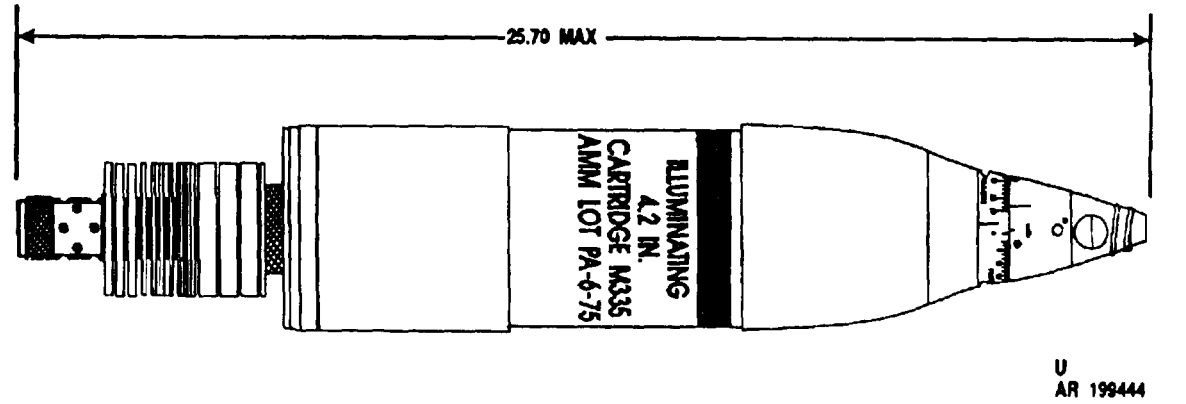
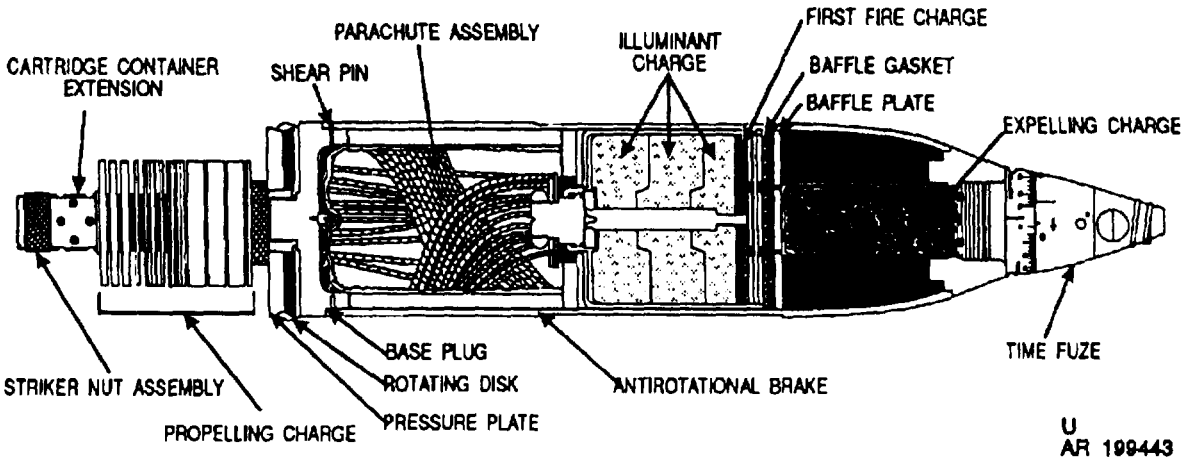
APPENDIX L – MUNITIONS TECHNICAL DATA SHEETS

CARTRIDGE, 4.2-INCH: ILLUMINATING, M335A1 AND M335





Type Classification:

M335A1: Std AMCTC 3881 dtd 1965.
M335: Cont AMCTC 9546 dtd 1972

Use:

This cartridge is used for target and battlefield illumination at night and during other periods of low visibility.

Description:

The complete round consists of a projectile body with a detachable base plug, an MTSQ fuze, an illuminant assembly attached to a parachute assembly, and a tail assembly. The steel tube body is designed to accommodate an expelling charge immediately below the fuze, and the base plug is attached with four equally spaced shear pins. The illuminant assembly consists of a first-fire charge and an illuminant charge, contained in a canister fitted with antirotational brakes to reduce canister spin at the time of ejection and prevent twisting of the parachute suspension lines. The tail assembly includes a pressure plate and rotating disc, a propelling charge, a cartridge container and ignition cartridge, and a striker nut assembly.

Functioning

When the cartridge is released, it slides down the mortar tube until the percussion primer strikes the firing pin. The flash from the primer ignites the ignition cartridge which, in turn, ignites the propelling charge. The gases from the propelling charge exert pressure on the pressure plate at the base of the projectile which expands the rotating disc, engaging it in the rifling of the tube. The spin imparted to the projectile as it leaves the weapon stabilizes it in flight. Upon functioning of the MTSQ fuze, the expelling charge is ignited, expelling the illuminant and parachute assemblies from the projectile body and igniting the first-fire charge in the illuminant canister. The first-fire charge ignites the illuminant

charge, the spring-loaded brakes extend to stop rotation, and the parachute deploys. Burning time is approximate 70 seconds at 500,000 candlepower for the M335A1, and 60 seconds for the M335.

Difference Between Models:

M335A1 and M335 are similar except for ignition cartridges and propelling charges. See separate data sheets or detailed descriptions of ignition cartridges M2A1 and M2, and propelling charges M36A1 and M36.

Tabulated Data:

Complete Round:
- Type ---------- Illuminating
- Weight . . . . . 26.00 lb
- Length . . . . . 25.70 in.
- Cannon used with M2, M30

Projectile:
- Body material . . . . . Steel
- Color ---------- White w/black markings
- Filler and weight ---------- Illuminant, 3.31 lb
- Expelling charge ---------- BP 0.18 lb

Components:

	M335	M335A1
Ignition cartridge	M2*	M2A1*
Propelling charge	M36*	M36A1*
Fuse	MTSQ, M501	MT, M562

Performance (full charge):

	M335	M335A1
Maximum range	5251 yd (4800 m)	5787 yd (5290 m)
Muzzle velocity	952 fps (290 reps)	990 fps (301.7 reps)

*NOTE: See separate data sheets.

Temperature Limits:

Firing:
- Lower limit ---------- -40°F (-40°C)
- Upper limit . . . . . +125°F (+52.0°C)

Storage:
- Lower limit ---------- -80°F (-62.2°C) (for period not more than 3 days)
- Upper limit ---------- +160°F (+71.1°F) (for period not more than 4 hr/day)

** Packing ---------- 1 round in fiber container; 2 containers in wood box

**Packing Box:
- Weight ---------- 76.0 lb
- Dimensions ---------- 31-5/16 x 11-13/16 x 7-5/8 in.
- Cube ---------- 1.6 cu ft

**NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

- UNO serial number ---------- 0171
- Quantity-distance class ---------- 1.2 (08)
- Storage compatibility group ----- G
- DOT shipping class ---------- A
- DOT designation ---------- AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES
- DODAC ---------- 1315-C706
- Drawing number ---------- 8833724 (M335A1) 8833741 (M335)

References:

TM 9-1015-215-10
TM 9-1300-251-20

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General Specifications

Updated: No Approved: No

Print

ID:	Nomen:	Category:	Country of Origin:
3012	U.S. PROJECTILE, 37-MM, TP, GUN, M55A1	Projectiles	UNITED STATES

Descriptions

Outline Description:

The projectile is made up of three parts. The body has no filler, but is made the same size as the HE, M54. A tracer cavity is machined into the base. Since no filler is used, the tracer does not have shell-destroying qualities. The tracer consists of red tracer composition and igniting compound closed into the tracer cavity with a celluloid cup which is sealed with adhesive compound. The fuze, dummy, M50, is entirely inert and is made in one piece of cast aluminum. It is the same size, shape, and weight as the M56 fuze. These projectiles are similar in ballistic properties to service projectiles and are used for practice firing and training in marksmanship. They may be made from service projectiles or from components similar in shape to service projectiles. This round was designed to simulate the M54, HE shell for practice firing.

Structure:

Assemblies:

Markings:

Method of Operation:

Alert:

Specifications

Diameter (mm):	37	**Component Materials:** The projectile is made of steel.	**Countries used in:**
Length(mm):	247.65	**Case Material:** Steel	
Width (mm):		**Detectability:**	
Height (mm):		**Explosive:** NONE	
Weight (g):	0	**Transport:** Do not transport	
Metallic Weight (g):		**Hazard:** None	
Explosive Weight (g):	0		
Frag range (m):	20		

Images

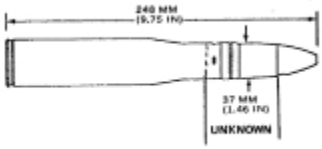
Original Ordata Photo

D2671UQMTN.jpg

Original Ordata Image

Original Ordata Thumb

Additional image 1



Primary

Disposal

Neutralization:
Do not neutralize

Disarming:
Do not disarm

Demolition:

Charge Weight (kg): 0

Placement: Do not demolish

37mm Practice M55A1

Figure 45. Shell, fixed, TP-T, M55A1, MV 2,600, w/fuze, dummy, M50, for 37-mm guns M1A2 and AN–M9.

34. Shell, Fixed, TP-T, M55A1, MV 2,600, w/Fuze, Dummy, M50, for 37-mm Guns M1A2 and AN–M9 (fig. 45)

a. GENERAL. This shell provides practice ammunition for these guns, with the same ballistic characteristics as the high-explosive service round M54 (par. 31). The M17 (brass) or M17B1 (steel) cartridge case and a service primer and propelling charge are used. The projectile is similar in contour to the M54 shell and of the same weight, but has no bursting charge and is fitted with a dummy-fuze. In addition, the shell-destroying tracer of the service round is replaced by a composition for tracing purposes only. The tracer, consisting of a red tracer composition and an igniter composition, burns for about 8 seconds, or 3,500 yards. FUZE, dummy, M50, simulates the M56 service fuze but has no explosive elements.

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General Specifications

Updated: No Approved: No

Print

ID:	Nomen:	Category:	Country of Origin:
6340	U.S. PROJECTILE, 37-MM, AP, M80	Projectiles	UNITED STATES

Descriptions

Outline Description:

Armor-piercing projectiles consist essentially of a steel shell to which is attached, usually by crimping, a steel armor piercing cap, and to this cap is attached, by screw threads or crimping, a windshield for ballistic purposes. The projectile may be either filled with explosive D or may be inert. A very important part of the modern armor-piercing projectile is the cap. Against face-hardened armor, projectiles which would be useless without the cap are, with its assistance, able to penetrate in bursting condition. The cap is made of high-carbon chrome steel and heat treated so that the portion directly in front of the point of the projectile is very hard while the skirt is very tough. This is a spin stabilized, armor piercing projectile. The M80 is very similar to the M74 Armor-piercing. Shot which is fired from the M1A2 antiaircraft gun. The main differences are in the cartridge case and propelling charge. The two projectiles are of similar construction, but the M80 is lighter in weight. This is accomplished by shortening the projectile. The M80 is 4.23 inches long and weighs 1.66 pounds, while the M74 is 4.84 inches long and weighs 1.92 pounds. The aircraft round also has a slightly greater radius of ogive (2.35 inches as compared to 2.205 inches). The Aircraft Round M80 may be distinguished as 37-mm ammunition by its size, and for the aircraft group by the length (5.69 inches) and flange of its cartridge case. The complete round is 9.34 inches long and weighs 2.25 pounds.

Structure:

Assemblies:

Markings:

The projectile is painted black with white stencil.

Method of Operation:

Alert:

Specifications

Diameter (mm):	37	**Component Materials:** The projectile is made of steel.	**Countries used in:**
Length(mm):	107.442	**Case Material:** Steel bar	
Width (mm):		**Detectability:**	
Height (mm):		**Explosive:** NONE	
Weight (g):	752.976	**Transport:** Do not transport	
Metallic Weight (g):			
Explosive Weight (g):	0		
Frag range (m):	20		

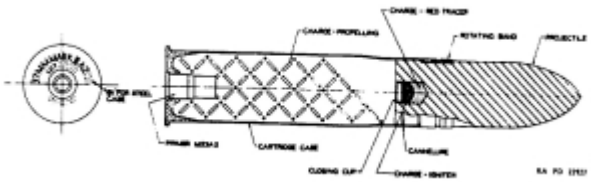
Hazard:
None

Images


Original Ordata Photo

A2093UP012TN.jpg
Original Ordata Image


Original Ordata Thumb



Diagram


Primary


Additional image 1

Disposal

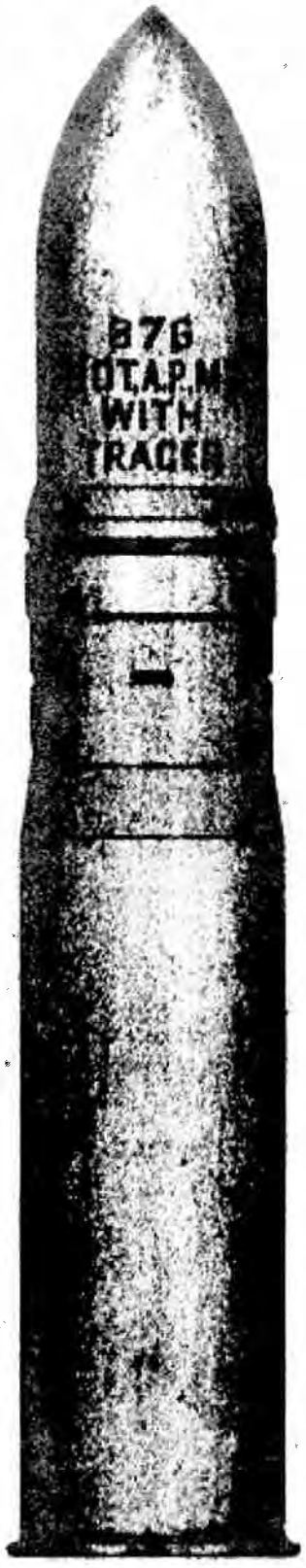
Neutralization:
Do not neutralize

Disarming:
Do not disarm

Demolition:

Charge Weight (kg):	0
Placement:	Do not demolish

NATIONALITY: U. S. ARMY	INFORMATION DATE: April 1943
SIZE: 37 mm., M80	TYPE: Armor piercing
GUNS USED IN: 37 mm., M4	TARGET: Used against armored aircraft and vehicles, concrete emplacements, etc.



NATIONALITY: U. S. ARMY	INFORMATION DATE: April 1943
SIZE: 37 mm., M80	TYPE: Armor piercing
GUNS USED IN: 37 mm., M4	TARGET: Used against armored aircraft and vehicles, concrete emplacements, etc.

1.	COMPLETE ROUND: a. Overall length b. Total weight	M80 9.34 inches 2.25 pounds
2.	PROJECTILE: a. Length b. Diameter of bourrelet c. Width of rotating band d. Diameter of base e. Total weight f. Weight and type of bursting charge g. Tracer h. Markings	M80 4.23 inches 1.45 inches 0.74 inch 1.44 inches 1.66 pounds None. 0.1 pound. Tracer contained in projectile. Projectile painted black. Stencilled in white:- "37 G, SHOT A.P. M80, WITH TRACER." Also stamped on rotating band with LOT NO. ----, month and year of manufacture in addition.
3.	CARTRIDGE CASE: a. Length b. Diameter of neck c. Diameter of shoulder d. Diameter of extracting flange e. Weight of case f. Weight and type of propellant g. Primer h. Markings	Mk. III A2 5.63 inches 1.43 inches 1.55 inches 1.735 inches 0.39 pound 2.3 ounces of Flashless Non-hygroscopic powder. M23A2 Stamped on base:- "37 G, M4, MK. III A2", explosive LOT NO., manufacturer's and inspector's marks.
4.	FUZE: a. Type b. Booster c. Adapter	None.

5. REMARKS: a. There is no armor-piercing cap or windshield fitted to this projectile.

b. Tracer burns for approximately 2000 yards of air travel.

NATIONALITY: U. S. ARMY

INFORMATION DATE: April 1943

SIZE: 57 mm., M70

TYPE: Armor-piercing for anti-aircraft

GUNS USED IN: 57 mm., M1 & T2E1

TARGET: Used against armored aircraft.

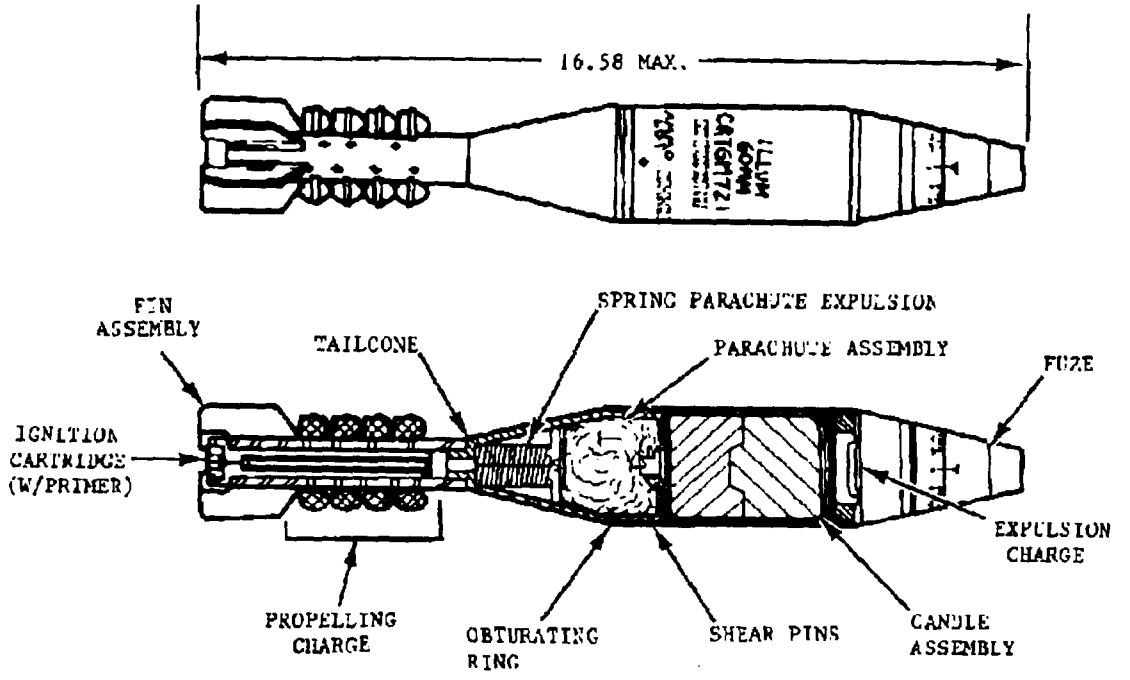
1.	COMPLETE ROUND:	
	a. Overall length	M70 23.22 inches
	b. Total weight	6.28 pounds
2.	PROJECTILE:	M70
	a. Length	6.61 inches
	b. Diameter of bourrelet	2.264 inches
	c. Width of rotating band	0.79 inch
	d. Diameter of base	2.235 inches
	e. Total weight	
	f. Weight and type of bursting charge	None, solid shot projectile.
	g. Tracer	0.1 pound internal tracer.
	h. Markings	Projectile, except rotating band, painted black. Stencilled in white:- "57 G, SHOT A.P, M70." Stamped on rotating band:- "57 MM, M70, contractor's initials, LOT NO month and year of manufacture."
3.	CARTRIDGE CASE:	M23A2 (or M23A2E1)
	a. Length	17.40 inches
	b. Diameter of neck	2.319 inches
	c. Diameter of shoulder	2.810 inches
	d. Diameter of extracting flange	3.54 inches
	e. Weight of case	3.9 pounds, M23A2. 3.6 pounds, M23A2E1.
	f. Weight and type of propellant	2.25 pounds Flashless Non-hygroscopic powder.
	g. Primer	M18A2 percussion primer.
	h. Markings	Stamped on base:- "AMM. LOT NO., 57 MM., M23A2."
4.	FUZE:	None.
	a. Type	
	b. Booster	
	c. Adapter	

5. REMARKS: (a) No armor-piercing cap or windshield is fitted to this projectile.

(b) The rotating band is formed with two circumferential grooves.

(c) Cartridge case M23A2E1 is made of steel.

CARTRIDGE, 60 MILLIMETER: ILLUMINATING, M721



AR 4022

Type Classification:

Std Sep '87

Use:

This cartridge is an illumination round for the 60mm M224 mortar and is used for laminating a desired point or area.

Description:

The cartridge has a mechanical time superquick fuze with an expulsion charge, a candle/parachute assembly a four increment propelling charge, and an ignition cartridge. The round provides 400,000 average candlepower illumination for about 40 seconds.

Functioning:

Loaded fin-end first into the mortar barrel, the cartridge slides down the barrel and strikes the firing pin. The ignition cartridge functions and ignites the propelling charge. Combustion gases from the ignition cartridge and propelling charges propel the cartridge out of the barrel. At a pre-set time the fuze functions in flight. The expulsion charge ignites and ejects the candle assembly. A spring ejects the parachute from the tail cone. The parachute opens, slowing the descent of the burning candle which illuminates the target.

Tabulated Data:

Complete Round:	
Type	Illumination
Weight	3.76 lb (1.71 kg)
Length	16.58 max.
Projectile:	
Material	
Color	White w/black markings
Filler	Illuminating
	Assembly
Components:	
Ignition cartridge	M702
Fin assembly	M27
Fuze	MTSQ, M776 (DM93)
Propelling charge	M204
Drawing number	9345338
Maximum range:	3490 m (11,450 ft)

Temperature Limits:

Firing:	
Lower	-50°F (-45.6°C)
Upper	+145°F (+62.8°C)
Storage:	
Lower	-50°F (-45.6°C) for a period of not more than 3 days
Upper	+160°F (+71.1°C) for a period of not more than 4hr/day

Shipping and Storage Data:

UNO serial number	0171
DOD hazard class	(08) 1.2
Storage compatibility group	G
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES
*Packing	1 cartridge per fiber container; 8 containers per metal box; 2 metal boxes per wirebound box.
*Packing Box:	
Weight	112 lb (50.80 kg)
Dimensions	14-15/16 x 13-3/16 x 20 in. (37.94 x 33.50 x 50.8 cm)
Cube	2.3 cu ft (0.07 cu m)
DODAC	1310-B647

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Limitations:

The M721 cartridge cannot be fired above Charge 2 in the M19 mortar. Do not fire below Charge 1.

References:

TM 9-1010-223-10
DOD Consolidated Ammunition Catalog AMC-P 700-3-3

75mm APHE (or 76mm APHE)

The 76mm is basicly a 75mm with a larger rotating band. Our 75mm APHE is actally a 76mm.

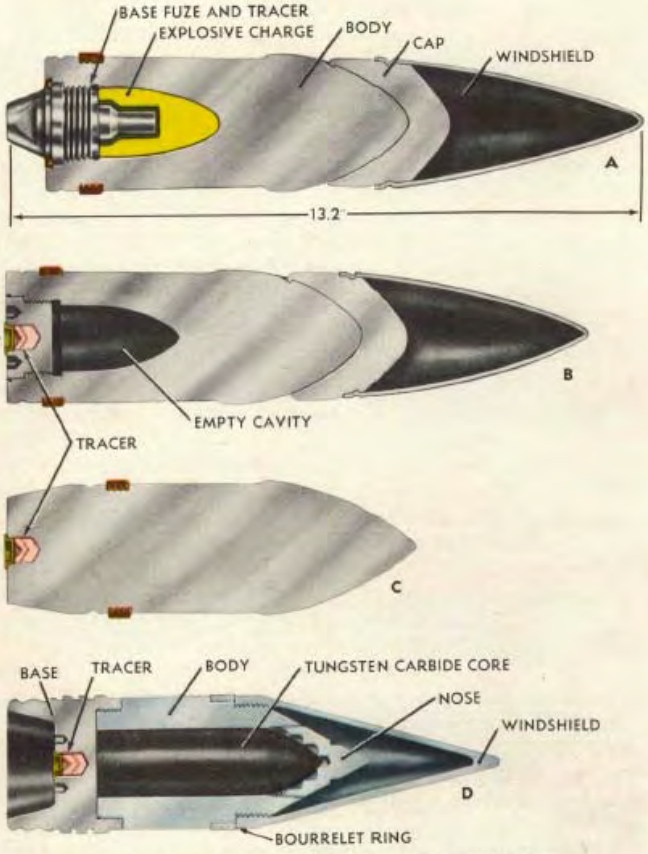


Figure 2. Typical armor-piercing projectiles.

record is mandatory. This nomenclature is published in the Department of the Army Supply Catalog, groups P, R, S, and T, for use in connection with the shipping, storing, issue, and use of ammunition items.

Fuze for APHE

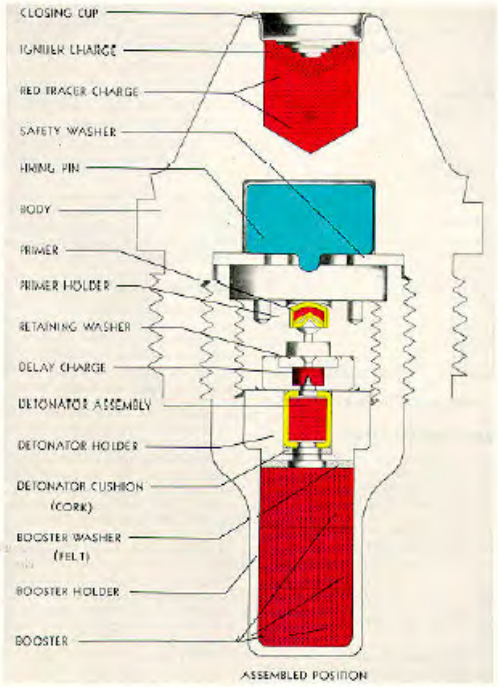
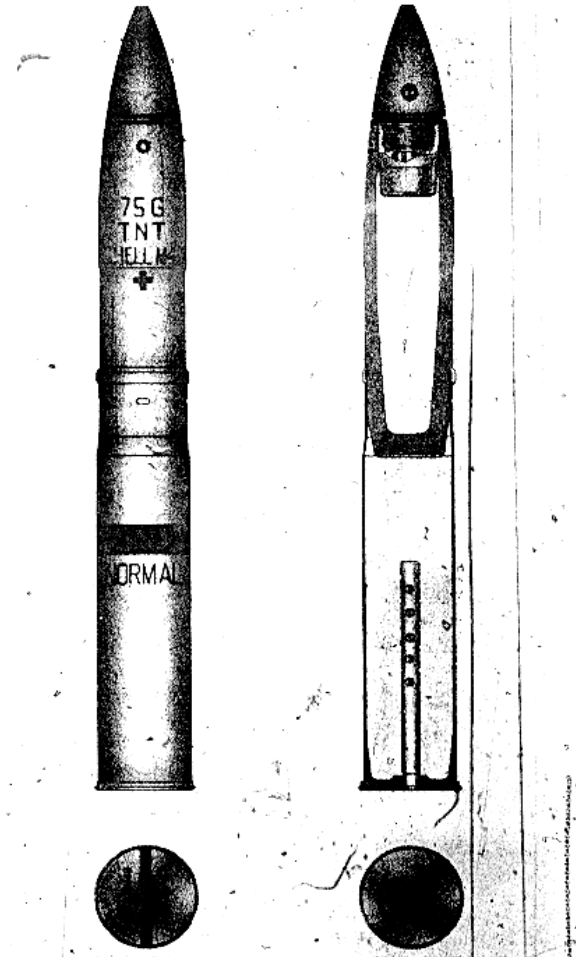


Figure 64.—Base Detonating Fuze M66A1—Sectional View

75mm HE

PROJECTILE DATA

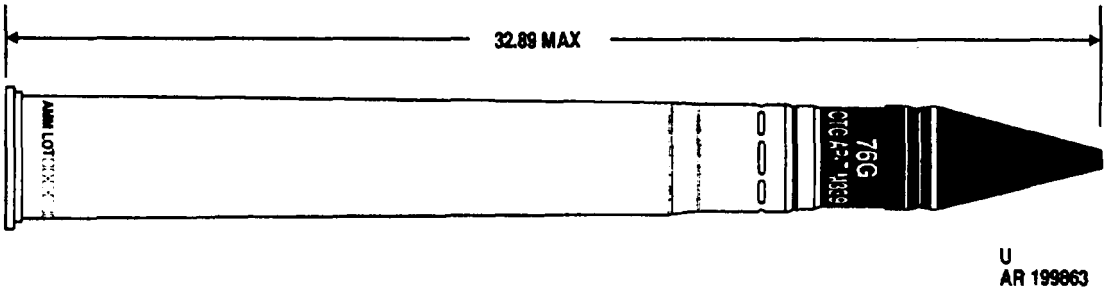
NATIONALITY: U. S. ARMY	INFORMATION DATE: April 1943
SIZE: 75 mm., M48	TYPE: High Explosive
GUNS USED IN: 75 mm. Howitzer, M1	TARGET: Used against personnel and unarmored materiel.

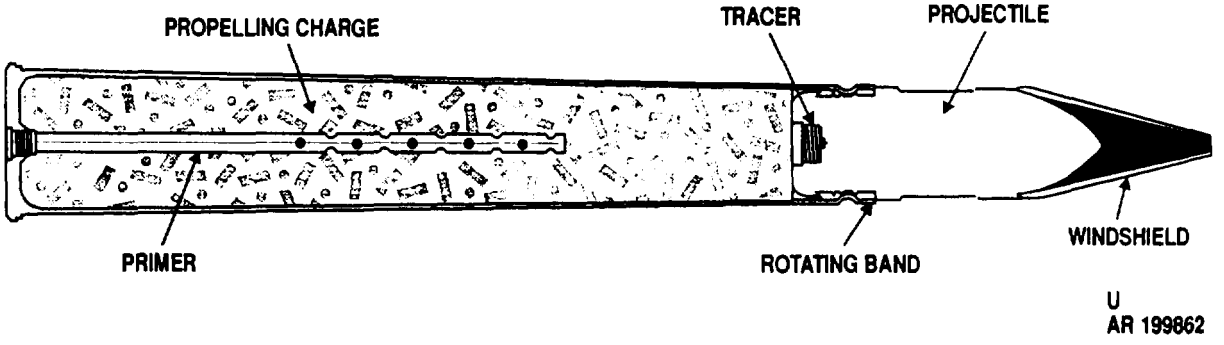


PROJECTILE DATA

	NATIONALITY: U. S. ARMY	INFORMATION DATE: April 1943	
	SIZE: 75 mm., M48	TYPE: High Explosive	
	GUNS USED IN: 75 mm. Howitzer, M1	TARGET: Used against personnel and unarmored materiel.	
1.	COMPLETE ROUND: a. Overall length b. Total weight	M48 23.48 inches 18.24 pounds	M48 26.66 inches 18.70 pounds (Normal charge)
2.	PROJECTILE: a. Length, less fuze b. Diameter of bourrelet c. Width of rotating band d. Diameter of base e. Total weight f. Weight and type of bursting charge g. Tracer h. Markings	M48 11.26 inches 2.945 inches 0.49 inch 2.48 inches 14.60 pounds with M48 fuze. 1.47 pounds of cast TNT. None. Projectile painted yellow except rotating band. Stencilled in black:- "75 H, TNT, SHELL M48", zone markings (crosses) and charge markings.	
3.	CARTRIDGE CASE: a. Length b. Diameter of neck c. Diameter of shoulder d. Depth of extracting flange e. Weight of case f. Weight and type of propellant g. Primer h. Markings	M5A1 10.69 inches 3.05 inches 3.125 inches 0.19 inch 2.45 pounds 1.06 pounds of Flashless Non-hygroscopic powder. M1B1A2 Stamped on base:- "SHELL M48, ARM. LOT NO. ---, M5A1 (or M18)", date of manufacture, loader's initials, charge markings.	M18 13.82 inches 2.92 inches 3.04 inches 0.24 inch 2.75 pounds 1.15 pounds of Flashless Non-hygroscopic powder. (Normal charge). M22A1
4.	FUZE: a. Type b. Adapter - booster	M48 Point detonating M20 & M20A1	M48 and M54 Point detonating, time and super quick. M20 & M20A1
5.	REMARKS: a. Booster held in projectile by set screw through nose of shell. Fuze screwed into booster and staked in place. b. Ogive radius - 22.8 inches. c. Weight of propellant for other than normal charge (M18 cartridge case):- SUPER - 2.00 pounds FNH. REDUCED - 0.59 pound FNH. d. Primer M31 is used with SUPER charge. e. Cartridge case M5A1B1, steel, 2.18 pounds, may be used in place of M5A1 (Brass).		

CARTRIDGE, 76 MILLIMETER: AP-T, M339





Type Classification:

OBS MSR 11756003.

Use:

This fixed cartridge is designed for use in 76mm guns against armored targets.

Description:

The solid tungsten carbide projectile is fitted with a lightweight windshield to provide a better ballistic shape. A tracer is located at the base of the projectile. The cartridge case, fitted with percussion primer and containing a triple-base propellant, is crimped to the projectile. A distinguishing characteristic of these rounds is the case-over-band construction. The specially designed rotating band has a crimping groove which permits the cartridge case to be assembled over the rotating ban and rigidly crimped to it.

Functioning:

When the weapon is fired, a flash from the primer ignites the propellant. Gases from the burning propellant ignite the tracer and force the projectile from the gun barrel. The tracer provides a luminous red trace. Upon impact, the windshield breaks up and the tungsten carbide shot penetrates the armored target.

Tabulated Data:

Complete round:

Type	AP-T
Weight	27.32 lb
Length	32.89 in.
Cannon used with	M32 or M48

Projectile:

Body material	Steel/tungsten carbide
Color	Black w/white markings

Components:
- Cartridge case ---------- M88 (brass); M88B1 (steel)
- Propelling charge ---------- M30, 5.6 lb
- Primer ---------- M58 percussion (400 gr black
- Tracer ---------- M13

Performance:
- Maximum range ---------- 14,704 m (16,419 yd)
- Muzzle velocity ---------- 954 mps (3200 fps)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F
  - Upper limit ---------- +125°F
- **Storage:**
  - Lower limit ---------- -80°F (for period not more than 3 days)
  - Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight ---------- 88 lb
- Dimensions ---------- 38-5/8 x 11-1/6 x 7-5/32 in.
- cube ---------- 1.8 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

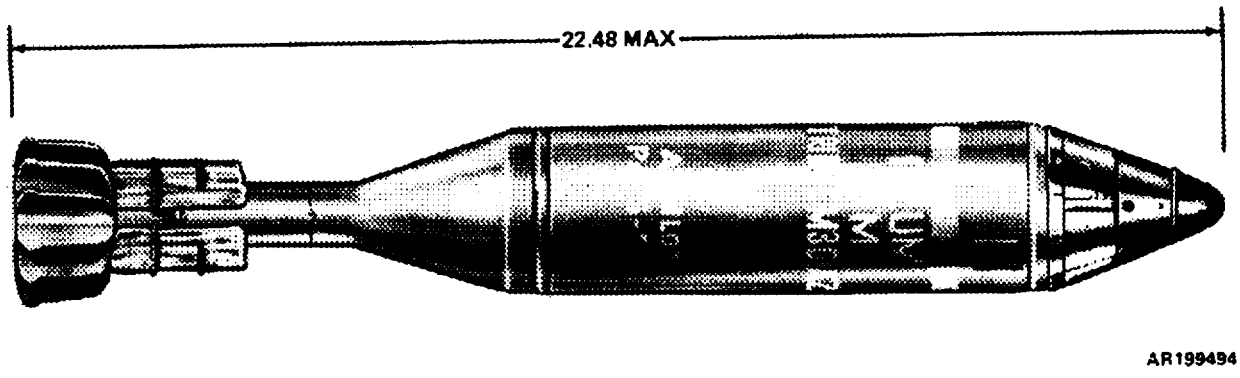
Shipping and Storage Data:

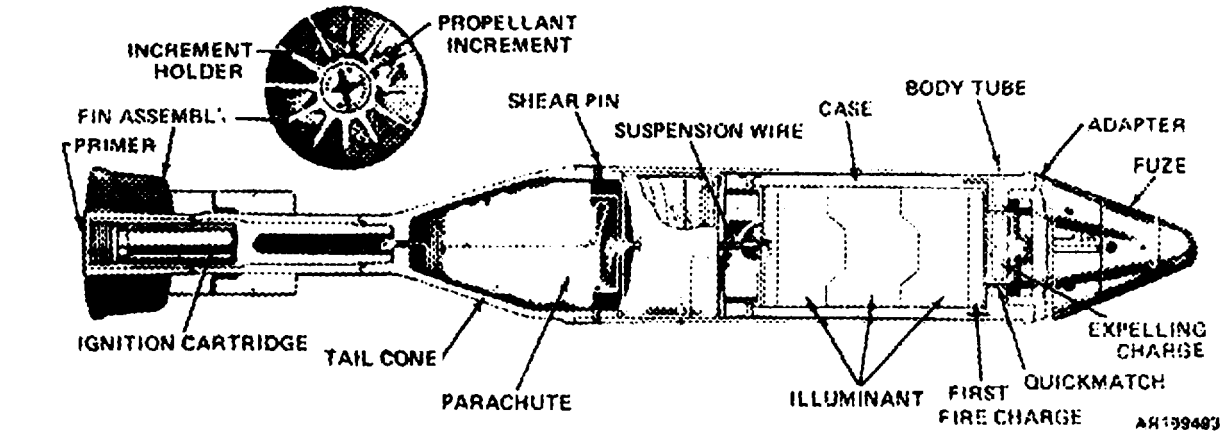
UNO serial number ---------- 0328
Quantity-distance class --------- (08) 1.2
Storage compatibility group--- C
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC ---------- 1315-C120
Drawing number ---------- 8886612

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

CARTRIDGE, 81 MILLIMETER: ILLUMINATING, M301A2 AND M301A1





Type Classification:

CONT MSR 11756003.

Use:

This projectile is used for illuminating a desired point or area.

Description:

The complete round consists of a body tube and tail cone assembly, an illuminant candle, and parachute assembly a time fuze with a built in expelling charge, a fin assembly with propellant charge, and an ignition cartridge with percussion primer. The nose of the thin-walled steel tubing body is fitted with a steel adapter and internally threaded to accept the fuze. The tail cone is internally threaded to accept the tin assembly, and is attached to the body tube with four equally spaced shear pins. The illuminant assembly consisting of a first-fire charge and an illuminant charge, is contained in a boxboard case and attached to the parachute with a 30-inch suspension line.

Functioning:

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 to the desired height. The projectile is fin-stabilized in flight. Functioning of the time fuze detonates the expelling charge and ignites the first-fire charge by means of a length of quickmatch. The expelling charge separates the cone from the tube allowing the illuminant candle and parachute to fall free. The first-fire charge ignites the illuminant, and the parachute deploys to support the burning candle. Burning time is at least 60 seconds with a minimum of 500,000 candlepower.

Difference Between Models:

Cartridge M301A1 has gas check bourrelet grooves and some minor dimensional differences in metal parts.

Tabulated Data:

Complete Round:	
Type	Illuminating
Weight	10.7 lb
Length	22.48 in.
Cannon used with	M1, M29, M29A1, M252
Projectile:	
Body material	Steel tube
Color:	
Old	Gray w/white band white markings
New	White w/black markings
Filler and weight	Illuminating, 1.37 lb
Components:	
Ignition cartridge	M6
Propellant charge	M2A1
Percussion primer	M34
Fin assembly	M4A1
Fuze	Time, M84

Temperature Limits:

Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (+52.0°C)
Storage:	
Lower limit	-80°F (for period not more than 3 days) (-62.2°C)
Upper limit	+160°F (for period not more than 4 hr/day) (+71.1°C)
*Packing	One round in jungle wrapped fiber or metal container; three fiber/metal containers in wooden box
*Packing Box:	
Weight	53.6 lb
Dimensions	30-9/16 x 13-15/16 x 6-25/32 in.
Cube	1.9 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0171
Quantity-distance class	(08) 1.2
Storage compatibility group	G
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES
DODAC	1315-C226
Drawing number	8865058

Ballistics:

Charge	Muzzle Velocity (fps)	Range to Burst (m)	Range to Burst (yd)
2*	440	1000	1094
3	517	1600	1750
4	595	2150	2350

*Charge 2 is the ignition cartridge and two increment charges; Charge 4 is the ignition charge and four increment charges.

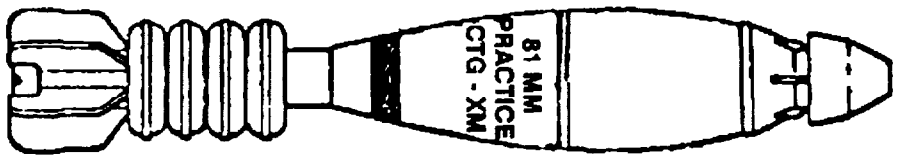
Limitations:

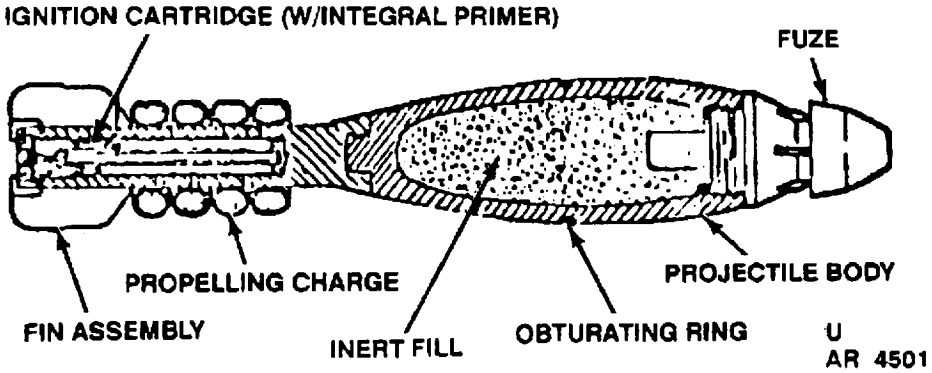
Firing with less than two propellant increment charges (Charge 2) is not authorized.

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20
TM 9-3071-1

CARTRIDGE, 81 MILLIMETER: TARGET PRACTICE M879 WITH FUZE, PD, M751





Type Classification:

TBD

Use:

This cartridge is a full range training round for use in the M252 improved 81mm mortar system.

Description:

This cartridge consists of a PD (practice) fuze, an inert loaded projectile body, fin assembly, four propellant increments, obturating ring and an ignition cartridge (with integral primer). The cartridge with the M751, PD fuze resembles the 81MM M821 HE cartridge. These practice cartridges are ballistic matches to the HE cartridges and produce a similar signature (flash, audible sound, and smoke cloud) upon impact on the ground.

Functioning:

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 which ignites the propellant charge. Gases from the burning propellant expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. The acceleration arms the fuze. The cartridge travels down-range and impacts the target. The fuze functions on impact. A pyrotechnic smoke charge in the fuze produces a flash, an audible sound, and a smoke cloud.

Tabulated Data:

Complete Round:	
Type	Practice (full range)
Weight	9.40 lb
Length	19.55 in.
Projectile:	
Body material	Steel
Color	Blue w/white markings and 1 brown ban
Filler and weight	Hydrocal (inert), 2.05 lb
Components:	
Ignition cartridge	M299 (with integral primer)
Propellant charge	M220
Fuze	PD, M751
Fin assembly	M24
Maximum range	5700 m
Maximum muzzle velocity	305 mps

Temperature Limit

Firing:	
Lower limit	0°F
Upper limit	+110°F
Storage:	
Lower limit	-45°F
Upper limit	+145°F
Packing	1 cartridge per wax treated fiber container; 3 containers in metal box
Weight	x lb
Dimensions	25-1/16 x 13-13/16x 6-11/16 in.
Cube	1.34 cu ft

Shipping and Storage Data:

UNO serial number	0328
Quantity-distance class	(08) 1.2
Storage compatibility group	C
DOT shipping class	C
DOT designation	AMMUNITION FOR CANNON WITH INERT LOADED PROJECTILE
DODAC	1315-C875
NSN	1315-01-200-4223
Drawing number	9381430

Limitations:

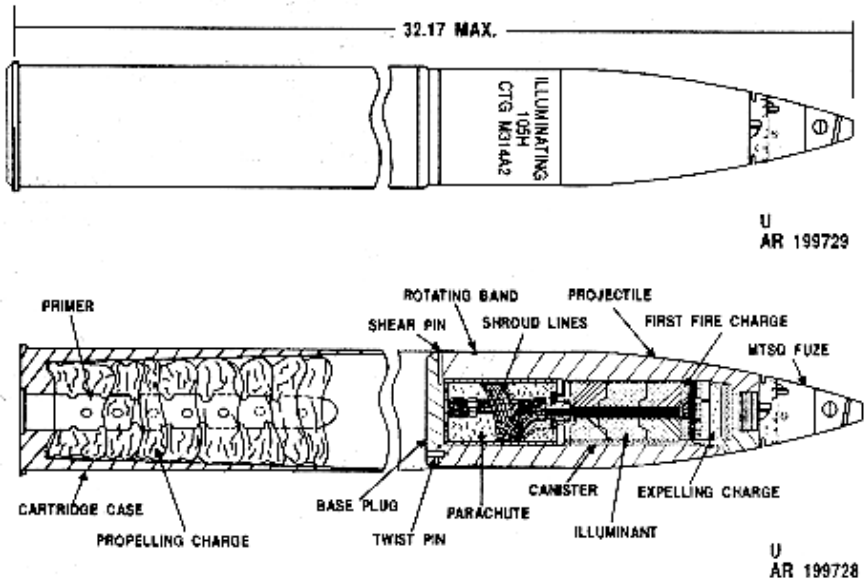
None.

References:

TM 9-1015-249-10
SB 700-20
AMC-P 700-3-3
DOD Consolidated Ammunition Catalog
TM 9-1300-251-20

105mm Illumination
M314

CARTRIDGE, 105-MILLIMETER: ILLUMINATING, M314, M314A2, M314A2B1



Type Classification:

C & T AMCTC 7467, dtd 1970.

Use:

This cartridge is intended for illuminating a designated target area.

Description:

The projectile is a hollow steel forging with a streamlined ogive, gilding metal rotating band, and pinned base plug. The projectile is assembled with an MTSQ fuze threaded into the nose of the projectile. The projectile cavity contains the expelling charge, illuminating canister, and parachute assembly. The expelling charge consists of 0.11 lb of black powder contained in a cloth bag. The illuminating canister contains the illuminant and 0.15 lb of first-fire composition. The parachute assembly is attached to the illuminating canister body. The base plug is inserted into the opening at the base of the projectile and held in place by three shear pins and three twist pins. The complete projectile is free-fitted to a cartridge case. The cartridge case contains a percussion primer assembly and seven individually bagged and numbered propelling charge increments. The base of the cartridge case is drilled and the primer assembly is pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing black powder. The seven numbered increments bags are tied together, in numerical order, with acrylic cord. These are assembled into the cartridge case, around the primer flash tube, with Increment 1 at the base of the cartridge case and Increment 7 toward the mouth of the cartridge case.

Functioning:

If the projectile is unfuzed, both the closing plug and the fuze assembly to the projectile are removed prior to adjusting the charge and loading the cartridge into the weapon. Impact of the weapon firing pin results in the initiation of the percussion primer which, in turn, ignites the black powder in the flash tube. The flash tube provides for uniform ignition of the propelling charge producing a rapid expansion of the propellant gas which propels the projectile out of the weapon tube. Engagement of the projectile rotating band with the rifling of the weapon

105mm Illumination continued

tube imparts spin to the projectile providing in-flight stability. The MTSQ fuze functions and ignites the expelling charge, and in turn, ignites the first-fire composition. The expelling charge ejects the illumination canister and parachute assembly from the base of the projectile by blowing off the base plug. Concurrently, the parachute deploys and inflates, and the illuminant is ignited by the first-fire composition. Average luminosity is 450,000 candlepower with a burning time of 60 seconds.

Tabulated Data:

Complete round:

Type	Illuminating
Weight	46.43 lb
Length	32.17 in.
Cannon (weapon) used with	M49 , (M52, M52A1), M2A1, M2A2 (M101, M101A1), M103 (M108), M137 (M102)

Projectile:

Body material	Forged steel
Color	Gray w/white band and white markings (Later manufacture - white w/black markings)
Filler and weight	Illum, 1.74 lb
Fuze	MTSQ, M501, M501A1

Propelling charge:

Cartridge Case	M14 series
Propellant	M67, 2.8 lb
Primer	M28A2, M28B2

Performance:

Using M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle Velocity (fps)	Velocity (mps)	Maximum Range (m)	Range (yd)
1	650	198.1	3610	3840
2	710	216.4	4110	4495
3	780	237.7	4860	5315
4	875	266.7	5950	6505
5	1020	310.9	7650	8370
6	1235	376.4	9380	10,260
7	1550	472.4	11,270	12,330

Maximum Range	11,270 m (12,330 yd)
Muzzle velocity	472.4 mps (1550 fps)

Using M102 and M108 howitzers:

Charge	Muzzle Velocity (fps)	Velocity (mps)	Maximum Range (m)	Range (yd)
1	673	205	3700	4040
2	732	223	4300	4700
3	810	247	5200	5690
4	912	278	6300	6890
5	1066	325	8100	8500
6	1289	393	9600	10,500
7	1621	494	11,500	12,590

Maximum Range	11,500 m (12,590 yd)
Muzzle velocity	494 mps (1621 fps)

Temperature Limits:

Firing:

Lower limit	-40°F (-40°C)
Upper limit	+125°F (+52°C)

Storage:

Lower limit	-80°F (for periods not exceeding 3 days) (-63°C)
Upper limit	+160°F (for periods not exceeding 4 hr/day) (+71.1°C)
*Packing	1 round in fiber container; 2 containers in wooden box

*Packing Box:

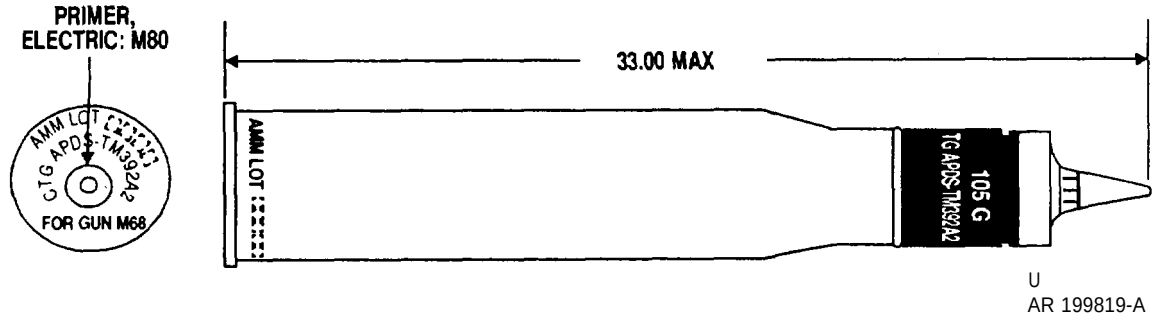
Weight	120 lb
Dimensions	37-1/4 x 11-15/16 x 7-19/32 in.
Cube	2 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Storage class/SCG	(08) 1.2 G
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES
DODAC	1315-C449
UNO serial number	0171
UNO proper shipping name	Ammunition, illuminating
Drawing number	75-1-229

CARTRIDGE, 105 MILLIMETER: APDS-T, M392A2 AND M392



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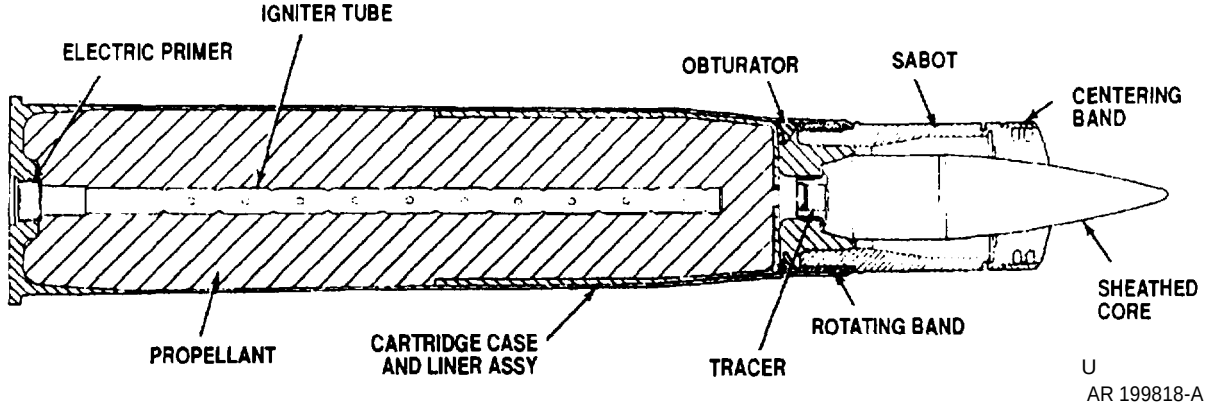

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Type Classification:

STD MSR 02787001 (M392A2).
STD OTCM 38116 dtd 1961 (M392).

Use:

This cartridge is a hypervelocity armor-piercing type with discarding sabot, intended for use in 105mm guns against armored targets.

Description:

The projectile consists of a sheathed tungsten carbide core with tracer and a sabot. The core, which is the armor-piercing element, is carried within the sheath with the sabot assembled on the exterior surface. A plastic band is positioned on the outside diameter of the sabot at the forward end. A fiber rotating band and a rubber obturator are assembled on the outside diameter near the base of the sabot. The igniter tube of the electric primer extends almost the entire length of the propellant loosely packed in the cartridge case.

Functioning:

The electrically initiated primer ignites the propelling charge. Gases produced by the burning propellant propel the projectile from the gun and ignite the tracer which burns for a minimum of 2.5 seconds. Setback, centrifugal, and air pressure forces cause the sabot to discard upon leaving the gun tube. The sheathed core is spin stabilized and penetrates the target solely by kinetic energy.

Difference Between Models:

The M392 is of United Kingdom manufacture and bears the U.K. designation of L36A1. The M392 is fitted with U.K. L4A1 or L4A2 primer.

Tabulated Data:

Complete round:
- Type ---------- APDS-T
- Weight ---------- 41 lb
- Length ---------- 33 in.
- Cannon used with ---------- M68

Projectile:
- Body material ---------- Tungsten carbide core
- Color ---------- Black w/white marking

Components:
- Cartridge case ---------- M115, M115B1
- Propelling charge ---------- M30 (T36)
- Primer ---------- M80A1
- Tracer ---------- M13

Performance:
- Maximum range ---------- 36,745 m (40,162 yd)
- Muzzle velocity ---------- 1478 mps (4850 fps)

Temperature limits:
- Firing:
  - Lowerlimit ---------- -40°F
  - Upper limit ---------- +125°F
- Storage:
  - Lower limit ---------- -80°F (for period not more than 3 days)
  - Upper limit ---------- +160°F (for period not more than 4 hr/day)

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight ---------- 126 lb
- Dimensions ---------- 39-7/8 x 14-1/8 x 8-23/32 in.
- Cube ---------- 2.8 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0328
Quantity-distance class --------- (08) 1.2
Storage compatibility group--- C
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC ---------- 1315-C505, C506
Drawing number ---------- 8863427

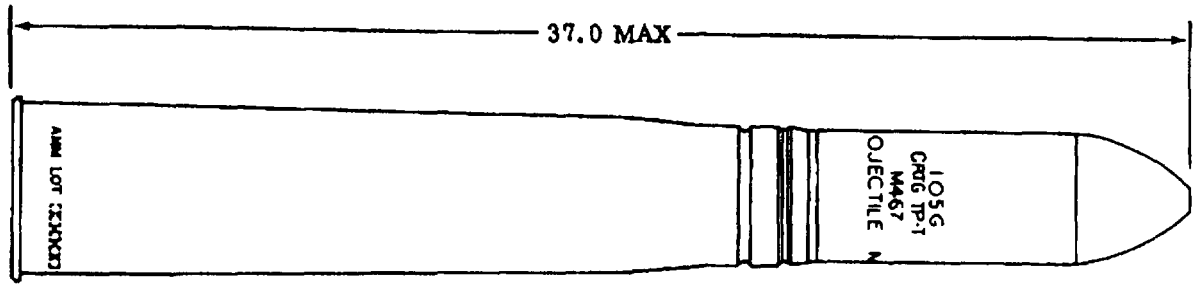
Limitations:

United Kingdom L28A1 cartridge, similar to the M392 except for its primer (L1A2, L1A3, or L1A4), is not to be fired in 105mm gun M68 except under combat emergency conditions. The clip will remain on the cartridge case at all times until the cartridge is partially chambered.

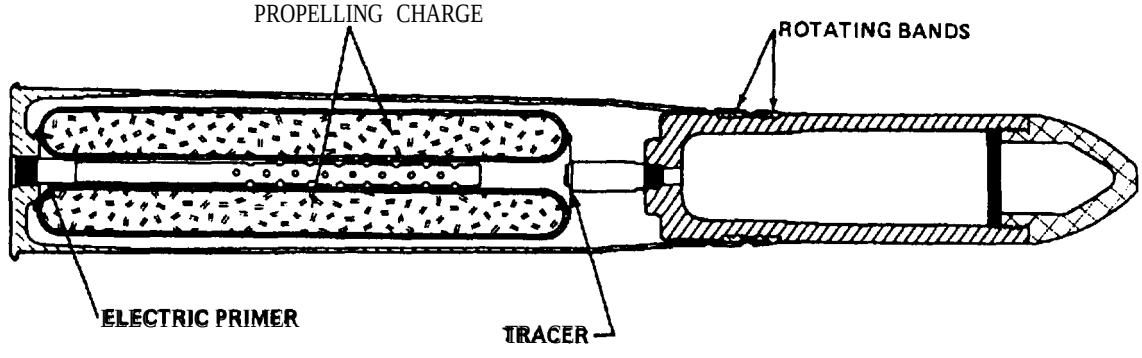
References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

CARTRIDGE, 105 MILLIMETER: TP-T, M467



AR199911



AR1981O

Type Classification:

STD MSR 0173625 dtd 1973,

Use:

This cartridge is for use in 105mm gun cannons for training in marksmanship.

Description:

The cartridge is similar in appearance and ballistically similar to high-explosive plastic service rounds. The projectile consists of a steel body and it fitted with a tracer. The cartridge case contains bagged propellant and is equipped with an electric primer.

Functioning:

The electrically initiated primer ignites the propelling charge. Gases produced by the burning propellant propel the projectile from the gun and ignite the tracer which burns for a minimum of 2,5 seconds.

Tabulated Data:

Complete round:

Type	TP-T
Weight	45 lb
Length	37 in.
Cannon used with	M68

Projectile:

Body material	Steel
Color	Blue w/white marking

Components:

Cartridge case	M150B1, M150
Propelling charge	Ml
Primer	M86
Tracer	M12

Performance:

Maximum range	9510 m (10,400 yd)
Muzzle velocity	730 mps (2400 fps)

Temperature limits:

Firing:
- Lower limit ---------- 40°F (-40°C)
- Upper limit ---------- +125°F (+52.0°C)

Storage:
- Lower limit ---------- -80°F (-62.2°C) (for period not more than 3 days)
- Upper limit ---------- +160°F (-71.1°C) (for period not more than 4 hr/day

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight ---------- 137 lb
- Dimensions ---------- 43-1/2 x 14 x 8-1/2 in.
- Cube ---------- 3 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

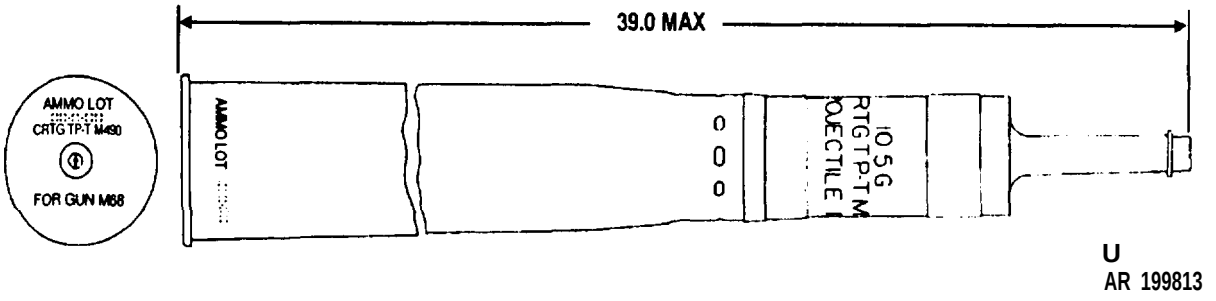
Shipping and Storage Data:

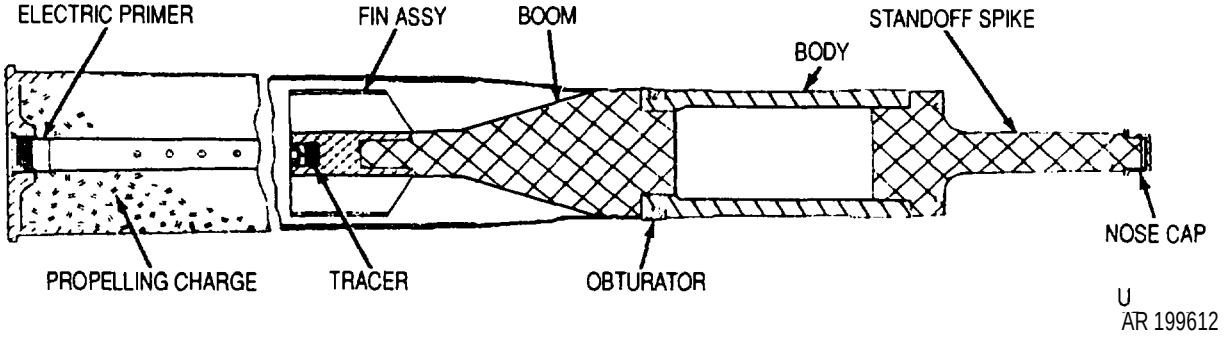
UNO serial number ----------	0328
Quantity-distance class ---------	(08) 1.2
Storage compatibility group ---	C
DOT shipping class ----------	
DOT designation ----------	AMMUNITION FOR CANNON WITH EMPTY PROJECTILES
DODAC ----------	1315-C510
Drawing number ----------	8863618

References:

AMC-P 700-3-3
SB 700-20
TM 9-1300-251-20

CARTRIDGE, 105 MILLIMETER: TM490





Type Classification:

STD AMCTC 1103 dtd 1963.

Use:

This cartridge is for use in 105mm gun cannons for training in marksmanship.

Description:

The cartridge is similar in external appearance and ballistically similar to HEAT-T cartridge M456 series. The projectile consists of a steel body, an aluminum standoff spike, and a boom and fin assembly with tracer. The cartridge case is filled with loosely packed propellant and is fitted with an electric primer.

Functioning:

The electrically initiated primer ignites the propelling charge. Gases produced by the burning propellant propel the projectile from the gun and ignite the tracer which burns for a minimum of 2.5 seconds.

Tabulated Data:

Complete round:
- Type ---------- TP-T
- Weight ---------- 45 lb
- Length ---------- 39 in.
- Cannon used with ---------- M68

Projectile:
- Body material ---------- Steel
- Color ---------- Blue w/white marking

Components:
- Cartridge case ---------- M148A1B1, M148A1
- Propelling charge ---------- M30
  ---------- M83
- Tracer ---------- M13

Performance:
- Maximum range ---------- 8207 m (8975 yd)
- Muzzle velocity ---------- 1170 mps (3850 fps)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F (-40°C)
  - Upper limit ---------- +125°F (+52.O°C)
- Storage:
  - Lower limit ---------- -80°F (-62.2°C) (for period not more than 30 days)
  - Upper limit ---------- +160°F (71.1°C) (for period not more than 4 hr/day)

*Packing ---------- 1 round per fiber container; 2 containers per wooden box

*Packing box:
- Weight ---------- 132 lb
- Dimensions ---------- 45-7/8 x 14-1/4 x 8-3/4 in.
- Cube ---------- 3.3 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number ---------- 0328
Quantity-distance class --------- (04) 1.2
Storage compatibility group --- C
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH EMPTY PROJECTILES
DODAC ---------- 1815-C511
Drawing number ---------- 8865533

Limitations:

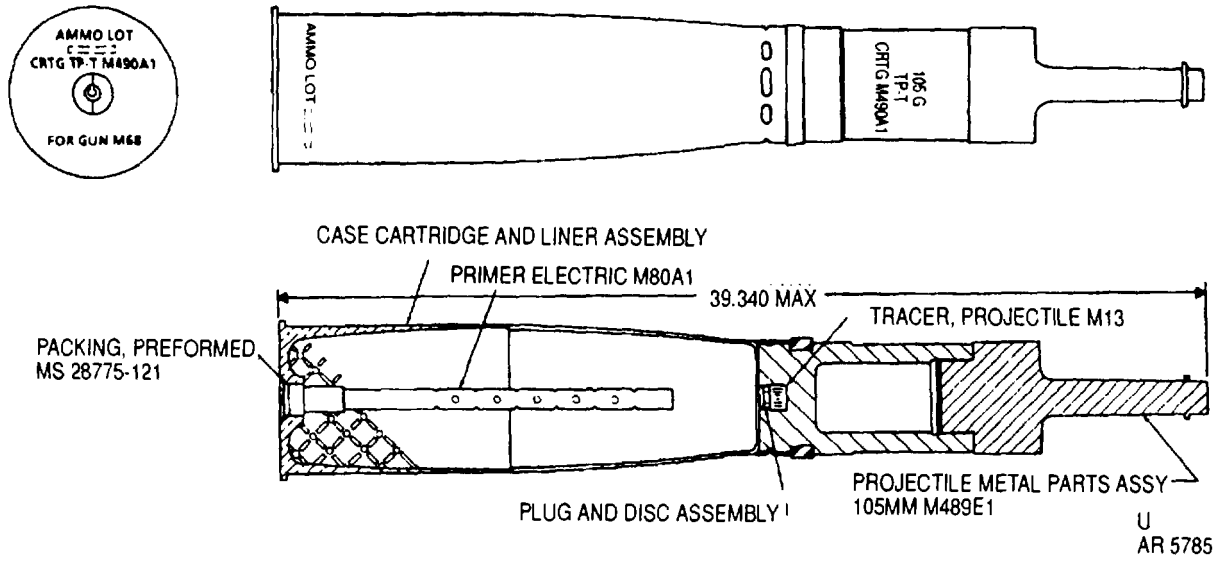
M490 cartridges manufactured prior to January 1967 have a cartridge case liner which utilizes a low-melt wax. Do not fire cartridges which have been tank transported at temperatures above + 120°F (+49°C).

References:

AMC-P 700-3-3

TM 9-1300-251-20

CARTRIDGE, 105 MILLIMETER: TP-T, M490A1



Type Classification:

STD MSR 06846011.

Use:

This cartridge is for use in 105mm tank cannon M68 for training in marksmanship.

Description:

The cartridge is the same in external appearance as the basic M490. However, internally it differs from the M490 in that the projectile has no fin assembly and is static stabilized. The projectile body is one inch longer. Some M490A1's may be assembled with the spiral-wrapped cartridge case. The standoff spike is steel, not aluminum, and the obturator has no seal.

The propellant in the cartridge case is the M14 and not the M30 as in the M490 cartridge. The cartridge case is fitted with the electric primer M80A1 instead of the M83.

Functioning:

The electrically initiated primer ignites the propelling charge. Gases produced by the burning propellant propel the projectile from the gun and ignite the tracer which burns for a minimum of 2.5 seconds.

Tabulated Data:

Complete round:	
Type	TP.T
Weight	45.81 lb
Length	39.34 in.
Cannon used with	M68
Projectile:	
Body material	Steel
Color	Blue w/white markings
Components:	
Cartridge case	M148A1B1, M148A2B1*
Propelling charge	M14
Primer	M80A1
Tracer	M13
Fuze	N/A
Performance:	
Maximum range	8975 yd
Average velocity	3850 fps
Temperature limits:	
Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (+52°C)
Storage:	
Lower limit	-80°F (-62.2°C) (for period not more than 3 days)
Upper limit	+160°F (+71.0°C) (for period not more than 4 hr/day)

* M148A2B1 uses spiral-wrapped cartridge case.

**Packing	1 round per fiber container; 2 containers per wooden box
**Packing box:	
Weight	132 lb
Dimensions	45-13/16 x 14-13/16 x 8-25/32 in.
Cube	3.3 cu ft

**NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0328
Quantity-distance class	(04) 1.2
Storage compatibility group	C
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITH EMPTY PROJECTILES
Drawing number	9343009 12935040***
DODAC	1315-C511

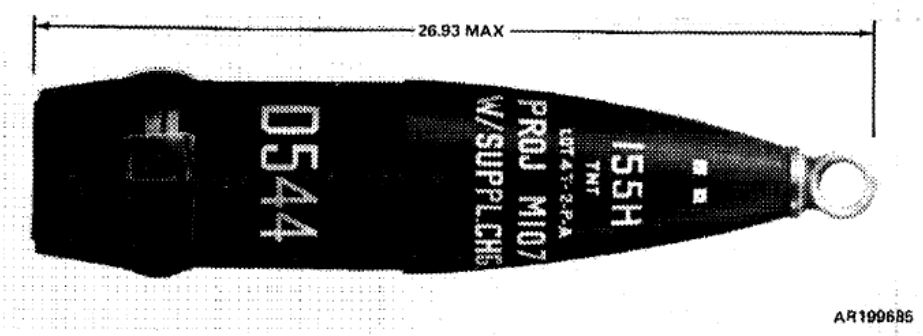
*** This drawing shows the M490Al assembled with the spiral-wrapped cartridge case.

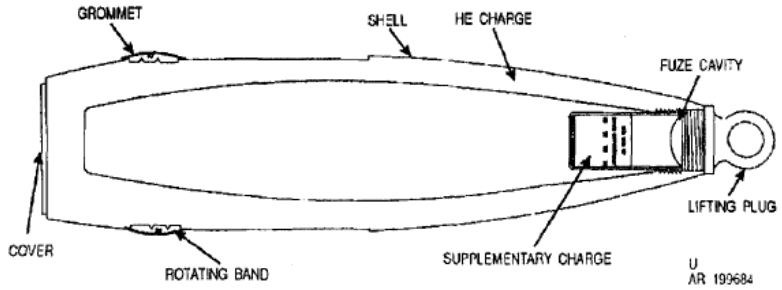
References:

AMC-P 700-3-3
TM 9-1300-251-20
TM 9-1300-251-34

155mm M107

PROJECTILE, 155-MILLIMETER: HE, M107 (NORMAL AND DEEP CAVITY)





Type Classification:

Deep Cavity: Std OTCM 36841, dtd 1958.
Normal Cavity: Std OTCM 36841, dtd 1958.

Use:

This projectile is fired from 155mm howitzers and is used for blast effect, fragmentation, and mining.

Description:

The projectile is a hollow steel shell filled with 14.6 pounds of TNT or 15.4 pounds of Composition B. The shape is ogival with a boattail for aerodynamic efficiency. A supplementary charge of 0.3 lb. TNT is contained in an aluminum liner in the deep fuze cavity. A threaded lifting plug closes the fuze cavity at the nose of the projectile for handling and storage. Point detonating, time or proximity (deep cavity only) fuzes may be used with this projectile. When a proximity fuze is fitted, the supplementary charge is removed. A rotating band encircles the shell casing near the base and is protected by a grommet before loading. A steel plate (base cover) is welded over the base to prevent entry of hot propellant gases into the projectile interior.

Functioning:

When the weapon is 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 (proximity action). The proximity fuze contains its own booster element to initiate the warhead filler.

Difference Between Models:

155mm HE Projectile M107 (Normal Cavity) has a shallower fuze receptacle and cannot accommodate proximity fuzes. Because of the absence of a supplementary charge, the basic Composition B charge of 15.4 pounds is slightly greater than in the deep cavity projectile.

Tabulated Data:

Weight Zones
Loaded Projectile (w/o fuze, w/o plug)

Zone	Pounds Over	Up to & Incl	Marking
2	90.0	91.3	▫ ▫
3	91.1	92.4	▫ ▫ ▫
4	92.0	93.7	▫ ▫ ▫ ▫
5	93.3	94.6	▫ ▫ ▫ ▫ ▫

Complete round:
- Type ---------- HE
- Length w/lifting plug --------- 26.93 in. max
- Length w/o lifting plug ------ 23.89 in.
- Cannon used with ---------- M1, M1A1, M1A2, M45, M126, M126A1, M185, XM199

Projectile:
- Body material ---------- Forged steel
- Color ---------- Olive drab w/yellow markings

Filler and weight:
- TNT ---------- 14.6 lb
- Comp B ---------- 15.4 lb

Primers:
- For cannon: M45, M126,M126A1, M199, and M185 ---------- M82
- M1, M1A1 ---------- MK2A4
- Propelling charges ---------- M3, M3A1, M4A1, M4A2, M119/M119A1
- Fuzes ---------- PD: M557, M78 series; M739 series; MK399 MOD 1; MTSQ: M564, M582 series; Prox: M728, M732 series, ET: M767

Temperature Limits:

Firing:
- Lower limit ---------- -65°F
- Upper limit ---------- +145°F

Storage:
- Lower limit ---------- -80°F (for periods not more than 3 days)
- Upper limit ---------- +160°F (for periods not more than 4 hr/day)
- *Packing ---------- 8 projectiles on pallet

*Pallet:
- Weight ---------- 797 lb
- Dimensions ---------- 27-1/8 x 13-5/8 x 32 in.
- Cube ---------- 6.8 cu ft

*NOTE See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

- UNO serial number ---------- 0168
- Quantity-distance class --------- (18) 1.1
- Storage compatibility group -- D
- DOT shipping class ---------- A
- DOT designation ---------- EXPLOSIVE PROJECTILES

DODAC:
- Deep cavity ---------- 1320-D544
- Normal cavity ---------- 1320-D571

Assembly Dwg No.
- Deep cavity ---------- 9216352

Ballistics:

Cannon M1, M1A1, M45:

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
1, M3, green bag	207.3	3900	774.4
2, M3, green bag	234.7	4800	698.6
3, M3, green bag	268.2	6100	729.2
4, M3, green bag	310.9	7800	749.6
5, M3, green bag	371.9	9700	760.7
3, M4A1, white bag	274.3	6300	702.7
4, M4A1, white bag	316.4	8000	729.9
5, M4A1, white bag	374.6	9700	720.6
6, M4A1, white bag	463.3	12000	759.8
7, M4A1, white bag	563.9	14600	740.8

Ballistics: (cont.)

Cannon M126/M126A1:

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	207.3	3900	729.2
2, M3A1, green bag	236.2	4900	710.1
3, M3A1, green bag	275.8	6500	739.3
4, M3A1, green bag	317.0	8200	744.1

Cannon M126/M126A1:

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
5, M3A1, green bag	374.9	9800	743.2
3, M4A2, white bag	269.7	6200	700.7
4, M4A2, white bag	313.9	8000	700.8
5, M4A2, white bag	373.4	9800	778.8
6, M4A2, white bag	461.8	12000	746.2
7, M4A2, white bag	562.4	14600	772.5

Cannon M185:

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	211.8	4000	673.6
2, M3A1, green bag	237.7	5000	722.4
3, M3A1, green bag	277.4	6500	690.4
4, M3A1, green bag	318.5	8300	760.9
5, M3A1, green bag	374.9	9800	717.2
3, M4A2, white bag	292.6	7200	734.9
4, M4A2, white bag	336.8	8900	736.8
5, M4A2, white bag	393.2	10300	756.1
6, M4A2, white bag	475.5	12400	758.4
7, M4A2, white bag	565.4	14800	760.3
8, M119/ M119A1	684.3	18100	781.5

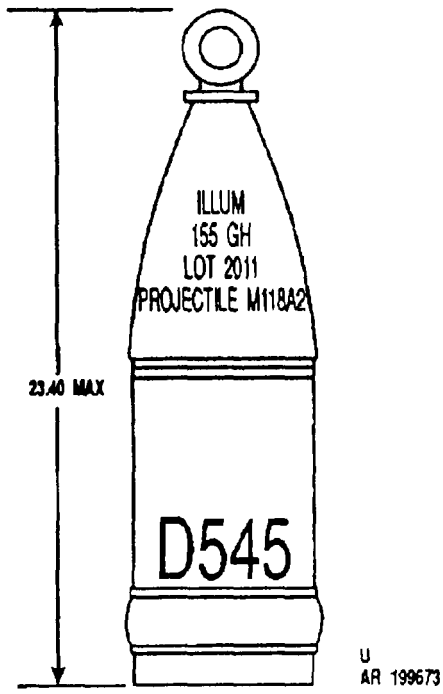
Cannon M199:

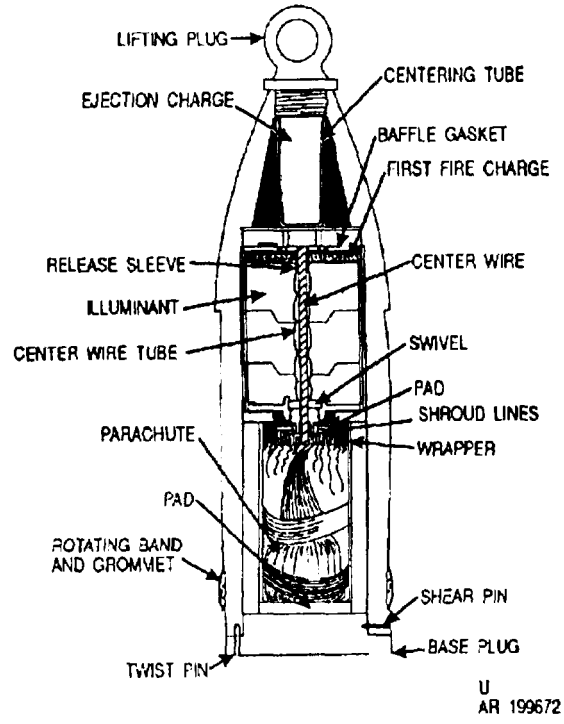
Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	212.8	4000	673.6
2, M3A1, green bag	239.8	5000	722.4
3, M3A1, green bag	280.8	6500	690.4
4, M3A1, green bag	322.9	8300	760.9
5, M3A1, green bag	380.1	9800	717.2
3, M4A2, white bag	296.5	7200	734.9
4, M4A2, white bag	340.9	8900	736.8
5, M4A2, white bag	398.0	10300	756.1
6, M4A2, white bag	482.0	12400	758.4
7, M4A2, white bag	574.3	14800	760.3
8, M119/ M119A1	684.3	18100	781.5

References:

AMC-P 700-3-3
SB 700-20
TM 9-1025-200-12&P
TM 9-1300-251-20
TM 9-2350-311-10
TM 9-2350-314-10

PROJECTILE, 155-MILLIMETER: ILLUMINATING, M118 SERIES





Type Classification:

Std CONT AMCTC 6558 dtd 1969.

Use:

This projectile is fired from 155mm howitzers for battlefield illumination at night or during other conditions of reduced visibility.

Description:

The projectile is a hollow steel shell containing an illuminant canister, an ejection charge in the nose, and a parachute in the base. A threaded nose cavity is provided for an MTSQ fuze, and a lifting plug in installed in the fuze cavity for shipment and handling. The base of the projectile is closed with a steel plug retained by twist and shear pins. A center wire connecting the parachute suspension lines and the illuminant canister runs through the illuminant charge within a tube and is secured at the forward end by solder attachment to a release sleeve. The release sleeve is imbedded in the forward end of the illuminant assembly behind a first fire charge. A rotating band encircles the projectile near the base and is protected by a grommet for shipment and handling.

Functioning:

When the weapon is fired, the burning propellant charge generates rapidly expanding gases to propel the projectile through the barrel to the velocity required to reach the function point. The rotating band engages the barrel rifling to impact spin to the projectile for stability in flight and provides a seal to prevent leakage of gas pressure past the projectile. Functioning of the fuze detonates the ejection charge. The ejection charge ignites the first fire charge and the illuminant while blowing out the base plug to eject the parachute and the illuminant canister, The parachute does not open until the burning illuminant has melted the soldered center wire from the release sleeve. Release of the center wire frees the parachute risers, permitting the parachute to open fully. This delay permits the canister and parachute to decelerate to a safe deployment speed. Suspended from the parachute, the illuminant burns for approximately 60 seconds with a maximum of 400, 000 candlepower.

Tabulated Data:

Complete round:
- Type ---------- Illuminum
- Weight w/o fuze ---------- 102 lb
- Length w/lifting plug --------- 23.40 in, max
- Cannon used with ---------- Ml, MlAl, M45, M126, M126A1

Projectile:
- Body material ---------- Forged steel
- Color ---------- Gray w/white markings (Later manufactured w/white markings and a white band)
- Filler and weight ---------- Illuminum composition, 4,30 lb
- Propelling charge ---------- M3/M4 series
- Primer ---------- MK2A4 (M1, MlAl, M1A2, M45 cannon) M82 (M126, M126A1 cannon) M185, M199
- Fuze ---------- MTSQ, M501 series"

Temperature Limits:

Firing:
- Lower limit ---------- -65°F
- Upper limit ---------- + 145°F

Storage:
- Lower limit ---------- -80°F (for periods not more than 3 days)
- Upper limit ---------- + 160°F (for periods not more than 4 hrs/day)
- *Packing ---------- 8 projectiles on pallet

*Pallet:
- Weight ---------- 866 lb
- Dimensions ---------- 29-1/8 X 14-5/8 x 28-1/2 in.
- Cube ---------- 7.0 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class --------- 1.3
Storage compatibility group -- G
DOT shipping class ---------- B
DOT designation ---------- SPECIAL FIREWORKS, HANDLE CAREFULLY, KEEP FIRE AWAY
DODAC ---------- 1320-D545
UNO serial number ---------- 0254
UNO proper shipping name --- Ammunition, illuminating
Assembly Dwg No ---------- 75-14-480

Ballistics:

Cannon M126/M126A1:

Charge	Muzzle Velocity m/sec	Max Range to Burst m	Elevation mil	Fuze Setting sec
1, M3 green bag	200	2600	793.2	20.4
2, M3 green bag	228	3600	782.9	25.2
3, M3 green bag	259	4700	770.1	29.6
4, M3 green bag	298	6100	761.7	34.5
5, M3 green bag	355	7800	743. 3	39.4
3, M4A1, white bag	270	5100	769. 6	31.1
4, M4A1, white bag	309	6500	765. 8	36.1
5, M4A1, white bag	360	8000	796. 4	42. 5
6, M4A1, white bag	443	9700	758. 8	46.1
7, M4A1, white bag	536	11600	763. 0	51. 9

Cannon M199:

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	211.8	4000	673.6
2, M3A1, green bag	239.8	5000	722.4
3,M3A1, green bag	280.8	6500	690.4
4, M3A1, green bag	322.9	8300	760.9
5, M3A1, green bag	380.1	9800	717.2

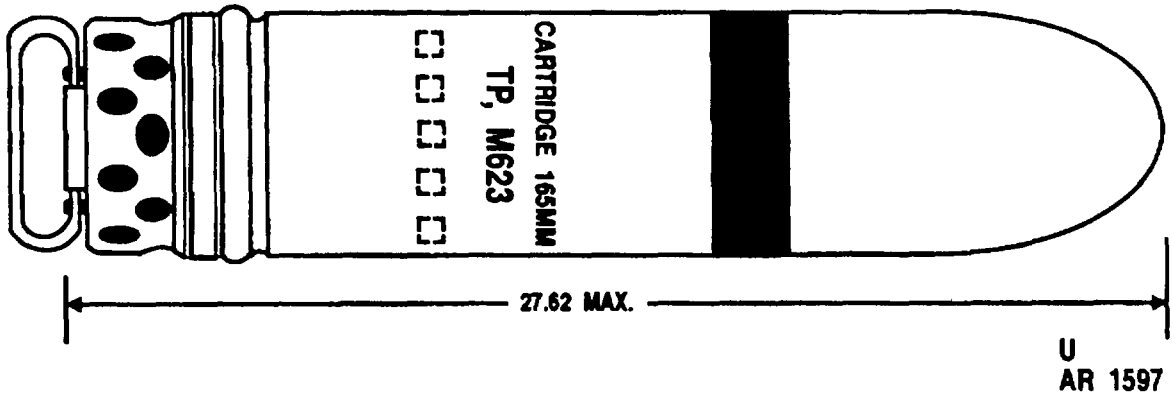
Cannon M199: (cont.)

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
3, M4A2, white bag	296.5	7200	734.9
4, M4A2, white bag	340.9	8900	736.8
5,M4A2, white bag	398.0	10300	756.1
6, M4A2, white bag	482.0	12400	758.4
7, M4A2, white bag	574.3	14800	760.3
8, M119/ M119A1	684.3	18100	781.5

References:

AMC-P 700-3-3
SB 700-20
TM 9-1025-200-12&P
TM 9-1300-251-20
TM 9-2350-311-10

CARTRIDGE, 165-MILLIMETER: TP, M623



Type Classification:

Std AMCTC 8415 dtd July 1971.

Use:

This cartridge is similar in appearance to Cartridge HEP M123A1 and is used for target practice with the M135 gun cannon.

Description:

Except for the projectile and fuze, the target practice cartridge is assembled with the same components as the HEP cartridge. The primary difference between the two rounds is that the TP projectile contains an inert filler in lieu of explosive, and is fitted with either a solid base plug or a dummy fuze assembled to the standard M123A1 base plug. The handle assembly attached to the base of the primer, is fitted with a quick-release mechanism which permits its removal after the round is loaded into the weapon.

Functioning:

In firing, an electric current transmitted by the firing mechanism in the weapon activates the primer, which ignites the propellant. The propellant gases, escaping through perforations in the cartridge case, force the cartridge out of the gun tube and propel it to the target. Unlike other types of fixed ammunition, the cartridge case remains fixed after firing and leaves the weapon with the projectile. The cartridge is spin stabilized in flight.

Tabulated Data:

Complete round:

Type	Target Practice
Weight	67.6 lb
Length	27.62 in.
Cannon used with	M135

Projectile:

Inert filler	35 lb
Body material	Steel
Color	Blue w/white markings
Cartridge case	M104

This is a two-piece welded steel perforated basket type. The mouth is threaded for attachment to the projectile, a well in the base accommodates the primer.

Length	Approx 4 in.
Diameter	6.5 in.
Propellant	M2 (2.12 lb)
Primer	M73
Fuze	Inert or solid base plug

Ballistics:

Maximum range	1000 yd (914 m)
Muzzle velocity	850 fps (259.08 mps)

Temperature Limits:

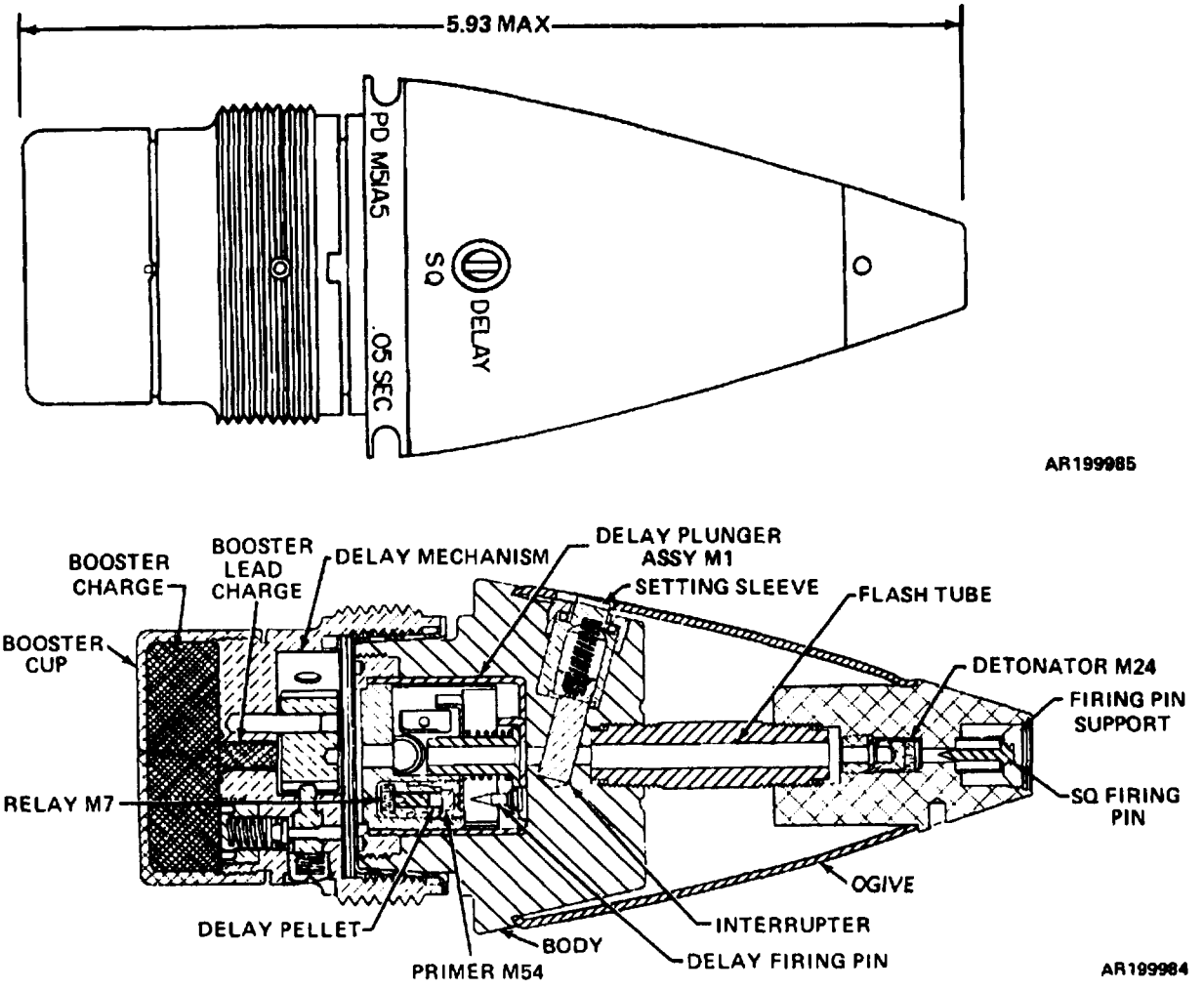
Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (+52°C)
Storage:	
Lower limit	-80°F (-62.2°C) (for period not more than 3 days)
Upper limit	+160°F (+71.1°C) (for period not more than 4 hr/day)
*Packing	l round per fiber container; l container per wooden box
*Packing Box:	
Weight w/cartridge	94.0 lb
Dimensions	30-1/16 x 7-3/8 x 7-7/16 in.

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0328
DOD hazard class	(08) 1.2
Storage compatibility group	C
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON W/INERT LOADED PROJECTILE
DODAC	1320 -D590
Drawing number	9219045

FUZE, POINT DETONATING: M51A5



Type Classification:

Std OTCM 36841 dtd 1958.

Use:

Point Detonating Fuze M51A5 is a selective, superquick or 0.05 second delay impact fuze used to detonate HE ammunition in calibers 75mm through 105mm.

Description:

The M51A5 fuze consists of Fuze M48A3 assembled with the M21A4 booster. The fuze PD head assembly contains a firing pin held in position by a firing pin support which prevents initiation of Detonator M24 until impact. The fuze body contains an M1 delay plunger assembly and an interrupter assembly with a setting sleeve which provides a means of setting or selecting fuze PD (Super Quick Action) or delay functioning. The delay plunger assembly includes a firing pin and Delay Element M2. The delay element includes Primer M54, a black powder delay charge and Relay M7. The head assembly is attached to the body by means of the flash tube which also positions the fuze windshield or ogive. The ogive is a thin-walled steel stamping utilized to provide an aerodynamic shape to the fuze. The M21A4 booster consists of a brass booster body having external (male) threads to fit projectiles having 2-inch diameter, 12 threads per inch and internal (female) threads to receive fuzes having 1.7-inch diameter, 14 threads per inch. An aluminum booster cup containing a 340-grain tetryl booster pellet is threaded to the booster body. The M21A4 booster internal configuration is that of an eccentric rotor containing an M17 detonator held in an unarmed (out of line) position by centrifugal and setback lock ins. On firing, the locking mechanisms are released and the rotor becomes aligned with the booster lead

charge and the fuze flash tube when set for PD action or the fuze delay plunger relay charge when set for "delay" action.

Functioning:

Upon firing, the combination of setback and centrifugal forces are utilized to arm the fuze. The setback forces retract the booster lock pin allowing centrifugal force to extract the rotor lock pin and permitting the rotor to rotate into an armed position aligning the rotor M17 detonator with the detonation train of the fuze. Simultaneously, centrifugal force will arm the M1 delay plunger of the fuze and retract the flash tube interrupter unless the fuze is set delay, in which instance, the flash tube interrupter will not retract and the flash from the nose superquick element will be prevented from initiating the explosive train of the booster. The fuze is initiated upon impact with the target; the firing pin oft the fuze head assembly is driven into the M24 detonator which flashes through to the M17 detonator activating the lead charge and booster pellet. If set delay, the flash tube is blocked and the M17 detonator is activated by the delay element.

Difference Between Models:

M51A5 Mod 3 ---------- USN mod certification only

Tabulated Data:

Type	PD
Weight	2.12 lb
Length:	
Visible	3.74 in.
Overall	5.93 in.
Assembly Dwg. No.	73-2-146

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for not more than 3 days)
Upper limit	+160°F (for not more than 4 hr/day)
*Packing	8 fuzes in metal container; 2 containers in wooden box
*Packing Box:	
Weight	55.8 lb
Dimensions	14-5/8 x 12-13/16 x 9-1/8 in.
Cube	1.04 cu ft

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number	0106
UNO proper shipping name	Fuzes, detonating
Quantity-distance class	1.1
Storage compatibility group	B
DOT shipping class	A
DOT designation	DETONATING FUZE CLASS A EXPLOSIVES, DO NOT STORE OR LOAD WITH ANY HIGH EXPLOSIVE.

Explosive Components:

SQ Action	Detonator M24, Detonator M17, tetryl booster lead charge, and tetryl booster charge
Delay Action	Delay plunger assembly M1 (Delay Element M2, M54 primer, black powder delay charge, Relay M7), Detonator M17, tetryl booster lead charge, and tetryl booster charge.

Limitation:

Bore safe only. Premature functioning can occur when fuzes are fired in heavy rainfall.

References:

TM 9-1300-251-20
SC 1340/98-IL
SB 700-20