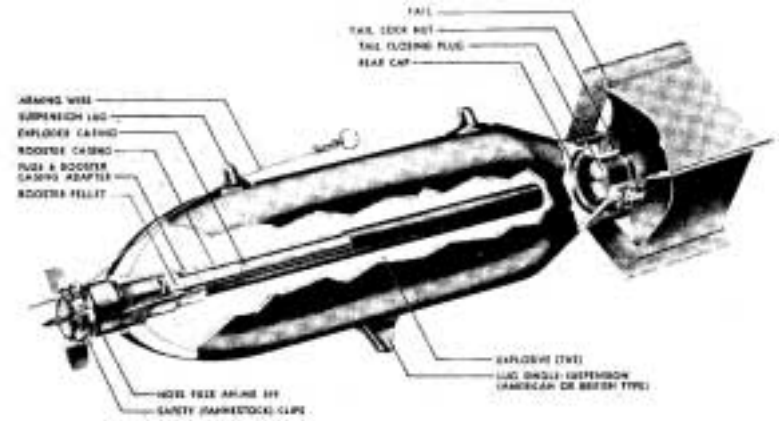
MK4 100Lb Bomb, US

The Mk 4 bomb is made from a single-piece steel forging; cylindrical, with ogival nose. Mk 4 has two lugs welded on the body 14 inches apart; with a single lug welded on the opposite side. The bomb is gray over all with a four-inch yellow disc between the two lugs, indicating H.E. The color may be yellow over all. The Mk 4 has four vanes welded to a sleeve that is secured to the bomb body with a locking nut. Box-type internal struts are welded to the vanes.

Exploder with MK219 Fuze Attached from MK4 100 LB Bomb.

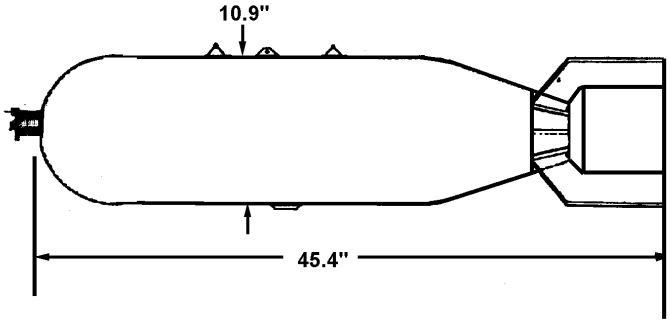
HAZARDOUS COMPONENTS: The Mk 4 Mod 1 and Mod 4 contains 55 pounds of TNT and uses either the AN-Mk219 or Mk 233 nose fuzes. The Mk 219 fuze consists of a detonator, a tetryl lead, a tetryl lead-in, and a 0.9-ounce tetryl booster charge.

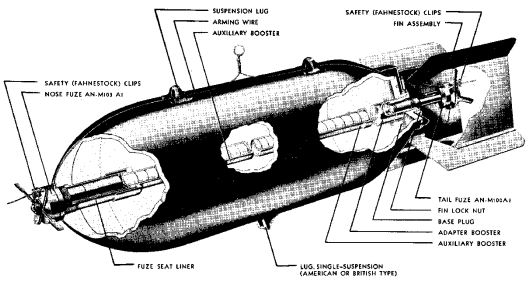




U.S. BOMB, GP, 250-LB, AN-M57 & AN-M57A1

250-Pound GP AN-M57 and AN-M57A1. Over-all length, inches: 45.4. Body length, inches: 36.0. Body diameter, inches: 10.9. Wall thickness, inch: 0.27. Tail length, inches: 12.1. Tail width, inches: 14.9. Tail weight, pounds: 6.0. Total weight is 260.0 pounds.



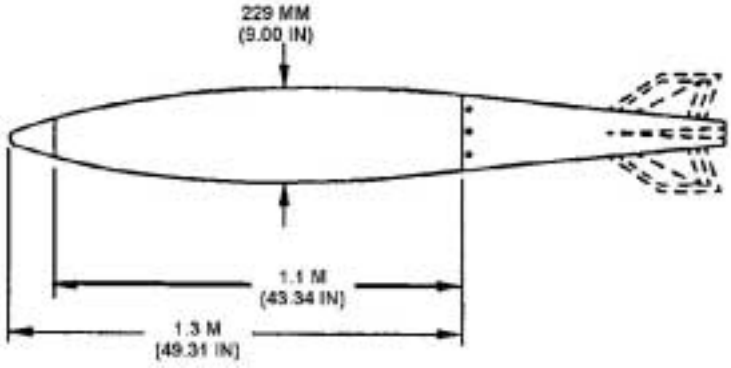


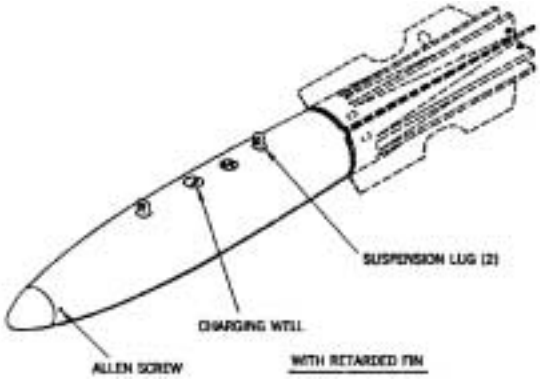
HAZARDOUS COMPONENTS: The bomb is filled with either 123.7 pounds of 50/50 Amatol or 129 pounds of TNT.

MK81 250Lb LDGP Bomb, US

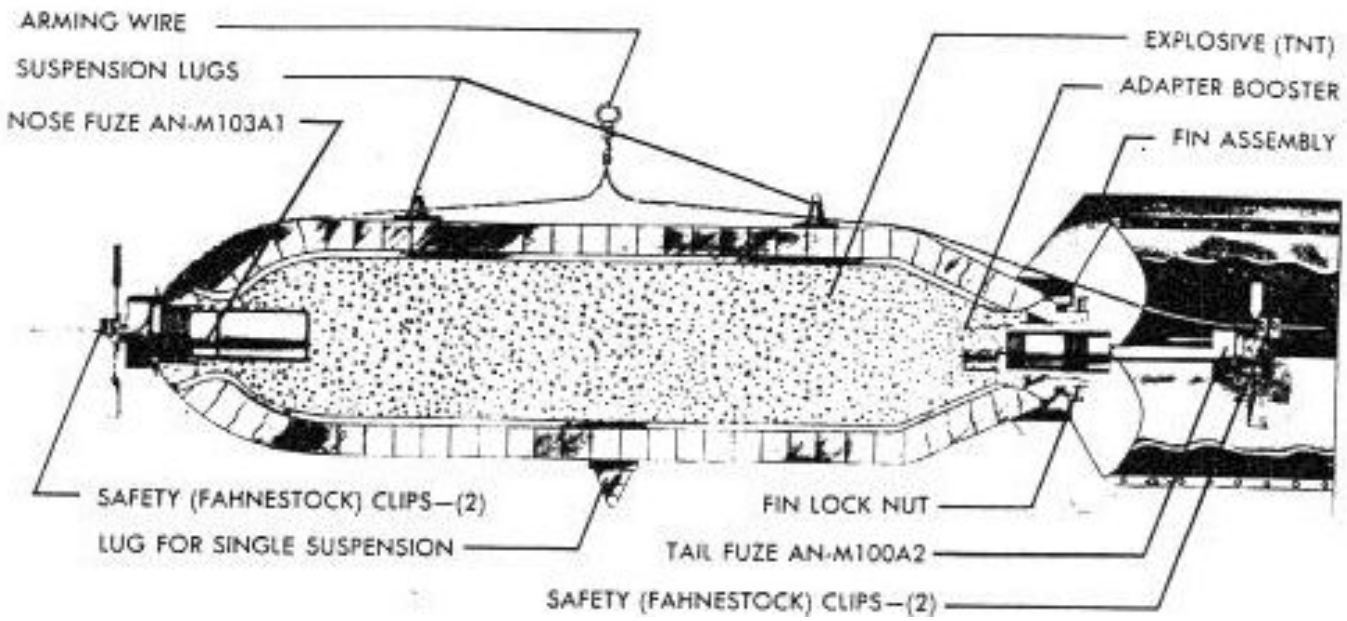
These are general-purpose low-drag, high explosive filled bombs. They can be used against personnel, moderately reinforced concrete, and light armor. Both fragmentation and blast effect are produced. The bomb body is steel. The charging well plug and the nose and tail closure plugs are steel or plastic. The external thermal protection covering on the bombs is a copolymer elastomer thermosetting compound.

HAZARDOUS COMPONENTS: tritonal or H-6 explosive, weighing 45.4 kilograms (100.0 pounds).





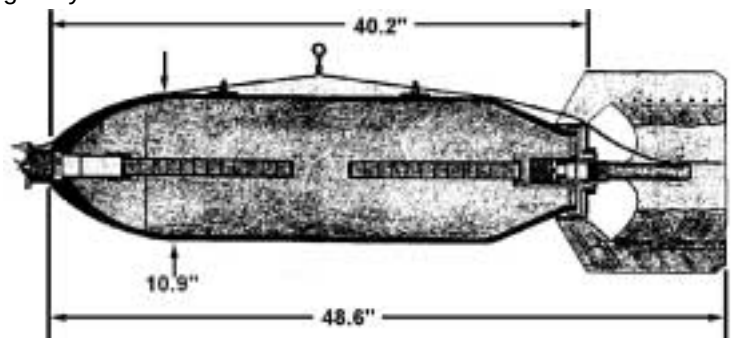
AN-M81 260 LB Frag Bomb



No Data available.

M31 300Lb Demolition Bomb, US

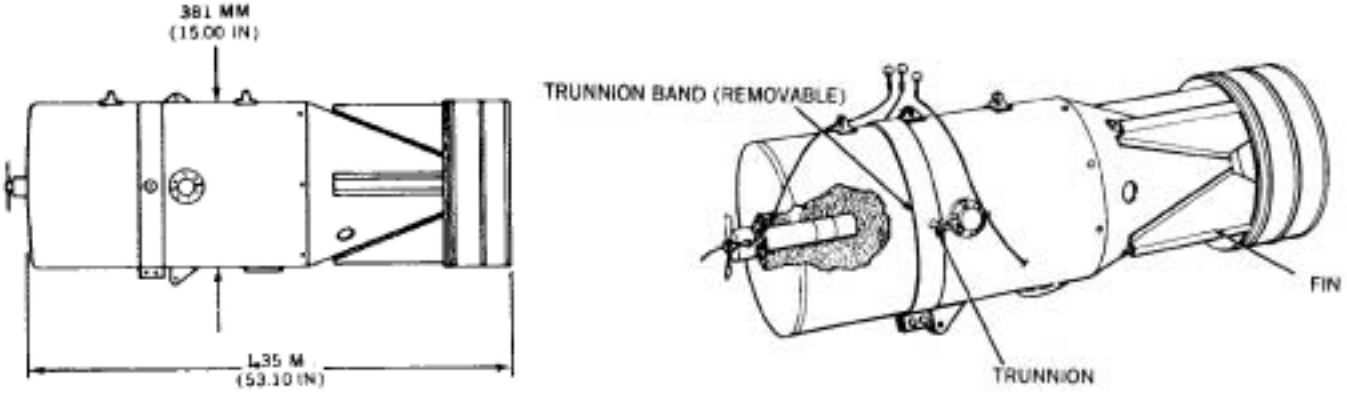
Before the organization of the AN Standardization Board in 1941, these bombs were designated as "Demolition H.E." bombs; under the standardization policy they were re-titled as "General Purpose High-Explosive (G.P.H.E.)" bombs. The targets were Ammunition dumps, railway engines, and cars, all types of construction, and aircraft on the ground. These bombs may be made by any one of the following methods: **(1)** From seamless steel tubing in which the nose of the bomb is formed by swaging and the tail by drawing to the necessary diameter; or **(2)** the case may be forged in one piece; or **(3)** it may be formed from cast sections welded together. These bombs have female base filling plates and are suspended from the aircraft horizontally, by dual lugs. The suspension lugs are constructed by welding two eyebolts to the body along the longitudinal axis of the bomb. The bomb color and markings are as follows: Prior to 11 March, 1942, these bombs would have been painted yellow all over, with black manufacturers makings; since that date they have been painted olive drab with a one-inch yellow band around the nose and base and a 1/4-inch band around the center of gravity.



HAZARDOUS COMPONENTS: **50/50 Amatol**: **135.5 Lbs**. Since Amatol is hygroscopic, TNT surrounds are placed around the nose and tail booster sleeves to seal the Amatol from moisture; **TNT**: **137 Lbs**. 100 percent TNT, which will be stenciled on the bomb.

AN-MK47 350 LB Depth Bomb

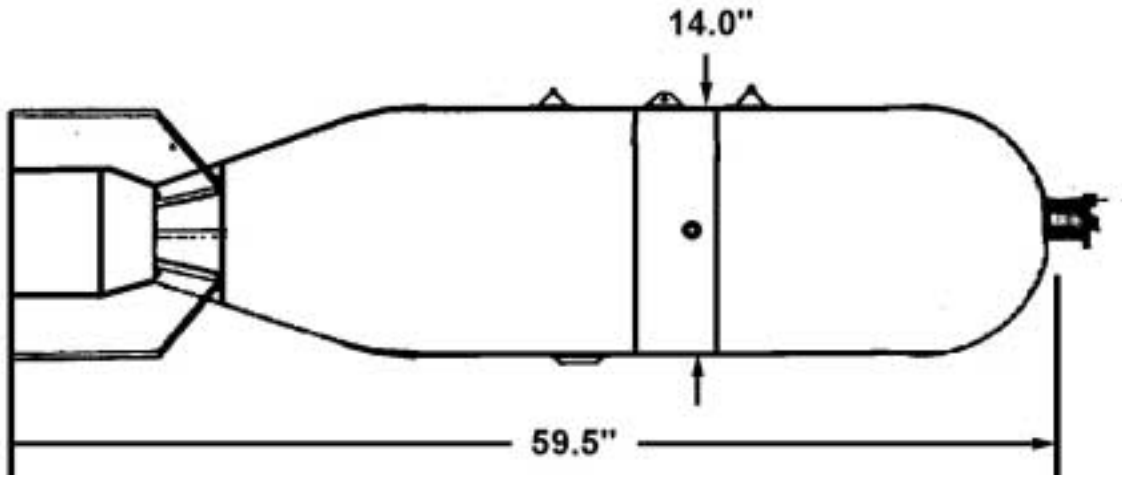
These are aircraft-laid, hydrostatically or impact-actuated, antisubmarine and underwater target depth bombs. When appropriately fuzed, they may be used for blast effect against surface targets. The cases of the depth bombs are olive drab. All depth bombs have a 25-millimeter (1.00-inch) yellow band around the nose, a 25-millimeter (1.00-inch) yellow band on each side around the athwart ship fuze well, and a 6-millimeter (0.25-inch) yellow band around the center of gravity. Torpex-loaded depth bomb cases have the weight and Mk number stenciled in blue, and TNT-loaded depth bomb cases are stenciled in yellow. The depth bomb cases are steel.



HAZARDOUS COMPONENTS: Main charge is 114 kilograms (252 pounds) Torpex (TPX)

MK12 500Lb Bomb, US

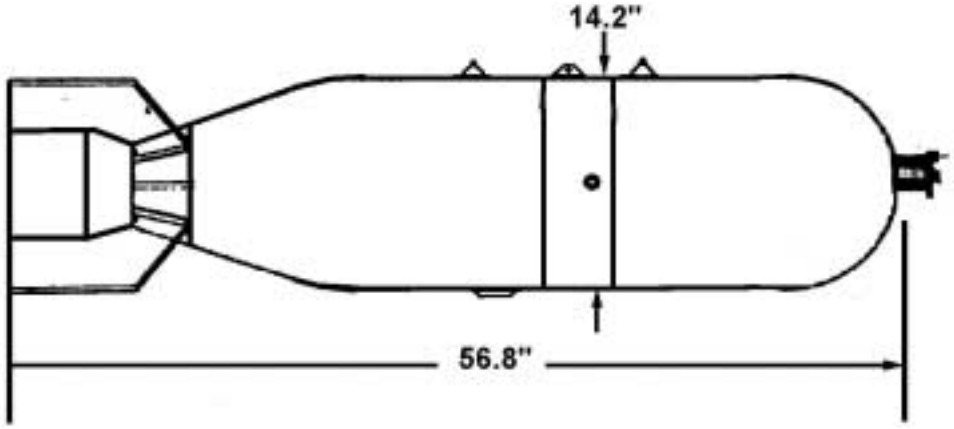
500-pound GP MK 12 Mod 2. Over-all length, inches: 59.5. Body length, inches: 42.6. Body diameter, inches: 14.0. Wall thickness, inch: 0.36. Tail length, inches: 20. Tail width, inches: 19.4. Filling: TNT. Weight of filling, pounds: 256. Total weight, pounds: 504. Charge/weight ratio: 50 percent. Fuzing: Nose: AN-Mk 219 (Instantaneous) Requires Mk 219 adapter ring and one additional Auxiliary Booster Mk 1. Mk 221 (0.01 second delay), Mk 243 Mod 0, Mk 244 Mods 0-1, Mk 239. Tail: Mk 223 (0.01 second delay), Mk 229 Mod 3. Body construction: One-piece steel, forged or drawn; cylindrical with ogival nose. Suspension: Horizontal suspension by two lugs or trunnions on band for dive-bombing. Color and markings: Grey over all with yellow disc between lugs, indicating H.E. Tail construction: Four sheet metal vanes are welded to a cone which is attached to the body by a nut which surrounds the fuze. Box-type struts are used. Remarks: The 500-pound GP Bomb Mk 12 Mod 2 is still to be found in the field, but is no longer being manufactured. The other Marks are obsolete. The Mk 12 and Mk 12 Mod 1 differ from the Mk 12 Mod 2 as follows: Trunnions are welded to the body. They also have two hoisting lugs welded to the body, a female base plate, and a right-angle fin sleeve instead of the conical type. In order to get a wider selection of possible tail fuzing, use an Adapter Booster M102 with a 0.47-inch spacer ring, and install any of the following fuzes: AN-M101A2, M113A1 or M116.



HAZARDOUS COMPONENTS: Filling is TNT: Weight of filling is 256 lbs. Fuzing = Nose--AN-Mk 219 (Instantaneous), requires Mk 219 adapter ring and one additional Auxiliary Booster Mk 1. Mk 221 (0.01 second delay), Mk 243 Mod 0, Mk 244 Mods 0-1, and Mk 239. Tail--Mk 223 (0.01 second delay) and Mk 229 Mod 3

U.S. BOMB, DEMOLITION HE, 500-LB, AN-M43, AN-M64, & AN-M64A1

The fuzing of these three bombs is the same, with these exceptions: The Tail Fuzes AN-Mk 230 and Mods and Mk 231 Mod 0 can be used in the GP Bomb, AN-M64 because this bomb has the Adapter Booster, M115 or M115A1. The Adapter Booster M115 has a sleeve that can be easily removed, making it possible to use a fuze with a larger diameter. With the removable sleeve screwed in the adapter booster, any Army tail fuze may be used. The GP Bomb, AN-M43 uses the Adapter Booster, M102, which has no removable sleeve and therefore cannot take the Hydrostatic Fuzes, AN-Mk 230 and Mk 231.

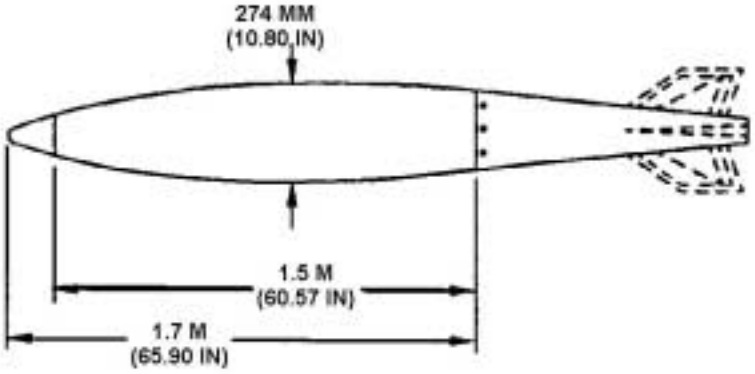


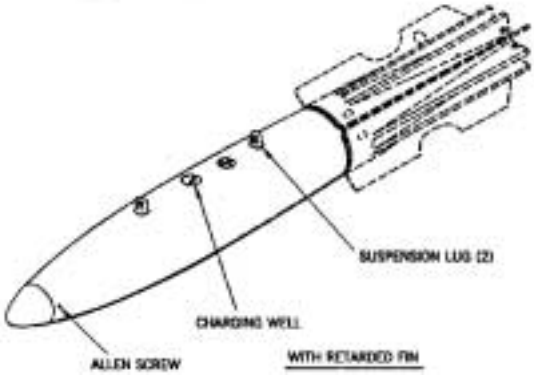
HAZARDOUS COMPONENTS: AN-M43 filling: Amatol. Wt. of filling: 262 pounds. Total weight: 510 pounds. AN-M64 filling: TNT. Wt. of filling: 267 pounds. Total weight: 525 pounds. AN-M64A1 filling: Comp. B. Wt. of filling: 274 pounds. Total weight: 535 pounds. For REGULAR MISSIONS: The following nose fuzes are used: AN-M103, M103, AN-M103A1, M135, M135A1, M136, M136A1, M139, AN-M139A1, M140, AN-M140A1, M149, M163, M164, M165, Mk 243, Mk 244, Mk 239, and AN-Mk 219. The following tail fuses are used:: AN-M101A2, AN-M101A1, M101, and M161. For SPECIAL MISSIONS: The tail fuzes are: M113, M113A1 (Masthead bombing from land based planes only). M116 (Masthead bombing from carriers and land bases). M124, M124A1, and Mk 237-0 (Long-delay time fuze against land targets). M133 and M151 (Anti-ricochet) and a shipping plug are in the nose, when above tail fuzes are used. For ANTI-SUBMARINE MISSIONS (AN-M64, AN-M64A1): The nose fuzes are: AN-M103A1, AN-M103, M103, M139, AN-M139A1, M140, AN-M140A1, M163, M164, M165, Mk 239, Mk 243, and Mk 244-0-1. The tail fuzes are: AN-Mk 230-4-5-6 and Mk 231-0.

MK82 500Lb LDGP Bomb, US

These are general-purpose low-drag high-explosive filled bombs. The bombs are painted olive drab and have a yellow band 76-MM wide around the nose and tail or around the nose only. The bomb body is steel. The charging well plug and the nose and tail closure plugs are steel or plastic. The external thermal protection covering on the bombs is a copolymer elastomer thermosetting compound. Externally thermally protected bombs have an alligator skin covering, and are designed primarily for shipboard use. Internally thermally protected bombs are marked as such.

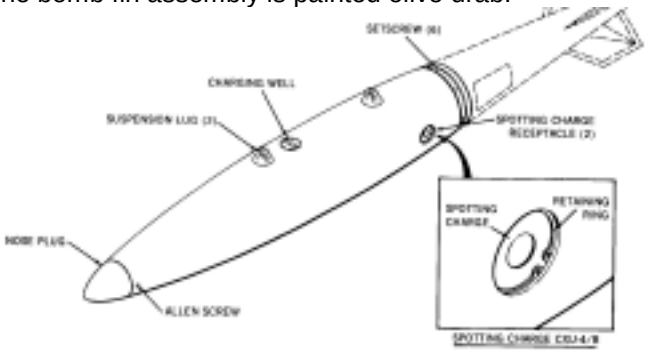
HAZARDOUS COMPONENTS: The Mk 82 bombs are filled with tritonal or H-6 explosive, weighing 87.1 kilograms (192.0 pounds). The BLU-111A/B bombs are filled with PBXN-109 explosive weighing 87.1 kilograms (192.0 pounds).





U.S. BOMB UNIT, SIMULATED, 500-LB, BDU-45/B, QUIET BOMB

The BDU-45 is a 500 lb. Navy practice bomb. The bomb is a low drag type of the same size and shape as a Mk 82 bomb container. This is a signal generating simulated bomb used for pilot proficiency training with provisions for visual spotting of bombing accuracy. The bomb is steel. The bomb is painted blue with the designation BDU-45/B stenciled in white on the forward end of the bomb. Early models of the bomb are stamped with Mk 82 designations between the suspension lugs and with Mk 82 designation, ordnance drawing number, and loading data stenciled in white on the side of the bomb. The bomb fin assembly is painted olive drab.



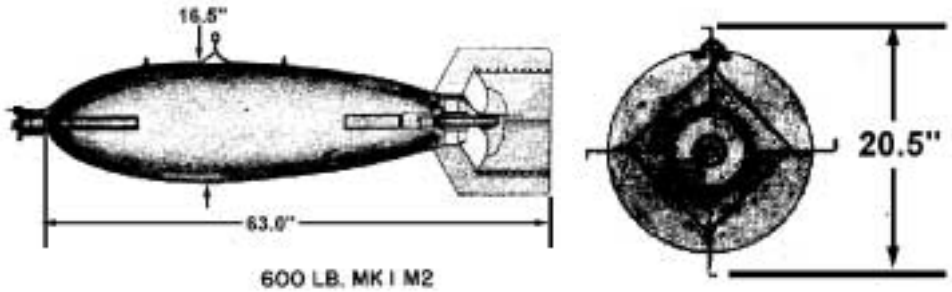
FUNCTIONING: Arming. The arming wire assemblies and lanyard, depending on the fuzing and fin assembly employed, are connected to the aircraft bomb rack or pylon. As the bomb is released from the aircraft, the retarded fin assembly opens (if employed) and the fuze arming sequence is initiated. After a predetermined time, the fuze arms. Firing. If only a nose fuze is installed, on bomb impact with the target the fuze functions and the detonating booster provides visual observation of the point of impact. If a spotting charge adapter is installed, on bomb impact with the target, the signal cartridge functions and ejects a smoke cloud for visual observation of the point of impact. If a tail fuze is installed (with or without a TDD or sensing element), on proximity or bomb impact with the target the fuze functions, rupturing the spotting charges, breaking the glass vials, and expelling the titanium tetrachloride. This reacts with the moisture in the air to produce a white smoke cloud for visual observation of the point of impact. For nighttime use, the spotting charges are not installed, but the spotting charge receptacle shipping plugs are removed. On proximity or bomb impact, the fuze functions and the flash from the fuze booster detonating blows out through the receptacles providing visual observation of the point of impact.

HAZARDOUS COMPONENTS: The bomb is loaded with an inert filler and contains no hazardous components. For the hazards of the fuze(s), TDD or sensing element, spotting charge adapter, and spotting charges, refer to the applicable item.

MK1 M2 600Lb Bomb, US

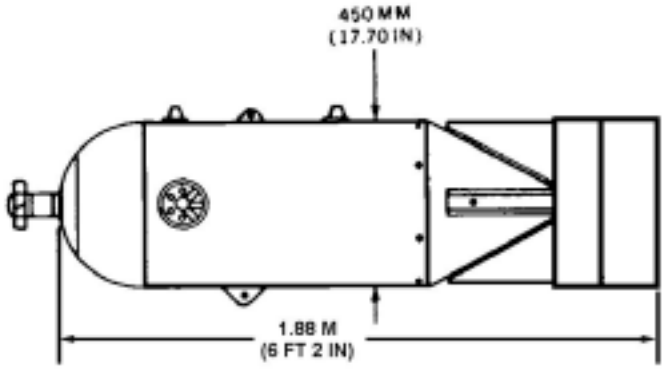
This is a general-purpose demolition bomb. The body is formed by welding three cast steel sections together. The tail is a cast steel sleeve secured to the body by a fin-locking nut, it has four fins or vanes, and internal box type struts. The suspension is two u-shaped bar steel eyebolts welded to the body along the longitudinal axis. Prior to March 11, 1942 this bomb would be painted yellow all over with black manufacturers markings, but since that date it will be painted olive drab all over with one inch yellow bands around the nose and base and a 1/4 inch yellow band around the center of gravity. This particular series of bombs was not satisfactory for war use and has been abandoned, except for a few of these bombs which are used for target practice and training purposes. They are intended for target use and general bombardment.

HAZARDOUS COMPONENTS: This bomb contains 355 lbs. of cast TNT.

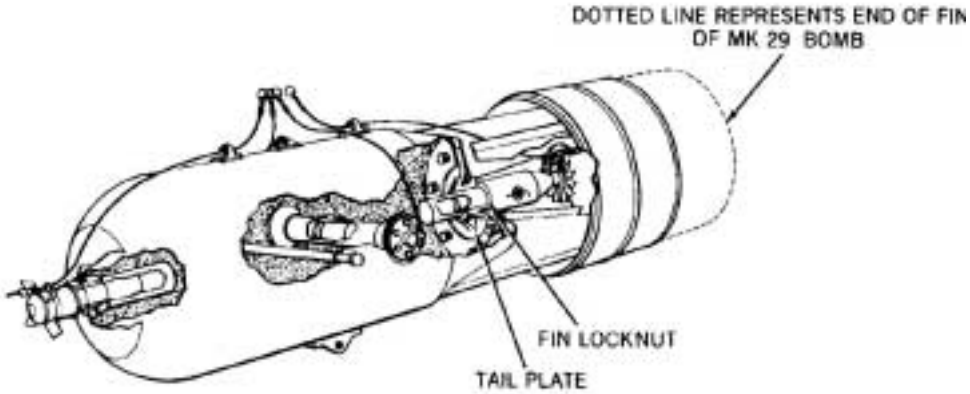


U.S. BOMB, DEPTH, MK 29

These are aircraft-laid, hydrostatically or impact-actuated, antisubmarine and underwater target depth bombs. When appropriately fuzed, they may be used for blast effect against surface targets. The cases of the depth bombs are olive drab. All depth bombs have a 25-millimeter (1.00-inch) yellow band around the nose, a 25-millimeter (1.00-inch) yellow band on each side around the athwart ship fuze well, and a 6-millimeter (0.25-inch) yellow band around the center of gravity. Torpex-loaded depth bomb cases have the weight and Mk number stenciled in blue, and TNT-loaded depth bomb cases are stenciled in yellow. The depth bomb cases are steel. The Mk 29 is converted to the Mk 37 by replacing the tail. Because of numerous instances in water crash landings where depth bombs fuzed with the Athwart ship Fuze AN-Mk 224 or AN-Mk 234 exploded, these two fuzes have been suspended from use. As a consequence, the Depth Bombs Mk 29 and Mk 37 may be used only if a nose impact fuze is installed.



HAZARDOUS COMPONENTS: Main charge is 210 kilograms (464 pounds) TNT

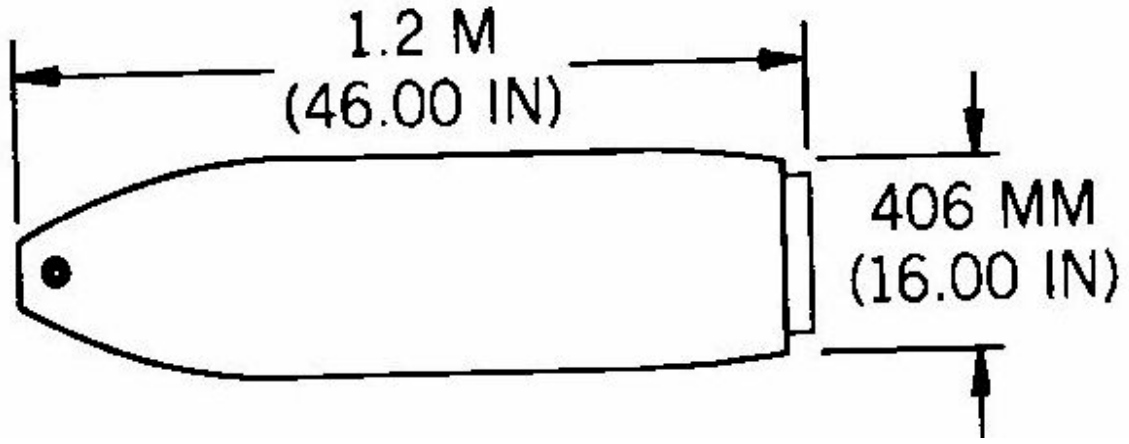


MK 29 AND MK 37 DEPTH BOMB

M117 750Lb Bomb, US

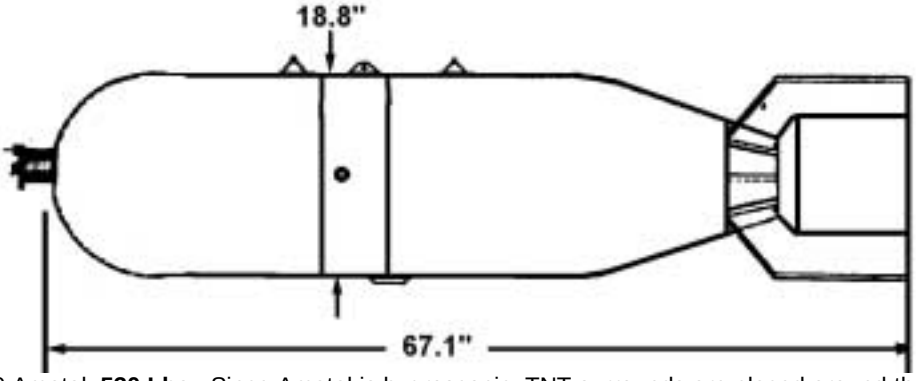
This bomb is generally representative of all bombs in the M117 series. Major differences between the M117-series bombs are primarily the method of baseplate attachment (i.e., welding, bolts, etc.), type of explosive filler, use of metal or plastic shipping protectors, the number of suspension lugs, and the addition of an O-ring on the baseplate (M117A1E3 only). These are general-purpose (GP) high-explosive (HE) bombs which may use proximity, mechanical, or electric nose and tail fuzes. When used as an M117D (destructor), the M117 bomb has a fuzing system actuated by magnetic/seismic influence. Both fragmentation and blast effect are produced by these bombs. The bombs are painted olive drab and have yellow markings which include the type of explosive charge, the national stock number (NSN), the average weight, and the year loaded. The bomb body and conical fin assembly are steel.

HAZARDOUS COMPONENTS: The M117 series bombs could have 172 kilograms (**379 pounds**) to 175 kilograms (**386 pounds**) of ether Tritonal, H-6 or Minol 2 explosive.

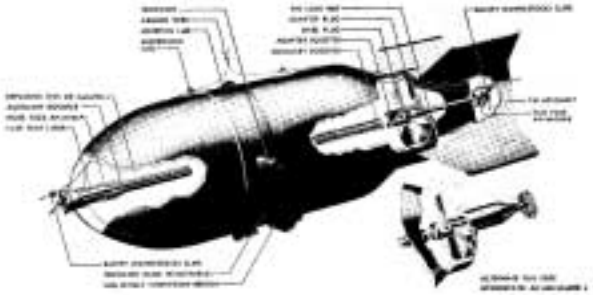


AN-M65 1000 LB Bomb, US

The fundamental characteristics of Army "M" Series bombs are: Parallel sides, ogival nose, and boat tail (box type-tail assembly construction); and filled with 50/50 Amatol sealed at both ends with TNT surrounds. Some are now classified as obsolescent. The Army-Navy "AN" series is similar to the "M" Series, except: (1) Third suspension lug added at center of gravity and 180 degrees removed from other two lugs, and (2) base plate changed to the male type. Targets: Ammunition dumps, railway engines, and cars, all types of construction, and aircraft on the ground. These bombs may be made by any one of the following methods: (1) From seamless steel tubing in which the nose of the bomb is formed by swaging and the tail by drawing to the necessary diameter; or (2) the case may be forged in one piece; or (3) it may be formed from cast sections welded together. These bombs have female base filling plates. Type of suspension: Horizontally, by dual lugs. Color and markings: Prior to 11 March, 1942, these bombs would have been painted yellow all over, with black manufacturers markings; since that date they have been painted olive drab with a one-inch yellow band around the nose and base and a 1/4-inch band around the center of gravity. Material of tail: Sheet steel. Tail construction: This type of tail consists of the following parts: (1) a cast-steel sleeve secured to the body of the bomb by a fin-locking nut; (2) four fins or vanes; and (3) internal box-type struts. One vane and one strut are pressed from one piece of metal, and the four pieces are welded to one another and to the sleeve.

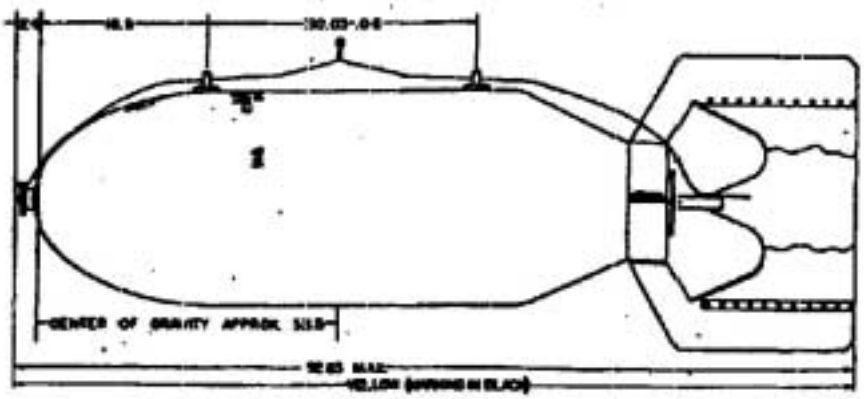


HAZARDOUS COMPONENTS: 50/50 Amatol. **530 Lbs.**, Since Amatol is hygroscopic, TNT surrounds are placed around the nose and tail booster sleeves to seal the Amatol from moisture; (2) 100 percent TNT, **558 Lbs.**, which will be stenciled on the bomb. The AN-M65A1 can also contain Comp B, **595 Lbs**. Auxiliary Boosters, M101, one in the nose and one in tail, which contain tetryl. The Adapter Booster, M102 (tetryl) is threaded to the base plate of all bombs in the series and receives the tail fuze.

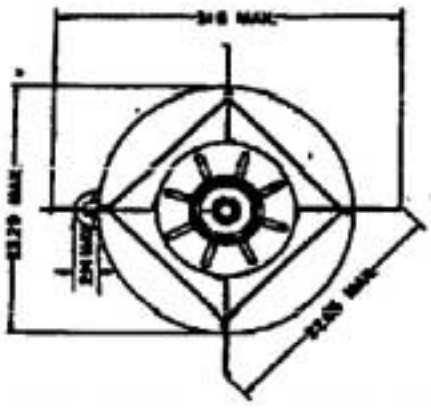


AN-M66 2000Lb Bomb, US

The AN-M66A2 is a cylindrical bomb, which is 92.63 inches long and weighs 2,155.5 pounds as released. The body is 71.8 inches in length and 23.3 inches in diameter. 1,140.3 pounds (52.9 percent of the complete round) is explosive charge of 2,098.5 pounds. The charge may be tritonal, TNT, COMP B, or Amatol. The base plate of this bomb is securely locked to the body and the adapter-booster may be locked to the base plate. When the AN-M66A2 is used for dive-bombing, by the Navy, it must be fitted with the BAND, trunnion, AN-M7. Other models of this size and type of bomb and the details in which they differ from the AN-M66A2 are listed below: (1) Bomb, GP, 2,000-lb, AN-M66A1 differs from AN-M66A2 in that it is 92.83 inches long and weighs 2,155 pounds as released. The AN-M66A1 contains 1,156 pounds of explosive (tritonal) or 53.6 percent of the total weight. In addition, the nose of the AN-M66A2 is thicker and not as rounded as that of the AN-M66A1, the AN-M66A2 being more similar in shape to smaller GP bombs. (2) Bomb, GP, 2,000-lb, AN-M66 is the same as the AN-M66A1 except that its base plate is removable and the adapter-booster cannot be locked in place. (3) Bomb, GP, 2,000-lb, AN-M34 is an earlier model corresponding to the AN-M66 series. It weighs 2,049.0-pounds of which 1,060 pounds is explosive charge (Amatol). (4) Bomb, demolition, 2,000-lb, M34 differs from the AN-M34 in that it weighs 1,987 pounds of which 1,076 pounds is explosive charge (Amatol). In addition, the M34 does not have the single suspension lug and is fitted with a base cap in place of a base plate.

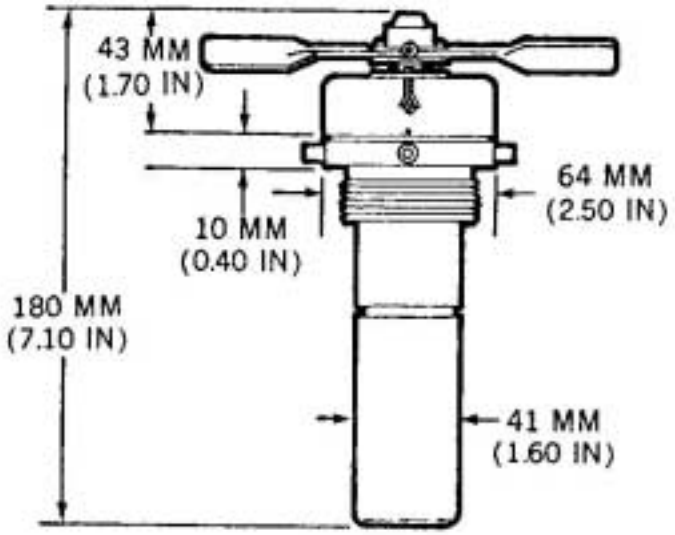


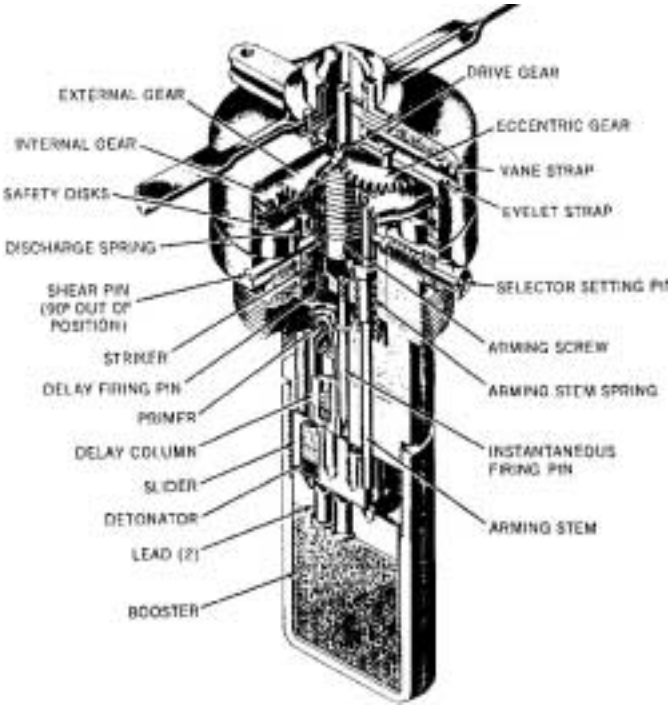
HAZARDOUS COMPONENTS: The AN-M66A2: **1,140.3** pounds of tritonal, TNT, COMP B, or Amatol. The AN-M66A1 Contains **1,156** pounds of explosive (tritonal). The AN-M34 is an earlier model corresponding to the AN-M66 series. The M43 contains **1,060** pounds of Amatol. The AN-M34 contains **1,076** pounds of Amatol.



U.S. FUZE, BOMB, NOSE, M103, AN-M103, AN-M103A1

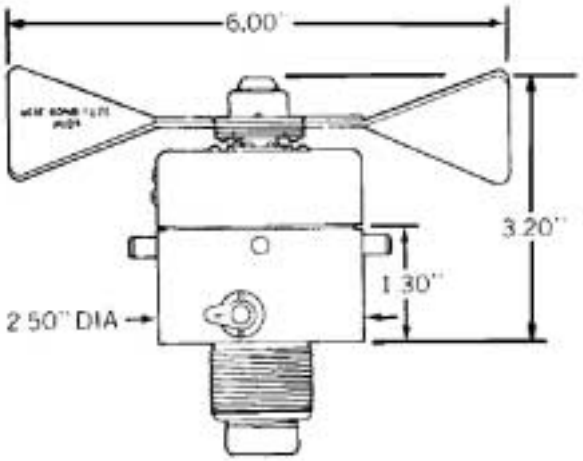
These vane-armed nose fuzes are fired on impact either instantaneously or after a short delay. The words DEEP SLOT DELAY and SHALLOW SLOT INST are stamped in the fuze body flange. The fuzes are unpainted and are constructed of cadmium plated steel.



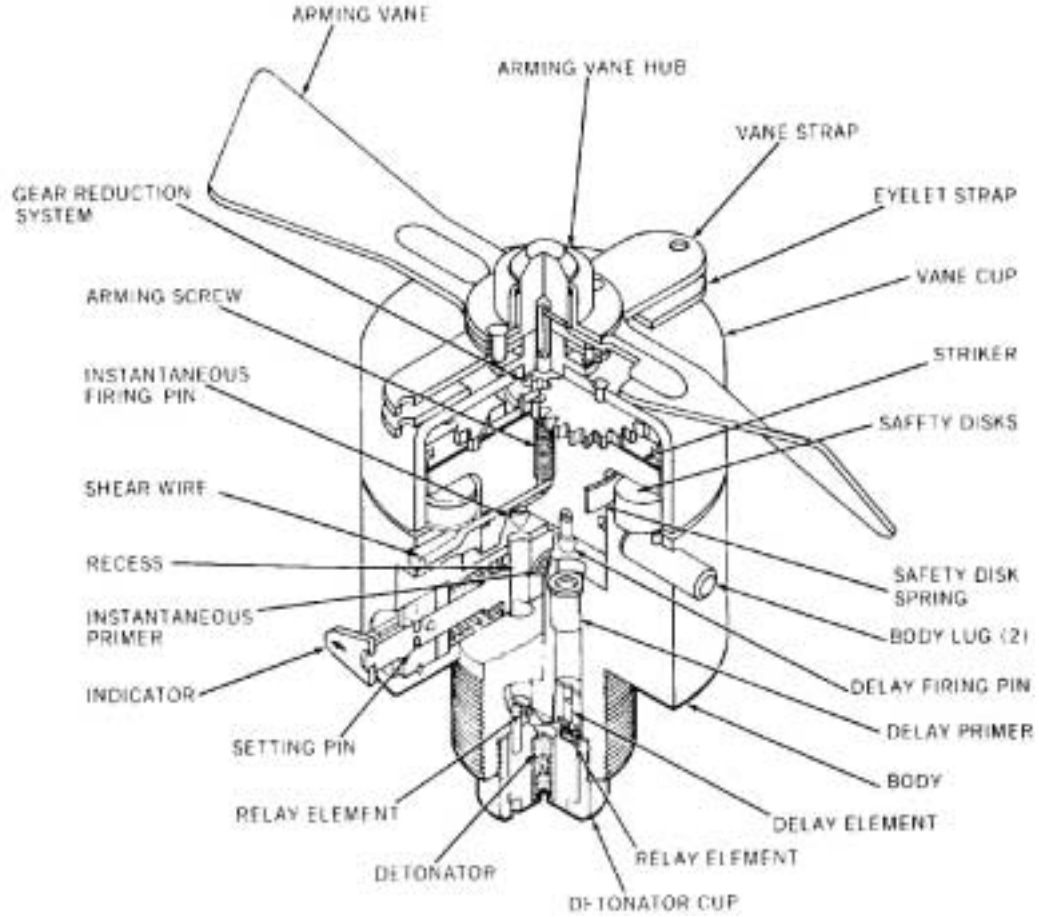


HAZARDOUS COMPONENTS: Each fuze contains a primer, a delay column, two leads, and detonator, each weighing less than 1 gram. The boosters of the fuzes contain a tetryl charge weighing 54 grams (1.9 ounces).

U.S. FUZE, BOMB, NOSE, M105



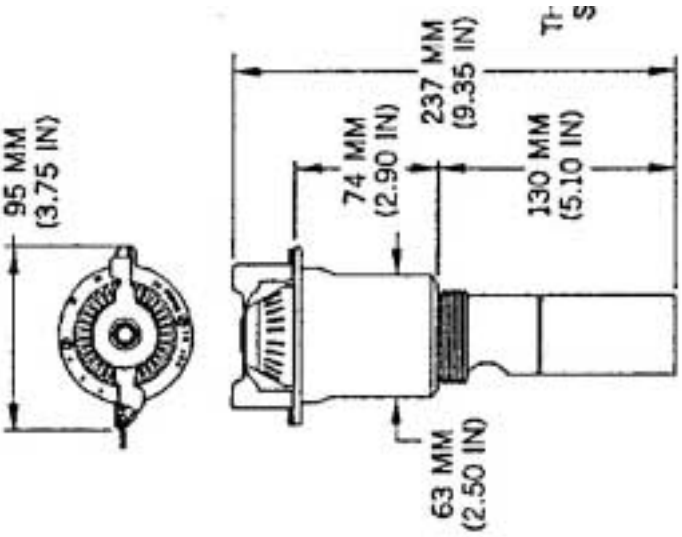
This is an arming-vane, delayed arming, instantaneous-or-short delay, impact-fired, nose fuze. The body and vane cup is cadmium plated. The words "DEEP SLOT DELAY" and "SHALLOW SLOT INST" are stamped on the body. The fuze designation is stamped on the arming vane. The body, striker, safety disks, vane cup, and arming vane are steel. The arming vane hub is brass. The detonator cup may be either brass or steel. The figure shows the general arrangement of the fuze in the unarmed condition and set for delay firing. Both firing pins (instantaneous and delay) are blunt. NOTE: This fuze is used in conjunction with the M106 series tail fuzes.



HAZARDOUS COMPONENTS: The fuze has two explosive trains, consisting of two primers, one black-powder delay element, two lead-Azide relay elements, and a detonator. The weight and composition of the detonator are unknown. Each of the other elements contains less than 1 gram of explosive.

U.S. FUZE, BOMB, NOSE, M904E1, M904E2, M904E3, & M904E4

Description: The figure shows the appearance and dimensions of the M904-series fuzes. The M904E4 is identical to the M904E3 except that it is thermally protected by the addition of a thermal shield. These are vane armed, impact initiated, instantaneous or delay fired nose fuzes. The M904E1 can be manually "pre-armed" (preset) for a minimum arming time of 2 seconds.



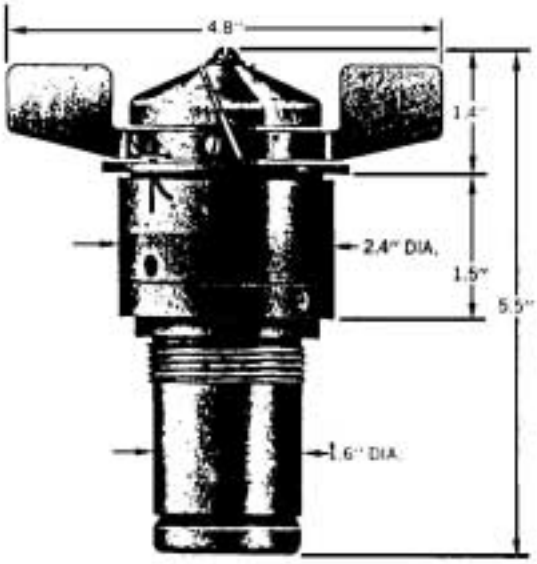
Color and Markings: The fuzes are unpainted. The fuze designation and instructions for setting the arming delay are either stamped or printed on the upper part of the body, and printed on the thermal shield of the M904E4. Colors, visible through the upper inspection port, are used in determining the armed or unarmed condition of the fuze. Red is visible through the lower inspection port when the detonator is aligned with the explosive train. The stop screws are removed from these fuzes for settings below 6 seconds. After the fuze is installed in a bomb, an arming wire or Dexter clip is inserted through the arming vane and arming delay indicator plate, (on fuzes using arming wire, the fahnstock spring clips are then attached to the arming wire) and the safety wire is removed. A fuze protective cover also can be installed on M904E4 fuzes during surface handling.

Construction: The body is aluminum and the arming delay indicator plate is steel. The thermal shield on the M904E4 fuze is synthetic rubber and is held on the fuze by an adhesive compound.

Hazardous Material: Each fuze contains a detonator, a relay, and a booster lead each weighing less than 1 gram. The M9 delay element contains a percussion primer, a pyrotechnic delay, and a lead Azide relay, each weighing less than 1 gram. The booster charge is 75 grams (2.6 ounces) of tetryl.

U.S. FUZE, BOMB, NOSE, AN-MK 219 MODS 3 & 4, MK 219, MK 19, & MK XIX


The Mk 219 Group is comprised of the AN-MK 219 MODS 3 & 4; MK 219 MODS 0 THRU 4; MK 19 MODS 0 THRU 4; and MK XIX MODS 0 THRU 4. All fuzes within the group are identical in external appearance and dimensions. The figure shows the external appearance and dimensional characteristics of the Mk 219 Group fuzes. These fuzes are vane-armed, impact fired, direct arming, nose fuzes. The Mk 219 Group fuzes have instantaneous action upon impact. The fuze designation and loading information are stamped on the fuze body just above the fuze-seating surface. The external parts of each fuze are zinc or cadmium plated steel except the striker, which is zinc-plated brass.

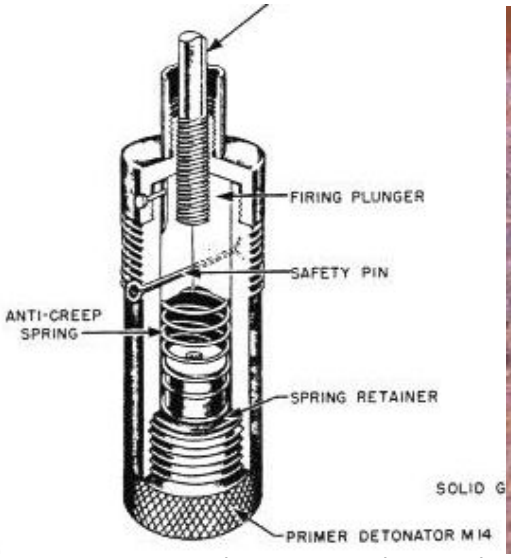


assembly is forced inward, shearing the shear pin and driving the firing pin extension against the firing pin that is driven into the detonator; firing the fuze.

HAZARDOUS COMPONENTS: The explosive train of the Mk 219 Group fuzes consists of a detonator, a tetryl lead, a tetryl lead-in, and a 0.9 ounce tetryl booster charge.

U.S. FUZE, BOMB, TAIL, IMPACT-INERTIA, M100 SERIES

The M100 series is composed of the M100, AN-M100A1, AN-M100A2, AN-M100A2C, M101, AN-M101A1, AN-M101A2, AN-M101A2C, M102, AN-M102A1, AN-M102A2, AN-M102A2C, M160, M161, M162, M172, M175, AN-M175, M176, AN-M177, AN-M184, AN-M185, AN-M194, and AN-M195 fuzes. These fuzes differ externally from each other in the arming stem tube length and, consequently, in overall length. The two groups of fuzes differ principally in the type of arming vane mechanism employed. These fuzes are no longer in the U.S. inventory but are known to be used by others. These are vane-armed, impact inertia fired, non-delay or short-delay bomb tail fuzes. The fuze designation and loading information may be stamped or stenciled on the cylindrical surface of the fuze body cap. The AN-M100A2C, AN-M101A2C, AN-M102A2C, M160, M161, M162, M175, AN-M175, M176, and AN-M177 fuzes have a 76-millimeter (3-inch) yellow band painted on the arming stem tube to indicate a longer arming time. The primer-detonator is stamped and painted with the designation and delay. The identifying features of the fuzes are shown in the figure. The AN-M100A2 and M175 may have either a two-piece or a one-piece body. The M100, M101, M102, and all A1 models have a safety cotter pin which passes through the arming stem tube and arming stem, and an eight-bladed rather than four-bladed arming vane. All other fuzes have a safety cotter pin that passes through the body and inertia plunger; this cotter pin must be removed before the fuze can be installed. The fuzes are constructed of steel.



FUNCTIONING: Arming. M100 series. On bomb release, an arming wire is withdrawn from the arming vane, allowing the vane to rotate in the airstream. The arming vane rotates the bearing cup assembly and pinion gear, which is attached to the bearing cup. The pinion gear meshes with the stationary gear and the movable gear. The stationary gear is prevented from rotation by the carrier stop, which passes through a hole in the stem cup. As the pinion gear makes each rotation around the movable and stationary gears, the movable gear is advanced one tooth ahead of the stationary gear. The arming stem, which is secured by a cotter pin or pushpin to the movable gear carrier, unscrews from the inertia plunger, arming the fuze. The inertia plunger is prevented from striking the primer by the creep spring. Continued rotation of the arming vane unscrews the arming stem from the fuze body cap, allowing the vane, bearing cup assembly, and arming stem to fall as a unit from the fuze. Firing. Upon bomb impact, the inertia plunger overcomes the creep spring and strikes the primer, initiating the explosive train.

HAZARDOUS COMPONENTS: Each fuze contains a primer, an ignition and delay element, black powder, and a detonator, each weighing less than 1 gram.

U.S. FUZE, BOMB, TAIL, M106, M106 LONG, M106A1, & M106A2

These fuzes are of the impact, direct arming (jump-out pin), and medium delay (pyrotechnic) type. They are mechanically the same in operation. Fuze designation and delay time are stenciled on the side of the firing pin holder. Fuze designation and loading information are stamped on the plug located on the top of the holder. The M106 and M106 LONG fuzes are unpainted. The firing pin holders of the M106A1 and M106A2 are painted white. The plug of the M106A1 is painted green, while the plug of the M106A2 is painted yellow. The fuze body and firing pin holders are threaded together. The detonator housing forms an extension of the body. The arming pin near the plug end of the fuze secures the inertia weight; a safety cotter pin or arming wire secures the arming pin. An instructional tag may be attached to the safety cotter pin. The plug, firing pin holder, body, and detonator housing are cadmium-plated steel. The primer housing is brass. The M106 LONG was designed to be used only in the Modified Mark series 2000-pound GP bombs. The M106 fuzes are used in combination with the AN-M103 or M105 nose fuzes.

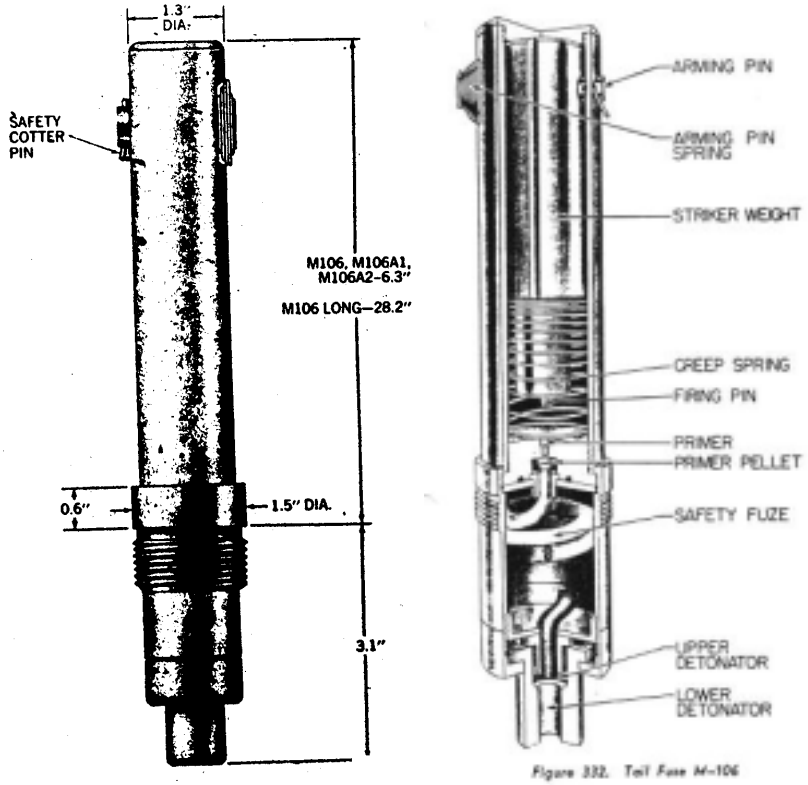


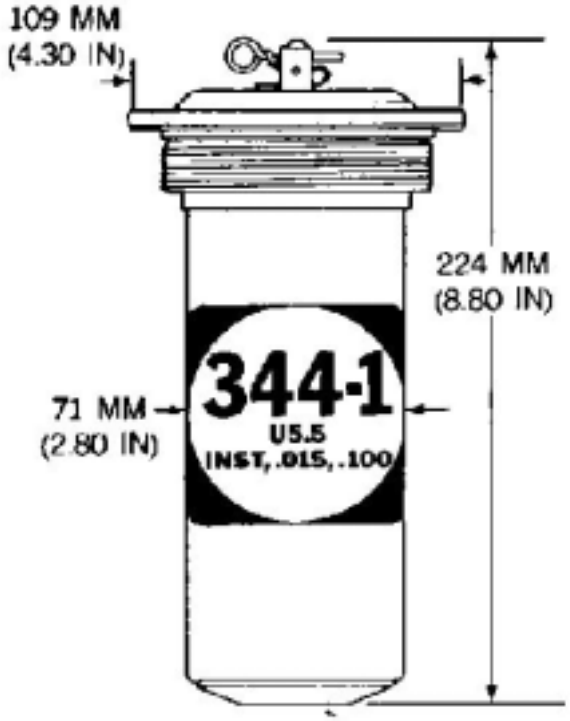
Figure 332. Tail Fuze M-106

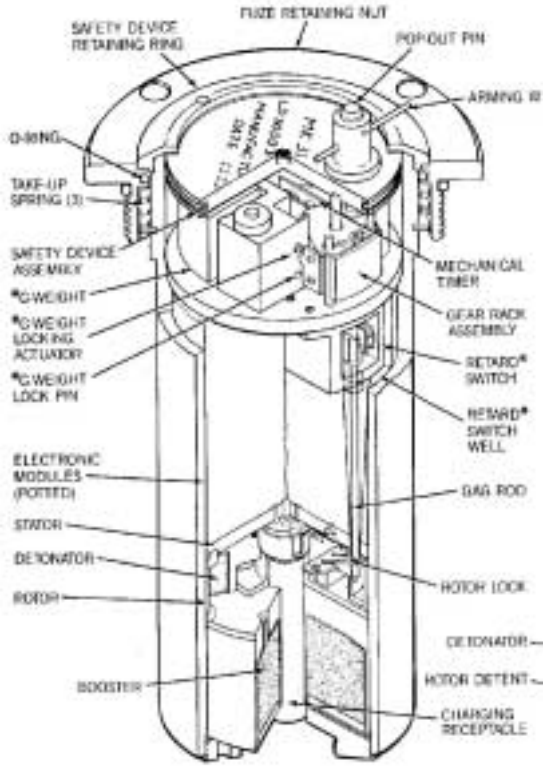
FUNCTIONING: The figure shows the general arrangement of these fuzes. Construction is the same for all fuzes with the exception of the firing pin holder and inertia weight assembly of the M106 LONG. The lengths of time fuse vary. Upon withdrawal of the arming wire (or safety cotter pin), the arming pin is ejected by its spring. This action fully arms the fuze. On impact, the inertia weight overcomes the anti-creep spring, driving the firing pin into the primer. The primer ignites the primer pellet, which ignites the time fuse. The time fuse burns for a short time and then ignites the black powder pellet, which initiates the detonator.

HAZARDOUS COMPONENTS: These fuzes contain a primer, a primer pellet. a length of time fuse at the end of which is a black powder pellet, and a detonator. The detonator charge consists of black powder, lead Azide, and tetryl.

U.S. FUZE, BOMB, TAIL, ELECTRIC, MK 344 MOD 0, MK 344 MOD 1, & MK 376 MOD 0

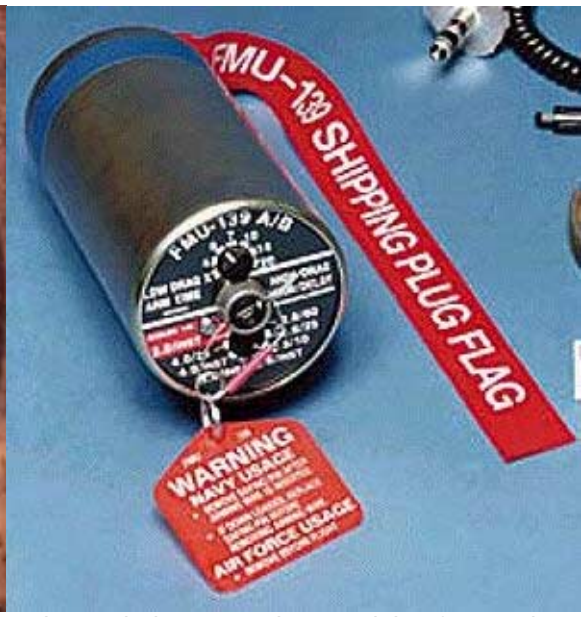
Except for markings and differences in the fuze arming times and delivery modes, the fuzes are identical. The Mk 344 Mod 0 and Mk 376 Mod 0 fuzes use the Mk 31 Mod 1 safety device, and the Mk 344 Mod 1 uses the Mk 31 Mod 2 safety device. If all decals have been removed or destroyed, the Mk 344 Mod 1 may be identified by the Mk 31 Mod 2 safety device marking. These are electric, proximity or impact initiated (instantaneous or delay) tail fuzes. The mode of functioning and the firing time are pre-selected before bomb release. The fuzes are used in the tail fuze well to detonate low drag or high drag, guided or unguided general purpose (GP) bombs that have 3 inch diameter fuze wells, internal plumbing with a bomb internal fuze cable harness installed, and a charging well. The fuzes are unpainted; the housing is anodized gold (Mk 344), or gray (Mk 376). Fuze designation is printed on the decal on the side of the fuze. Decals, specifying fuze designations, are also found covering the identification marking on the face of the Mk 31 safety device. The fuze housing and face of the Mk 31 safety device are aluminum. The fuze retaining nut with the square flange, the safety device-retaining ring, and the fuze restraining clips are steel. The fuze-retaining nut with the round flange may be steel or aluminum.



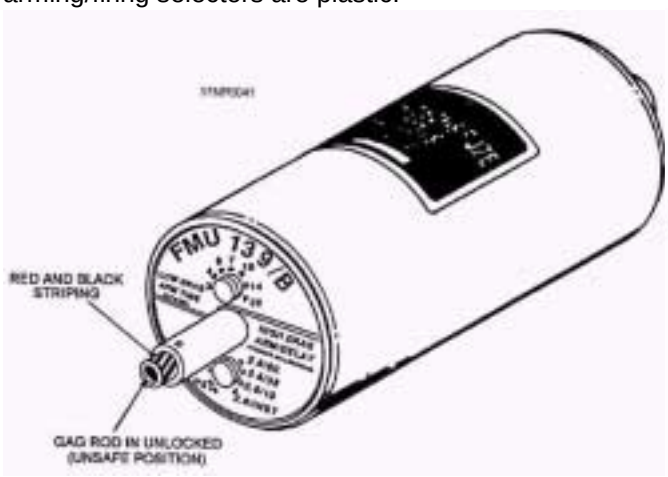


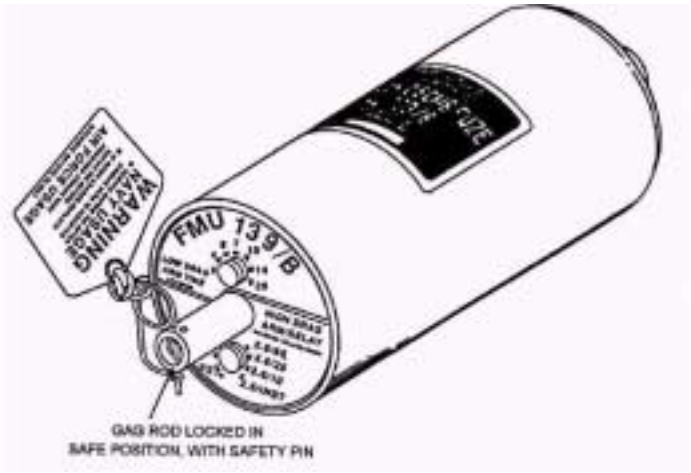
HAZARDOUS COMPONENTS: The two explosive bellows and the Mk 100 electric detonator each contain less than 1 gram of explosive. The tetryl booster with its lead weighs approximately 113 grams (4.0 ounces).

U.S. FUZE, BOMB, ELECTRONIC, NOSE &/OR TAIL, IMPACT, FMU-139/B & FMU-139A/B



The FMU-139 (series) electronic bomb fuze (fig. 1-12) is an electronic impact or impact-delay fuze. It is used in Mk 80 series general-purpose bombs, including laser-guided bombs. The fuzes differ in that (1) the FMU-139A/B gag rod (housing) is shorter in length, (2) a new type gag rod safety pin has been incorporated in the FMU-139A/B, and (3) two modified reinforcing thrust plates have been installed in the FMU-139A/B between the fuze electronics and outside container. This is an electronic, solid state microcomputer, multi-option (delay armed, proximity, impact instantaneous or short delay fired), multipurpose nose and/or tail fuze. The fuze provides the Navy with in flight selection of arming and firing delay times and permits ground selectable arming and firing delay times for the Air Force. The fuze is used in both nose and/or tail fuze wells to detonate low-drag or high-drag, guided or unguided GP bombs that have 3.00 inch (76 millimeter) diameter fuze wells, internal plumbing, and a charging well. The fuze body is chemically coated gold. The faceplate is black with white alphanumeric lettering that provides fuze model, designation and arm/firing delay-time setting identification. A red section on a black background with white lettering highlights the interlock button and arm/firing delay for the high-drag selection. A lead foil decal with black background is attached to the fuze housing. The decal provides fuze model, date of manufacture, and lot number in silver alphanumeric lettering. In the extended (armed) position, the gag rod has black and red (barber-pole-like) striping. The fuze housing and faceplate are steel. The arming and arming/firing selectors are plastic.

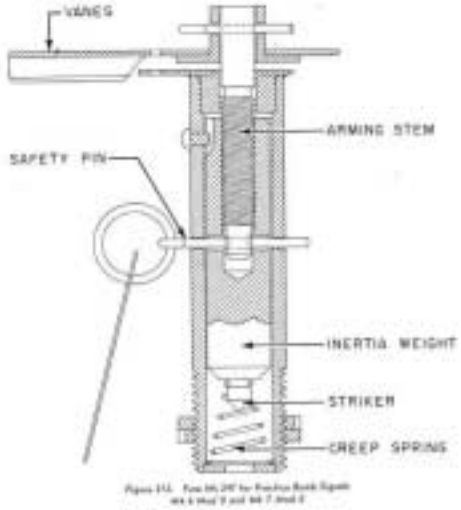




HAZARDOUS COMPONENTS: The FMU-139 fuze has: one (1) piston actuator with less than 1 gram of Lead Styphnate, one (1) bellows motor with less than one gram of LMNR and Black Powder, one (1) detonator with less than 1 gram of Lead Styphnate, one (1) detonator with less than 1 gram of Lead Azide and PETN, one (1) lead with less than 1 gram CH-6, and one (1) booster with 125 grams (4.4 ounce) of CH-6.

U.S. FUZE, BOMB, TAIL, MK 247 MOD 0

The Mk 247 Mod 0 is a vane-armed, impact inertia-fired tail fuze. The fuze is unpainted. The fuze designation and manufacturing data are stenciled in black on the side of the fuze. The fittings and features of the Mk 247 fuze are shown in the figure. The fuze body and arming vane assembly are steel. The blank caliber .38 cartridge case is brass. The practice bomb signals are steel. The Mk 247 fuze with the Mk 6 signal is used with Practice Bomb Mk 65 Mod 0 (500 pound) and Practice Bomb Mk 66 Mod 0 (1000 pound). The Mk 247 fuze with the Mk 7 signal is used with Practice Bomb Mk 15 Mod 3 and Mod 4 (100 pound).



FUNCTIONING: The figure shows the general arrangement of the Mk 247 Mod 0 fuze ARMING When the bomb is dropped, the arming wire is withdrawn from the fuze, freeing the arming vane which rotates in the airstream. As the arming vane rotates, it causes the arming screw to unscrew from the firing plunger. This extends the arming vane upward from the fuze. The firing plunger is prevented from rotating or extending upward by the firing plunger pin. At completion of 13 revolutions, the plunger can move inward far enough to allow the firing pin to strike the blank cartridge. Continued rotation of the arming vane causes the arming screw to free itself from the firing plunger. Both the arming vane and the arming screw are released into the air stream. FIRING when the bomb impacts, the inertia of the firing plunger compresses the anti-creep spring and drives the firing plunger toward the blank cartridge. The firing pin strikes the blank caliber .38 cartridge, which in turn ignites the signal.

HAZARDOUS COMPONENTS: The Mk 247 fuze after removal from the signal, is inert and presents no hazard. The Mk 6 and Mk 7 signals contain 2 pounds and one pound, respectively, of black powder. The blank caliber .38 cartridge contains approximately 1 gram of E.C. blank powder.