

TM 43-0001-28
C5

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 10 August 1979

CHANGE }
No. 5 }

**ARMY AMMUNITION DATA SHEETS
FOR
ARTILLERY AMMUNITION:
GUNS, HOWITZERS, MORTARS, RECOILLESS RIFLES,
GRENADE LAUNCHERS AND
ARTILLERY FUZES
(Federal Supply Class 1310, 1315, 1320, 1390)**

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<i>Remove pages</i>	<i>Insert pages</i>
iii through vi	iii through vi
3-15 and 3-16	3-15 and 3-16
3-65 through 3-70	3-65 and 3-66/3-70
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None	3-104.1 and 3-104.2
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None	4-18.1 through 4-18.4
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None	7-34.1 and 7-34.2
7-35 and 7-36	7-35 and 7-36
None	7-36.1 and 7-36.2
None	7-78.1 through 7-78.4
None	8-10.1 and 8-10.2

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CHANGE }
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HEADQUARTERS
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WASHINGTON, DC, 20 December 1978

ARMY AMMUNITION DATA SHEETS FOR

ARTILLERY AMMUNITION: GUNS, HOWITZERS, MORTARS, RECOILLESS RIFLES, GRENADE LAUNCHERS AND ARTILLERY FUZES (Federal Supply Class 1310, 1315, 1320, 1390)

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- 8-23 and 8-24
- 8-31 and 8-32
- 8-49 and 8-50
- A-3 and A-4

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TM 43-0001-28
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Change)
No. 3)

HEADQUARTERS
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Washington, DC, 29 May 1978

ARMY AMMUNITION DATA SHEETS
FOR
ARTILLERY AMMUNITION:
GUNS, HOWITZERS, MORTARS,
RECOILLESS RIFLES, AND GRENADE LAUNCHERS
(Federal Supply Class 1310, 1315, 1320, 1390).

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Remove pages

- i through vi
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- None
- None
- None
- None

Insert pages

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- 3-128.1 and 3-128.2
- 6-48.1 and 6-48.2
- 7-104.1 and 7-104.2
- 8-30.1 and 8-30.2

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HEADQUARTERS
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Change
No. 2

ARMY AMMUNITION DATA SHEETS
FOR
ARTILLERY AMMUNITION:
GUNS, HOWITZERS, MORTARS,
RECOILLESS RIFLES, AND GRENADE LAUNCHERS
(Federal Supply Class 1310, 1315, 1320, 1390)

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Remove pages

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- 3-57 and 3-58
- 3-117 and 3-118
- None

Insert pages

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- 3-117 and 3-118
- 3-118.1 and 3-118.2

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TM 43-0001-28
C1

Change)
No. 1)

HEADQUARTERS
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ARMY AMMUNITION DATA SHEETS
FOR
ARTILLERY AMMUNITION:
GUNS, HOWITZERS, MORTARS,
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v and vi
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TECHNICAL MANUAL

No. 43-0001-28

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 35 April 1977

ARMY AMMUNITION DATA SHEETS FOR

ARTILLERY AMMUNITION: GUNS, HOWITZERS, MORTARS, RECOILLESS RIFLES, GRENADE LAUNCHERS AND ARTILLERY FUZES (Federal Supply Class 1310, 1315, 1320, 1390)

REPORTING OF ERRORS

You can improve this manual by recommending improvements using DA Form 2028 (Recommended Changes to Publications and Blank Forms) or DA Form 2028-2 (Recommended Changes to Equipment Technical Manuals), located in the back of the manual and mail the form direct to Commander, US Army Armament Materiel Readiness Command, ATTN: DRSAR-MAS-MA, Dover, NJ 07801. A reply will be furnished direct to you.

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*This manual, together w/TM 9-1300-251-20, dtd Dec 73, and TM 9-1300-251-34, dtd Jan 75, including all changes, supersedes TM 9-1300-203, dtd Apr 67, including all changes.

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APPENDIX A. CARTRIDGE/PROJECTILE-FUZE COMBINATION CHARTS ----- A-1

CHAPTER 1
INTRODUCTION

1-1. Purpose

This manual is a reference handbook published as an aid in planning, training, familiarization and identification of artillery ammunition, including guns, howitzers, recoilless rifles, mortars, 40-mm grenade launchers, and artillery fuzes.

1-2. Scope

a. For each item of materiel, there are illustrations and descriptions together with characteristics and related data. Included in the related data are weights, dimensions, performance data, packing, shipping and storage data, type classification, and logistics control codes (LCC).

b. Information concerning supply, operation, and maintenance of the items will be found in the publications referenced for those items. A complete listing of these publications is maintained in DA Pam 310 series indexes.

c. Within this manual, items with the following type classifications are included:

- (1) Standard (LCC-A, LCC-B)
- (2) Contingency (CON)
- (3) Limited Procurement (LP)
- (4) Reclassified obsolete (OBS) for regular Army use, but used by National Guard or Reserve Units.
- (5) Reclassified OBS for all Army use, but used by Marine Corps, Air Force or Navy.
- (6) Reclassified OBS, no users, but US stocks remain.

Items with the following type classification are not included:

Reclassified OBS for all US use. No US

stocks remain. (Foreign use or stock may remain.)

d. Numerical values, such as weights, dimensions, candlepower, etc., are nominal values, except when specified as maximum or minimum. Actual items may vary slightly from these values. Allowable limits can be obtained from the drawings indicated in the data sheets.

1-3. Metric Conversion Chart

For approximate conversions to/from metric measures see figure 1-1.

1-4. Key to Abbreviations and Symbols

AP	Armor piercing
APC	Armor piercing capped
ARDS	Armor piercing, discarding sabot
APERS	Antipersonnel
AT	Antitank
BD	Base detonating
BE	Base ejection
CS	A tactical riot control agent
DS	Discarding sabot
GB	Nonpersistent toxic (casualty) nerve gas
H	Mustard gas
HD	Distilled mustard gas
HE	High explosive
HEAT	High explosive antitank
HEAT-T-MP	High explosive antitank with tracer, multipurpose
HEDP	High explosive dual purpose
HEI	High explosive incendiary
HEP	High explosive plastic
HERA	High explosive rocket assisted
HVAP	Hypervelocity, armor piercing
HVTP	Hypervelocity, target practice
Illum	Illuminating
Mod	Modified
MK	Mark
MP	Multipurpose
MT	Mechanical time
MTSQ	Mechanical time and super-quick
MV	Muzzle velocity

* Packing ----- 1 cartridge in fiber container; 8 containers per wooden box

* Packing Box:

Weight ----- 98.6 lbs.

Dimensions ----- 25-13/16 x 12-15/16 x 10-23/32 in.

Cube ----- 2.12 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 4

Storage compatibility ----- E

DOT shipping class ----- B

DOT designation ----- AMMUNITION FOR CANNON WITHOUT PROJECTILES

DODAC ----- 1315-C261

Drawing number ----- 7549210

Limitations:

Closure debris from blank ammunition can be expelled a distance of 300 feet forward of the weapon muzzle.

References:

SC 1305/30-IL

SB 700-20

AMCP 700-3-3

TM 9-1300-251-20

TM 9-2350-224-10

TM 9-7012

PD ----- Point detonating
 PI ----- Point initiating
 PIBD ----- Point initiating, base
 Prax ----- Proximity
 PWP ----- Plasticized white phosphorous
 RAP ----- Rocket assisted projectile

SD ----- Self destroying
 T ----- Time fuze or for training only
 -T ----- With tracer
 TP ----- Target practice
 TSO ----- Time superquick
 VX ----- Persistent toxic (casualty) nerve gas
 WP ----- White phosphorous

METRIC CONVERSION CHART

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol	
LENGTH					
in	inches	2.5	centimeters	cm	
ft	feet	30	centimeters	cm	
yd	yards	0.9	meters	m	
mi	miles	1.6	kilometers	km	
AREA					
in ²	square inches	6.5	square centimeters	cm ²	
ft ²	square feet	0.09	square meters	m ²	
yd ²	square yards	0.8	square meters	m ²	
mi ²	square miles	2.6	square kilometers	km ²	
	acres	0.4	hectares	ha	
WEIGHT					
oz	ounces	28	grams	g	
lb	pounds	0.45	kilograms	kg	
	short tons (2000 lb)	0.9	tonnes	t	
VOLUME					
rsp	teaspoons	5	milliliters	ml	
Tbsp	tablespoons	15	milliliters	ml	
fl oz	fluid ounces	30	milliliters	ml	
c	cups	0.24	liters	l	
pt	pints	0.47	liters	l	
qt	quarts	0.95	liters	l	
gal	gallons	3.8	liters	l	
ft ³	cubic feet	0.03	cubic meters	m ³	
yd ³	cubic yards	0.76	cubic meters	m ³	
TEMPERATURE					
Symbol	When You Know	Subtract	Multiply by	To Find	Symbol
F	Fahrenheit	32	5/9	Celsius	C

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol	
LENGTH					
mm	millimeters	0.04	inches	in	
cm	centimeters	0.4	inches	in	
m	meters	3.3	feet	ft	
m	meters	1.1	yards	yd	
km	kilometers	0.6	miles	mi	
AREA					
cm ²	square centimeters	0.16	square inches	in ²	
m ²	square meters	1.2	square yards	yd ²	
km ²	square kilometers	0.4	square miles	mi ²	
ha	hectares (10,000 m ²)	2.5	acres		
WEIGHT					
g	grams	0.035	ounces	oz	
kg	kilograms	2.2	pounds	lb	
t	tonnes (1000 kg)	1.1	short tons		
VOLUME					
ml	milliliters	0.03	fluid ounces	fl oz	
l	liters	2.1	pints	pt	
l	liters	1.06	quarts	qt	
l	liters	0.26	gallons	gal	
m ³	cubic meters	35	cubic feet	ft ³	
m ³	cubic meters	1.3	cubic yards	yd ³	
TEMPERATURE					
Symbol	When You Know	Multiply by	Add	To Find	Symbol
C	Celsius	1.8	32	Fahrenheit	F

Figure 1-1. Metric conversion chart.

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CHAPTER 3

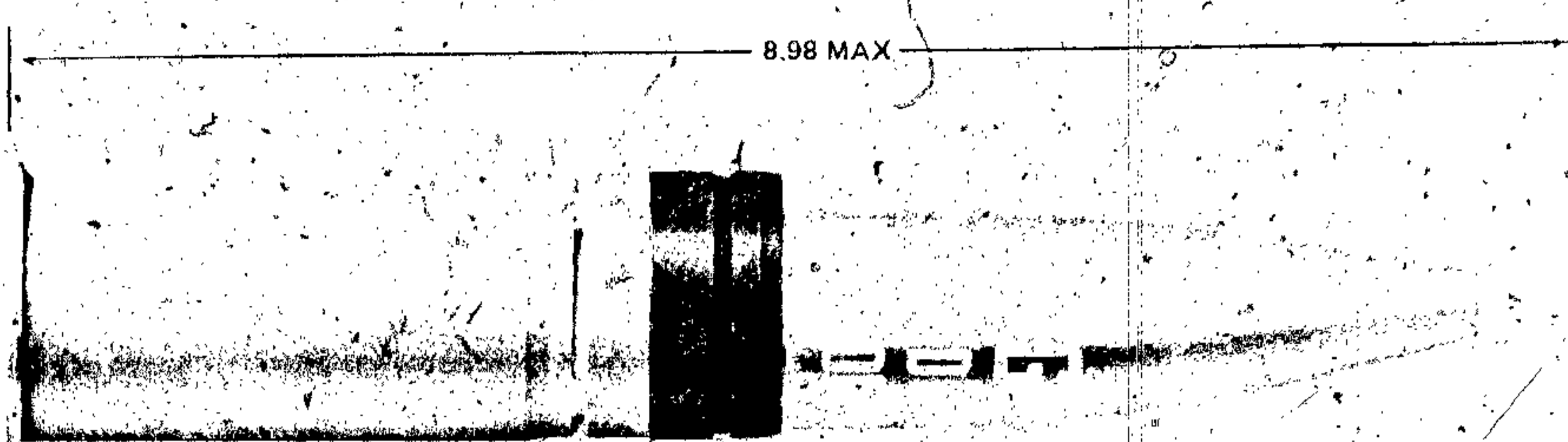
ARTILLERY AMMUNITION

FOR

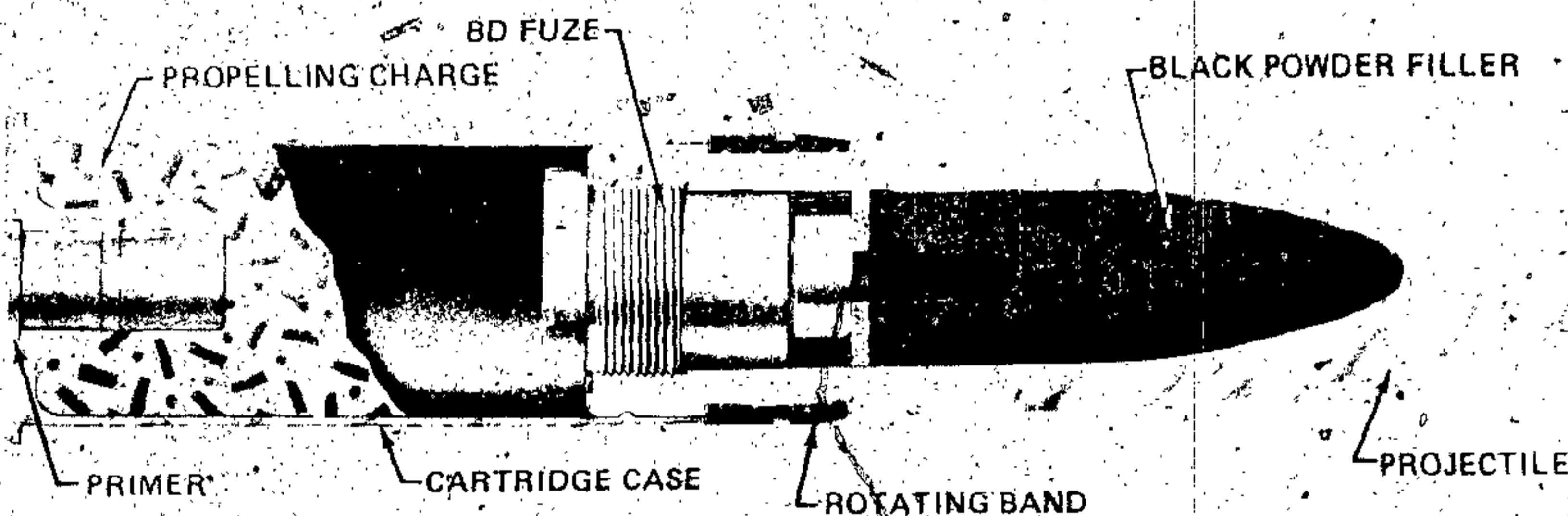
GUNS

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CARTRIDGE, 37 MILLIMETER: TP, M63, MOD 1.



AR199879



AR199878

Type Classification:

Std OTCM 37119 dtd 1959

Use:

This target practice cartridge is used in subcaliber 37-mm guns fitted to larger weapons for practice firing and training.

Description:

The cartridge consists of a black powder filled steel projectile crimped to a steel cartridge case and fitted with a base-detonating practice fuze. A rotating band encircles the projectile near the base. The cartridge case is loosely filled with propellant and is fitted with a percussion primer.

Functioning:

When the weapon is fired, the firing pin strikes the primer to ignite the propelling charge. The rotating band engages the barrel rifling to impart spin to the projectile and prevent escape of pressure past the projectile. Rapidly expanding gases from the burning propellant drive the projectile through the barrel with the velocity required to reach the target. On impact the base detonating fuze ignites the black powder filler in the projectile, simulating the detonation of a service projectile.

Tabulated Data:

Complete round:

Type ----- TP

Weight ----- 2.01 lbs.
 Length ----- 8.98 in.
 Cannon used with ----- M12, M13, M14, M15, M1916
 Projectile:
 Body material ----- Steel
 Color ----- Blue w/white markings (and brown band for later manufacture)
 Filler and weight ----- Black powder, 0.084 lb.
 Fuze ----- M58
 Propelling charge:
 Cartridge case ----- MK1A2, MK1A2B1
 Propellant ----- M2, 0.56 lb.
 Primer ----- M23A2 percussion
 Performance:
 Maximum range ----- 4459 meters (4980 yds.)
 Muzzle velocity ----- 328 mps (1100 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 4hrs/day)
 *Packing ----- 1 round per fiber container, 20 containers per wooden box

*Packing Box:
 Weight ----- 60.5 lbs.
 Dimensions ----- 23-11/16 x 11-7/16 x 6-19/32 in.
 Cube ----- 1.0 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

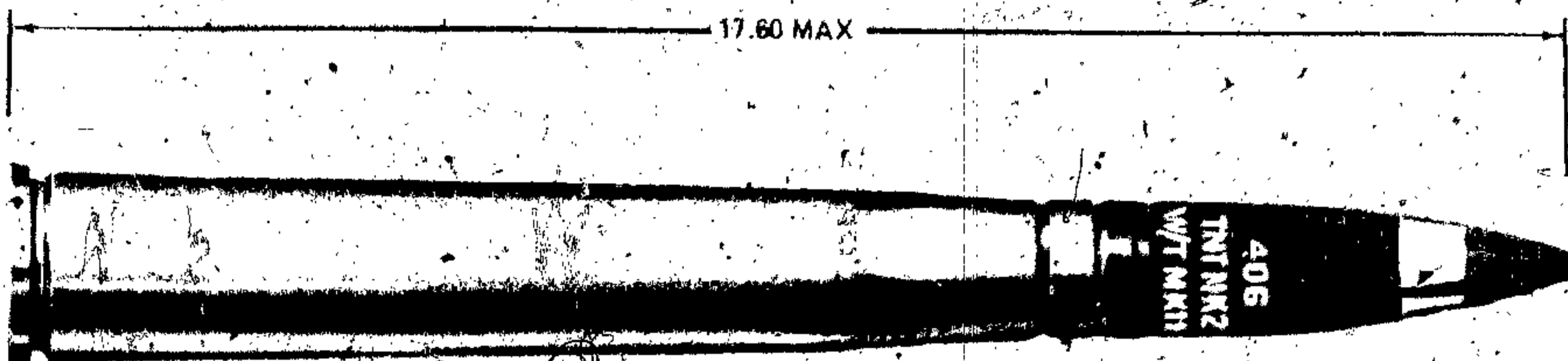
Shipping and Storage Data:

Quantity-distance class ----- 4
 Storage compatibility group ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
 DODAC ----- 1310-B526
 Drawing number ----- 8831141

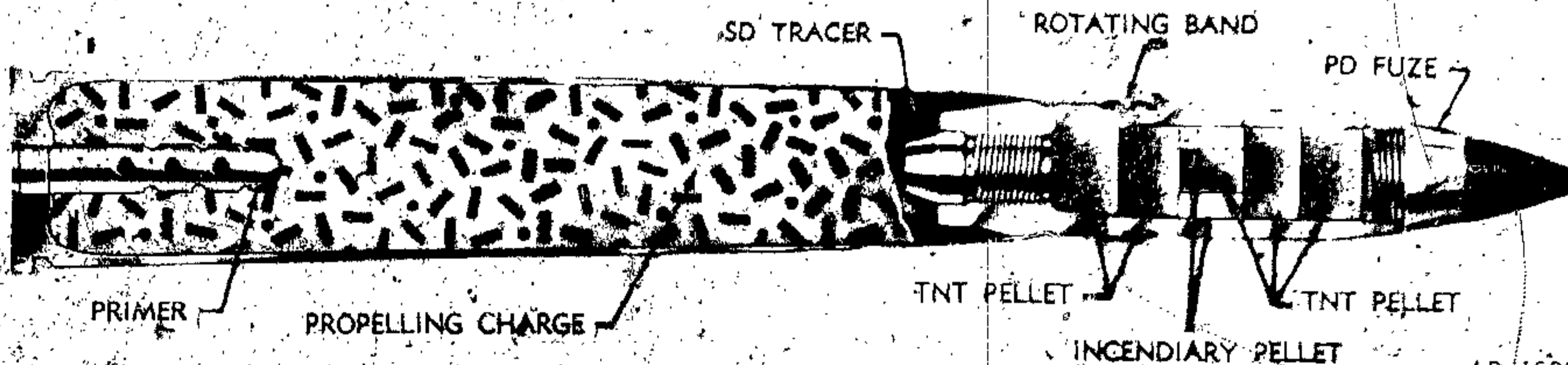
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1300-251-20

CARTRIDGE, 40-MILLIMETER: HEI-T, SD, MK11, MK2, MV2890



AR199875



AR 199874

Type Classification:

Std OTCM-37119 dtd 1959.
(MK2 only, CON MSR 11756003)

Use:

This fixed ammunition is used in 40-mm gun cannons for firing against materiel.

Description:

The relatively thin-walled projectile contains a burster charge, an incendiary charge, a point-detonating (PD) fuze, and a shell-destroying (SD) tracer. The projectile nose is threaded to receive the fuze. The shell-destroying tracer assembly is contained in the boat-tailed base of projectile, which is internally threaded, and extends approximately 0.80-inch beyond the base. The shell-destroying tracer consists of an igniting charge, a red tracer composition, and a relay igniting charge. The cartridge case, either brass or steel, is crimped rigidly to the projectile by means of a 360° crimp. The base of the cartridge case contains a percussion primer consisting of a perforated tube containing black powder and a percussion element.

Functioning:

When the firing pin of the weapon strikes the percussion primer, the black powder in the primer tube is ignited. Sparks from the black powder ignite the propellant charge to impart velocity to the projectile and to ignite the tracer. The high explosive bursting charge is detonated either by the fuze upon contact with the target, or by the tracer relay igniting charge. The tracer composition burns with a visible trace for 8 to 10 seconds.

Difference Among Models:

Cartridges manufactured by the Navy may be distinguished by the painting on the fuzes: the fuze for the Navy HEI-T cartridge is painted red and white (red tip on fuze.)

Tabulated Data:

Complete round:	
Type -----	HEI-T
Weight -----	4.75 lbs.
Length -----	17.60 in.

Cannon used with ----- M1 series, M2 series, MK1 (Navy)

Projectile:
 Body material ----- Steel
 Color:
 Army mfg ----- Olive drab w/yellow marking
 Navy mfg ----- Green w/black band

Filler and weight ----- TNT -0.14 lb.
 Tracer incendiary charge-36 gr.

Components:
 Cartridge case ----- MK2, MK2 Mod, or MK3
 Tracer ----- MK11, MK11 Mods
 Tracer charge ----- Igniting charge, a red tracer composition, and a relay igniting charge of black powder

Fuze ----- PD, MK27
 Propelling charge -- M1 propellant, 0.72 lb
 Primer ----- MK22, M38A1, M38B2
 Burst charge ----- TNT powder and incendiary charge

Performance:
 Maximum range ----- 3932 m (4300 yds)
 Muzzle velocity ----- 879 mps (2890 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 hrs/day)

* Packing (Navy) ----- 4 cartridges in charger clip; 4 charger clips in metal box.

* Packing Box:
 Weight ----- 110 lbs.
 Dimensions ----- 22 x 11.75 x 11.75 in.
 Cube ----- 1.7 cu. ft.

* Packing (Army) ----- 1 cartridge in fiber container; 8 containers in wooden box

* Packing Box:
 Weight ----- 59 lbs.
 Dimensions ----- 21-11/16 x 7-31/32 x 12-9/16 in.
 Cube ----- 1.3 cu. ft.

* NOTE: See SC for complete packing data including NSN's

Shipping and Storage Data:

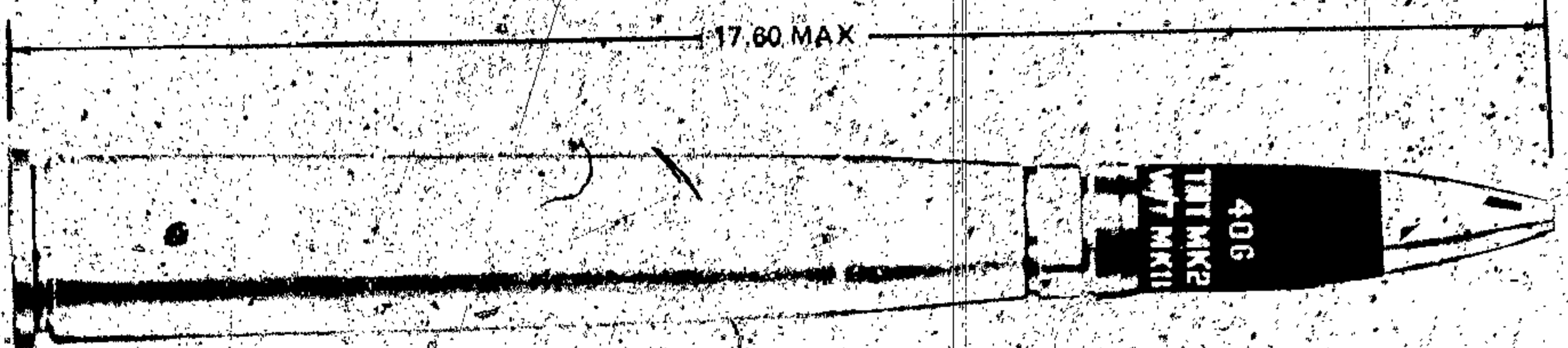
Quantity-distance class ----- 4
 Storage compatibility group ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES

DODAC ----- 1310-B559
 Drawing number ----- 75-1-166

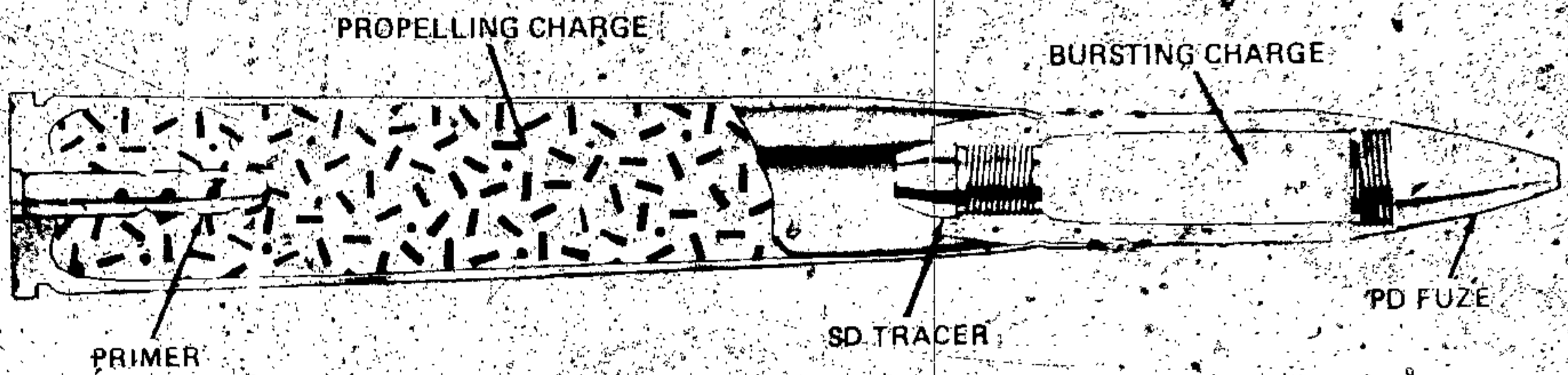
References:

DARCOM P 700-3-3
 SB 700-20
 SC 1305/30-11
 TM 9-1300-251-20
 TM 9-2350-202-12
 TM 9-7218

CARTRIDGE, 40-MILLIMETER: HE-T, SD, MK11, MK2, MV2870 and SD, M3 or M3A1, MV2700



AR199877



AR199878

Type Classification:

Std OTCM 36841 dtd 1958.
(MK2 only, CON MSR 11756003)

Use:

These cartridges are used in 40-mm gun cannons for firing against materiel.

Description:

The thin walled projectile contains a TNT bursting charge, a point-detonating (PD) fuze, and a shell-destroying (SD) tracer. The projectile nose is internally threaded to receive the fuze. The boat tailed base has a shell-destroying tracer assembly threaded internally. The assembly, protruding approximately 0.60-inch from the base, contains an

igniting charge, tracer composition, and a relay igniting charge of black powder. The projectile is assembled with either a brass or steel cartridge case containing a percussion primer that is crimped to projectile by means of a 360° crimp. This cartridge provides a muzzle velocity of 2870-fps.

Functioning:

When the percussion primer is struck by the firing pin of the weapon, the black powder in the primer tube is ignited. Sparks from the black powder ignite the propellant, which in turn, imparts velocity to the projectile and ignites the tracer. The high explosive bursting charge is detonated by either the fuze functioning or the tracer relay igniting charge, depending upon whether contact with a target or

the burning out of the tracer occurs first. The tracer composition burns with a visible trace for 8 to 10 seconds.

Differences Among Models:

The MV2,700 cartridge is similar except the tracer is M3 or M3A1 and the projectile is loaded with tetryl.

Tabulated Data:

Complete round:

Type ----- HE-T, SD
 Weight ----- 4.75 lbs.
 Length ----- 17.60 in.
 Cannon used with ----- M1 series, M2 series or MK1 (Navy)

Projectile:

Body material ----- Steel
 Color
 Army mfg ----- Olive drab w/yellow markings
 Navy mfg ----- Green w/white markings and green tip fuze

Filler and weight ----- TNT or Tetryl-0.14 lb.

Components:

Cartridge case ----- M25, M25B1
 Propelling charge ----- M1 propellant-0.72 lb.
 Primer ----- M38, M38B2 or MK22
 Tracer ----- MK11, MK11 Mod 2, M3, M3A1-Red
 Bursting charge ----- Pressed TNT
 Fuze ----- PD-MK27 (M3 or M3A1) M27, M71 (MK11, MK11 Mod 2)

Performance:

Maximum range ----- SD, MK2 (2870 fps): 4300 yds. (tracer burnout)
 SD, MK2 (2700 fps): 5700 yds. (tracer burnout)

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 hrs/day)

* Packing (Navy) ----- 4 cartridges per charger clip; 4 clips (16 cartridges) per metal box

* Packing Box (Navy):

Weight ----- 110 lbs.
 Dimensions ----- 22 x 11-3/4 x 11-3/4 in.
 Cube ----- 1.70 cu. ft.

* Packing (Army) -----

1 round per fiber container; 8 containers per wooden box

* Packing Box (Army):

Weight ----- 59.0 lbs.
 Dimensions ----- 21-11/15 x 12-9/16 x 7-31/32 in.
 Cube ----- 1.3 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 4
 Storage compatibility ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
 DODAC ----- 1310-B562
 Drawing number ----- 75-1-166

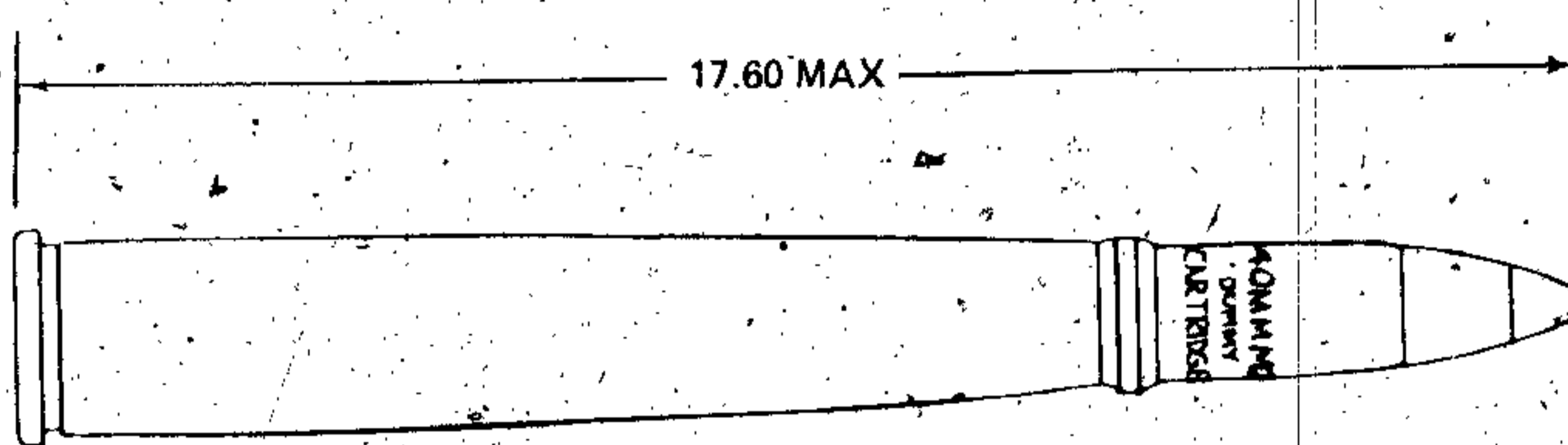
Limitations:

None.

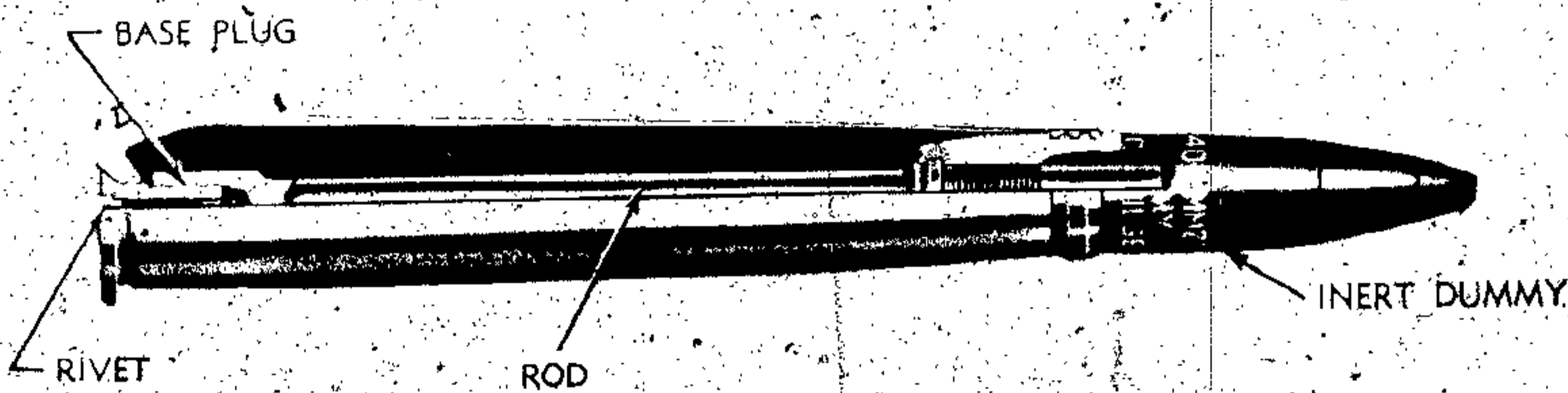
References:

SC 1305/30-IL
 SB 700-20
 DARCOM P 700-3-3
 TM 9-1300-251-20
 TM 9-2350-202-12
 TM 9-7218

CARTRIDGE, 40-MILLIMETER: DUMMY, M25



AR199869



AR 199868

Type Classification:

Std OTCM 36841 dtd 1958.

Use:

This dummy cartridge is used in 40-mm guns to simulate firings and to train personnel in ammunition handling and loading the weapon.

Description:

The cartridge consists of a modified service projectile and a modified cartridge case. The projectile is inert and is fitted with a dummy

nose fuze. The cartridge case has a base plug in place of a primer, and a copper rivet is centered in the base plug to avoid damage to the firing pin of the weapon. The projectile and case are held together by a steel retaining rod extending through the case. One end of the rod is threaded into the tracer cavity in the dummy projectile, and the other end has an internally threaded socket to fit the base plug of the cartridge case.

Functioning:

The dummy cartridge is completely inert and non-functioning.

Tabulated Data:

Complete round:

Type ----- Dummy
 Weight ----- 4.75 lbs.
 Length ----- 17.60 in.
 Cannon used with ----- M1 series, M2 series, MK1 (Navy)

Projectile:

Body material ----- Steel
 Color:
 Old ----- Black w/white markings
 New ----- Bronze w/white markings
 Fuze ----- Dummy, M69 or M69B1

Cartridge case ----- M25B1 modified

* Packing ----- 1 cartridge per fiber container; 8 containers per wooden box

* Packing Box:

Weight ----- 59 lbs.

Dimensions ----- 21-11/16 x 7-31/32 x 12-9/16 in.

Cube ----- 1.3 cu. ft.

* NOTE: See SC for complete packing data including NSN's

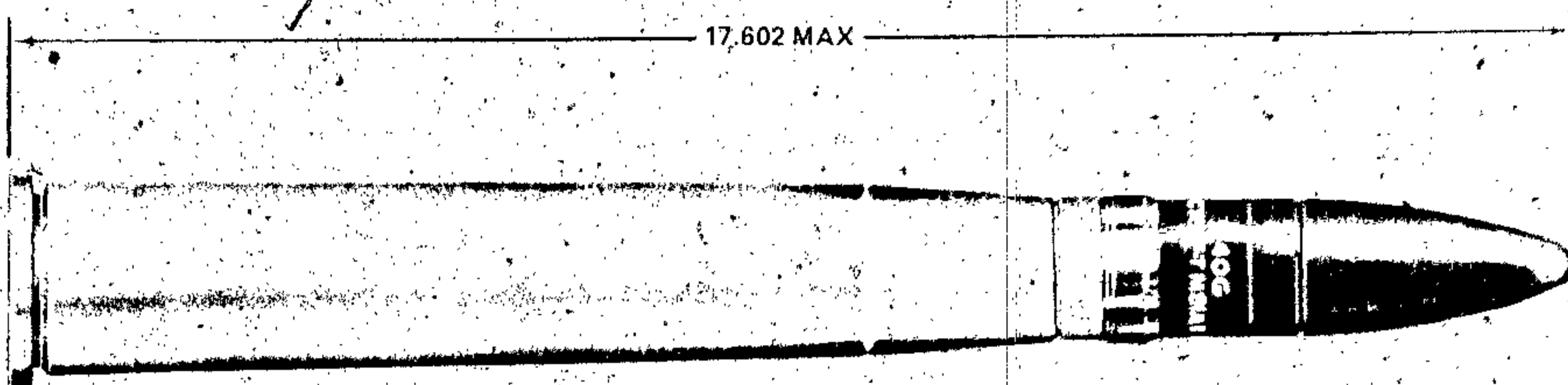
Shipping and Storage Data:

Quantity-distance class ----- N/A
 Storage compatibility group ----- N/A
 DOT shipping class ----- N/A
 DOT designation ----- DRILL CARTRIDGE (INERT)
 DODAC ----- 1310-B565
 Drawing number ----- 72-3-101

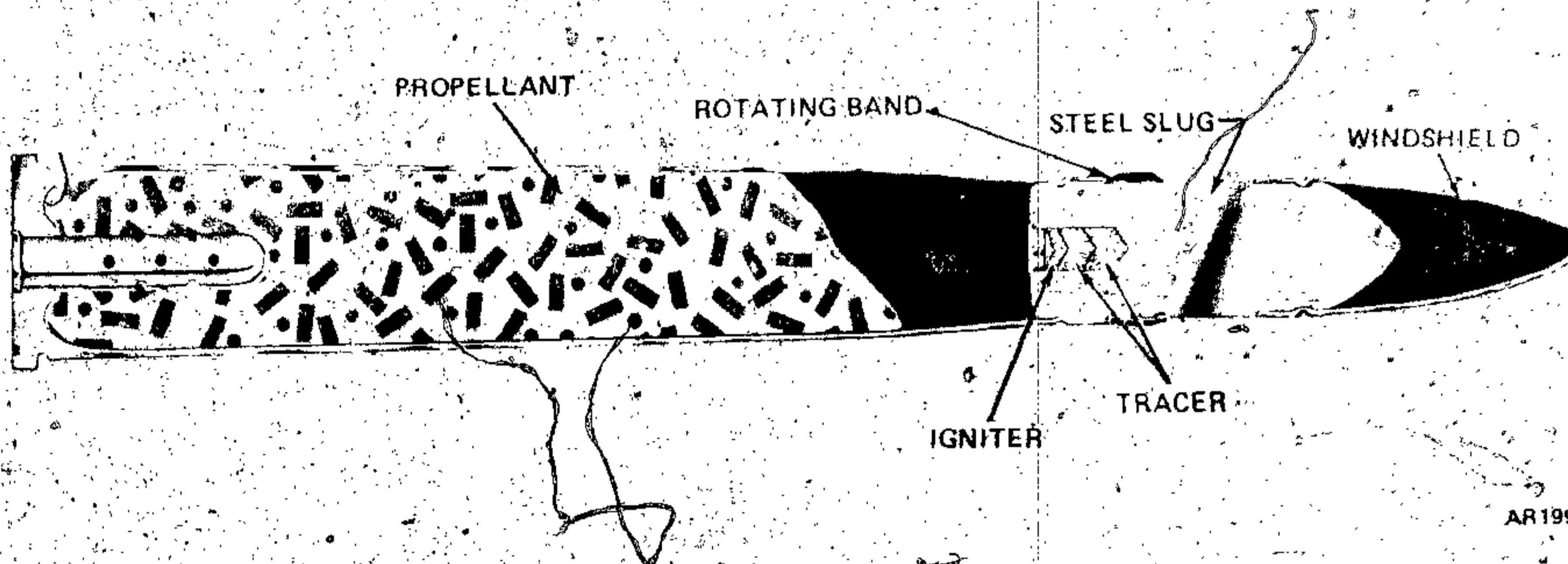
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1300-251-20
 TM 9-2350-202-12
 TM 9-7218

CARTRIDGE, 40-MILLIMETER: AP-T, M81A1 AND M81



AR199873



AR199872

Type Classification:

CONT AMCTC 6418 dtd 1968.

Use:

This fixed ammunition is used in 40-mm gun cannons for firing at armored and other protected targets.

Description:

The projectile for Cartridge M81A1 consists of a hardened steel monobloc slug, crimp-fitted on the blunt ogival nose with a thin steel, streamlined windshield cap to reduce aerodynamic drag. A tracer element in the base of the projectile provides a visible trace for approximately 12 seconds. In addition, some lots of these cartridges are coated on the windshield with a compound designed to leave a vapor trail for about 1000 yards. Such lots are intended

for training only and not for use in combat except for emergency. A rotating band encircles the projectile near the base. A brass or steel cartridge case filled with loose propellant is crimped to the projectile. The case has an extractor rim base, and the base contains a percussion primer consisting of a perforated tube containing black powder and a percussion element.

Functioning:

When the firing pin of the weapon strikes the primer, the black powder in the primer tube is ignited. Sparks flash through the tube perforations to ignite the propelling charge, and the burning propelling charge drives the projectile through the barrel with the velocity required to reach the target. On impact, the thin windshield crumbles, but the hardened steel slug penetrates the armor of the target.

Difference Between Models:

The windshield on Model M81 is attached with an adapter rather than by crimping, and a different model primer is used.

Tabulated Data:

Complete round:

Type ----- AP-T
 Weight ----- 4.58 lbs.
 Length ----- 17.60 in.
 Cannon used with ----- M1 series, M2 series, MK1 (Navy)

Projectile:

Body material ----- Steel
 Color ----- Black w/white markings

Components:

Tracer and weight --- Red, 0.02 lb.

Propelling charge:

Cartridge case ----- M25, M25B1
 Propellant and weight ----- M1 0.65 lb.
 Primer ----- M23A2, M38A1, M38B2 or MK22

Performance:

Maximum range ----- 8779 m. (9600 yds.)
 Muzzle velocity ----- 872 mps (2870 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 hrs/day)

* Packing ----- 1 per fiber container; 8 containers per wooden box

* Packing Box:

Weight ----- 59 lbs.
 Dimensions ----- 21-11/16 x 7-31/32 x 12-9/16
 Cube ----- 1.3 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

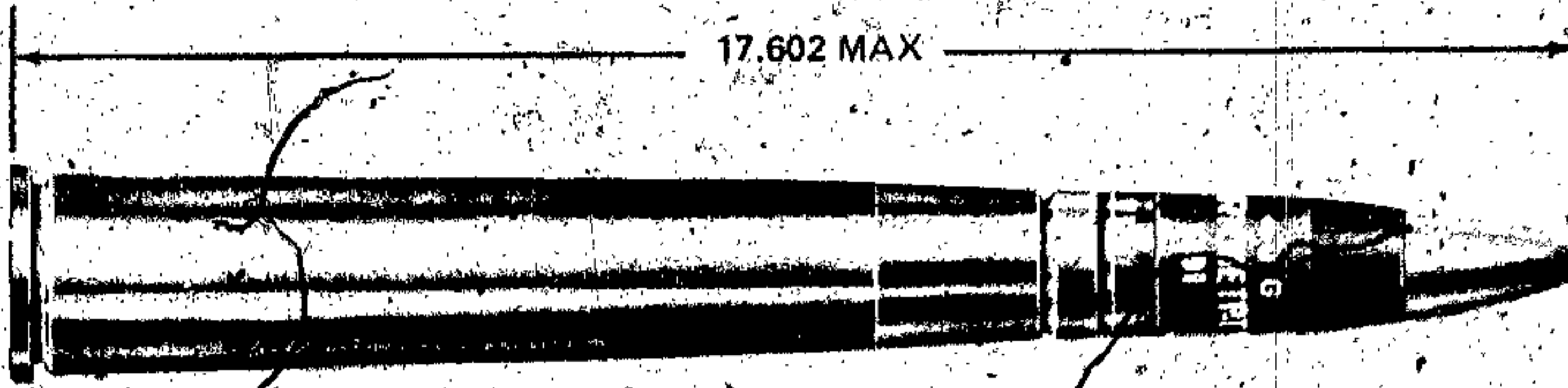
Shipping and Storage Data:

Quantity-distance class ----- 4
 Storage compatibility group ----- E
 DOT shipping class ----- B
 DOT designation ----- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
 DODAC ----- 1310-B552
 Drawing number ----- 75-1-140

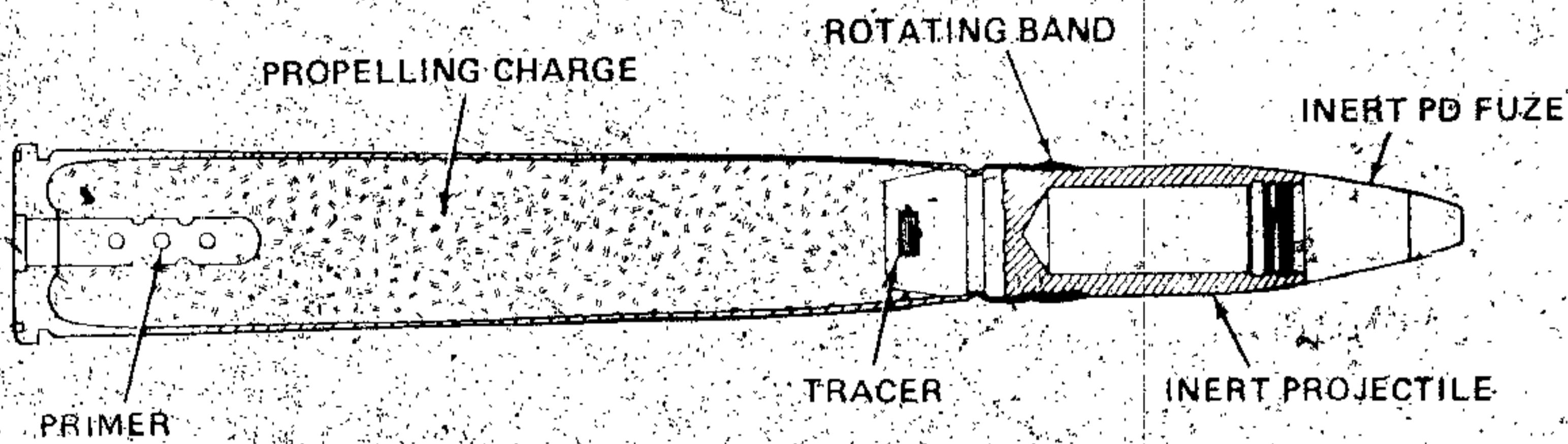
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1300-251-20
 TM 9-2350-202-12
 TM 9-7218

CARTRIDGE, 40-MILLIMETER: TP-T, M91



AR199871



AR199870

Type Classification:

CONT OTCM 37119 dtd 1959.

Use:

This fixed ammunition resembles 40-mm HE-T Cartridge MK2 and is used for target practice in 40-mm gun cannons.

Description:

The projectile, filled with an inert material, simulates the HE service round. The base is fitted with a tracer, and an inert or dummy point-detonating fuze forms the nose. A rotating band encircles the projectile near the base where the projectile is assembled into the cartridge case. The cartridge case is crimped to

the projectile. The cartridge case is filled with loose propellant. The base of the case forms an extractor rim, and contains a percussion primer consisting of a perforated tube containing black powder and a percussion element.

Functioning:

When the firing pin of the weapon strikes the percussion primer, the black powder in the primer tube is ignited. Sparks from the black powder ignite the propellant, and the burning propellant generates rapidly expanding gases to propel the projectile through the barrel to the velocity required to reach the target. The tracer composition burns for approximately 12 seconds, providing visibility of the trajectory. The inert projectile does not detonate on impact.

Tabulated Data:

Complete round:
 Type ----- TP-T
 Weight ----- 4.72 lbs.
 Length ----- 17.60 in.
 Cannon used with ----- M1 series, M2 series, MK1 (Navy)
 Projectile:
 Body material ----- Steel
 Color:
 Old ----- Blue or black w/white markings
 New ----- Blue w/brown band and white markings
 Filler ----- Inert material
 Components:
 Tracer (and weight) ----- Red, 0.02 lb.
 Fuzes ----- Dummy, M69 or M69B1, Inert, M71 or MK27
 Propelling charge:
 Cartridge case ----- M25, M25B1
 Propellant and weight ----- M1, 0.72 lb.
 Primer ----- M38A1, M38B2, MK22
 Performance:
 Maximum range ----- 10,058 m. (11,000 yds.)
 Muzzle velocity ----- 872 mps (2870 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 hrs/day)

* Packing (Navy): ----- 4 cartridges per charger clip; 4 clips in metal box

* Packing Box (Navy):
 Weight ----- 111 lbs.
 Dimensions ----- 22 x 11.75 x 11.75 in.
 Cube ----- 1.70 cu. ft.

* Packing (Army): ----- 1 round per fiber container, 2 containers per wooden box

* Packing Box (Army):
 Weight ----- 59.0 lbs
 Dimensions ----- 21-11/16 x 7-31/32 x 12-9/16 in.
 Cube ----- 1.3 cu ft

* NOTE: See SC for complete packing data including NSN's.

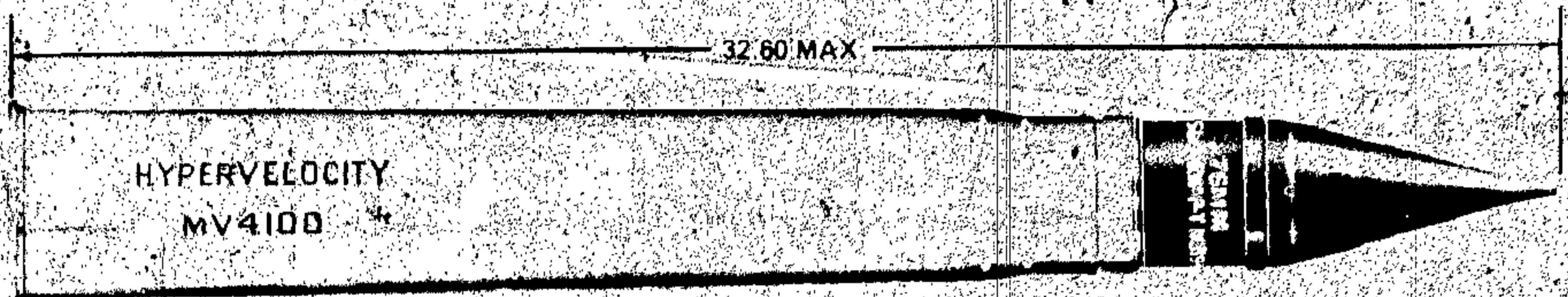
Shipping and Storage Data

Quantity-distance class ----- 4
 Storage compatibility group ----- E
 DOT shipping class ----- B
 DOT designation ----- AMMUNITION FOR CANNON WITH EMPTY PROJECTILES
 DODAC ----- 1310-B564
 Drawing number ----- 75-1-173

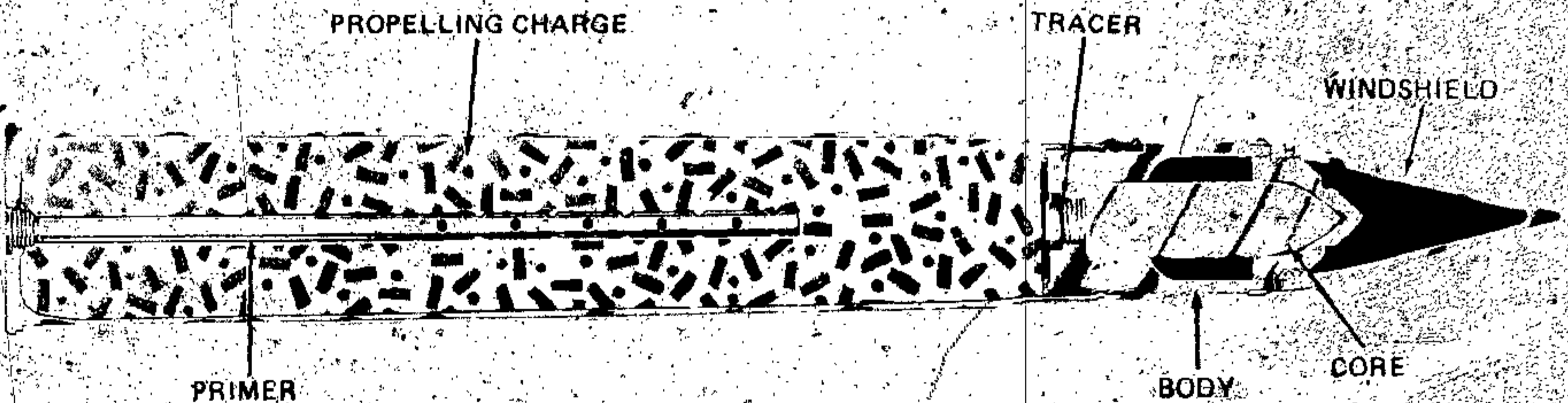
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1300-251-20
 TM 9-2350-202-12
 TM 9-7218

CARTRIDGE, 76-MILLIMETER, HVAP-T, M319



AR199853



AR199852

Type Classification:

C & T AMCTC 6267 dtd 1968.

Use:

This fixed ammunition is a high velocity cartridge intended for use in 76-mm gun cannons against armor.

Description:

The projectile consists of a core of tungsten carbide housed in an aluminum body fitted with an aluminum windshield and contains a tracer assembly in the base. The brass or steel cartridge case contains a single-base propellant and a percussion primer, and is crimped to the projectile. A distinguishing characteristic of these rounds is the cartridge case-over-band construction. The specially designed rotating

band has a crimping groove which permits the cartridge case to be assembled over the rotating band and rigidly crimped to it.

Functioning:

When the weapon is fired, the flash from the primer ignites the propellant. The burning propellant ignites the tracer and creates gases which propel the projectile from the gun barrel. The tracer provides a luminous trace during the early stages of flight. On impact, the windshield breaks up and the tungsten carbide core penetrates the target by kinetic energy.

Tabulated Data:

Complete round:

Type ----- HVAP-T
 Weight ----- 19.04 lbs.
 Length ----- 32.60 in.

Cannon used with ---- M32, M48
 Projectile:
 Body material ---- Aluminum alloy
 Core ---- Tungsten carbide
 Color ---- Black w/white marking

Components:
 Cartridge case ---- M88B1, M88
 Propelling charge ---- M6, 5.03 lbs.
 Primer ---- M62, M58 percussion
 Tracer ---- M5A1B1 or M5A1

Performance:
 Maximum range ---- 9,885 meters (11,038 yds.)
 Muzzle velocity ---- 1234 mps (4,135 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 hrs/day)

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

* Packing Box:

Weight ---- 66.75 lbs.
 Dimensions ---- 37-3/16 x 11-1/6 x 7-5/32 in.
 Cube ---- 1.7 cu. ft.

*NOTE: See SC for complete packing data including NEN's.

Shipping and Storage Data:

Quantity-distance class ---- 4
 Storage compatibility ---- E
 DOT shipping class ---- B
 DOT description ---- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
 DODAC ---- 1315-C124
 Drawing number ---- 75-1-295

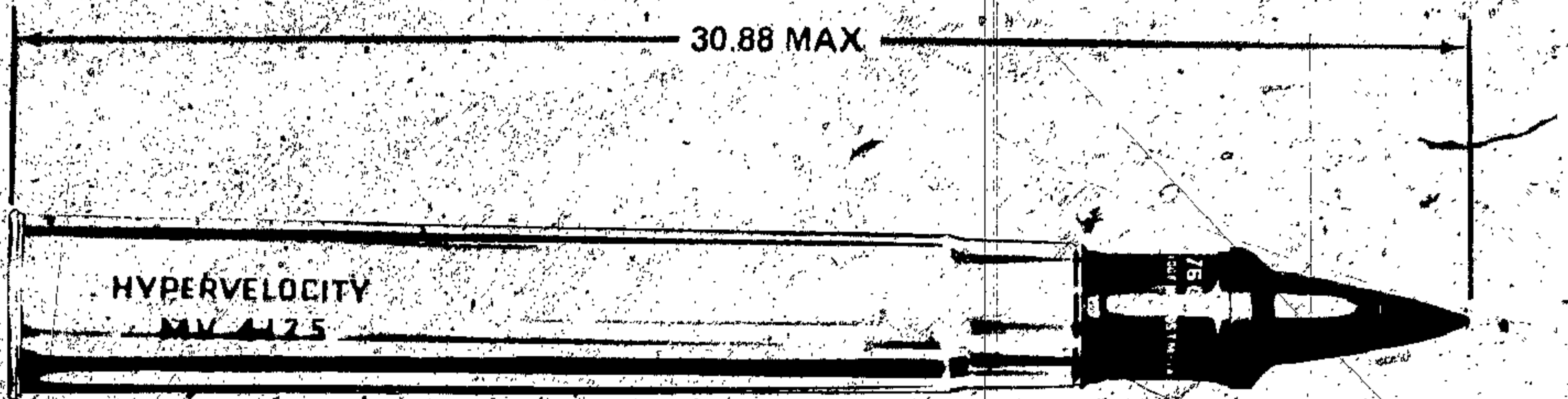
Limitations:

None

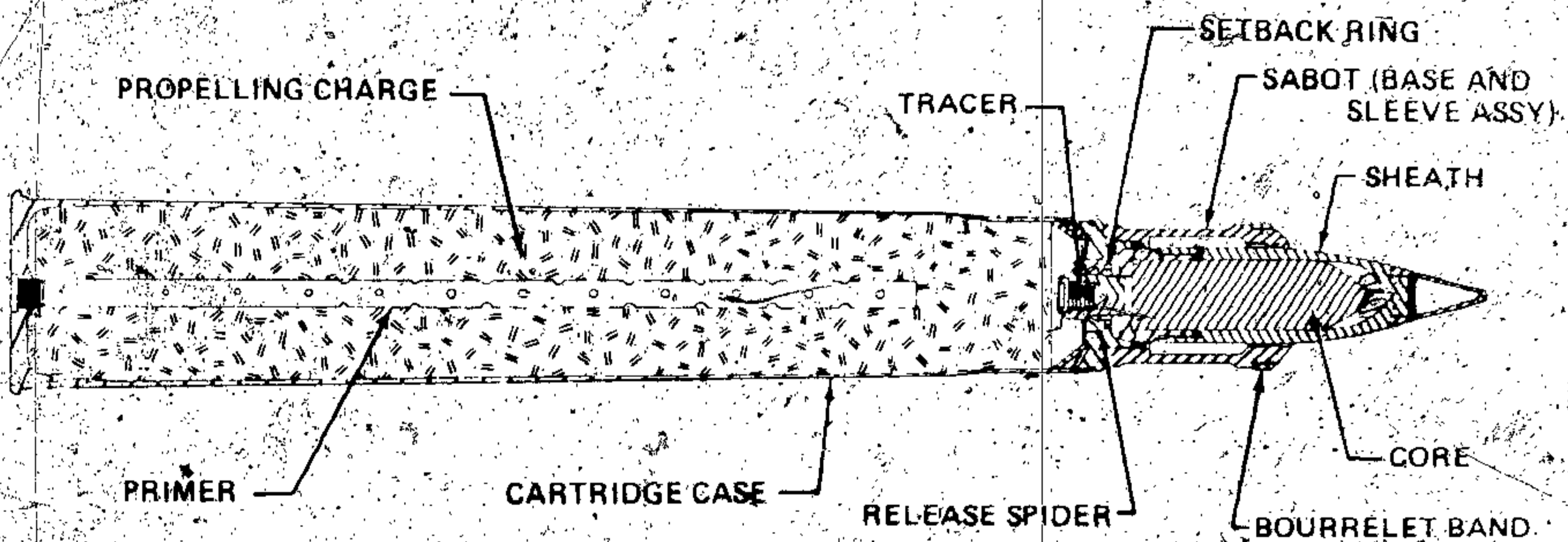
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1300-251-20
 TM 9-7017-5
 TM 9-7017-6

CARTRIDGE, 76-MILLIMETER: HVAP-DS-T, M331A1 and M331A2



AR199855



AR199854

Type Classification:

OBS MSR 11756003

Use:

This fixed ammunition is intended for use in 76-mm gun cannons against armor.

Description:

The projectile consists of a dense core of tungsten carbide steel covered with a steel sheath, and a base and sleeve assembly called a sabot. The core is held in place inside the sabot by a sheet steel release spider. The projectile is inert, except for a tracer contained in the base. It is assembled to a steel cartridge

case which is loaded with a triple-base propellant and has a percussion primer. A distinguishing characteristic of these rounds is the cartridge case-over-band construction. The specially designed rotating band has a crimping groove which permits the cartridge case to be assembled over the rotating band and rigidly crimped to it.

Functioning:

When the cartridge is fired, a setback ring moves rearward, opening the release spider. Setback holds the sabot and core together until exit from the gun, at which time, centrifugal force separates the sabot from the core. The tracer, ignited by the propellant, provides a visible trace during the first few seconds of

flight. On impact, the projectile sheath crumples and the tungsten carbide core penetrates the target.

Difference Between Models:

See Tabulated Data for difference in cartridge cases and tracer assemblies.

Tabulated Data:

Complete round:

Type ----- HVAP-DS-T
 Weight ----- 20.7 lbs.
 Length ----- 30.88 in.
 Cannon used with ---- M32, M48

Projectile:

Body material ----- Tungsten-carbide steel and aluminum
 Color ----- Black w/white marking

Components:

Cartridge case ----- M331A2: M88B1
 M331A1: M88
 Propelling charge ----- M17, 5.57 lbs.
 Primer ----- M58 percussion
 Tracer ----- M5 (M331A1),
 M5A3 (M331A2)

Performance:

Maximum range ----- 21,607 meters
 (24,127 yds.)
 Muzzle velocity ----- 1231 mps
 (4,125 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 hrs/day)

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

* Packing Box:
 Weight ----- 71.0 lbs.
 Dimensions ----- 36-3/4 x 11-1/16 x 7-5/32 in.
 Cube ----- 1.68 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 4
 Storage compatibility ----- E
 DOT shipping class ----- B
 DOT designation ----- AMMUNITION FOR CANNON WITH SOLID PROJECTILES.
 DODAC ----- 1315-C125
 Drawing number ----- 75-1-308

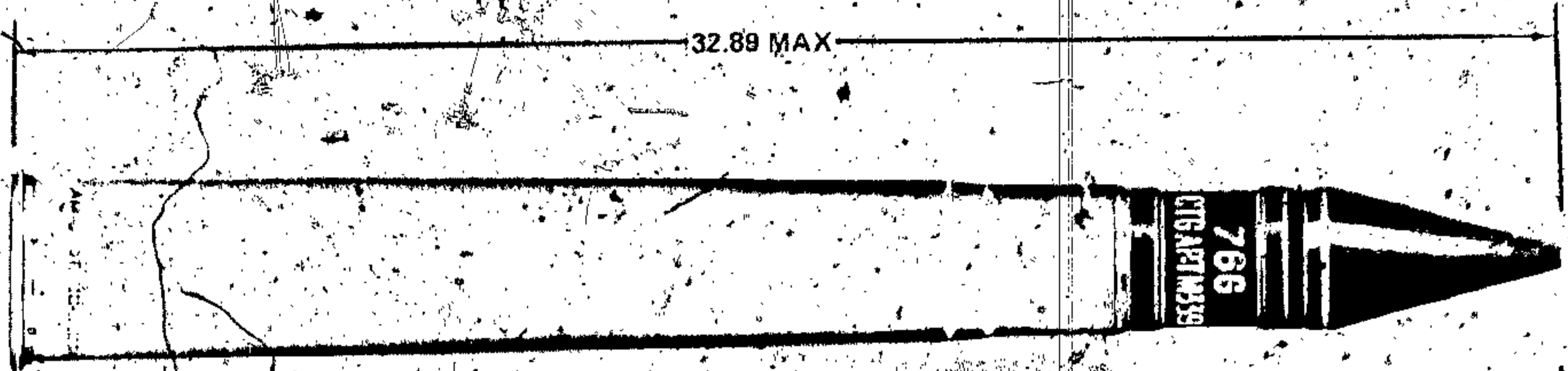
Limitations:

The danger area from the discarded sabot extends downrange approximately 750 meters along the path of trajectory and spreads out to 45 meters on either side of the trajectory, at that range.

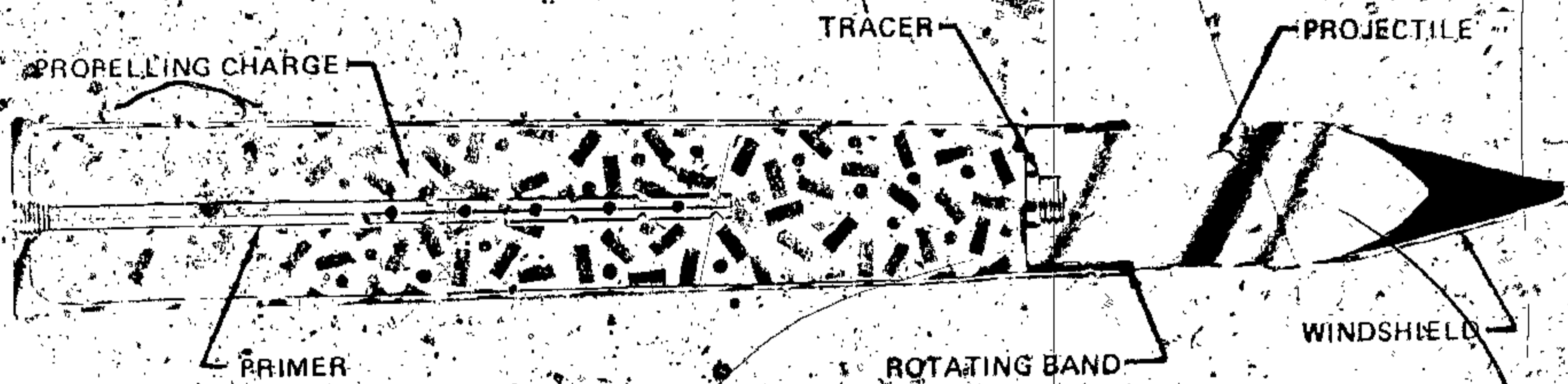
References:

SC 1305/30-IL
 SB 700-20
 DARCOM F 700-3-3
 TM 9-1300-251-20
 TM 9-7017-5
 TM 9-7017-6

CARTRIDGE 76-MILLIMETER: AP-T, M339



AR199863



AR199862

Type Classification:

OBS: MSR 11756003

Use:

This fixed cartridge is designed for use in 76-mm 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 band 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. On impact, the windshield breaks up and the tungsten carbide shot penetrates the armored target.

Tabulated Data:

Complete round:

Type ----- AP-T
 Weight ----- 27.32 lbs.
 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, 5.60 lbs.
 Primer ----- M58 percussion (400 grains black powder)
 Tracer ----- M13

*Performance:

Maximum range ----- 14,704 meters (16,419 yds.)
 Muzzle velocity ----- 954 mps (3,200 fps)

Temperature Range:

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 hrs/day)

*Packing

----- 1 round per fiber container, 2 containers per wooden box

*Packing Box:

Weight ----- 88.0 lbs.
 Dimensions ----- 38-5/8 x 11-1/6 x 7-5/32 in.
 Cube ----- 1.8 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 4
 Storage compatibility ----- E
 DGT shipping class ----- AH
 DOT designation ----- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
 DODAC ----- 1315-C120
 Drawing number ----- 8886612

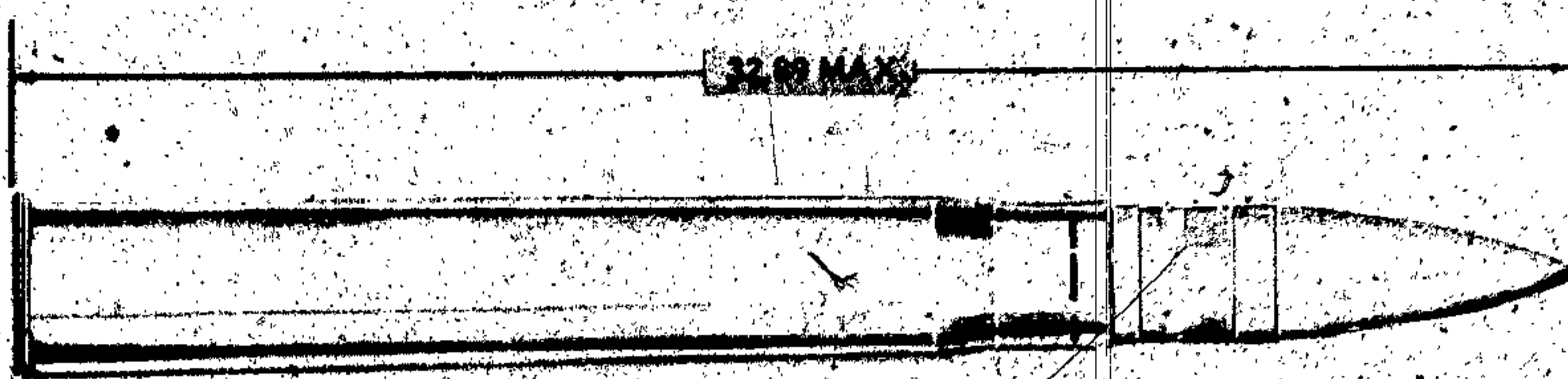
Limitations:

None

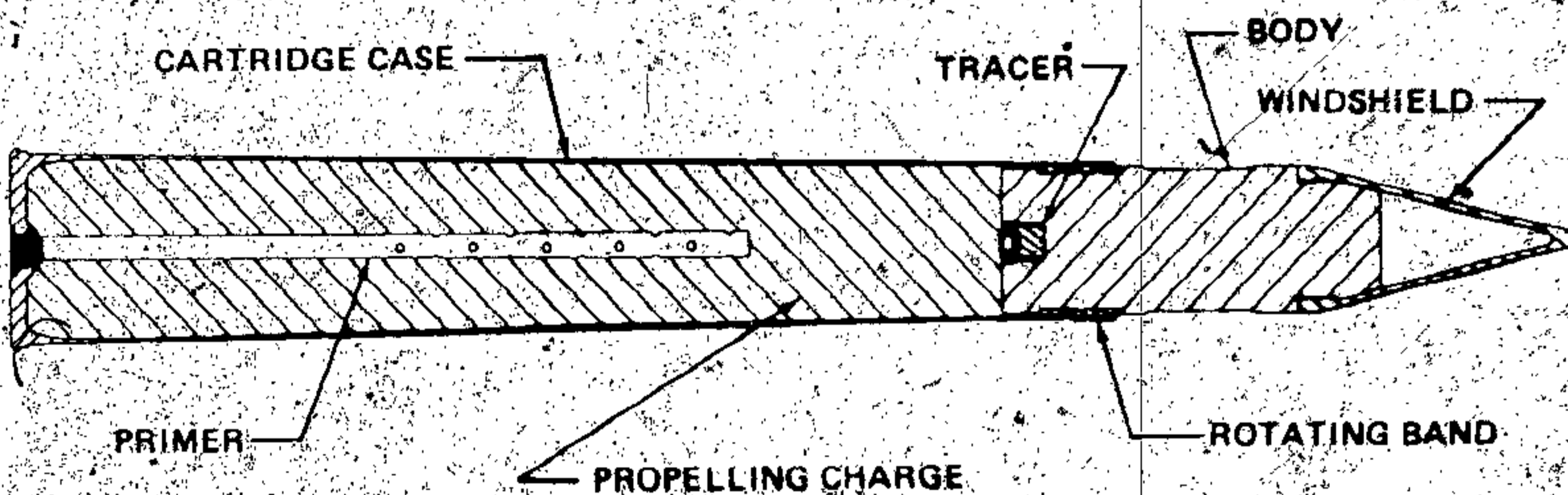
References:

SC 1305/30-IL
 SB 700-20
 DARCOM P 700-3-3
 TM 9-1300-251-20
 TM 9-7017-5
 TM 9-7017-6

CARTRIDGE, 76-MILLIMETER: TP-T, M340A1 and M340



AR19857



AR19856

Type Classification:

OBS MSR 11756003

Use:

Cartridge 76-MM TP-T, M340A1 and M340 is intended for target practice.

Description:

The projectile consists of a steel body with a gilding metal rotating band and an aluminum windshield. A tracer is threaded into the base of the projectile. The brass or steel cartridge case is loaded with a triple base propellant and

fitted with a percussion primer. A distinguishing characteristic of these rounds is the cartridge case-over-band construction. The specially designed rotating band has a crimping groove which permits the cartridge case to be assembled over the rotating band and rigidly crimped to it.

Functioning:

When the weapon is fired the primer flashes, igniting the propellant and tracer. Gases created by the burning propellant force the projectile from the gun barrel. The tracer burns with a visible trace for approximately three seconds of projectile flight. On impact, there is little

penetration of the target because the round lacks armor-piercing capability.

Difference Between Models:

Difference in cartridge cases and tracer assemblies.

Tabulated Data:

Complete round:

Type ----- TP-T
 Weight ----- 27.32 lbs.
 Length ----- 32.89 in.
 Cannon used with ----- M32, M48
 Projectile:
 Body material ----- Steel
 Color:
 Old ----- Blue or Black
 w/white marking
 New ----- Blue w/white
 marking

Components:

Cartridge case ----- M340A1; M88B1
 M340; M88
 Propelling
 charge ----- M30, 5.60 lbs.
 Primer ----- M58, percussion
 Tracer ----- M5A2B1 (M340)
 M13 (M340A1)

Performance:

Maximum range ----- 14,704 meters
 (16,419 yds.)
 Muzzle velocity ----- 955 mps
 (3,200 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 hrs/day)

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

* Packing Box:

Weight ----- 88.0 lbs.
 Dimensions ----- 38-5/8 x 11-1/16
 x 7-5/32 in.
 Cube ----- 1.8 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 4
 Storage
 compatibility ----- E
 DOT shipping class ----- B
 DOT designation ----- AMMUNITION FOR
 CANNON WITH
 SOLID PROJEC-
 TILES
 DODAC ----- 1315-C127
 Drawing number ----- 8857345

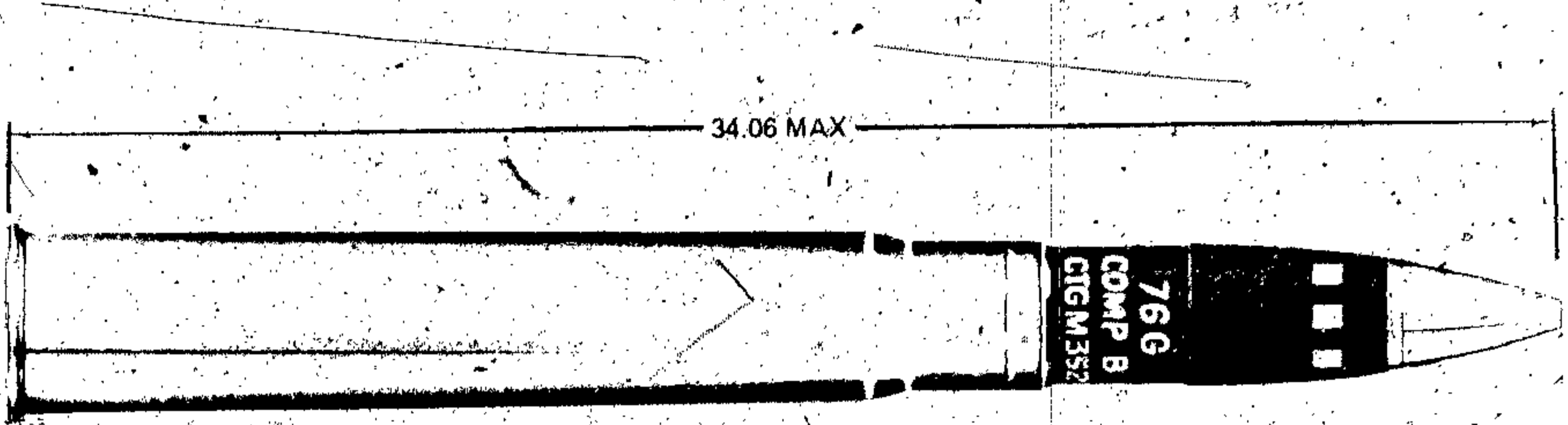
Limitations:

None

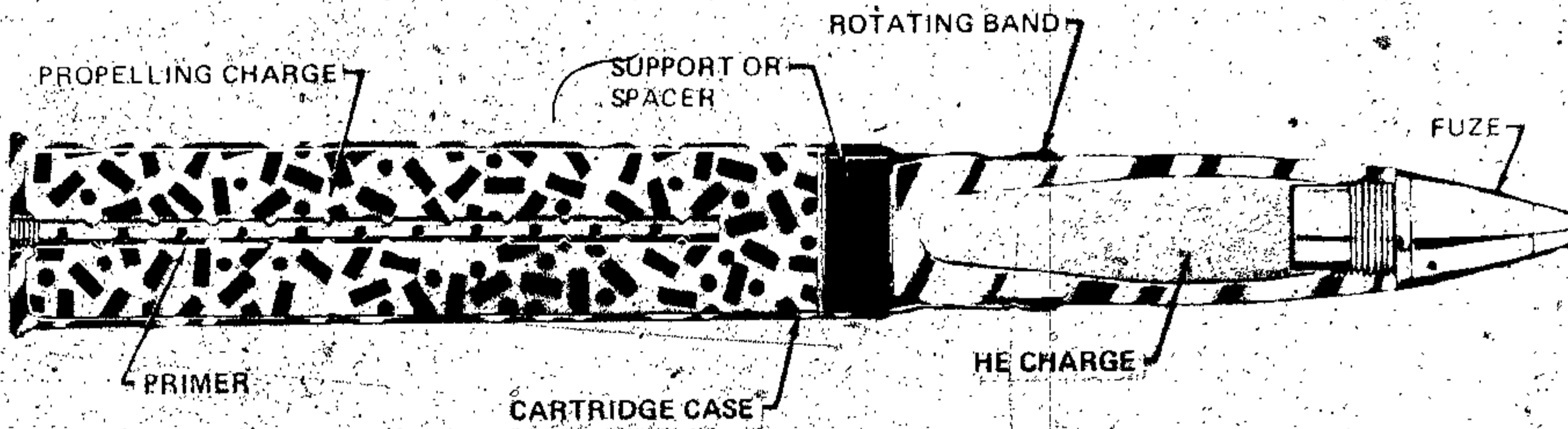
References:

SC 1305/30-IL
 SB 700-20
 DARCOM P 700-3-3
 TM 9-1300-251-20
 TM 9-7017-5
 TM 9-7017-6

CARTRIDGE, 76-MILLIMETER: HE, M352



AR199861



AR199860

Type Classification:

OBS MSR 11756003

Use:

These fixed cartridges are intended for fragmentation, blast or mining effect and are used in 76-mm guns against light materiel and personnel.

Description:

The projectile is a thin walled, forged steel casing with an explosive charge cavity filled with Composition B, extending almost the full length of the body. The projectile is assembled with a nose fuze. A brass or steel cartridge case, containing a single-base propellant and a percussion primer, is crimped to the projectile. A distinguishing characteristic of these rounds is the cartridge case-over-band construction.

The specially designed rotating band has a crimping groove which permits the cartridge case to be assembled over the rotating band and rigidly crimped to it.

Functioning:

When the weapon is fired, a flash from the primer ignites the propellant. Gases created by the burning propellant force the projectile from the gun barrel. On impact, fuze functioning detonates the explosive charge creating blast and fragmentation.

Tabulated Data:

Complete round:

Type	-----	HE
Weight	-----	25.52 lbs.
Length	-----	34.06 in.
Cannon used with	----	M32 or M48

Projectile:

Body material-----Steel
 Color-----Olive drab w/yel-
 low marking
 Filler and weight----Composition B-
 1.46 lbs.

Components:

Cartridge case-----M88B1 (steel)
 M88 (brass)
 Propelling
 charge-----M6, 3.64 lbs.
 Primer-----M58 or M68
 percussion
 Fuze-----PD or MTSQ

Performance:

Maximum range-----14,338 meters
 (16,010 yds.)
 Muzzle velocity-----716 mps
 (2,400 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 hrs/day)

***Packing:**

1 round per fiber
 container, 2 con-
 tainers per wooden
 box

***Packing Box:**

Weight-----86.0 lbs.
 Dimensions-----39-15/16 x 10-15/16
 x 7-3/32 in.
 Cube-----1.8 cu. ft.

*NOTE: See SC for complete packing data
 including NSN

Shipping and Storage Data:

Quantity-distance
 class-----4
 Storage
 compatibility-----E
 DOT shipping class-----A
 DOT designation-----AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES
 DODAC-----1315-C122
 Drawing number-----75-1-293

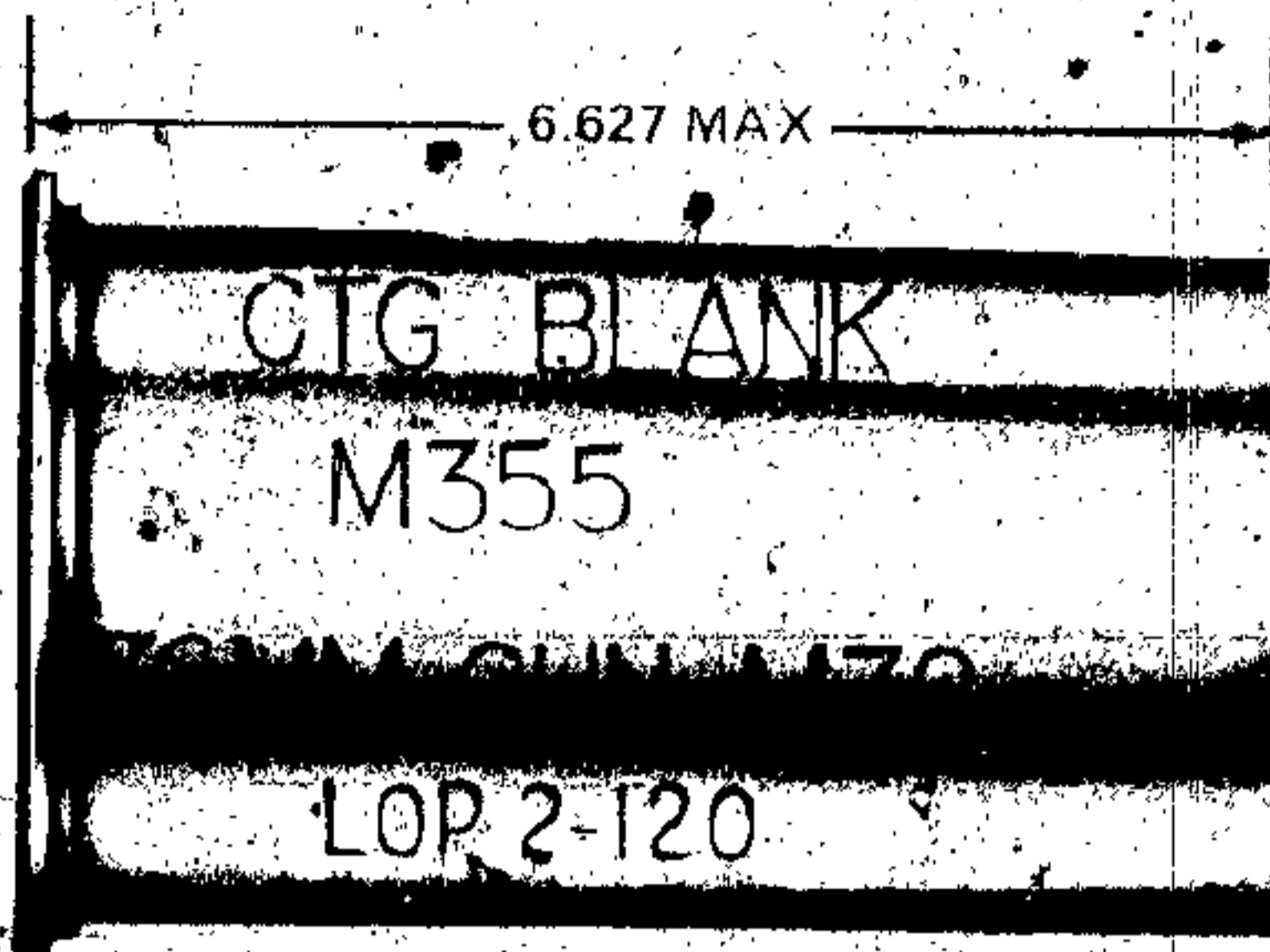
Limitations:

None

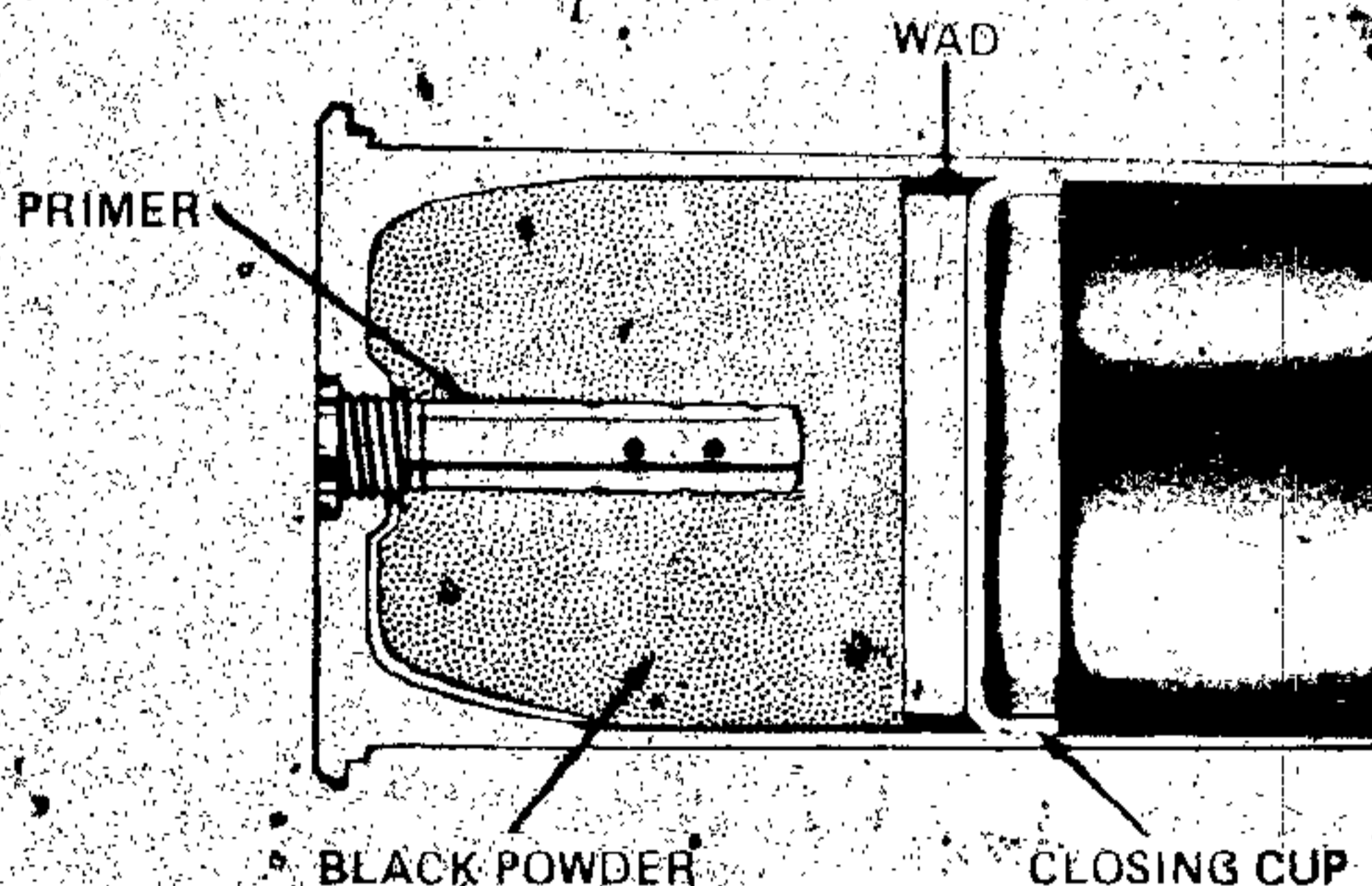
References:

SC 1305/30-IL
 SB 700-20
 DARCOM A 700-3-3
 TM 9-1300-251-20
 TM 9-7017-5
 TM 9-7017-8

CARTRIDGE, 76-MILLIMETER: BLANK, M355A2



AR199849



AR199848

Type Classification:

OBS MSR 11756003

Use:

This cartridge is used for salutes and simulated fire in 76-mm guns.

Description:

The cartridge contains a charge of sodium nitrate black powder, assembled loose in a primed brass or steel cartridge case. Slightly recessed in the mouth of the cartridge case is a plastic closing cup, which retains the loose charge. Earlier models of this cartridge contain a bagged charge of potassium nitrate black powder.

Functioning:

When the primer is initiated by the firing pin of the weapon, the black powder charge is ignited producing a flash, smoke and loud report.

Tabulated Data:

Complete round:

Type ----- Blank
 Weight ----- 4.33 lbs.
 Length ----- 6.627 in.
 Cannon used with ---- M32, M48

Components:

Body material ----- Brass or steel
 Color ----- Blue or black w/white marking

Filler and weight ----- BP, 1.0 lb.
 Cartridge case ----- M101 (brass)
 M101B1 (steel)
 Primer ----- M70 percussion

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 hrs/day)

* Packing ----- 1 round per fiber
 container; 8 con-
 tainers per wooden
 box

* Packing Box:
 Weight ----- 58.0 lbs.
 Dimensions ----- 22-1/4 x 11-1/8
 x 10 in.
 Cube ----- 1.43 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 4
 Storage
 compatibility ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITHOUT
 PROJECTILES
 DODAC ----- 1315-C131
 Drawing number ----- 7549267

References:

SC 1305/30-IL
 SB 700-20
 DARCOM P 700-3-3
 TM 9-1300-251-20
 TM 9-7017-5
 TM 9-7017-6

Difference Between Models:

Cartridge M361 is similar to Cartridge M361A1 except that the burster is contained in a two-piece steel casing and the adapter is a separate component. Also Model M361A1 includes a tracer assembly in the base of the projectile. See Tabulated Data for cartridge case and fuze differences.

Tabulated Data:

Complete round:

Type ----- Smoke WP
 Weight ----- 25.82 lbs.
 Length ----- 34.06 in.
 Cannon used with ----- M32, M48

Projectile:

Body material ----- Forged steel
 Color
 Old ----- Gray w/yellow band and yellow marking
 New ----- Light green w/yellow band and red marking
 Filler and weight ----- WP - 1.38 lbs.
 Burster ----- M28 - 1.2 oz. tetrytol
 Burster initiator ----- M2

Component:

Cartridge case ----- M361A1; M88B1
 M361; M88
 Propelling charge ----- M6, 3.64 lbs.
 Primer ----- M68, M58 percussion
 Fuze ----- PD: M521
 (M361A1)
 M48A3
 (M361)

Performance:

Maximum range ----- 14,594 meters
 (16,298 yds)
 Muzzle velocity ----- 713 mps (2,400 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 ----- +125°F

*Packing:

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

*Packing Box:

Weight ----- 86 lbs.
 Dimensions ----- 39-15/16 x 10-15/16 x 7-3/32 in.
 Cube ----- 1.8 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity - distance class ----- 5
 Storage compatibility ----- A
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
 DODAC ----- 1315-C128
 Drawing number ----- P85133

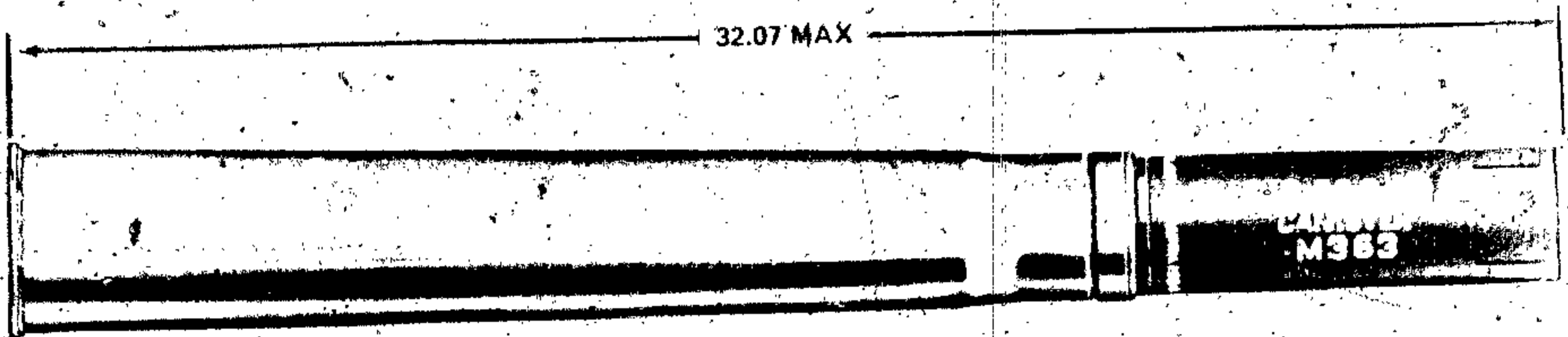
Limitations:

- a. Since the burster in this ammunition is loaded with tetrytol, it is not to be stored or fired at temperatures exceeding +125°F.
- b. Store and transport rounds at temperatures below 111.4°F (melting point of WP). If impractical store rounds on bases, so that if WP melts it will resolidify with void space in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

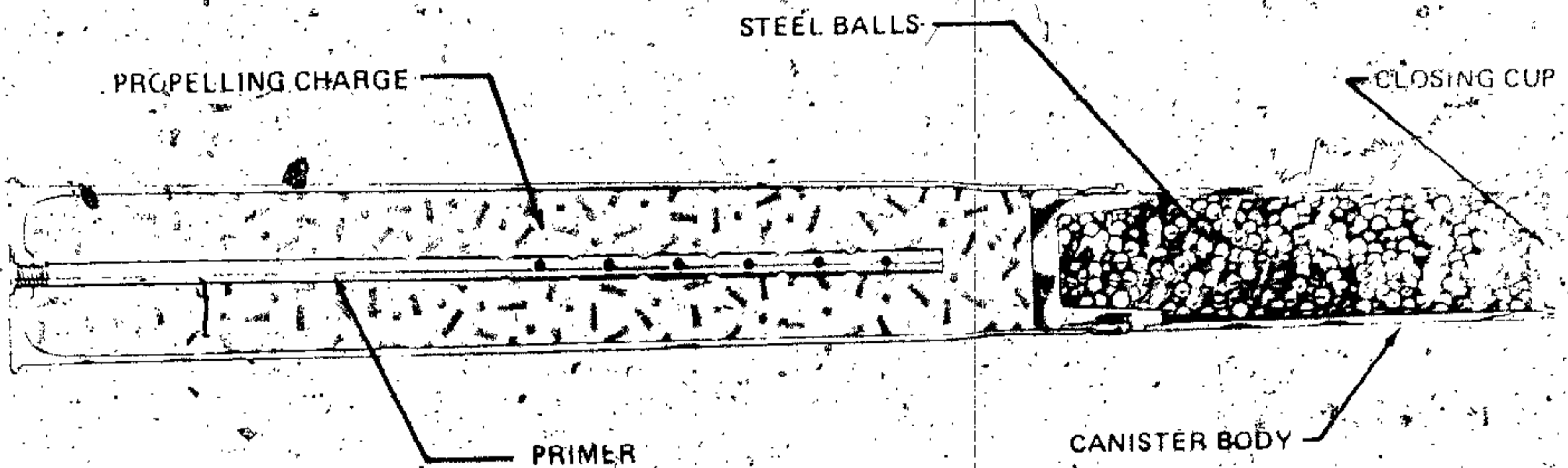
References:

- SC 1305/30-IL
- SB 700-20
- DARCOM P 700-3-3
- TM 9-1300-251-20
- TM 9-7017-5
- TM 9-7017-6

CARTRIDGE, 76-MILLIMETER: CANISTER, M363



AR199866



AR199864

Type Classification:

OBS MSR 11756003

Use:

This fixed cartridge is intended for use in 76-mm gun cannons against personnel at close range.

Description:

The canister has a heavy-steel base and a lightweight body, loaded with steel balls. The forward end is sealed with a closing cup. The canister body is distinguished by four equally spaced longitudinal slits in the lightweight body construction. The canister body is assembled to a brass or steel cartridge case, loaded with

a single base propellant and fitted with a percussion primer. A distinguishing physical 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 band and rigidly crimped to it.

Functioning:

When the weapon is fired, a flash from the primer ignites the propellant. Gases from the burning propellant force the projectile out of the gun barrel. Immediately after leaving the gun barrel, air pressure on the closing cup and centrifugal force action on the body and balls cause the canister to break at the slits, dispersing the balls in a cone-shaped pattern along the line of flight.

Fabricated Data:

Complete round:

Type ----- Antipersonnel
 Weight ----- 27.18 lbs.
 Length ----- 32.07 in.
 Cannon used with ----- M32 or M48

Projectile:

Body material ----- Steel
 Color:
 Old ----- Black w/white marking
 New ----- Olive drab w/white marking

Filler and weight ----- Steel balls-
 9 lbs.

Components:

Cartridge case ----- M88B1 M88
 Propelling charge ----- M6, 5.0 lbs.
 Primer ----- M62, percussion

Performance:

Maximum range ----- 155 meters
 (192 yds.)
 Muzzle velocity ----- 716 mps
 (2,400 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 hrs/day)

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

* Packing Box:

Weight ----- 88.0 lbs.
 Dimensions ----- 37-5/16 x 11 x
 7-5/32 in.
 Cube ----- 1.7 cu. ft.

*NOTE: See SC for complete packing data
 including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 4
 Storage
 compatibility ----- E
 DOT shipping class ----- B
 DOT designation ----- AMMUNITION FOR
 CANNON WITH
 SOLID PROJECTILE
 DODAC ----- 1315-C121
 Drawing number ----- 9204458

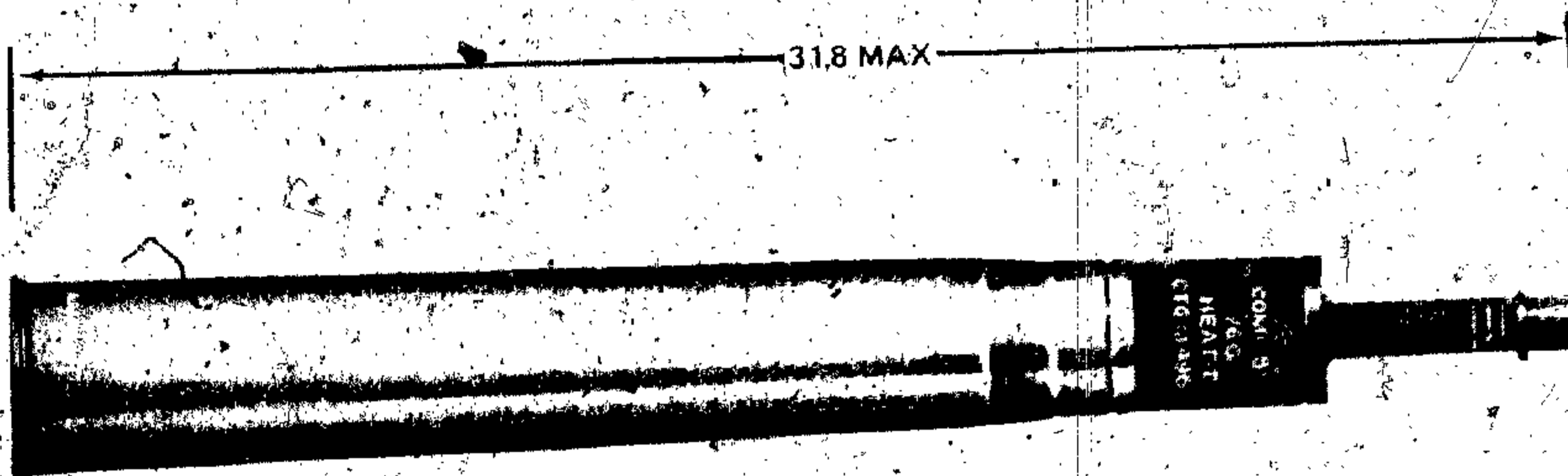
Limitations:

None

References:

SC 1305/30-IL
 SB 700-20
 DARCOM P 700-3-3
 TM 9-1300-251-20
 TM 9-7017-5
 TM 9-7017-6

CARTRIDGE, 76-MILLIMETER, HEAT-T, M496



AR199859

Type Classification:

OBS MSR 11756003

Use:

This fixed ammunition cartridge is used in 76-mm gun cannons against heavily armored targets.

Description:

The projectile is a hollow steel shell tapered at the rear and fitted on the nose with a stand-off spike containing a piezoelectric element. The shell is filled with high explosive fitted around an internal copper cone. The apex of the cone is to the rear, thus shaping the charge.

The base of the projectile is closed by an adapter which also provides a seat for the fuze. A boom and fin assembly is assembled to the adapter (for stabilization in flight) and a tracer element is located in the fin assembly. A PIBD fuze is located in the adapter. A brass cartridge case containing a single-base propellant and a percussion primer is crimped to the projectile. A distinguishing characteristic of these rounds is the cartridge case-over-band construction. The specially designed rotating band has a crimping groove which permits the cartridge case to be assembled over the rotating band and rigidly crimped to it.

Functioning:

When the weapon is fired, flash from the primer ignites the propellant. The burning

propellant ignites the tracer and generates gas to propel the projectile from the gun barrel. The booby and fin assembly provides stability in flight, and the tracer provides a visible trace of the trajectory. On impact, the piezo-electric element in the standoff spike initiates functioning of the PIBD fuze. The fuze detonates the explosive charge and causes the copper cone to collapse creating a high velocity shock wave and a jet of metal particles which penetrate the target.

Tabulated Data:

Complete round:

Type ----- HEAT-T
 Weight ----- 25.83 lbs.
 Length ----- 31.8 in.
 Cannon used with ----- M32 or M48

Projectile:

Body material ----- Steel
 Color ----- Black w/white markings and yellow band.
 Filler and weight ----- Comp B- 1.10 lbs.

Components:

Cartridge case ----- M171A1
 Propelling charge ----- M6, 5.06 lbs.
 Primer ----- M81 percussion
 Tracer ----- M13
 Fuze ----- PIBD-M509A1

Performance:

Maximum range ----- 7,488 meters (8360 yds.)
 Muzzle velocity ----- 1060 mps (3,550 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 hrs/day)

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

*Packing Box

Weight ----- 72.5 lbs.

Dimensions ----- 37-1/16 x 11 x 7-5/32 in.

Cube ----- 1.7 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance

class ----- 4

Storage

compatibility ----- E

DOT shipping class ----- A

DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES

DODAC ----- 1315-C110

Drawing number ----- 8848863

Limitations:

None.

References:

SC 1305/30-IL

SB 700-20

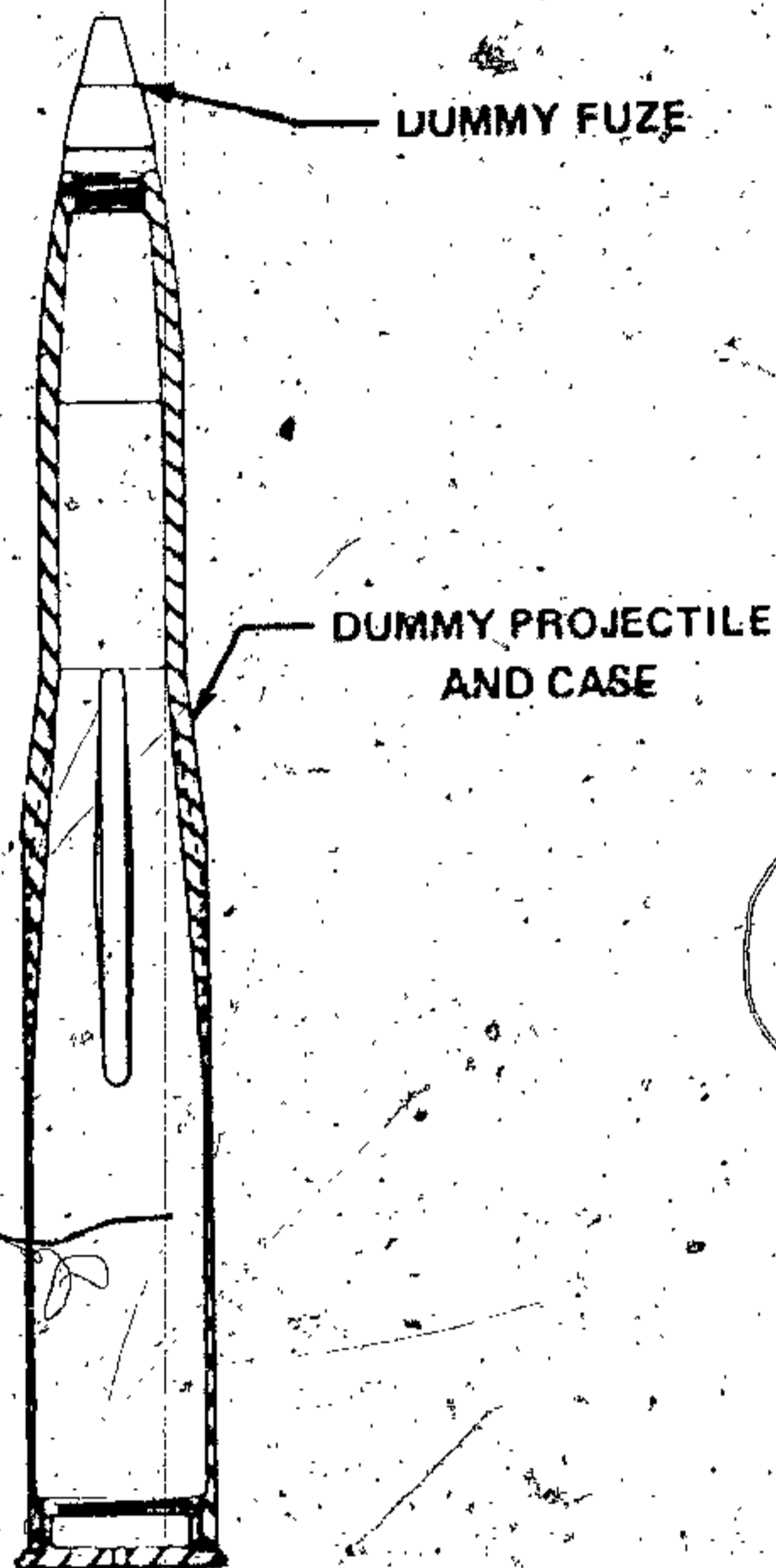
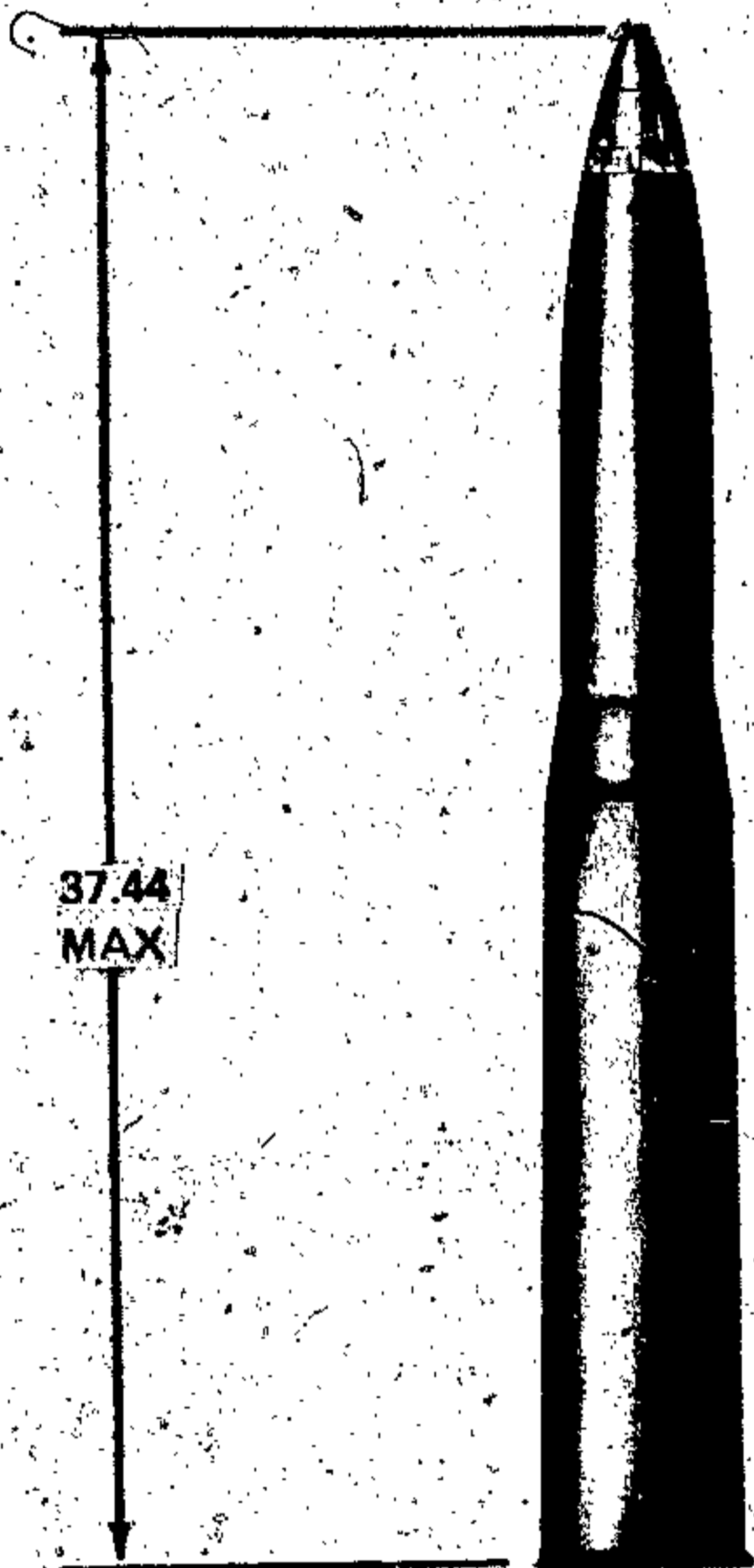
DARCOM P 700-3-3

TM 9-1300-251-20

TM 9-7017-5

TM 9-7017-6

CARTRIDGE 90-MILLIMETER: DUMMY, M12, M12B1 AND M12B2



AR199825

AR199824

Type Classification:

CON MSR 11756003

Use:

This dummy cartridge is used for training in handling and loading ammunition for 90-mm guns.

Description:

This cartridge simulates an HE-loaded round of 90-mm ammunition in size, weight and center of gravity. A completely inert bronze (M12), malleable iron (M12B1) or manganese bronze (M12B2) body is fitted with a bronze or steel base. The nose of the cartridge may be

fitted with a dummy or inert fuze or may be unfuzed.

Functioning:

The dummy cartridge is completely inert and is nonfunctioning.

Tabulated Data:

Complete round:

Type -----	Dummy
Weight -----	42.04-44.00/lbs.
Length -----	37.44 in.
Canon used with ----	M36, M41 or M54

Projectile:

Body material -----	Manganese bronze
Color -----	Bronze w/white marking

TM 43-0001-28

Fuze ----- Dummy, M80
* Packing ----- 1 round per fiber
container; 2 con-
tainers per wooden
box

* Packing Box:
Weight ----- 132 lbs.
Dimensions ----- 43-5/8 x 13 x
8-5/32 in.
Cube ----- 2.69 cu. ft.

* NOTE: See SC for complete packing data
including NSN's.

Shipping and Storage Data:

Quantity-distance
class ----- N/A
Storage
compatibility ----- N/A

DOT shipping class ----- N/A
DOT designation ----- NONE

DODAC ----- 1315-C263
Drawing number ----- 72-3-76

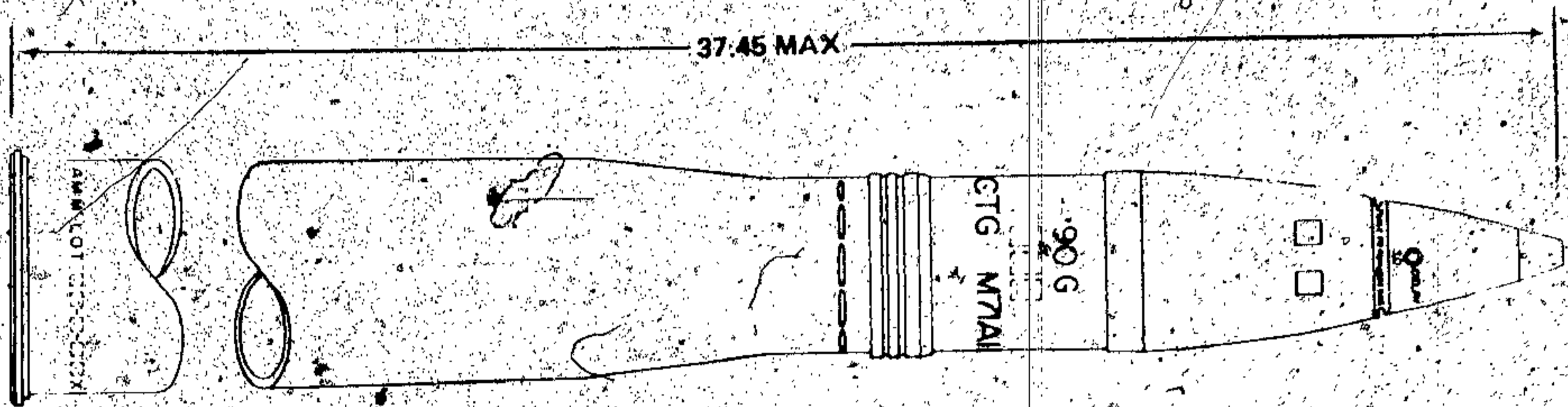
Limitations:

None

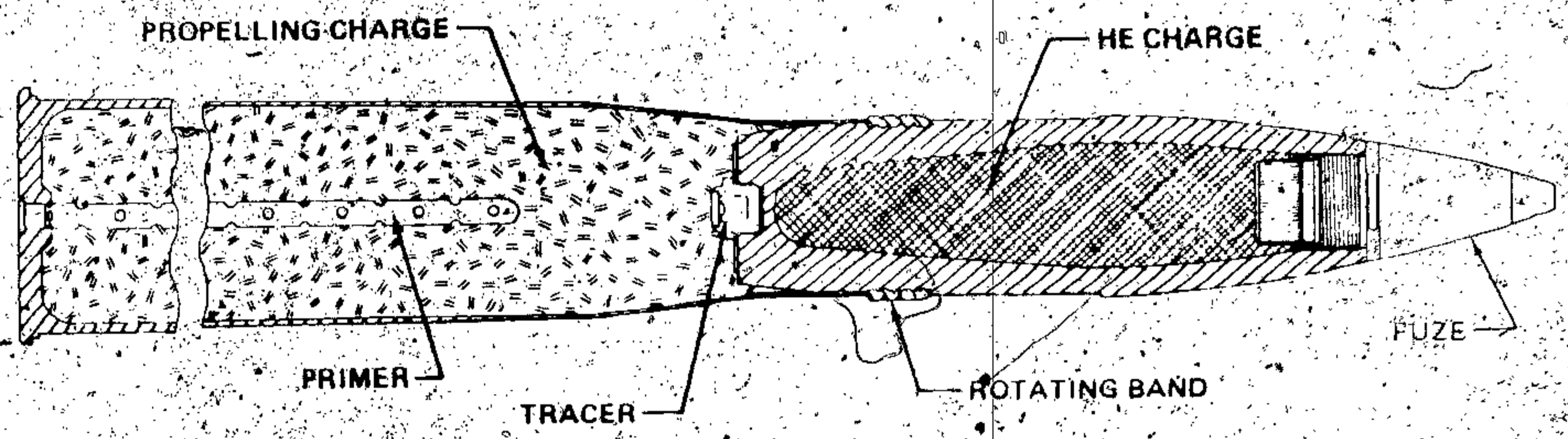
References:

SC 1305/30-IL
SB 700-20
DARCOM P. 700-3-3
TM 9-1300-251-20
TM 9-2350-224-10
TM 9-7012

CARTRIDGE, 90-MILLIMETER: HE-T, M71A1 AND HE, M71



AR199839



AR199838

Type Classification:

Std. OTCM 37436 dtd 1960 (M71A1)
CON MSR 11756003 (M71)

Use:

These cartridges are used in 90-mm guns against personnel and materiel, producing blast and fragmentation at the target.

Description:

The hollow steel forged projectile has a boattailed base and a streamlined ogive. Fuze cavity may be normal or deep cavity type. The projectile is loaded with 2.15 pounds (1.68

pounds, deep cavity) of Composition B or TNT. A tracer is threaded into the projectile base (M71A1). A point detonating fuze is assembled to the projectile. Loaded projectile weights fall into one of three weight zones.

Functioning:

When the weapon is fired, the burning propellant ignites the tracer and creates gases which propel the projectile out of the gun tube. The tracer burns for a minimum of three seconds. Upon impact, the fuze functions on superquick or delay, as preset, and detonates the high explosive filler, producing blast and fragmentation.

Difference Between Models:

M71A1 has a tracer; M71 does not. M71A1 has M1 propellant resulting in lower velocity; M71 has M6 or M15 propellant.

Tabulated Data:

Complete round:	M71A1	M71
Type -----	HE-T	HE
Weight -----	38.8-39.54 lbs.	41.19-41.93 lbs.
Length -----	37.46 in.	
Cannon used with -----	M36, M41 or M54	
Projectile: *		
Body material -----	Steel	
Color -----	Olive drab w/yellow marking	
Filler and weight -----	Composition B-2.15 lbs.	
Components:		
Cartridge case -----	M19, M19B1	
Propelling charge -----	M1-5.33 lbs. (M71A1) M6 or M15-7.31 lbs. (M71)	
Primer -----	M28B2, M28A2	
Tracer -----	XM10 (M71A1)	
Fuze -----	PD, M51A5, M557, MTSQ, M520 Series, M564	
Performance:		
Maximum range -----	15,800 meters (17,300 yds.) (M71A1) 17,800 meters (19,475 yds.) (M71)	
Muzzle velocity -----	730 mps (2,400 fps) (M71A1) 823 mps (2700 fps) (M71)	

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 hrs/day)

* Packing -----	1 round per fiber container; 2 containers per wooden box
* Packing Box:	
Weight -----	132 lbs.
Dimensions -----	43-5/8 x 13 x 8-5/32 in.
Cube -----	2.69 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance data -----	5
Storage compatibility -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC -----	1315-C280 (M71A1) 1315-C285 (M71) 1315-C266 (M71) 1315-C267 (M71)
Drawing numbers -----	8849017-1 (M71A1) 75-1-157 (M71)

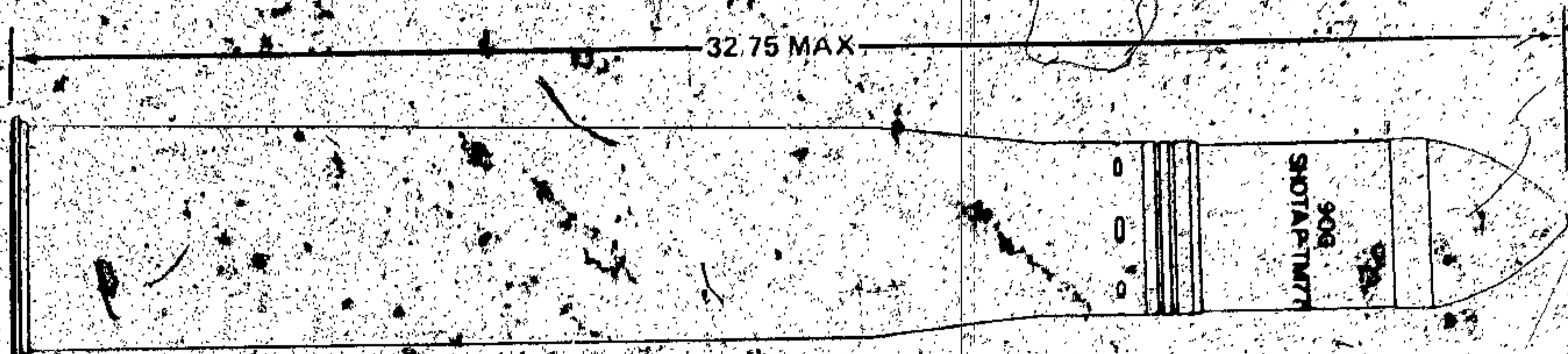
Limitations:

None

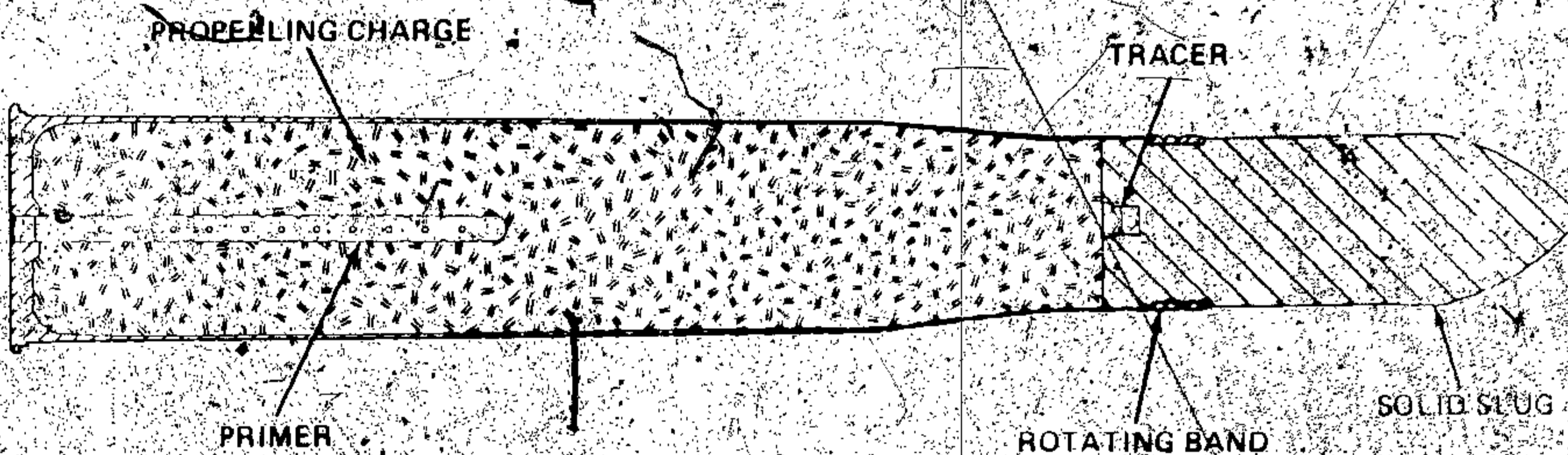
References:

- SC 1305/30-IL
- SB 700-20
- DARCOM P 700-3-3
- TM 9-1300-251-20
- TM 9-2350-224-10
- TM 9-7012

CARTRIDGE, 90-MILLIMETER: AP-T M77



AK199833



AK199832

Type Classification:

OBS MSR 11756003

Use:

This cartridge is an obsolescent armor piercing model currently used for training purposes in 90-mm guns.

Description:

The projectile is a hardened steel monobloc slug and has no windshield. The projectile base is threaded to receive a tracer. The brass or steel cartridge case is loosely packed with propellant and is fitted with a percussion primer in the base.

Functioning:

When the weapon is fired, the burning propellant ignites the tracer and creates gases which propel the projectile out of the gun tube and ignite the tracer, which burns for a minimum of 3 seconds of projectile flight. The projectile is designed to penetrate the target solely by kinetic energy.

Tabulated Data:

Complete round	
Type	AP-T
Weight	42.04 lbs.
Length	32.75 in.
Canon used with	M36, M41 or M54

TM 43-0001-28

Projectile

Body material ----- Steel
Color ----- Black w/white marking

Components

Cartridge case ----- M19, M19B1
Propelling charge ----- M6, 7.31 lbs.
Primer ----- M28A2, M28B1
Tracer ----- M3

Performance

Maximum range ----- 11,270 meters (12,325 yds.)
Muzzle velocity ----- 821 mps (2,700 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 hrs/day)

*Packing

1 round per fiber container; 2 containers per wooden box

*Packing Box

Weight ----- 132 lbs.

Dimensions ----- 43-5/8 x 13 x 8-5/32 in.

Cube ----- 2.69 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance

class ----- 5

Storage

compatibility ----- E

DOT shipping class ----- B

DOT designation ----- AMMUNITION FOR CANNON WITH SOLID PROJEC-TILES

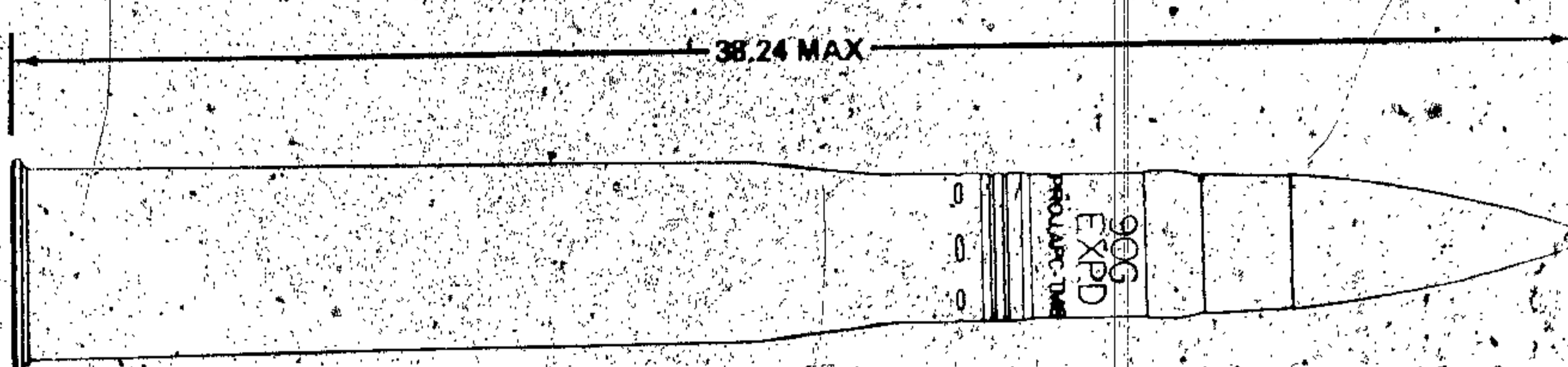
DODAC ----- 1315-C259

*Drawing number ----- 75-1-136

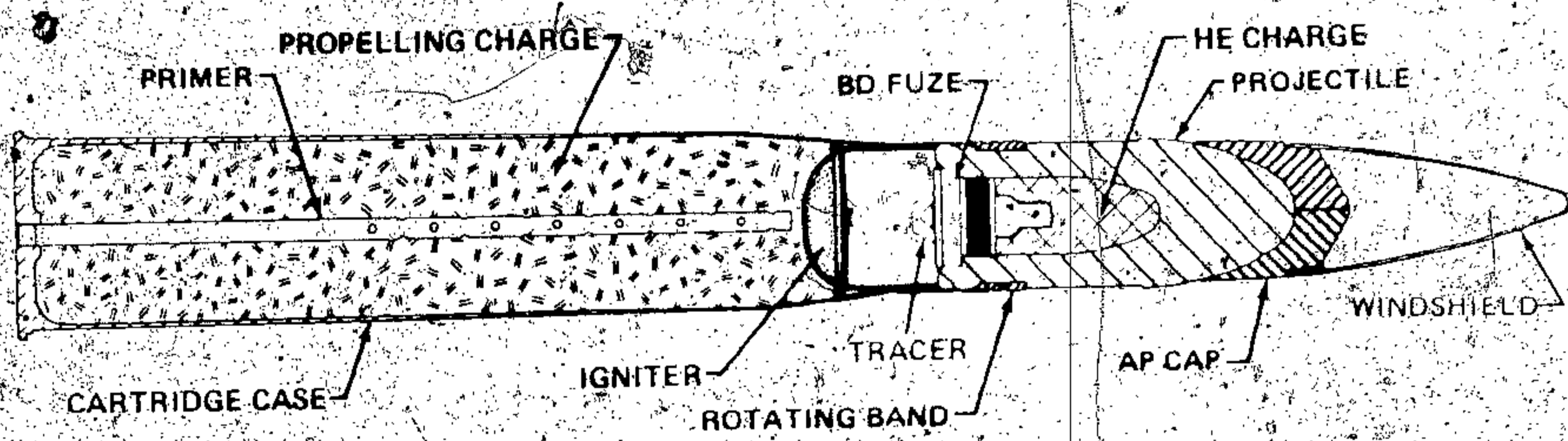
References:

SC 1305/30-IL
SB 700-20
DARCOM-P 700-3-3
TM 9-1300-251-20
TM 9-2350-224-10
TM 9-7012

CARTRIDGE, 90-MILLIMETER: APC-T, M82



AR199835



AR199834

Type Classification:

OBS MSR 11756003

Use:

This cartridge is fired from 90-mm guns and is designed for use against face hardened armored materiel.

Description:

The hardened steel projectile has a flat base and a nose shaped to a relatively short ogive, and is fitted with an armor piercing cap. A small cavity in the rear portion of the body holds a small explosive charge and is threaded to receive a delayed-action base-detonating fuze with tracer. The cartridge is loaded with

one of two different primers and a varying amount of propellant, with or without an igniter charge, depending on the velocity desired.

Functioning:

When the weapon is fired, the resultant burning propellant creates gases which propel the projectile out of the gun tube and ignite the tracer which burns for a minimum of 3 seconds of projectile flight. The armor plate of the target is penetrated by the hardened face of the armor-piercing cap, solely by kinetic energy. The softer core protects the hardened point of the projectile body by distribution of stresses. The base-detonating fuze, a simple inertia type, functions with delay action detonating the explosive filler after projectile penetration.

Tabulated Data:

Complete round:

Type ----- APC-T
 Weight ----- 42.75 or 43.87 lbs.
 Length ----- 38.24 in.

Cannon used with ----- M36, M41 or M54

Projectile:

Body material ----- Steel
 Color ----- Olive drab w/
 black band and
 yellow marking
 Filler and weight ----- Expl D-0.31 lb.

Components:

Cartridge case ----- M19
 Propelling
 charge ----- M6-7.31 to 8.06 lbs.
 Primer ----- M28A1, M49
 Tracer ----- Integral with fuze
 (red)
 Fuze ----- BD- M68 or M68A1

Performance:

Maximum range ----- 19,570 meters
 (21,400 yds.)
 Muzzle velocity ----- 790 mps (2,600 fps)
 851 mps (2,800 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 hrs/day)

*Packing:

1 round per fiber
 container; 2 con-
 tainers per wooden
 box

*Packing Box:

Weight ----- 136.5 lbs.
 Dimensions ----- 44-21/32 x 13 x
 7-3/8 in.
 Cube ----- 2.75 cu. ft.

*NOTE: See SC for complete packing data
 including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 4
 Storage
 compatibility ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES
 DODAC ----- 1315-C260
 Drawing number ----- 75-1-145

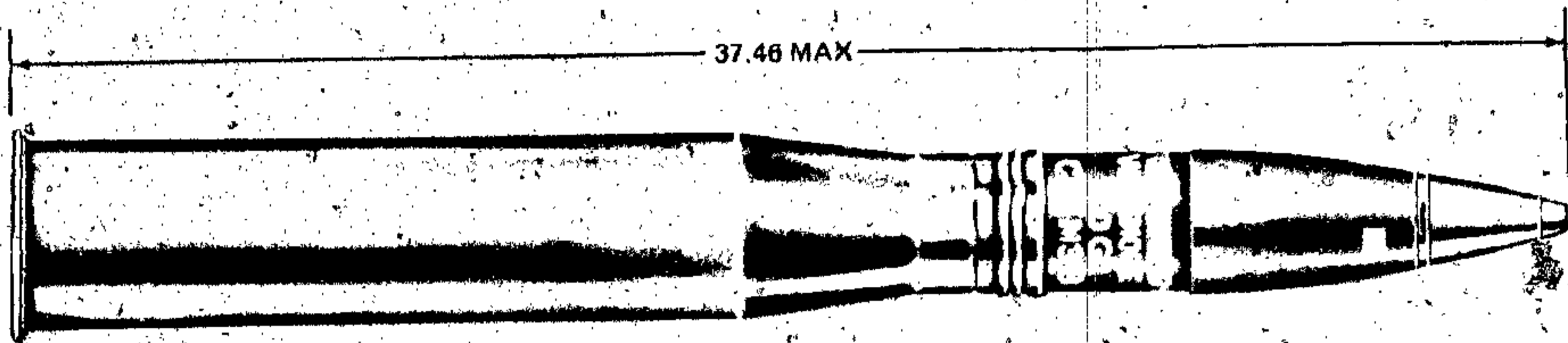
Limitations:

None

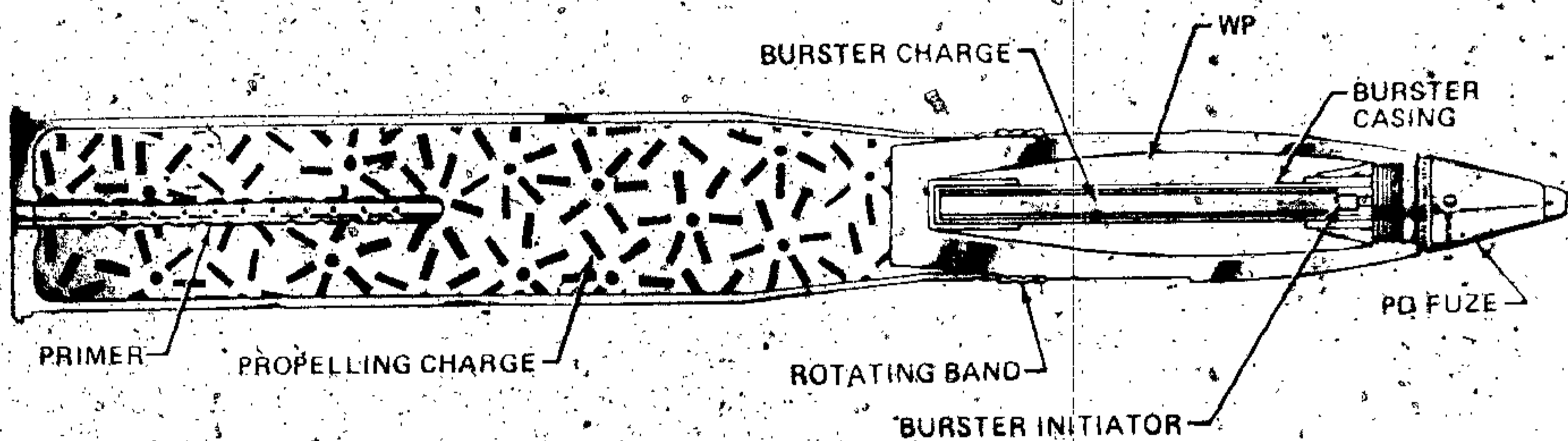
References:

SC 1305/30-IL
 SB 700-20
 DARCOM P 700-3-3
 TM 9-1300-251-20
 TM 9-2350-224-10
 TM 9-7012

CARTRIDGE 90-MILLIMETER: SMOKE, WP, M313 AND M313C



AR199829



AR199828

Type Classification:

M313 ----- Std OTCM 37119
 dtd 1959
 M313C ----- Std OTCM 37619
 dtd 1960

Use:

This cartridge is used in 90-mm guns for spotting and screening purposes and has a limited incendiary effect.

Description:

The projectile consists of a hollow steel forging with a boattailed base and streamlined ogive. The projectile nose is threaded to receive an adapter for the point-detonating (PD)

fuze and provide a seat for the burster casing assembly. The burster casing assembly, a thin walled steel tube containing the burster charge and burster initiator, extends from the adapter to the rear of the projectile cavity. The burster tube provides a tight seal for the charge of white phosphorous.

Functioning:

When the weapon is fired, the burning propellant creates gases which propel the projectile out of the gun tube. On impact the point-detonating fuze functions, igniting the burster initiator and detonating the burster charge. The projectile casing ruptures, dispersing the filler. WP ignites on contact with the air, producing a dense white smoke and flaming particles.

Difference Among Models:

Cartridge M313C is identical to Cartridge M313 except for a different propellant charge which gives a lower muzzle velocity and a resultant reduction in gun wear.

Tabulated Data:

Complete round:	M313	M313C
Type	Smoke (WP)	Smoke (WP)
Weight	2.52 lbs.	40.52 lbs.
Length	37.44 in.	37.46 in.
Cannon used with	M38, M41 or M54	
Projectile:		
Body material	Steel	
Color	Gray w/yellow band and marking (Later manufacture Green w/red marking)	
Filler and weight	WP-1.97 lbs.	
Components:		
Cartridge case	M19, M19B1	
Propelling charge	(M313) M15, M6-7.31 lbs. (M313C) M1-5.33 lbs.	
Primer	M49, M28B2	
Burster	M24-Tetrytol-2.33 oz.	
Burster initiator	M2	
Fuze	PD-M48A3, M57; MTSQ, M501 series	
Performance:		
Maximum range	(M313) 17,717 meters (19,375 yds) (M313C) 15,362 meters (16,800 yds)	
Muzzle velocity	(M313) 821 mps (2,700 fps) (M313C) 730 mps (2,400 fps)	

Temperature Limits:

Firing:	
Lower limit	- 40°F
Upper limit	+ 125°F

Storage:

Lower limit	- 65°F
Upper limit	+ 125°F

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

*Packing Box:

Weight	132 lbs.
Dimensions	43-5/8 x 13 x 8-5/32 in.
Cube	2.89 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	5
Storage compatibility	A
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC	1315-C258
Drawing number	8858640

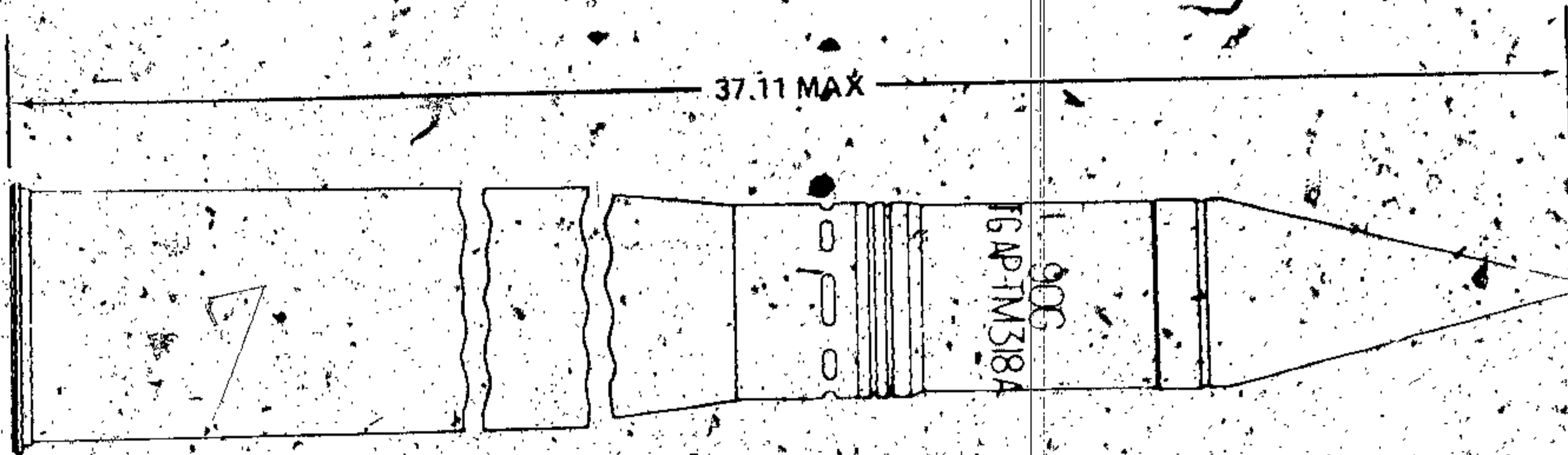
Limitations:

- Since the burster in this ammunition is loaded with tetrytol, it is not to be stored or fired at temperature exceeding + 125°F.
- Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical store rounds on bases, so that if WP melts it will re-solidify with void space in normal position in nose of projectile. Erratic performance may occur if voids exist inside of WP filler.

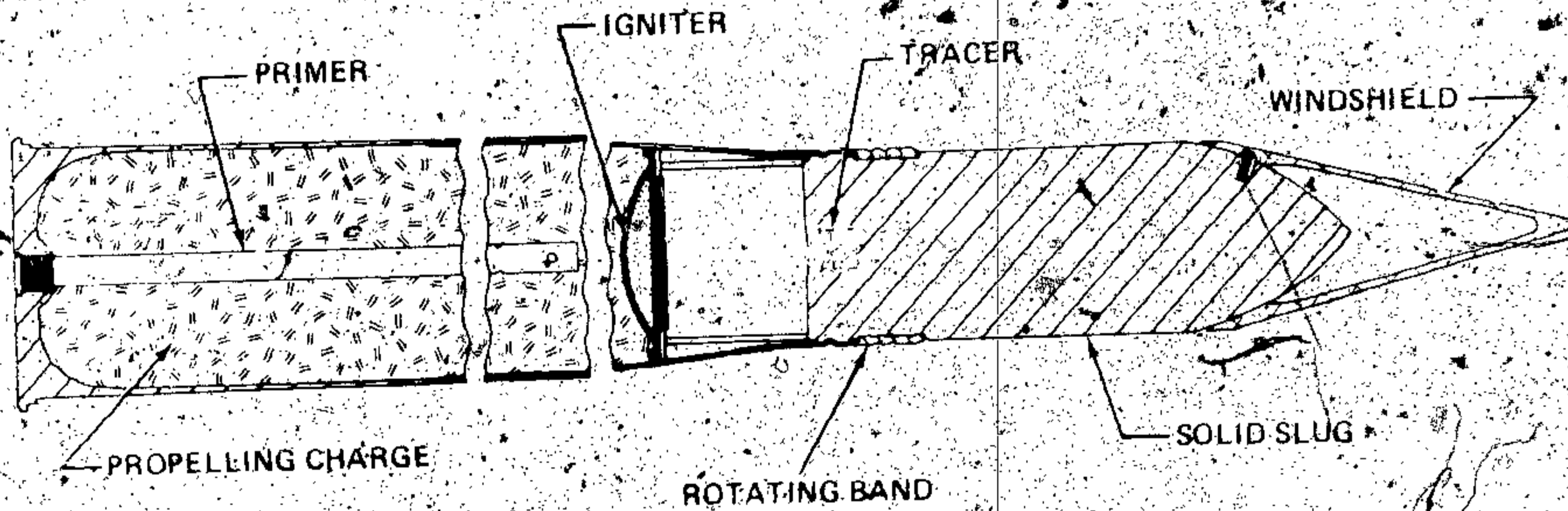
References:

- SC 1305/30-IL
- SB 700-20
- AMCP 700-3-3
- TM 9-1300-251-20
- TM 9-2350-224-10
- TM 9-7012

CARTRIDGE, 90-MILLIMETER: AP-T, M318, MV2800; AND M318 (T33E7) OR M318A1, MV3000.



AR199831



AR199830

Type Classification:

M318A1 --- Std OTCM 37119 dtd 1959
 M318 --- Std OTCM 36841 dtd 1958

Use:

This armor piercing cartridge is for use in 90-mm guns against armored materiel.

Description:

The body of the projectile is made of hardened steel, has a flat base, and a nose that is shaped to a relatively short ogive. A light weight aluminum windshield is welded to the projectile. The base of the projectile is

threaded to receive a tracer. The cartridge case is loosely packed with propellant, and the base is fitted with a percussion primer. An igniter to assist uniform propellant ignition is fitted below the closing disk.

Functioning:

When the weapon is fired, the burning propellant creates gases which propel the projectile out of the gun tube and ignite the tracer which burns for a minimum of 3 seconds of projectile flight. The projectile is designed to penetrate the target solely by kinetic energy.

Difference Between Models:

See Tabulated Data.

Tabulated Data:

Complete round:	M318	M318 (T33E7) or M318A1
Type	AP-T	AP-T
Weight	43.98 lbs.	43.91 lbs.
Length	37.43 in.	37.11 in.
Cannon used with	M36, M41 or M54	
Projectile:		
Body material	Steel	
Color	Black w/white marking	
Components:	M318	M318 (T33E7) or M318A1
Cartridge case	M19, M19B1	M108, M108B1
Propelling charge	M6- 8.6 lbs.	M17, M30 -8.6 lbs.
Primer	M49 (T33)	M58
Tracer	(Red) M5A2B1, M5A2- 0.10 lb	M5A2B1, M5A2 or M13- 7.5 grams
Performance:		
Maximum range	19,570 meters (21,400 yds.)	21,031 meters (23,000 yds.)
Muzzle velocity	851 mps (2,800 fps)	912 mps (3,000 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 hrs/day)

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

*Packing Box:

Weight	130.47 lbs.
Dimensions	44 x 12-7/8 x 8-1/32 in.
Cube	2.7 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

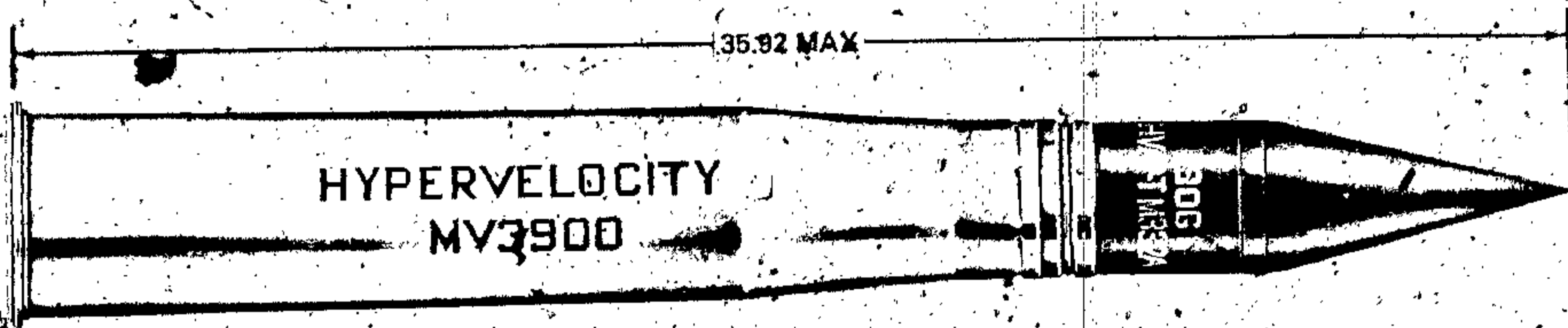
Shipping and Storage Data:

Quantity-distance class	4
Storage compatibility	E
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC	1315-C285 (MV3000) 1315-C259 (MV2800)
Drawing number	75-1-358 (M318) 9207966 (M318A1)

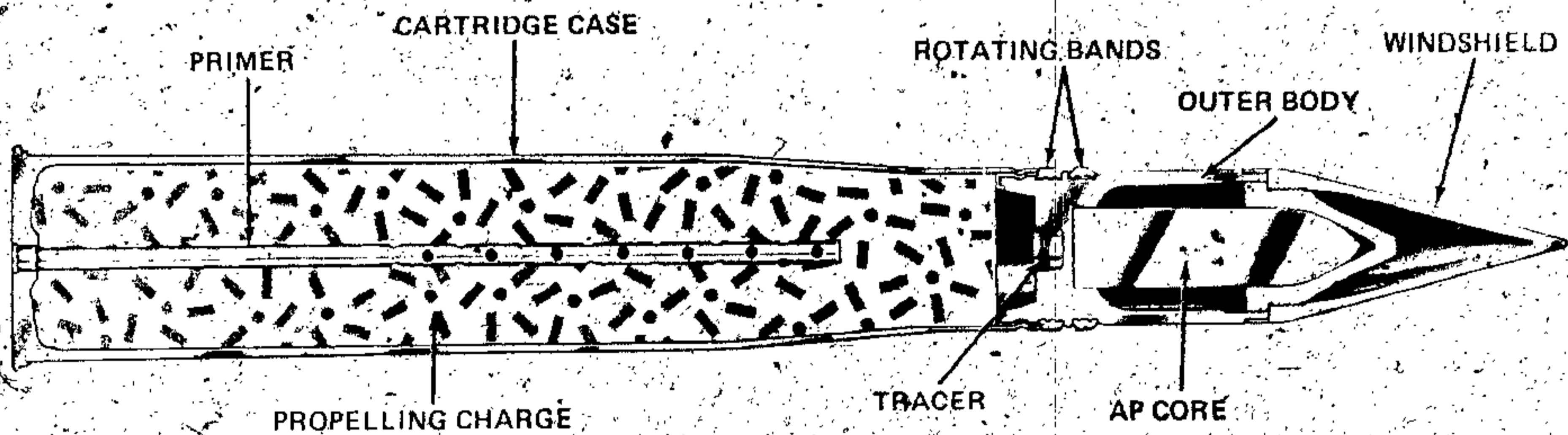
References:

- SC 1305/30-IL
- SB 700-20
- AMCP 700-3-9
- TM 9-1300-251-20
- TM 9-2350-224-10
- TM 9-7012

CARTRIDGE, 90-MILLIMETER: HVAP-T, M332A1



AR199823



AR199822

Type Classification:

CON / MSR 11756003

Use:

This high velocity armor piercing cartridge is designed for use in 90-mm guns against armored targets.

Description:

The projectile contains a hard armor-piercing core of tungsten carbide steel in an aluminum alloy outer body. The outer body is fitted with two sintered-iron rotating bands, a steel bourfelet, and an aluminum alloy windshield. The base of the body is skirted and contains a tracer. Modifications of the projectile are assembled with a sprayed base or steel base shield to counteract erosion. The cartridge case is

loosely packed with propellant and is fitted with a percussion primer in the base.

Functioning:

When the weapon is fired, the burning propellant creates gases which propel the projectile out of the gun tube and ignite the tracer which burns for a minimum of 3 seconds of projectile flight. On impact, the outer shell crumples and the tungsten carbide core penetrates the target solely by kinetic energy.

Tabulated Data:

Complete round:

Type -----	Hypervelocity
Weight -----	32.30 lbs.
Length -----	35.92 in.
Cannon used with ----	M36, M41 or M54

Change 4 2-45

Projectile:

Body material-----Tungsten-Carbide
and aluminum alloy
Color-----Black w/white
marking

Components:

Cartridge case-----M19, M19B1
Propelling
charge-----M17
Primer-----M49
Tracer-----M5A2B1

Performance:

Maximum range-----14,456 meters
(15,700 yds.)
Muzzle velocity-----1,165 mps
(3,875 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 hrs/day)

*** Packing:**

1 round per fiber
container; 2 con-
tainers per wooden
box

*** Packing Box:**

Weight-----119 lbs.
Dimensions-----42-7/16 x 12-15/16
x 8-3/32 in.

Cube-----2.6 cu. ft.

*NOTE: See SC for complete packing data
including NSN's.

Shipping and Storage Data:

Quantity-distance

class-----5

Storage

compatibility-----E

DOT shipping class-----B

DOT designation-----AMMUNITION FOR
CANNON WITH
SOLID PROJEC-
TILES

DODAC-----1315-C270

Drawing number-----75-1-310

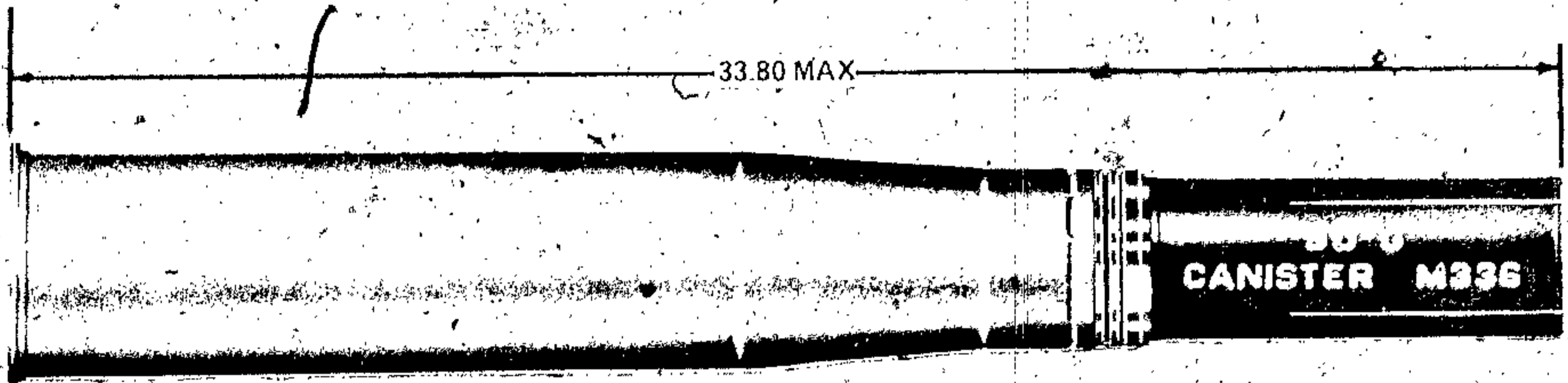
Limitations:

This cartridge is not to be fired at temper-
atures below +40°F when loaded with M17
propellant.

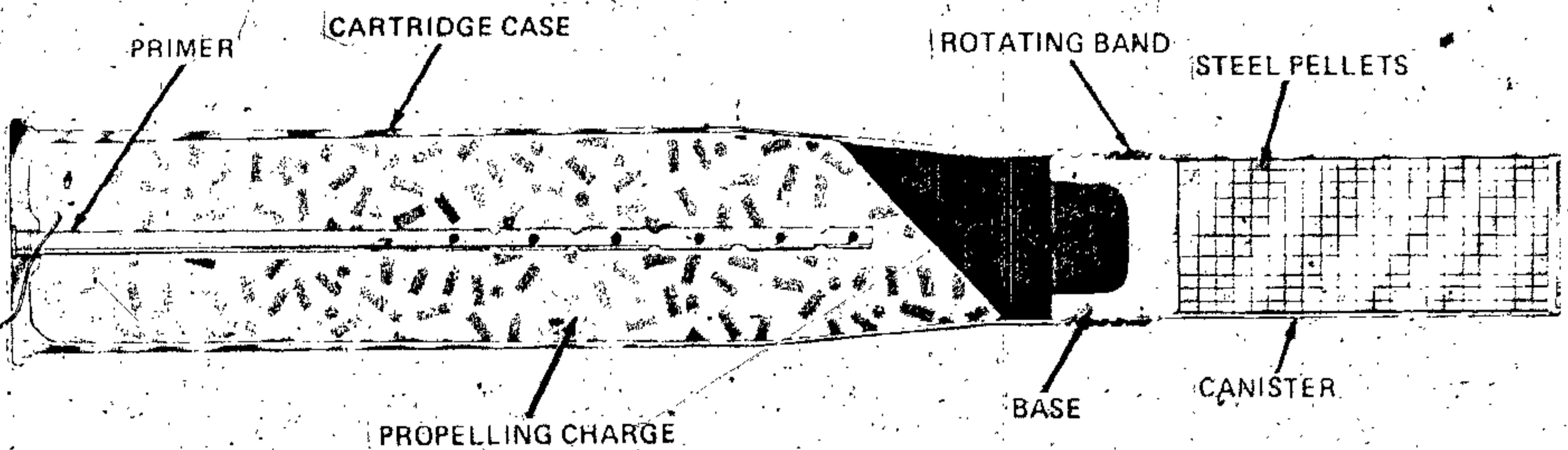
References:

SC 1305/30-IL
SB 700-20
DARCOM P 700-3-3
TM 9-1300-251-20
TM 9-2350-224-10
TM 9-7012

CARTRIDGE, 90-MILLIMETER: CANISTER, M336



AR199845



AR199844

Type Classification:

CON MSR 11756003

Use:

Canister Cartridge M336 is fired from 90-mm guns and is intended primarily for anti-personnel use at close range.

Description:

The canister consists of a thin steel cylindrical body welded to a heavy steel cup-shaped base. A gilding metal rotating band is assembled to the base. The body has four equally spaced axial slits extending from the forward

end of the canister for approximately half the canister length. The canister body is filled with approximately 1,281 stacked steel cylindrical pellets held in place by a soldered closing disk. A percussion primed cartridge case containing propellant is crimped to the projectile.

Functioning:

Immediately after the canister leaves the muzzle of the gun, air pressure on the closing disk and centrifugal force acting on the body and pellets cause the canister to break at the four slits on the body with resultant conical dispersion of the pellets. The round has an effective range of 0 to 183 meters. The minimum angle of dispersion is approximately 9°.

Tabulated Data:

Complete round:

Type ----- Canister
 Weight ----- 41.6 lbs.
 Length ----- 33.80 in.
 Cannon used with ----- M36, M41, M54

Projectile:

Body material ----- Steel
 Color ----- Olive drab w/white marking
 Filler and weight ----- 1,281 slugs, 14.9 lbs.

Propelling charge:

Cartridge case ----- M108B1
 Propellant ----- M2 - 8 lbs
 Primer ----- M58 percussion

Performance:

Minimum effective range ----- 0 meters
 Maximum effective range ----- 183 meters (200 yds.)
 Muzzle velocity ----- 858 mps (2,870 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 hrs/day)

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

* Packing Box:

Weight ----- 111 lbs.
 Dimensions ----- 40-1/16 x 12-7/8 x 8-1/32 in.
 Cube ----- 2.4 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Quantity-distance

class ----- 4

Storage

compatibility ----- E

DOT shipping class ----- B

DOT designation ----- AMMUNITION FOR CANNON WITH SOLID PROJECTILES

DODAC ----- 1315-C262

Drawing number ----- 9214203

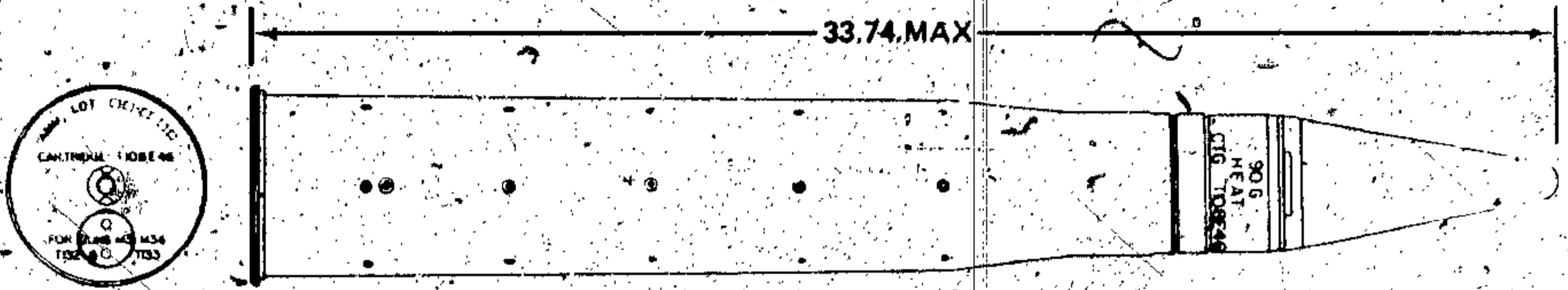
Limitations:

Cartridge may not be fired over the heads of friendly troops.

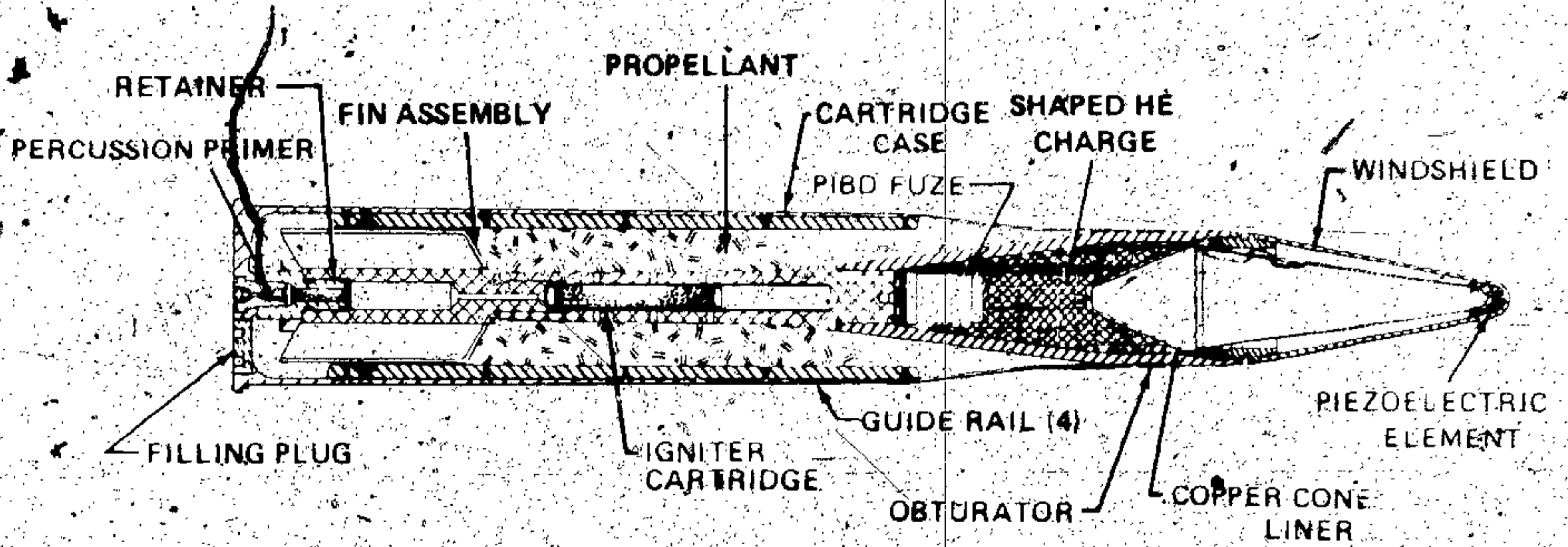
References:

SC 1305/30-IL
 SB 700-20
 DARCOM P 700-3-3
 TM 9-1300-251-20
 TM 9-2350-224-10
 TM 9-7012

CARTRIDGE, 90-MILLIMETER: HEAT, M348A1 (T108E46) AND M848 (T108E40)



AR199520



AR199518

Type Classification:

OBS AMCTC 6287 dtd 1968

Use:

This cartridge is fired from 90-mm gun cannons against armored targets.

Description:

The cartridge consists of a fin-stabilized steel projectile containing a high explosive shaped charge and a brass cartridge case loosely filled with propellant. An inverted copper cone liner in the front of the projectile serves to shape the Comp B charge, and a streamlined windshield houses a piezoelectric element to initiate the PIBD fuze in the base.

An obturator band encircles the projectile above the lip of the cartridge case. An igniter and fin assembly is threaded to the base of the projectile and extends the length of the cartridge case through the propelling charge. The igniter is a perforated shaft filled with 400 grains of black powder. The four fixed fins are attached to the base of the assembly, and the igniter tube is closed with a threaded retainer containing approximately 20 grains of black powder. The percussion primer is in turn threaded into the retainer, flush with the base of the cartridge case, and contains 7 grains of black powder. The interior of the cartridge case is fitted with guide rails for the projectile fins. A filling plug is threaded into the base of the cartridge case for filling the case with the propelling charge after cartridge assembly.

Functioning:

When the primer is struck by the firing pin of the weapon, the black powder is ignited through primer, retainer, and igniter to flash through the igniter perforations and ignite the propelling charge. Rapidly expanding gases from the burning propellant force the projectile through the gun barrel with a velocity of 2800 feet per second. The obturator expands to prevent escape of gas pressure past the projectile while it is in the barrel, and the fins stabilize the projectile in flight. Upon impact with the target, distortion of the piezo-electric unit generates an electric current to initiate the fuze and detonate the explosive charge. As the copper cone is crushed, the detonation results in an intensely focussed, high velocity shock wave which causes failure of the target armor, and a jet of molten metal penetrates the target interior.

Difference Between Models:

Model M348 has a cone tube extension which is not present in the M348A1. The fin cross-section of the M348 is rectangular while that of the M348A1 is T-shaped.

Tabulated Data:

Complete round

Type -----	HEAT
Weight -----	34.79 lbs.
Length -----	33.74 in.
Cannon used with -----	M3, M36, T132, T133
Projectile:	
Body material -----	Steel forging
Color -----	Olive drab w/ black markings
Filler and weight -----	Comp. B, 1.56 lbs.
Components:	
Cartridge case -----	T27E2
Propelling charge -----	M6 (80.0 oz.); M1 (87.0 oz.)
Primer -----	T69
Igniter, fin assembly -----	T33E2
Fuze -----	PIBD, M509A1

Performance:

Maximum range -----	11,650 meters (13,010 yds.)
Muzzle velocity -----	832 mps (2800 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 hrs/day)

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

* Packing Box:

Weight -----	115.7
Dimensions -----	39-15/16 x 13 x 8-5/32 in.
Cube -----	2.4 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class -----	5
Storage compatibility group -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNITION FOR CANNON WITH EX- PLOSIVE PROJEC- TILES
DODAC -----	1315-C268
Assembly Dwg. No. -----	75-1-359

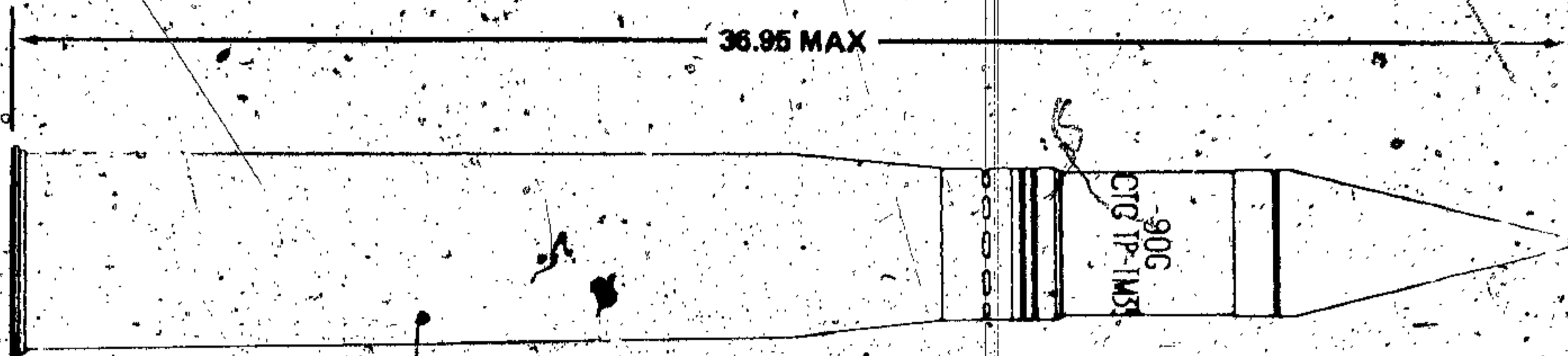
Limitations:

None

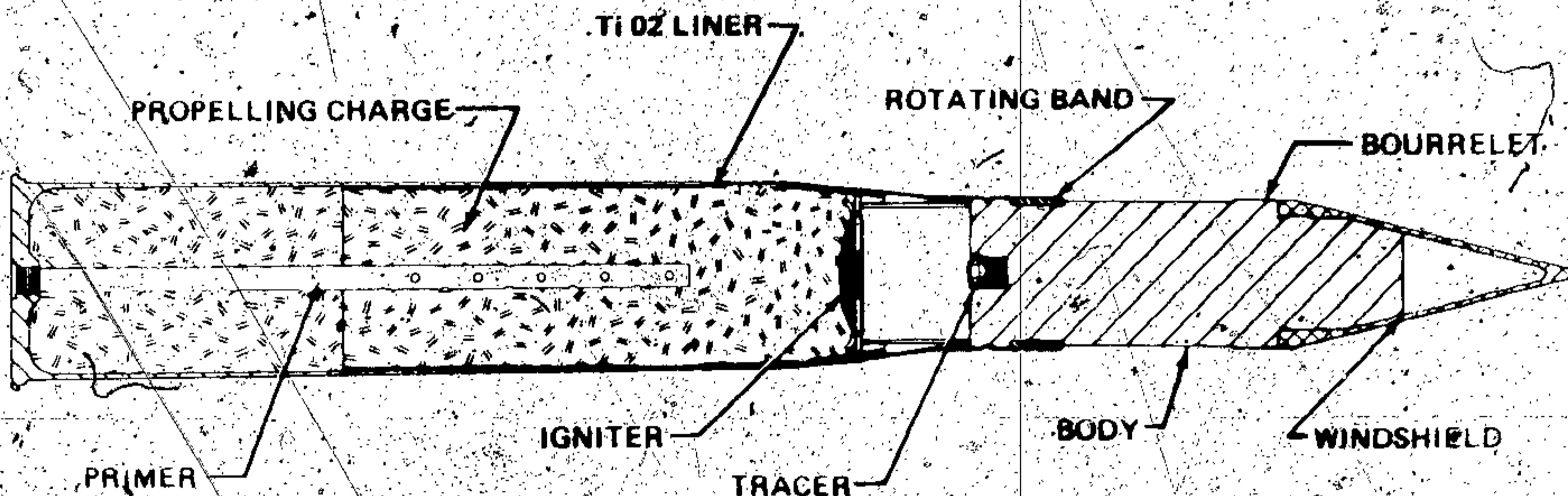
References:

TM 9-1300-251-20
TM 9-2350-224-10
TM 9-7012

CARTRIDGE, 90-MILLIMETER: TP-T, M353 (T22E1), M353A1 (M353E1) AND M353A2



AR199827



AR199826

Type Classification:

- M353A2 -----Std: AMCTC 4634 dtd 1966
- M353A1 -----Std: AMCTC 4634 dtd 1966
- M353 -----OBS OTCM 37344

Use:

This cartridge is used in 90-mm guns for training and marksmanship practice.

Description:

The projectile is ballistically matched to AP-T Cartridge M318. The body is steel with an integral bourrelet and a gilding metal rotating band. The flat base is fitted with a tracer. An aluminum windshield is threaded

to the nose. A percussion primer is fitted in the cartridge base.

Functioning:

When the weapon is fired, the burning propellant creates gases which propel the projectile out of the gun tube and ignite the tracer which burns for a minimum of three seconds of projectile flight. Since it is a practice round, the projectile lacks the penetrating capability of a service round.

Difference Among Models:

M353: does not contain a cartridge case liner.

TM 43-0001-28

M353A1: contains TiO₂ liner with low temperature melt wax.

M353A2: contains TiO₂ liner with high temperature melt wax.

Tabulated Data:

Complete round:

Type ----- TP-T
Weight ----- 43.9 lbs.
Length ----- 36.95 in.
Cannon used with ----- M36, M41 or M54

Projectile:

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

Components:

Cartridge case ----- M108, M108B1
Propelling charge ----- M30 (T36) -
8.6 lbs.
Primer ----- M58
Tracer ----- M5A2, M5A2B1,
M13

Performance:

Maximum range ----- 21,031 meters
(23,000 yds.)
Muzzle velocity ----- 914 mps (3,000 fps)

Temperature Limits:

Firing:
Lower limit ----- - 65° F.
Upper limit ----- + 120° F.
Storage:
Lower limit ----- - 65° F.
Upper limit ----- + 120° F.

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

* Packing Box:

Weight ----- 129 lbs.
Dimensions ----- 44 x 12-7/8 x
8-1/8 in.
Cube ----- 2.64 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 4
Storage compatibility ----- E
DOT shipping class ----- B
DOT designation ----- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC ----- 1315-C290
Drawing number ----- 8861603

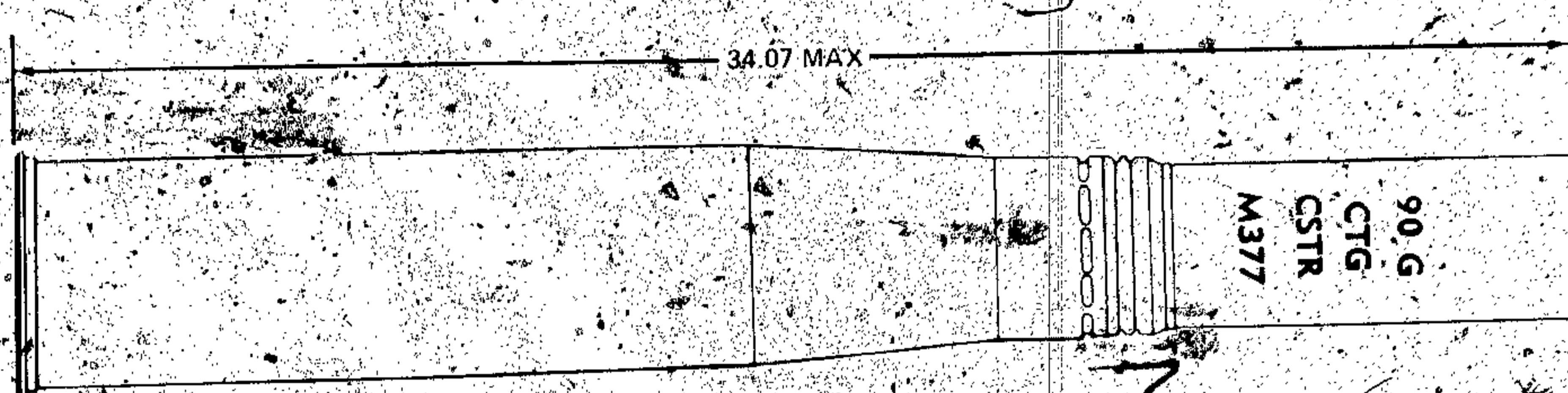
Limitations:

Do not fire M353A1 rounds which have been tank transported at temperatures in excess of 120° F.

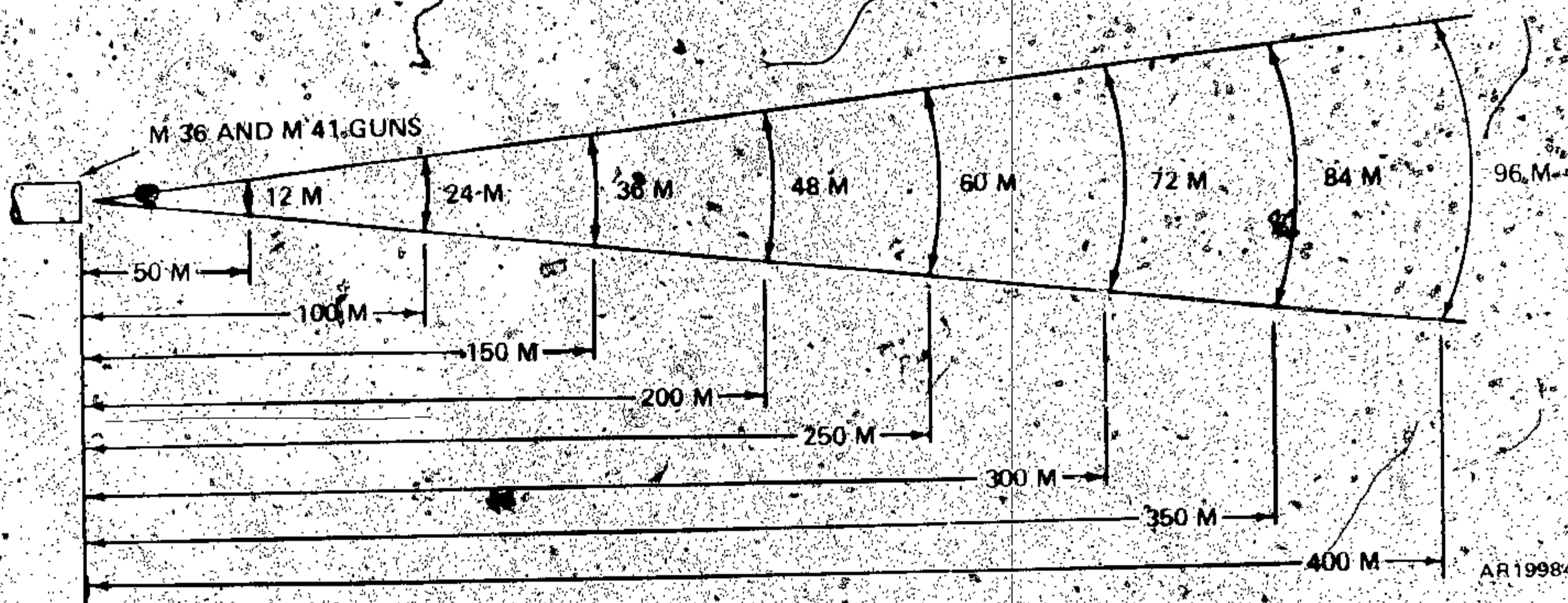
References:

SC 1305/30-IL
SB 700-20
DARCOM P. 700-3-3
TM 9-1300-254-20
TM 9-2350-224-10
TM 9-7012

CARTRIDGE, 90-MILLIMETER: CANISTER, M377



AR199843



AR199842

Type Classification:

CON MSR 11756003

Use:

This cartridge is fired from 90-mm guns and is intended primarily for antipersonnel use at close range. The cartridge is effective in dense foliage.

Description:

The canister consists of a thin steel cylindrical body welded to a heavy steel cup-shaped base assembly with a gilding metal rotating band. The body has four equally spaced axial grooves extending from the forward end of the canister for approximately half the canister length. The canister body is filled with flechettes held in place by a crimped closing cup.

A percussion primed cartridge case filled with propellant is crimped to the projectile.

Functioning:

When the weapon is fired, the burning propellant creates gases which propel the canister out of the gun tube. Immediately after the canister leaves the muzzle of the gun, air pressure on the closing cup and centrifugal force acting on the body and flechettes cause the canister to break at the four grooves on the body resulting in conical dispersion of the flechettes. The conical angle of dispersion is approximately 14 degrees.

Tabulated Data:

Complete round:

Type	-----	Canister
Weight	-----	39.30 lbs.

Length ----- 34.07 in.
 Cannon used with ---- M36, M41 or M54
 Projectile
 Body material ----- Steel
 Color ----- Olive drab w/white
 marking and white
 diamonds
 Filler and weight ---- 5,600-gr. flech-
 ettes 6.8 lbs.

Components
 Cartridge case ----- M108B1
 Propelling
 charge ----- M6-9.0 lbs.
 Primer ----- M58 percussion
 Performance
 Minimum range ----- 0 meters
 Maximum range ----- 402 meters
 (440 yds.)
 Muzzle velocity ----- 851 mps.
 (2,950 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 hrs/day)

*Packing ----- 1 round per fiber
 container, 2 con-
 tainers per wooden
 box

*Packing Box
 Weight ----- 118 lbs.

Dimensions ----- 40-5/16 x 12-15/16
 x 8-5/32 in.
 Cube ----- 2.5 cu. ft.

*NOTE: See SC for complete packing data
 including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 5
 Storage
 compatibility ----- E
 DOT shipping class ----- B
 DOT designation ----- AMMUNITION FOR
 CANNON WITH
 SOLID PROJEC-
 TILES
 DODAC ----- 1315-C601
 Drawing number ----- 9214706

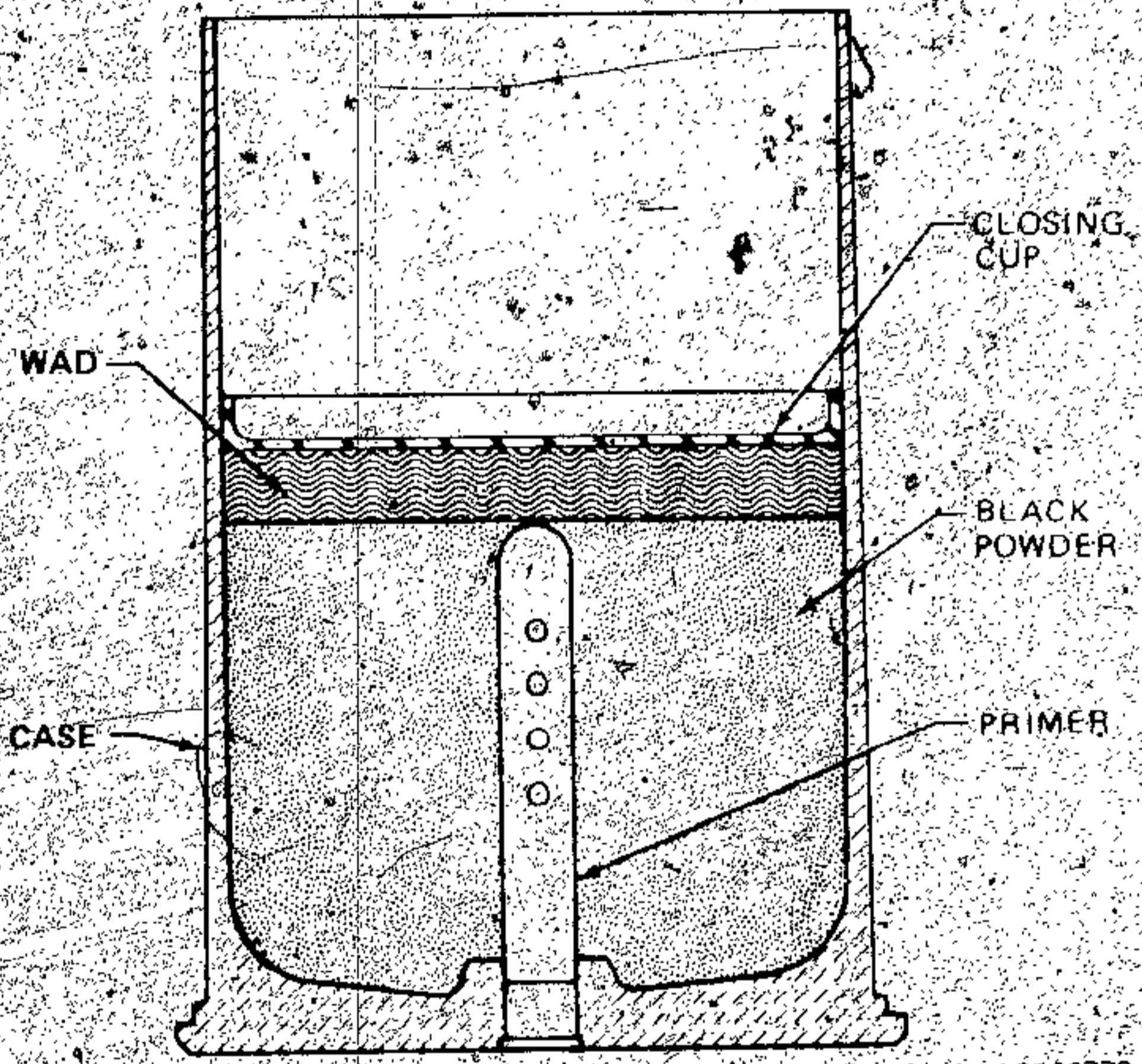
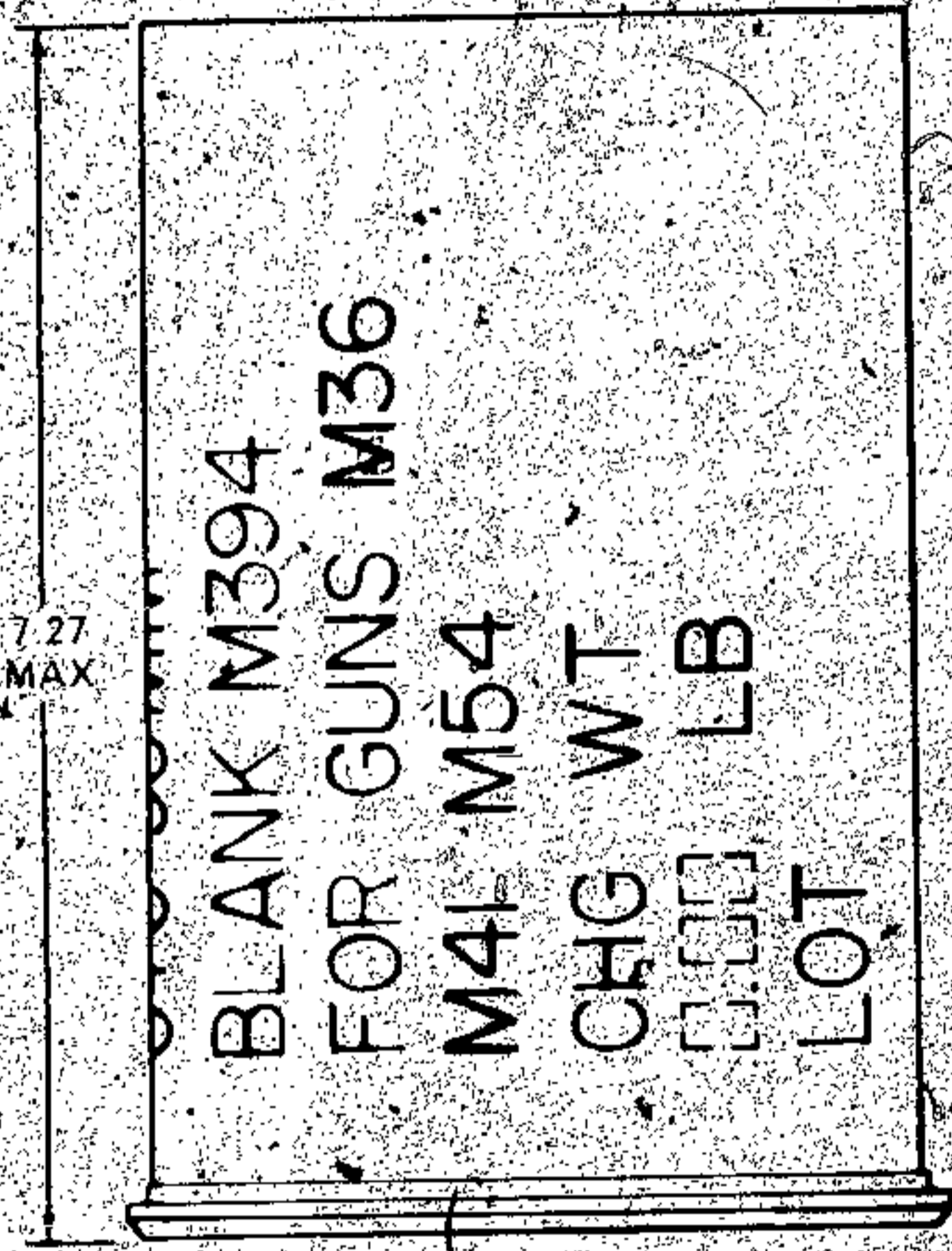
Limitations:

Before firing, clear friendly personnel from
 dispersion cone area. Firing over the heads of
 friendly troops is prohibited.

References:

SC 1305/30-IL
 SB 700-20
 DARCOM P. 700-3-3
 TM 9-1300-251-20
 TM 9-2350-224-10
 TM 9-7012

CARTRIDGE, 90-MILLIMETER: BLANK, M394



Type Classification:

Std OTCM 38091 dtd 1962

Use:

This blank cartridge is provided for saluting purposes and simulated firing in 90-mm guns.

Description:

The cartridge consists of a cartridge case, a primer, and a charge of black powder. A polystyrene closing cup is used to seal the charge inside the case.

Functioning:

After the primer is initiated by the firing pin of the weapon, the black powder charge is ignited, producing a loud report and flash.

Tabulated Data:

Complete round:

Type ----- Blank
 Weight ----- 8.23 lbs.
 Length ----- 7.27 in.

Cannon used with ---- M36, M41 or M54
 Components:

Body material ----- Brass or aluminum
 Filler and weight ---- Black powder and potassium nitrate-1.75 lb.
 Cartridge case ----- M27, M27B1
 Primer ----- M1A2

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 hrs/day)

* Packing ----- 1 cartridge in fiber container; 8 containers per wooden box

* Packing Box:

Weight ----- 98.6 lbs.

Dimensions ----- 25-13/16 x 12-15/16 x 10-23/32 in.

Cube ----- 2.12 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 4

Storage compatibility ----- E

DOT shipping class ----- B

DOT designation ----- AMMUNITION FOR CANNON WITHOUT PROJECTILES

DODAC ----- 1315-C261

Drawing number ----- 7549210

Limitations:

Closure debris from blank ammunition can be expelled a distance of 300 feet forward of the weapon muzzle.

References:

SC 1305/30-IL

SB 700-20

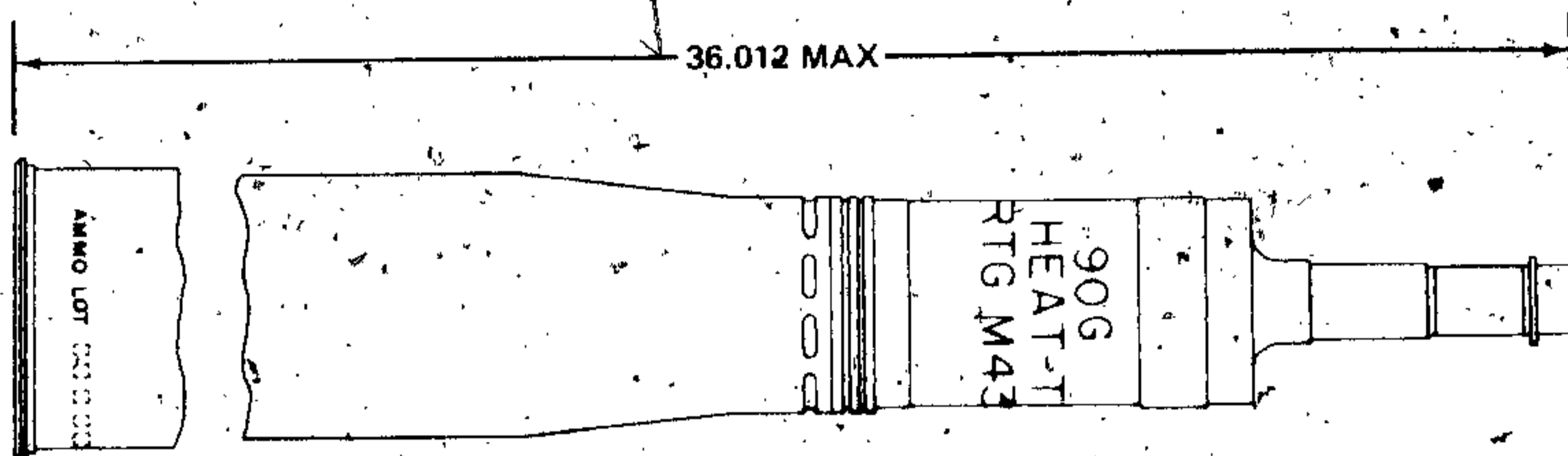
AMCP 700-3-3

TM 9-1300-251-20

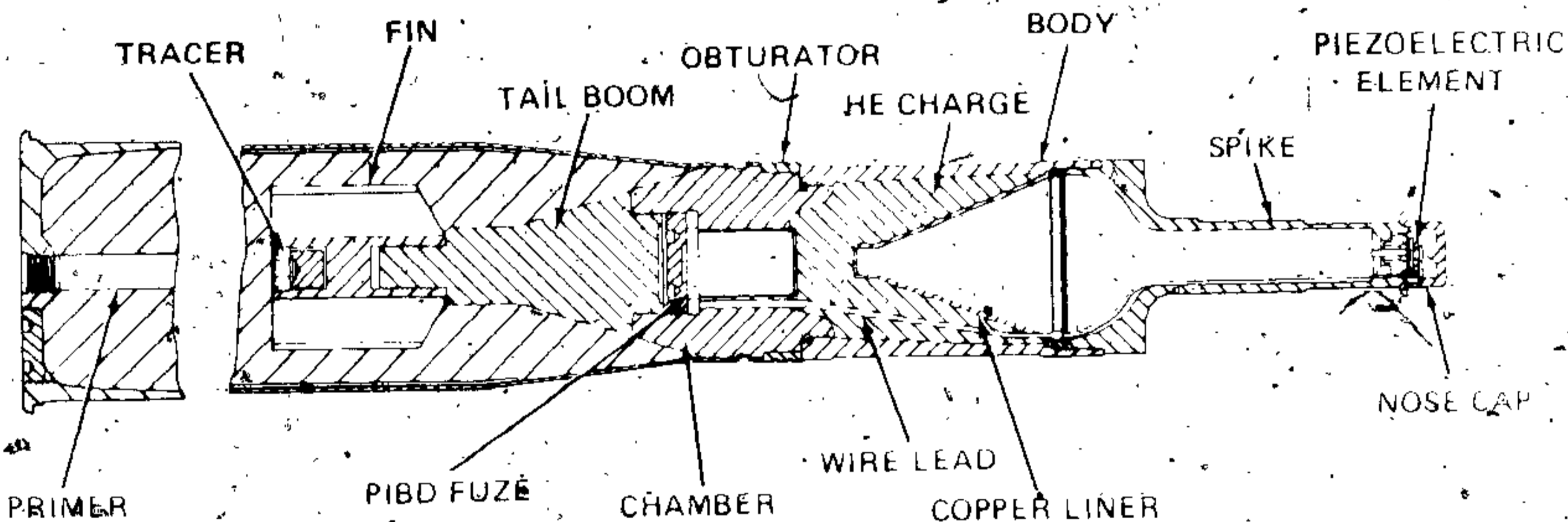
TM 9-2350-224-10

TM 9-7012

CARTRIDGE, 90-MILLIMETER: HEAT-T, M431 (T300E59), M431A1 AND M431A2



AR199837



AR199836

Type Classification:

Std AMCTC 8823 dtd 1971

Use:

Cartridges of the M431 series are intended for use in 90-mm guns against armored targets.

Description:

The projectile consists of a steel body, a threaded stand-off spike assembly, an aluminum chamber, and a fin and boom assembly. A funnel-shaped liner contained in the body shapes the high explosive charge. The chamber adapts the fin and boom assembly to the body and contains the BD fuze. The projectile is fitted with

a plastic obturator band. The nose cap, containing a piezoelectric element, is fitted to the spike assembly. The tracer is threaded to the fin. The cartridge case base is fitted with a threaded loading plug and a percussion primer.

Functioning:

When the weapon is fired, the primer ignites the propelling charge. The burning propellant generates gases to propel the projectile out of the gun tube and ignites the tracer, which burns for a minimum of 2500 yards. The projectile is detonated on impact by fuze functioning. On detonation the cone collapses, creating an intensely focused high-velocity shock wave, and a jet of metal particles that penetrates the target.

Difference Among Models:

Cartridge M431A1 is similar to the M431 except that the cartridge case contains a wax-impregnated titanium dioxide (TiO₂) liner designed to reduce gun wear. A TiO₂ additive liner with high melt wax and a mylar barrier is used on cartridge M431A2.

Tabulated Data:

Complete round:

Type ----- HEAT-T
 Weight ----- 33 lbs.
 Length ----- 36 in.
 Cannon used with --- M36, M41
 or M54

Projectile:

Body material----- Steel
 Color ----- Black w/yel-
 low marking
 Filler and weight --- Composition B-
 1.2 lbs.

Components:

Cartridge case----- M114A1
 Propelling charge --- M30-8.25 lbs.
 Primer----- M79
 Tracer ----- M13
 Fuze ----- PIBD-M509A1

Performance:

Maximum range ----- 8,138 meters
 (8,900 yds.)
 Muzzle velocity ----- 1,216 mps
 (4,000 fps)

Temperature Limits:

Firing:

Lower limit----- - 40°F
 Upper limit----- + 125°F (M431
 and M431A1)
 + 140°F (M431A2)

Storage:

Lower limit----- - 65°F

Upper limit ----- + 125°F (M431
 and M431A1)
 + 145°F (M431A2)
 * Packing ----- 1 round per fiber
 container; 2 con-
 tainers per wooden
 box

* Packing Box:

Weight ----- 106 lbs.
 Dimensions----- 40-1/2 x 12-3/8
 x 6-5/8 in.
 Cube----- 1.9 cu ft

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 5
 Storage
 compatibility ----- E
 DOT shipping class----- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES
 DODAC ----- 1315-C294
 Drawing number----- 8822481

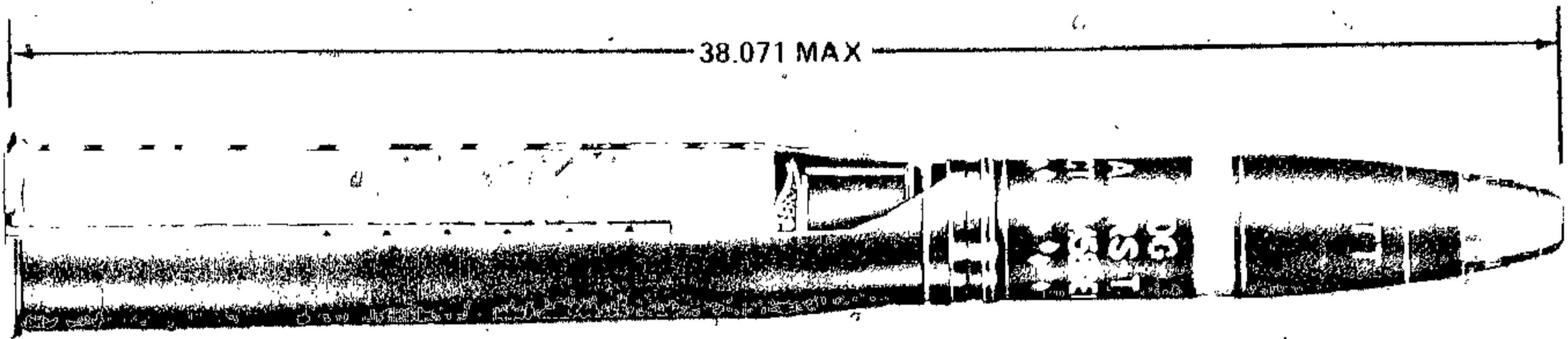
Limitations:

Because of the low melting point of the wax used in M431A1 cartridges, tank-transported cartridges that are exposed to temperature above + 120°F shall not be fired.

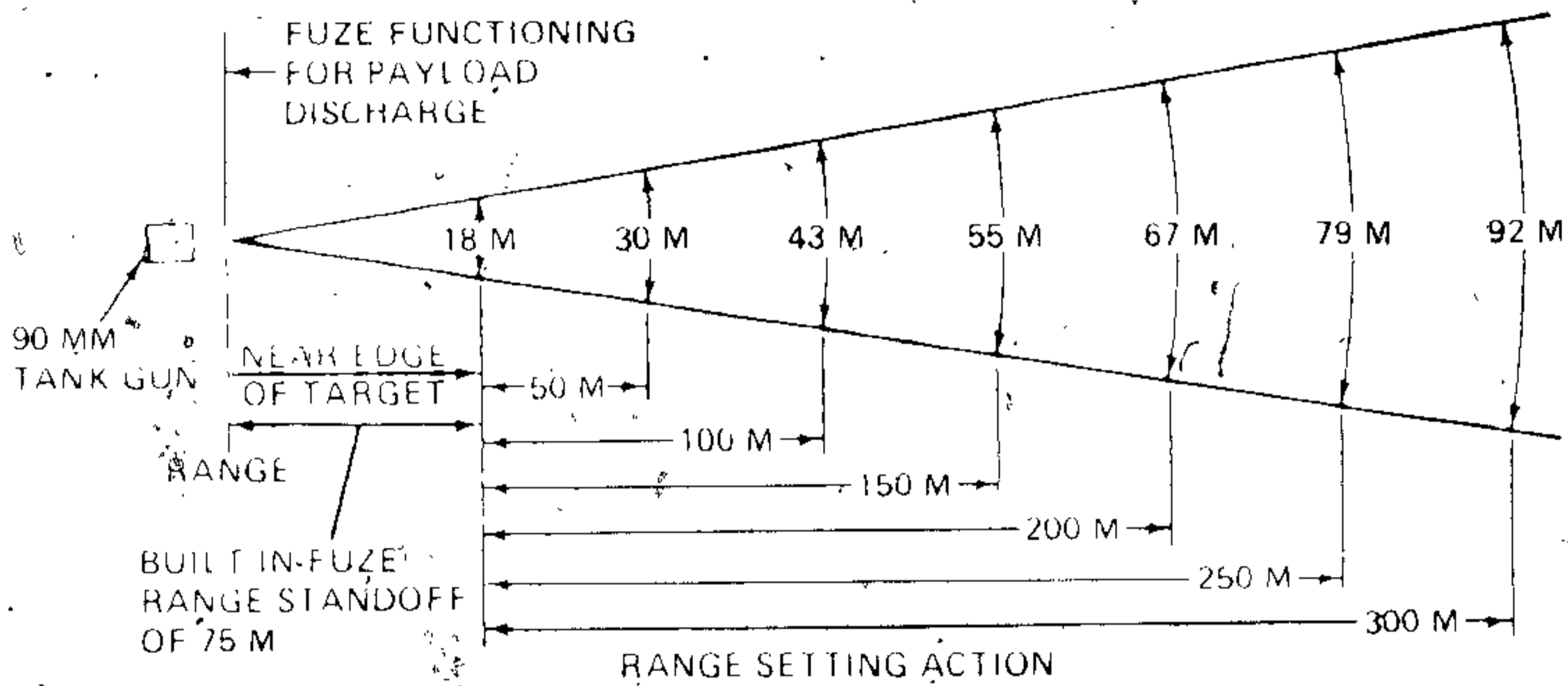
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1300-251-20
 TM 9-2350-224-10
 TM 9-7012

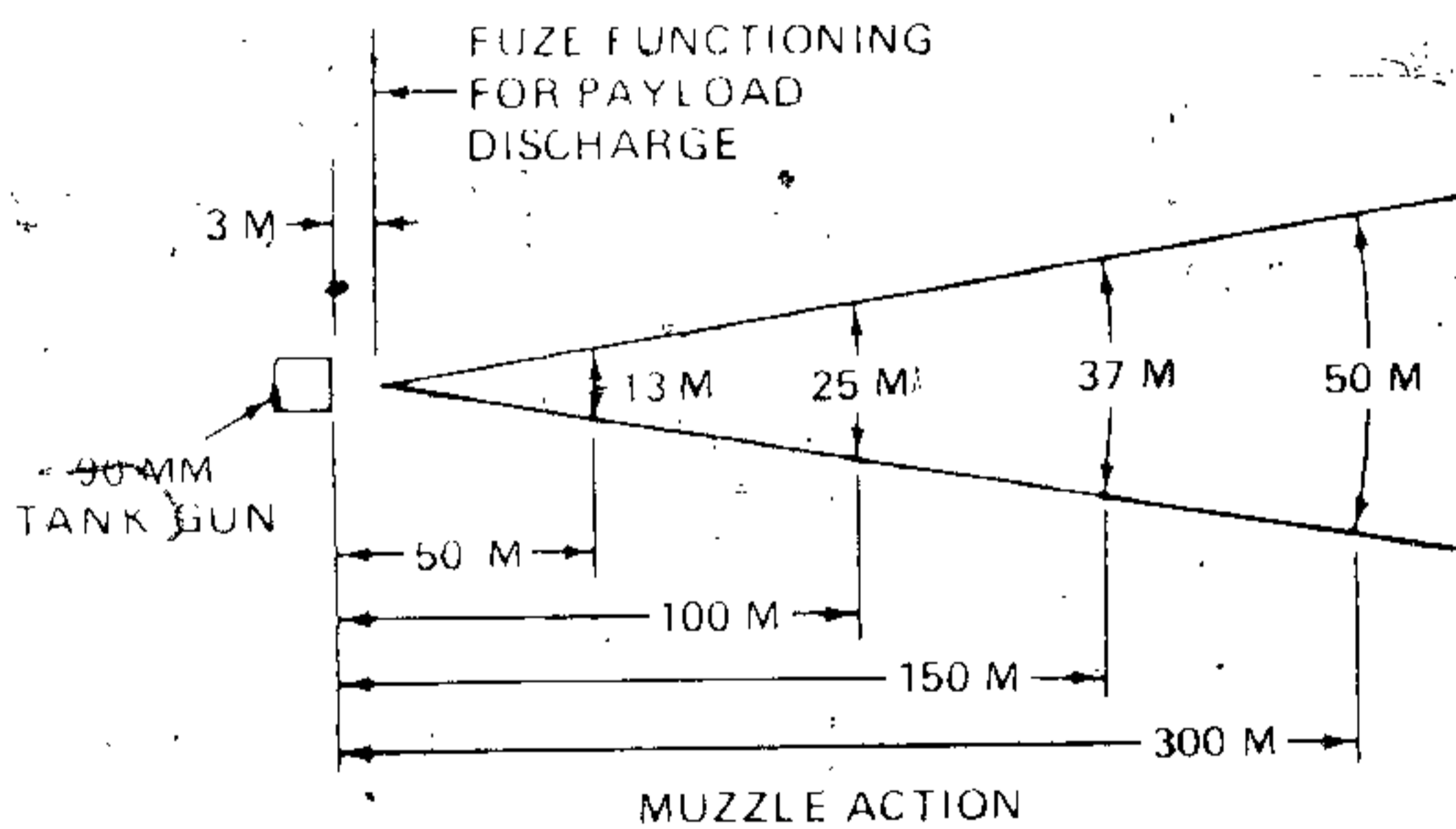
CARTRIDGE, 90-MILLIMETER: APERS-T, M580



AR199847



AR199846



AR199883

Type Classification:

Std AMCTC 9575 dtd 1972

Use:

This fixed cartridge is fired from 90-mm guns and is for antipersonnel use at both close

and long ranges. The cartridge is particularly effective against personnel in dense foliage.

Description:

The projectile consists of an aluminum forward body, a steel connector, and a hollow steel

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base. Threaded to the forward body is an aluminum fuze adapter containing four radially oriented detonators and an axially oriented flash tube relay and detonator. The central steel flash tube connects the projectile base to the detonator in the fuze adapter. The body is loaded with flechettes and also contains a yellow dye mixture that serves as a spotting charge. A plastic bag of flake propellant is located in the hollow base. An MT fuze is assembled to the fuze adapter, and a tracer is attached to the base of the projectile. The projectile is crimped to a cartridge case loosely filled with propellant and fitted with a percussion primer.

Functioning:

When the weapon is fired, the primer ignites the propellant. The burning propellant ignites the tracer and creates gases which propel the projectile from the gun tube. The fuze will arm immediately and will function according to the time setting. The fuze functions as soon as the projectile leaves the weapon if set for muzzle action. If set for range, the fuze will function 75 to 100 meters short of set range. This built in standoff is designed to assure maximum application of the dispersion pattern to the target. Concurrently with fuze functioning, the four radially oriented detonators and the axially oriented detonator and relay in the fuze adapter are exploded. Detonation of the radially oriented detonators rips open the forward skin of the projectile ogive, permitting the flechettes in the forward section to be acted upon by centrifugal force. The axially oriented detonator and relay flash through the tube to ignite the base charge. Pressure from the burning charge forces the flechettes and spotting charge forward and out of the projectile. The combination of forward and centrifugal forces results in a conical dispersal pattern. The spotting charge marks the approximate fuze functioning point, allowing adjustment of fire for maximum effect.

Tabulated Data:

Complete round:
 Type ----- APERS-T
 Weight ----- 41.25 lbs.
 Length ----- 38.071 in.
 Cannon used with ----- M36, M41 or M54

Projectile:

Body material ----- Steel/aluminum
 Color ----- Olive drab w/white marking and white diamonds
 Filler and weight ----- 4,200-8 gr. flechettes-4.5 lbs.

Components:

Cartridge case ----- M200.
 Propelling charge ----- M6, 9.0 lbs.
 Primer ----- M58 percussion
 Tracer ----- M13-Red-G 13 lb.
 Base charge ----- M9-25 gr.
 Fuze ----- MT, M711

Performance:

Maximum range ----- 4,389 meters (4,800 yds.)
 Muzzle velocity ----- 914.4 mps (3,000 fps)
 Maximum effective range (from point of fuze functioning) ----- 300 meters (328 yds.)

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 hrs day)

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

* Packing Box:

Weight ----- 128 lbs.
 Dimensions ----- 44-13/16 x 13-3/16 x 8-7/16 in.
 Cube ----- 2.8 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 5
 Storage compatibility ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION, FOR CANNON WITH EXPLOSIVE PROJECTILES

TM 43-0001-28

DODAC ----- 1315-C275

Drawing number ----- 9216454

Limitations:

Before firing, clear friendly personnel from dispersion cone area. Firing over the heads of friendly troops is prohibited.

References:

SC 1305/30-IL

SB 700-20

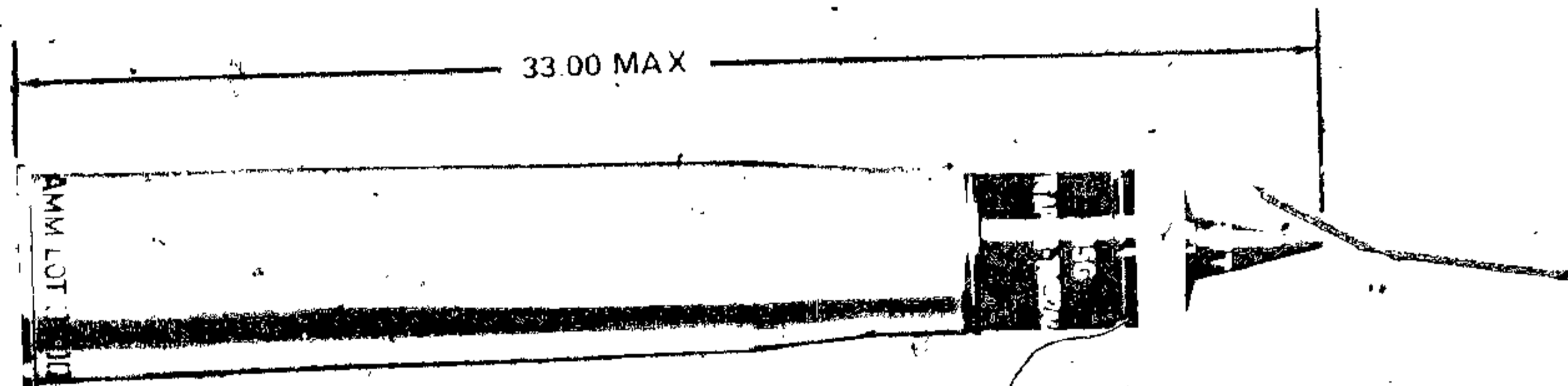
AMCP 700-3-3

TM 9-1300-251-20

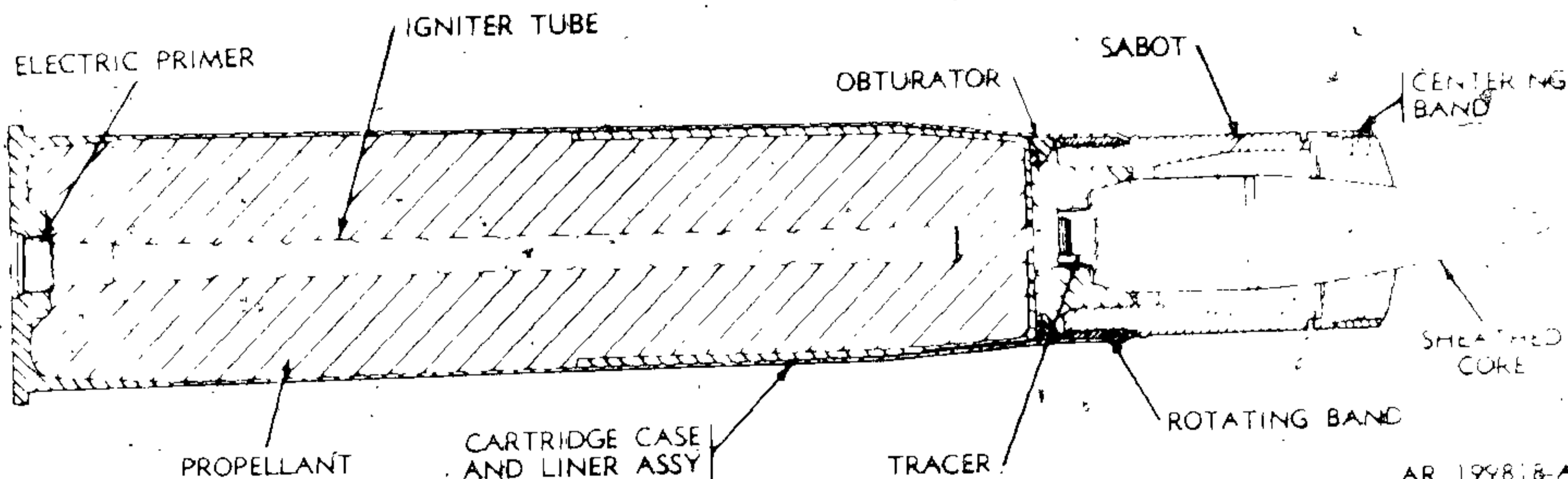
TM 9-2350-224-10

TM 9-7012

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



AR199819



AR 199818-A

Type Classification:

- M392A2 ----- Std MSR 02787001
- M392 ----- Std OTCM 38116 -
dtd 1961

Use:

This cartridge is a hypervelocity armor-piercing type with discarding sabot, intended for use in 105-mm 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 target solely by kinetic energy.

Difference Between Models:

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

Tabulated Data:

Complete round:

Type ----- APDS-T
 Weight ----- 41.0 lbs.
 Length ----- 33.0 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 meters (40,162 yds.)
 Muzzle velocity ----- 1,478 mps (4,850 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 hrs/day)

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

* Packing Box:

Weight ----- 126 lbs.
 Dimensions ----- 39-7/8 x 14-1/8 x 8-23/32 in.
 Cube ----- 2.8 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 4
 Storage compatibility ----- E
 DOT shipping class ----- B
 DOT designation ----- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
 DODAC ----- 1315-C505, C506
 Drawing number ----- 8863427

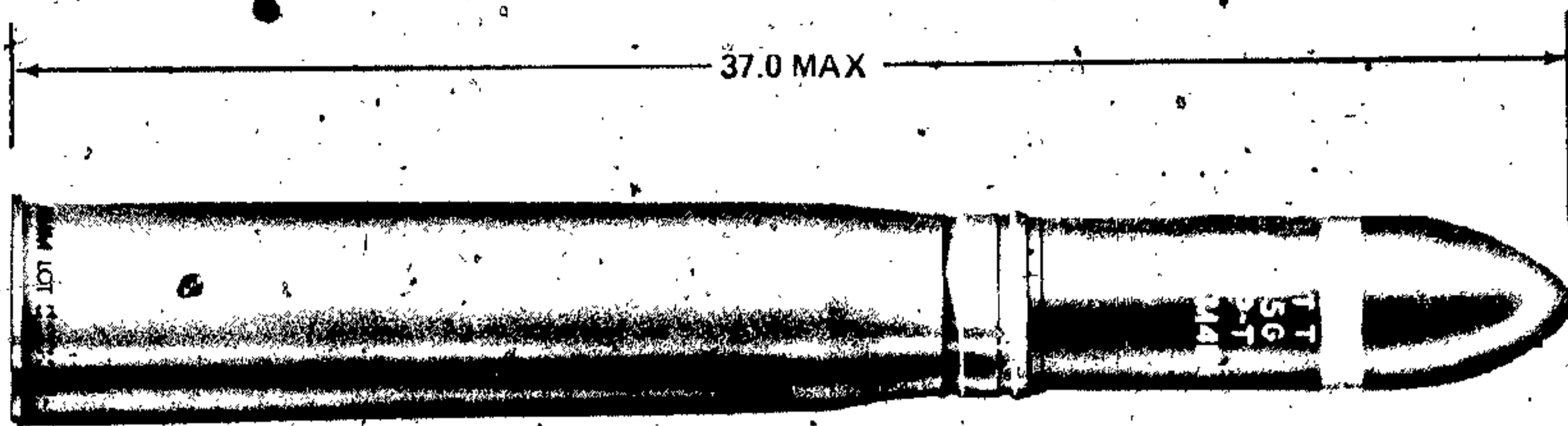
Limitations:

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

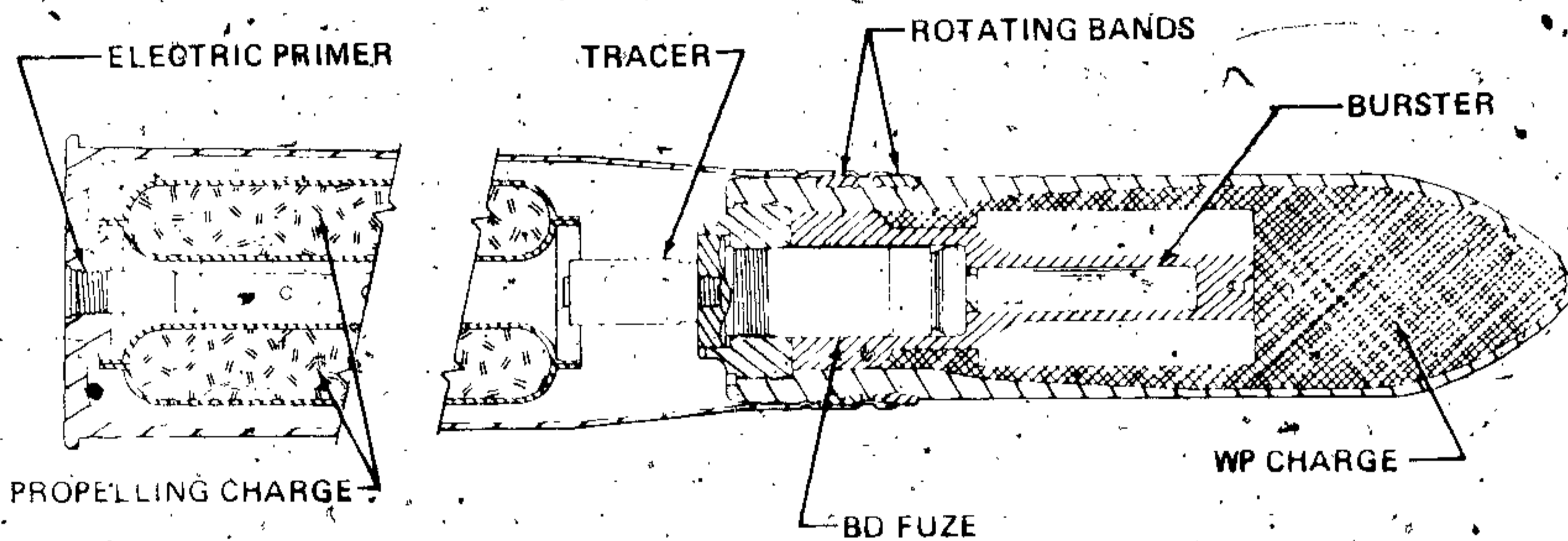
References:

- SC 1305/30-IL
- SB 700-20
- DARCOM P 700-3-3
- TM 9-1000-213-35
- TM 9-1300-251-20
- TM 9-2350-215-10

CARTRIDGE, 105-MILLIMETER: SMOKE, WP-T, M416.



AR199815



AR199814

Type Classification:

Std. AMCTC 2173 dtd 1964.

Use:

This cartridge is intended for screening and spotting fire from 105-mm gun cannons. There is some limited incendiary effect.

Description:

The thin walled projectile is cylindrical in shape with a relatively short ogive and is fitted with two gilding metal rotating bands. The projectile is loaded with white phosphorous (WP) and has a base detonating fuze and an extended tracer. The shell contains a centrally oriented

burster of Composition B. To increase in-flight stability at temperatures above +110° F, the burster casing is machined with a six-bladed impeller which extends into the WP filler. 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 six seconds. On impact, the fuze functions and detonates the burster charge which ruptures the projectile and disperses the WP filler. On contact with the air white phosphorous ignites, producing a dense cloud of smoke.

Tabulated Data:

Complete round:

Type ----- Smoke (WP-T)
 Weight ----- 45.5 lbs.
 Length ----- 37.0 in.
 Cannon used with ----- M68

Projectile:

Body material ----- Steel
 Color ----- Light green w/yel-
 low band and light
 red markings
 Filler and weight ----- White phosphorous-
 6.0 lbs.

Components:

Cartridge case ----- M150B1, M150
 Propellant ----- M1
 Primer ----- M86
 Tracer ----- M12
 Burster ----- M48
 Fuze ----- BD, M534

Performance:

Maximum range ----- 9,150 meters
 (10,000 yds)
 Muzzle velocity ----- 730 mps (2,400 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 hrs/day)
 * Packing ----- 1 round per fiber con-
 tainer; 2 containers
 per wooden box.

* Packing Box:

Weight ----- 137 lbs.
 Dimensions ----- 44 x 14-7/8 x
 8-7/8 in.
 • Cube ----- 3.22 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 5
 Storage/compatibility ----- A
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITH
 SMOKE PROJEC-
 TILES
 DODAC ----- 1315-C512
 Drawing number ----- 8886487

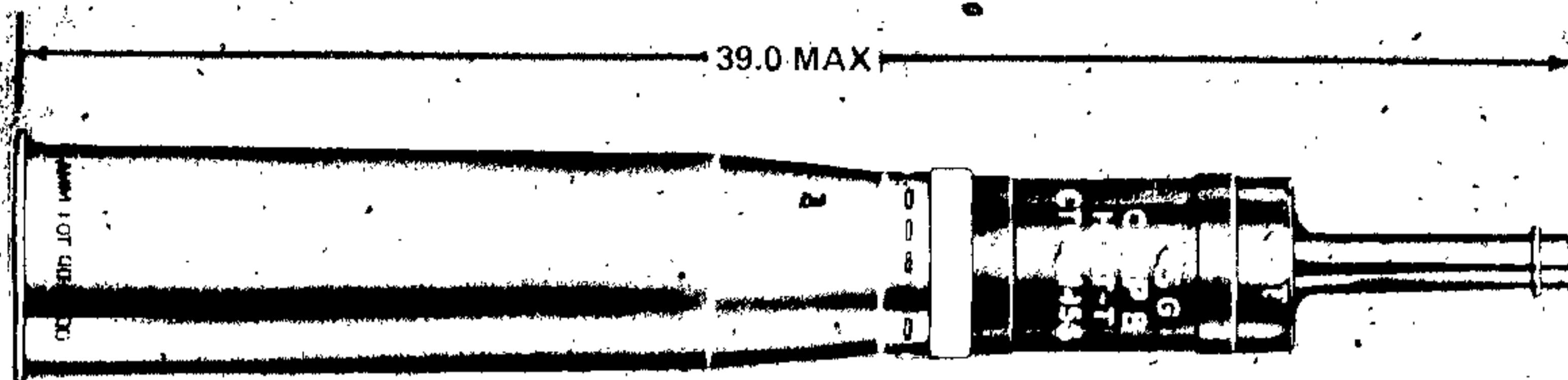
Limitations:

Store and transport WP rounds at tempera-
 tures below 111.4° F (melting point of WP). If
 impractical, store rounds on bases, so that if
 WP melts it will resolidify with void space in
 normal position in the nose of the projectile.
 Erratic performance may occur if voids exist
 inside of WP filler.

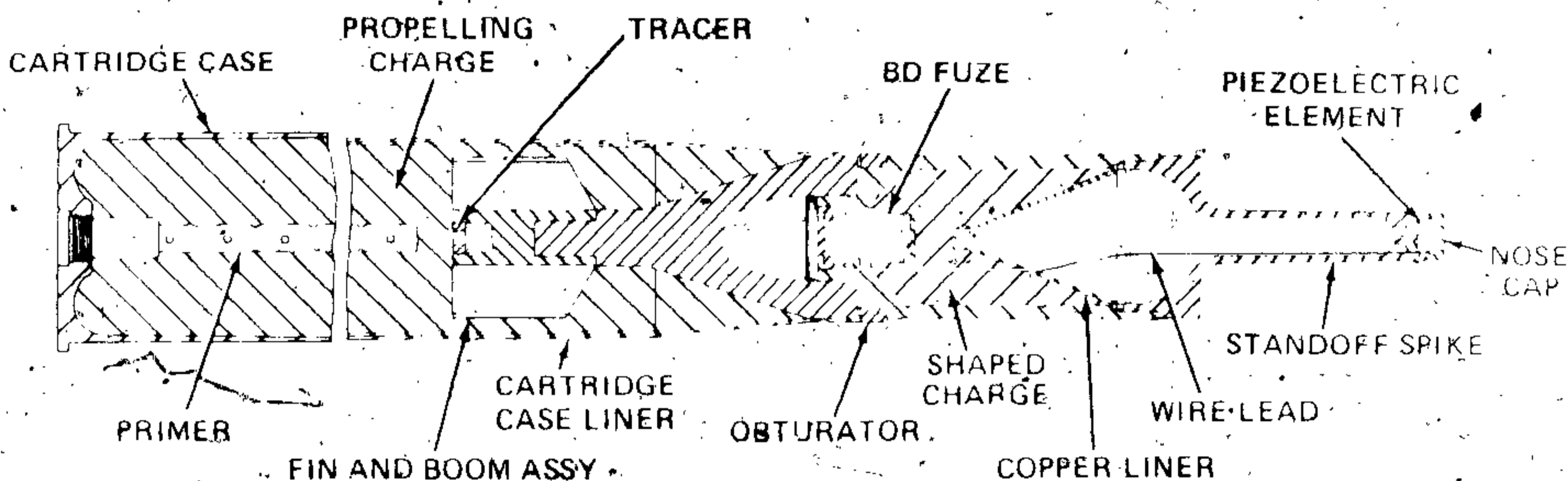
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1015-203-12
 TM 9-1015-234-12
 TM 9-1300-251-20
 TM 9-2350-217-10

CARTRIDGE, 105-MILLIMETER: HEAT-T, M456 SERIES



AR199817



A7199816

Type Classification:

Std AMCTC 4877 dtd 1966 (M456A1)
Obs MSR 11756003 (M456)

Use:

This cartridge is a high explosive antitank cartridge and is intended for use in 105-mm guns against armored targets.

Description:

The steel body projectile is fitted with a plastic obturator, a threaded standoff spike assembly, a fin and boom and a PIBD fuze. A funnel-shaped copper liner within the body shapes the explosive charge of Comp B. A piezoelectric element retained in a nose cap is fitted to the spike assembly, and is connected

to the BD fuze in the body. The fin is threaded to receive a tracer.

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. On impact, fuze functioning detonates the projectile and the cone collapses, creating a high velocity focussed shock wave and a jet of metal particles that penetrates the target.

Difference Among Models:

The three models in the M456 series differ in the use of cartridge case liners. The M456A1

has a cloth liner coated on one side with a wax-titanium dioxide admixture covered with mylar film. The M456E1 has a similar liner without the mylar film. The M456 has no liner. The M456A1 also differs from other models in the series in that all projectile bodies manufactured after August 1967 entirely enclose the fuze. Earlier M456A1 production as well as all M456E1 and M456 models are assembled with an aluminum chamber.

Calculated Data:

Complete round:

Type ----- HEAT-T
 Weight ----- 48 lbs.
 Length ----- 30.0 in.
 Cannot used with ----- M68

Projectile

Body material ----- Steel
 Color ----- Black w/white
 markings and
 yellow band

Filler and weight ----- Comp B. -2.14 lbs.

Components:

Cartridge case ----- M148A1B1
 Propellant ----- M30
 Primer ----- M83
 Tracer ----- M13
 fuze ----- PIBD-M509A1

Performance

Muzzle velocity ----- 1173 mps
 (3850 fps)
 Maximum range ----- 8200 meters
 (8975 yds)

Temperature Limits:

Temperature:

Lower limit ----- - 40°F
 Upper limit ----- + 140°F

Storage:

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

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

*Packing Box:

Weight ----- 132 lbs.
 Dimensions ----- 45-13/16 x 14-3/16
 x 8-25/32 in.
 Cube ----- 3.3 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 5
 Storage
 compatibility ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES
 DODAC ----- 1315-C508
 Drawing number ----- 8861065

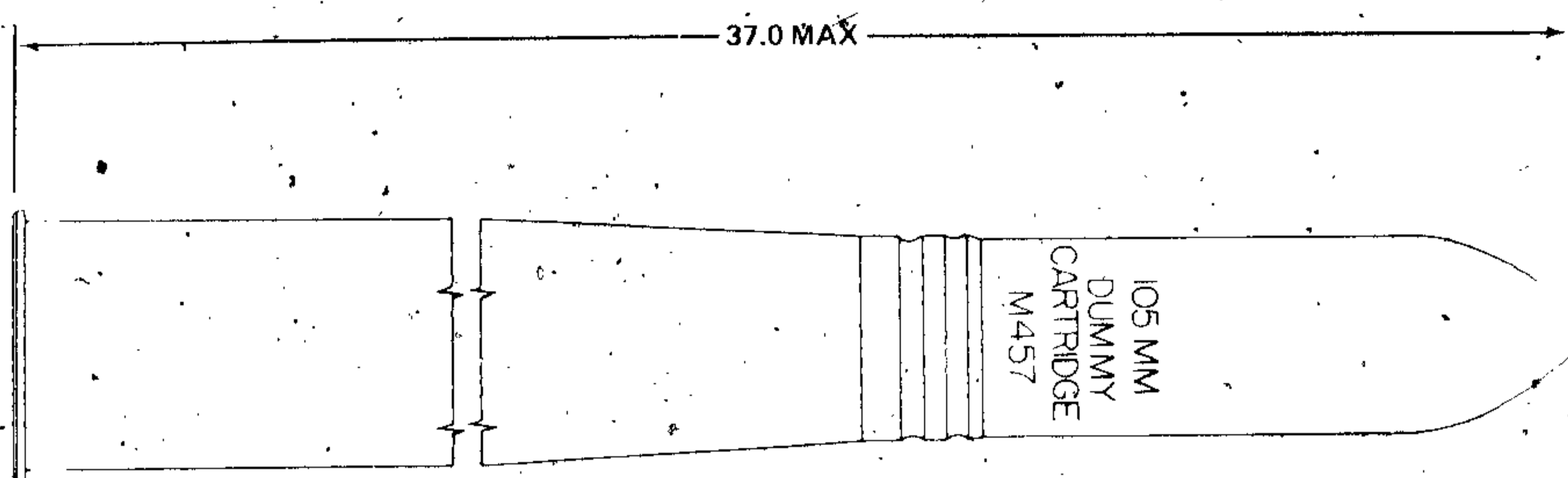
Limitations:

Do not fire Cartridges M456E1 which have been tank-transported at temperatures above 120°F.

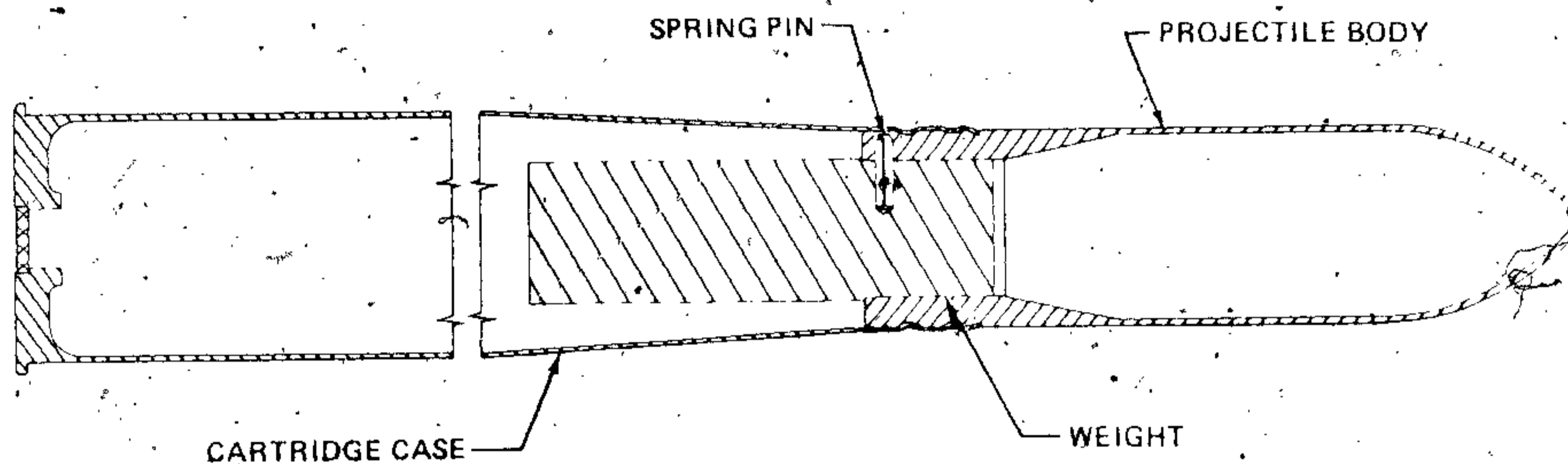
References:

SC 1305/30-IL
 SB 700-20
 DARCOM P 700-3-3
 TM 9-1300-251-20
 TM 9-2350-215-10

CARTRIDGE, 105-MILLIMETER: DUMMY, M457



AR199809



AR199808

Type Classification:

Std. AMCTC 639 dtd 1962

Use:

This dummy cartridge is used as a drill round to train tank crews in handling ammunition and loading the 105-mm gun cannon.

Description:

The cartridge simulates a loaded round of 105-mm HEP ammunition in size, weight, and center of gravity. The projectile is of steel, and is secured to the cartridge case by crimping. A steel weight is assembled to the rear

of the projectile and is held in place with a spring pin.

Functioning:

The cartridge is completely inert and does not function.

Tabulated Data:

Complete round:

Type ----- Dummy
 Weight ----- 44 lbs.
 Length ----- 37 in.
 Cannon used with ----- M68

Projectile:

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

(Later manufacture unpainted on bronze body)

Components:

Cartridge case ----- M148A1B1
 Propelling charge --- N/A
 Primer ----- N/A
 *Packing ----- 1 round per fiber
 container; 2 con-
 tainers in wooden
 box

*Packing Box:

Weight ----- 137 lbs.
 Dimensions ----- 43-1/2 x 14
 x 8-1/2 in.
 Cube ----- 3.0 cu. ft.

*NOTE See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- N/A
 Storage compatibility --- N/A

DOT shipping class ---- N/A
 DOT designation ----- NON-EXPLOSIVE
 AMMUNITION
 DODAC ----- 1315-C514
 Drawing number ----- 10534154

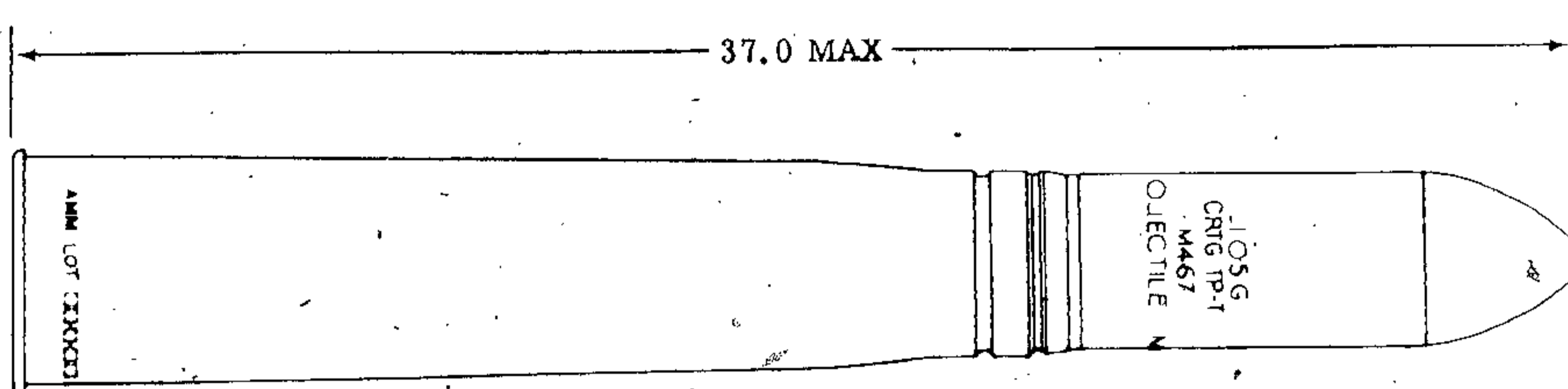
Limitations:

None

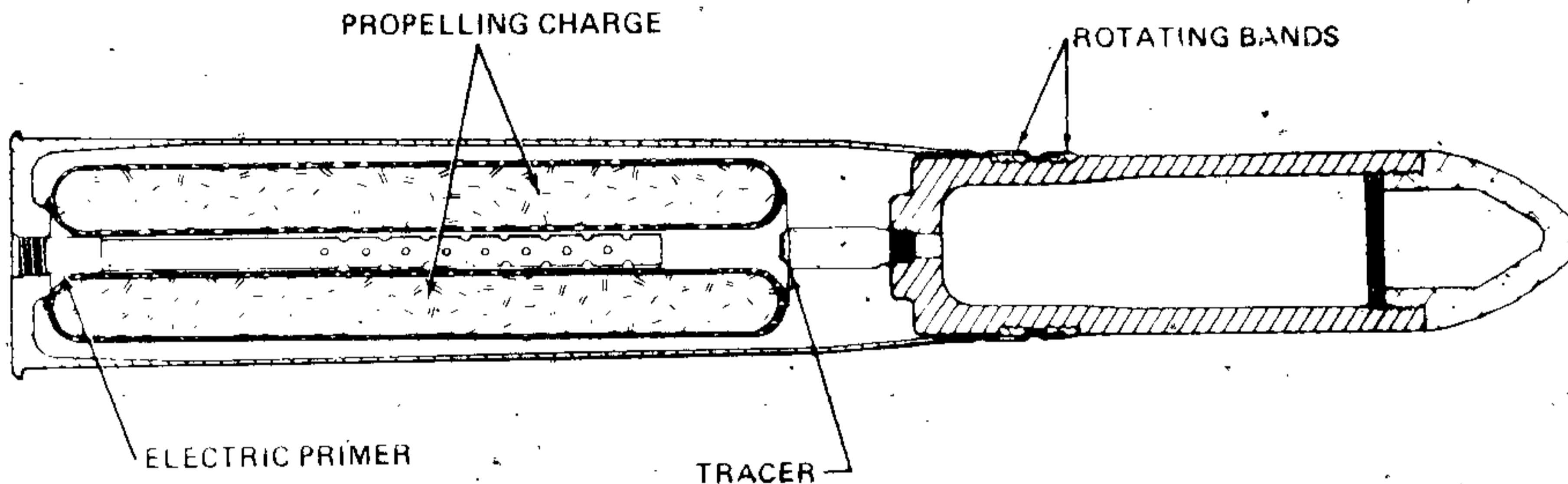
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1300-251-20
 TM 9-2350-215-10

CARTRIDGE, -105 MILLIMETER: TP-T, M467



AR199811



AR199810

Type Classification:

Std. MSR 0173625 dtd 1973

Use:

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

Description:

This cartridge is similar in appearance and ballistically matched to high explosive (HEP) service rounds. The projectile consists of a steel body and is 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	-----	45.0 lbs.
Length	-----	37.0 in.
Cannon used with	----	M68

Projectile:

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

Components:

Cartridge case-----M150B1, M150
 Propelling charge ---M1
 Primer-----M86
 Tracer-----M12

Performance:

Maximum range-----9,510 meters
 (10,400 yds.)
 Muzzle velocity ----730 mps (2,400
 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 hrs/day)

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

*** Packing Box:**

Weight-----137 lbs.
 Dimensions----- 43-1/2 x 14 x
 8-1/2 in.
 Cube-----3.0 cu ft.

* NOTE: See SC for complete packing data
 including NSN's.

Shipping and Storage Data:

Quantity-distance
 class -----5
 Storage compatibility ---E
 DOT shipping class-----B
 DOT designation -----AMMUNITION FOR
 CANNON WITH
 EMPTY PROJEC-
 TILES
 DODAC -----1315-C510
 Drawing number -----8863618

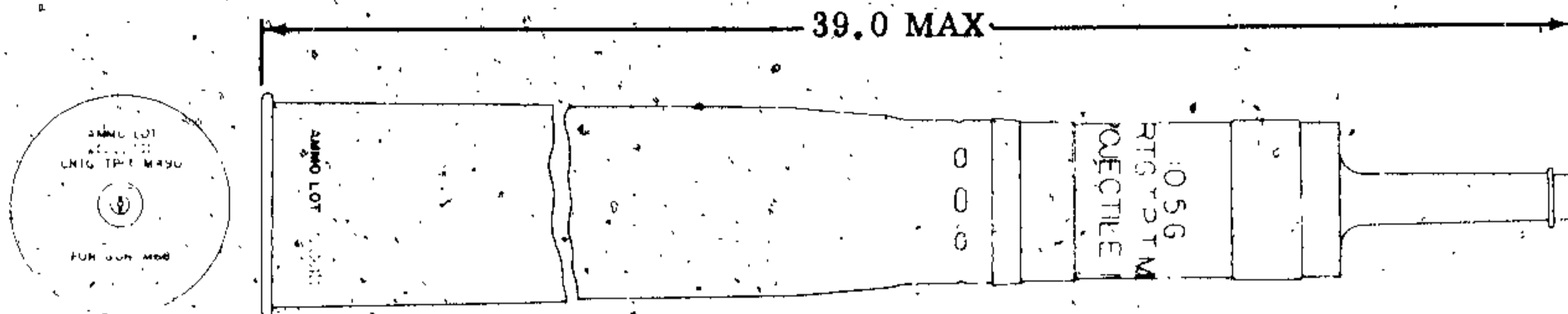
Limitations:

None

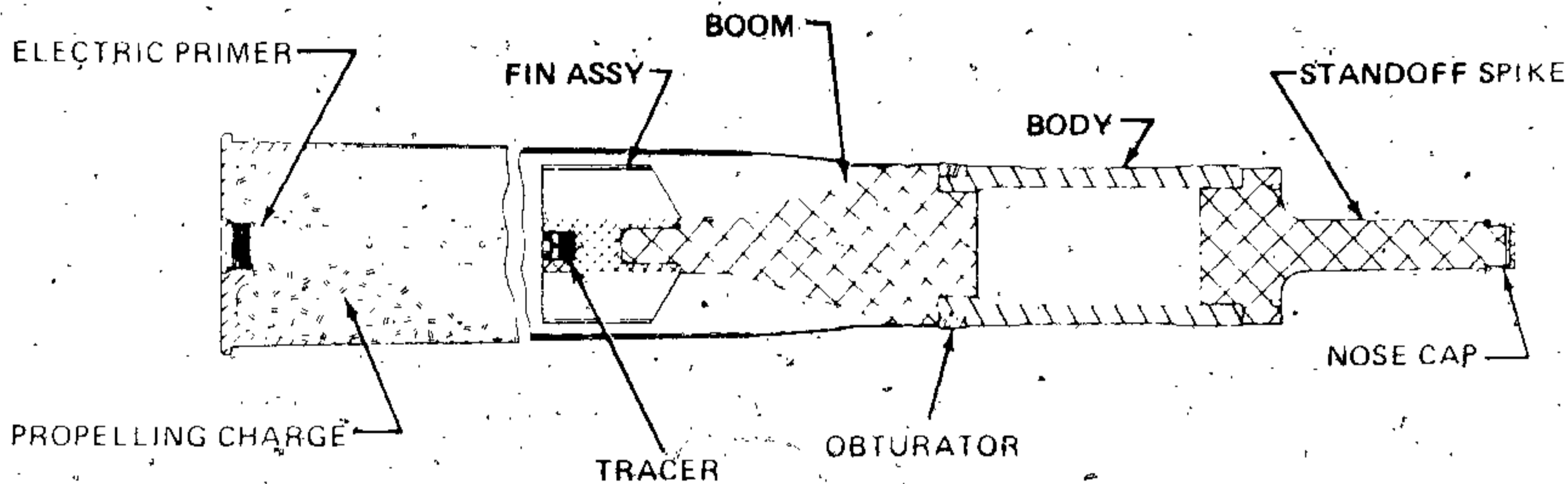
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1300-251-20
 TM 9-2350-215-10

CARTRIDGE 105-MILLIMETER: TP-T, M490



AR199813



AR199812

Type Classification:

Std. AMCTC 1103 dtd 1963.

Use:

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

Description:

The cartridge is similar in external appearance and ballistically matched 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 lbs.
 Length -----39.0 in.
 Cannon used with ----M68

Projectile:

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

Components:

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

Performance:

Maximum range ----- 8,207 meters
 (8,975 yds)
 Muzzle velocity ----- 1,170 mps (3,850
 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 hrs/day)

* Packing ----- 1 round per fiber
 container; 2 con-
 tainers per wooden
 box.

* Packing Box:

Weight ----- 132 lbs.
 Dimensions ----- 45-7/8 x 14-1/4
 x 8-3/4 in.
 Cube ----- 3.3 cu. ft.

*NOTE: See SC for complete packing data
 including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 4
 Storage compatibility --- E
 DOT shipping class ----- B
 DOT designation ----- AMMUNITION FOR
 CANNON WITH
 EMPTY PROJEC-
 TILES
 DODAC ----- 1315-C511
 Drawing number ----- 8865533

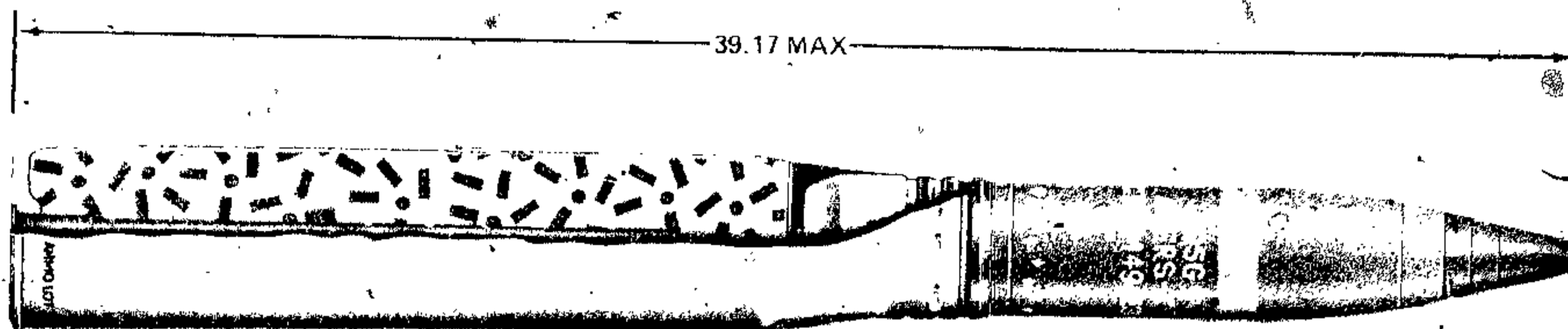
Limitations:

Cartridges M490 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 tempera-
 tures above + 120° F.

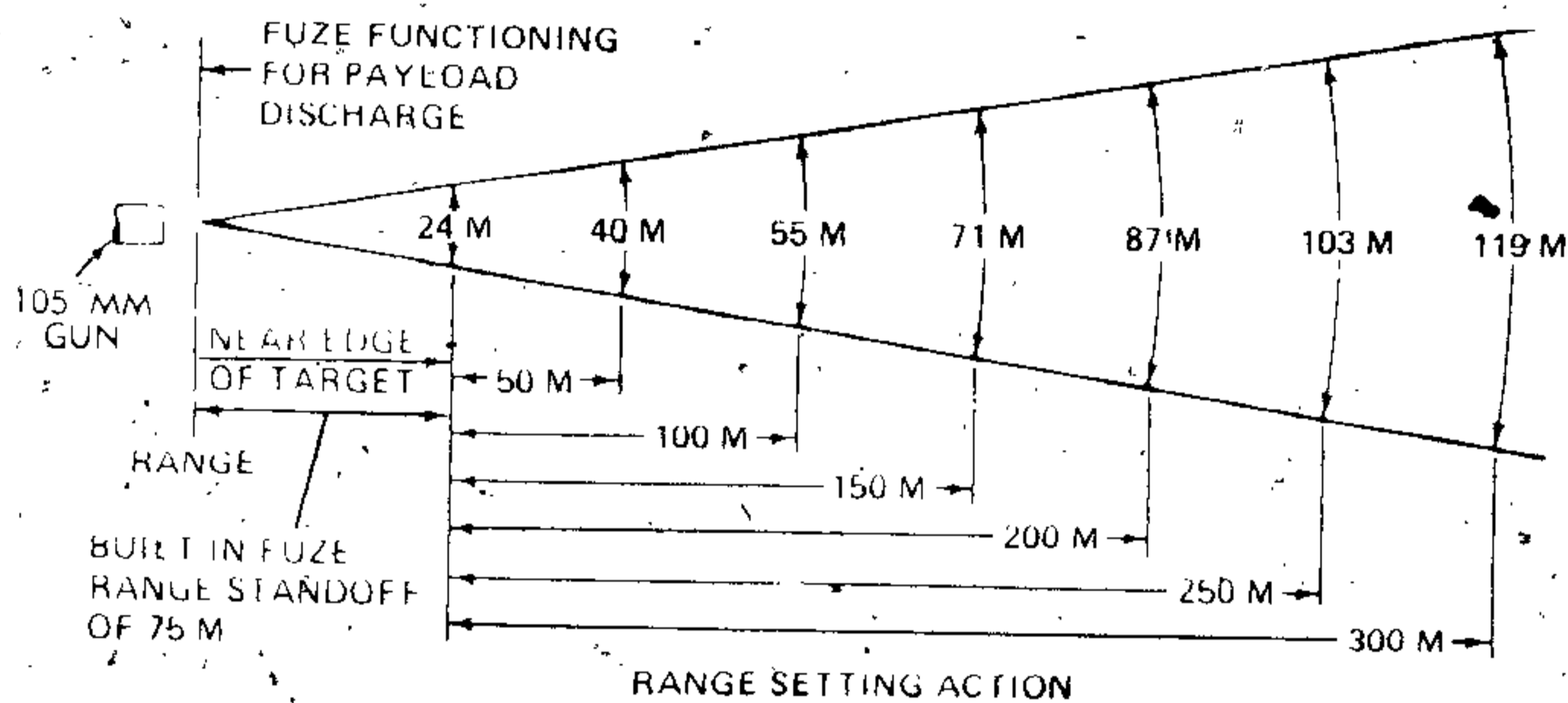
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1300-251-20
 TM 9-2350-215-10

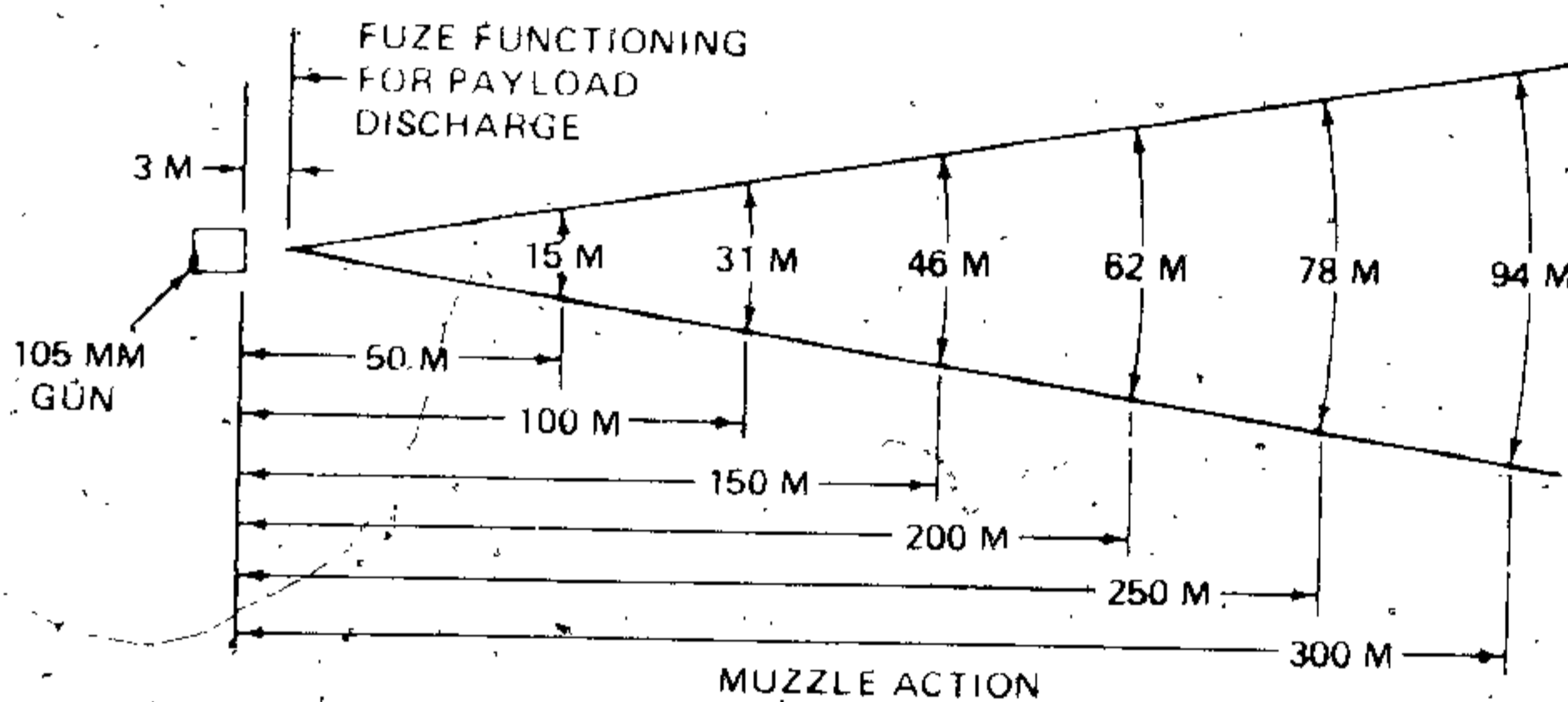
CARTRIDGE, 105-MILLIMETER: APERS-T, M494



AR199821



AR199820



AR199882

Type Classification:

Std AMC TC 9575 dtd 1972

Use:

This fixed cartridge is fired from 105-mm Gun Cannon M68. The cartridge is designed

for close-in defense against massed infantry assaults and for offensive fire against exposed enemy personnel. There is a secondary capability against light armor and low-flying aircraft.

Description:

The projectile casing consists of a forward aluminum body and a rear steel base. A fuze adapter, containing four detonators, a relay and detonator assembly and a flash tube, is fitted to the forward end of the body. The flash tube extends from the fuze adapter to the projectile base. Flechettes and a yellow dye marker are contained in the body of the projectile. The base of the projectile contains an expelling charge and a tracer. The cartridge case, fitted at the base with an electric primer, is crimped to the projectile. An MT fuze with muzzle action capability is used with this cartridge.

Functioning:

The electrically initiated primer ignites the propelling charge and tracer. Gases produced by the burning propellant propel the projectile from the gun. Concurrently with fuze functioning, the fuze detonator ignites the relay and the four detonators in the projectile. On functioning of the detonators the forward portion of the projectile is ruptured, releasing the flechettes and dye marker. Detonator flash follows the flash tube to ignite the expelling charge, and detonation of the expelling charge ejects the flechettes in the lower portion of the projectile. Flechettes are dispersed in a cone-shaped pattern, resulting from the forward force of the expelling charge and centrifugal force from projectile spin.

Tabulated Data:

Complete round:

Type ----- APERS-T
 Weight ----- 55.0 lbs.
 Length ----- 39.17 in.
 Cannon used with ----- M68

Projectile:

Body material ----- Aluminum and steel
 Color ----- Olive drab w/yellow band, white marking and white diamonds

Filler and weight ----- Flechettes-9.2 lbs.

Components:

Cartridge case ----- M150B1

Propelling charge ----- M6, 9.2 lbs.
 Primer ----- M86 electric
 Tracer ----- M13
 Fuze ----- MT-M571

Performance:

Maximum range ----- 4,400 meters (4,840 yds.)
 Muzzle velocity ----- 821 mps (2,700 fps)
 Flechette range from point of fuze function ----- 300 meters (330 yds.)

Temperature Limits:

Firing:

Lower limit ----- -40° F
 Upper limit ----- +125° F

Storage:

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

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

* Packing Box:

Weight ----- 140 lbs.
 Dimensions ----- 46-1/4 x 14-3/16 x 8-11/16 in.
 Cube ----- 3.3 cu ft

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 5
 Storage compatibility ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
 DODAC ----- 1315-C519
 Drawing number ----- 9229962

Limitations:

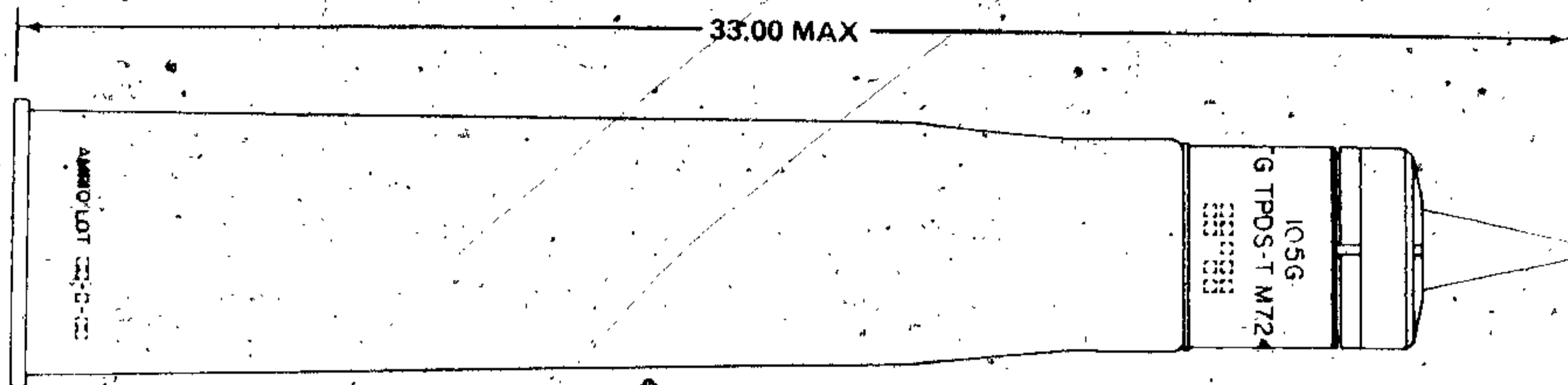
Firing the ammunition over the heads of exposed friendly troops is prohibited. When firing muzzle action, assure that personnel clear dispersion cone area and take cover.

References:

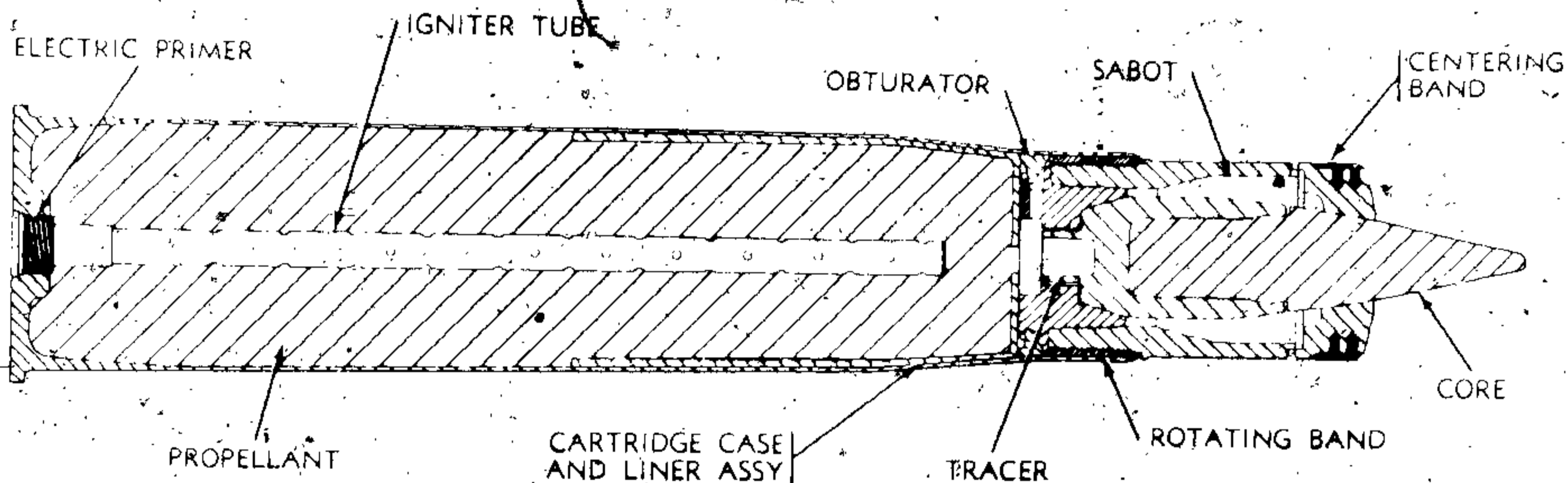
- SC 1305/30-IL
- SB 700-20
- AMCP 700-3-3
- TM 9-1300-251-20
- TM 9-2350-215-10

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CARTRIDGE, 105-MILLIMETER: TPDS-T, M724A1 AND M724



AR199807



AR 199806-A

Type Classification:

STD, MSR 05746014 dtd 1974

Use:

This cartridge is used for gunnery training in tank-mounted 105-mm gun cannons.

Description:

This discarding sabot round is similar in external appearance and is ballistically matched to 2000 meters with the APDS-T Cartridge M392A2. There is a tracer located in the base of the projectile. A plastic band encircles the sabot at the forward end. A fiber rotating band and rubber obturating band are mounted toward

the base of the sabot. The igniter tube of the electric primer extends almost the entire length of the propellant packed loosely in the cartridge case.

Functioning:

The electrically initiated primer ignites the propelling charge and tracer. Gases produced by the burning propellant propel the projectile from the gun. The tracer burns for a minimum of 2.5 seconds. The sabot is discarded after leaving the muzzle of the weapon, as a result of setback, centrifugal, and air pressure forces. The solid core of the projectile continues to the target. Since it is a practice round, the projectile lacks the penetrating capability of a service round.

Difference Between Models:

The M724 cartridge is a United Kingdom manufactured L45A1 round, modified by replacing the U. K. L1A4 conductive cap primer with the U. S. M80A1 bridge-wire primer.

Tabulated Data:

Complete round:

Type ----- TPDS-T
 Weight ----- 32 lbs.
 Length ----- 33 in.
 Cannon used with ---- M68

Projectile

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

Components:

Cartridge case ----- M115B1
 Propelling charge ----- M30
 Primer ----- M80A1
 Tracer ----- M13

Performance:

Maximum range ----- 16739 meters
 (18450 yards)
 Muzzle velocity ----- 1539 mps
 (5080 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 hrs/day)

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

* Packing Box:

Weight ----- 107 lbs.
 Dimensions ----- 39-7/8 x 14-1/8 x 8-23/32 in.
 Cube ----- 2.8 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 4
 Storage compatibility ----- E
 DOT shipping class ----- B
 DOT designation ----- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
 DODAC ----- 1315-C520
 Drawing number ----- 9278500

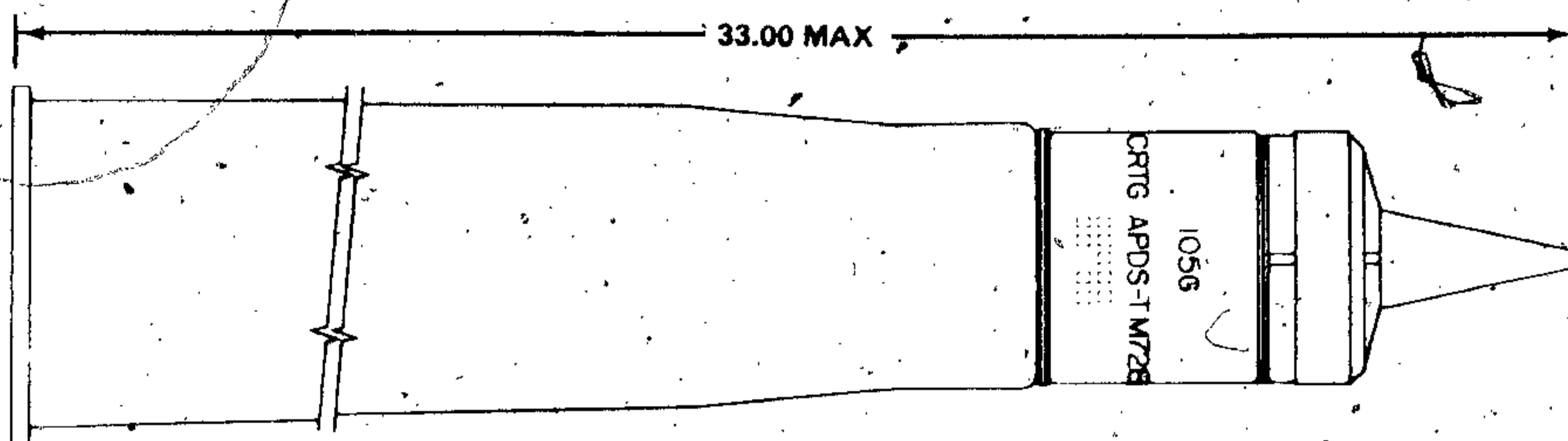
Limitations:

Not applicable.

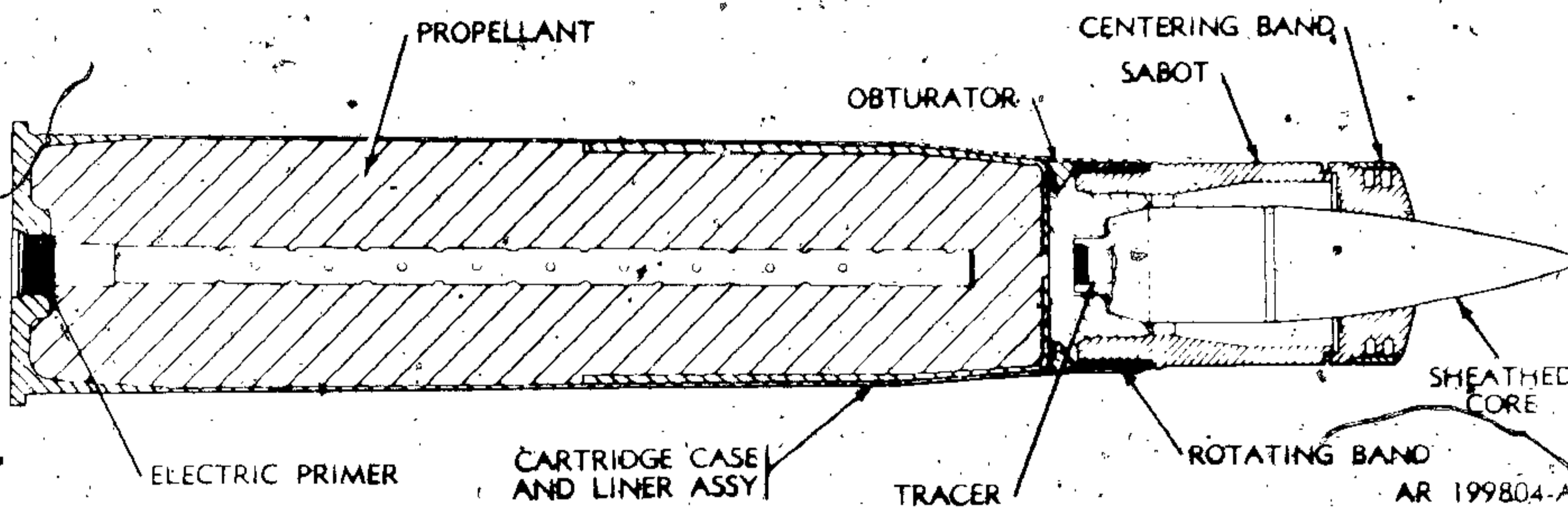
References:

SC 1305/30-IL
 SB 700-20
 DARCOM P 700-3-3
 TM 9-1300-251-20
 TM 9-2350-215-10

CARTRIDGE, 105-MILLIMETER: APDS-T M728



AR199805



AR 199804-A

Type Classification:

Std MSR 02787001

Use:

This cartridge is a high velocity, flat trajectory, discarding sabot round used in 105-mm gun cannons against armored targets.

Description:

The projectile consists of a tungsten, nickel, copper penetrator seated in a steel base with tracer and aluminum forward sheath. These components are encased in an aluminum and magnesium sabot. A plastic centering band encircles the sabot at the forward end. A fiber

rotating band and rubber obturator are mounted toward the base of the sabot. The cartridge case contains a polyurethane laminar additive liner over the forward end of the propellant. The case is loosely packed with propellant, and is fitted with an electric primer.

Functioning:

The primer is electrically initiated to ignite 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. The sabot discards upon leaving the gun tube by setback, centrifugal, and air pressure forces. The spin stabilized projectile sheathed core penetrates the target solely by kinetic energy.

Tabulated Data:

Complete round:

Type ----- APDS-T
 Weight ----- 41.70 lbs.
 Length ----- 33.0 in.
 Cannon used with ----- M68

Projectile:

Body material ----- Sabot-magnesium/
 aluminum
 penetrator-tungsten
 /nickel/copper
 Color ----- Black w/white
 marking

Components:

Cartridge case ----- M115B1
 Propelling
 charge ----- M30
 Primer ----- M80A1
 Tracer ----- M13

Performance:

Maximum range -----
 Muzzle velocity ----- 4680 fps

Temperature Limits:

Firing:

Lower limit ----- - 65° F
 Upper limit ----- + 125° F

Storage:

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

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

* Packing Box:

Weight ----- 126 lbs.
 Dimensions ----- 39-7/8 x 14-1/8
 x 8-23/32 in.
 Cube ----- 2.8 cu ft

* NOTE: See SC for complete packing data
 including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 4
 Storage
 compatibility ----- E
 DOT shipping class ----- B
 DOT designation ----- AMMUNITION FOR
 CANNON WITH
 SOLID PROJEC-
 TILES
 DODAC ----- 1315-C494
 Drawing number ----- 9276810

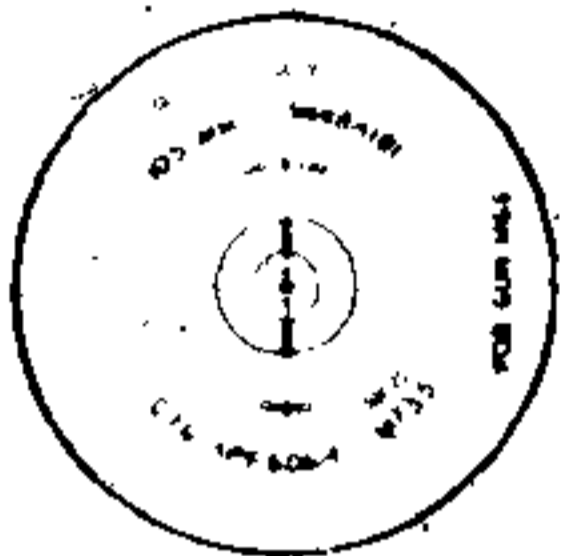
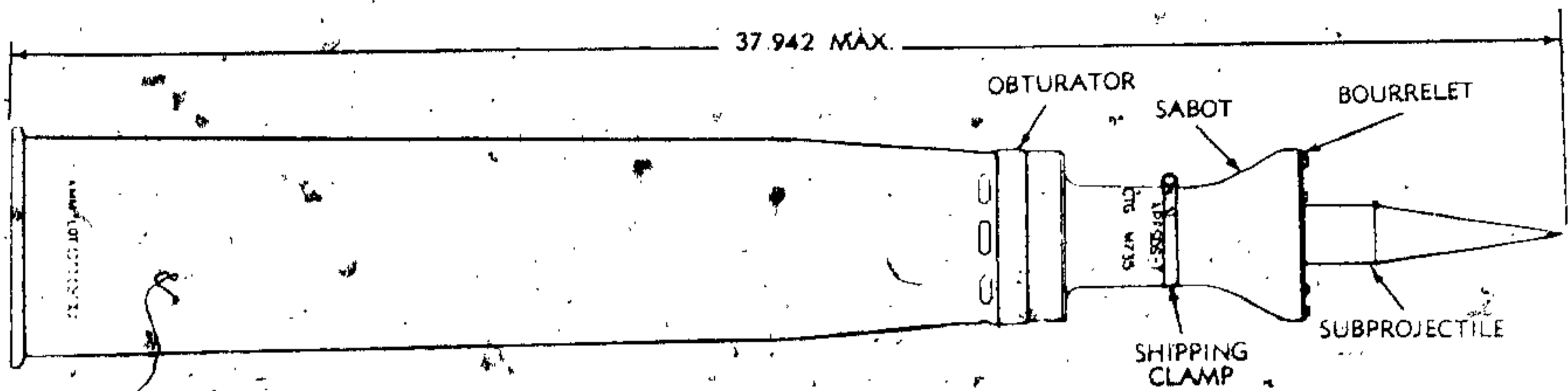
Limitations:

None

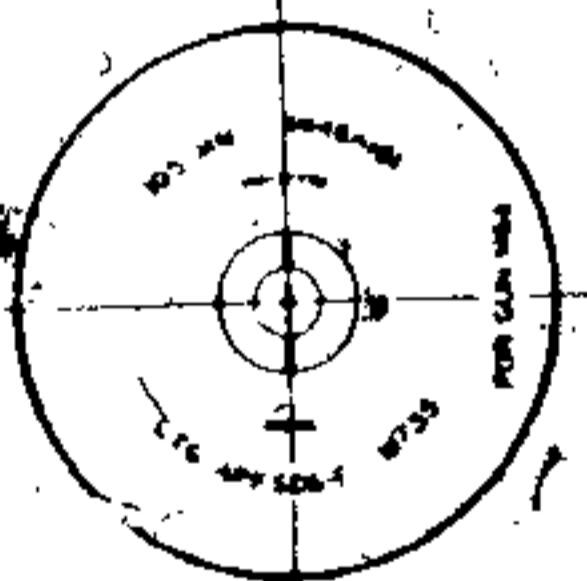
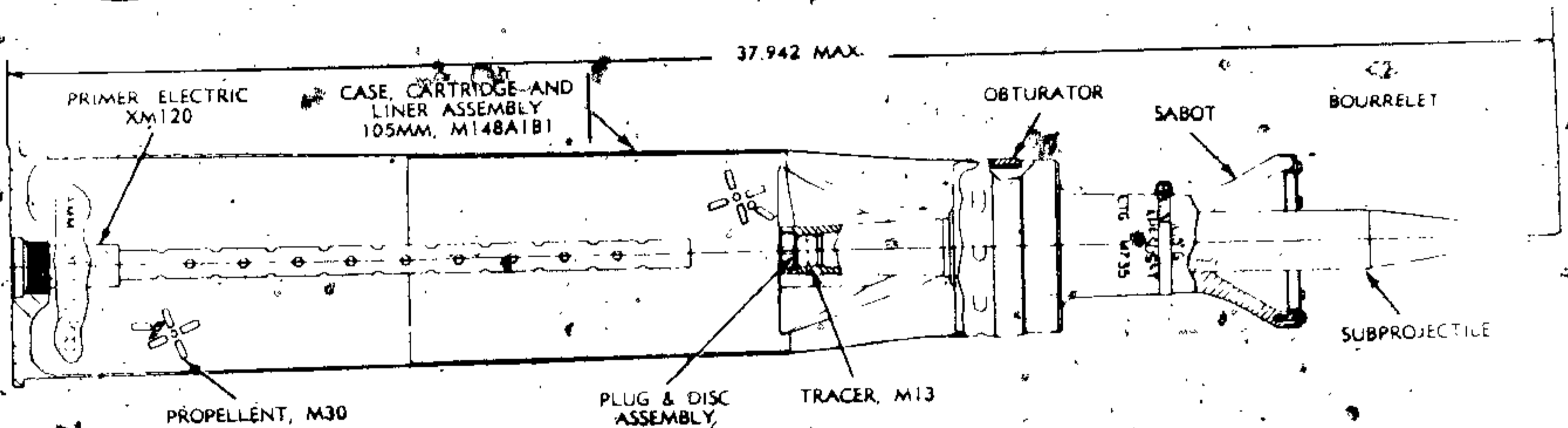
References:

SC 1305/30-IL
 SB 700-20
 DARCOM P 700-3-3
 TM 9-1000-213-35
 TM 9-1300-251-20
 TM 9-2350-215-10

CARTRIDGE, 105-MILLIMETER: APFSDS-T, M735



AR 101660



AR 100995

Type Classification:

Cartridge, 105-mm, APFSDS-T, M735.

Use:

This cartridge is a high velocity, flat trajectory, discarding sabot, round used in 105-mm gun cannons against armored targets.

Description:

The projectile consists of a sub-projectile and sabot. The sub-projectile consists of a steel-nickel body, which houses a tungsten core and is fitted with an aluminum windshield and

fin assembly. The aluminum sabot, composed of three 120° sections, is assembled around the sub-projectile. A steel bourrelet, containing three shear cuts, is screwed to the sabot forward face. A nylon obturator and polypropylene seat is assembled around the sabot, and a urethane seal is applied over the rear face of the sabot. An M13 Tracer is assembled in the fin and held in place by a threaded plug and disc assembly. The projectile is crimped to an M148A1B1 Cartridge Case, which holds approximately 12.5 pounds of M30 propellant, and is fitted with an XM120 electric primer. A gun tube wear-reducing titanium-dioxide liner is assembled to the interior wall of the cartridge case.

Functioning:

The M735 is loaded and fired in the tank gun in the normal manner. Upon firing, the sabot with its subprojectile is propelled from the gun and the tracer is ignited. The subprojectile is on a low friction bearing surface within the sabot and is free to rotate and so does not pick up the high rotation rate the gun rifling normally imparts to a projectile. Upon leaving the gun centrifugal and aerodynamic forces cause the sabot to separate from the subprojectile and it quickly falls to earth. The fin stabilized subprojectile continues on a true course to the target at high velocity. Target penetration is effected strictly by the high kinetic energy of the subprojectile's high density core when it impacts.

Tabulated Data:

Complete Round:

Type ----- Fixed
 Weight ----- 39.50 lb
 Length ----- 37.94 in.
 Assembly Dwg. No. ----- 9296707
 Color ----- Black w/white markings

Temperature Limits:

Firing:
 Lower limit ----- -25°F
 Upper limit ----- +125°F
 Storage:
 Lower limit ----- -65°F
 Upper limit ----- +160°F

Performance:

Chamber pressure ----- 60,000 psi at +70°F

Packaging:

Inner pack dwg. ----- 9293481
 Outer pack dwg. ----- 9293479
 Weight (lbs) ----- 132.0
 Cube (ft) ----- 3.4

*Packing ----- 1 round per fiber container, 2 containers per wire-bound box

*Packing Box:

Weight ----- 124.0 lbs
 Dimensions ----- 47-7/16 x 13-5/16 x 7-1/16 in.
 Cube ----- 2.5 cu ft

*NOTE: See SC for complete packing data including NSN's.

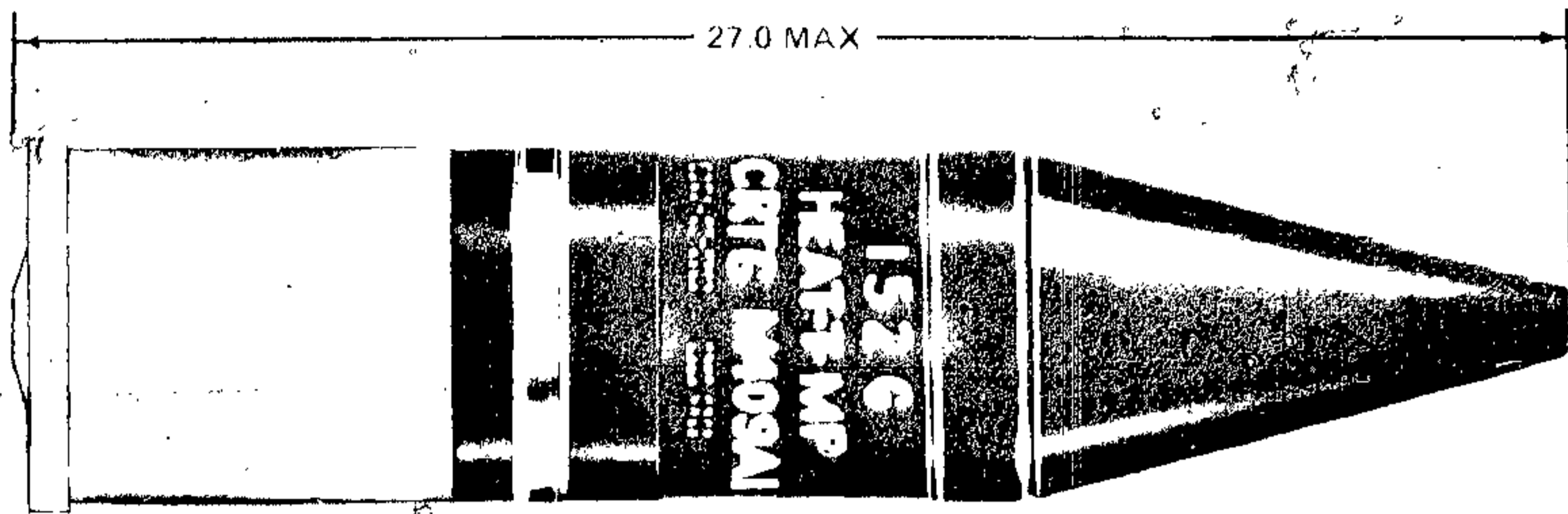
Shipping and Storage Data:

Quantity-distance class --- 4
 Storage compatibility --- E
 DOT shipping class --- B
 DOT classification --- Ammunition for Cannon w/Solid Projectile
 DODIC ----- Not assigned

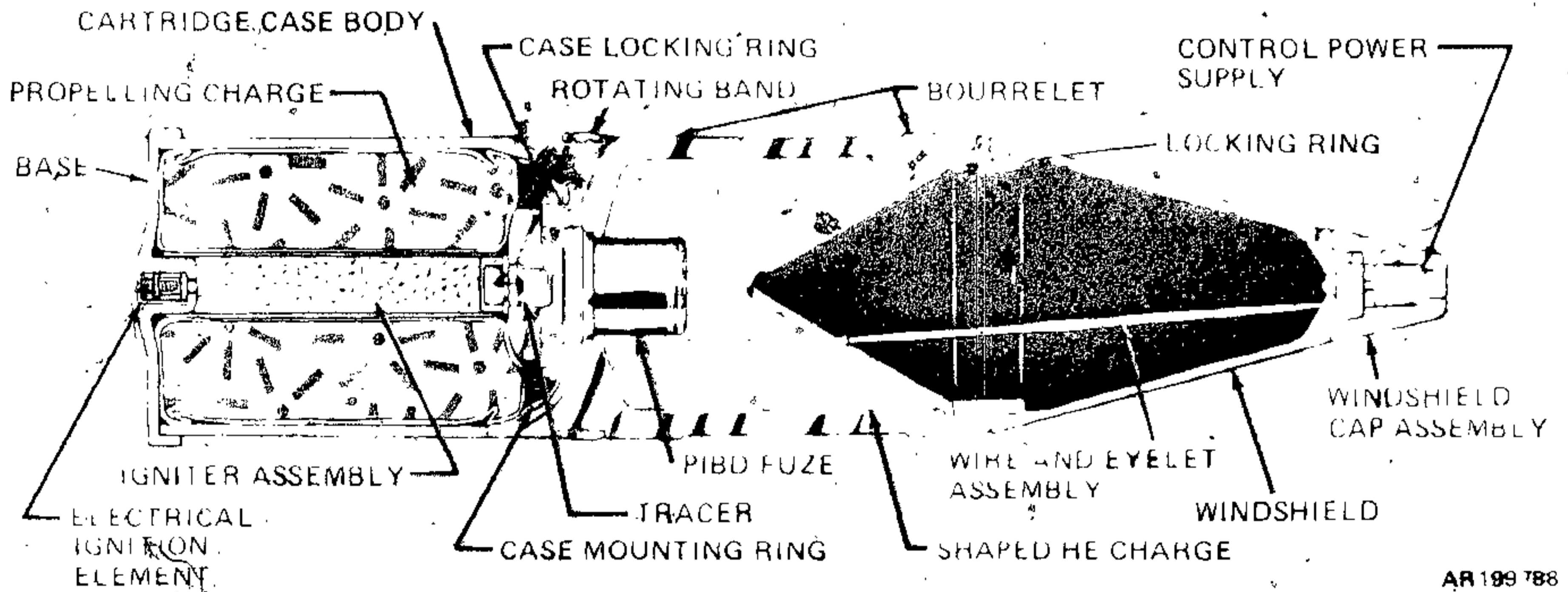
References:

TM 9-1300-251-20
 TM 9-1300-251-34

CARTRIDGE, 152-MILLIMETER: HEAT-T-MP, M409A1 AND M409



AR199789



AR199788

Type Classification:

- M409A2----- Std DA Ltr 1976
- M409A1----- Std AMCTC 8965
- M409----- C&T AMCTC 8965

Use:

This cartridge is fired from 152-mm gun-launchers primarily as an armor-defeating round with additional antipersonnel capability.

Description:

The projectile consists of a forged steel body fitted with a steel windshield and a fluted copper cone liner to shape the high explosive charge. The liner is held in place by a steel locking ring. The windshield is threaded to the locking ring and houses an insulator and

wire eyelet connector assembly. The wire connector assembly connects the fuze with the control power supply housed in a two-piece windshield cap. The control power supply provides the point-initiating, base-detonating fuze with electrical energy. The projectile is loaded with Composition B, and the fuze is fitted in a cavity of the explosive charge. The tracer is contained in the base plug and is assembled to a steel fuze-locking cup in the base of the projectile. A sintered iron rotating band, forward of the base, provides spin and obturation. Cartridge Case M205 used in M409A1 is a two-piece assembly of base and body made of high-density felted nitrocellulose inert fibers, and resin. The body containing a bagged propelling charge, is attached to the projectile by a steel mounting ring and a case locking ring. The base houses the electric

ignition system and is cemented to the body with a special nitrocellulose lacquer. Cartridge Case M157 used in Cartridge M409 is similar to the M205 in shape and function, but is of a different non-metallic flammable material. The M157 case is more vulnerable to fracture on impact than the M205, and the igniter primer is of a different design. The body is attached to the projectile by epoxy resin and a case locking ring.

Functioning:

Electric current from the firing mechanism of the weapon initiates the ignition element/initiator. The resulting flash ignites the propellant, and the burning propellant generates gases to force the projectile from the gun tube and concurrently ignite the tracer. When the round is used against armor, electrical energy from the control power supply in the nose of the projectile is fed to the fuze on impact. Functioning of the fuze detonates the shaped explosive charge of Composition B to collapse the copper cone and create a high-velocity focused shock wave. The intensity of the shock wave causes failure of the target armor, and a jet of metal particles penetrates the interior of the target. For antipersonnel use, the round is fired so the fuze will function on graze or direct impact on target. Blast and fragmentation created by detonation of the explosive charge inflicts casualties.

Tabulated Data:

Complete round:

Type ----- HEAT-T-MP
 Weight ----- 48.5 lbs.
 Length ----- 27.0 in.
 Cannon used with ----- M81 Series, M162

Projectile:

Body material ----- Forged steel
 Color -----
 (Old) ----- Black w/yellow markings
 (New) ----- Black w/white markings and yellow band
 Filler and weight -- Comp. B-6.3 lbs.

Components:	<u>M409A1</u>	<u>M409</u>
Cartridge case -----	M205	M157
Propelling charge -----	M189	M189
Primer -----	Electric	M91
Tracer -----	M13	M13
Fuze -----	PIBD-M539, XM539E1	

Performance:

Maximum range ---- 9000 meters.
 Muzzle velocity --- 2240 fps.

Temperature Limits:

Firing:
 Lower limit ----- -40 °F
 Upper limit ----- +125 °F
 Storage:
 Lower limit ----- -80 °F for period of not more than 3 days
 Upper limit ----- +160 °F for period of not more than 4 hrs/day

*Packing ----- 1 cartridge in fiber container; 1 container per wooden box

*Packing Box:

Weight ----- 97.5 lbs.
 Dimensions ----- 42-1/8 x 12-9/16 x 13-11/32 in.
 Cube ----- 4.0 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 7
 Storage compatibility ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
 DODAC ----- 1320-D381
 Drawing number ----- M409 - 9204196,
 M409A1 - 9257471

Operational Characteristics:

Because they are flammable, unprotected cartridge cases, those from which barrier bags have been removed can be ignited accidentally by burning cigarettes, smoldering residue, embers, open flame, etc. Do not remove barrier bag until round is being chambered. Neoprene barrier bags may be difficult to remove at -25°F or below.

Limitations:

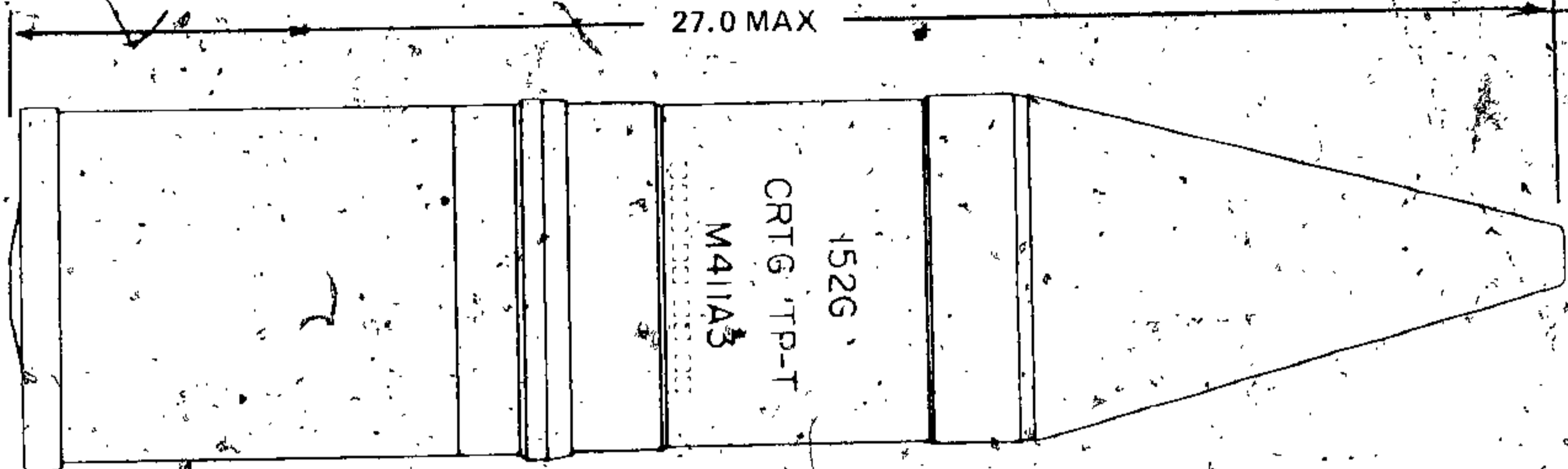
Probe adapter will not be used when firing rounds assembled with Cartridge Case M205.

References:

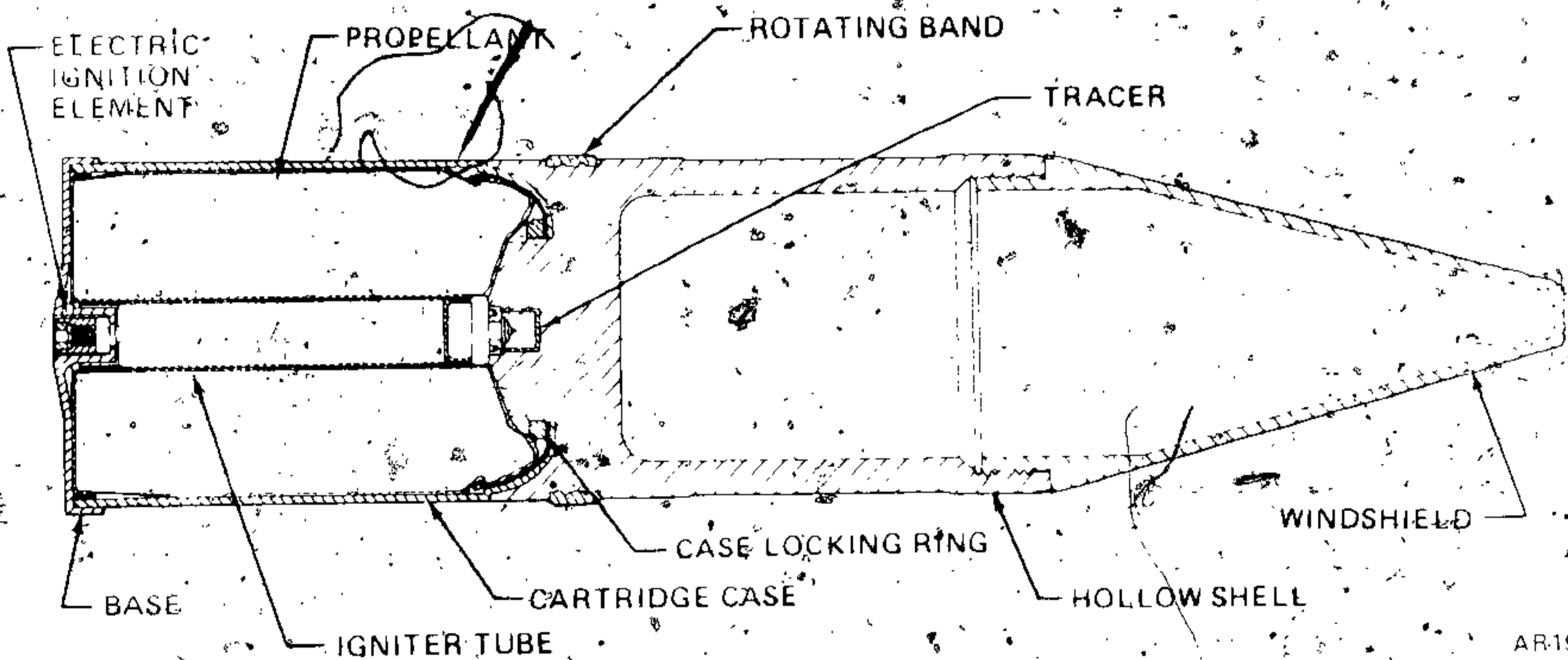
SC 1305/30-IL
SB 700-20
AMCP 700-3-3
TM 9-2350-230-12
TM 9-2350-232-10
TM 9-1300-251-20

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CARTRIDGE, 152-MILLIMETER: TP-T, M411 SERIES.



AR199783



AR199782

Type Classification:

- M411A3 ----- Std AMCTC 9103 dtd 1972
- M411A2 ----- Std AMCTC 9103 dtd 1972
- M411A1, M411 -- C & T, AMCTC 9103 dtd 1972

Use:

This cartridge is designed for training in gunnery and fire control with 152-mm gun launchers.

Description:

Cartridges of the M411 series consist of a hollow projectile secured to a cartridge case of combustible material, and simulate for practice purposes the 152-mm HEAT-T-MP, M409 series. Model M411A3 (XM411E7) is

inert except for a tracer in the base of the projectile for observation of the trajectory. The M205 cartridge case is filled with bagged propellant and is equipped with an electrical ignition element. Model M411A2 is identical with M411A3 except for use of the older M157 cartridge case and M91 electrical primer. M411A1 has a multipiece projectile including steel body, aluminum spike, and steel windshield. M411 is the same as M411A1 except it carries a PD fuze and supplementary charge for spotting purposes in the aluminum spike.

Functioning:

Electric current from the firing mechanism initiates the ignition element/primer and the resulting flash ignites the propellant. The burning propellant generates gases which force

the projectile from the gun tube and concurrently ignite the tracer. Except for the tracer, which marks the flight of the projectile, Cartridges M411A3, M411A2, and M411A1 are nonfunctioning. Model M411 has a functioning fuze and spotting charge.

Tabulated Data:

• Complete round:

Type -----	Target practice
Weight (lbs.):	
M411A3 -----	48.8
M411A2 -----	49.8
M411A1 -----	49.8
M411 -----	48.8
Length (in.):	
M411A3 -----	27.0
M411A2 -----	27.1
M411A1 -----	26.9
M411 -----	26.7
Cannon used with:	M81 Series, M162

Projectile:

Body material: Steel
 Color: ----- Blue w/white marking and yellow band

Filler and weight:

M411A3 -----	N/A
M411A2 -----	N/A
M411A1 -----	N/A
M411 -----	TNT, 0.30 lb.

Components:

Cartridge case:

M411A3 -----	M205
M411A2 -----	M157
M411A1 -----	M157
M411 -----	XM157

Propelling charge: M189

Primer:

M411A3 -----	N/A
M411A2 -----	M91
M411A1 -----	M91
M411 -----	M91

Tracer: M13

Fuze:

M411A3 -----	N/A
M411A2 -----	N/A
M411A1 -----	N/A
M411 -----	M557

Performance:

Maximum range --- 9000 meters
 Muzzle velocity --- 2,240 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 hrs/day)

*Packing:

M411, M411A1, M411A2 - 1 round in fiber container; 1 container per wooden box
 M411A3 ----- 1 round in metal container

*Packing Box:

Weight ----- 97.5 lb.
 Metal Container (M411A3):
 Weight ----- 87.0 lb
 Dimensions ----- 10-15/32 x 10-15/32 x 36-1/8 in.
 Cube ----- 2.0 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 5
 Storage compatibility ----- E
 DOT shipping class:
 M411 ----- A
 M411A1, M411A2, M411A3 ----- B
 DOT designation ----- AMMUNITION FOR CANNON WITH INERT LOADED PROJECTILE.
 (M411): AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE.
 DODAC ----- 1320-D383 (M411A3, M411A2, and M411A1)
 1320-D380 (M411)

Drawing number: ----- 9266944 (M411A3)
9242430 (M411A2)
9233376 (M411A1)
9210425 (M411)

References:

- SC 1305/30-IL
- SB 700-20
- AMCP 700-3-3
- TM 9-2350-230-12
- TM 9-2350-232-10
- TM 9-1300-251-20

Limitations:

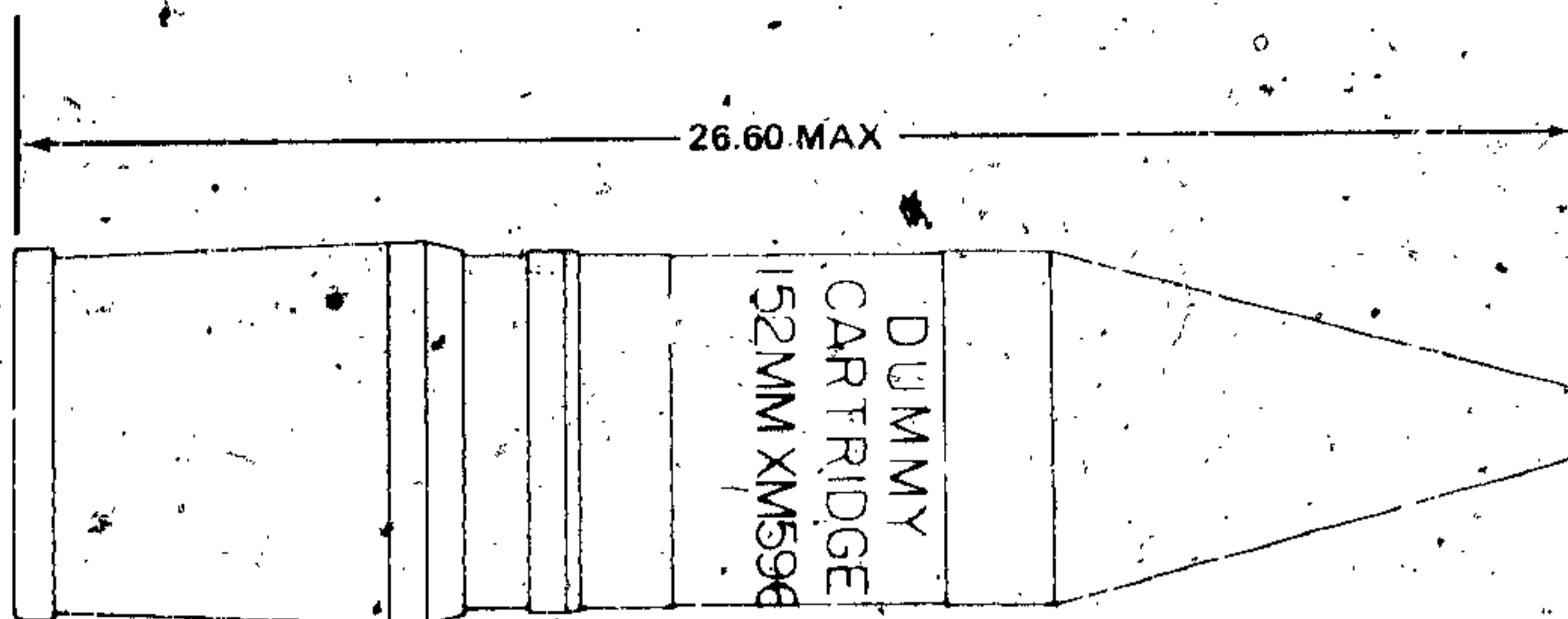
None

2

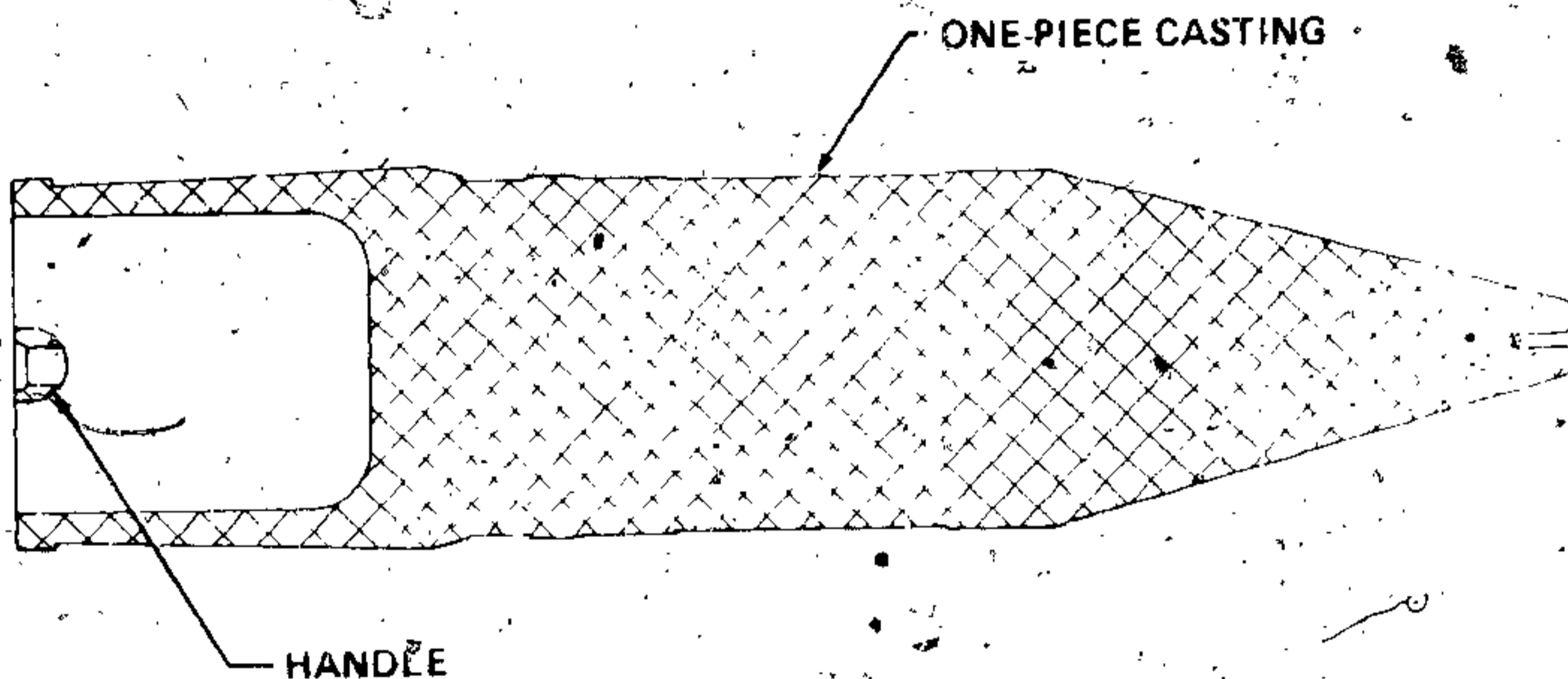
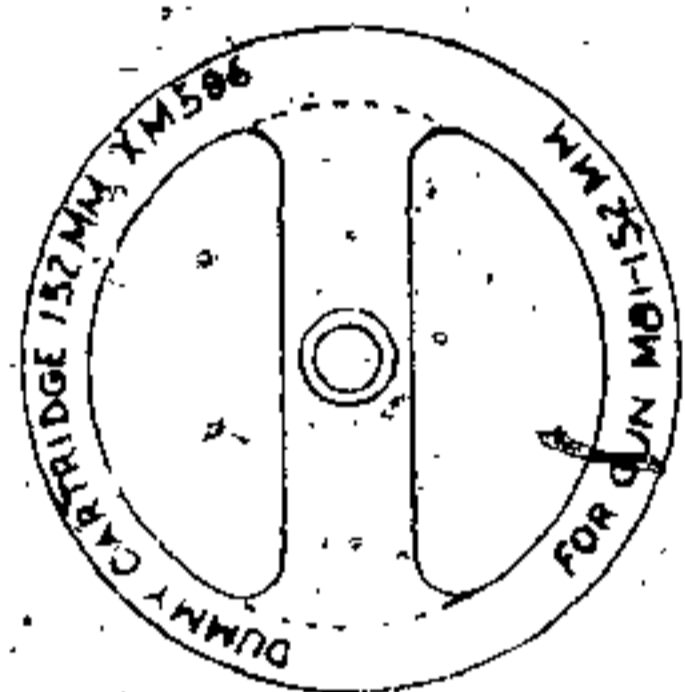
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C

CARTRIDGE, 152-MILLIMETER: DUMMY, M596



AR199787



AR199786

Type Classification:

Std AMCTC 5909 dtd 1968

Use:

This dummy cartridge is used as a drill round to train troops in handling ammunition and loading the 152-mm, M81 gun-launcher.

Description:

This cartridge simulates a loaded round of 152-mm ammunition in size, weight, and center of gravity. The cartridge is a one-piece alloy casting with a protective hard anodized coating and has a life expectancy of 75,000 loadings. The material results in negligible wear to the gun tube. The hollowed-out base provides a

handle for removal of the round after practice loading.

Functioning:

Projectile is completely inert and does not function.

Tabulated Data:

Complete round:

Type -----	Dummy
Weight -----	51.0 lbs.
Length -----	26.60 in.
Cannon used, with -----	M81

Projectile:

Body material-----Aluminum alloy

Color:-----

(Old)-----Black or blue w/
white marking

(New)-----Bronze w/white
markings

Packing-----1 round per wooden
box

Packing Box:

Weight-----69.0 lbs.

Dimensions-----29-7/8 x 8-1/8 x
8-29/32 in.

Cube-----1.3 cu. ft.

Limitations:

None.

References:

SC 1305/30-IL

SB 700-20

AMCP 700-3-3

TM 9-2350-230-12

TM 9-2350-232-10

TM 9-1300-251-20

NOTE: See SC for complete packing data
including NSN's.

Shipping and Storage Data:

Quantity-distance

class-----N/A

Storage compati-

bility-----N/A

DOT shipping

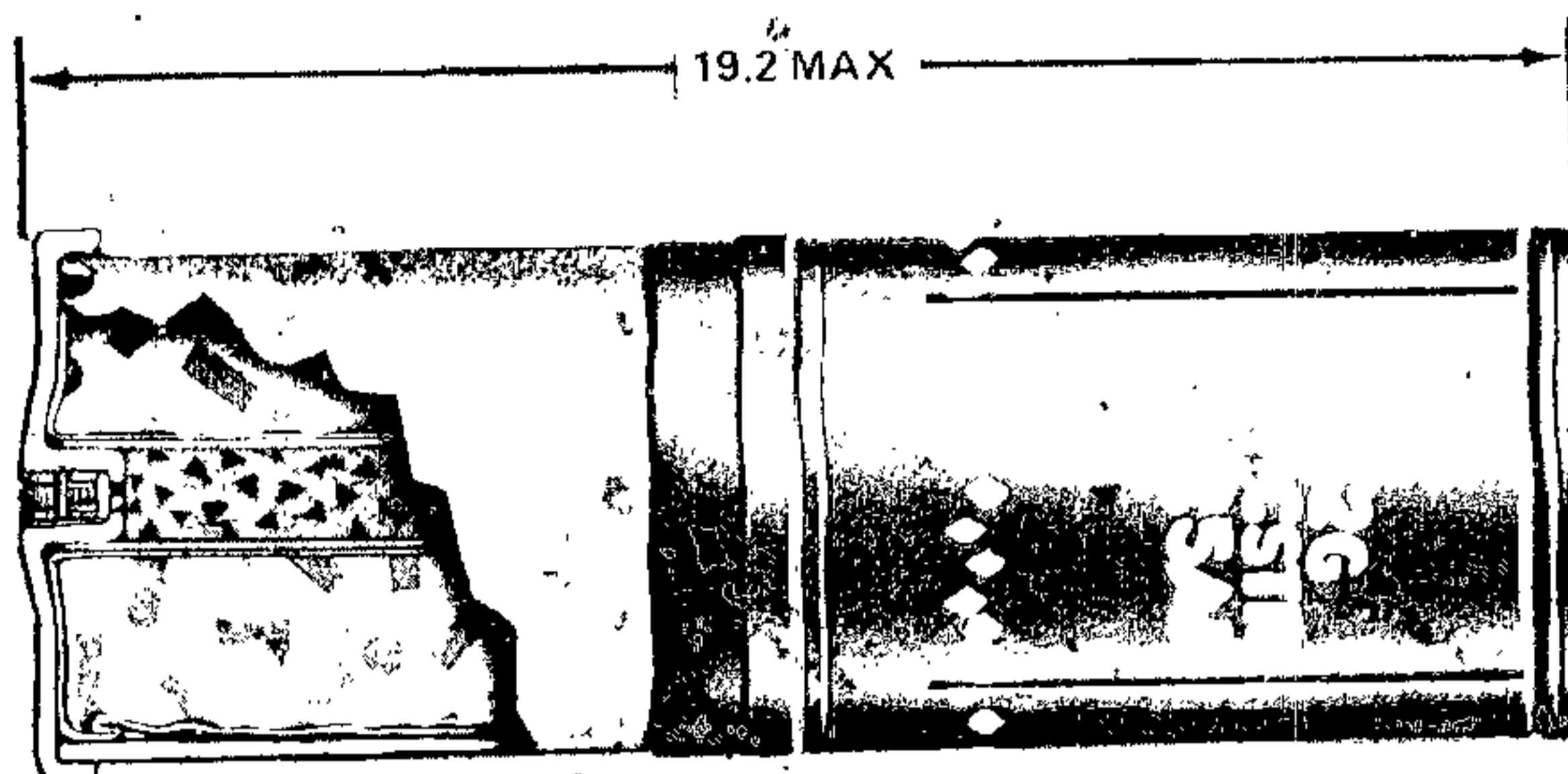
class-----C

DOT designation-----NON-EXPLOSIVE
AMMUNITION

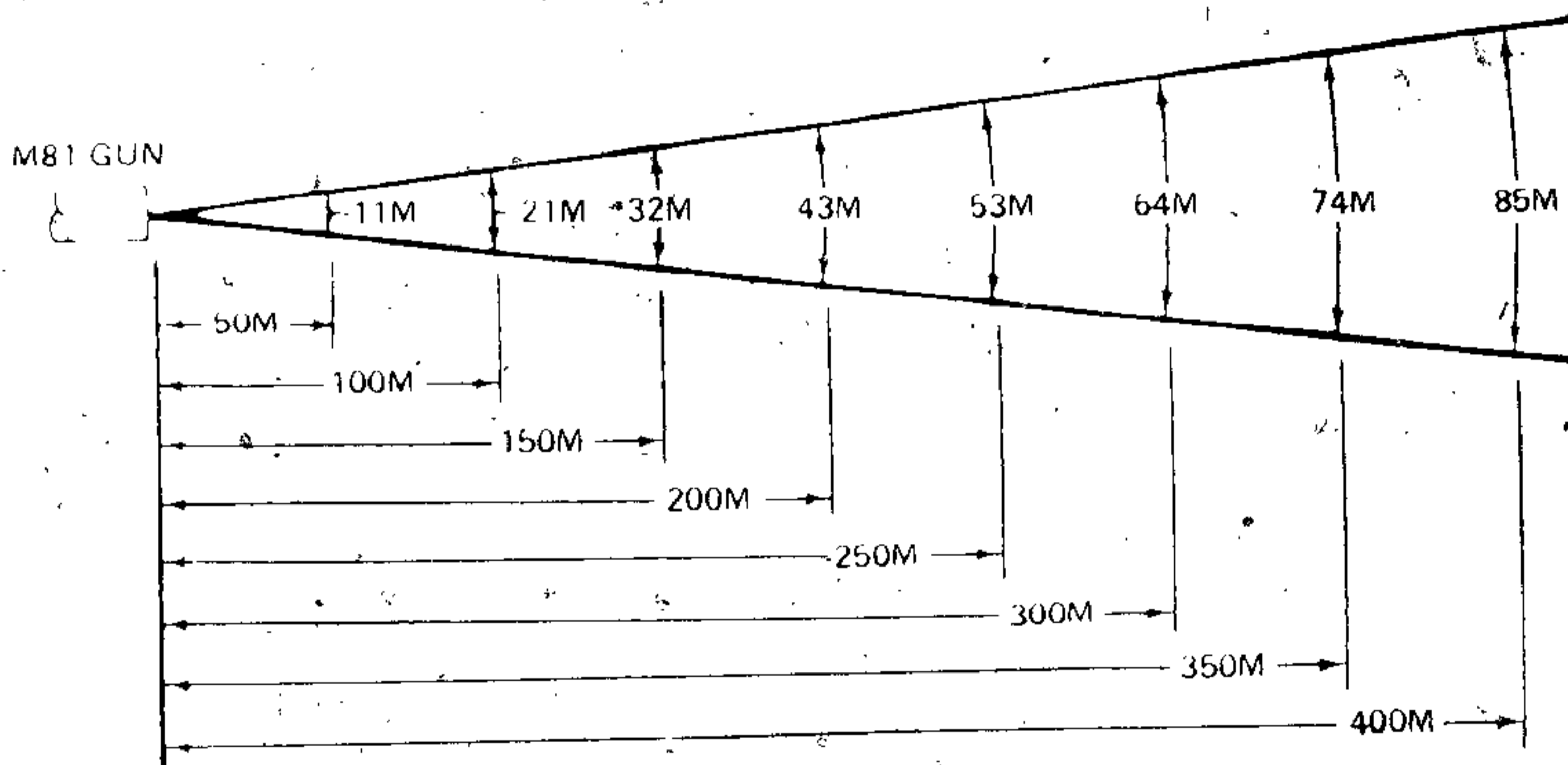
DODAC-----1320-D500

Drawing number-----8430306

CARTRIDGE, 152-MILLIMETER: CANISTER, M625A1 AND M625



AR199793



AR199792

Type Classification:

M625A1 ---- Std AMCTC 8966 dtd 1972
 M625 ----- C & T, MSR 11756003

Use:

These canister cartridges are used in 152-mm gun-launchers and are intended primarily for antipersonnel use at close range. The cartridges are effective in dense foliage.

Description:

The canister-type projectile for M625 and M625A1 cartridges consists of an aluminum base and body threaded together. Four axial

grooves, 90 degrees apart, extend from the forward end of the body for approximately 3/4 of its length. The body contains steel flechettes loaded in five separate bays. The bay assemblies are secured by a closing cup crimped over the forward end of the body. A bleed hole in the base of the projectile allows propellant gases to build up internal pressure in the body to facilitate breakup. The cartridge case is a two piece assembly of base and body made of high-density felt nitrocellulose, metal fibers, and resin. The cylindrical body of the M205 case containing a bagged propelling charge is attached to the projectile by a steel mounting ring and aluminum locking ring. The base houses the electrical ignition element and is cemented to the body with a special nitrocellulose lacquer.

Functioning:

Electrical current from the firing mechanism of the weapon initiates the ignition element/initiator. The resultant flash ignites the propellant and the burning propellant generates gases that force the canister projectile from the gun tube. Immediately after the projectile leaves the gun tube, centrifugal force and internal pressure from the propellant gases split the canister at grooves releasing the flechettes. The flechettes disperse forward in a conical pattern as a result of the combination of forward and centrifugal forces.

Difference Between Models:

Canister M625A1 and M625 are identical except for the cartridge case, which is more vulnerable to fracture on impact in M625. M625 has a different ignition element and the method of attachment of the cartridge case to the projectile is not the same.

Tabulated Data:

Complete round:

Type ----- Canister
 Weight ----- 48.5 lbs.
 Length ----- 19.2 in.
 Cannon used with - M81 series, M162

Projectile:

Body material --- Aluminum
 Color ----- Olive drab w/white diamonds and white marking
 Filler and ----- Flechettes 10,000-
 weight ----- 15.2 lbs.

Components:

	<u>M625A1</u>	<u>M625</u>
Cartridge case	M205	M157
Propelling charge	M189	M189
Primer	Electrical	M91

Performance:

Maximum -----400 meters effective.
 range
 Muzzle -----2,260 fps.
 velocity

Temperature Limits:

Firing:

Lower limit -----40 F
 Upper limit -----+125 °F

Storage:

Lower limit -----80 ° F (for period of not more than 3 days)
 Upper limit -----+160 ° F (for period of not more than 4 hrs/day)

*Packing ----- 1 cartridge in fiber container; 1 container per wooden box

*Packing Box:

Weight ----- 97.5 lbs.
 Dimensions ----- 39-1/2 x 12-1/2 x 13-3/16 in.
 Cube ----- 4.0 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance --5 class
 Storage compati- -- E bility
 DOT shipping ----- B class*
 DOT designation --- AMMUNITION FOR CANNON WITH SOLID PROJECTILE
 DODAC ----- 1320-D390
 Drawing number. ----- 9219469 (M625)
 9257471 (M625A1)

Operational Characteristics:

Because they are flammable, unprotected cartridge cases, those from which barrier bags have been removed can be ignited accidentally by burning cigarettes, smoldering residue, embers, open flame, etc. Do not remove ballistic protective cover until round is removed from stowage rack for firing. Do not remove barrier bag until round is being chambered. Neoprene barrier bags may be difficult to remove at -25 ° F or below.

Limitations:

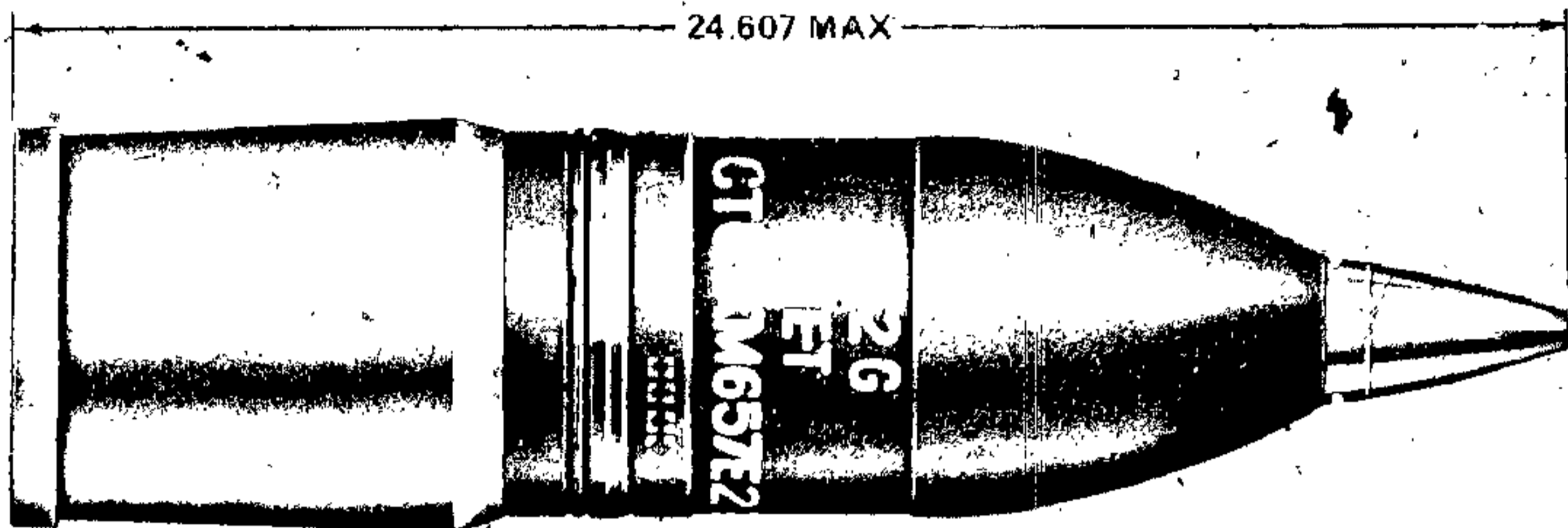
Overhead firing of canister cartridge is prohibited. Do not use probe adapter when firing rounds assembled with Cartridge Case M205.

References:

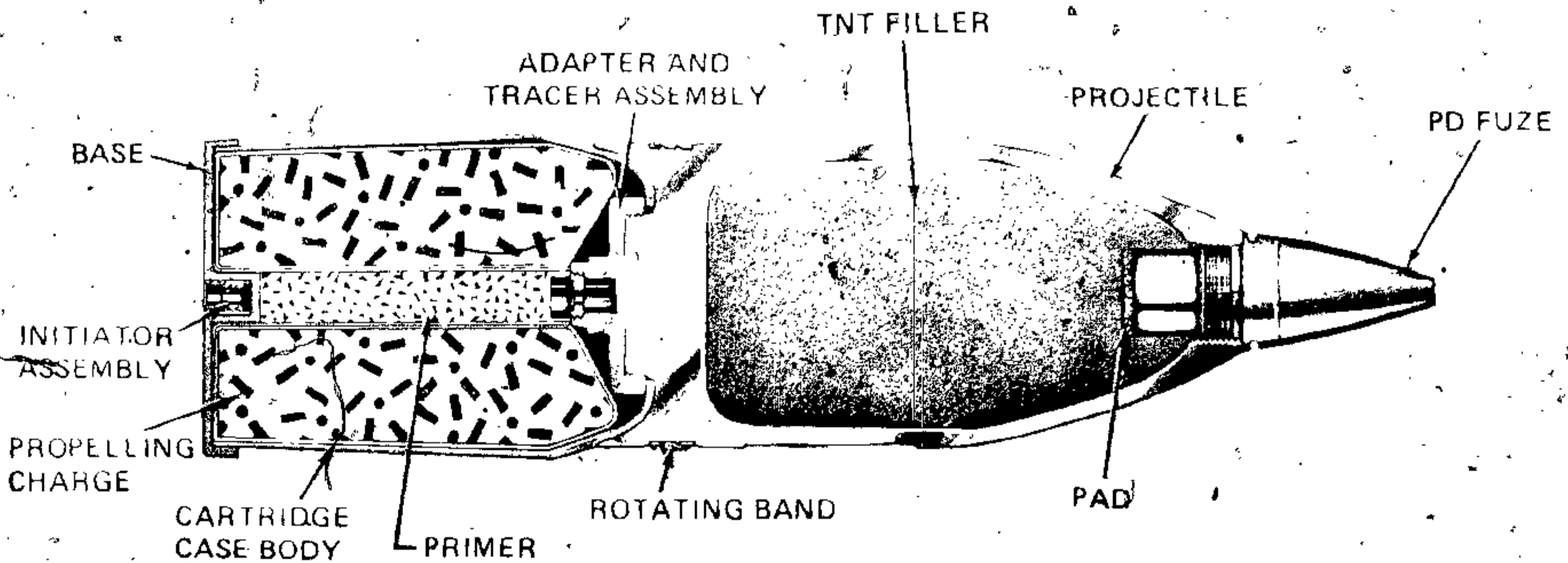
SC 1305/30-IL
SB 700-20
AMCP 700-3-3
TM 9-2350-230-12
TM 9-2350-232-10
TM 9-1300-251-20

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CARTRIDGE, 152-MILLIMETER: HE-T, M657



AR198791



AR199790

Type Classification:

C & T AMC TC 9193 dtd 1972

Use:

This fixed ammunition cartridge is a high-explosive round for 152-mm gun-launchers, employed against light materiel and personnel.

Description:

The complete round consists of a one-piece, forged steel projectile loaded with high explosive assembled to a nonmetallic cartridge case. The projectile is fitted at the nose with a

point-detonating (PD) fuze and at the base with a tracer adapter. The adapter is threaded to the projectile base, and is designed to secure the projectile to the cartridge case as well as to hold the tracer. A gliding metal rotating band encircles the projectile 1-3/4 inches forward of the base. Cartridge Case M157 used with this round is a two-piece assembly of base and body, manufactured from nitrocellulose and relatively vulnerable to fracture from impact. The cylindrical body, containing the bagged propelling charge, is attached to the projectile by epoxy resin and a case locking ring, secured by the projectile base adapter. The base of the cartridge case houses the electric primer initiator. The primer tube is of nitrocellulose and contains a black powder charge.

Functioning:

Electric current from the firing mechanism of the weapon initiates the ignition element/initiator. The resultant flash through the primer tube ignites the propellant, and the burning propellant generates gases which ignite the tracer and force the projectile from the gun tube. The superquick point-detonating fuze functions on impact with the target or on graze. Functioning of the fuze detonates the explosive charge, which creates blast and fragmentation.

Tabulated Data:

Complete round:

Type ----- HE-T
 Weight ----- 48.5 lbs.
 Length ----- 24.6 in.
 Cannon used with -- M81

Projectile:

Body material ----- Forged steel
 Color ----- Olive drab w/yellow marking
 Filler and weight -- TNT-9.5 lbs.

Components:

Cartridge case ----- M157
 Propelling charge -- M190
 Primer ----- M117
 Tracer ----- M13
 Fuze ----- PD, M720 or XM720

Performance:

Maximum range --- 9000 meters
 Muzzle velocity --- 2240 fps.

Temperature Limits:

Firing:

Lower limit ----- +40°F
 Upper limit ----- +125°F

Storage:

Lower limit ----- -80°F for periods of not more than 3 days

Upper limit ----- +160°F for periods of not more than 4 hrs/day;

*Packing ----- 1 cartridge in fiber container; 1 container per wooden box

*Packing Box:

Weight ----- 97.5 lbs.
 Dimensions ----- 39-1/2 x 12-1/2 x 13-3/16 in.
 Cube ----- 4.0 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class - 5
 Storage compatibility --- E
 DOT shipping class ---- A
 DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
 DODAC ----- 1320-D592
 Drawing number ----- 9223763

Operational Characteristics:

Because they are flammable, unprotected cartridge cases, those from which barrier bags have been removed, can be ignited accidentally by burning cigarettes, smoldering residue, embers, open fire, etc. Do not remove ballistic protective cover until round is removed from stowage rack for firing. Do not remove barrier bag until round is being chambered. Neoprene barrier bags may be difficult to remove at -25°F or below.

References:

SL 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-2350-230-12
 TM 9-2350-232-10
 TM 9-1300-251-20

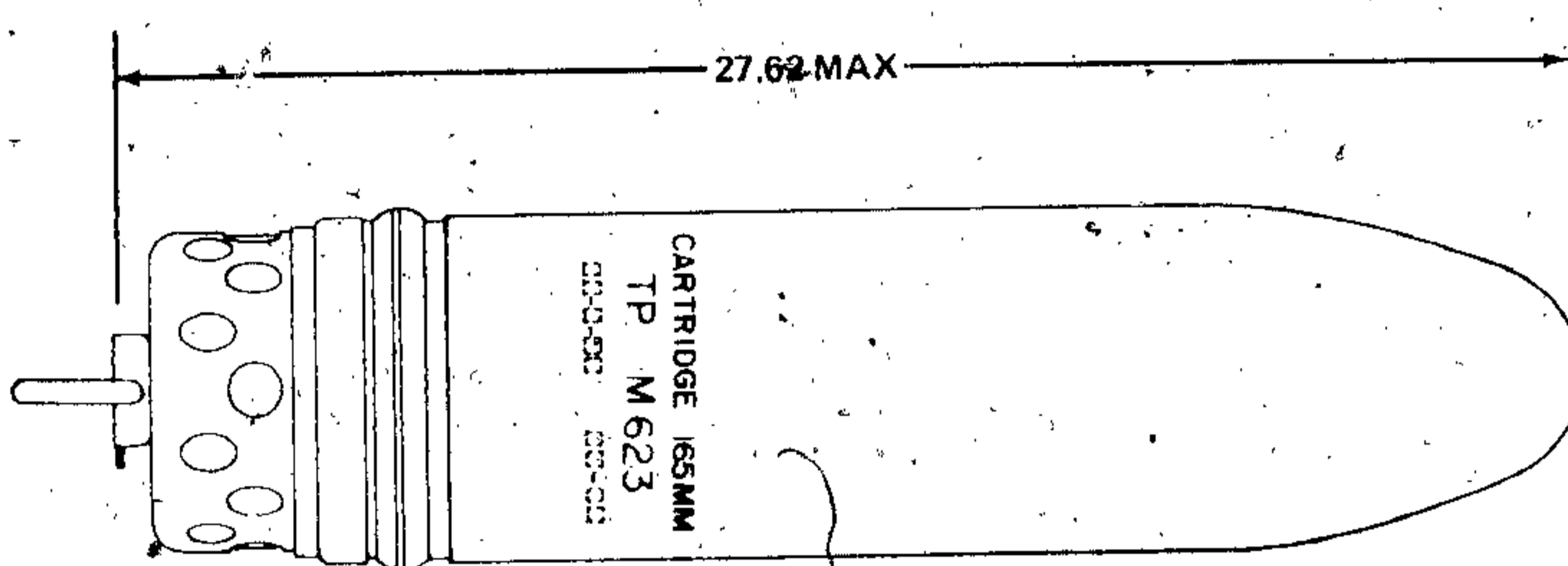
TM 43-0001-28

CARTRIDGE, 165-MILLIMETER: HEP, M123A1 AND M123

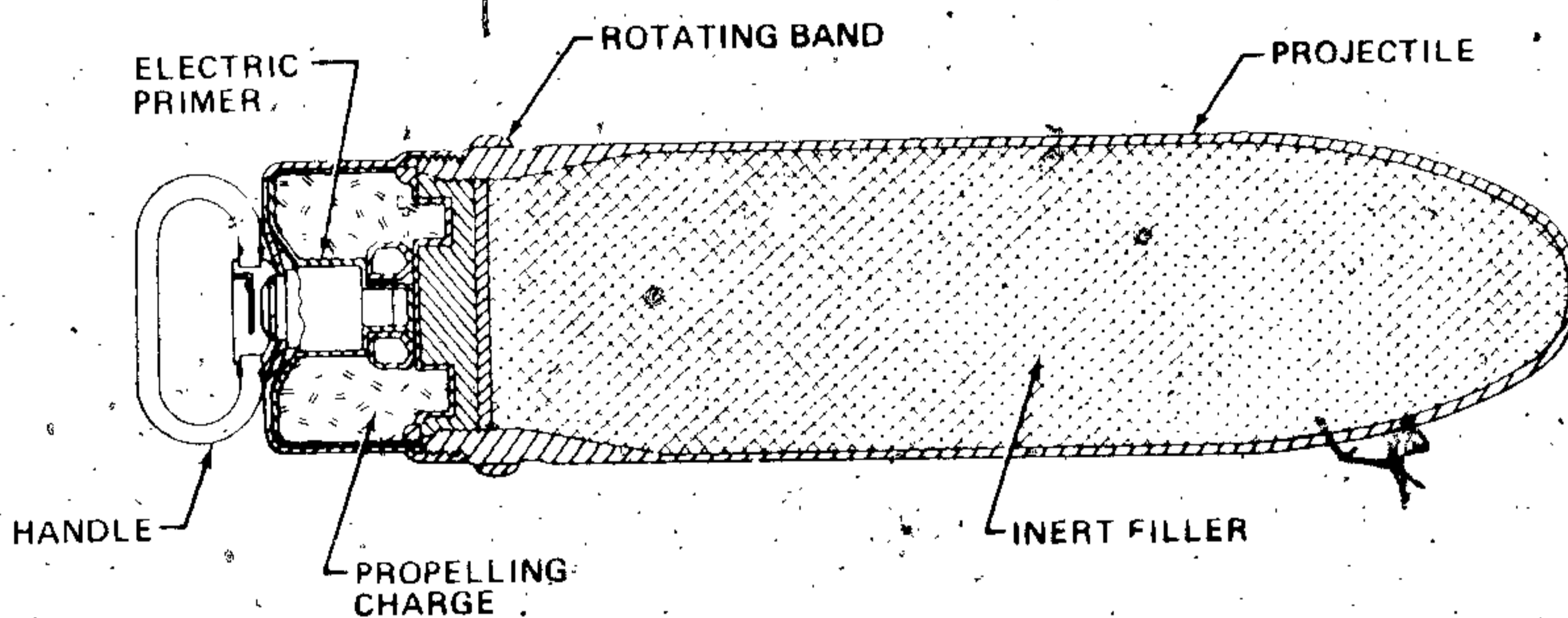
For information on this item refer to (C)TM 9-1300-203/2.

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CARTRIDGE, 165-MILLIMETER: TP, M623



AR199781



AR199780

Type Classification:

Std AMCTC 8415 dtd 1971

Use:

This practice cartridge is used for training in marksmanship with 165-mm Gun Cannon M135.

Description:

The cartridge is an inert loaded, fixed type, spin stabilized round. Essentially the projectile simulates the M123A1, HEP projectile except that the fuze/base plug combination is replaced by a redesigned solid base plug. The ignition system is the same as that utilized with the M123A1. An alternate TP design is

provided which differs from the above in use of the M123A1 projectile body and standard base plug. In this design a dummy fuze is assembled to the standard M123A1 base plug for weight considerations in lieu of the solid base plug utilized with the basic TP design.

Functioning:

Functioning is the same as a service round except that the projectile is inert and does not detonate on impact.

Tabulated Data:

Complete round:
 Type ----- TP
 Weight ----- 65 lbs.
 Length ----- 27.62 in.

Cannon used with ---- M135

Projectile:

Body material-----Steel
 Color -----Blue w/white markings

Filler and weight ---- Inert-36 lbs.

Components:

Cartridge case ----- M104

Propelling

charge ----- M2, 2.12 lbs.

Primer----- Electric, M73

Supplementary ignition

charge ----- Black powder,
 220 grains

Performance:

Maximum range ---- Classified

Muzzle velocity ---- Classified

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 hrs/day)

* Packing ----- 1 round per fiber
 container; 1 con-
 tainer per wooden
 box

* Packing Box:

Weight ----- 94 lbs.

Dimensions----- 34-13/16 x 8-3/4
 x 9-13/16 in.

Cube----- 1.7 cu. ft.

*NOTE: See SC for complete packing data
 including NSN' s.

Shipping and Storage Data:

Quantity-distance

class ----- 4

Storage

compatibility----- E

* DOT shipping class----- B

DOT designation ----- AMMUNITION FOR
 CANNON WITH
 INERT PROJEC-
 TILE

DODAC ----- 1320-D590

Drawing number ----- 9219045

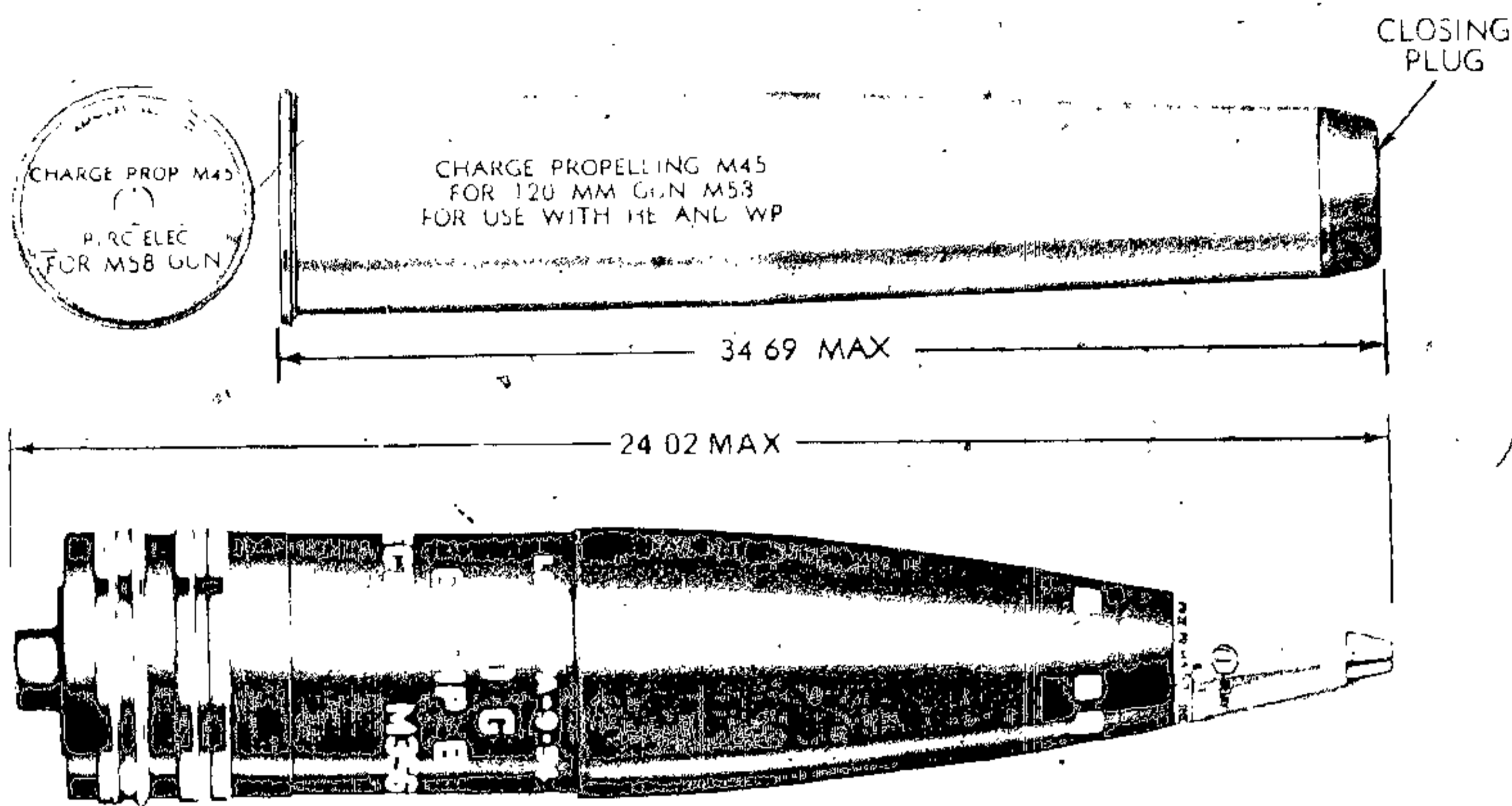
References:

TM 9-1300-251-20

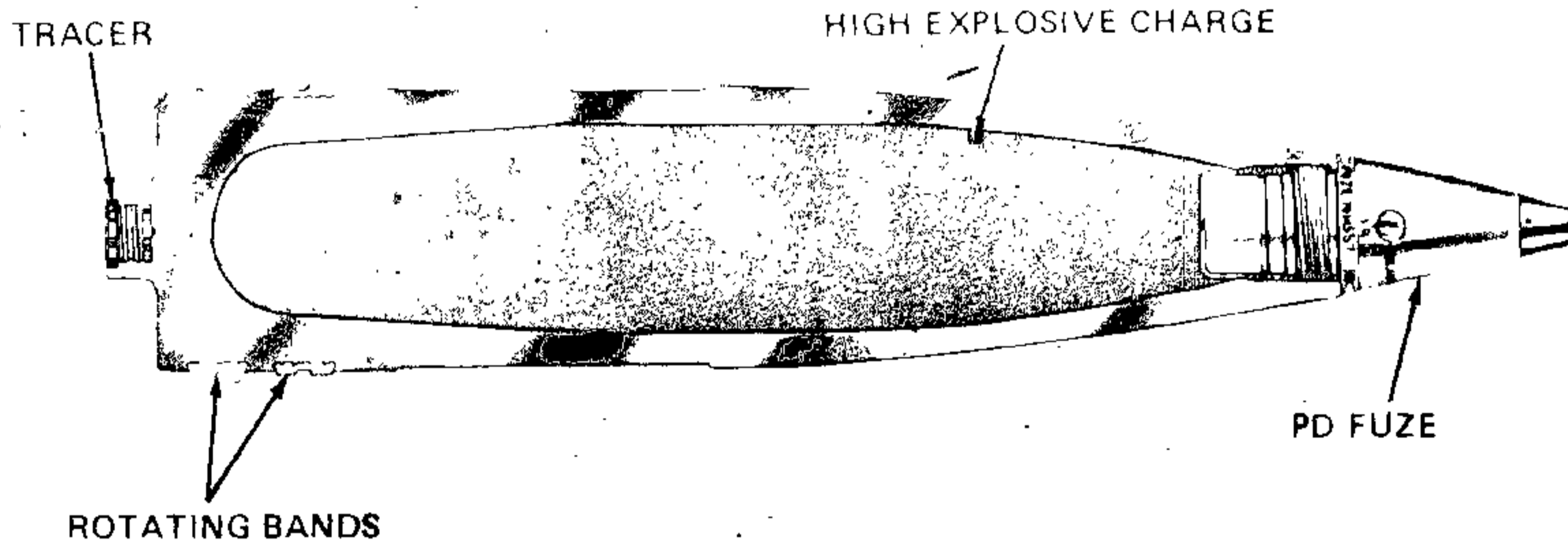
AMCP 700-3-3

TM 9-2350-222-10

PROJECTILE, 120 MILLIMETER: HE-T, M356 (T15E3)



AR199803



AR199802

Type Classification:

Std. OTCM 36841 dtd 1958

Use:

This separated round is used in 120-mm tank gun Cannon M58 for fragmentation, blast, or mining effect.

Description:

The complete round consists of a projectile, a propelling charge assembly, and a point-detonating (PD) fuze. The exterior of the projectile body has two gilding metal rotating bands and a boss on the base. A tracer is screwed into the boss. The propelling

charge is contained in a brass cartridge case. The propellant is in a silk bag, held in place in the cartridge case by distance wadding. The cartridge case is closed with a closing plug.

Functioning:

When the primer is struck by the firing pin of the weapon, the resulting flash ignites the propelling charge. The burning propelling charge generates gases that drive the projectile from the gun bore and ignites the tracer. The burning tracer provides a visible red trace for approximately 3 seconds. Upon impact, the fuze functions to detonate the composition B explosive causing blast and fragmentation of the projectile at the target.

Tabulated Data:

Projectile w/fuze:

Type ----- HE-T
 Weight ----- 50.41 lbs.
 Length ----- 24.02 in.
 Cannon used with ---- M58
 Body material ----- Steel
 Color ----- Olive drab w/yel-
 low marking
 Filler and weight ---- Composition B-
 7.84 lbs.

Propelling charge
 assy. weight ----- 38.75 lbs.

Components:

Cartridge case ----- M109 (T25)
 (brass)
 Propelling charge
 assembly ----- M45 (T21E1)
 Propellant ----- M31
 Primer ----- M67 percussion-
 electric
 Closing plug ----- M6
 Tracer ----- M5 Series
 Fuze ----- PD M557

Performance:

Maximum range ----- 18,206 meters
 (19,910 yds.)
 Muzzle velocity ----- 760 mps
 (2,500 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 hrs/day)

* Packing ----- Projectile and
 propelling charge
 in separate fiber
 containers; 2
 fiber containers
 (1 round) per
 wooden box

* Packing Box:

Weight ----- 142.65 lbs.
 Dimensions ----- 41 x 10-27/32 x
 15-9/16 in.
 Cube ----- 3.9 cu. ft.

* NOTE: See SC for complete packing data
 including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 6
 Storage compatibility --- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILE
 DODAC ----- 1315-C800
 Drawing number ----- 8822495

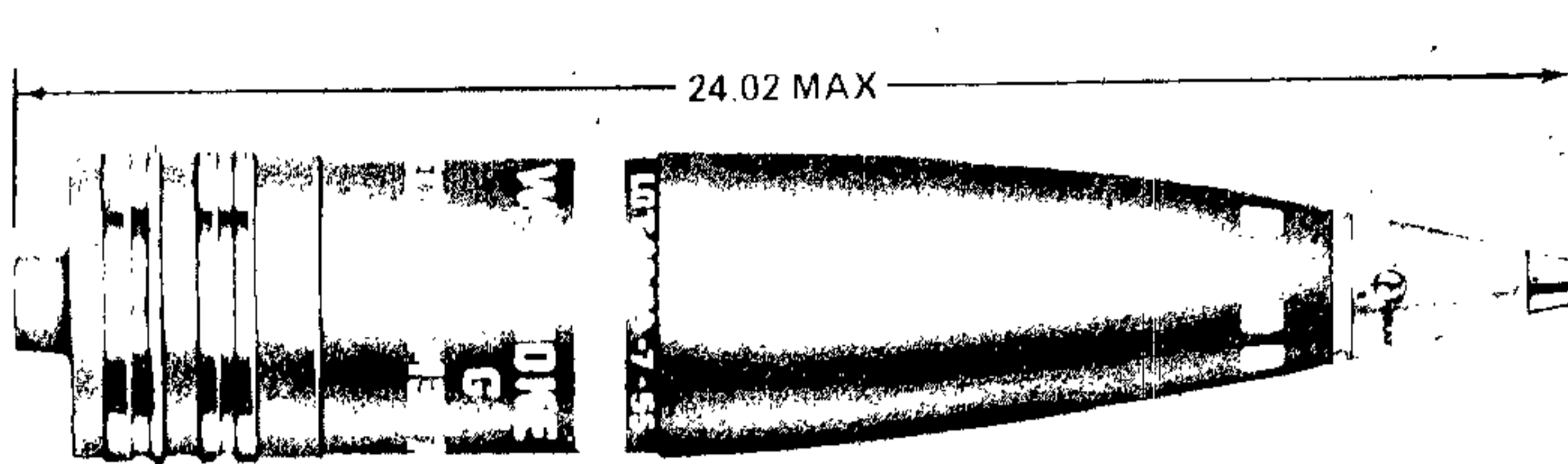
Limitations:

None

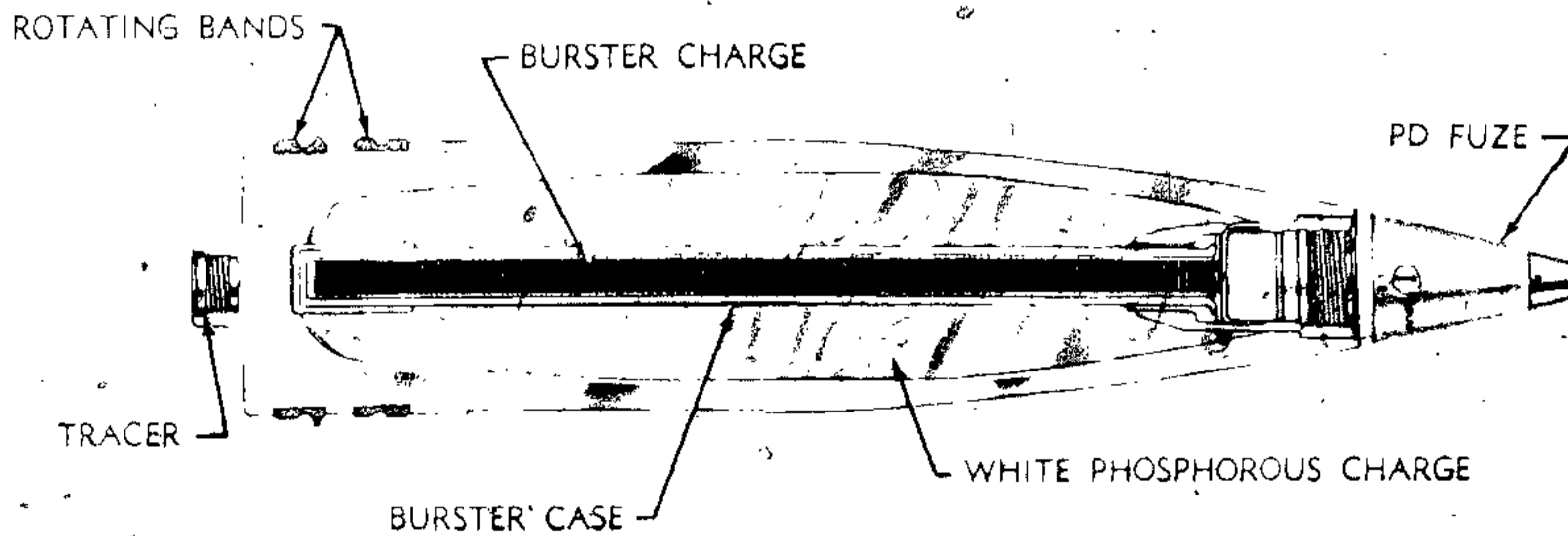
References:

SC 1305/30-IL
 SB.700-20
 AMCP 700-3-3
 TM 9-1300-251-20

PROJECTILE, 120-MILLIMETER: SMOKE, WP-T, M357 (T16E4)



AR199797



AR 199796

Type Classification:

Std OTCM 37741 dtd 1961

Use:

This round is used in 120-mm tank guns for target marking and smoke screening. It also has a limited incendiary action.

Description:

The complete round consists of projectile and propelling charge. The projectile is a tapered steel body fuzed with a point-detonating (PD) fuze. Assembled to the projectile are two gilding metal rotating bands forward of the fuze. A boss containing a tracer is threaded

to the base. A burster casing is press-fitted in the projectile nose with the other end seated in a well at the base of the projectile. A burster charge of tetrytol is contained in the burster casing. The propelling charge consists of a brass cartridge case containing the propelling charge in a silk bag. Distance wadding is used to hold the silk bag in place and a plastic closing plug is used to close the mouth of the cartridge case. An electric percussion primer is installed in the base of the cartridge case.

Functioning:

When the electric percussion primer is initiated in the breech of the weapon, the resulting flash ignites the propelling charge. The

burning propelling charge generates gases that drive the projectile from the gun bore and ignite the tracer. The tracer provides a visible red trace during the first three seconds of projectile flight. The PD fuze functions on impact, detonating the burster charge. Explosion of the burster charge shatters the projectile body and disperses the white phosphorous. Upon contact with the air, white phosphorous spontaneously ignites and burns, producing a dense white smoke and flaming particles.

Tabulated Data:

Projectile w/fuze:

Type ----- Smoke WP-T
 Weight ----- 50.41 lbs.
 Length ----- 24.02 in.
 Cannon used with ---- M58.

Projectile:

Body material----- Steel
 Color ----- Light green
 w/yellow band
 and light red
 marking.

Filler and weight ---- White phos-
 phorous (WP)
 7.5 lbs.

Components:

Propelling charge
 assembly----- M45 (T21E1)
 Cartridge case ----- M109 (T25)
 Propellant ----- M31
 Primer ----- M67 (T85E3)
 Tracer ----- M7
 Burster casing ----- T20
 Burster charge----- M41-(T18)
 (1700 grains
 tetrytol)
 Fuze----- PD-M557
 MTSQ, M520 series,
 M564

Performance:

Maximum range ----- 18,206 meters
 (19,910 yds.)
 Muzzle velocity ----- 760 mps
 (2,500 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 ----- + 125° F

* Packing

----- Projectile and
 propelling charge
 assembly in se-
 parate fiber con-
 tainers; 2 fiber
 containers (1 round)
 per wooden box

* Packing Box:

Weight----- 142.65 lbs.
 Dimensions----- 41 x 10-27/32 x
 15-9/16 in.
 Cube ----- 3.9 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 4
 Storage compatibility --- A
 DOT shipping class----- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILE
 DODAC ----- 1315-C806
 Drawing number ----- 8826688

Limitations:

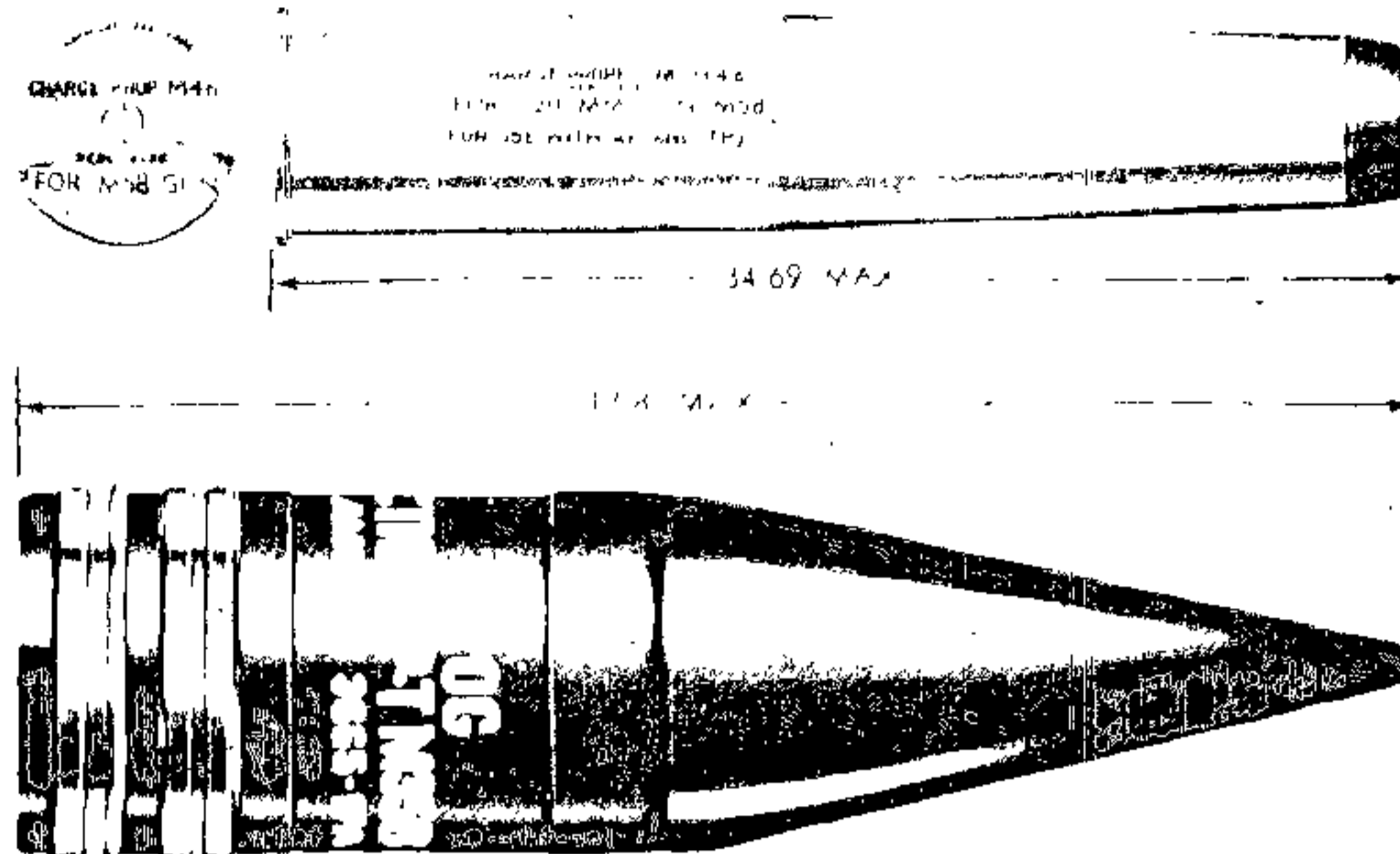
a. Since the burster in the ammunition is loaded with tetrytol, it should not be stored or fired at temperatures exceeding +125° F.

b. Store and transport WP rounds at temperatures below 111.4° F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will re-solidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

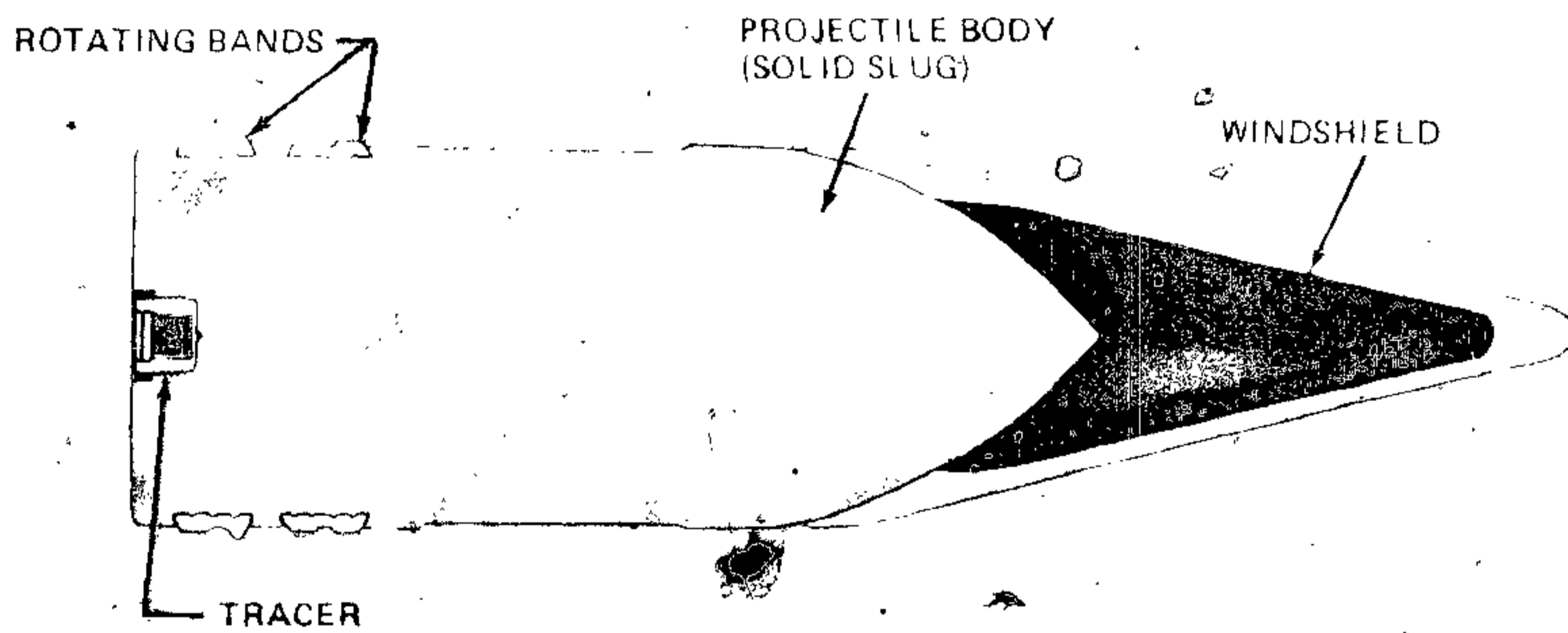
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1300-251-20

PROJECTILE, 120 MILLIMETER: AP-T, M358



AR199798



AR199798

Type Classification:

Std. OTCM 36841 dtd 1958

Use:

This armor piercing round has a high velocity projectile designed for use in 120-mm tank guns against armored targets.

Description:

The complete round consists of a **steel projectile** and a propelling charge assembly. The projectile body is a monobloc slug with a blunt nose and hardened face. A forged-aluminum windshield is attached to the front of the solid projectile body and two separate gilding metal rotating bands are located near the base of the

body. A tracer is threaded into the base. The propelling charge assembly consists of a cartridge case, propellant, and a percussion primer.

Functioning:

When the primer is struck by the firing pin of the weapon, the resulting flash ignites the propelling charge. The burning propelling charge generates gases that drive the projectile from the gun bore and ignite the tracer. The tracer provides a visible trace during the first 3 seconds of flight or a range of approximately 3,500 yards. On impact, the windshield spreads over the surface of the target, and the hard core projectile body penetrates the target by means of kinetic energy.

Tabulated Data:

Complete round:

Type ----- AP-T
 Weight ----- 50.85 lbs.
 Length ----- 17.82 in.
 Cannon used with ---- M58

Projectile:

Body material ----- Steel and alu-
 minium
 Color ----- Black w/white
 marking

Components of complete round:

Propelling charge
 assembly ----- M46 (T38E1)
 Cartridge case ----- M109
 Propellant ----- M17
 Primer ----- M67
 Tracer ----- M5 series

Performance:

Maximum range ----- 23,683 meters
 (25,290 yds.)
 Muzzle velocity ----- 1,064 mps
 (3,500 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 hrs/day)

* Packing

----- Projectile and
 propelling charge
 assembly in se-
 parate fiber con-
 tainers; 2 fiber-
 containers (1 round)
 per wooden box

*Packing Box:

Weight ----- 152.0 lbs.
 Dimensions ----- 41 x 10-27/32
 x 15-9/16 in.
 Cube ----- 3.9 cu. ft.

*NOTE: See SC for complete packing data
 including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 4
 Storage compatibility --- E
 DOT shipping class ----- B
 DOT designation ----- AMMUNITION FOR
 CANNON WITH
 SOLID PROJEC-
 TILE
 DODAC ----- 1315-C802
 Drawing number ----- 7548465

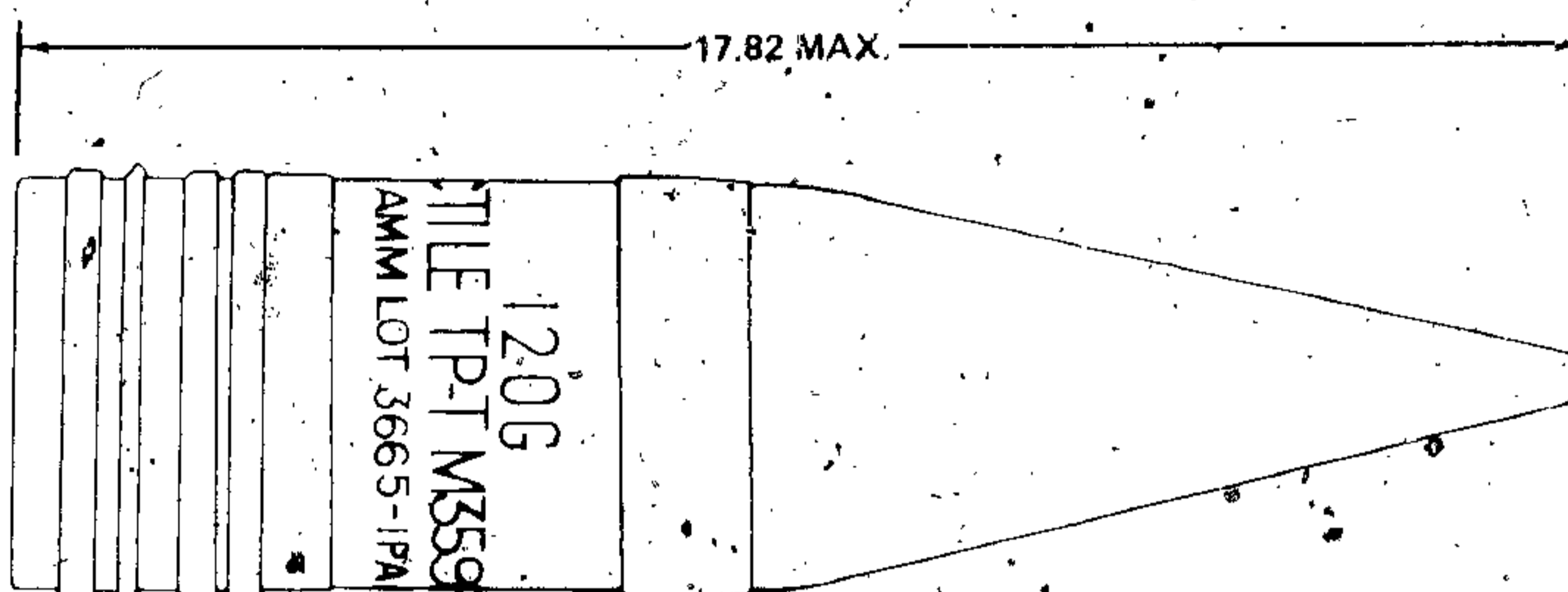
Limitations:

None

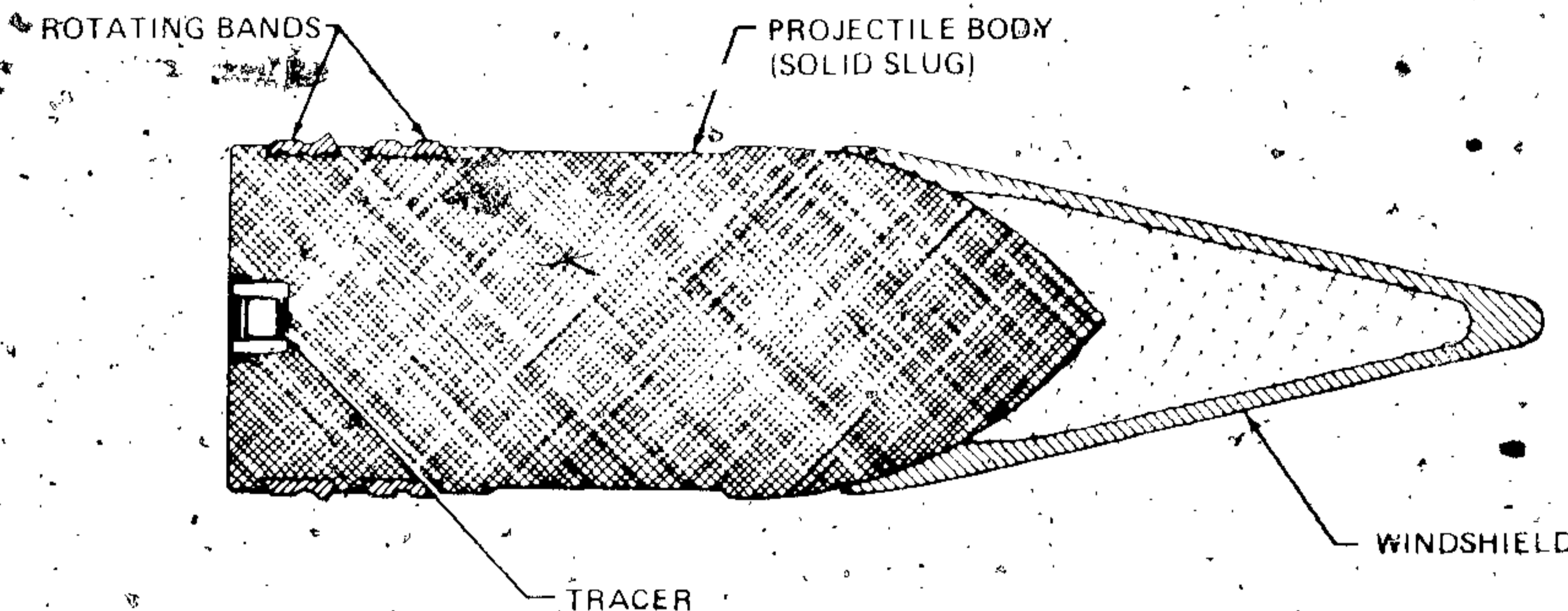
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1300-251-20

PROJECTILE 120-MILLIMETER: TP-T, M359E2 (T14E7)



AR199795



AR199794

Type Classification:

Std. OTCM 36841 dtd. 1958

Use:

This separated ammunition is a target practice projectile designed for training in marksmanship with 120-mm tank gun cannons.

Description:

The complete round consists of a solid projectile and a propelling charge assembly. The projectile body is a steel monobloc design with a tracer threaded into the base. A streamlined steel nose cone is fitted to the solid slug to improve the ballistic shape. Two gilding metal rotating bands encircle the projectile near the

base. The propelling charge assembly is M46, consisting of a cartridge case, propellant, and percussion primer.

Functioning:

When the primer is struck by the firing pin of the weapon, the resulting flash ignites the propelling charge. The burning propellant ignites the tracer and generates rapidly expanding gases to drive the projectile through the barrel with the velocity required to reach the target. The rotating bands engage the barrel rifling to impart spin to the projectile for stability in flight. The burning tracer provides visibility of the trajectory for a minimum of three seconds. Since the projectile is inert and unfuzed, the only function at the target is the effect of impact.

Tabulated Data:

Projectile:

Type ----- TP-T
 Weight ----- 50.85 lbs.
 Length ----- 17.82 in.
 Cannon used with ---- M58
 Body material ----- Low-strength
 carbon steel
 Color ----- Blue w/white
 marking

Components of complete round:

Propelling charge
 assembly ----- M46 (T38E1)
 Cartridge case ----- M109
 Propellant ----- M17
 Primer ----- M67
 Tracer ----- M5 series

Performance:

Maximum range ----- 23,683 meters
 (25,290 yds.)
 Muzzle velocity ----- 1,064 mps
 (3,500 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 hrs/day)

* Packing -----

Projectile and
 propelling charge
 assembly in se-
 parate fiber con-
 tainers; 2 fiber
 containers (1
 round) per wooden
 box

* Packing Box:

Weight ----- 152.0 lbs.
 Dimensions ----- 4 1/2 x 10-27/32
 x 15-9/16 in.
 Cube ----- 3.9 cu. ft.

*NOTE: See SC for complete packing data
 including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 4
 Storage compatibility --- E
 DOT shipping class ---- B
 DOT designation ----- AMMUNITION FOR
 CANNON WITH
 SOLID PROJEC-
 TILE
 DODAC ----- 1315-C804
 Drawing number ----- 7548465

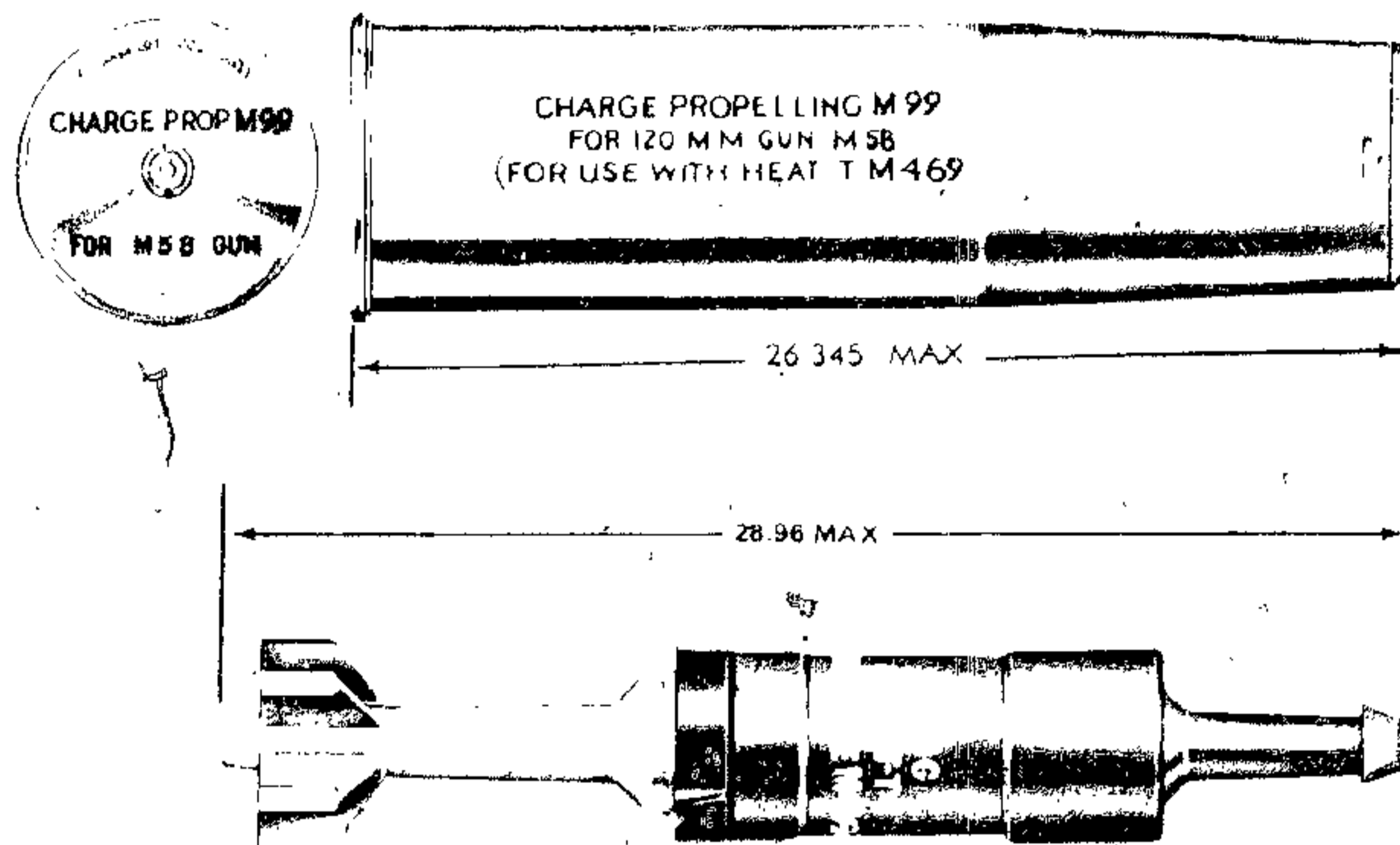
Limitations:

None.

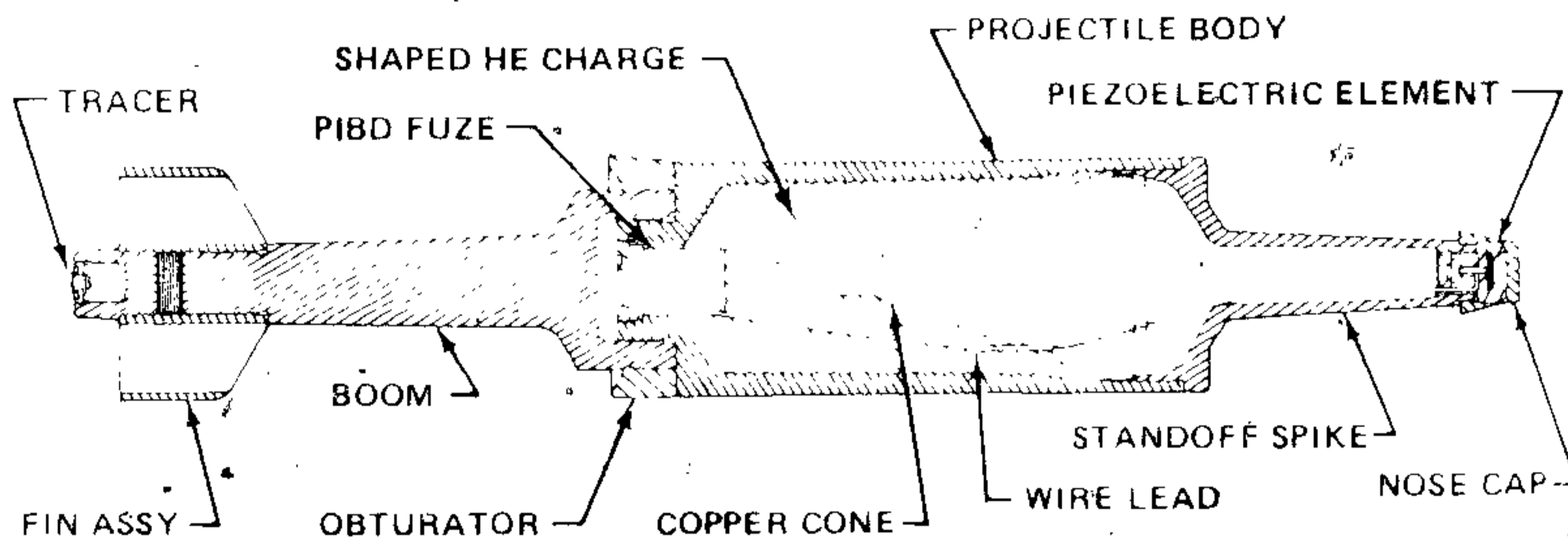
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1300-251-20

PROJECTILE, 120 MILLIMETER HEAT-T, M469 (T153E15)



AR199801



AR199800

Type Classification:

Std. OTCM 38009 dtd. 1962

Use:

This separated round includes a high velocity projectile designed for use in 120-mm tank guns against armored targets.

Description:

The complete round consists of a projectile and separated cartridge case. The projectile contains a shaped charge, a spike and cone assembly, a fin assembly, and a point-initiating base detonating fuze. A piezoelectric assembly, contained in the nose spike, acts as a power source for the fuze. Threaded to the

projectile base is the boom with a rubber obturator, six fins, and a tracer. A plug and disk assembly in the aft end of the boom hold the tracer. The propelling charge assembly consists of a cartridge case filled with propellant and a primer. The triple-base propellant is packed loose in the cartridge case and held in place with cristance wadding. A plastic plug is used to seal the mouth of the cartridge case.

Functioning:

When the percussion primer is struck by the firing pin of the weapon, the resulting flash ignites the propelling charge. The burning propelling charge generates gases that drive the fin stabilized projectile from the gun barrel and ignite the tracer. The tracer provides a visual and trace for approximately three seconds of

a range of 3,500 yards. Upon impact, the spike nose is crushed causing the fuze to function. Fuze functioning detonates the high-explosive shaped-charge which collapses the cone assembly and creates a high velocity focused shock wave. The intensity of the shock wave causes failure of the target armor and a jet of metal particles penetrates the interior of the target.

Tabulated Data:

Projectile w/fuze: C
 Type ----- HEAT-T
 Weight ----- 31.11 lbs.
 Length ----- 28.96 in.
 Cannon used with ----- M58

Projectile:
 Body material ----- Steel
 Color ----- Black w/yel-
 low marking
 Filler and weight ----- Comp. B.
 4.51 lbs.

Components:
 Propelling charge
 assembly ----- M99 (T42E1)
 Cartridge case ----- M111
 Propellant ----- M6 (22 lbs.)
 Primer ----- M96 percussion
 Tracer ----- M13 series
 Fuze ----- PIBD-M509A1

Performance:
 Maximum range ----- 23,683 meters
 (25,290 yds.)
 Muzzle velocity ----- 1,140 mps
 (3,750 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 hrs/day)

* Packing ----- Projectile and
 propelling
 charge assembly
 in separate fiber
 containers; 2 fiber
 containers (1 round)
 per wooden box

* Packing Box:

Weight ----- 115 lbs.
 Dimensions ----- 35-1/2 x 10-27/32
 x 15-3/16 in.
 Cube ----- 3.4 cu. ft.

* NOTE: See SC for complete packing data
 including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 7
 Storage compatibility --- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILE
 DODAC ----- 1315-C807
 Drawing number ----- 8840529

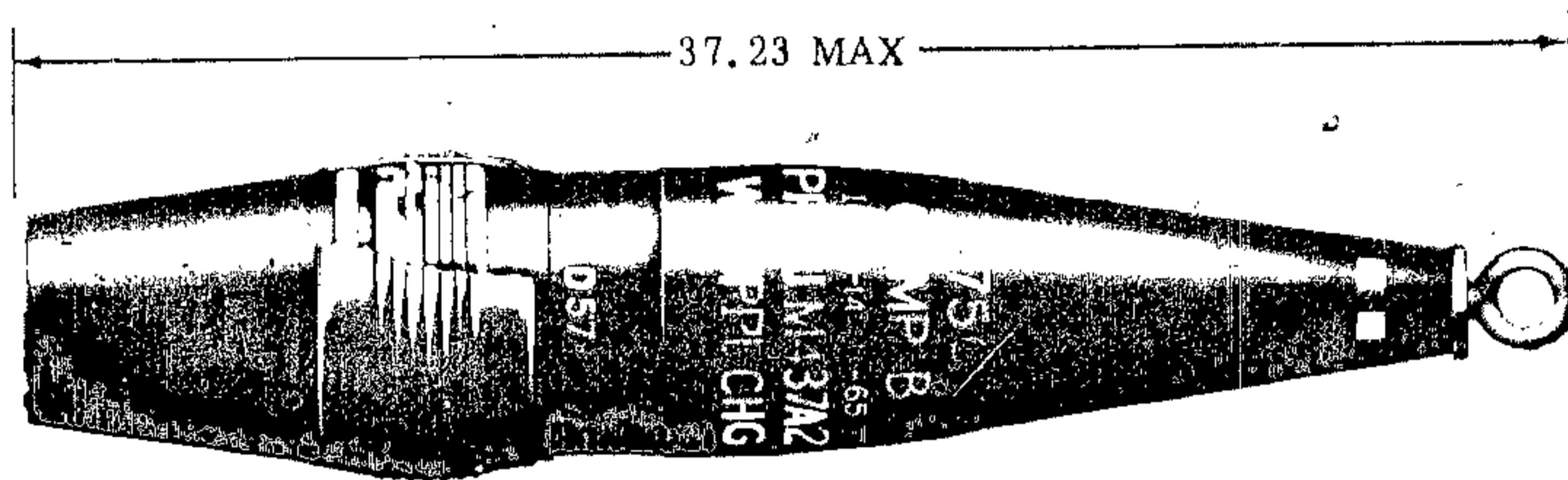
Limitations:

None

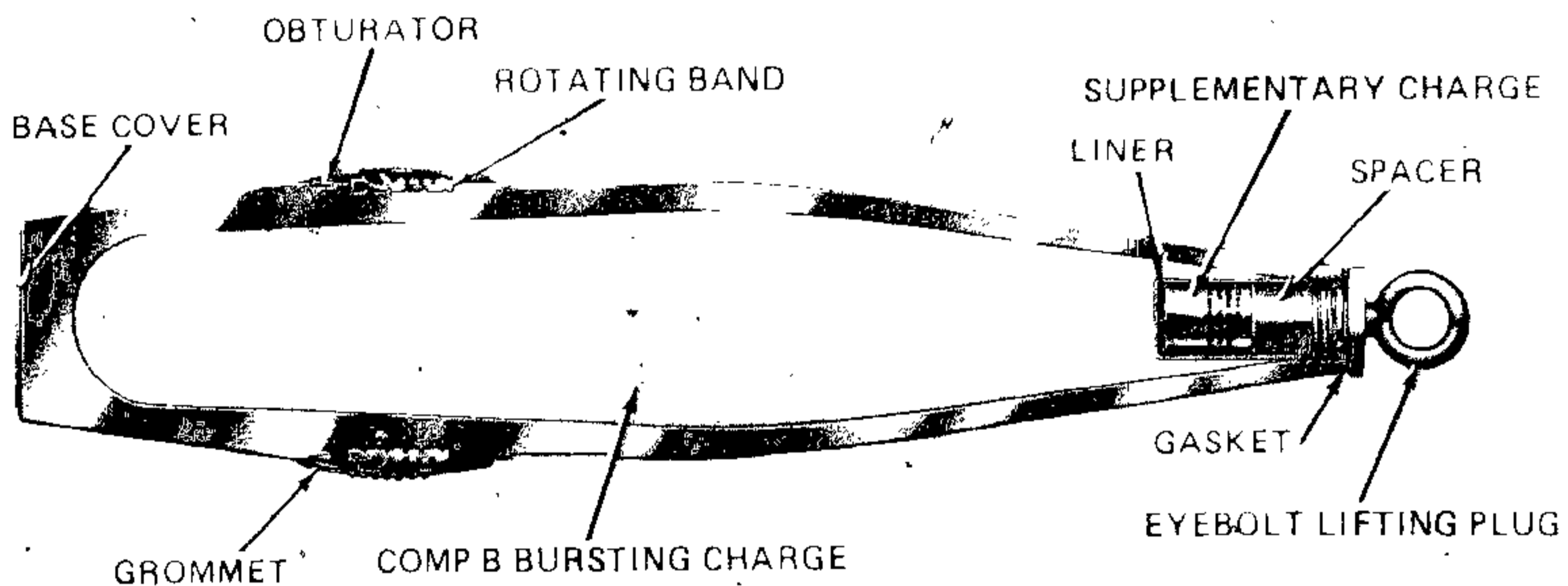
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1300-251-20

PROJECTILES, 175 MILLIMETER: HE, M437A2 AND M437A1



AR199692



AR199691

Type Classification:

- M437A2: Std AMCTC 3089 dtd 1965
- M437A1: Std AMCTC 3089 dtd 1965

Use:

175 mm HE Projectiles M437A2 and M437A1 are high explosive rounds for the 175-mm Gun Cannon M113 used for fragmentation, blast, and mining in support of ground troops and armored columns.

Description:

The projectile consists of a hollow steel form with a boattailed base, a streamlined obturating band, a gilding metal rotating band, and a nylon

obturator 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. The nose of the projectile is fitted with a threaded eye-bolt lifting plug to facilitate handling and provide a closure for the fuze cavity. The projectile is made with a deep fuze cavity and may be loaded with TNT or Composition B. Deep cavity projectiles contain a supplementary charge in the fuze cavity. A cardboard spacer is placed in the fuze cavity between the supplementary charge and the lifting plug to limit movement of the supplementary charge during shipping and handling. The rotating band is protected by a removable grommet. The loaded projectile is divided into one of four weight zones ranging from 30 to 40 pounds.

142.75 to 147.23 pounds. The weight zone of the projectile is indicated by the number of prick punch marks on the ogive of the projectile

Functioning:

When the weapon is fired, Primer M82 ignites the igniter pad of the propelling charge. The burning pad ignites the black powder in the core assembly. Sparks and flame flash through perforations in the igniter core tubes in a pattern designed to assure uniform ignition of the propellant increments. Bore wear in the gun is reduced by an additive jacket assembled to increment 3 when firing at full charge. Gases generated by the burning propellant force the projectile through the gun tube with the velocity required to reach the target. The rotating band engages the barrel rifling to impart spin for stabilization in flight. The obturating band expands to prevent leakage of gas pressure past the projectile, and is discarded on leaving the weapon. Depending upon the type fuze employed, the projectile is detonated either on impact or on approach to the target.

Difference Between Models:

Model M437A2 is filled with Comp. B; Model M437A1 is filled with TNT.

Tabulated Data:

Projectile:

Type ----- HE

Weight Zone Information:

WEIGHT ZONE

LOADED PROJECTILE (W/O FUZE)

	POUNDS		MARK
	OVER	UP TO & INCL	
1	142.75	143.96	□
2	143.84	145.05	□□
3	144.93	146.14	□□□
4	146.02	147.23	□□□□

Length:

W/O lifting plug ----- 34.14 in.
 W/ lifting plug ----- 37.23 in. (max.)
 Cannon (Weapon) used with ----- M113, M113A1

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

Filler and weight:

M437A2 ----- Comp. B 31 lbs.;
 Supp Chg. 0.30 lb. TNT
 M437A1 ----- TNT 30 lbs.;
 Supp Chg. 0.30 lb. TNT

Components:

Propelling charge ----- M86 series
 Primer ----- M82
 Fuzes ----- PD, M572; Prox., M514A1, M728; MTSQ, M582

Temperature Limits:

Firing:

Lower limit ----- - 40° F
 Upper limit ----- + 125° 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 ----- 6 projectiles per pallet

* Pallet:

Weight ----- 948 lbs.
 Dimensions ----- 42-3/16 x 25-5/8 x 17-1/8 in.
 Cube ----- 10.6 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 7
 Storage compatibility group ----- A
 DOT shipping class ----- A
 DOT designation ----- EXPLOSIVE PROJECTILE
 DODAC ----- 1320-D572 (M437A2, M437A1) w/Supplementary Charge
 1320-D591 (M437A1, M437A2 without supplementary charge)

Assembly Dwg.

No. ----- 8837902

Ballistics: (M113 and M113A1 Cannons)References:

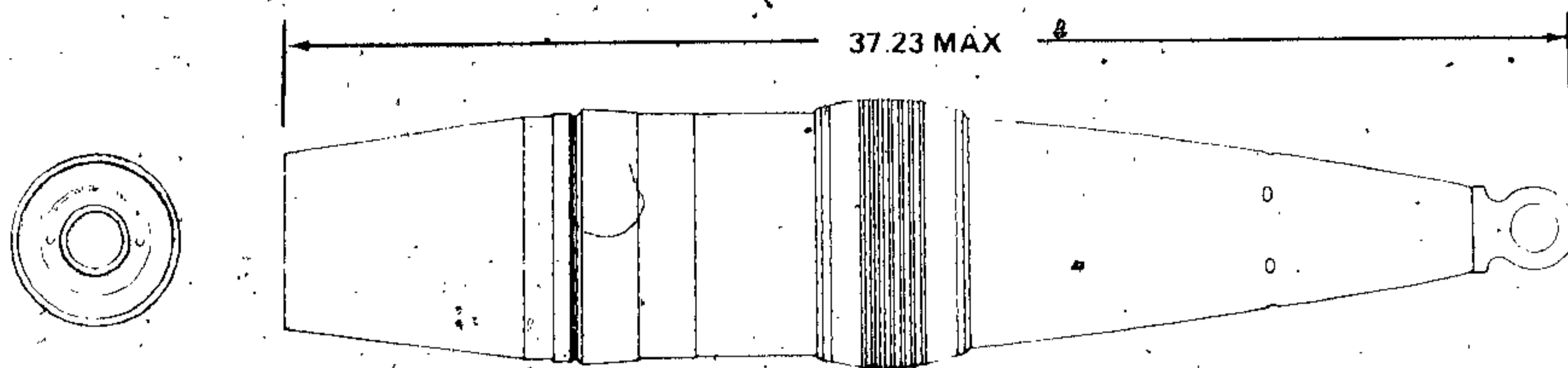
Charge M86	Muzzle Velocity (fps)	Maximum Range (yds)	Maximum Range (meters)	Chamber Pressure (psi)
* Charge 1	1675	16,515	15,100	10,100
Charge 2	2310	24,200	22,100	20,200
Charge 3	3000	35,800	32,700	45,700

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-2300-216-10
 TM 9-1300-206
 TM 9-1300-251-20
 TM 9-1300-251-34
 TM 9-1300-250

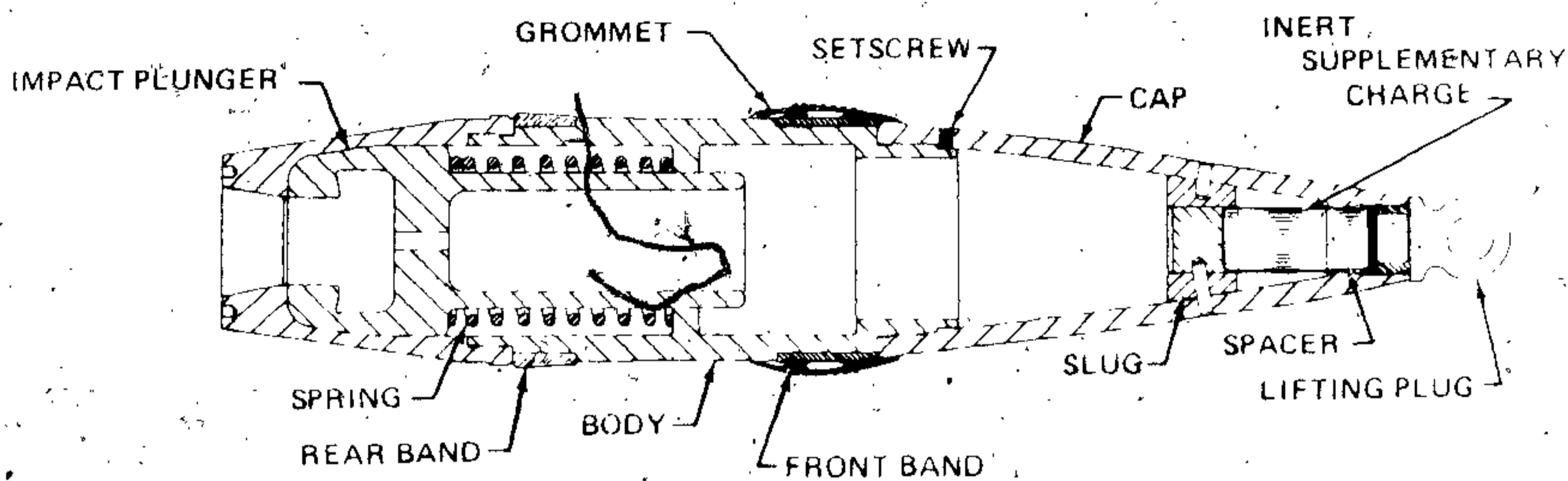
*When firing M86-series Propelling Charge at Zone 1 in a cold weapon expect the muzzle velocity to exceed the service velocity (1,675 fps) by up to 100 fps resulting in extended range.

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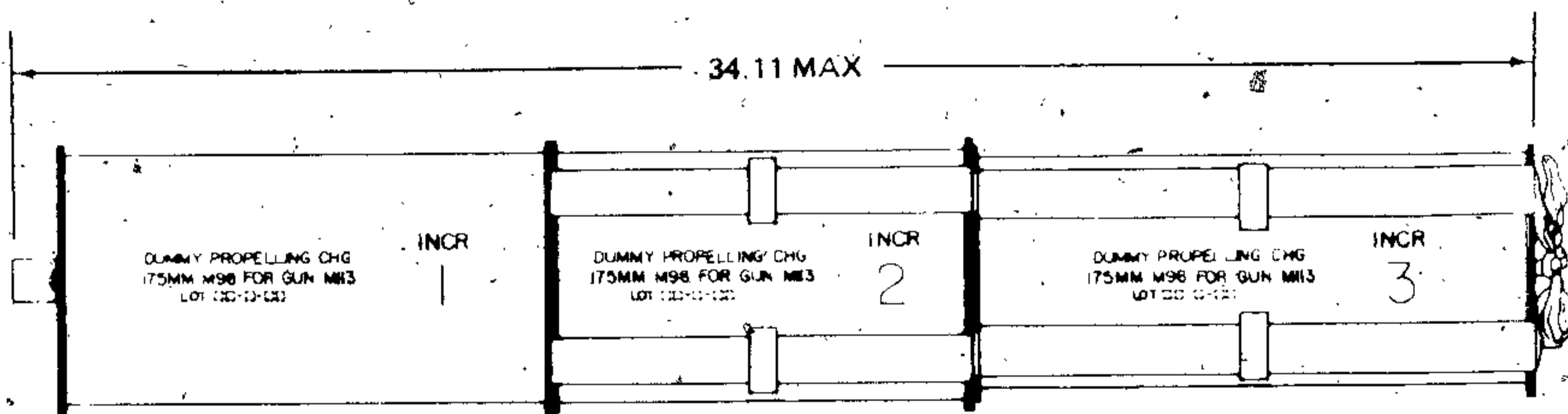
PROJECTILE, 175-MILLIMETER: DUMMY, M458 WITH CHARGE, PROPELLING: DUMMY M98



AR199687



AR199686



AR199707

Type Classification:

Std AMCTC 2819 dtd 1964

Use:

Dummy Projectile M458 is used with Dummy Propelling Charge M98. Both components are

inert and are used as a drill round to train troops in handling the ammunition and loading the weapon.

Description:

Dummy Projectile M458 simulates the projectile M437A2 or M437A1 in exterior shape,

weight and center of gravity. Dummy Propelling Charge M98 likewise simulates service propelling charge M86. The round is employed with Dummy Projectile Extractor M7 for removal of the dummy projectile after ramming. The extractor tool is an 18-foot, 8-inch aluminum pipe fitted with a hook at one end and handles at the other. The base of the dummy projectile contains a lubricated spring-loaded plunger to loosen the projectile in the forcing cone of the barrel after ramming. The projectile exterior is fitted with front and rear bands for engagement with the barrel rifling, and the front band is covered with a protective grommet to be removed before loading. The nose of the projectile has an inert supplementary charge, a spacer, and a threaded lifting plug in the fuze cavity. Dummy Propelling Charge M98 consists of 3 increments filled with wood blocks, weighted with lead to equal the weight of the service charge.

Functioning:

The complete round is inert and does not function. During ramming of the projectile, the internal plunger is driven forward against the plunger spring. On rebound, the plunger impacts the base to loosen the tight fit in the forcing cone which resulted from ramming. The purpose of the mechanism is to ease the extraction of the projectile. Actual extraction is accomplished by manual pulling, using Extractor M7 from the breech of the weapon to engage the base of the projectile.

Tabulated Data:

Type-----	Dummy
Weight:	
M458-----	148.7 lbs.
M98-----	57 lbs.
Length:	
M458 w/lifting plug-----	37.23 in. max.
M458 w/o lifting plug-----	34.11 in. max.
M98-----	49.5 in. max.
Diameter:	
M458 at forward band-----	6.885 in. max.
M458 at rear band-----	7.103 in.
M98-----	8 in. max.
Cannon used with-----	M113, M113A1
Body material-----	Steel
Material, M98-----	Lead weighted, fabric covered wooden blocks

Primer-----	Expended service primer M82
Assembly Dwg. Nos.:	
M458-----	115656
M98-----	9205873
Color-----	Old mfg: black or blue New mfg: bronze

Temperature Limits:

Not Applicable.

*Packing:

M458-----	6 projectiles on pallet
M98-----	1 dummy charge and expended primer in metal container; 6 con- tainers in wooden box

*Pallet:

Weight-----	948 lbs.
Dimensions-----	42-3/16 x 25-5/8 x 17-1/8 in.
Cube-----	10.6 cu. ft.

*Packing Box:

Weight-----	114 lbs.
Dimensions-----	55 x 9-13/16 x 8-7/32 in.
Cube-----	3.45 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class-----	N/A
Storage compatibility group-----	N/A
DOT shipping class-----	N/A
DOT designation-----	AMMUNITION NON- EXPLOSIVE
DODAC:	
M458-----	1320-D709
M98-----	1320-D535

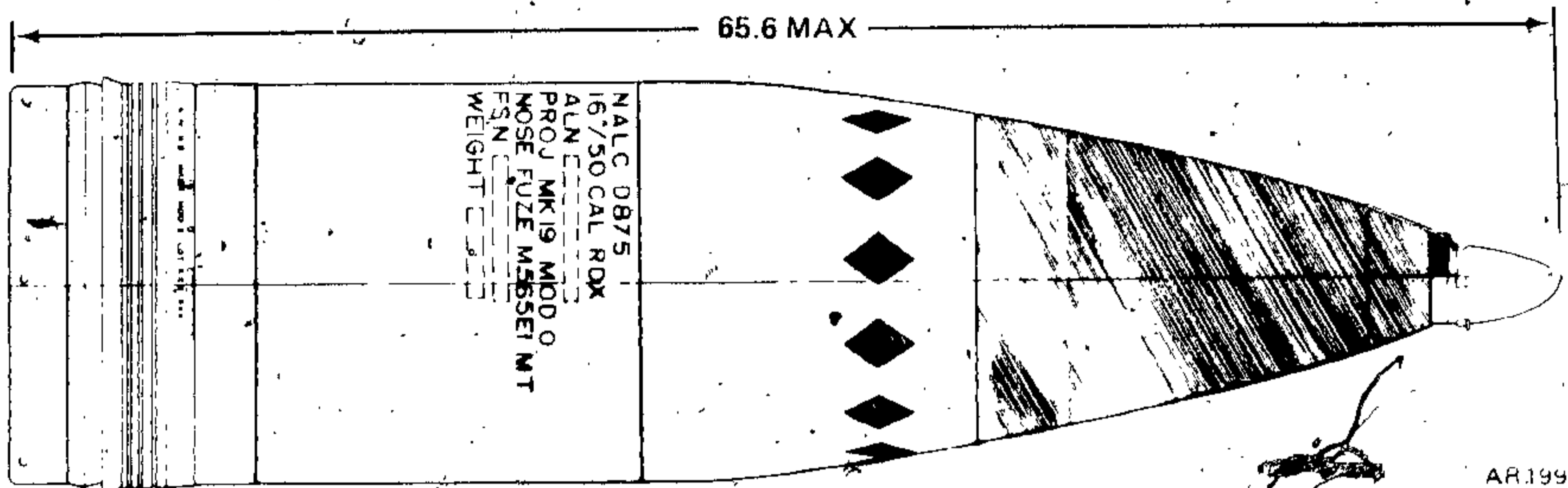
Ballistics:

Not Applicable.

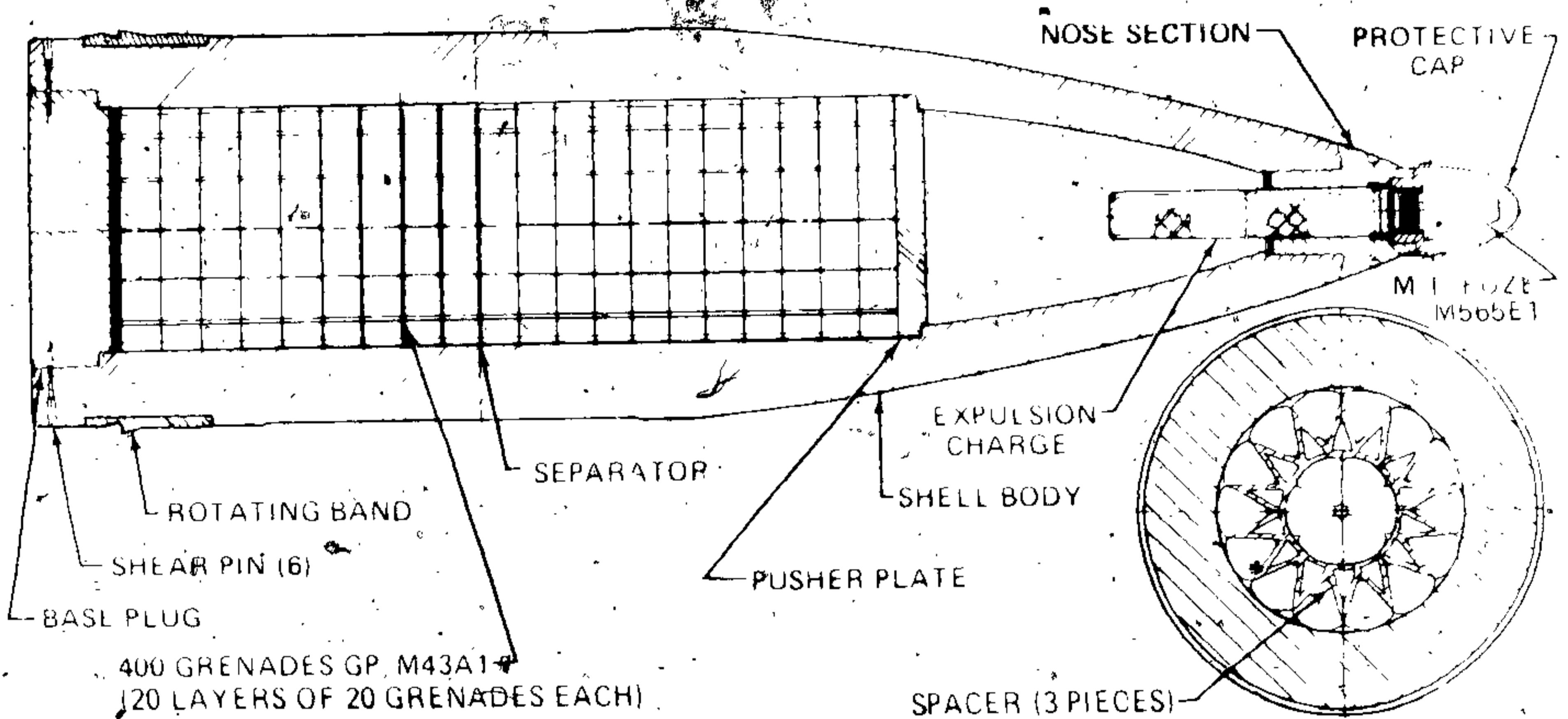
References:

- SC 1305/30-IL
- SB 700-20
- AMCP 700-3-3
- TM 9-2300-216-10

PROJECTILE, 16-INCH: HE, MK19 MOD O



AR199436



AR199435

Type Classification:

Std

Use:

This projectile is for Naval use only. It is designed for use against personnel on the beach or inland, delivering a concentration of grenades at 16-inch gun range.

Description:

This projectile is of the separate loading type. The projectile is shipped to, and stored at depot level with a nose protective cap installed. The projectile body is a hollow one-piece steel forging with a streamlined ogive and gilding

metal rotating band. The projectile is threaded in the nose to accept an MT fuze and explosion charge. The explosion charge consists of 400 grams of M9 mortar propellant. The MT fuze and shims are stripped separately. A base plug is press-fitted and pinned into the rear end of the projectile body. The projectile cavity contains 400 optimum fragmentation M43 grenades, which are held in place by the base plug. The grenades are arranged in 20 layers of 20 grenades each. The grenades are seated in the cavity behind a pusher plate with a separator dividing each layer. The grenades are wedge-shaped submissiles, each containing 21.2 grams of explosive Composition A5. With installation of the MT fuze, the projectile is ready to fire utilizing the standard 16-inch propelling charge loaded behind the projectile, and a suitable cannon primer in the breechblock of the weapon.

Functioning:

The cannon primer is initiated, igniting the propelling charge. The expanding propellant gases propel the projectile forward. The rotating band around the projectile engages the rifling in the barrel, imparting spin and obturation to the projectile. The expanding propellant gases force the projectile through the barrel with the velocity required to reach the target area. The fuze timer is initiated when the projectile is fired. After the set time in flight, the fuze functions initiating the expelling charge. The force from the expelling charge detonation pushes the grenade load against the base plug, which shears the pins and ejects the grenades into the air stream. Centrifugal force disperses the grenades radially from the projectile line of flight. When each grenade impacts the target area an ejection charge functions the grenade 4 to 6 feet above the impact surface. The grenade explodes in an air burst designed to inflict personnel casualties in the target area.

Tabulated Data:

Complete round:

Type ----- HE
 Weight ----- 1,880 lbs.
 Length ----- 65.6 in.
 Cannon used with ----- Naval Rifle,
 16-inch/50

Projectile:

Body material ----- Forged steel
 Color ----- Olive drab w/yel-
 low diamonds and
 yellow markings

Filler and
 weight ----- Explosive Comp.
 A5, 19 lbs

Fuze ----- MT, M565E1

Propelling charge:

Type ----- SPD

Weight:

Service ----- 660 lbs.
 Reduced ----- 315 lbs.
 Primer ----- Standard, 16-inch

Performance:

Maximum range ----- 36,576 meters
 (40,000 yds.)
 Muzzle velocity ----- 822.96 mps
 (2700 fps)

Temperature Limits:

Firing:

Lower limit ----- -29°C (-20°F)
 Upper limit ----- +54.4°C (+130°F)

Storage:

Lower limit ----- -29°C (-20°F)
 Upper limit ----- +54.4°C (+130°F)

*Packing:

Pallet of 20
 projectiles ----- MK 3 MOD O
 Pallet adapter ----- MK 88 MOD O

*Pallet:

Weight (pallet and 2
 projectiles) ----- 4,100 lbs.
 Dimensions ----- 69.0 x 41.0 x
 26.0 in.
 Cube ----- 42.5 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 5
 Storage compatibility
 group ----- A
 DOT shipping class ----- A
 DOT designation ----- EXPLOSIVE
 PROJECTILE
 DODAC ----- None assigned
 Drawing number ----- 9235148

References:

TP-101 (US Naval Weapons Laboratory)
 August 1968.
 SC 1305/30-IL

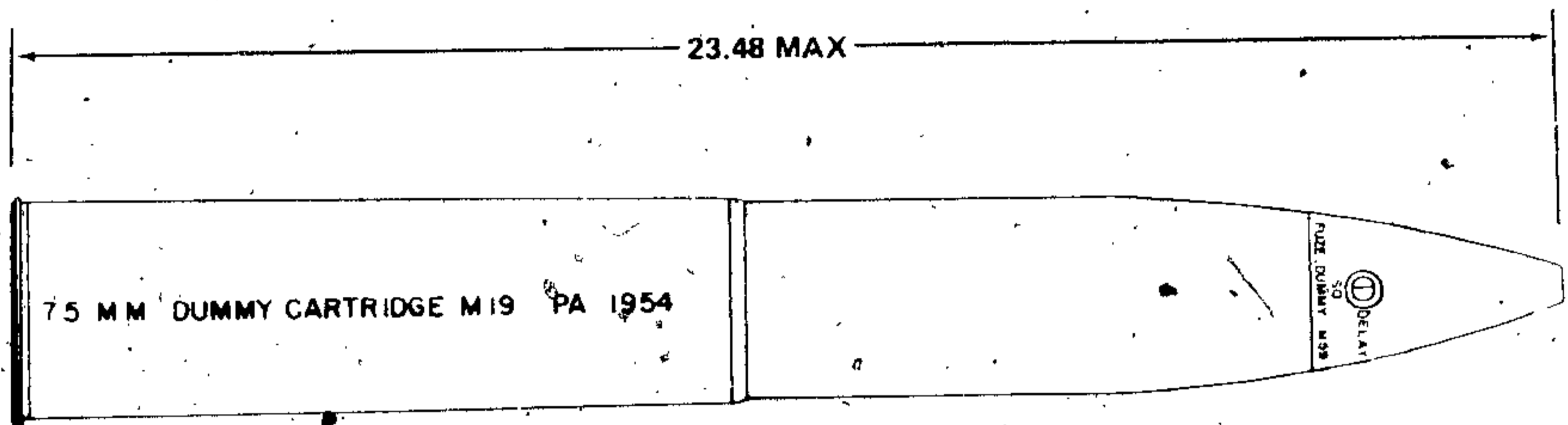
TM 43-0001-28

CHAPTER 3

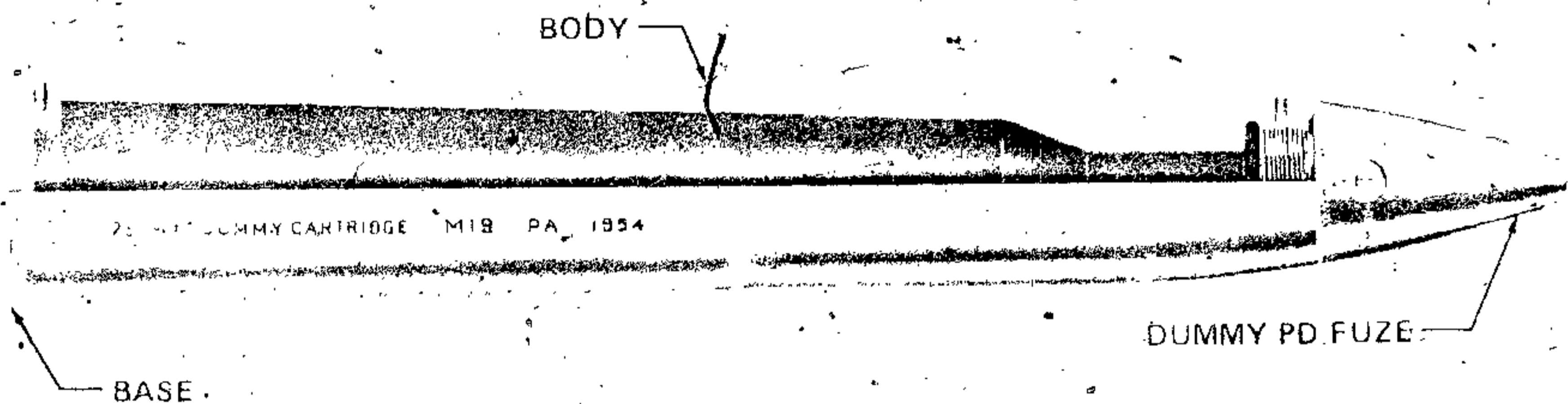
AMMUNITION FOR HOWITZERS

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CARTRIDGE, 75-MILLIMETER: DUMMY, M19 OR M19B1



AR199745



AR199744

Type Classification:

Obsolete OTCM 37119 dtd 1959

Use:

Cartridge M19 or the alternative M19B1 is a dummy cartridge used for training purposes. The cartridge is used with 75-mm pack Howitzer M1A1.

Description:

The Cartridge M19 consists of a malleable iron body simulating a service round with projectile, cartridge case and a steel base; all assembled with a dummy fuze. The alternate dummy Cartridge M19B1 has a bronze body. The cartridge base has a plug simulating a

primer. The dummy fuze simulates the weight and contour of a PD service fuze.

Functioning:

The cartridge is inert and nonfunctioning.

Tabulated Data:

Complete round:

Type -----	Dummy
Weight -----	18.24 lbs.
Length -----	23.48 in.
Cannon used with -----	M1A1

Projectile:

<u>Body material:</u>	
M19 -----	Iron
M19B1 -----	Bronze

TM 43-0001-28

Color:

Old mfg. ----- Black or blue w/
white markings

New mfg. ----- Bronze w/white
markings

Fuze ----- Dummy M59

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

*Packing Box:

Weight ----- 48 lbs.

Dimensions ----- 28-11/16 x 9-11/16
x 6-15/32 in.

Cube ----- 1.04 cu. ft.

*NOTE: See SC for complete packing data in-
cluding NSN'S.

Shipping and Storage Data:

DOT designation ----- DRILL CARTRIDGES
INERT

DODAC ----- 1315-C033

Drawing number ----- 72-3-8

References:

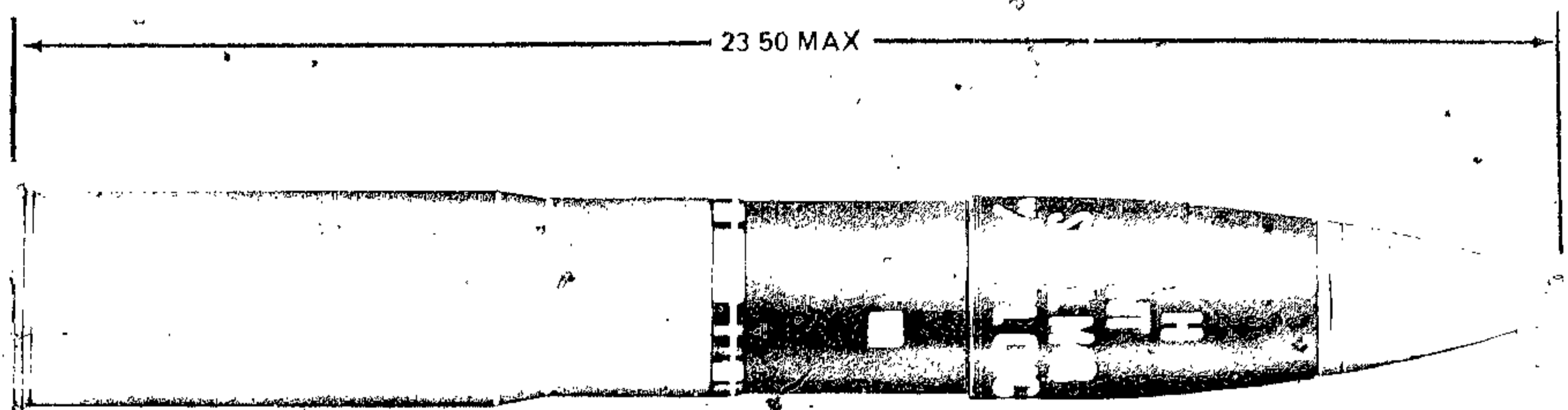
SC 1350/30-IL

SB 700-20

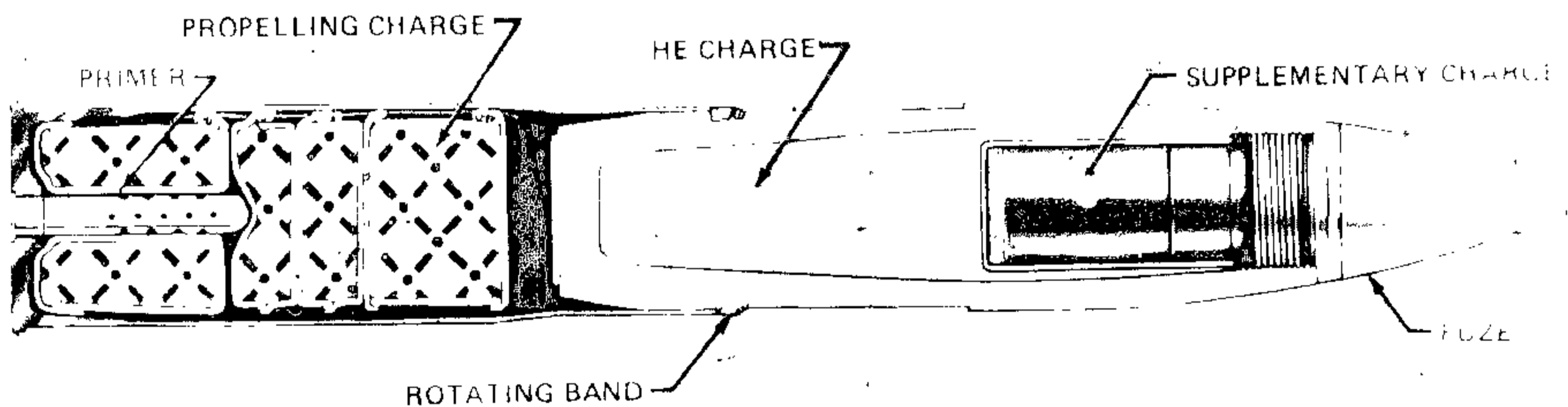
AMCP 700-3-3

TM 9-1300-251-20

CARTRIDGE, 75-MILLIMETER: HE, M48



AR199/47



AR199/46

Type Classification:

OBS MSR 11756003

Use:

Cartridge M48 is a high explosive type round used for fragmentation, mining, and blast effects. The cartridge is used in 75-mm Howitzer M1A1.

Description:

The projectile of this cartridge is loosely assembled in the cartridge case because of the necessity for removal to adjust the propelling charge. The projectile is made with either a normal or deep fuze cavity. The deep fuze cavity type may be issued with or without a supplementary charge. As issued, the projectile may be fuzed or assembled with a closing plug.

Impact, mechanical time-superquick, or proximity fuzes may be used. The propelling charge consists of a four-increment charge (base charge plus three increments) assembled in the cartridge case. A percussion primer is fitted in the base of the cartridge case.

Functioning:

When the percussion primer is struck by the firing pin of the weapon, a small amount of black powder in the primer tube is ignited. Sparks and flame from the black powder ignite the propelling charge. Gases from the burning propelling charge drive the projectile through the bore of the weapon. Spin is imparted to the projectile by the engagement of the rotating band with the rifling in the bore. This spin stabilizes the projectile in flight. When the fuze functions,

either over or on the target, the bursting charge detonates with both blast and fragmentation effect.

Tabulated Data:

Complete round:

Type ----- HE
 Weight ----- 18.24 lbs.
 Length ----- 23.50 in.
 Cannon used with ---- M1A1

Projectile:

Body material ----- Forged steel
 Color ----- Olive drab w/yellow markings
 Filler and weight --- TNT or 50/50 amatol, 1.49 lbs.

Components:

Cartridge case ----- M5A1, M5A1B1
 Propelling charge --- M1
 Primer ----- M1, M1A1, M1A2, M1B1A2 or M64

Fuze:

PD ----- M557
 PROX. ----- M513 series
 MTSQ ----- M520 series, M564

Performance:

Maximum range ---- 8796 meters
 Muzzle velocity ---- 1250 fps

Temperature Limits:

Firing

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 hrs/day)

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

*Packing Box:

Weight ----- 53.0 lbs.
 Dimensions ----- 27-15/16 x 9-5/8 x 6-11/32 in.
 Cube ----- 1.01 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class - 4
 Storage compatibility group ----- E
 DOT shipping class ---- A
 DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
 DODAC ----- 1315-C027-W/PD fuze
 1315-C028-W/O fuze
 Drawing number ----- 75-1-59

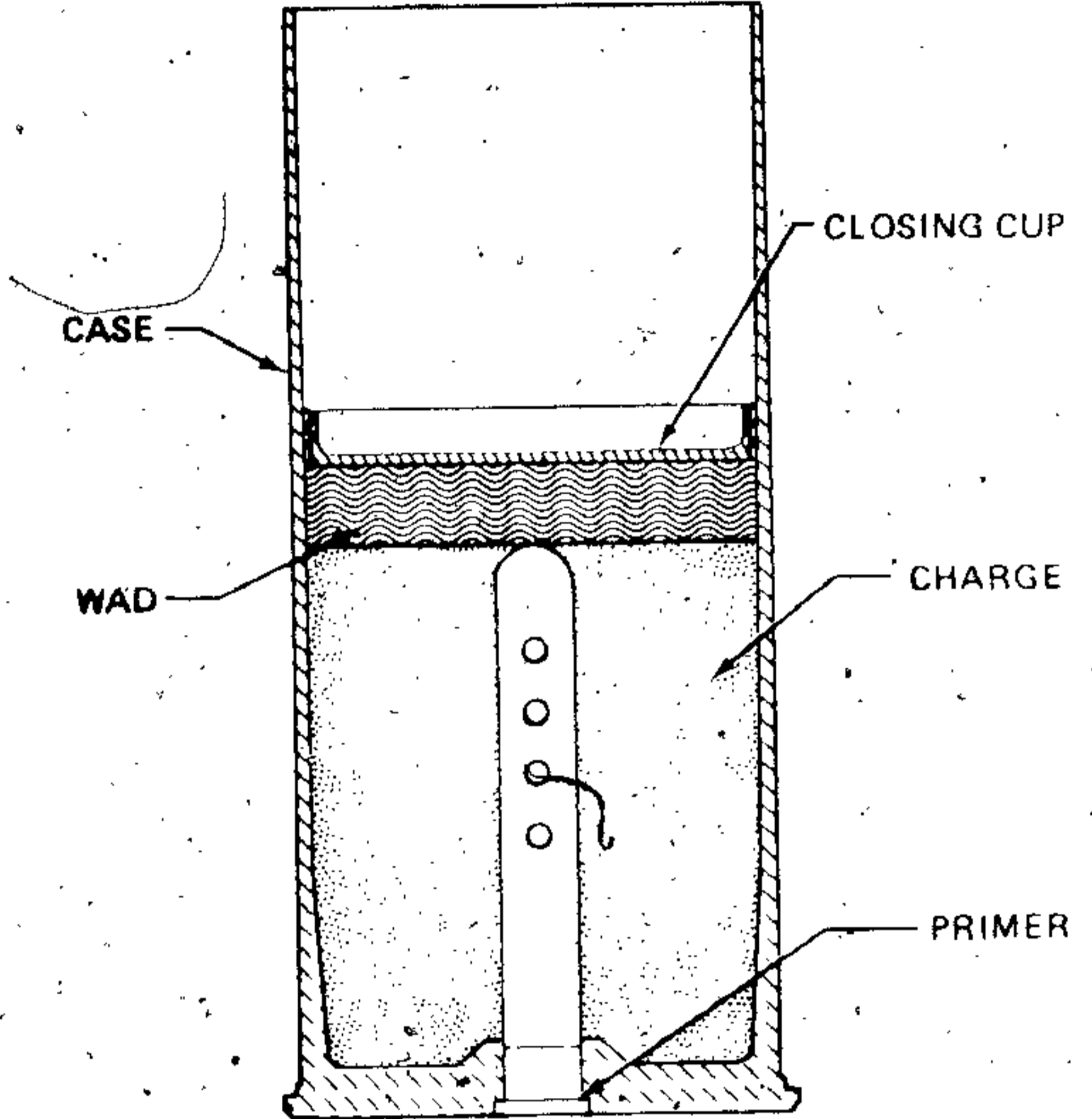
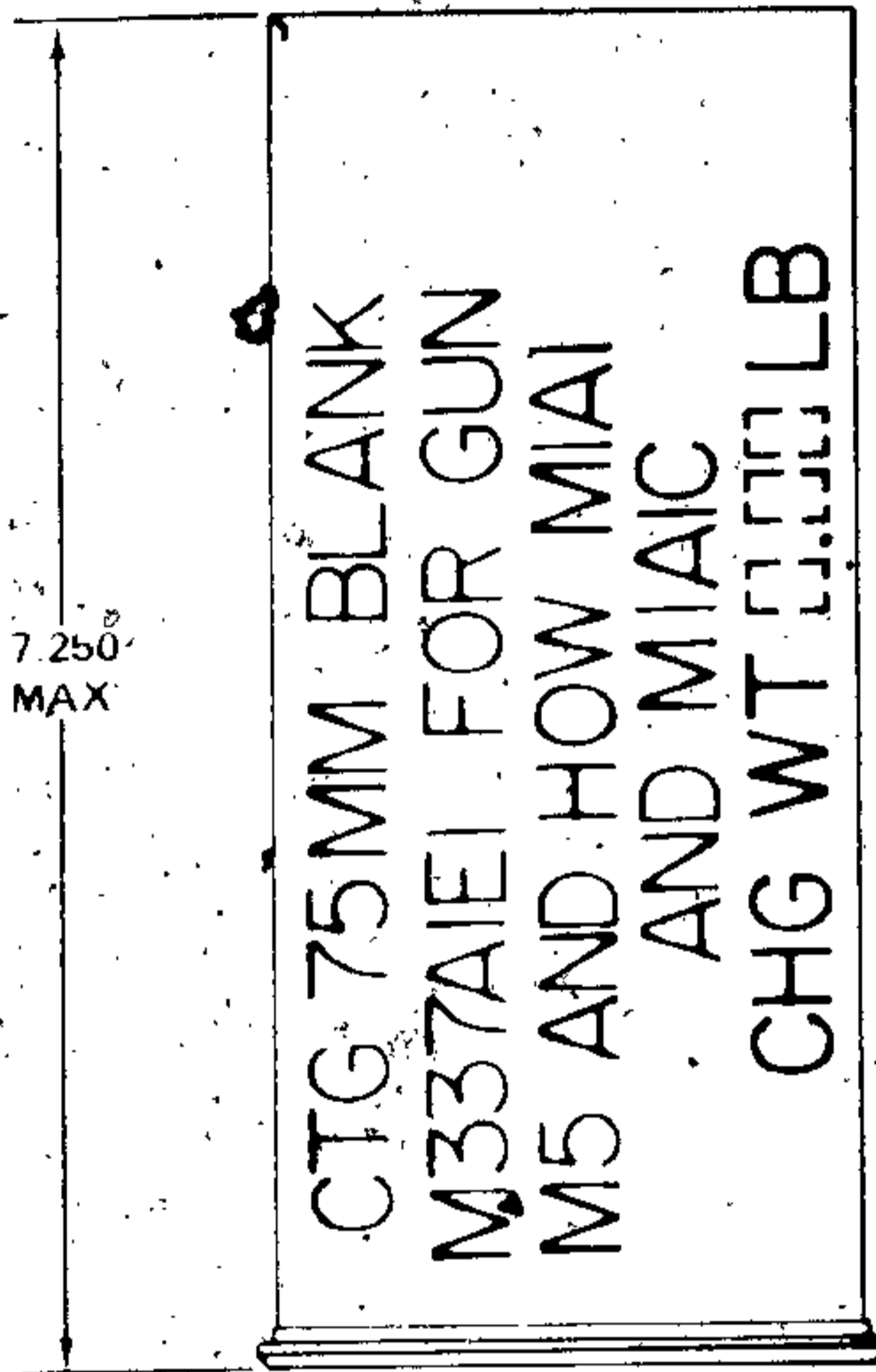
Operational Characteristics:

When assembling an impact or mechanical time fuze to a deep cavity projectile, assure that a supplementary charge is installed, as some deep cavity projectiles do not contain a supplementary charge when issued.

References:

SC 1305/30-IL
 SB 700-20
 DARCOM P 700-3-3
 TM 9-1300-251-20

CARTRIDGE, 75-MILLIMETER: BLANK, M337A2 (M337A1E1), M337A1 AND M337



AR199867

AR199866

Type Classification:

Std AMCTC 4371 dtd 1966 (M337A2)
CON MSR 11756003 (M337A1)
Std OTCM 36841 dtd 1958 (M337)

Use:

These cartridges are provided for saluting and simulated firing.

Description:

Cartridge M337A2 (M337A1E1) consists of a cartridge case of brass or aluminum containing loosely packed black powder (potassium nitrate) and a press-fitted percussion primer. A fiberglass wad is inserted over the black powder and a polystyrene closing cup is cemented in place with a polyester resin adhesive.

Functioning:

When the firing pin of the weapon strikes the primer, a flash is generated which ignites the black powder charge producing flash, smoke, and a loud report to simulate weapon firing.

Difference Among Models:

Cartridges M337A1 and M337 have brass cartridge cases containing a charge of black powder (sodium nitrate or potassium nitrate) in a cotton bag, and a press-fitted percussion primer. A hair felt wad is inserted over the cotton bag, and a chipboard closing cup is cemented in place with pettman cement.

Tabulated Data:

Complete round:

Type ----- Blank
 Weight ----- 3.25 lbs.
 Length ----- 7.25 in.
 Cannon used with ----- M116, M120, M1A1,
 M1A1C, M3

Components:

Body material ----- Brass or aluminum
 Filler and weight ----- Potassium nitrate or
 sodium nitrate - 1
 lb.

Cartridge case ----- M337A2(M337A1E1);
 M9A1, M9A1E1,
 M337A1, M337;
 M9A1, M18 (modi-
 fied)

Primer ----- M1B1A2

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 hrs/day)

*Packing ----- 1 round per fiber
 container; 15 con-
 tainers per wooden
 box

*Packing Box:

Weight ----- 74 lbs.
 Dimensions ----- 22-13/16 x 13-7/16
 x 10-17/32 in.
 Cube ----- 1.9 cu. ft.

*NOTE: See SC for complete packing data in-
 cluding NSN's.

Shipping and Storage Data:

Quantity-distance class - 4
 Storage compatibility
 group ----- E
 DOT shipping class ----- B
 DOT description ----- AMMUNITION FOR
 CANNON WITHOUT
 PROJECTILE
 DODAC ----- 1315-C025
 Drawing number ----- 7549273

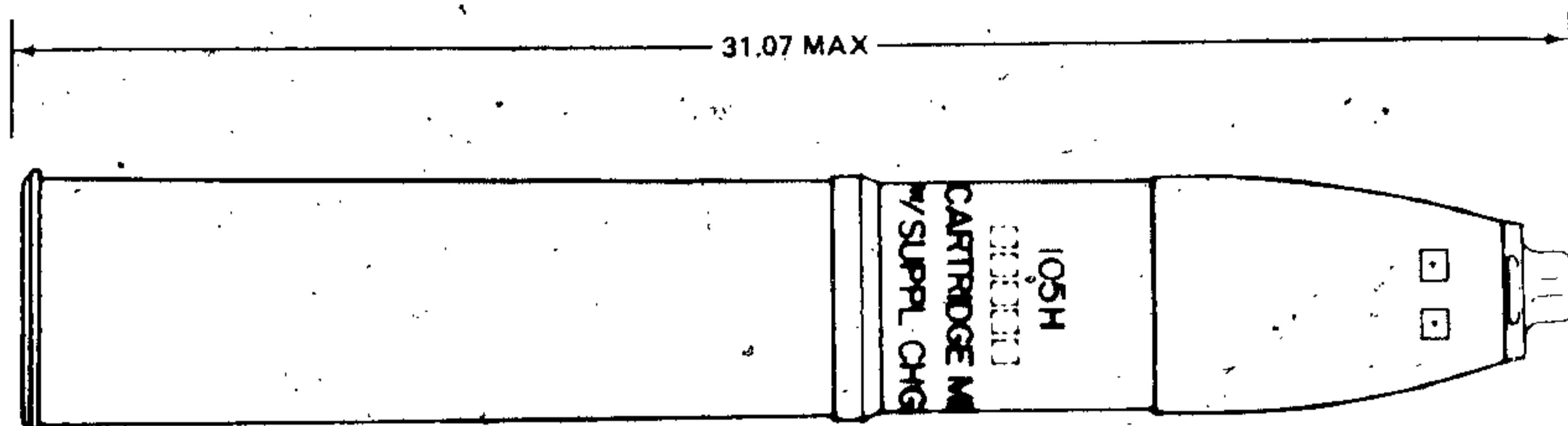
Limitations:

Closure debris from blank ammunition can be expelled
 a distance of 300 feet forward of the weapon muzzle.

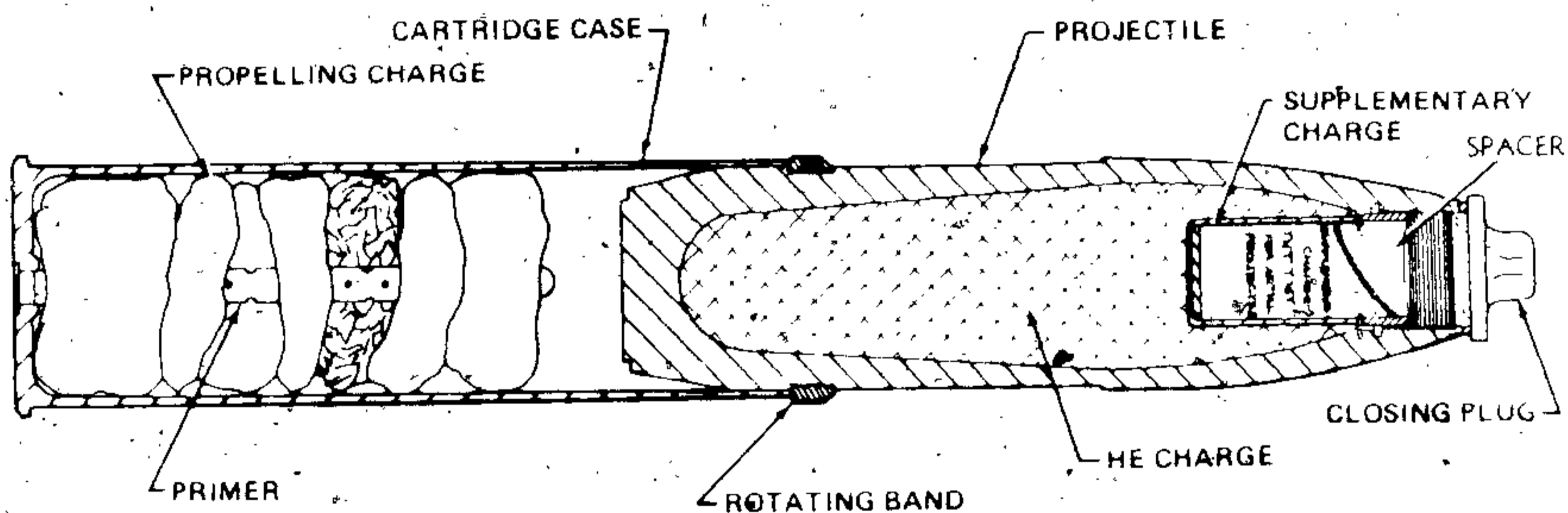
References:

SC 1305/30-IL
 SB 700-20
 DARCOM P 700-3-3
 TM 9-1300-251-20

CARTRIDGE, 105-MILLIMETER: HE, M1



AR199735



AR199734

Type Classification:

Std AMCTC 4181 dtd 1966

Use:

The projectile of this cartridge contains high explosive and is used for fragmentation, blast, and mining in support of ground troops and armored columns.

Description:

The projectile consists of a hollow steel forging with a boattail base, a streamlined ogive, and 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.

The high explosive (HE) filler within the projectile may be either cast TNT or Composition B. A fuze cavity is either drilled or formed in the filler at the nose end of the projectile. This cavity may be either shallow or deep. A cavity liner, to preclude dusting of HE during transportation and handling, is seated in the cavity and expanded into the lower projectile fuze threads. A supplementary charge is placed in the fuze cavity of projectiles having deep cavities. Projectiles with shallow cavities or deep cavities containing a supplementary charge use only short intrusion fuzes, PD, or MT. Those with deep cavities will accept the long intrusion proximity fuze after removing the supplementary charge. Projectiles may be shipped with a PD or MTSQ fuze or with a closing plug. When shipped with a closing plug, a chip board spacer is assembled between the

supplementary charge and plug to limit movement of the former during transportation and handling.

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 increment 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, the closing plug is removed and a fuze assembled to the projectile 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 tube imparts spin to the projectile providing in-flight stability. Projectile functioning is dependent upon the fuze used and may function on impact (instantaneous or delay), function above ground either at a predetermined height based upon time of flight, or function in proximity with the target area. Fuze function detonates the H.E. projectile filler resulting in projectile fragmentation and blast.

Tabulated Data:

Complete round:

Type ----- H.-E.
 Weight ----- 39.92 lbs
 Length ----- W/closing plug,
 31.07 inches max.
 Cannon (weapon)
 used with ----- M49 (M52, M52A1),
 M2A1, M2A2 (M101,
 M101A1), M103
 (M108), M137
 (M102)

Projectile:

Body material ----- Forged steel
 Color ----- Olive drab w/yel-
 low marking

Filler weights:

Comp B:
 Normal cavity ----- 5.08 lbs.
 Deep cavity ----- 4.60 lbs.
 TNT:
 Normal cavity ----- 4.80 lbs.
 Deep cavity ----- 4.25 lbs.

Weight Zone:

Loaded Shell w/Suppl Charge (with- out fuze)	Pounds		Up to & Incl	Zones	Marks
	Over				
Pounds	29.90	30.60	1		—
	30.50	31.20	2		— —
Note:	31.10	31.80	3		— — —

Comp B filled projectiles fall in weight zone-2-1/2
 Cartridge Case:

Model	Mat'l	Wt. (lbs) (approx)
M14	Brass	5.9
M14B1	Steel, Drawn	5.4
M14B3	Steel, 5 pc spiral wrap	4.7
M14B4	Steel, 3 pc spiral wrap	4.7

Propelling charge:

Model ----- M67

Components:

Incre- ment No.	Prop Comp & Type	Web Size in approx	Wt Oz Approx
1	M1, Type II	.014	8.6 Single Perf
2	M1, Type II	.014	1.4 Single Perf
3	M1, Type I	.026	2.5 Multi Perf
4	M1, Type I	.026	3.8 Multi Perf
5	M1, Type I	.026	5.8 Multi Perf
6	M1, Type I	.026	8.8 Multi Perf
7	M1, Type I	.026	14.3 Multi Perf

Weight, Total In-
 crements 1-7 ----- 2.83 lbs.

Percussion primer assembly:

	M28A2	M28B2
Primer	M61	M61
Black powder	Cl 1, Spec MIL-P-223 (Note B)	Cl 1, Spec MIL-P-223 (Note B)
Weight (lbs.) (primer)	.00014	.00014
(BP)	.043	.043
Body	Brass, Type 1	Steel, Type 2

Fuzes ----- PD, M557, M78 series CP; MTSQ M520, M564; Prox. M513 series; M728

Performance:

(1) Using M52, M52A1 and M101/M101A1 howitzers.

Charge	Muzzle Velocity (fps)	Muzzle Velocity (mps)	Maximum Range (meters)	Maximum Range (yards)
1	650	198.1	3510	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 meters
12,330 yds.

Muzzle velocity ----- 472.4 mps
1550 fps.

(2) Using M102 and M108 howitzers.

Charge	Muzzle Velocity (fps)	Muzzle Velocity (mps)	Maximum Range (meters)	Maximum Range (yards)
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 meters
12,590 yds.

Muzzle velocity ----- 494 mps
1621 fps.

Temperature Limits:

Firing:

Lower limit ----- - 40°F
Upper limit ----- + 125°F

Storage:

Lower limit ----- - 80°F (for periods not exceeding three days)

Upper limit ----- + 160°F (for periods not exceeding 4 hours per day)

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

* Packing Box:

Weight w/cartridge ----- 120 lbs.
Dimensions ----- 37-1/4 x 11-15/16 x 7-19/32 in.
Cube ----- 2.0 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 5
Storage compatibility group ----- E
DOT shipping class ----- A
DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ----- 1315-C445
Drawing number ----- 9211611 (shipped without fuze)

Limitations:

For Proximity mode; VT M513 proximity fuzes are limited to Zones 2 through 6. Zone 7 in combat emergency only. For Impact Action, Zones 4 through 6 only.

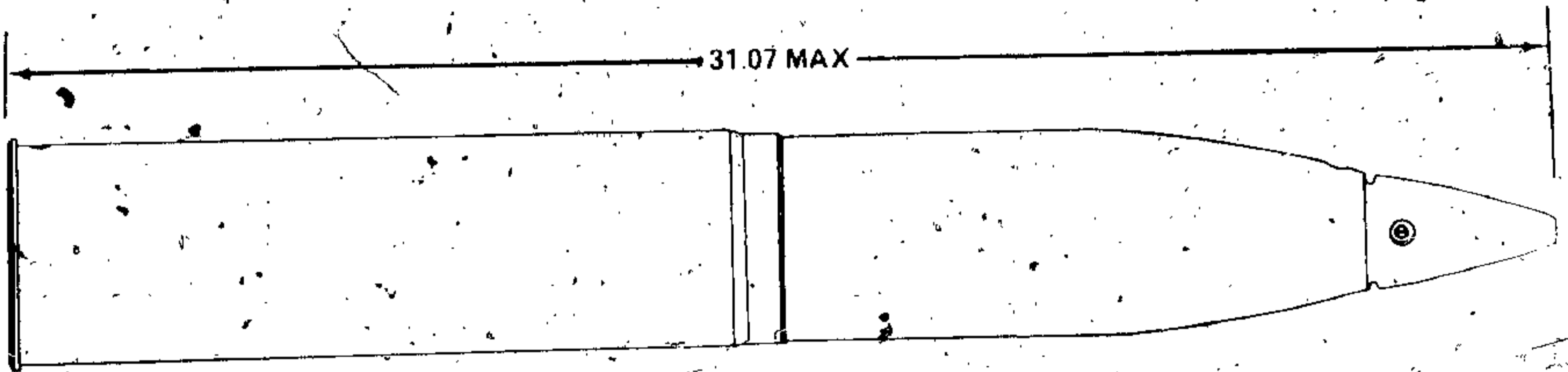
VT Fuze M728, for proximity or impact action, Zones 1 through 6. Zone 7 for Proximity action only in a combat emergency.

References:

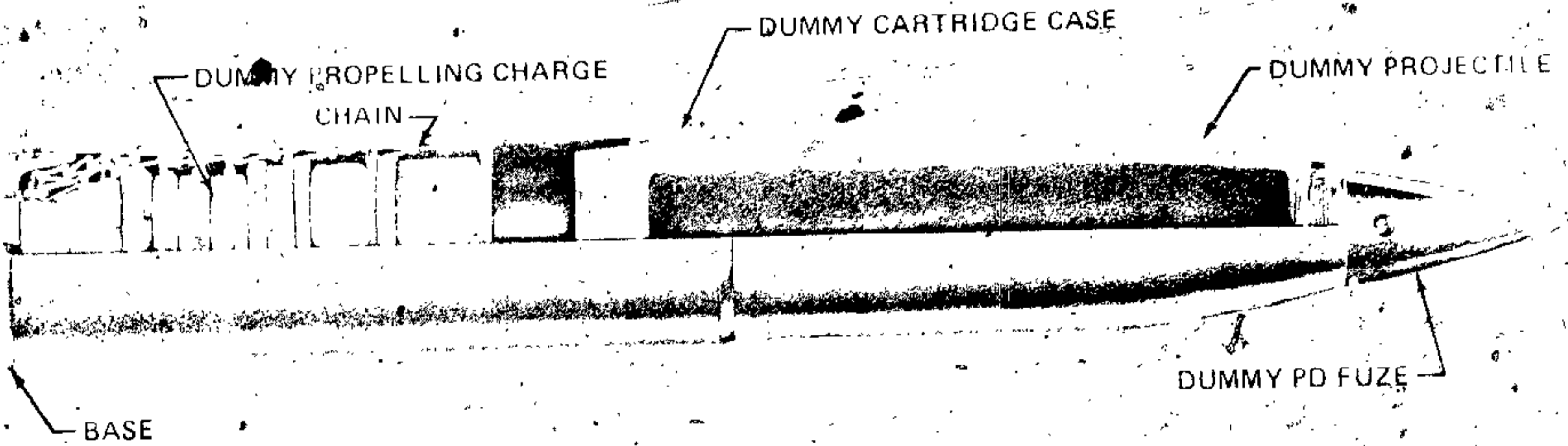
- SC 1305/30-IL
- SB 700-20
- AMCP 700-3-3
- TM 9-1015-203-12
- TM 9-1015-234-12
- TM 9-1300-251-20
- TM 9-2350-217-10

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CARTRIDGE, 105-MILLIMETER: DUMMY. M14



AR199743



AR199742

Type Classification:

Std. OTCM 36841

Use:

This cartridge is completely inert, and is used for training gun crews in handling and loading 105-mm howitzers.

Description:

The cartridge consists of a hollow dummy projectile loosely seated in a manganese bronze sleeve fitted at the mouth of a dummy cartridge case. The projectile is hollow malleable iron or bronze. A dummy PD fuze is screwed into the internal threading at the nose of the projectile. The projectile has an open base to facilitate extraction from the weapon. The cartridge case is a cadmium plated steel tube with a

female thread in the base. A steel or malleable iron base containing an inert primer is threaded into the base of the cartridge case. The cartridge case contains a dummy propelling charge, consisting of a base charge and six increments. The base charge is secured by twine or snaps on a sash chain to two eyebolts screwed into the base. The six additional increments are secured to the base charge by twine or snaps on a sash chain.

Functioning:

This dummy cartridge is completely inert and non-functional.

Tabulated Data:

Complete round:
 Type ----- Inert
 Weight ----- 42.06 lbs.

Length w/ fuze ----- 31.07 in.
 Cannon used with ----- M2A1, M2A2, M49,
 M101, M101A, M52,
 M52A1, M103
 (M108), M137
 (M102)

Projectile:
 Body material ----- Malleable iron or
 bronze casting

Color:
 Old ----- Black or blue
 w/white markings
 New ----- Bronze w/white
 markings

Fuze ----- PD, Dummy M59

Components:

Cartridge case ----- M14 series
 Propelling charge --- M3, dummy
 Primer ----- M1B1, inert

Temperature Limits:

None

* Packing ----- 1 round in fiber
 container; 2 con-
 tainers in wooden
 box

* Packing Box:

Weight ----- 120 lbs.
 Dimensions ----- 37-1/4 x 11-15/16
 x 7-19/32 in.
 Cube ----- 2.0 cu. ft.

*NOTE: See SC for complete packing data
 including NSN's.

Shipping and Storage Data:

DOT designation ----- DRILL CARTRIDGE
 INERT

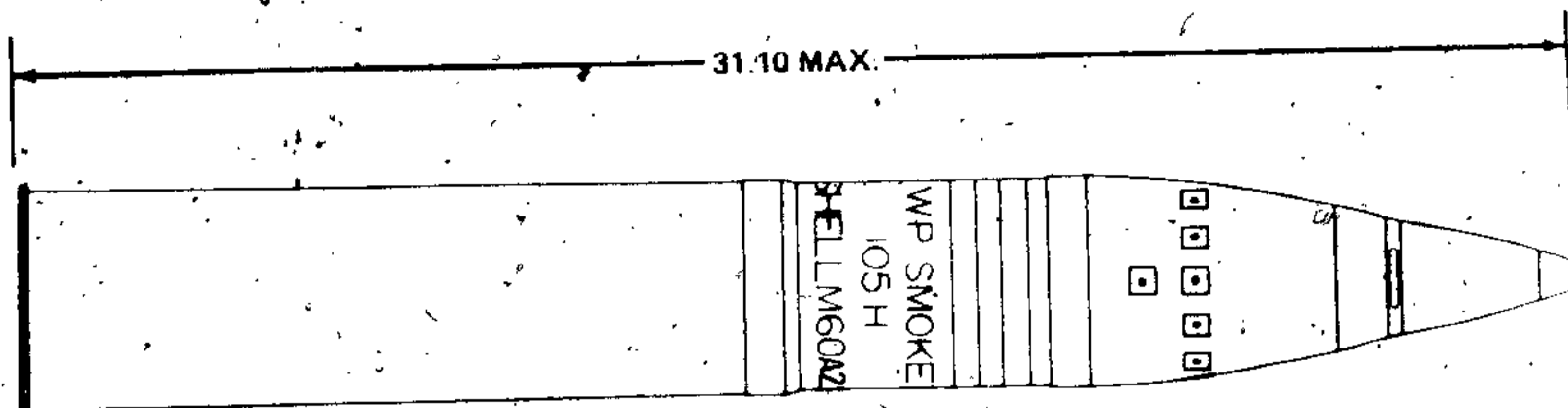
DODAC ----- 1315-C458

Drawing number ----- 72-3-78

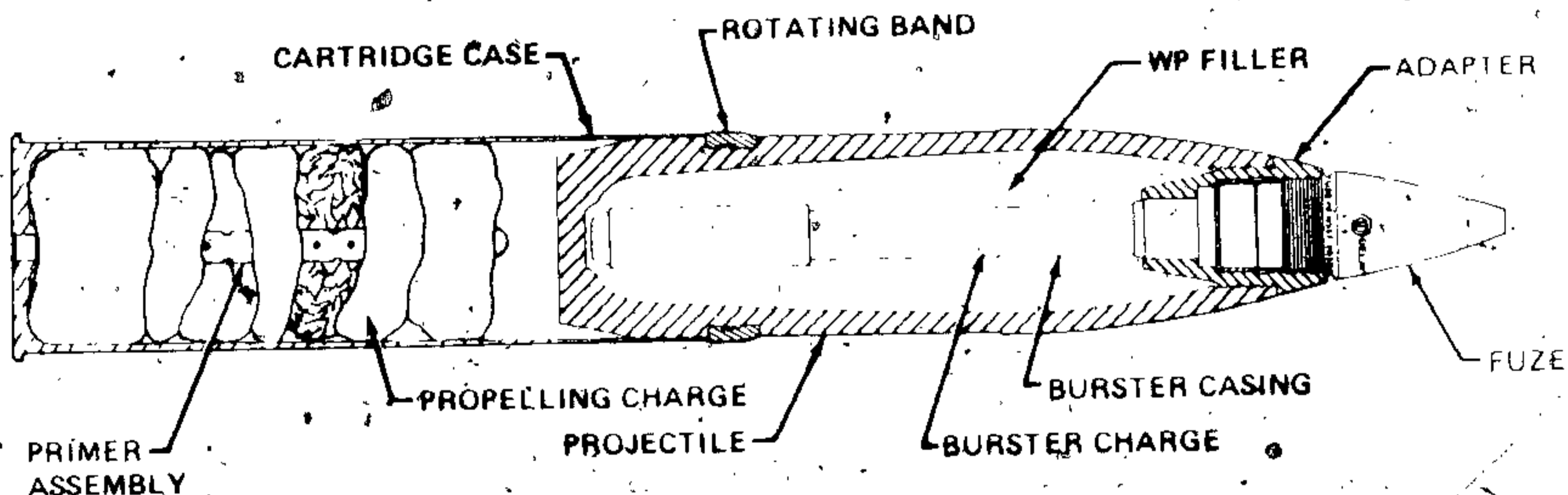
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1015-203-12
 TM 9-1015-234-12
 TM 9-1300-251-20
 TM 9-2350-217-10

CARTRIDGE, 105 MILLIMETER: SMOKE, WP, M60 SERIES



AR 199721 A



AR199720

Type Classification:

Std AMCTC 9102 dtd 1972 (M60A2, M60A1)
CON MSR 11756003 (M60)

Use:

The projectile of this cartridge contains white phosphorous (WP) which is dispersed over the target area for screening purposes. The WP also has a limited incendiary effect.

Description:

The projectile consists of a hollow steel forging with a boattail base, a streamlined ogive, and gilding metal rotating band. The projectile cavity is filled with cast WP. A steel nose adapter, having a female fuze thread, with a

press fitted burster casing is brazed into the nose of the projectile providing a seal for the filler. A burster charge is placed inside the burster casing and a fuze is threaded into the adapter. 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 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 increment bags are tied together, in numerical order, with polyester 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, the closing plug is removed, and a fuze is assembled to the projectile 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 tube imparts spin to the projectile providing inflight stability. Projectile functioning is dependent upon the fuze used and may function on impact, or function above ground at a predetermined height based upon time of flight. The fuze detonates the burster charge, rupturing the projectile, and dispersing the WP filler. White phosphorous burns on contact with air, producing a dense white cloud of smoke used for ground cover or spotting.

Differences Among Models:

Model	Burster Casing Material	Burster Model No.	Burster Expl. Comp.	Fuze
M60	Steel	M5	Tetrytol	PD M557
M60A1	High strength aluminum	M53	Comp B	PD M557 or MTSQ, M564
M60A2 (E3)	High strength aluminum	M53A1 (XM53E1)	Comp B5	PD M557 or MTSQ M564

Tabulated Data:

Complete round:

Type ----- Smoke, WP
 Weight ----- 42.92 lbs.,
 Length ----- 31.10 in.
 Cannon (weapon)
 used with ----- M49 (M52, M52A1),
 M2A1, M2A2
 (M101, M101A1),
 M103 (M108, M137)
 (M102)

Projectile:

Body material ---- Forged steel
 Color:
 Old mfg. ----- Gray w/yellow
 markings

New mfg. ----- Light green w/
 yellow bands and
 light red markings
 Filler and weight -- WP, 3.86 lbs.

WEIGHT ZONES

* Loaded projectile (w/o fuze or plug)

Zones	Over Pounds	Up to & Incl Pounds	Marking
3	31.1	31.8	□ ● □
4	31.7	32.4	□ □ □ □
5	32.3	33.0	□ □ □ □ □
6	32.9	33.8	□ □ □ □ □ □

Fuze ----- PD, M557 or MTSQ,
 M564

Cartridge case:

Model	Mat'l	Wt. (lbs.) (approx.)
M14	Brass	5.9
M14B1	Steel, Drawn	5.4
M14B3	Steel, 5 pc spiral wrap	4.7
M14B4	Steel, 3 pc spiral wrap	4.7

Propelling charge:

Model ----- M67

Components:

Increment No.	Prop Comp & Type	Web Size in Approx	Wt Oz Approx	Perf.
1	M1, Type II	.014	8.6	Single
2	M1, Type II	.014	1.4	Single
3	M1, Type I	.026	2.5	Multi
4	M1, Type I	.026	3.8	Multi
5	M1, Type I	.026	5.8	Multi
6	M1, Type I	.026	8.8	Multi
7	M1, Type I	.026	14.3	Multi

Weight, Total Increments 1-7 2.83 lbs.

Percussion Primer Assembly:

	M28A2	M28B2
Primer	M61	M61
Black powder	Cl 1, Spec MIL-P-223 (Note B)	Cl 1, Spec MIL-P-223 (Note B)
Weight (lbs.) (primer)	.00014	.00014
(BP)	.043	.043
Body	Brass, Type 1	Steel, Type 2

Performance:

(1) For M52, M52A1 and M101/M101A1 howitzers.

Charge	Muzzle Velocity (mps)	Muzzle Velocity (fps)	Maximum Range (meters)	Maximum Range (yards)
1	198.1	650	3510	3840
2	216.4	710	4110	4495
3	237.7	780	4860	5315
4	266.7	875	5950	6505
5	310.9	1020	7650	8370
6	376.4	1235	9380	10,260
7	472.4	1550	11,270	12,330

Maximum range ---- 11,270 meters (12,330 yds.)

Muzzle velocity ---- 472 mps (1550 fps.)

(2) For M102 and M108 howitzers.

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

Maximum range ---- 11,500 meters (12,590 yds.)

Muzzle velocity ---- 494 mps (1621 fps.)

Temperature Limits:

Firing:	M60	M60A1	M60A2 (E3)
Lower limit---	- 40°F	- 50°F	- 50°F
Upper limit---	+ 125°F	+ 145°F	+ 145°F
Storage:			
Lower limit---	- 65°F	- 50°F	- 50°F
Upper limit---	+ 125°F	+ 145°F	+ 145°F

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

* Packing Box:

Weight -----	120 lbs.
Dimensions-----	37-1/4 x 11-15/16 x 7-19/32 in.
Cube-----	2.0 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class -----	5
Storage compatibility group -----	A
DOT shipping class-----	C
DOT designation -----	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC -----	1315-C 454
Drawing number -----	9216521

Limitations:

a. All models: this cartridge should be stored or transported at temperatures below the melting point (+ 111.4°F) of the WP filler, because of possible cavitation in the filler from melting and resolidification in the projectile cavity. If this is not practicable, the cartridge should be transported or stored with the nose end up to prevent cavitation.

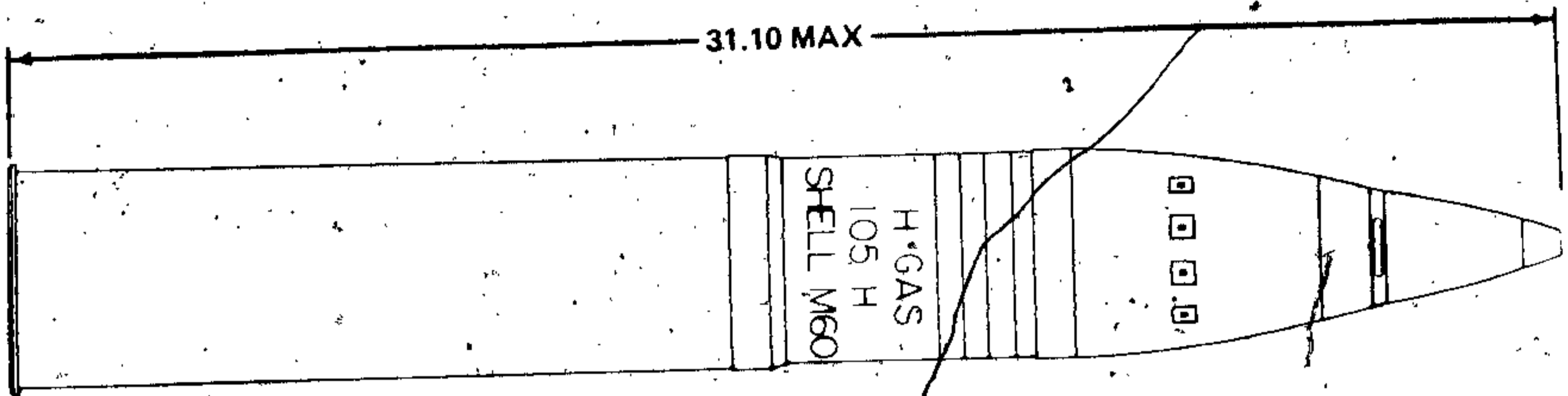
b. For M60 only: the burster casing in this cartridge contains tetrytol and should not be transported, stored or fired at temperatures exceeding + 125°F.

References:

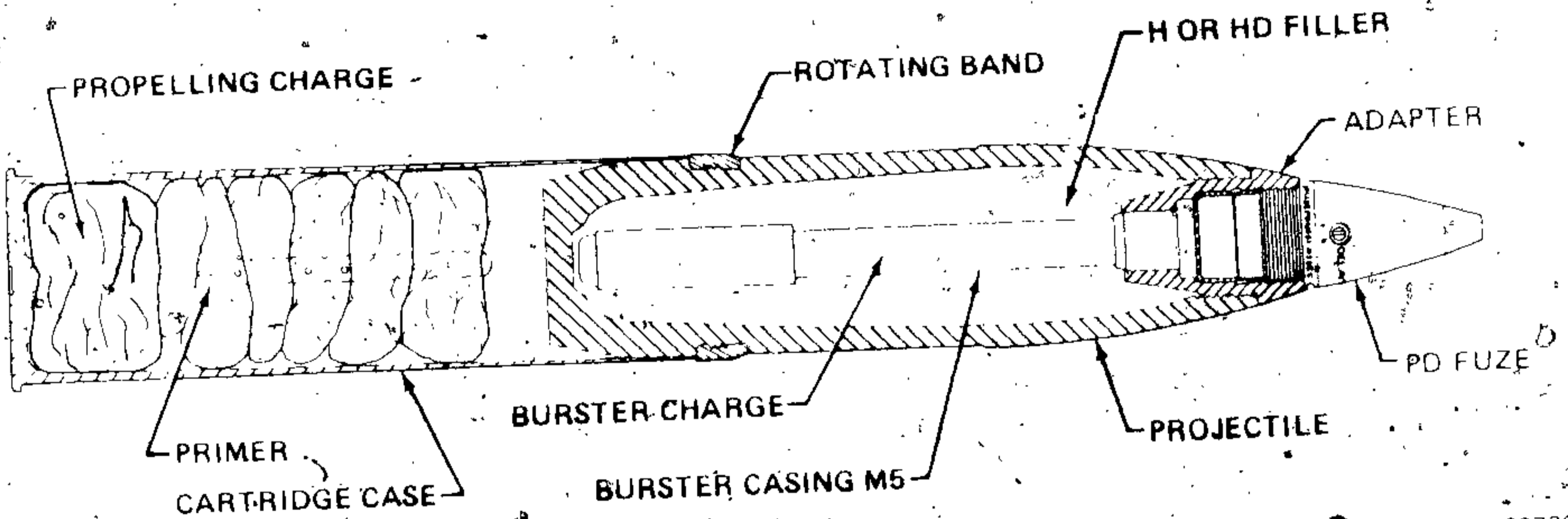
- SC 1305/30-IL
- SB 700-20
- AMCP 700-3-3
- TM 9-1015-203-12
- TM 9-1015-234-12
- TM 9-1300-251-20
- TM 9-2350-217-10

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CARTRIDGE, 105-MILLIMETER: AGENT, H OR HD, M60



AR199737



AR199736

Type Classification:

Std OTCM 36841 dtd 1958.

Use:

The projectile of this cartridge contains a casualty producing agent for use against enemy personnel.

Description:

The projectile consists of a hollow steel forging with a boattail base, a streamlined ogive, and 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. The projectile cavity is filled with H (mustard) or HD (distilled mustard) in liquid form. A steel nose adapter, having a female fuze thread, with a press fitted burster casing is threaded into the nose of the projectile providing a seal for the filler. A tetrytol burster charge is placed inside the burster casing and a PD fuze threaded into the adapter. 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 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 increment 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:

The propelling charge is adjusted and the cartridge loaded 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 tube imparts spin to the projectile providing in-flight stability. Upon impact with the target, the PD fuze detonates the burster charge rupturing the projectile and dispersing the chemical agent. The liquid agent evaporates forming a persistent gas to envelope the target areas.

Tabulated Data:

Complete round:

Type ----- Agent H or HD, persistent
 Weight ----- 42.92 lbs.
 Length ----- 31.07 in.
 Cannon (weapon) used with ----- M2A1, M2A2 (M101, M101A1), M49 (M52, M52A1), M137 (M102) and M103 (M108)

Projectile:

Body material ----- Forged steel
 Color ----- Gray w/dark green bands (2)
 Filler and weight ----- 3.17 lbs. H, or 2.97 lbs. HD
 Fuze ----- PD M557

WEIGHT ZONES

Loaded Shell W/Burster Charge
 W/O Fuze

Zone	Over	Up to & Incl	Marking
2	30.5	31.2	□□
3	31.1	31.8	□□□
4	31.7	32.4	□□□□

Propelling charge:

Cartridge case ----- M14 series
 Propellant ----- M67, 2.825 lbs.
 Primer ----- M28A2, or M28B2

Performance:

(1) For M52, M52A1 and M101/M101A1 howitzers.

Charge	Muz- zle (mps)	Velo- city (fps)	Maxi- mum (me- ters)	Range and (yards)	Ele- va- tion (mils)	An- gle (deg)
1	198.1	650	3510	3840	782	44.0
2	216.4	710	4110	4495	780	43.9
3	237.7	780	4860	5315	774	43.6
4	266.7	875	5950	6505	784	44.1
5	310.9	1020	7650	8370	771	43.4
6	376.4	1235	9380	10,260	779	43.8
7	472.4	1550	11,270	12,330	783	44.0

Maximum range ----- 11,270 m (12,330 yds.)
 Muzzle velocity ----- 472.4 mps (1550 fps.)

(2) For M102 and M108 howitzers

Charge	Muz- zle (mps)	Velo- city (fps)	Maxi- mum (me- ters)	Range and (yards)	Ele- va- tion (mils)	An- gle (deg)
1	205	673	3700	4040	689.6	36.7
2	223	732	4300	4700	694.1	35.0
3	247	810	5200	5690	742.7	41.7
4	278	912	6300	6890	687.2	38.6
5	325	1066	8100	8500	702.0	39.5
6	393	1289	9600	10,500	734.2	41.3
7	494	1621	11,500	12,590	728.4	40.9

Maximum range ----- 11,500 m (12,590 yds.)
 Muzzle velocity ----- 494 mps (1621 fps.)

Temperature Limits:

Firing:

Lower limit ----- - 40° F
 Upper limit ----- + 125° F

Storage:

Lower limit ----- - 40° F
 Upper limit ----- + 125° F

*Packing

1 round in fiber container; 2 containers in wooden box

***Packing Box:**

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

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 5
 Storage compatibility
 group ----- A
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITH GAS
 PROJECTILES

DODAC ----- 1315-C442
 Drawing Number ----- 75-1-109

Limitations:

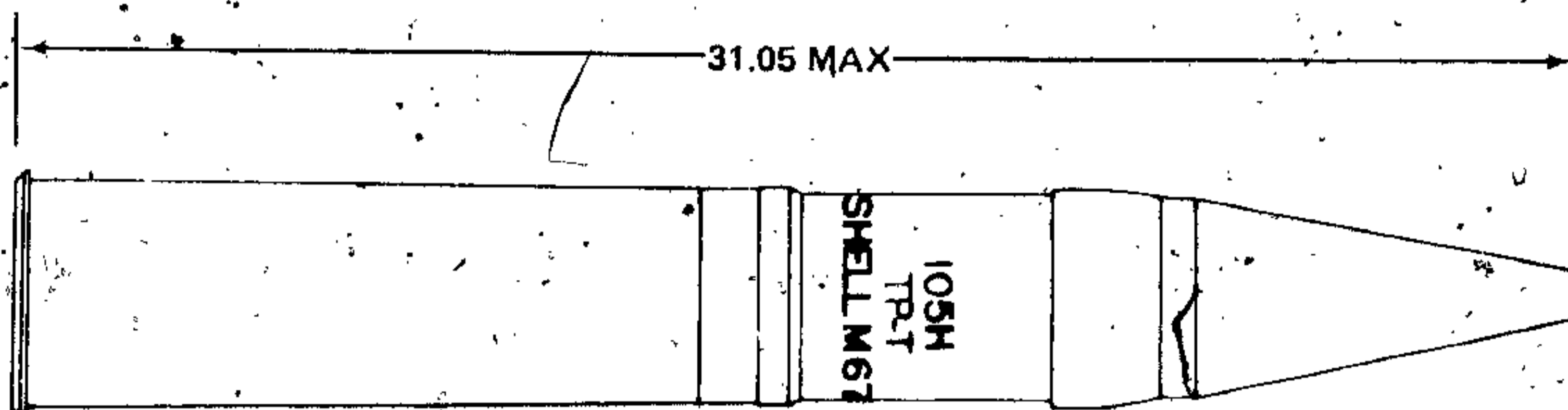
The burster in this ammunition is loaded with tetrytol and may not be stored or fired at temperatures exceeding + 125° F.

References:

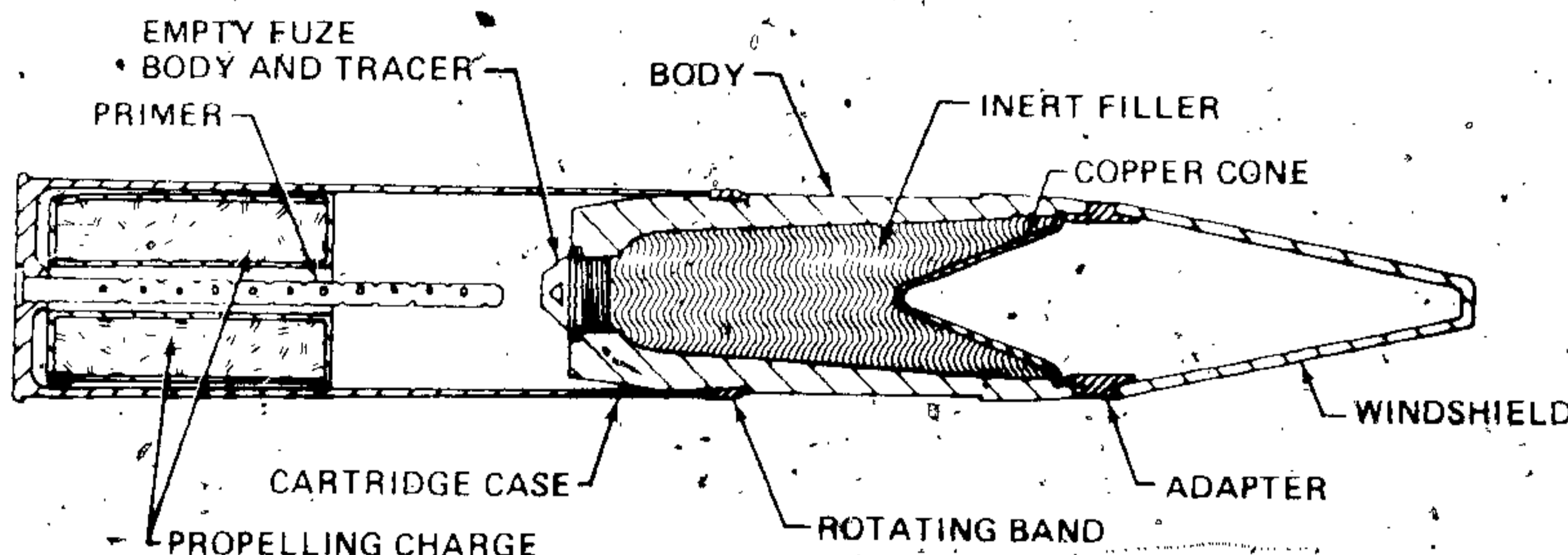
AMCP 700-3-3
 SB 700-20
 SC 105/30-IL
 TM 9-1015-203-12
 TM 9-1015-234-12
 TM 9-1300-251-20
 TM 9-2350-217-10

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CARTRIDGE, 105-MILLIMETER: TP-T, M67



AR199715



AR199714

Type Classification:

CONT AMCTC 8650 dtd 1971.

Use:

This cartridge is used for training in marksmanship.

Description:

The projectile consists of a boattailed steel body fitted with a steel windshield and gilding metal rotating band. The windshield is a hollow steel cone fitted to the front of a steel adapter. The adapter is threaded into the front end of the projectile, and retains a copper conical liner in the projectile cavity. The projectile cavity contains an inert filler instead of a shaped HE

charge as in the service projectile. An empty fuze body with a live tracer is threaded into the base of the projectile. The complete projectile assembly is a free fit in the cartridge case. The cartridge case contains a percussion primer assembly and a single propelling charge increment. 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 single increment bag is assembled into the cartridge case around the primer assembly.

Functioning:

The weapon firing pin strikes the percussion primer which ignites the black powder in the primer. The primer ignites the propelling

charge uniformly through the perforations in the primer tube and also ignites the tracer. The rotating metal band around the projectile engages the rifling in the barrel to impart spin to the projectile for in-flight stability. The expanding gases from the propelling charge force the projectile through the barrel with the velocity required to reach the target. The tracer burns for a minimum of 3 seconds during projectile flight. The projectile is non-functional, because it is an inert practice round lacking the penetrating capability of a service round.

Tabulated Data:

Complete round:

Type ----- TP
 WEIGHT ----- 37.06 lbs.
 Length ----- 31.05 in.
 Cannon (weapon) used
 with ----- M49 (M52, M52A1),
 M2A1, M2A2
 (M101, M101A1),
 M103 (M108),
 M137 (M102)

Projectile:

Body material ----- Steel bar
 Color ----- Blue or black
 w/white markings
 Filler and weight ----- Inert filler,
 3.89 lbs.
 Tracer ----- M5A2B1

Propelling charge:

Cartridge case ----- M14 series
 M14 ----- Brass, 5.9 lbs.
 (approx.)
 M14B4 ----- Steel, 3 pc
 spiral wrap,
 4.7 lbs. (approx.)

Propelling

charge ----- M1, 1.54 lbs.
 Primer ----- M28A2, M28B2

Performance:

Maximum range ----- 8281 yds.
 Muzzle velocity ----- 1250 fps.

Temperature Limits:

Firing:

Lower limit ----- - 40°F
 Upper limit ----- + 125°F

Storage:

Lower limit ----- - 80°F (for peri-
 ods not exceeding
 3 days)
 Upper limit ----- + 160°F (for
 periods not ex-
 ceeding 4 hours
 per day)

* Packing ----- 1 round in fiber
 container; 2 con-
 tainers in wooden
 box

* Packing Box:

Weight ----- 120 lbs.
 Dimensions ----- 37-1/4 x 11-15/16
 x 7-19/32 in.
 Cube ----- 2.0 cu. ft.

* NOTE: See SC for complete packing data
 including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 5
 Storage compatibility
 group ----- E
 DOT shipping class ----- B
 DOT designation ----- AMMUNITION FOR
 CANNON WITH
 INERT-LOADED
 PROJECTILES

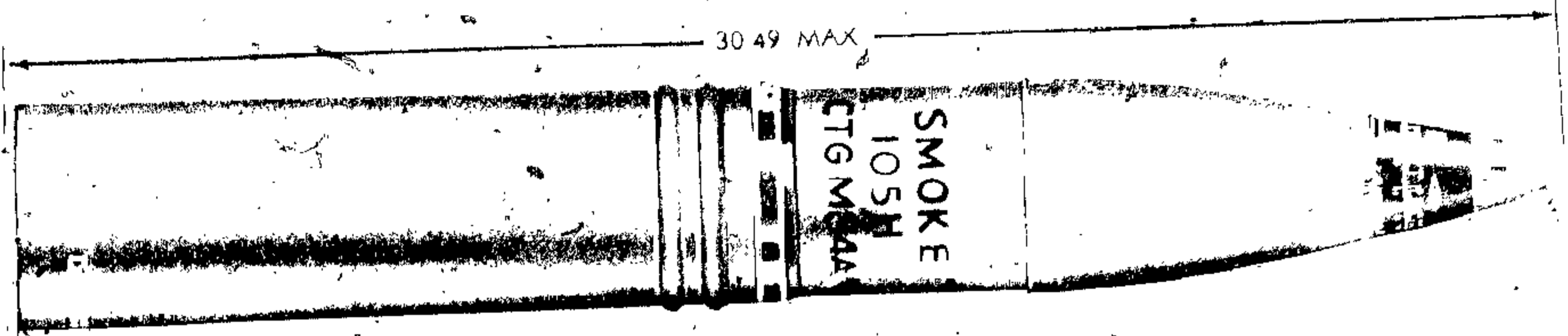
DODAC ----- 1315-C457

Drawing number ----- 75-1-491

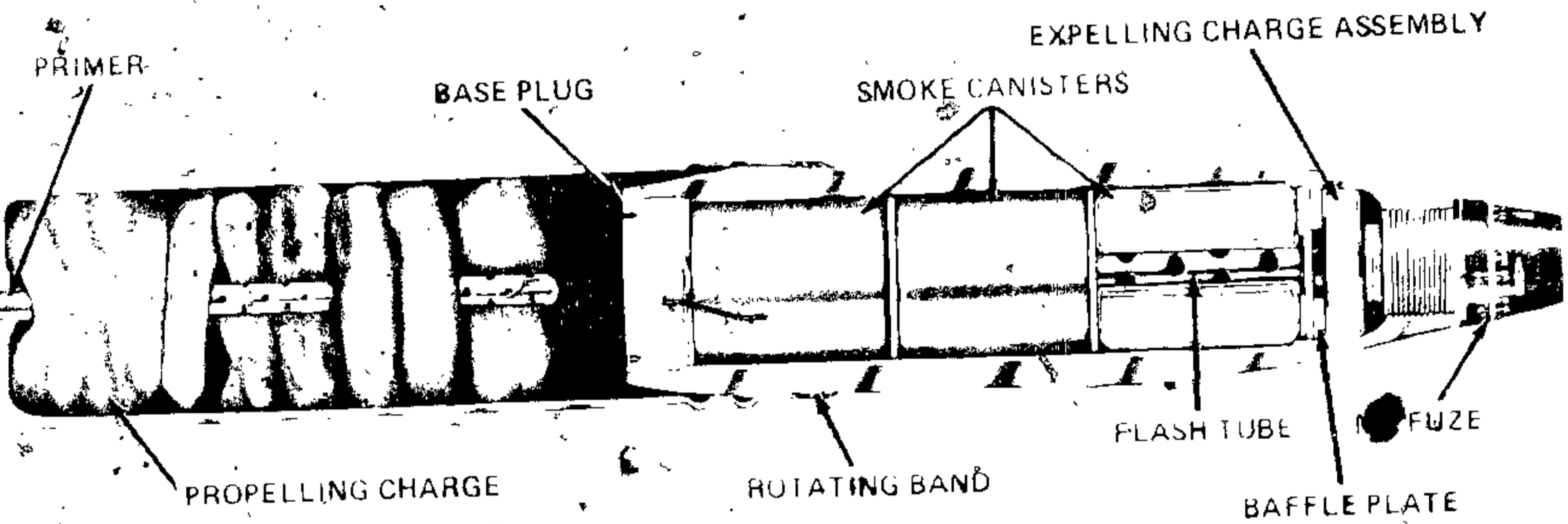
References:

AMCP 700-3-3
 SC 1305/30-LL
 SB 700-20
 TM 9-1015-203-12
 TM 9-1015-234-12
 TM 9-1300-251-20
 TM 9-2350-217-10

CARTRIDGE, 105-MILLIMETER: HC, BE, M84 SERIES



AR 199727



AR199726

Type Classification:

SP1 AMSC 7621 dtd 1970 (M84A1, M84B1)
CON MBR 11756003 (Red, Green, and Yellow
colored Smoke)

Use:

The projectile of this cartridge contains a smoke mixture which, when ignited and ejected, serves as a signal, as a screen, or to spot a target.

Description:

The projectile body consists of a hollow steel forging with a boattail base, a streamlined ogive, guiding metal rotating band, and base plug. A black powder expelling charge is assembled into the projectile at the nose end. Next, a steel baffle (pusher) plate with a central hole, is assembled behind the expelling charge followed by

three smoke canisters, alternating spacers, fillers, and the base plug. The spacers are assembled between canisters, as well as at the base, to insure a tight canister pack. An M100 or MT fuze is assembled to the nose of the projectile. The canisters are metal cylinders with a central igniter core. Around the igniter core is a first fire mix which serves to initiate the smoke mix. The smoke mix surrounds the first fire mix and when initiated, generates a white (HC) or, in the cases of the M84 and M84A1, or other colored smoke. The cartridge case contains a percussion primer assembly and seven individually bagged and numbered expelling charge increments. The base of the cartridge case is drilled and the primer assembly is press fitted in the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing black powder. The seven numbered increment bags are tied together, in numerical

Change 4

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:

Adjust the propelling charge, if required, prior to 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 tube imparts spin to the projectile providing in-flight stability. The projectile functions above ground at a predetermined height based upon time of flight. The fuze initiates the black powder in the expelling charge which flashes through the center hole of the baffle plate initiating the first fire mix in the canisters. The burning black powder generates gas pressure against the baffle plate which, through the canisters, causes the base plate and canisters to leave the projectile. The first fire mix initiates the smoke charge. The canisters burn for 40 to 90 seconds.

Difference Among Models:

	M84	M84B1	M84A1
Body forging	Transom below Fuze Thd	Transom below Fuze Thd	No transom
Expelling charge	BP in cloth bag	BP plastic cup encased	BP in plastic cylinder
Nose Thd	1.7 x 14 TPI	1.7 x 14 TPI	2 x 12 TPI
Fuze	MTSQ M501 M501A1	MTSQ M501 M501A1	MTSQ M548 MT M565
Spacers	Chip-board	Chip-board	Aluminum
Filler	Chip-board	Chip-board	Felt
Colors available	HC, red yellow green	HC, red, yellow green	HC, red yellow green

Tabulated Data:

Complete round:

Type ----- Smoke, HC (white)
 Weight ----- 41.96 lbs.
 Length ----- 30.49 in.
 Cannon used with ----- M2A2, M103 or M137

Projectile:

Body material ----- Steel forging
 Color ----- Light green w/ black markings
 Filler and weight ----- HC 12.3 lbs.

Components:

Cartridge case ----- M14B4 (3 pc spiral steel) or M14B1 (drawn steel)

Propelling charge ----- M67, 2.83 lbs.

Chg. Wt. In Oz. Approx.	Type	Web Approx.
8.6	II	.014
1.4	II	.014
2.5	I	.026
3.8	I	.026
5.8	I	.026
8.8	I	.026
14.3	I	.026

Primer ----- M28B2, M28A2
 Fuze ----- MT M565
 MTSQ: M548, M501, M501A1

Performance:

(1) Using M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle Velocity (fps)	Muzzle Velocity (mps)	Maximum Range (meters)	Maximum Range (yards)
1	650	198.1	3510	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 meters (12,330 yds.)
 Muzzle velocity ----- 472.4 mps (1550 fps.)

(2) Using M102 and M108 howitzers:

Charge	Muzzle Velocity (fps)	Muzzle Velocity (mps)	Maximum Range (meters)	Maximum Range (yards)
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 meters
(12,590 yds.)

Muzzle velocity ----- 494 mps
(1621 fps.)

Temperature Limits:

Firing:

Lower limit ----- - 65° F

Upper limit ----- + 145° F

Storage:

Lower limit ----- - 65° F

Upper limit ----- + 145° F

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

*Packing Box:

Weight ----- 120 lbs.

Dimensions ----- 37-1/4 x 11-15/16
x 7-19/32 in.

Cube ----- 2.0 cu ft.

*NOTE: See SC for complete packing data
including 'NSN' s.

Shipping and Storage Data:

Quantity-distance

class ----- 5

Storage

compatibility ----- A

DOT shipping class ----- E

DOT designation ----- AMMUNITION FOR
CANNON WITH
SMOKE PROJEC-
TILES

DODAC ----- 1315-C452

Drawing number ----- 9223421-1

References:

SC 1305/30-IL

SB 700-20

AMCP 700-3-3

TM 9-1015-203-12

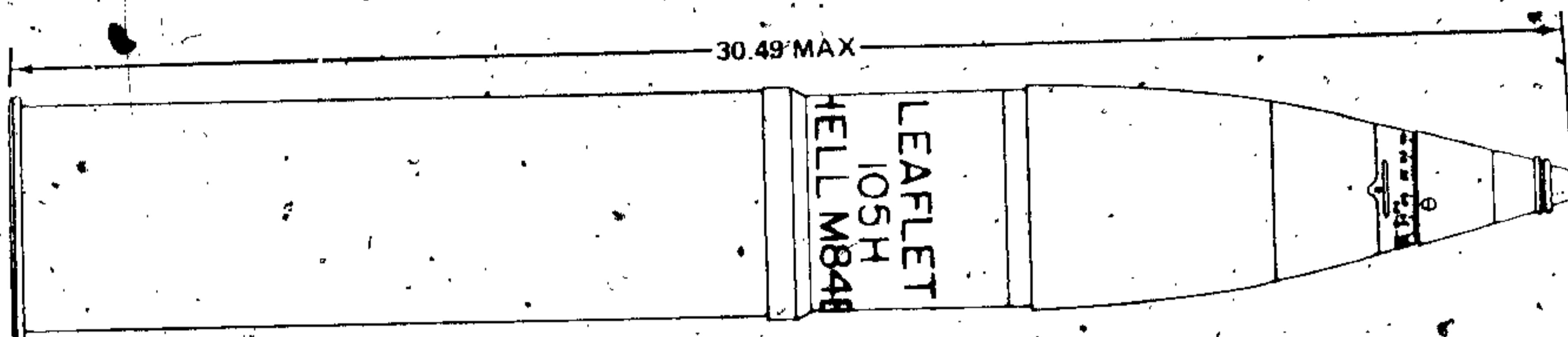
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TM 9-1300-251-20

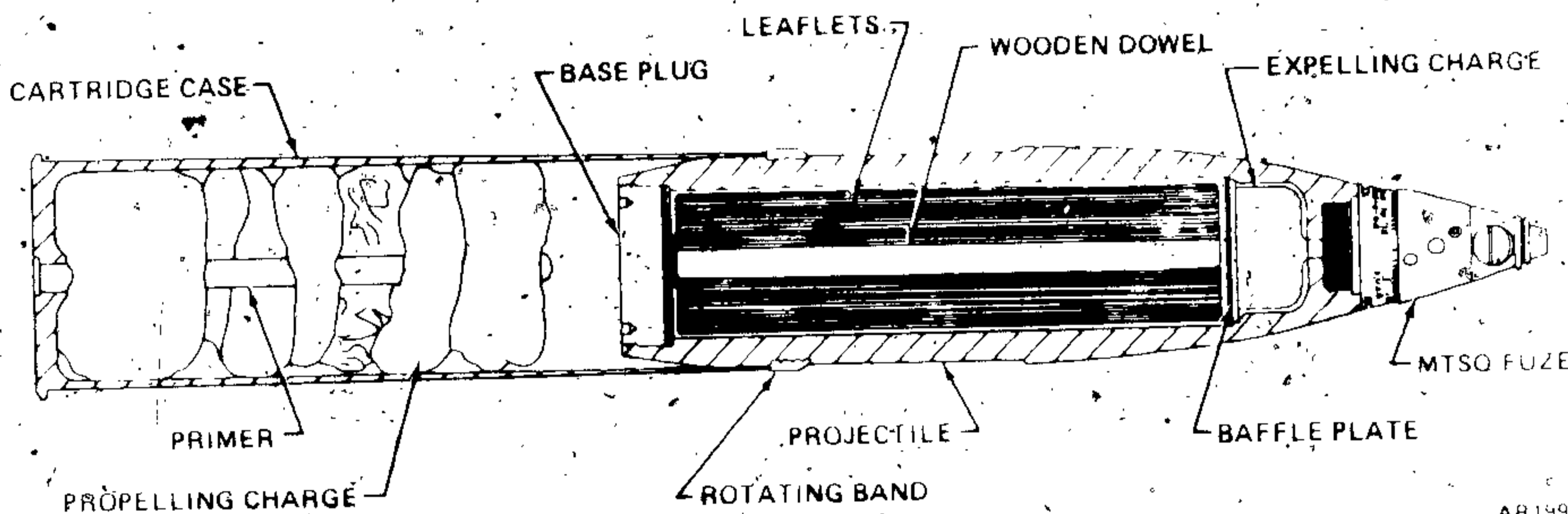
TM 9-2350-217-10

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CARTRIDGE, 105-MILLIMETER: LEAFLET, M84B1



AR199703



AR199708

Type Classification:

OBS MSR 11756003

Use:

The projectile of this cartridge is filled with printed instructional or propaganda material in the form of leaflets for distribution to enemy troops and/or civilians.

Description:

The projectile body consists of a hollow steel forging with a boattail base, a streamlined ogive, guiding metal rotating band, and steel base plug threaded into the base of the projectile. A plastic encased black powder expelling charge is assembled to the projectile at the nose end. Next,

a steel baffle plate is assembled behind the expelling charge followed by a 3/4-inch diameter wooden dowel, spacers, and the base plug. The leaflets are furnished later, to meet the mission requirements, and assembled in the projectile around the wooden dowel just prior to firing.

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 increment 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:

Adjust the propelling charge, if required, prior to 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 tube imparts spin to the projectile providing in-flight stability. The projectile functions above ground at a predetermined height based upon time of flight. The fuze ignites the black powder in the expelling charge which, in turn, through gas pressure on the baffle plate and through the dowel causes the base plate to separate from the projectile. The baffle plate pushes the leaflets out of the projectile, and the air stream and projectile spin disseminate the leaflets over the target area.

Tabulated Data:

Complete round:

Type ----- Leaflet
 Weight ----- 39.7 lbs.
 Length ----- 30.49 in.
 Cannon (weapon)

Used with ----- M2A1, M2A2
 (M101, M101A1),
 M49 (M52, M52A1),
 M103 (M108), M137
 (M102)

Projectile:

Body material ----- Forged steel
 Color -----
 Filler ----- Leaflets
 Fuze ----- MTSQ, M501 or
 M501A

Propelling charge:

Cartridge case ----- M14B1, M14B4
 Propelling charge
 Model ----- M67

Components:

Incre-

ment No.	Prop Comp & Type	Web size in approx	Wt oz approx	Perf.
1	M1, Type II	.014	8.8	Single
2	M1, Type II	.014	1.4	Single
3	M1, Type I	.026	2.5	Multi
4	M1, Type I	.026	3.8	Multi
5	M1, Type I	.026	5.8	Multi
6	M1, Type I	.026	8.8	Multi
7	M1, Type I	.026	14.3	Multi

Weight, Total Increments 1-7 2.83 lbs.

Primer ----- M28A2, M28B2

Performance:

Maximum range ----- 9943 yds.
 Muzzle velocity ----- 1422 fps.

Temperature Limits:

Firing:

Lower limit ----- - 65°F
 Upper limit ----- + 125°F

Storage:

Lower limit ----- - 65°F
 Upper limit ----- + 125°F

* Packing ----- 1 round in fiber
 container; 2 rounds
 in wooden box

* Packing Box:

Weight ----- 120 lbs.
 Dimensions ----- 37-1/4 x 11-15/16
 x 7-19/32 in.
 Cube ----- 2.0 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

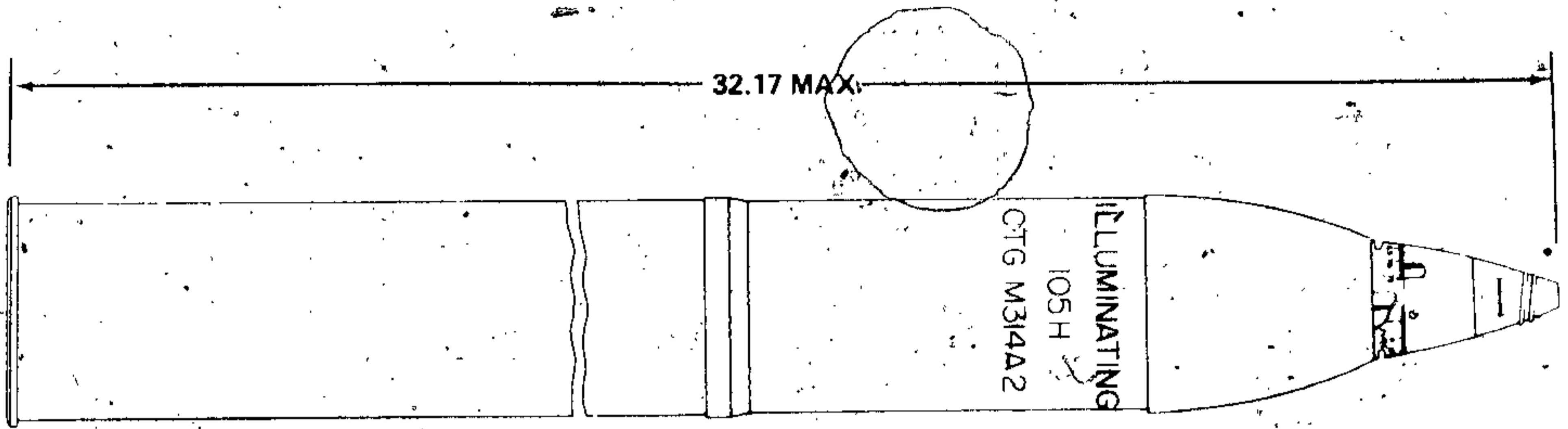
Shipping and Storage Data:

Quantity-distance/
 class ----- 4
 Storage compatibility
 group ----- S
 DOT shipping class -----
 DOT designation ----- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES
 DODAC ----- 1315-
 Drawing number ----- 9219187

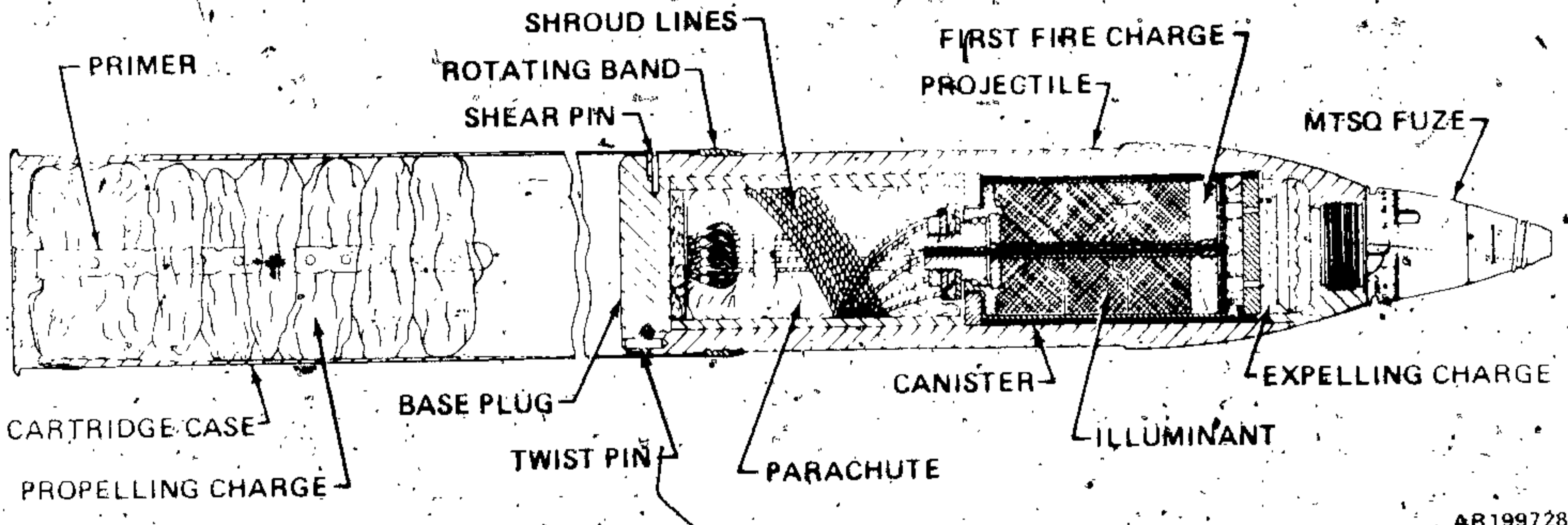
References:

SC 1305/30-IL
 SB 700-20
 DARCOM P 700-3-3
 TM 9-1015-203-12
 TM 9-1015-234-12
 TM 9-1300-251-20
 TM 9-2350-217-10

CARTRIDGE, 105-MILLIMETER: ILLUMINATING, M314, M314A1, M314A2



AR199729



AR199728

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 increment 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, the closing plug is removed and a fuze assembled to the projectile 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 tube imparts spin to the projectile providing in-flight stability. The MTSQ fuze functions and ignites the expelling charge, in turn, igniting 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 lbs.
 Length ----- 32.17 in.
 Cannon (weapon) used
 with ----- M49 (M52, M52A1),
 M2A1, M2A2 (M101,
 M101A), 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 lbs.
 Fuze ----- MTSQ, M501,
 M501A1

Propelling charge:

Cartridge case ----- M14 series
 Propellant ----- M67, 2.8 lbs.
 Primer ----- M28A2, M28B2

Performance:

(1) Using M52, M52A1 and M101/
 M101A1 howitzers.

Charge	Muzzle Velocity (fps)	Muzzle Velocity (mps)	Maximum Range (meters)	Maximum Range (yards)
1	650	198.1	3510	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 meters
 12,330 yds
 Muzzle velocity ----- 472.4 mps.
 1550 fps.

(2) Using M102 and M108 howitzers.

Charge	Muzzle Velocity (fps)	Muzzle Velocity (mps)	Maximum Range (meters)	Maximum Range (yards)
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 meters
 12,590 yds.
 Muzzle velocity ----- 494 mps
 1621 fps.

Temperature Limits:

Firing:

Lower limit ----- - 40° F
 Upper limit ----- + 125° F

Storage:

Lower limit ----- - 80° F (for periods
 not exceeding 3
 days)
 Upper limit ----- + 160° F (for
 periods not ex-
 ceeding 4 hours
 per day)

* Packing ----- 1 round in fiber
 container; 2 con-
 tainers in wooden
 box

* Packing Box:

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

* NOTE: See SC for complete packing data
 including NSN's.

Shipping and Storage Data:

DODAC ----- 1315-C449
Drawing number ----- 75-1-229

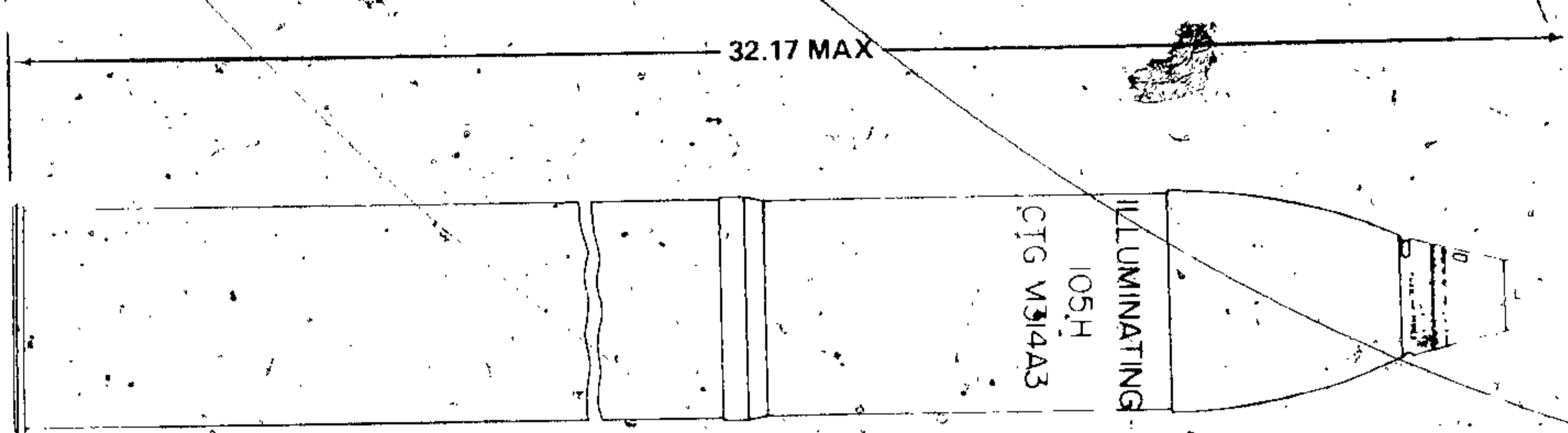
Quantity-distance
class ----- 4
Storage compatibility
group ----- E
DOT shipping class ----- A
DOT designation ----- AMMUNITION FOR
CANNON WITH IL-
LUMINATING PRO-
JECTILES

References:

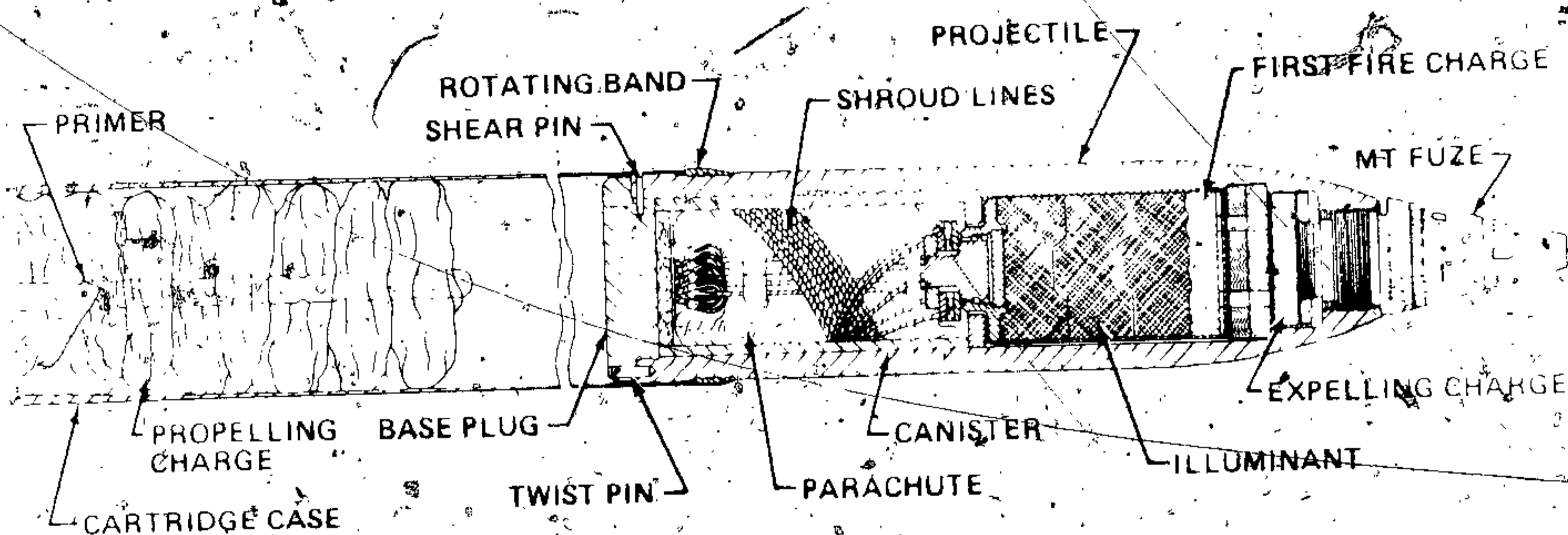
SC 1305/30-IL
SB 700-20
AMCP 700-3-3
TM 9-1015-203-12
TM 9-1015-234-12
TM 9-1300-215-20
TM 9-2350-217-10

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CARTRIDGE, 105-MILLIMETER: ILLUMINATING, M314A3



AR199/31



AR199730

Type Classification:

Std AMCTC 7467 dtd. 1970

Use:

This cartridge is intended for signalling or for illuminating a designated area.

Description:

The projectile is a hollow steel forging with a streamlined ogive, a gilding metal rotating band, and a pinned base plug. The projectile is assembled with an MT fuze screwed into the nose. The projectile cavity contains an expelling charge, illuminating canister, and parachute assembly. The expelling charge consists of 0.18 lb. of black powder contained in a sealed

plastic holder. The illuminating canister body contains the illuminant and 0.15 lb. of first fire composition. The illuminating canister body is fitted with anti-rotational brakes. 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 assembly 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 increment 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, the closing plug is removed and a fuze assembled to the projectile 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 tube imparts spin to the projectile providing in-flight stability. The MT fuze functions and ignites the expelling charge, in turn, igniting the first-fire composition in the illuminant canister. The expelling charge also ejects the illumination canister and parachute assembly from the base of the projectile by blowing out the base plug. Concurrently, the parachute deploys and inflates. The canister body rotation or spin is rapidly decreased by the anti-rotational brakes which open to the airstream when the canister is ejected, and the illuminant is ignited by the first-fire composition. Average luminosity is 450,000 candlepower with a static burning time of 60 seconds.

Tabulated Data:

Complete round:

Type ----- Illuminating
 Weight ----- 46.43 lbs.
 Length ----- 32.17 in.
 Cannon (weapon) used
 with ----- M49 (M52, M52A1);
 M2A1, M2A2
 (M101, M101A),
 M103 (M108),
 M137 (M102)

Projectile:

Body material ----- Forged steel
 Color ----- White w/black
 markings
 Expelling charge ----- Black powder,
 .18 lb.
 Filler and weight ----- Illum, 1.97 lbs.
 Fuze ----- MT, M565

Propelling charge:

Cartridge case ----- M14 series

M14 ----- Brass, 5.9 lbs.
 (approx.)
 M14B4 ----- Steel, 3 pc spiral
 wrap, 4.7 lbs.
 (approx.)

Propellant ----- M67, 2.83 lbs.
 Percussion primer assembly:

	M28A2	M28B2
Primer	M61, .00014 lb.	M61, .00014 lb.
Black powder	Cl 1, MIL-P-223 (Note B), .043 lb.	Cl 1, MIL-P-223 (Note B), .043 lb.
Body	Brass, Type 1	Steel, Type 2

Performance:

(1) Using M52, M52A1 and M101/
 M101A1 howitzers:

Charge	Muzzle Velocity (fps)	Muzzle Velocity (mps)	Maximum Range (meters)	Maximum Range (yards)
1	650	198.4	3510	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 meters
 12,330 yds.

Muzzle velocity ----- 472.4 mps
 1550 fps.

(2) Using M102 and M108 howitzers:

Charge	Muzzle Velocity (fps)	Muzzle Velocity (mps)	Maximum Range (meters)	Maximum Range (yards)
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 meters
 12,590 yds.

Muzzle velocity ----- 494 mps
 1621 fps.

Temperature Limits:

Firing:

Lower limit ----- 40°F

Upper limit ----- + 145°F
 Storage:
 Lower limit ----- -65°F
 Upper limit ----- + 145°F
 * Packing ----- 1 round in fiber
 container; 2 con-
 tainers in wooden
 box
 * Packing Box:
 Weight ----- 114 lbs.
 Dimensions ----- 37-1/4 x 11-15/16
 x 7-19/32 in.
 Cube ----- 2 cu. ft.

*NOTE: See SC for complete packing data
 including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 4

Storage compatibility
 group ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITH IL-
 LUMINATING PRO-
 JECTILES
 DODAC ----- 1315-C449
 Drawing number ----- 9206821

References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1015-203-12
 TM 9-1015-234-12
 TM 9-1300-251-20
 TM 9-2350-217-10

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CARTRIDGE, 105-MILLIMETER: HEP, HEP-T, M327

ILLUSTRATIONS

CLASSIFIED

Type Classification:Use:

This cartridge is used for both anti-tank and anti-personnel purposes.

Description:

Physical details of this cartridge are classified. See TM 9-1300-203/2 for a physical description.

Functioning:

Functional operating details of this cartridge are classified. See TM 9-1300-203/2 for a functioning description.

Tabulated Data:

Complete round:

Type ----- HEP
 Weight ----- 33.45 lbs.
 Length ----- 29.08 in.
 Cannon used with ----- M2A1, M2A2, M4;
 M4A1, M49, M103
 and M137

Projectile:

Body material ----- Forged steel
 Color ----- Olive drab w/black
 band and yellow
 markings
 Filler and weight ----- Comp. A3, 7.60 lbs.
 Fuze ----- BD, M91

Propelling charge:

Cartridge case ----- M14 series
 Propellant ----- M6, 3.90 lbs.
 Primer ----- M28A2, or M28B2
 Tracer ----- M5A2B1

Performance:

Maximum range ----- 9100 yards
 Muzzle velocity ----- 1835 fps.

Temperature Limits:

Firing:

Lower limit ----- - 40°F
 Upper limit ----- + 125°F

Storage:

Lower limit ----- - 80°F (for periods
 not exceeding 3
 days)

Upper limit ----- + 160°F (for periods
 not exceeding 4 hrs.
 /day)

*Packing ----- 1 round in fiber con-
 tainer; 2 containers
 in wooden box

*Packing Box:

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

*NOTE: See SC for complete packing data
 including NSN's.

Shipping and Storage Data:

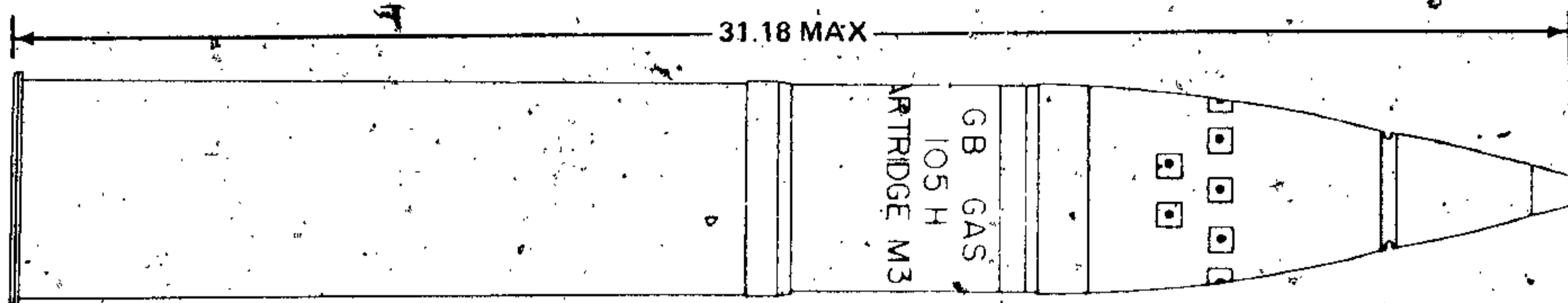
Quantity-distance
 class ----- 6
 Storage compatibility
 group ----- A
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES
 DODAC ----- 1315-C448
 Drawing number ----- 75-1-362

Limitations:

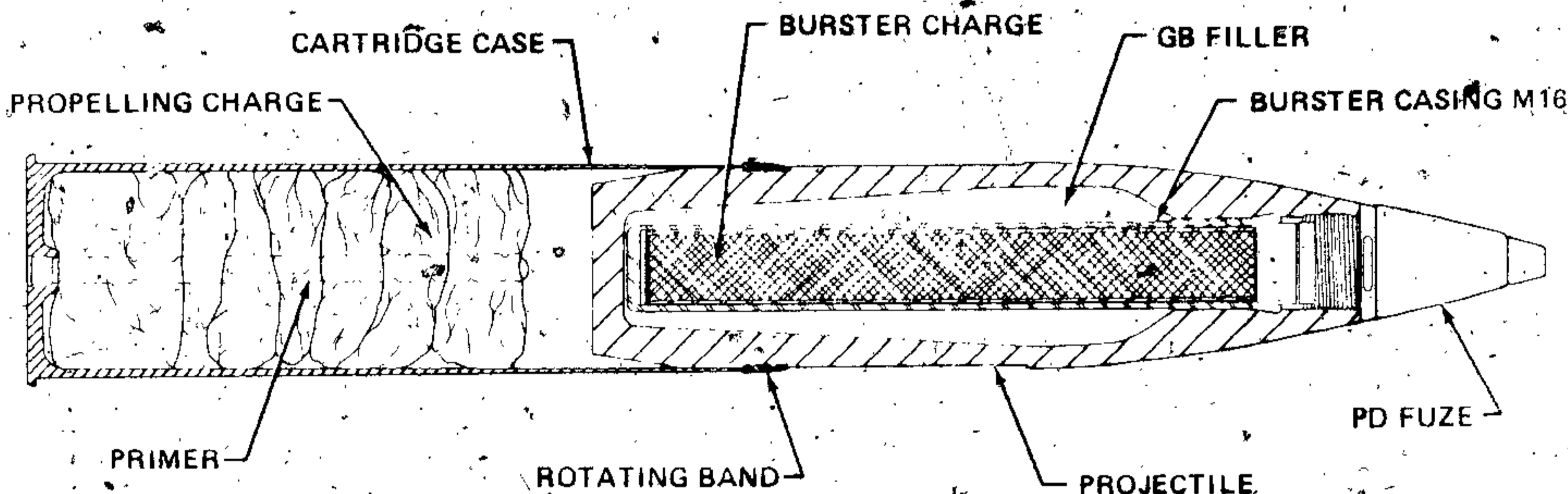
References:

TM 9-1015-203-12
 TM 9-1015-234-12
 TM 9-1300-251-20
 TM 9-2350-217-10

CARTRIDGE, 105-MILLIMETER: AGENT, GB, M360



AR199739



AR199738

Type Classification:

Std OTCM 37119 dtd 1959

Use:

This cartridge is used as a casualty producing round against personnel.

Description:

This cartridge is similar in external appearance to Cartridge HE M1. The projectile consists of a hollow one-piece steel forging, press-fitted with an M16 burster casing containing an M40 tetrytol burster charge, or M40A1 Composition B4 charge. The hollow projectile cavity is filled with a GB non-persistent liquid chemical agent. The projectile has a boat-tailed base

with stream-lined ogive and a gilding metal rotating band. A PD fuze is threaded into the nose of the projectile. The complete projectile assembly is free fitted into 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 increment 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 the closing plug is removed and a fuze assembled to the projectile 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 which the rifling of the weapon tube imparts spin to the projectile, providing flight stability. Projectile functioning is dependent upon the fuze used and may function on impact, instantaneous or delay, function above ground either at a predetermined height based upon time of flight or function in proximity with the target area. Fuze function detonates the burster charge, resulting in projectile rupture and dispersal of the chemical agent. The liquid agent evaporates, forming a non-persistent gas to envelope the area.

Tabulated Data:

Complete round:

Type ----- Chemical Agent,
GB, non-persistent
Weight ----- 43.86 lbs.
Length ----- 31.18 in.
Cannon used with ----- M2A1, M2A2,
M103, and M137

Projectile:

Body material ----- Steel, forged or
bar
Color ----- Gray w/two green bands
and green markings (One
yellow band with
explosive burster)
(Later manufacture -
three green bands)

Filler and weight ----- GB, non-persistent,
1.63 lbs.

Weight Zones

Zone	Loaded shell w/o fuze & w/o burster chg		Marks
	Over Pounds	Up to and including Pounds	
5	30.39	31.09	□□□□□
6	30.99	31.59	□□□□□
7	31.59	32.29	□□□□□

No projectile wt. zones lower than Zone-5

Fuze ----- PD, M508
series, M557

Propelling charge:

Cartridge case ----- M14 series
Propellant ----- M67, 2.83 lbs.
Primer ----- M28A2, M28B2

Performance:

(1) Using M52, M52A1 and
M101/M101A1 howitzers:

Charge	Muzzle Velocity (fps)	Muzzle Velocity (mps)	Maximum Range (meters)	Maximum Range (yards)
1	650	198.1	3510	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 meters
(12,330 yds.)

Muzzle velocity ----- 472.4 mps
(1550 fps)

(2) Using M102 and M108
howitzers:

Charge	Muzzle Velocity (fps)	Muzzle Velocity (mps)	Maximum Range (meters)	Maximum Range (yards)
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 meters
(12,590 yds.)

Muzzle velocity ----- 494 mps
(1621 fps)

Temperature Limits:

Firing:

Lower limit ----- - 40° F

Upper limit ----- + 125° F

Storage:

Lower limit ----- - 40° F

Upper limit ----- + 125° F

* Packing

----- 1 round in fiber container; 2 containers in wooden box

* Packing Box:

Weight ----- 117 lbs.

Dimensions ----- 37-1/4 x 11-5/16
x 7-19/32 in:

Cube ----- 2 cu. ft.

* NOTE - See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 5
 Storage compatibility group ----- A
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH GAS PROJECTILES
 DODAC ----- 1315-C441
 Drawing number ----- 75-1-363

Limitations:

Do not fire or store Cartridge M360 assembled with Burster M40 (loaded with tetrytol) at

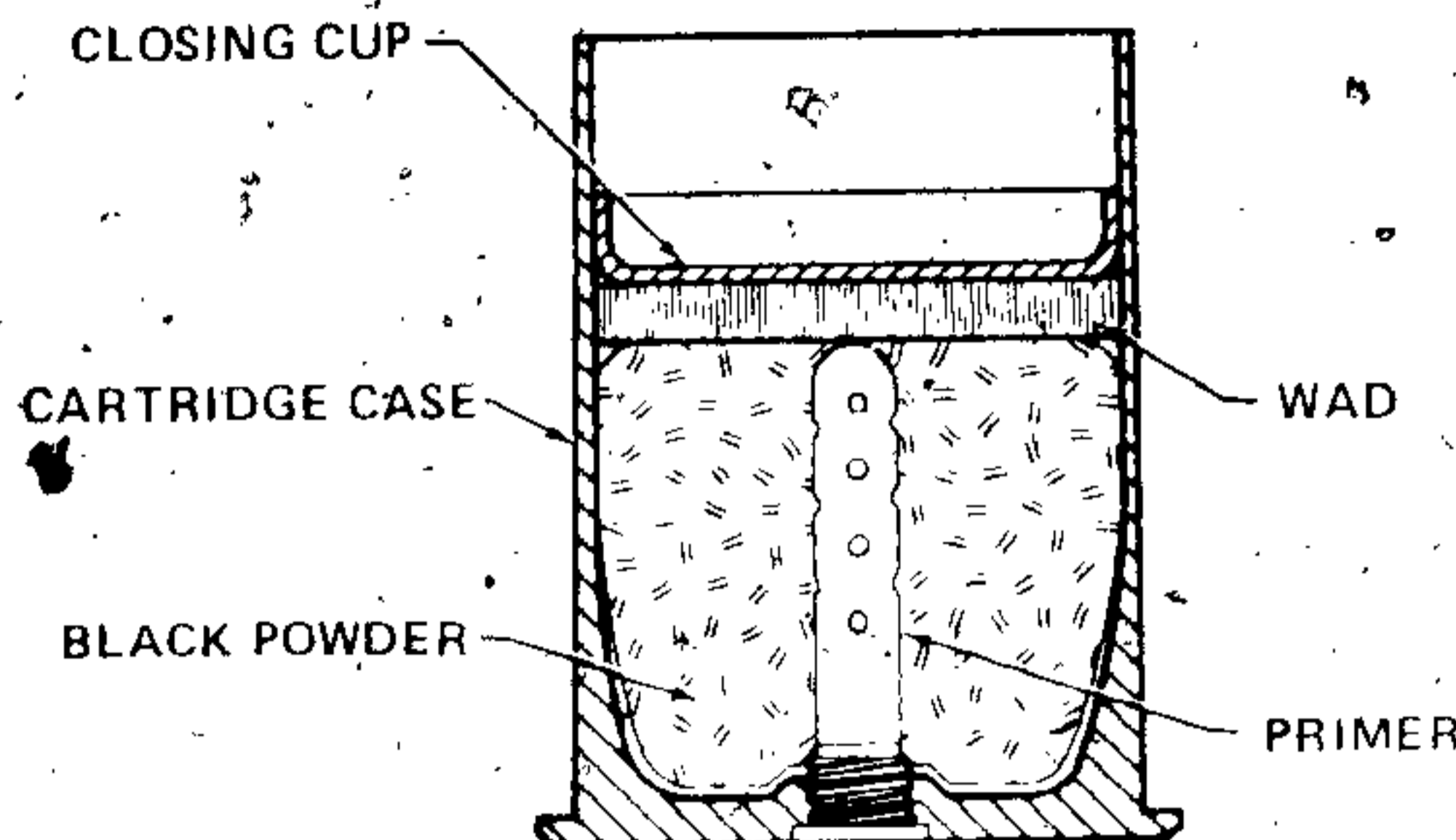
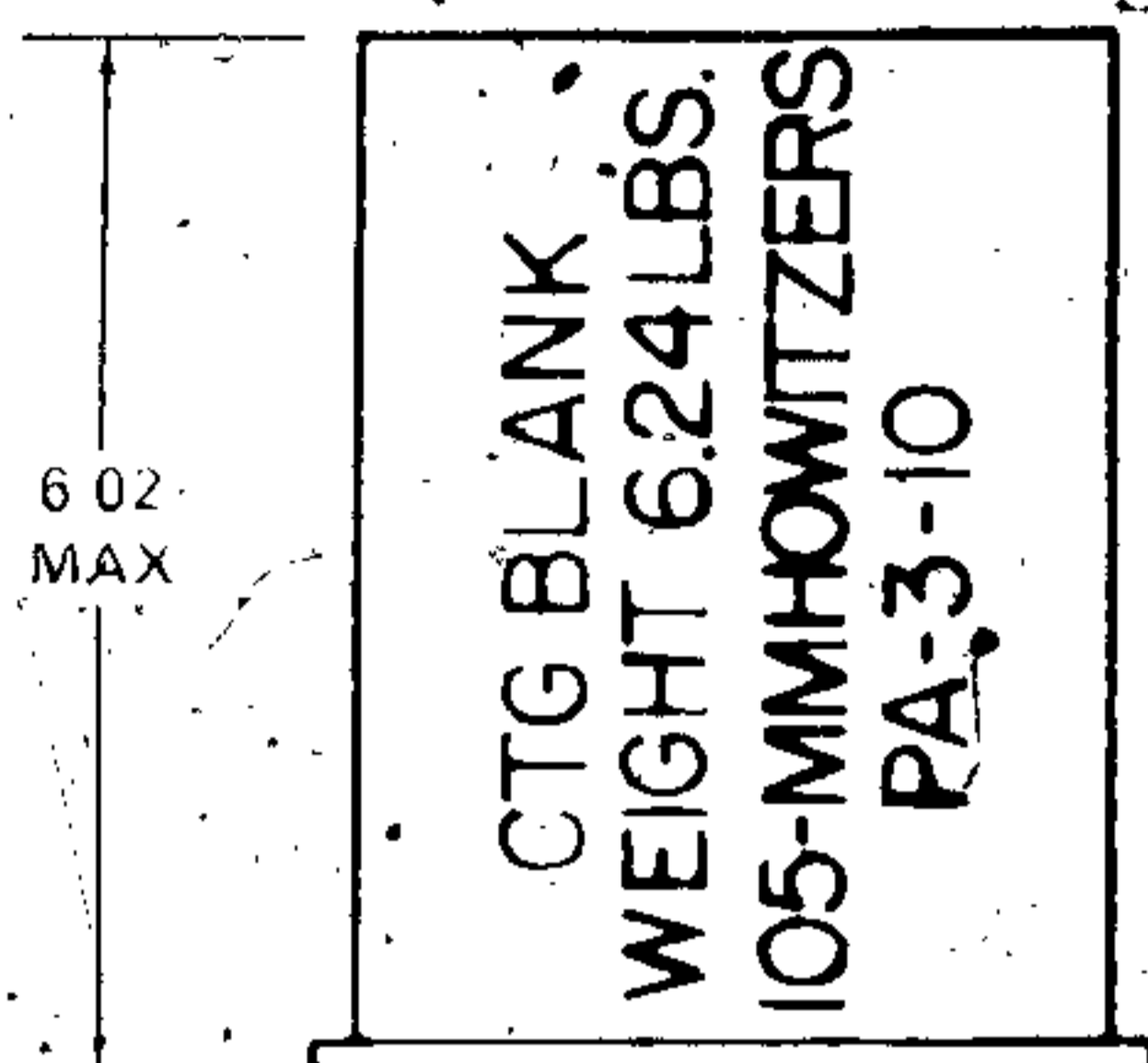
temperatures exceeding + 125°F. This restriction is not applicable to Burster M40A1. Cartridges assembled with Burster M40A1 (M40E1) are authorized for use in all 105-mm howitzer cannons. Cartridges assembled with Burster M40 are authorized for use in all 105-mm howitzers except M108 and M102.

References:

- SC 1305/30-IL
- SB 700-20
- DARCOM P 700-3-3
- TM 9-1015-203-12
- TM 9-1015-234-12
- TM 9-1300-251-20
- TM 9-2350-217-10

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CARTRIDGE, 105-MILLIMETER: BLANK, M395



AR199713

AR199712

Type Classification:

Std OTCM 38091 dtd 1962.

Use:

This cartridge is used for salutes and simulated fire.

Description:

The blank cartridge consists of a shortened cartridge case containing a black powder charge and primer. The shortened cartridge case is either brass, steel, or aluminum. The black powder charge in early production of this item is contained in a cloth bag and held in position by a closing cup or a plug assembly consisting of two pulp-board disks glued on either side of a hard felt disk and cemented in position about 0.5 inch from the mouth of the case. Renovated or newly manufactured blank cartridges are assembled with a loose powder charge contained by the cartridge case and retained by a fiberglass closing wad and a polystyrene closing cup glued in place with epoxy.

Functioning:

The weapon firing pin strikes the percussion primer igniting the black powder in the primer case, in turn, detonating the black powder charge which produces a load report with flash and smoke.

Tabulated Data:

Complete round:

Type -----	Blank
Weight -----	6.24 lbs.
Length -----	6.02 in.
Cannon (weapon) used with -----	M2A1, M2A2 (M101, M101A1), M49 (M52, M52A1), M103 (M108), M137 (M102)

Propelling charge:

Cartridge case -----	M15, Brass M15B1, Steel M15B2, Aluminum
Propellant -----	Black Powder; 1.7 lbs.
Primer -----	M1A2, M1B1A2
Percussion element --	M61
Body -----	8838089-10 (M1B1A2) 8838089-14 (M1A2)
Charge -----	Black powder, 100 ± 6 grains

Temperature Limits:

Firing:

Lower limit -----	-80°F
Upper limit -----	+125°F

Storage:

Lower limit -----	-80°F (for periods not exceeding 3 days)
-------------------	--

Upper limit ----- +160°F (for periods not exceeding 4 hours per day)

* Packing ----- 1 round in fiber container; 10 containers in wooden box.

* Packing Box:

Weight ----- 96.0 lbs.

Dimensions ----- 29-1/4 x 12-1/16 x 9-13/32 in.

Cube ----- 1.9 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 4

Storage compatibility group ----- E

DOT shipping class ----- A

DOT designation ----- AMMUNITION FOR CANNON WITHOUT PROJECTILES

DODAC ----- 1315-C440

Drawing number ----- 7549251

Limitations:

Closure debris from blank ammunition can be expelled a distance of 300 feet forward of the weapon muzzle.

References:

SC 1305/30-IL

SB 700-20

AMCP 700-3-3

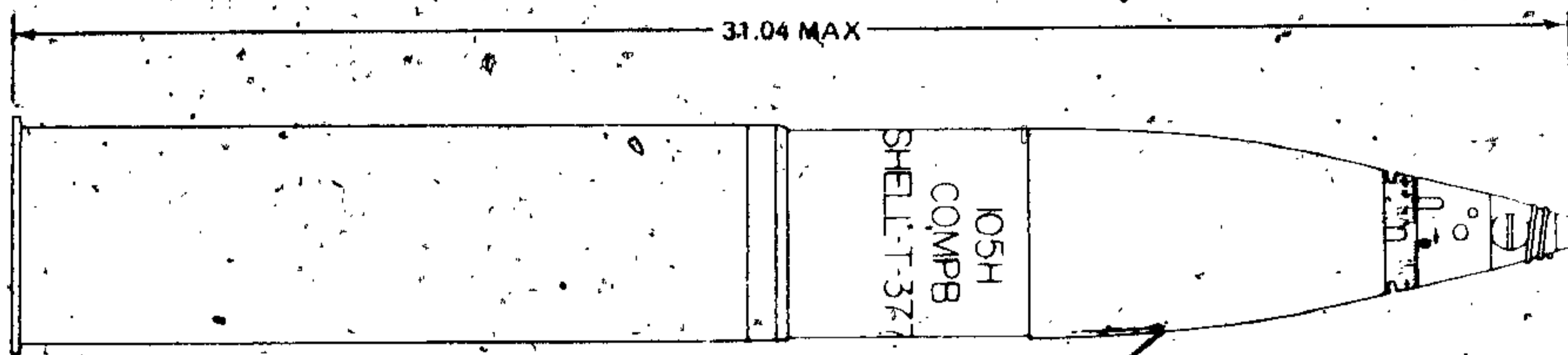
TM 9-1015-203-12

TM 9-1015-234-12

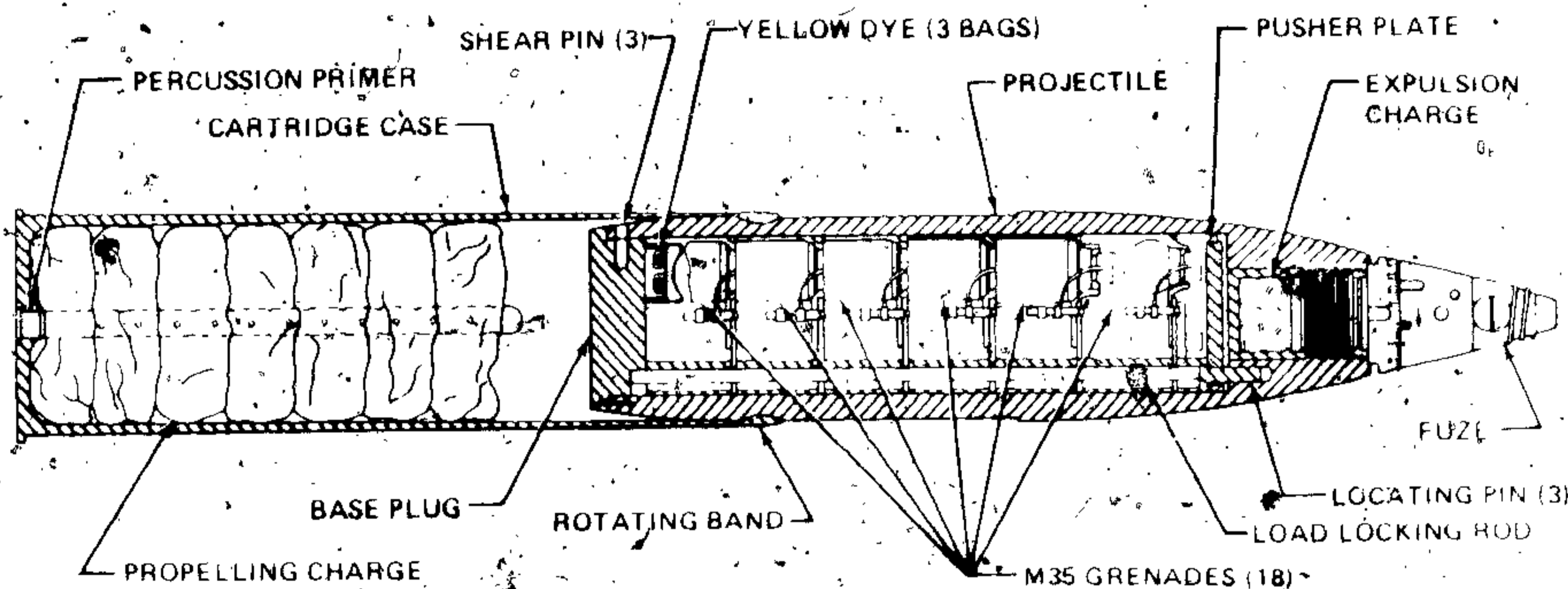
TM 9-1300-251-20

TM 9-2350-217-10

CARTRIDGE, 105-MILLIMETER: HE, M413 (T377E1)



AR199434



AR199433

Type Classification:

OBS MSR 11756003

Use:

This cartridge is used to deliver a concentration of antipersonnel grenades.

Description:

The complete round consists of a projectile, a modified fuze, and a cartridge case. The projectile contains six layers of grenades with three grenades in each layer. Three of the grenades in each projectile contain a bag of yellow dye for spotting the burst. The grenades are contained by a base plug attached to the projectile with three shear pins. A mechanical time superquick fuze incorporating an expulsion charge is installed in the nose of the projectile, and may be set to function at any

time between 2 and 75 seconds. The modified fuzes incorporate an expulsion charge and are not interchangeable with unmodified fuzes of the same model. The cartridge case contains a percussion primer and a propelling charge divided in increments to permit adjustment for the desired firing charge. The lip of the cartridge case is a free fit over the base of the projectile.

Functioning:

When the primer is detonated by the firing pin of the weapon, the flash from the primer ignites the propelling charge producing gases which propel the projectile from the barrel of the weapon. The rifling in the barrel imparts spin to the projectile, stabilizing it in flight. The fuze, having been set to function at a predetermined time in flight, initiates the expulsion charge ejecting the entire grenade load from the rear of the projectile. Centrifugal

force disperses the grenades radially from the projectile line-of-flight. The M35 grenade is a ground-burst submissile which explodes on impact.

Fabulated Data:

Complete round:

Type ----- HE
 Weight ----- 42.0 lbs.
 Length ----- 31.04 in.
 Cannon used with ----- M2A1, M2A2,
 and M49

Projectile:

Body material ----- Forged steel
 Color ----- Olive drab w/yel-
 low markings

Filler and weight:

Number of grenades,
 M35 ----- 18
 Explosive, Comp. B, each grenade --- 28 grams
 Explosive, Comp. B, each pro-
 jectile ----- 1.1 lbs.

Fuze ----- MTSQ, M554
 (Modified)

Cartridge Case:

Model	Mat'l	Wt. (lbs) (approx)
M14	Brass	5.9
M14B1	Steel, Drawn	5.4
M14B3	Steel, 5 pc spiral wrap	4.7
M14B4	Steel, 3 pc spiral wrap	4.7

Propelling charge:

Model ----- M67

Components:

Increment No.	Prop Comp & Type	Web Size in approx	Wt Oz Approx	Perf
1	M1, Type II	.014	8.8	Single
2	M1, Type II	.014	1.4	Single
3	M1, Type I	.026	2.5	Multi
4	M1, Type I	.026	3.8	Multi
5	M1, Type I	.026	5.8	Multi
6	M1, Type I	.026	8.8	Multi
7	M1, Type I	.026	14.3	Multi

Weight, Total In-crements 1-7 ----- 2.83 lbs.

Percussion primer assembly:

	M28A2	M28B2
Primer	M61	M61
Black powder	Cl 1, Spec MIL-P-223 (Note B)	Cl 1, Spec MIL-P-223 (Note B)
Weight (lbs.) (primer)	.00014	.00014
(BP)	.043	.043
Body	Brass, Type 1	Steel, Type 2

Performance:

(1) Using M52, M52A1 and M101/M101A1 howitzers.

Charge	Muzzle Velocity (fps)	(mps)	Maximum Range (meters)	(yards)
1	650	198.1	3510	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 meters

12,330 yds.

Muzzle velocity ----- 472.4 mps
 1550 fps.

(2) Using M102 and M108 howitzers.

Charge	Muzzle Velocity (fps)	(mps)	Maximum Range (meters)	(yards)
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 meters
 12,590 yds.

Muzzle velocity ----- 494 mps
 1621 fps.

Temperature Limits:

Firing:
 Lower limit----- -40°F
 Upper limit----- +125°F
 Storage:
 Lower limit----- -65° F (-53.8° C)
 Upper limit----- +165° F (73.9° C)

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

* Packing Box:
 Weight w/cartridge----- 120 lbs.
 Dimensions----- 37-1/4 x 11-15/16 x 7-19/32 in.

Cube----- 2.0 cu. ft.
 *NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

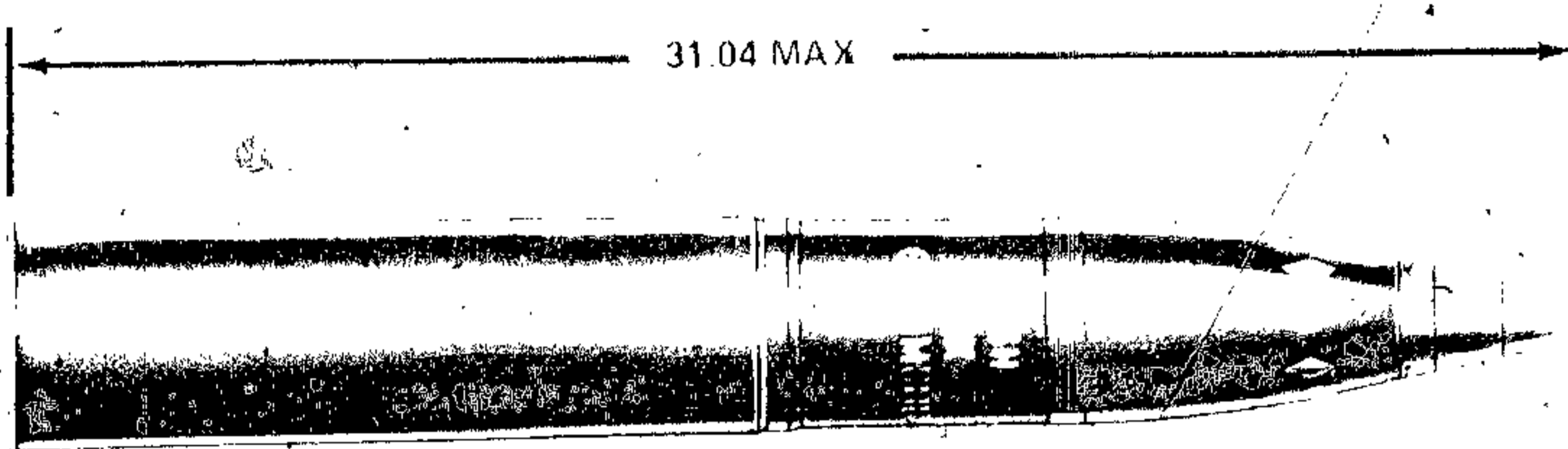
Quantity-distance
 class----- 5
 Storage compatibility
 group----- A
 DOT shipping class----- A
 DOT designation----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
 DODAC----- 1315-C469
 Cartridge
 drawing number - XP97090
 Packing drawing
 number----- 7549072

References:

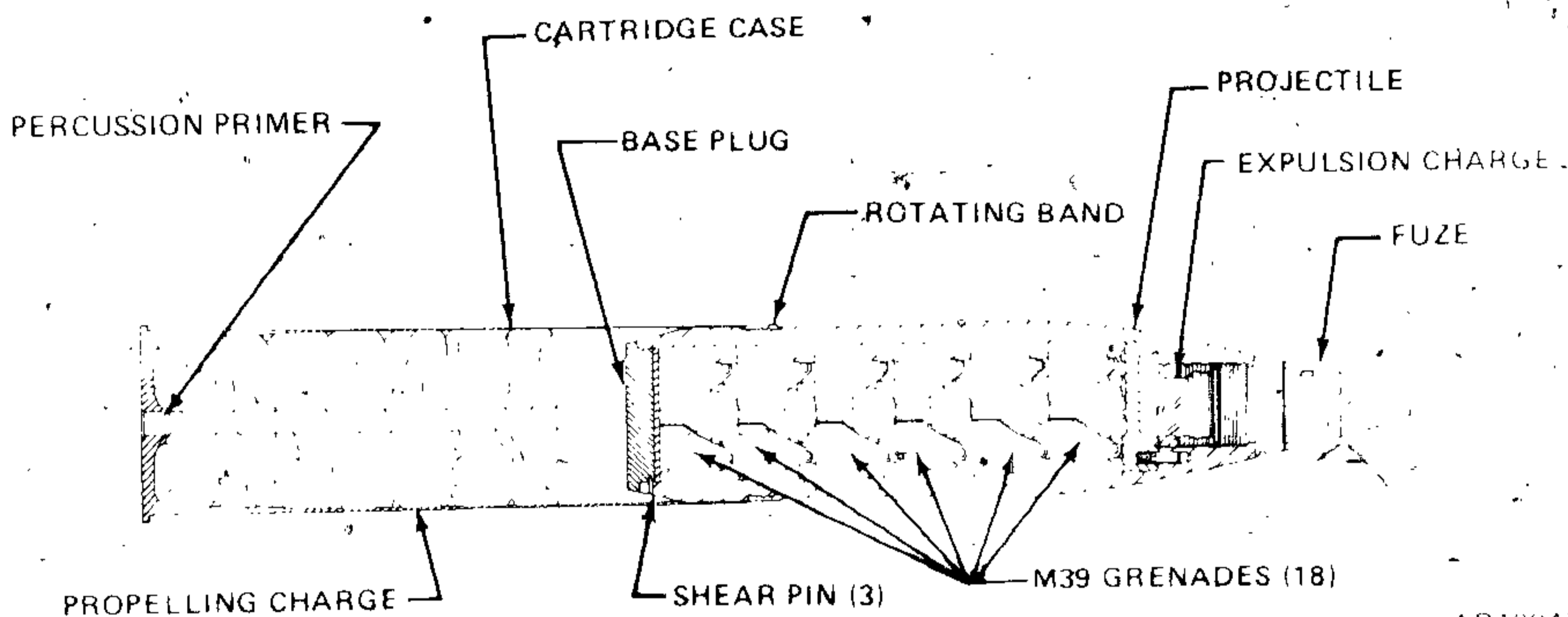
SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1015-203-12
 TM 9-1015-234-12
 TM 9-1300-251-20
 TM 9-1300-251-34

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CARTRIDGE, 105 MILLIMETER, HE, M444



AR199432



AR199431

Type Classification

Std OTCM 37803 dtd 1961

Use:

This cartridge is used to deliver a concentration of antipersonnel grenades.

Description:

The complete round consists of a projectile, a modified fuze, MTSQ, M548 or MT, M565, and a cartridge case. The projectile contains six layers of grenades with three grenades in each layer. The grenades are contained by a base plug attached to the projectile with three shear pins. A modified mechanical time and superquick or mechanical time fuze is installed in the nose of the projectile, and may be set to function at any time between 2 and 100 seconds. The modified fuze incorporate an expulsion charge and are not interchangeable with

unmodified fuzes of the same model. The cartridge case contains a percussion primer and a propelling charge divided in increments to permit adjustment for the desired firing charge. The lip of the cartridge case is a free fit over the base of the projectile.

Functioning

When the primer is detonated by the firing pin of the weapon, the flash from the primer ignites the propelling charge, producing gases which propel the projectile from the barrel of the weapon. The rifling in the barrel imparts spin to the projectile, stabilizing it in flight. The fuze, having been set to function at a predetermined time in flight, initiates the expulsion charge, ejecting the entire grenade load from the rear of the projectile. Centrifugal force disperses the grenades radially from the projectile line-of-flight. The M-39 grenade is an airburst submissile which

TM 43-0001-28

is expelled from its housing on impact and projected upward to burst at 4 to 6 feet above the ground.

Tabulated Data:

Complete round:

Type ----- HE
 Weight ----- 42.0 lbs.
 Length ----- 31.04 in.
 Cannon used with ----- M2A1, M2A2, M49,
 M103, M137; &
 M137E1

Projectile:

Body material ----- Forged steel
 Color ----- Olive drab w/yel-
 low diamonds and
 markings

Filler and weight:

Number of gre-
 nades, M39 ----- 18
 Explosive,
 Comp. A5,
 each grenade ----- 23.55 grams
 Explosive,
 Comp. A5,
 each projectile ----- 0.93 lb.

Fuze ----- MT, M565
 (modified) or
 MTSQ, M548
 (modified)

Cartridge Case:

Model	Mat'l	Wt. (lbs) (approx)
M14	Brass	5.9
M14B1	Steel, Drawn	5.4
M14B3	Steel, 5 pc spiral wrap	4.7
M14B4	Steel, 3 pc spiral wrap	4.7

Propelling charge:

Model ----- M67

Components:

Incre- ment No.	Prop Comp & Type	Web Size (in approx)	Wt Oz Approx	Perf
1	M1, Type II	.014	8.8	Single
2	M1, Type II	.014	1.4	Single
3	M1, Type I	.026	2.5	Multi
4	M1, Type I	.026	3.8	Multi
5	M1, Type I	.026	5.8	Multi
6	M1, Type I	.026	8.8	Multi
7	M1, Type I	.026	14.3	Multi

Weight, Total In-
 crements 1-7 ----- 2.83 lbs.

Percussion primer assembly:

	M28A2	M28B2
Primer	M61	M61
Black powder	Cl 1, Spec MIL-P-223 (Note B)	Cl 1, Spec MIL-P-223 (Note B)
Weight (lbs.) (primer)	.00014	.00014
(BP)	.043	.043
Body	Brass, Type 1	Steel, Type 2

Performance:

(1) Using M52, M52A1 and M101/M101A1 howitzers.

Charge	Muzzle Velocity (fps)	Muzzle Velocity (mps)	Maximum Range (meters)	Maximum Range (yards)
1	650	198.1	3510	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 meters
12,330 yds.

Muzzle velocity ----- 472.4 mps
1550 fps.

(2) Using M102 and M108 howitzers.

Charge	Muzzle Velocity (fps)	Muzzle Velocity (mps)	Maximum Range (meters)	Maximum Range (yards)
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 meters
12,590 yds.

Muzzle velocity ----- 494 mps
1621 fps.

Temperature Limits:

Firing:

Lower limit ----- 40°F

Upper limit ----- +125°F

Storage:

Lower limit ----- -65°F (-53.8° C)

Upper limit ----- +165° F (73.9° C)

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

*** Packing Box:**

Weight, w/cartridge ----- 120 lbs.

Dimensions ----- 37-1/4 x 11-15/16 x 7-19/32 in.

Cube ----- 2.0 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance

class ----- 5

Storage compatibility

group ----- A

DOT shipping class ----- A

DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES

DODAC ----- 1315-C462

Cartridge drawing

number ----- 8864930

Packing drawing

number ----- 7549072

References:

SC 1305/30-IL

SB 700-20

AMCP 700-3-3

TM 9-1015-203-12

TM 9-1015-234-12

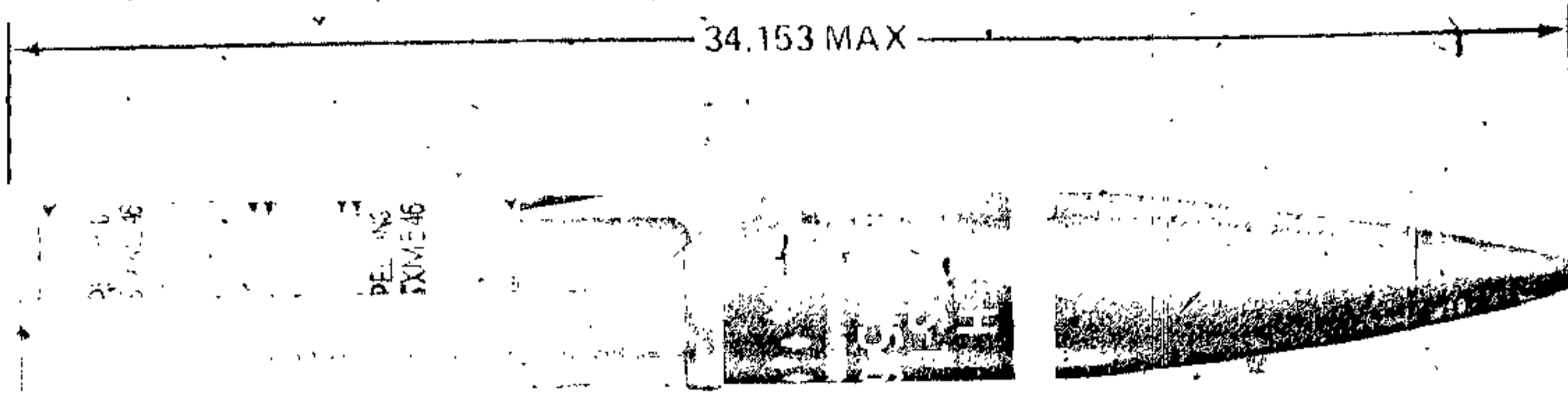
TM 9-1300-251-20

TM 9-1300-251-34

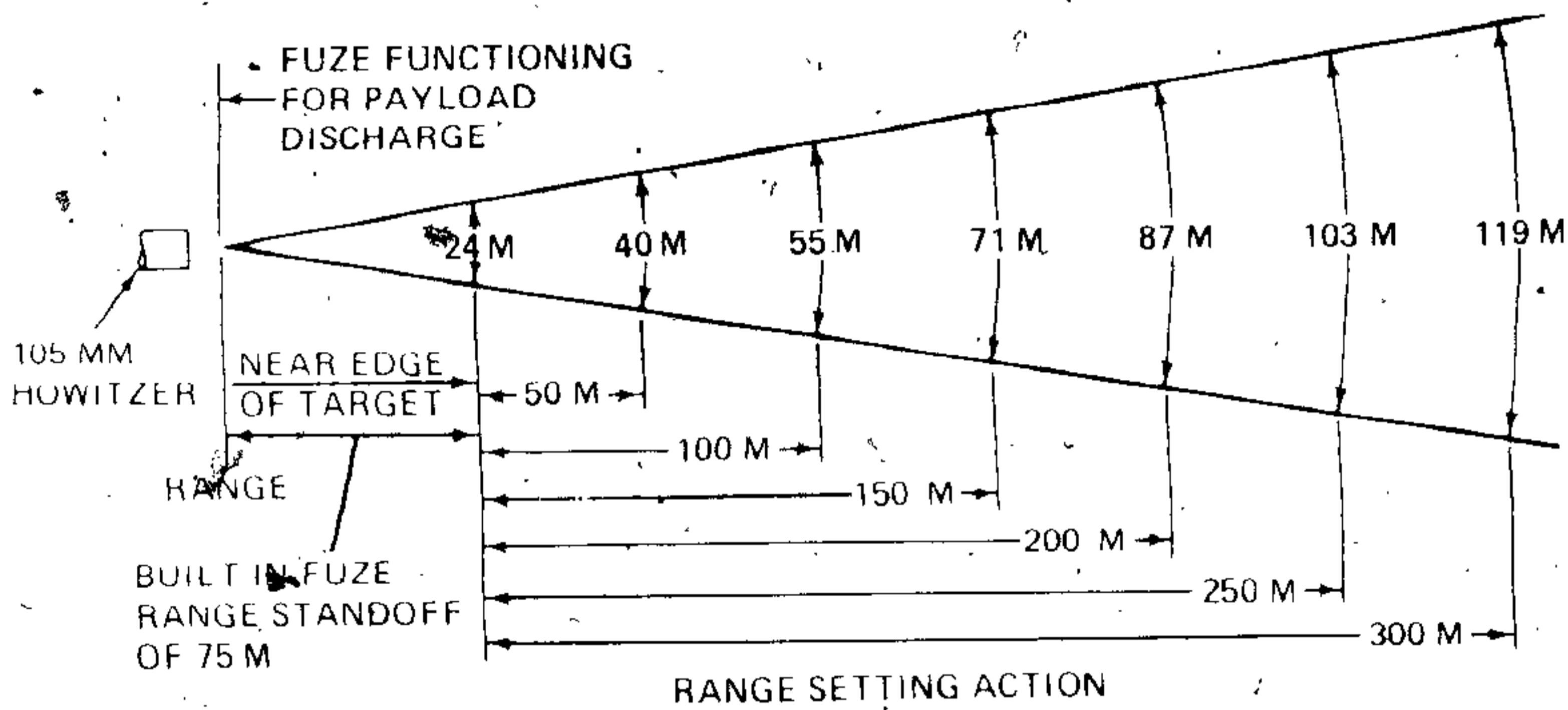
TM 9-1300-254-12

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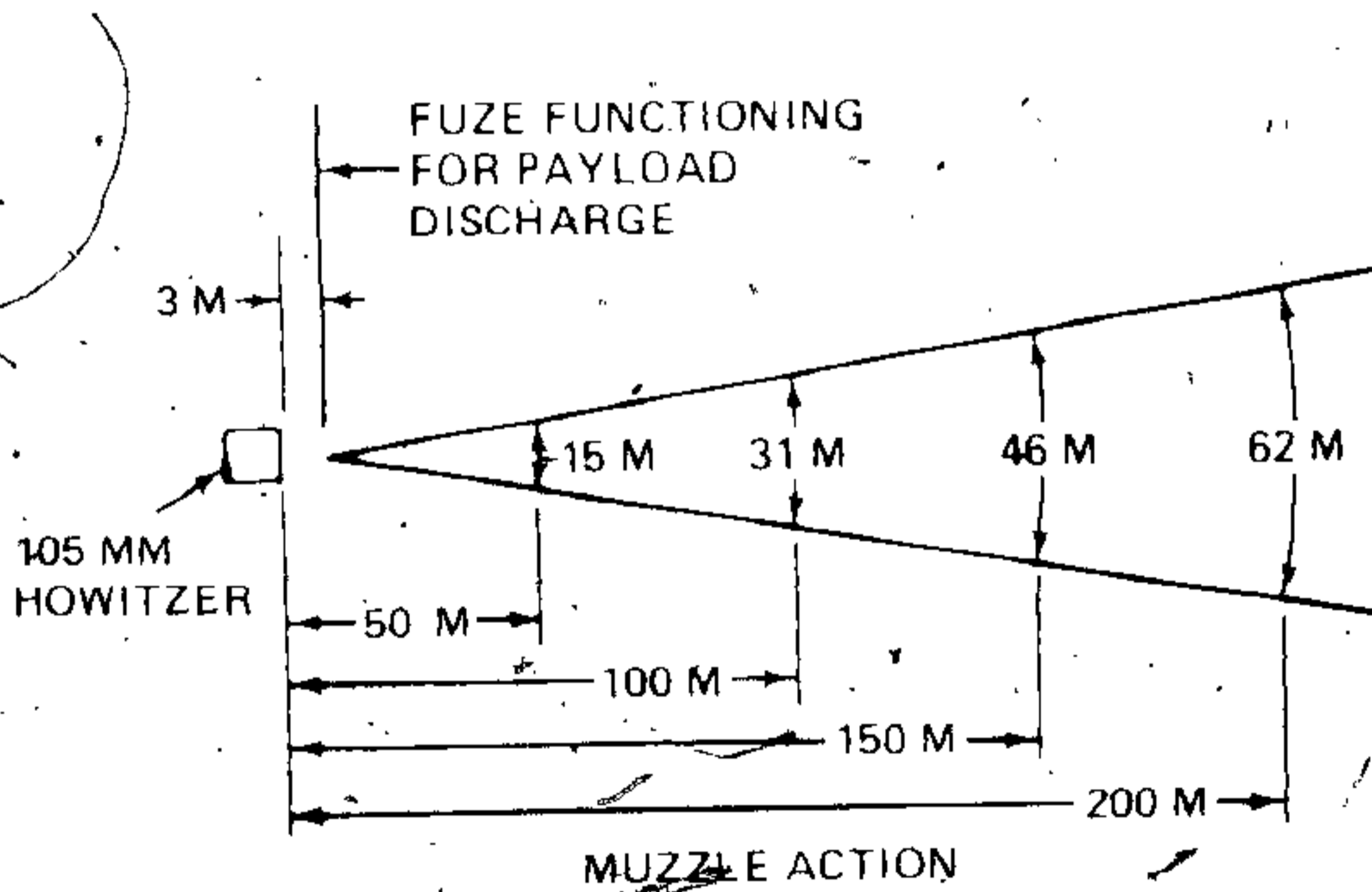
CARTRIDGE; 105-MILLIMETER: APERS-T, XM546



AR199741



AR199740



AR199724

Type Classification:

Std MSR 09736030 dtd 1973

Use:

This cartridge is designed for use against personnel in direct fire, muzzle action, and in a direct fire mission with a time setting other than muzzle action.

Description:

The projectile body is an assembly of four pieces: base with sintered iron rotating band and M13 Tracer, connector, forward body and fuze adapter. Inside the base of the projectile is a base charge. Forward of the base charge are assembled the tiers of flechettes, the centers of which form a flash tube. The fuze adapter is assembled forward of the first tier of flechettes. The fuze adapter contains an M87 detonator, M7 relay, four radially oriented M86 detonators and a pyrotechnic composition smoke marker pellet. The MT Fuze M563 series is assembled into the fuze adapter. The cartridge case contains a percussion primer assembly and two individually bagged propelling charge increments: one numbered Zone 6 and the second Zone 7. 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 perforated flash tube containing benite. The two increment bags are tied together with acrylic cord. The 6th increment is assembled around the primer flash tube at the base end of the cartridge case. The 7th increment is assembled around the flash tube toward the mouth of the cartridge case. The fuze may be set for muzzle action, for functioning at a minimum of 1/2 second or in tenths of a second up to 100 seconds after firing.

Functioning:

Prior to loading, the propelling charge is adjusted by cutting the cord and removing Zone 7 if Zone 6 is to be fired. If Zone 7 is to be fired, the charge is not touched. Also, if other than muzzle action is desired, the fuze is set. The cartridge is then loaded into the chamber of the cannon. 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 and initiates the M13 Tracer. Engagement of the projectile rotating band with the rifling of the weapon tube imparts spin to the projectile providing in-flight stability. When the fuze functions, it initiates the pyrotechnic composition smoke marker, the four radial M86 detonators and M7 relay simultaneously. The four detonators break the forward body into four longitudinal pieces and projectile spin disperses the first four tiers of flechettes.

Projectile forward velocity is imparted to the flechettes. The M7 relay initiates the M87 detonator which flashes through the flash tube formed by the tiers initiating the base charge. The base charge then propels the last five tiers of projectiles from the connector and spin disperses the flechettes. If the fuze is set for muzzle action, it will function within three meters of the cannon muzzle. If set for time, i.e., 1/2-100 seconds, the fuze will function 75 meters prior to set time for optimum payload dispersal. The payload pattern of dispersal is shown in Figure AR 199740. The tracer provides visual tracking of projectile trajectory.

Tabulated Data:

Complete round:

Type ----- APERS-T
 Weight ----- 38.25 lbs.
 Length ----- 34.153 in. (Max)
 Cannon (weapon)
 used with ----- M2A1, M2A2
 (M101, M101A1)
 M49 (M52, M52A1)
 M103 (M108) and
 M137 (M102)

Projectile:

Body material ----- Aluminum/steel
 Color ----- Olive drab w/
 white markings
 and a row of
 white diamonds
 Filler and weight ---- 8,000-8 gr flechettes, 9.145 lb.

Components:

Cartridge case ----- M14B4
 Propelling
 charge ----- XM121
 Increment loading
 assy. ----- 6.2 oz. propellant
 M30A1, single perforation,
 type II, .019 Web
 27.4 oz. propellant M30A1,
 multi perforation, type I,
 .039 Web.
 Charge: Propelling for Ctg.
 Aper's M546.
 Primer ----- M90
 Benite strands ----- 380 ± grains
 Percussion primer
 Dwg. ----- 7645339
 Tracer ----- M13
 1.7 grains igniter composition
 5.5 grains tracer composition
 Fuze ----- MT-M563-E1,
 -E2, -E3, -E4

Performance:

Range and velocity data:

	Muzzle Velocity		Maximum Range	
	(fps)	(mps)	(meters)	(yards)
Charge 6 (M101/ M101A1)	1265	385	9500	10,400
Charge 7 (M101/ M101A1)	1635	504	11,600	12,690
Charge 6 (M102/ M108)	1408	429	10,100	11,050
Charge 7 (M102/ M108)	1800	549	12,400	13,590

Temperature Limits:

Firing:	
Lower limit	-30°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for period not more than 3 days)
Upper limit	+145°F
* Packing	1 round per fiber container; 2 containers per wooden box
* Packing Box:	
Weight	122 lbs.
Dimensions	44-3/4 x 12-1/16 x 7-9/16 in.

Cube ----- 2.3 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	----- 5
Storage compatibility	----- E
DOT shipping class	----- B
DOT designation	----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	----- 1315-C513
Drawing number	----- 9211600

Limitations:

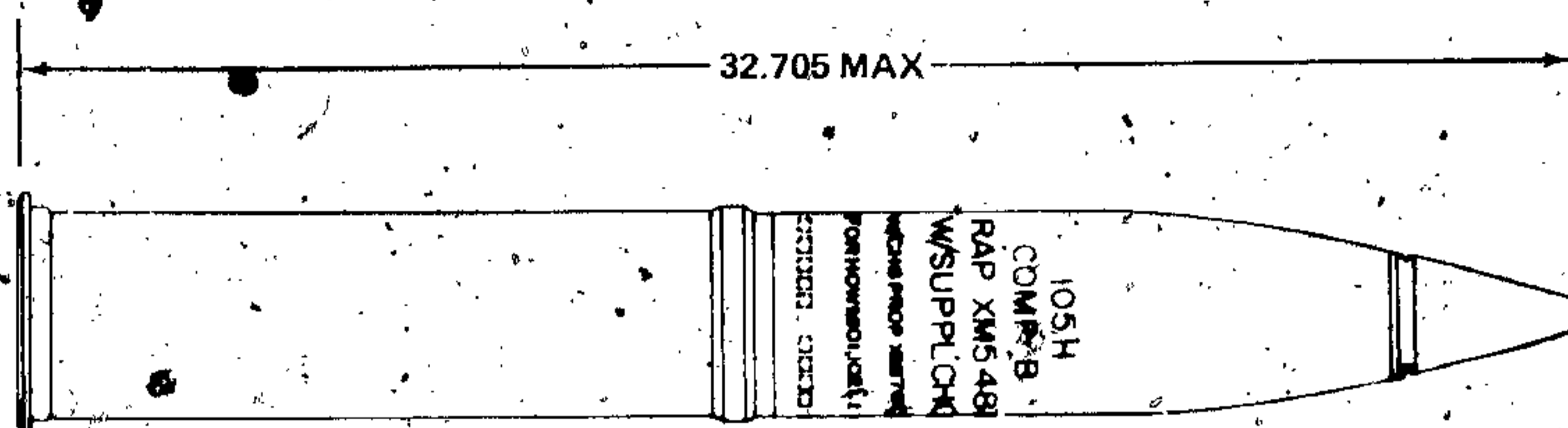
Cartridge XM 546 is not to be fired over the heads of friendly troops and is restricted to firing at Zone 7 only, however, when engaging stationary targets at ranges between 275 and 400 meters, Zone 6 firings with a fuze setting of 0.5 second is permitted.

References:

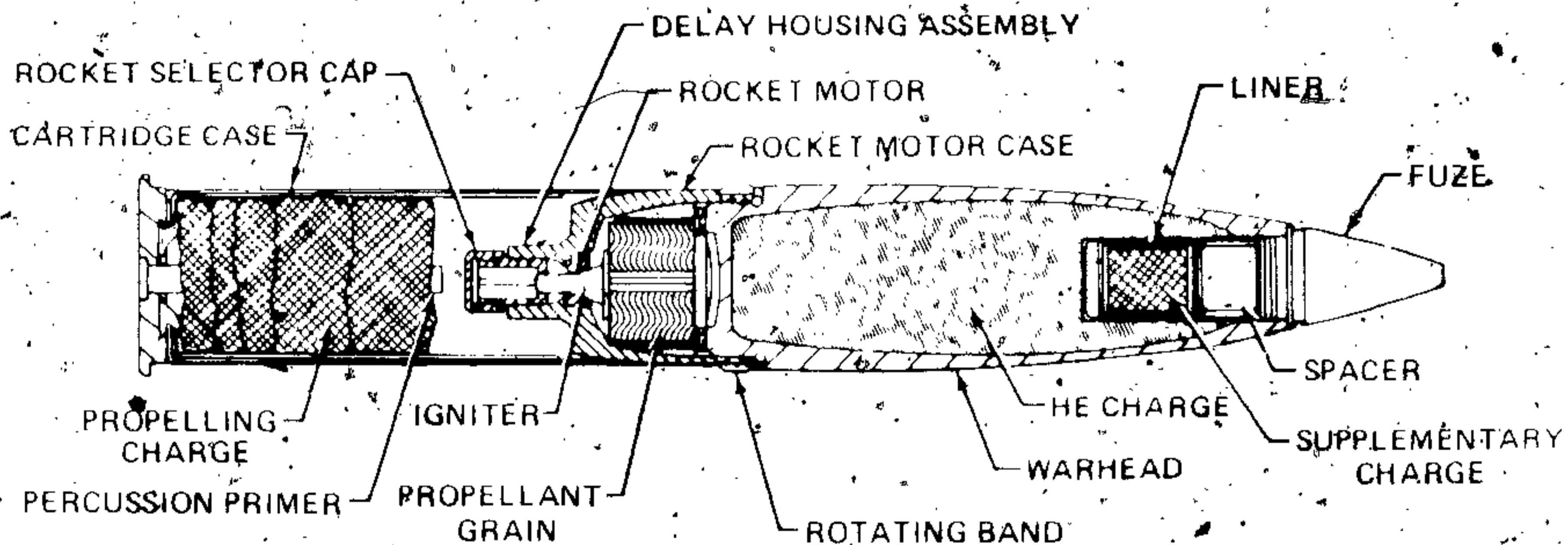
SC 1305/30-II
 SB 700-20
 AMCP 700-3-3
 TM 9-1015-203-12
 TM 9-1015-234-12
 TM 9-1300-251-20
 TM 9-2350-217-10

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CARTRIDGE, 105-MILLIMETER: HERA, M548.



AR199733



AR199732

Type Classification:

Std AMCTC.8414 dtd 1971

Use:

This cartridge is a high explosive, rocket-assisted round with extended range capability used for fragmentation, blast and mining in support of ground troops and armored columns.

Description:

The projectile consists of two pieces, a streamlined warhead and rocket motor body of boattail design. The nose of the warhead is threaded for a fuze and the warhead is filled

with cast Composition B having a deep cavity and supplementary charge. The rocket motor body contains the rocket grain and rocket ignition system, contained in a spike at the rear of the body. The spike housing ignition system is fitted with a cap. A sintered iron rotating band is swaged to the rocket motor body and the body threaded to the warhead to complete the projectile assembly. The cartridge case contains a primer and five individually bagged and numbered propelling charge increments. The base of the cartridge case is drilled and a percussion primer assembly is pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing benite. The five-numbered increment bags are tied together,

in numerical order, 3, 4, 5, 6 and 7 with acrylic cord. These are assembled into the cartridge case, around the primer flash tube, with Increment 3 at the base of the cartridge case and Increment 7 toward the mouth of the cartridge case.

Functioning:

1. Rocket "OFF-MODE"

If the projectile is unfuzed, the closing plug is removed and a fuze assembled to the projectile and if required is set. The cartridge is loaded into the weapon. Upon firing, impact of the weapon firing pin results in the initiation of the percussion primer which, in turn, ignites the benite 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 tube imparts spin to the projectile providing in-flight stability. Projectile functioning is dependent upon the fuze used and may function on impact (instantaneous or delay), function above ground either at a predetermined height based upon time of flight, or function in proximity with target area. Fuze function detonates the H. E. projectile filler resulting in projectile fragmentation and blast.

2. Rocket "ON-MODE"

The fuze is assembled to the projectile as in the Rocket "OFF-MODE". The rocket selector cap, on the spike of the projectile, is removed and the cartridge case with propellant is slipped over the projectile and the cartridge loaded into the weapon. After firing, the burning propellant gases initiate the ignition composition which, in turn, ignites the delay composition. Approximately 16 seconds later (the projectile has left the tube and is traveling downward), the balance of the rocket motor ignition system ignites the rocket motor. The rocket motor burns for 2 seconds boosting the projectile velocity resulting in a greater projectile range. Fuze initiation, as described for Rocket "OFF-MODE", detonates the projectile HE filler resulting in projectile fragmentation and blast.

Tabulated Data:

Complete round:

Type ----- HERA

Weight ----- 38.5 lbs.
 Length ----- 32.7 in.
 Cannon (weapon) used
 with ----- M49 (M52, M52A1),
 M2A1, M2A2
 (M101, M1C1A),
 M103 (M108), M137
 (M102)

Projectile:

Body material ----- High carbon steel forging
 Color ----- Olive drab w/yellow markings
 Filler and weight ---- Comp. B, 5.2 lbs.
 Fuzes ----- Prox. M728, PD
 M557, or MTSQ
 M564

Propelling charge:

Cartridge case:

M14 ----- Brass, 5.9 lbs.
 (approx.)
 M14B1 ----- Steel, drawn, 5.4
 lbs. (approx.)
 M14B4 ----- Steel, 3 pc spiral
 wrap, 4.7 lbs.
 (approx.)

Propelling charge ----- M176, 2.84 lbs.
 Percussion primer assembly ----- M108
 Primer ----- Dwg. No. 7645339
 Benite (BP) ----- 210 grains
 Motor body ----- Steel alloy forging
 Rocket propellant grain ----- XM-33 propellant
 Nitrocellulose base
 1.06 lbs.

Delay assembly:

No. increments	Weight	Composition
1	250 mg	Flash
6	950 mg (each)	Delay
1	200 mg	Igniter

Flash composition:

Constituent	Parts by wt.
Zirconium	58 ± 1.0
Chromium oxide	16 1.0
Molybdenum trioxide	25 1.0
Vinyl alcohol Acetate resin (solids)	1.0 ± 0.1

Igniter composition:

Constituent	Parts by wt.
Zirconium	65 ± 1.0
Iron oxide	25 ± 1.0
Diatomaceous carth	10 ± 1.0
Vinyl alcohol Acetate resin (solids)	1 ± 0.1

Delay composition:

Constituent	Parts by wt.
Tungsten	42.5 ± 5
Barium chromate	45 ± 5
Potassium perchlorate	12.5 ± 0.25
Vinyl alcohol	
Acetate resin (solids)	1 ± 0.1

Rocket propellant grain igniter:

Type 1 Class 3 boron potassium nitrate pellets 5.0 grains (approx.)

Performance:

Maximum range ----- 15,000 meters
Muzzle velocity ----- 1,800 fps

Temperature Limits:

* Firing:
Lower limit ----- - 40° F
Upper limit ----- + 145° F
Storage:
Lower limit ----- - 65° F
Upper limit ----- + 150° F
* Packing ----- 1 round in fiber container; 2 containers in wooden box

* Packing Box:

Weight ----- 122 lbs.
Dimensions ----- 45-19/32 x 11-13/16 x 7-11/16 in.
Cube ----- 2.4 cu ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 5
Storage compatibility group ----- E
DOT shipping class ----- A
DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE

DODAC ----- 1315-C463
Drawing number ----- 9212376

Limitations:

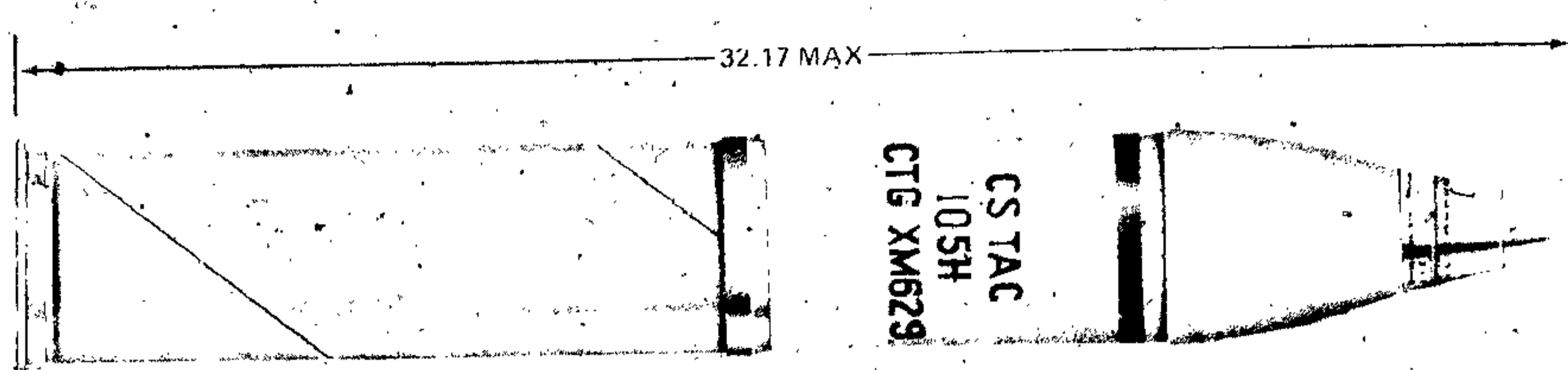
Charge 7 is authorized for firing in both Rocket-On and Rocket-Off modes. Charges 3, 4, 5, and 6 are authorized for Rocket-Off Mode firing only under emergency combat conditions.

References:

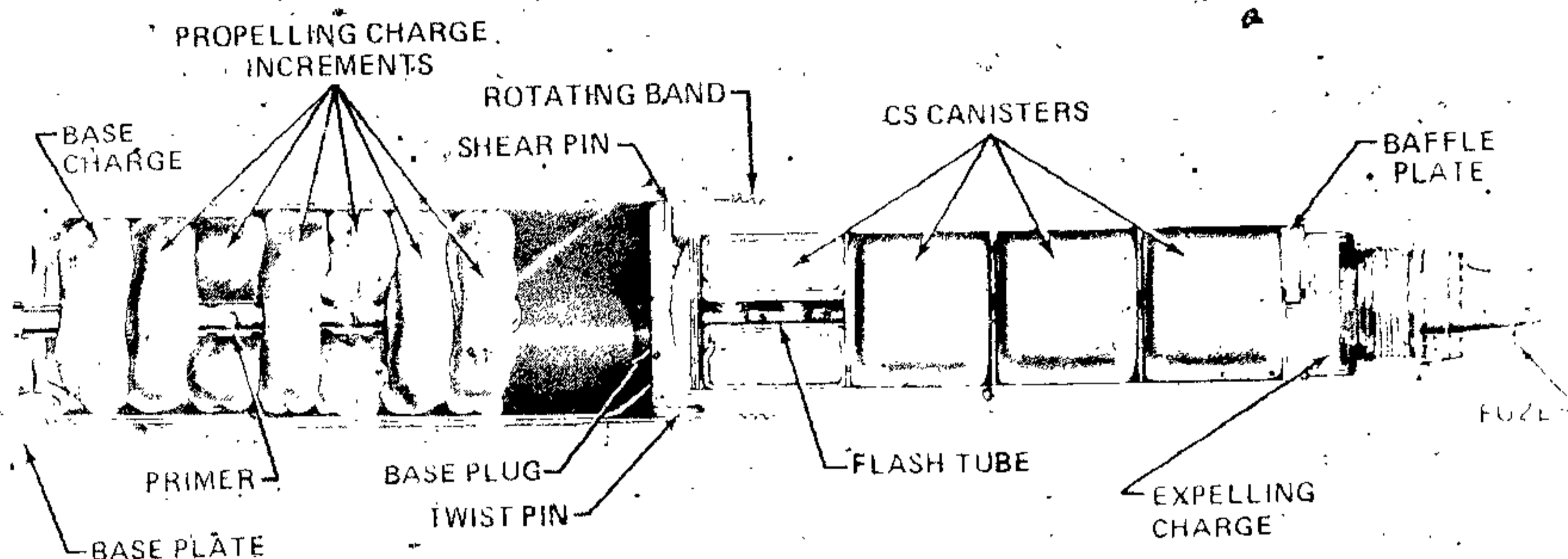
SC 1305/30-IL
SB 700-20
AMCP 700-3-3
TM 9-1015-203-12
TM 9-1015-234-12
TM 9-1300-251-20
TM 9-2350-217-10

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CARTRIDGE, 105-MILLIMETER: TACTICAL CS, XM629



AR199717



AR199716

Type Classification:

LP MSR 03736119 dtd 1973

Use:

This cartridge contains a CS riot control agent which emits irritating fumes intended to harass personnel.

Description:

This cartridge is similar in external configuration to Illuminating Cartridge M314A2E1. The projectile consists of a hollow steel forging with streamlined ogive, gilding metal rotating band, and pinned steel base plug. An MT or MTSQ fuze is internally threaded into the nose of the projectile. The projectile cavity contains an expelling charge and four CS pyrotechnic-filled canisters. The expelling charge

consists of 1.78 oz. of black powder in a plastic container. It is assembled to the rear of the fuze and separated from the CS canisters by an aluminum baffle plate with flash hole. Each CS canister contains 0.825 lb. of CS pyrotechnic mix and 0.81 oz. of starter mix. Located in the center of each CS canister is a perforated flash tube. The base plug is held in place by three shear pins and three twist pins. The complete projectile assembly is free-fitted to a steel 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 increment 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, the closing plug is removed and a fuze assembled to the projectile 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 retaining band with the rifling of the weapon tube imparts spin to the projectile providing in-flight stability. Projectile functioning is dependent upon the fuze used and may function on impact (instantaneous or delay), function above ground either at a predetermined height based upon time of flight, or function in proximity with the target area. The fuze functions and ignites the black powder in the expelling charge. The flash from the expelling charge ignites the four CS canisters through the perforations in the flash tubes. Concurrently, the pressure from the ignition of the expelling charge shears the retaining pins, blows out the base plug and expels the burning canisters into the airstream. The CS pyrotechnic mixture in the canisters burns and emits irritating fumes for approximately 60 seconds.

Tabulated Data:

Complete round:

Type ----- Riot control, CS
 Weight ----- 42.0 lbs.
 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/ 1 red
 band and red
 markings (1
 yellow band with
 explosive burster)

Filler and weight ----- Starter mixture,
 riot mixture
 CS, 6.66 lbs.
 Fuze ----- MTSQ M548, MT
 M565

Propelling charge:

Cartridge case ----- M14 series:
 M14 ----- Brass, 5.9 lbs.
 (approx.)
 M14B1 ----- Steel, drawn;
 5.4 lbs. (approx.)
 M14B4 ----- Steel, 3 piece,
 spiral wrap 4.7 lbs.
 (approx.)

Percussion primer assembly:

	M28B2	M28A2
Primer & weight	M61, .00014 lb.	M61, .00014 lb.
Black powder:	Cl 1, MIL-P-223 (Note B)	Cl 1, MIL-P-223 (Note B)
Weight	.043 lb.	.043 lb.
Body	Steel, Type 2	Brass, Type 1

Performance:

(1) Using M52, M52A1 and M101/
 M101A1 howitzers.

Charge	Muzzle Velocity (fps)	Muzzle Velocity (mps)	Maximum Range (meters)	Maximum Range (yards)
1	650	198.1	3510	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 meters
 12,330 yds.
 Muzzle velocity ----- 472.4 mps
 1550 fps.

(2) Using M102 and M108 howitzers.

Charge	Muzzle Velocity (fps)	Muzzle Velocity (mps)	Maximum Range (meters)	Maximum Range (yards)
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 meters
 12,590 yds.
 Muzzle velocity ----- 494 mps
 1621 fps.

Temperature Limits:

Firing:
 Lower limit ----- -40° F
 Upper limit ----- +145° F

Storage:
 Lower limit ----- -40° F
 Upper limit ----- +145° F

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

*Packing Box:
 Weight ----- 120 lbs.
 Dimensions ----- 37-1/4 x 11-15/16
 x 7-19/32 in.
 Cube ----- 2.0 cu. ft.

*NOTE:

See SC for complete packing data including
 NSN's.

Shipping and Storage Data:

Quantity-distance Class ----- 4
 Storage compatibility group --- A
 DOT shipping class ----- B
 DOT designation ----- AMMUNITION
 FOR CANNON
 WITH CS PRO-
 JECTILES CLASS
 B DOT SPECIAL
 PERMIT NO. 5208
 DODAC ----- 1315-C468
 Drawing number ----- 9220225

Limitations:

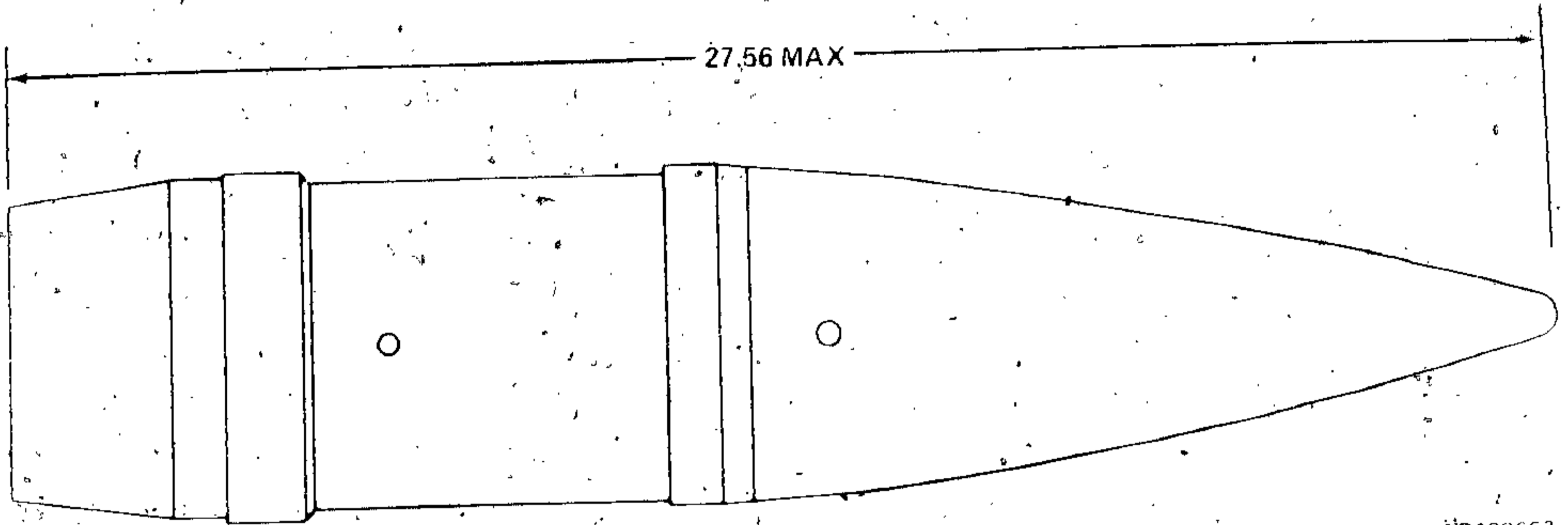
Do not fire this cartridge with the fuze set
 on the "S" shipping mark as issued, because
 fuze functioning after approximately 2 seconds
 may be anticipated. Do not attempt to reset
 the fuze until just before firing. Fuzes reset
 for firing, but not fired, should be reset on the
 "S" setting.

References:

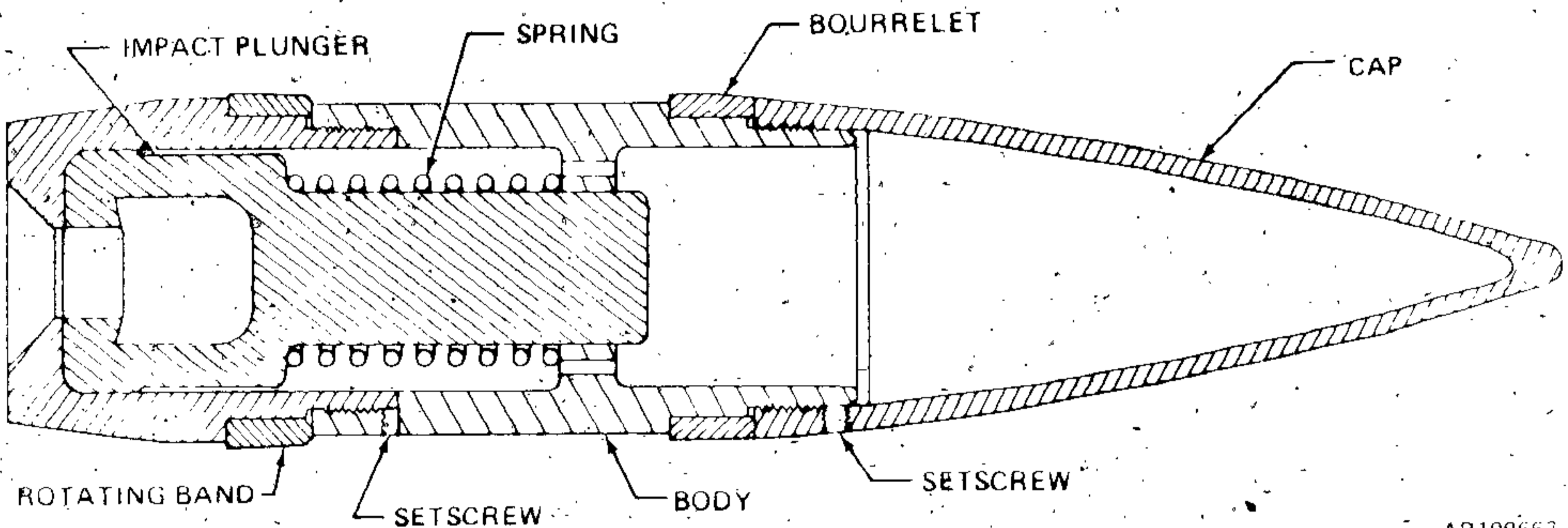
SC 1305/30-1L
 SB 700-20
 AMCP 700-3-3
 TM 9-1015-203-12
 TM 9-1015-234-12
 TM 9-1300-251-20
 TM 9-2350-217-10

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PROJECTILE, 155-MILLIMETER: DUMMY, M7 WITH CHARGE, PROPELLING; DUMMY, M2



AR199663



AR199662

Type Classification:

Std: OTCM- 36841 dtd 1958

Use:

This dummy projectile and dummy propelling charge are inert and are used for training troops in handling ammunition and loading weapons.

Description:

The dummy projectile has a bronze cap, a steel body, a bronze forward band (to simulate a bourrelet) and a bronze rear band (simulating a rotating band). In configuration, weight and center of gravity, the projectile resembles a service round. The body is hollow and contains

a spring-loaded impact plunger to assist in extraction from the weapon. Exterior markings indicate weapons with which the dummy projectile may be used. The dummy propelling charge is also inert and simulates a service charge in size and weight.

Functioning:

Since both projectile and propelling charge are inert, the only functioning involved is the action of the internal plunger in the projectile. When the round is rammed into the forcing cone of the cannon barrel, the plunger is pushed forward against the plunger spring. On rebound, the plunger strikes the internal base to loosen the projectile in the forcing cone and assist in extraction through the breech.

Difference Among Models:

Early production projectiles were intended for training with gun cannons only; recent production is suitable for loading in howitzers also.

Tabulated Data:

Complete round:

Type ----- Inert
 Cannon used with ----- Howitzers M1, M1A1, M45, M126, M126A1
 Guns M2, M2A1, M46

Projectile:

Body material ----- Cast steel

Weight ----- 95 lbs.

Length ----- 27.56 in.

Color:

Old mfg. ----- Blue or black w/white markings

New mfg. ----- Bronze w/white markings

Propelling charge:

Weight ----- 7.37 lbs.

Length ----- 11.0 in.

Primer ----- Expedited M82 or MK2A4 depending on weapon used with

Fuze ----- None

* Packing ----- 1 projectile in wooden crate; 2 propelling charges M2 per metal container M13A2

*Crate:

Weight ----- 106 lbs.

Dimensions ----- 33-3/8 x 20-1/8 x 10-1/8 in.

Cube ----- 1.98 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance

class ----- 00

Storage compatibility

group ----- N/A

DOT shipping class ----- 00

DOT designation ----- PROJECTILE

NON-EXPLOSIVE

DODAC:

Dummy Projectile --- 1320-D553

Dummy Propelling

Charge ----- 1320-D539

Assembly Dwg. Nos.:

Dummy Projectile --- 72-1-69

Dummy Propelling

Charge ----- 72-2-54

Limitations:

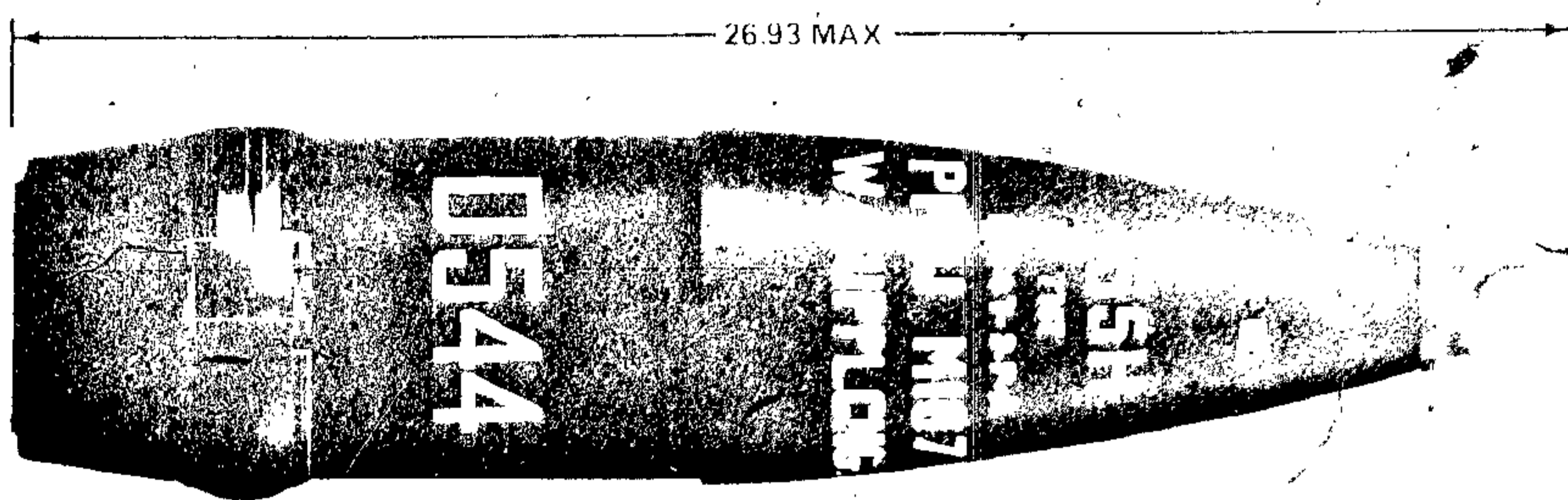
References:

SC 1305/30-IL

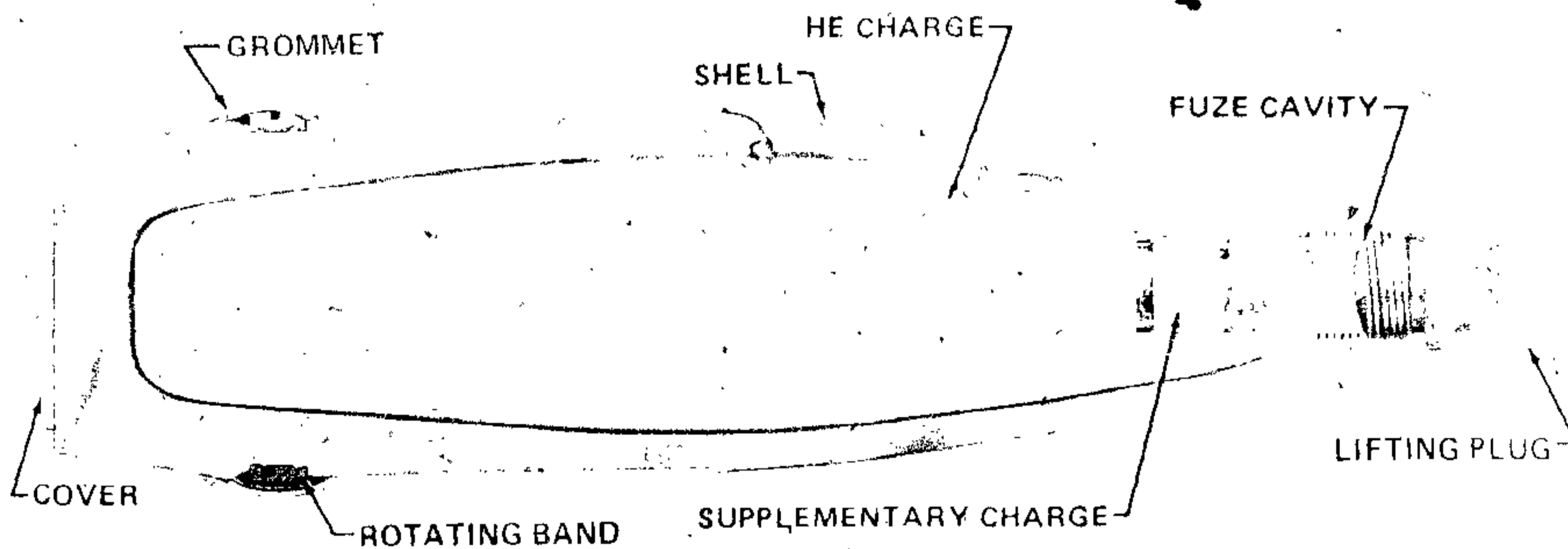
SB 700-20

AMCP 700-3-3

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



AR199685



AR199684

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 boat tail 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 lbs. is slightly greater than in the deep cavity projectile.

Tabulated Data

WEIGHT ZONES			Marking
Zone	Loaded Proj (W/O Fuze, W/O plug) Over (Lbs.)	Up To&Incl.	
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 lbs
 Comp B ----- 15.4 lbs

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
 MTSQ: M564, M520 series
 Prox: M514 series, M514A1E1 (M728)

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 ----- 797 lbs
 Dimensions ----- 27-1/8 x 13-5/8 x 32 in.
 Cube ----- 6.8 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class-- 6
 Storage compatibility group ----- A
 DOT shipping class ----- A
 DOT designation ----- EXPLOSIVE PROJECTILES

DODAC:
 Deep Cavity ----- 1320-D544

Normal Cavity
 Assembly Dwg No,
 Deep Cavity

1320-D571

921052

7, M4A2, white bag	562.4	14600	772.5
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Ballistics:

Cannon M1, M1A1, M45:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
1, M3, green bag	207.3	3900	774.4
2, M3, green bag	234.7	4800	698.6
3, M3, green bag	258.2	6100	729.2
4, M3, green bag	310.9	7800	749.6
5, M3, green bag	371.9	9700	760.4
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

Cannon M126/M126A1:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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	739.9
4, M3A1, green bag	317.0	8200	744.1
5, M3A1, green bag	374.9	9800	748.2
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

Cannon M185:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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 (mtrs)	Elevation (mils)
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

TM 43-0001-28

References:

AMCP 700-3-3

SC 1305/30-IE

SB 700-20

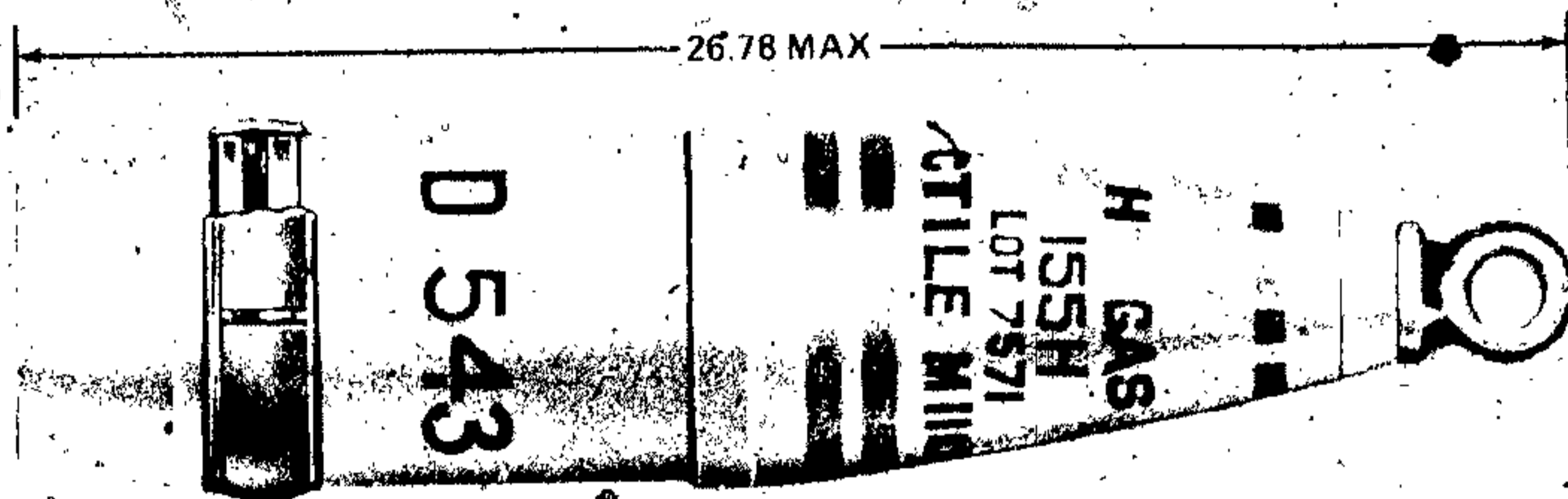
TM 9-1025-200-12

TM 9-1300-251-20

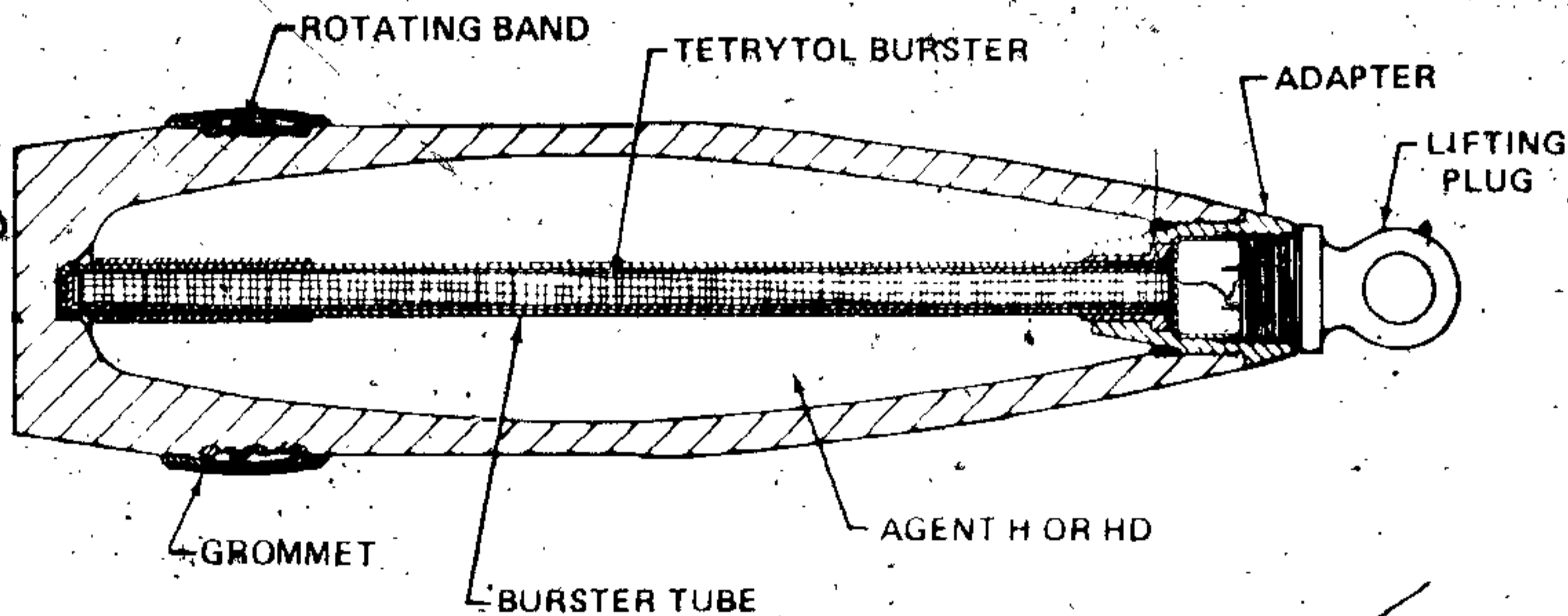
TM 9-2350-217-10

TM 9-2350-217-10N

PROJECTILE, 155 MILLIMETER: AGENT H/HD, M110



AR199683



AR199682

Type Classification:

Std. OTCM 36841. dtd 1958

Use:

This projectile is fired from 155mm howitzers to produce a toxic effect on personnel and to contaminate habitable areas.

Description:

The projectile is a hollow steel casing containing a burster extending through the center. The burster tube is loaded with tetrytol and the

remaining space within the projectile is filled with 11.7 pounds of the Agent H or 9.7 pounds of Agent HD. For shipping and handling, a lifting plug is installed in the fuze cavity in the nose. A rotating band encircles the projectile case near the base and is protected by a grommet to be removed before loading the projectile in the weapon. A FD fuze is normally used with this projectile.

Functioning:

When the weapon is fired, the burning propellant generates rapidly expanding gases to propel the projectile through the barrel with the velocity required to reach the target. The soft alloy,

of the rotating band engages the barrel rifling to impart spin to the projectile for stability in flight. The rotating band also forms a seal to prevent escape of gas pressure past the projectile. The PD fuze functions on impact to explode the burster. The burster ruptures the projectile case and disperses the agent.

Tabulated Data:

WEIGHT ZONES
Loaded Shell Without Fuze

Zone	Over Pounds H	Up to & Including Pounds H	Mark H
2	90.0	91.3	□ □
3	91.1	92.4	□ □ □
4	92.2	93.5	□ □ □ □

Projectile:

Type ----- H/HD agent
 Weight w lifting plug ----- 94.59 lbs
 Length w lifting plug ----- 26.78 in.
 Cannon used with ----- M1, M1A1, M1A2, M45, M126, M126A1, M185, M199
 Body material --- Steel
 Color:
 Old mfg ----- Gray w/green markings and two green bands
 New mfg ----- Blue-gray w/green markings, two green bands and one yellow band
 Filler and weight:
 H ----- 11.7 lbs
 or HD ----- 9.7 lbs
 Primers ----- M82 (M126, M126A1, M199, M185 cannon) MK2A4 (M1, M1A1, M1A2, M45 cannon)
 Fuzes ----- PD M557; MTSQ, M520, M564

Temperature Limits:

Handling and Storage:
 Lower limit ----- -65° F
 Upper limit ----- +125° F
 Packaging ----- 8 projectiles on pallet

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*Pallet:

Weight ----- 797 lbs
 Dimensions ----- 27-1/8 x 13-5/8 x 32 in.
 Cube ----- 6.8 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 5
 Storage compatibility group ----- A
 DOT shipping class -- A
 DOT designation ----- EXPLOSIVE PROJECTILES
 DODAC ----- 1320-D543
 Assembly Dwg No -- 75-14-317

Ballistics:

Cannon M1, M1A1, M45:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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

Cannon M126/M126A1:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
1, M3 A1, green bag	207.3	3900	729.2
2, M3 A1, green bag	236.2	4900	710.1
3, M3 A1, green bag	275.8	6500	739.3
4, M3 A1, green bag	317.0	8200	744.1
5, M3 A1, green bag	374.9	9800	743.2
3, M4 A2, white bag	269.7	6200	700.7
4, M4 A2, white bag	313.9	8000	700.8
5, M4 A2, white bag	373.4	9800	778.8
6, M4 A2, white bag	461.8	12000	746.2
7, M4 A2, white bag	562.4	14600	772.5

Cannon M185:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
1, M3 A1, green bag	211.8	4000	673.6
2, M3 A1, green bag	237.7	5000	722.4
3, M3 A1, green bag	277.4	6500	690.4
4, M3 A1, green bag	318.5	8300	760.9
5, M3 A1, green bag	374.9	9800	717.2
3, M4 A2, white bag	292.6	7200	734.9
4, M4 A2, white bag	336.8	8900	736.8
5, M4 A2, white bag	393.2	10300	756.1
6, M4 A2, white bag	475.5	12400	758.4
7, M4 A2, white bag	565.4	14800	760.3
8, M119, white bag	684.3	18100	781.5

Cannon M199:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
1, M3 A1, green bag	212.8	4000	673.6
2, M3 A1, green bag	239.8	5000	722.4
3, M3 A1, green bag	280.8	6500	690.4
4, M3 A1, green bag	322.9	8300	760.9
5, M3 A1, green bag	380.1	9800	717.2
3, M4 A2, white bag	296.5	7200	734.9
4, M4 A2, white bag	340.9	8900	736.8
5, M4 A2, white bag	398.0	10300	756.1
6, M4 A2, white bag	482.0	12400	758.4
7, M4 A2, white bag	574.3	14800	760.3
8, M119/M119A1	684.3	18100	781.5

Limitations:

This ammunition is not to be fired or stored at temperatures higher than 125°F because of the tetrytol burster.

References:

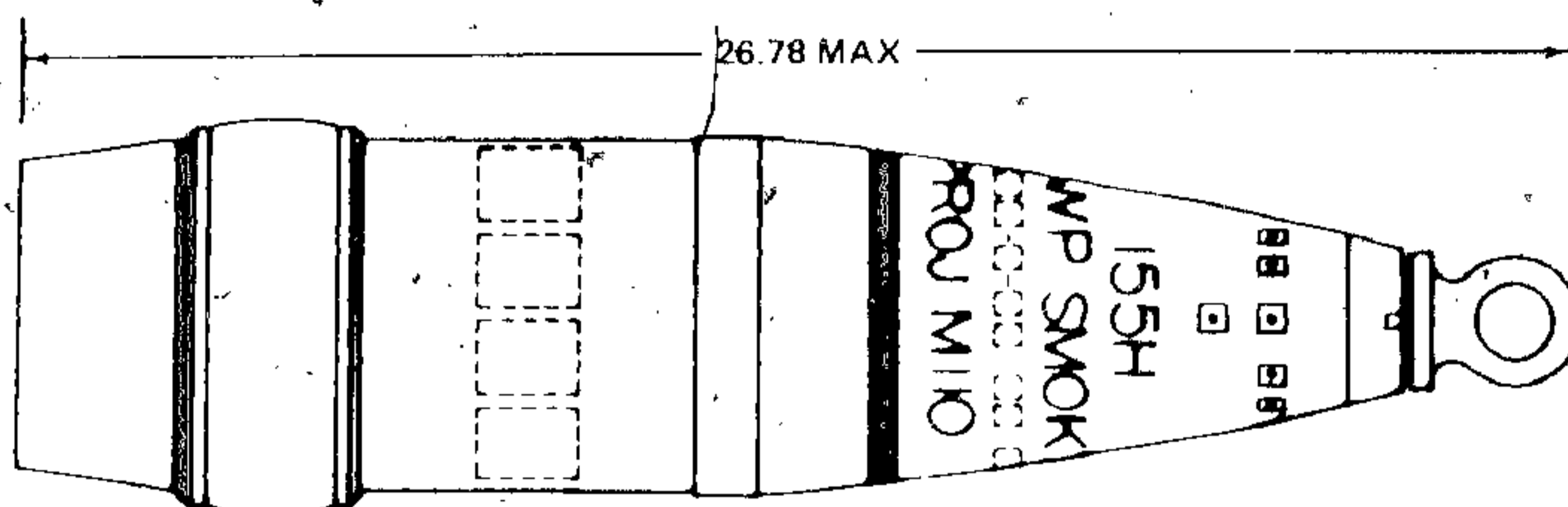
AMCP 700-3-3
 SC 1305/30-1L
 SB 700-20
 TM 9-1025-200-12
 TM 9-1300-251-20
 TM 9-2350-217-10

TM 43-0001-28

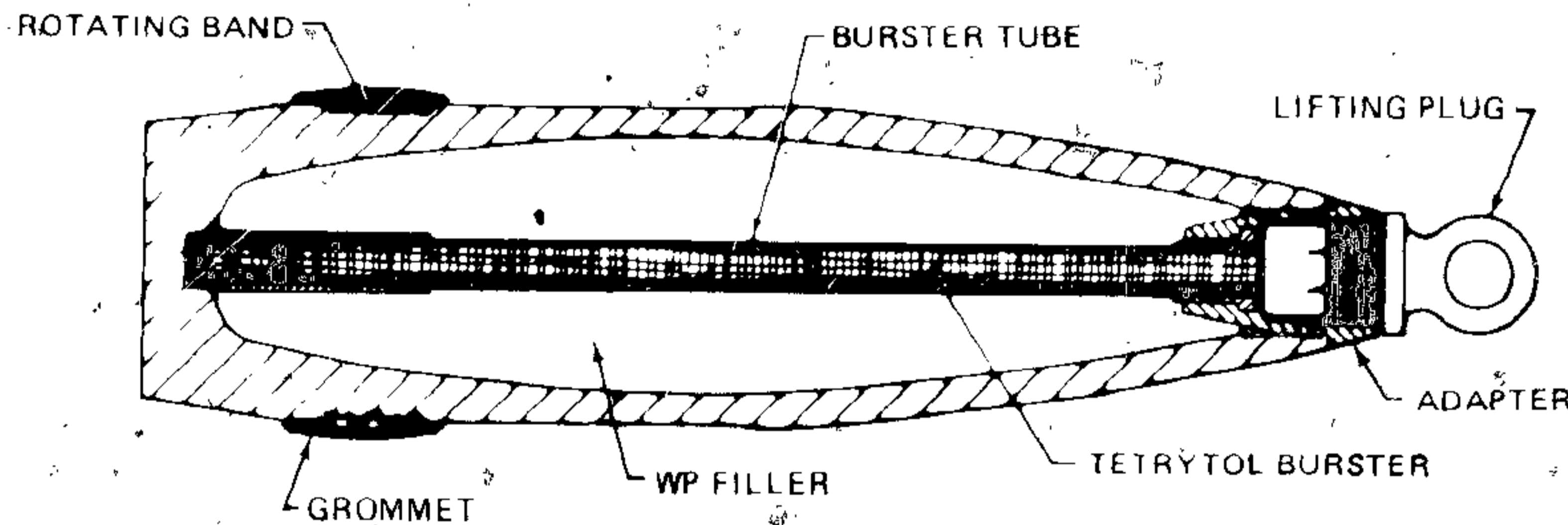
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3-80 Change 5

PROJECTILE, 155 MILLIMETER: SMOKE WP, M110 AND M110A1



AR199678



AR199678

Type Classification:

Std

Use:

These projectiles are fired from 155mm howitzers to produce screening smoke. The projectiles also have a slight incendiary effect.

Description:

The 155mm Smoke WP, M110, and M110A1 projectiles consist essentially of a steel shell

(casing) containing an M6 burster loaded with tetrytol running through the center of the shell, and an explosive filler of 15.6 pounds WP (white phosphorus). An adapter in the nose of the projectile is threaded to receive the fuze. For shipping and handling, a lifting plug is installed in the nose fuze cavity. A rotating band encircles the projectile case near the base and is protected by a grommet for shipment and handling. The grommet is to be removed before loading the projectile in the weapon. A PD fuze is normally used with these projectiles. Except for the WP contents, these projectiles are exactly the same as the projectile H BD.

M110, and the ballistics and configuration are the same as the HE, M107 projectile.

Functioning:

When the weapon is fired, the burning propellant charge generates rapidly expanding gases to propel the projectile through the barrel and to the velocity required to reach the target. The rotating band engages the barrel rotating band also provides a seal to prevent leakage of gas pressure past the projectile. When the fuze functions, the burster is detonated to rupture the projectile case and disperse the contents. White phosphorous ignites spontaneously upon contact with air and produces a dense white smoke.

Tabulated Data:

WEIGHT ZONES

Loaded Projectile (W/O Fuze)
(W/O Lifting Plug)
(W/O Grommet)

Zone	Over Pounds	Up To & Incl Pounds	Marking
5	93.3	94.6	□ □ □ □ □
6	94.4	95.7	□ □ □ □ □ □
7	95.5	96.8	□ □ □ □ □ □ □
8	96.6	97.9	□ □ □ □ □ □ □ □

Complete round:

Type ----- Smoke WP
 Weight w/lifting plug ----- 98.49 lbs nominal
 Length w/lifting plug ----- 26.78 in max
 Cannon used with ----- M1, M1A1, M1A2, M45, M126, M126A1, M185, M199.

Filler weight ----- 15.6 lbs WP
Projectile:
 Body material --- Steel
 Color ----- Light green w/yellow band and light red markings
 Propelling charge- M3/M4 series, M119/M119A1

Primers ----- MK2A4 (M1, M1A1, M1A2, M45 cannon)
 M82, (M126, M126A1, M185, M199 cannon)

Fuze ----- PD M557; MTSQ, M520, M564

Temperature Limits:

Firing and Storage:
 Lower limit ---- -65° F
 Upper limit ---- +125° F
 *Packing ----- 8 projectiles on pallet
 *Pallet:
 Weight ----- 830 lbs
 Dimensions ----- 27-1/8 x 13-5/8 x 32 in.
 Cube ----- 6.8 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 5
 Storage compatibility group ----- A
 DOT shipping class --- A
 DOT designation ----- EXPLOSIVE PROJECTILES
 DODAC ----- 1320-D550
 Assembly Dwg. No. --- 9210424

Ballistics:

Cannon M1, M1A1, M45:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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

Cannon M126/M126A1:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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	739.2
4, M3A1, green bag	317.0	8200	744.1
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 (mtrs)	Elevation (mils)
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 (mtrs)	Elevation (mils)
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

Limitations:

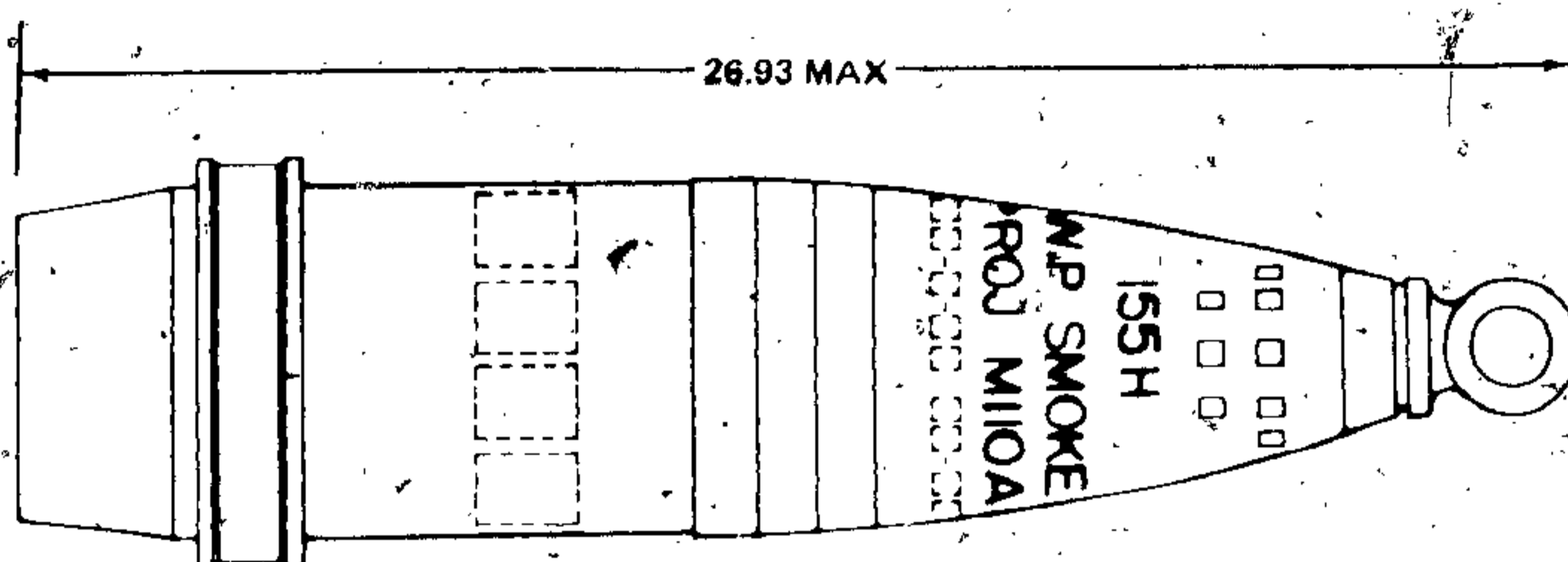
This ammunition is not to be loaded or stored at temperatures higher than 125°F because the tetrytol burster is unstable at higher temperatures. Additionally, projectiles should be stored and transported on their bases when temperatures exceed 111.4°F, the melting point of WP, to avoid cavities in the filler.

TM 43-0001-28

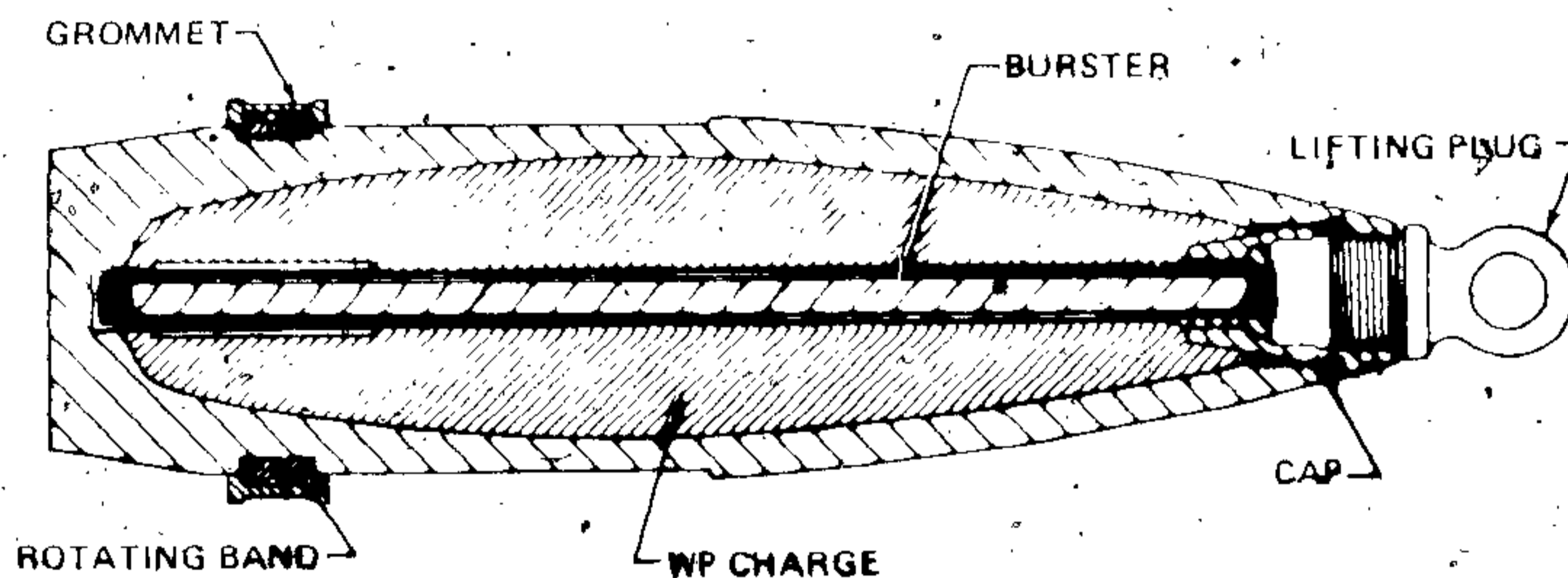
References:

AMCP 700-3-3
SC 1305/30-IL
SB 700-20
TM 9-1025-200-12
TM 9-1300-251-20
TM 9-2350-217-10
TM 9-2360-217-10N

PROJECTILE, 155 MILLIMETER: SMOKE WP, M110A2 (M110E3)



AR199681



AR199680

Type Classification:

Std AMCTC 9019 dtd 1972

Use:

This projectile is fired from 155mm howitzers to provide screening smoke. The projectile also has a slight incendiary effect.

Description:

The projectile is essentially a steel shell filled with 15.6 pounds of white phosphorous

with an M54A1 burster extending through the center, and an adapter in the nose of the projectile is threaded to receive the fuze. The burster tube is made from high strength aluminum alloy and is filled with Composition B5. An aluminum plug seals the base of the tube; and the tube is secured in the projectile well by a threaded cap assembled below the fuze well cap. For shipment and handling, a lifting plug is installed in the fuze cavity. A rotating band encircles the projectile near the base and is protected by a grommet to be removed before loading the projectile in the weapon. A PD fuze is normally used with this

projectile, although an NTSQ fuze may also be employed. Except for the WP contents, this projectile is the same as the projectile H/HD M110, and the ballistics are the same as the HE M107 projectile.

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 target. The rotating band engages the barrel rifling to impart spin to the projectile for stability in flight. The fuze normally installed functions on impact and detonates the burster. The burster ruptures the projectile case and disperses the WP filler. White phosphorous ignites spontaneously upon contact with air and produces a dense white smoke.

Difference Between Models:

Model M110A2 has an improved burster providing greater high temperature tolerance than the tetrytol bursters used in previous models of the WP, M110-series.

Tabulated Data:

WEIGHT ZONES
Loaded-projectile (w/o fuze)

Zone	Over Pounds	Up to & Incl Pounds	w/o lifting plug w/o grommet Marking
5	93.3	94.6	□ □ □ □ □
6	94.4	95.7	□ □ □ □ □ □
7	95.5	96.8	□ □ □ □ □ □ □
8	96.6	97.9	□ □ □ □ □ □ □ □

Complete round:

Type ----- Smoke WP
 Weight w/lifting plug ----- 98.49 lbs nominal
 Length w/lifting plug ----- 26.93 in. max
 Cannon used with -- M1, M1A1, M1A2, M45, M126, M126A1, M185, M199

Projectile:

Body material ----- Steel

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Color ----- Light green w/ yellow band and light red markings

Filler and weight ----- White phosphorous, 15.6 lbs

Propelling charge ----- M3/M4 series, M119/M119A1

Primer ----- MK2 A4 (M1A1, M1A2, M45, cannon) M82 (M126, M126A1, M185 cannon)

Fuzes ----- PD, M557, MTSQ, M564, M520 series

Temperatures Limits:

Firing and Storage:

Lower limit ----- -65° F

Upper limit ----- +145° F

*Packing ----- 8 projectiles on pallet

*Pallet:

Weight ----- 830 lbs

Dimensions ----- 27-1/8 x 13-5/8 x 32 in.

Cube ----- 6.8 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class- 5

Storage compatibility group ----- A

DOT shipping class ----- A

DOT designation ----- EXPLOSIVE PROJECTILES

DODAC ----- 1320-D550

Assembly Dwg No ----- 9217030

Ballistics:

Cannon M1, M1A1, M45:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
1, M3, green bag	307.3	3900	774.4
2, M3, green bag	234.7	4800	698.6
3, M3, green bag	268.2	6100	729.2

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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

Cannon M126/M126A1:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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
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 (mtrs)	Elevation (mils)
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	374.2	98000	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 (mtrs)	Elevation (mils)
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

Limitations:

When temperatures are anticipated to approach 111.4° F, the melting point of WP, store and transport projectiles on their bases to avoid cavities in the projectile filler.

TM 43-0001-28

References:

AMCP 700-3-3

SC 1305/30-IL

SB 700-20

TM 9-1025-200-12

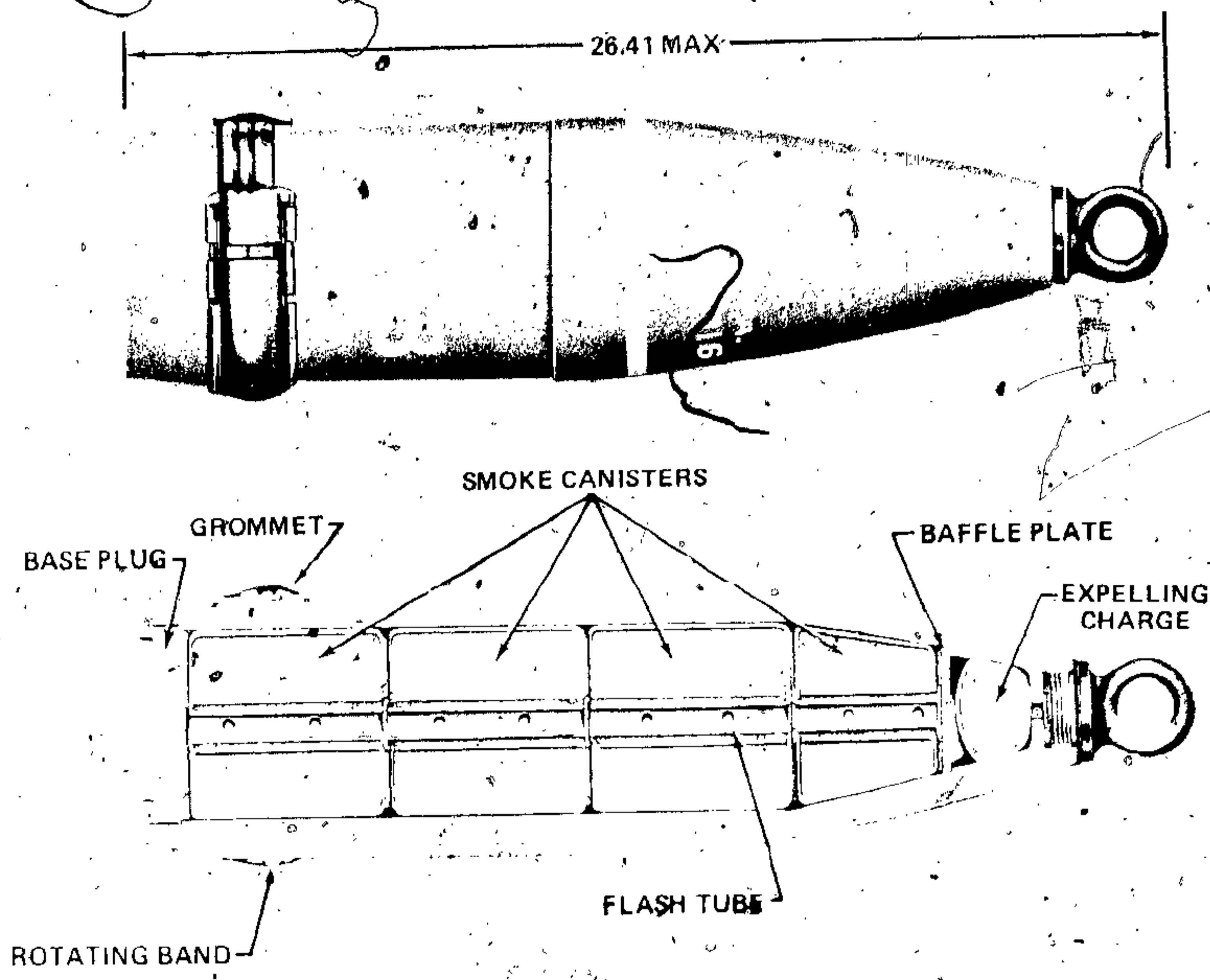
TM 9-1300-251-20

TM 9-2350-217-10

TM 9-2350-217-10N

3-88 Change 5

PROJECTILE, 155 MILLIMETER: SMOKE BE. M116 AND M116B1, HC AND COLORED



Type Classification:

Std OTCM 36841 dtd 1958

Use:

The projectile is fired from 155mm howitzers and is used for screening, spotting, or signalling.

Description:

This base-ejection type projectile is a hollow steel shell containing four canisters of chemical

smoke compound. The canister filler may be either hexachloroethane-zinc (HC) or a smoke mixture in colors of green, red or yellow. The canisters are stacked within the projectile and each has a perforated central tube so that in the stack a flash tube is continuous through the contents. The front canister is cone-shaped to conform to the curvature of the projectile case. An expelling charge of black powder is contained in the nose of the projectile under the fuze cavity. The fuze cavity is fitted with a lifting ring lug for shipment and handling. A baffle plate with a central hole near the flash tube separates the expelling charge from the first smoke canister. A

rotating band with a protective grommet for shipment and handling encircles the projectile near the base. The base is closed with a metal closure disk and threaded plug.

Functioning:

When the weapon is fired, the burning propelling charge generates rapidly expanding gases to propel the projectile through the barrel with the velocity required to reach the target. The rotating band engages the barrel rifling to impart spin to the projectile. The rotating band also forms a seal to prevent leakage of gas pressure past the projectile. Functioning of the fuze ignites the expelling charge. The expelling charge flashes through the central tube to ignite the smoke canisters, blow off the base, and expel the canisters. An effective smoke cloud is produced within 30 seconds, and maximum smoke emission occurs in about one minute.

Difference Among Models:

The expelling charge in Model M116B1 (.34 pound of black powder) is contained in a polyethylene cup instead of in a cloth bag as in M116 (.29 pound of black powder). Also, the copper closure disk used in Model M116 has been replaced with a steel disk in the newer model.

Tabulated Data:

Zone	WEIGHT ZONES		Marking (Zone squares)
	Over Pounds	Up to & Incl Pounds	
2	90.7	92.0	□ □
3	91.8	93.1	□ □ □
4	92.7	94.4	□ □ □ □
5	94.0	95.3	□ □ □ □ □

Weight Zone applies to HC canister loaded projectiles without fuze, lifting plug, gasket and grommet.

Complete round:

Type	Smoke HC or colored
Weight as fired:	
HC	94.80 lbs
Colored	86.23 lbs
Length w/lifting plug	26.41 in nominal
Cannon used with	M1, M1A1, M1A2,

M45, M126, M126A1, M185

Projectile:

Body material-- Forged steel
 Color ----- Newer-Light green w/black markings
 (Colored smoke - Color indicated by a series of 3 C's)
 Older - Gray w/yellow markings

Filler and weight- HC: 25.84 lbs
 Colored smoke: 17.19 lbs

Propelling charge ----- M3/M4 series, M119
 Primers ----- MK2A4 (M1, M1A1, M1A2, M45 cannon)
 M82 (M126, M126A1, M185, cannon)

Fuzes ----- MT, M565; MTSQ, M501 series

Temperature Limits, Firing:

Lower limit ----- -40° F
 Upper limit ----- +125° F

Temperature Limits, 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:

	Colored Smoke	HC Loaded
Weight	727 lbs	802 lbs
Dimensions	27-1/8 x 13-5/8 x 32 in.	27-1/8 x 13-5/8 x 32 in.
Cube	6.7 cu ft	6.7 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 2

Storage compatibility

Group -----
 OF shipping class -----
 OF designation -----

A
 B
**SPECIAL FIRE-
 WORKS, HANDLE
 CAREFULLY,
 KEEP FIRE
 AWAY**

DODAC:

HC ----- 1320-D548
 Red ----- 1320-D549
 Yellow ----- 1320-D551
 Green ----- 1320-D547
 Violet ----- 1320-D554
 Assembly Dwg No ----- 9227988

Cannon M126/M126A1:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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
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

Ballistics:

Cannon M1, M1A1, M45:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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

Cannon M185:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
1, M3A1, green bag	212.8	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

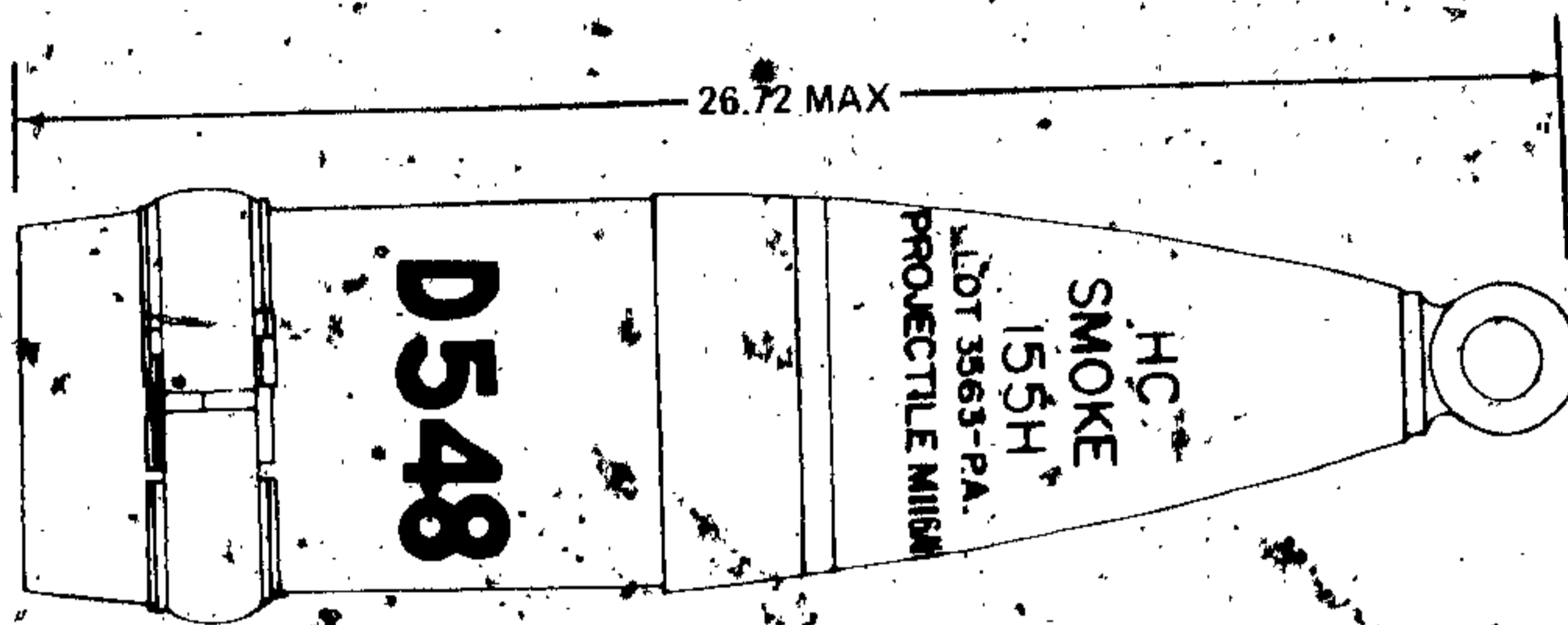
Cannon M199:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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
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

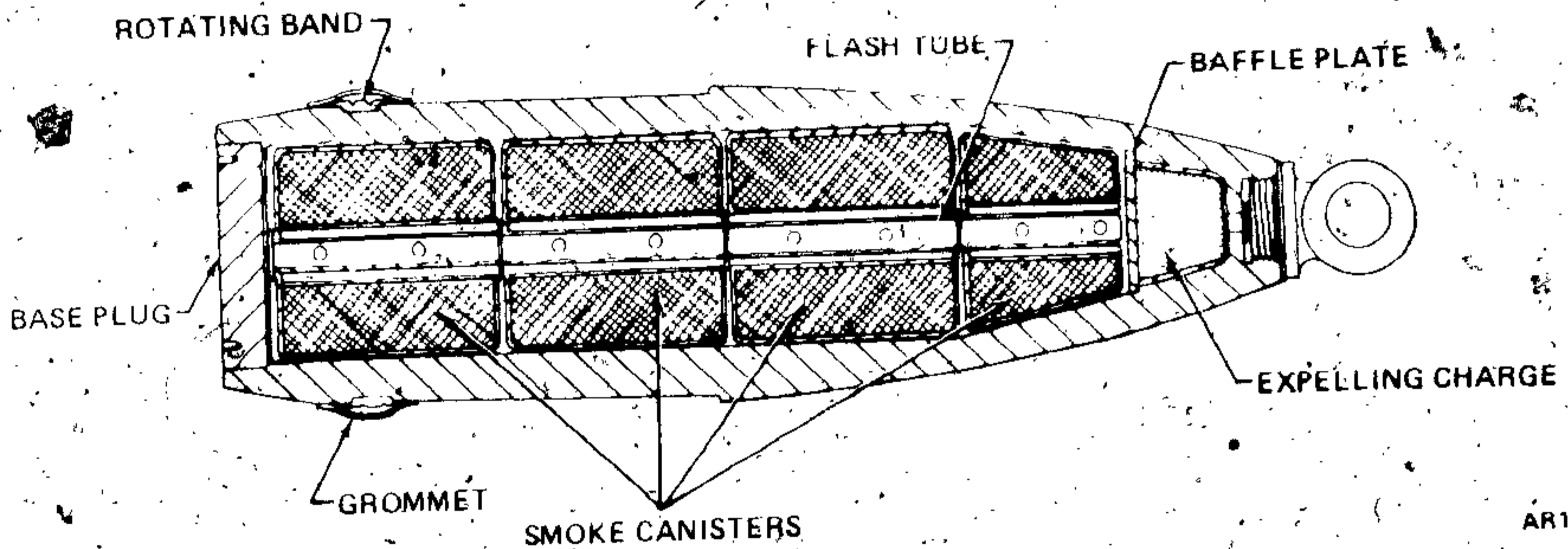
References:

- AMCP 700-3-3
- SC 1305/30-IL
- SB 700-20
- TM 9-1025-200-12
- TM 9-1300-251-20
- TM 9-2350-217-10
- TM 9-2350-217-10N

PROJECTILE, 155 MILLIMETER: SMOKE, BE, M16A1



AR 199675-A



AR199674

Type Classification:

Std MSR 04786002.

Use:

This projectile is fired from 155mm howitzers and is used for screening, spotting, and signalling.

Description:

This base-ejection type projectile is basically similar to Models M116 and M116B1, but with some design changes to improve reliability. The projectile is a hollow steel casing containing four canisters of chemical smoke compound.

The canister filler is HC (white smoke). The canisters are stacked within the projectile and separated by aluminum spacers. A metal ring supports the expelling charge of 0.34 lb. of black powder in the nose of the projectile under the fuze cavity. Each canister has a perforated tube through the center. A baffle plate, between the top canister, and the expelling charge, has a central hole. A flash tube is thus formed from the expelling charge through the length of the stacked canister. The fuze cavity will accommodate MT or MTSQ fuzes. For shipment and handling, the cavity has a lifting ring lug installed. A rotating band with a protective grommet for shipment and handling encircles the projectile near the base. The base is closed with a metal closure disk and a threaded base plug.

Functioning:

When the weapon is fired, the rotating band engages the barrel rifling to impart spin to the projectile. The rotating band also forms a seal to prevent leakage of gas pressure past the projectile. The burning propellant charge generates rapidly expanding gases to propel the projectile through the barrel with the velocity required to reach the target. Functioning of the fuze ignites the expelling charge which flashes through the central tube to ignite the smoke canisters. The expelling charge also blows off the base and expels the canisters. An effective smoke cloud is produced within 30 seconds, and maximum smoke emission occurs in about one minute.

Difference Among Models:

Models M116 and M116B1 have cardboard canister separators and a smaller fuze cavity. The size of the cavity limits choice of fuzes.

Tabulated Data:

Weight Zones:			
Zone	Pounds Over	Up to Incl Pounds ^b	Marking
2	90.1	91.4	□ □
3	91.2	92.5	□ □ □
4	92.1	93.8	□ □ □ □
5	93.4	94.7	□ □ □ □ □

Complete round:

Type ----- Smoke, HC or colored
 Weight with lifting plug ----- 94.7 lbs.
 Length with lifting plug ----- 26.72 in. nominal
 Cannon used with ----- M1, M1A, M1A2, M45, M126, M126A1, M185, M199

Projectile:

Body material ----- Steel
 Color ----- Light green w/ black markings (Color indicated by a series of 3 C's in color of smoke)

Filler and weight:

HC -----
 Colored smoke -----

Propelling charge ----- M3/M4 series, M119, M119A1
 Primers ----- MK2A4 (M1, M1A1, M1A2 cannon) M126, M126A1, M185, M199 cannon
 Fuzes ----- MT, M565; MTSQ, M577 & M548

Temperature Limits:

Firing:
 Lower limit ----- -40° F
 Upper limit ----- +125° 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 ----- 727 lbs.
 Dimensions ----- 27-1/8 x 13-5/8 x 32 in.
 Cube ----- 6.7 cu. ft.

*NOTE

See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 2
 Storage compatibility group ----- A
 DOT shipping class ----- B
 DOT designation ----- SPECIAL FIRE-WORKS, HANDLE CAREFULLY, KEEP FIRE AWAY

DODAC:

HC ----- 1320-D548

Assembly Dwg. No. ----- 8885162

Ballistics:

Cannon M1, M1A1, M45:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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

Cannon M126/M126A1:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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
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 (mtrs)	Elevation (mils)
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 (mtrs)	Elevation (mils)
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

TM 43-0001-28

References:

AMCP 700-3-3

SC 1305/30-IL

SB 700-20

TM 9-1025-200-12

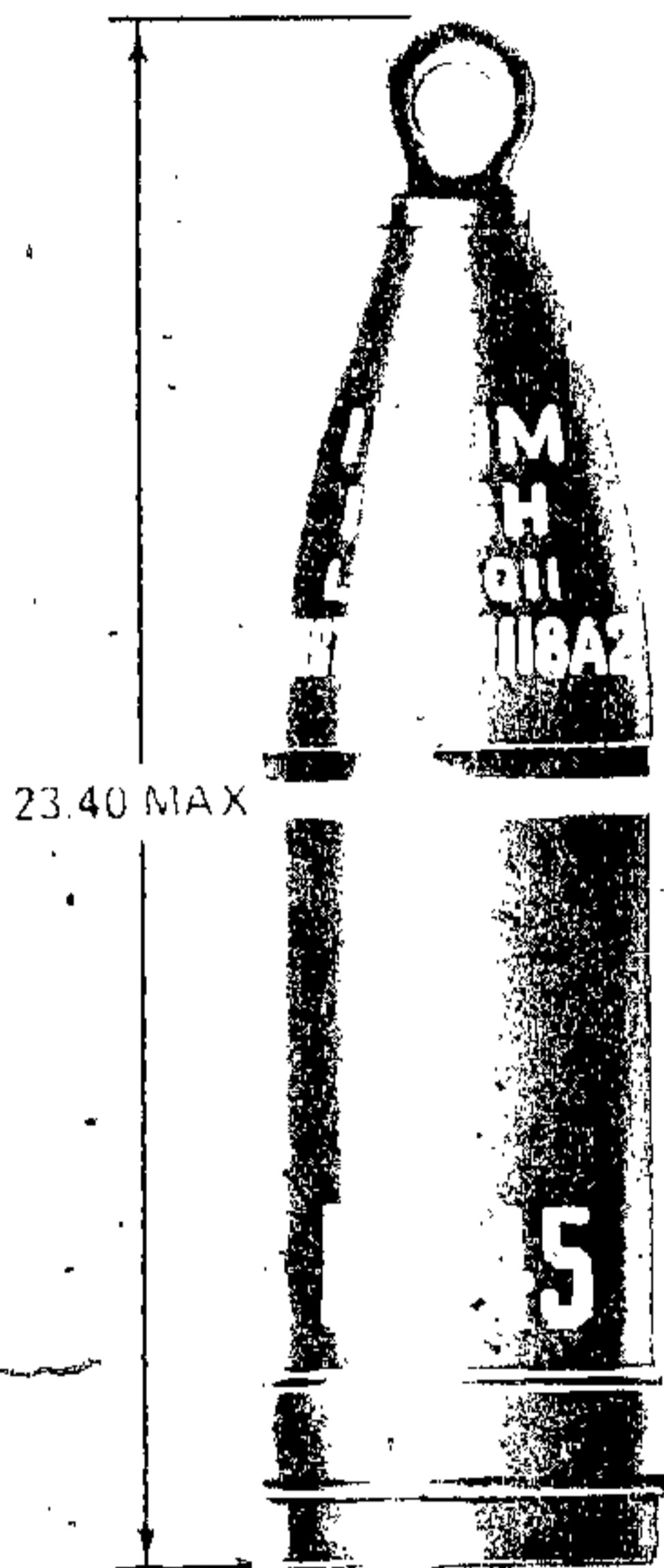
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TM 9-2350-217-10

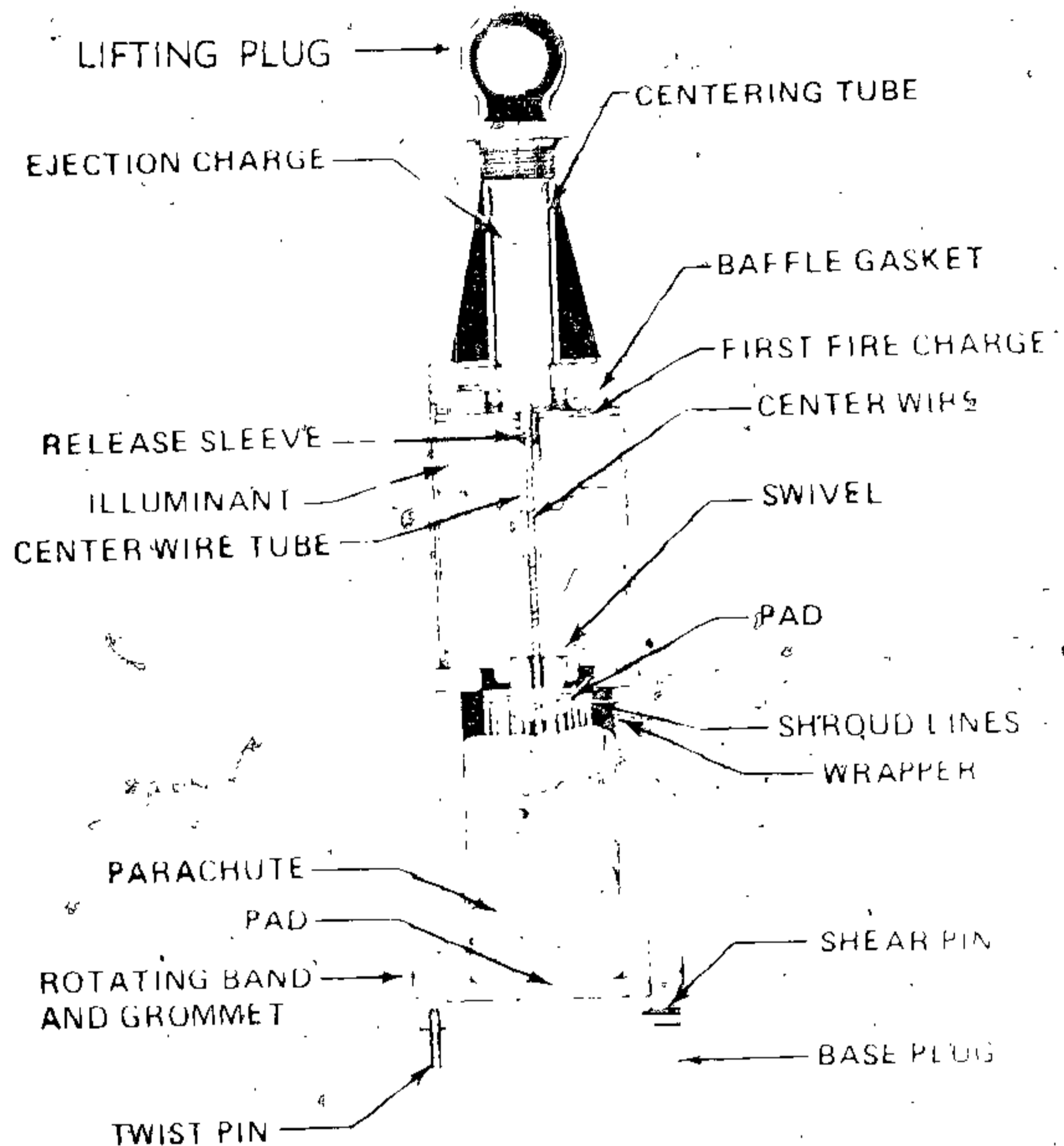
TM 9-2350-217-10N

3-96 Change 5

PROJECTILE, 155 MILLIMETER: ILLUM, M118 SERIES



AR199673



AR199672

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 is 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 attached 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 impart 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 lbs
 Length w lifting
 plug ----- 23.40 in max
 Cannon used with --- M1, M1A1, M45,
 M126, M126A1

Projectile:

Body material ----- Forged steel
 Color ----- Gray w/white
 markings
 (Later manu-
 facture - OD
 w/white mark-
 ings and a
 white band)

Filler and weight --- Illuminum com-
 position, 4.30
 lbs

Propelling charge ----- M3/M4 series
 Primer ----- MK2A4 (m1, M1A1,
 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 lbs
 Dimensions ----- 29-1/8 x 14-5/8 x
 28-1/2 in.
 Cube ----- 7.9 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class -- 2
 Storage compatibility
 group ----- E or N
 DOT shipping class ----- B
 DOT designation ----- SPECIAL FIRE-
 WORKS, HANDLE
 CAREFULLY.
 KEEP FIRE AWAY
 DODAC ----- 1320-D545
 Assembly Dwg No ----- 75-14-480

Ballistics:

Cannon M126/M126A1:

Charge	Muzzle Velocity met/sec	Max Range to Burst meters	Elevation mils	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

Charge	Muzzle Velocity met/sec	Max Range to Burst meters	Elevation mils	Fuze Setting sec
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 (mtrs)	Elevation (mils)
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

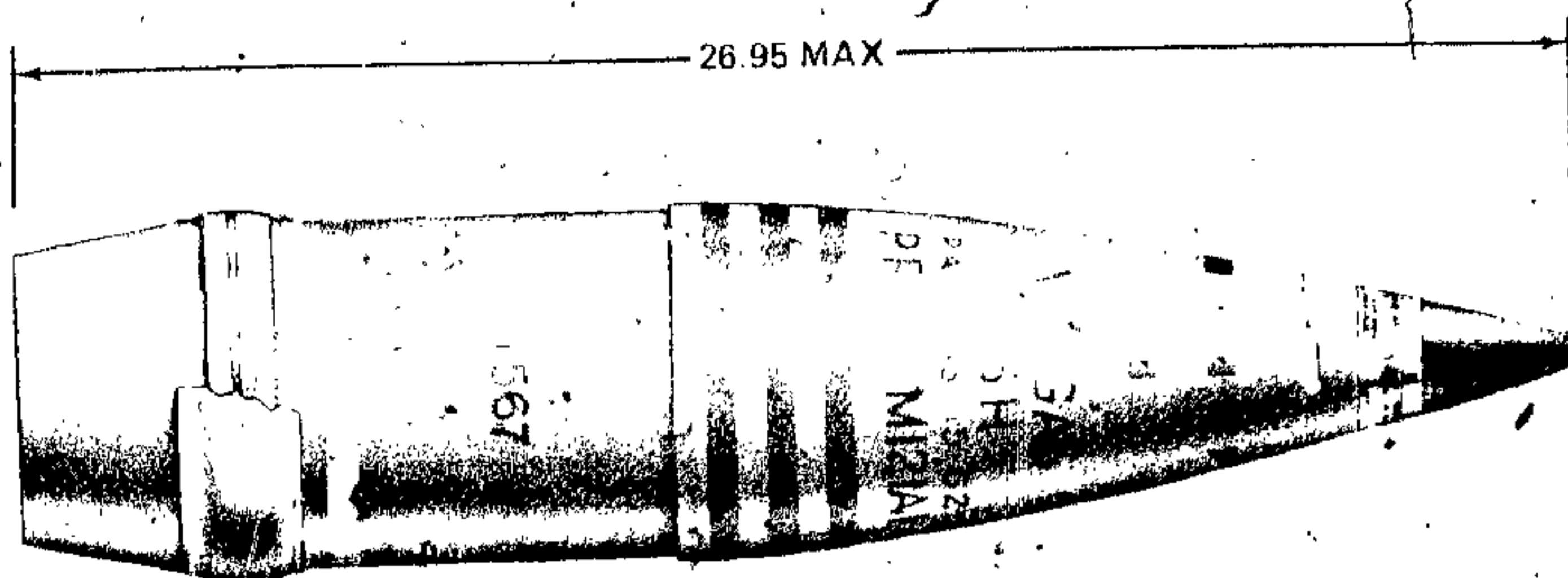
4, M3A1, green bag	322.9	8300	760.9
5, M3A1, green bag	380.1	9800	717.2
3, M4A2, white bag	296.5	7200	734.9
4, M4A2, white bag	340.9	8900	736.8
5, M4A2, white bag	398.0	10300	756.1
6, M4A2, white bag	482.0	12400	758.4
7, M4A2, white bag	574.3	14800	760.3
8, M119/ M119A1	684.3	18100	781.5

References:

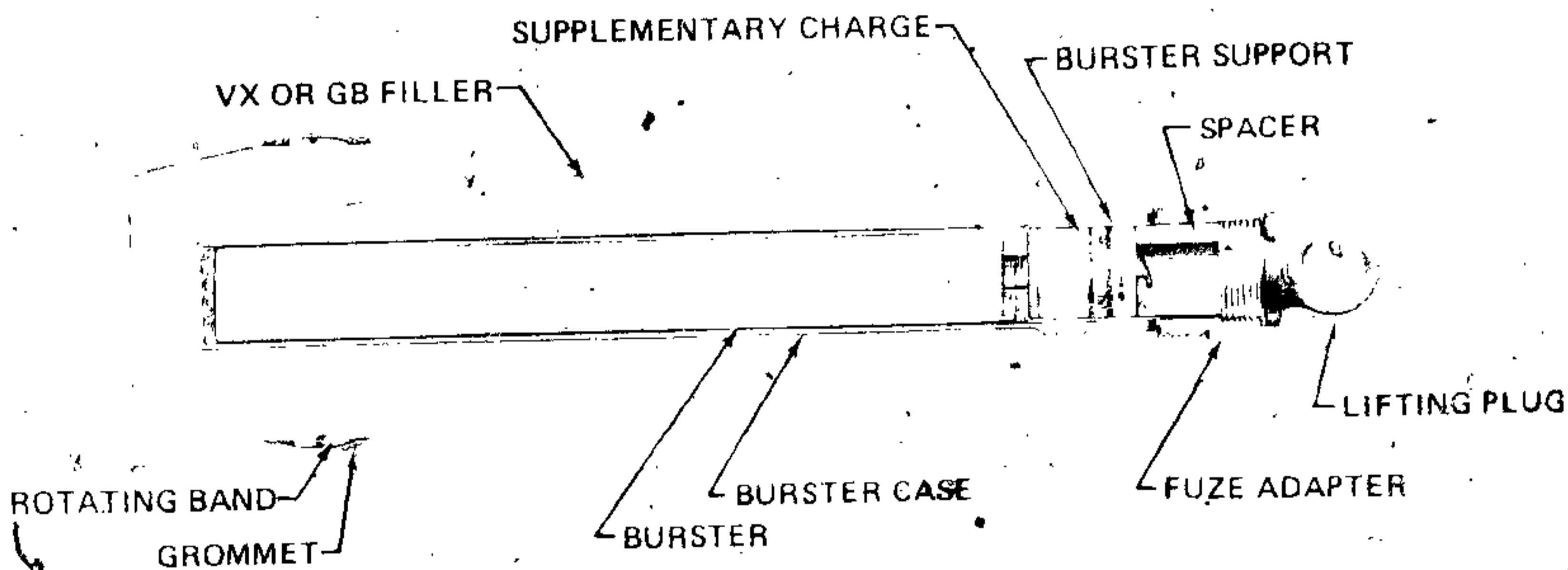
- AMCP 700-3-3
- SB 700-20
- SC 1305 30-1L
- TM 9-1025-200-12
- TM 9-1300-251-20
- TM 9-2350-217-10
- TM 9-2350-217-10N

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PROJECTILE, 155 MILLIMETER: VX (Persistent) or GB (Non-Persistent): M121A1



AR199671



AR199670

Type Classification:

Std OTCM 37870 dtd 1961

Use:

This projectile is used in 155mm howitzers to produce casualties. Projectiles filled with VX agent may also be used to contaminate habitable areas.

Description:

The projectile is a hollow, deep-cavity steel shell containing essentially a supplementary

charge, burster, and gas filler VX or GB. Burster M71 is a thin metal cylinder filled with Composition B extending through the center of Burster Casing M15. The remainder of the interior space of the projectile is filled with liquefied VX or GB agent. The neck of the burster tube seals the agent cavity. The nose of the steel projectile is closed with a threaded adapter to seal in the burster tube and supplementary TNT charge (0.3 pound), and also to provide a fuze receptacle. For shipment and handling, an adapter-type lifting plug is installed in the fuze cavity. A point-detonating or proximity fuze is installed before loading the weapon. When a proximity fuze is used,

the supplementary charge is removed. A rotating band encircles the projectile near the base and is protected by a grommet during shipment and handling.

Functioning:

When the weapon is fired, the burning propellant generates rapidly expanding gases to propel the projectile through the barrel with the velocity required to reach the target. The soft alloy of the rotating band engages the barrel rifling to impart spin to the projectile for stability in flight. The rotating band also forms a seal to prevent escape of gas pressure past the projectile. When a PD fuze is used, the fuze detonates the supplementary charge on impact. The supplementary charge detonates the burster which ruptures the projectile case and heats the agent so that dispersal is in the gaseous state. When a proximity fuze is employed detonation of the burster tube results directly from action of the fuze booster and occurs on approach to the target.

Difference Between Models:

Payload may be either 6.0 pounds of VX or 6.5 pounds of GB agent; type is specified in external marking.

Tabulated Data:

WEIGHT ZONES

Zone	W/O Lifting Plug, W/O Grommet Loaded Projectile		Marks
	Over Pounds	Up To & Incl Pounds	
2	90.0	91.3	□ □
3	91.1	92.4	□ □ □
4	92.0	93.7	□ □ □ □
5	93.3	94.6	□ □ □ □ □
6	94.4	95.7	□ □ □ □ □ □
7	95.5	96.8	□ □ □ □ □ □ □
8	96.6	97.9	□ □ □ □ □ □ □ □
9	97.7	99.0	□ □ □ □ □ □ □ □ □
10	98.8	100.1	□ □ □ □ □ □ □ □ □ □

Complete round:

Type ----- Agent VX (persistent) or GB (non-persistent)

Projectile:	
Weight -----	98.9 lbs
Length w/lifting plug -----	26.95 in max
Cannon used with --	M1, M1A1, M45, M126, M126A1, M185, M199
Body material ----	Steel
Color:	
GB loading -----	Gray w/green markings and one green band (Later manufacture - three green bands).
VX loading:	
Old -----	Gray w/green markings and two green bands
New -----	Three green and one yellow band
Filler and weight ----	VX, 6.0 lbs or GB, 6.5 lbs
Propelling charges ----	M3 or M4 series
Primers -----	M82 or MK2A4 (depending on cannon model)
Fuzes -----	PD M557; Prox M514 series, M728

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 hrs/day)
*Packing -----	8 projectiles on pallet
*Pallet:	
Weight -----	831 lbs
Dimensions -----	27-1/8 x 13-5/8 x 32 in.
Cube -----	6.8 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ---- 5
 Storage compatibility group ----- A
 DOT shipping class ----- A
 DOT designation ----- **EXPLOSIVE PROJECTILES**
 DODAC:
 VX ----- 1320-D568
 GB ----- 1320-D542
 Assembly Dwg Nos:
 VX filling assembly ---- 8861031
 GB filling assembly ---- 8861030
 Loading assembly, VX or GB ----- 8861029

Ballistics:

Cannon M1, M1A1, M45:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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	12,000	759.8
7, M4A1, white bag	563.9	14,600	740.8

Cannon M126/M126A1:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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
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	12,000	746.2
7, M4A2, white bag	562.4	14,600	772.5

Cannon M185:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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	10,300	756.1
6, M4A2, white bag	475.5	12,400	758.4
7, M4A2, white bag	565.4	14,800	760.3
8, M119/M119A1	684.3	18,100	781.5

Cannon M199:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
1, M3A1, green bag	212.8	4000	673.6

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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

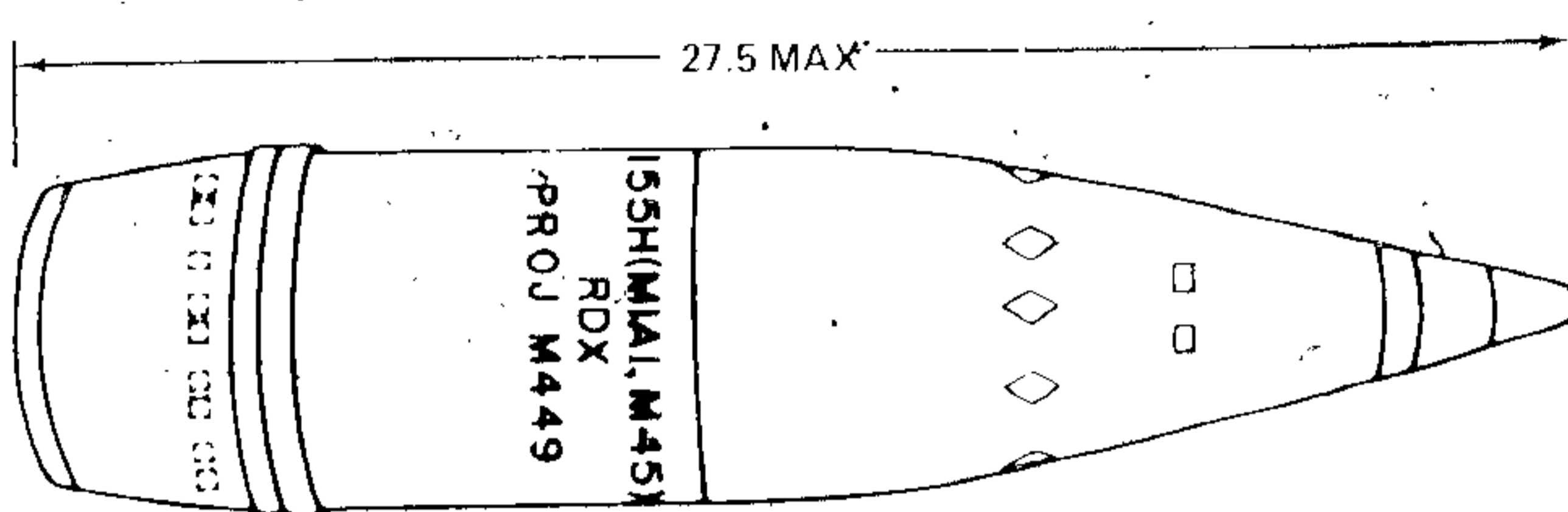
Limitations:

When contingency plans so require, these projectiles may be transported fully assembled with explosive components. Otherwise, assembly is prohibited except for storage and use.

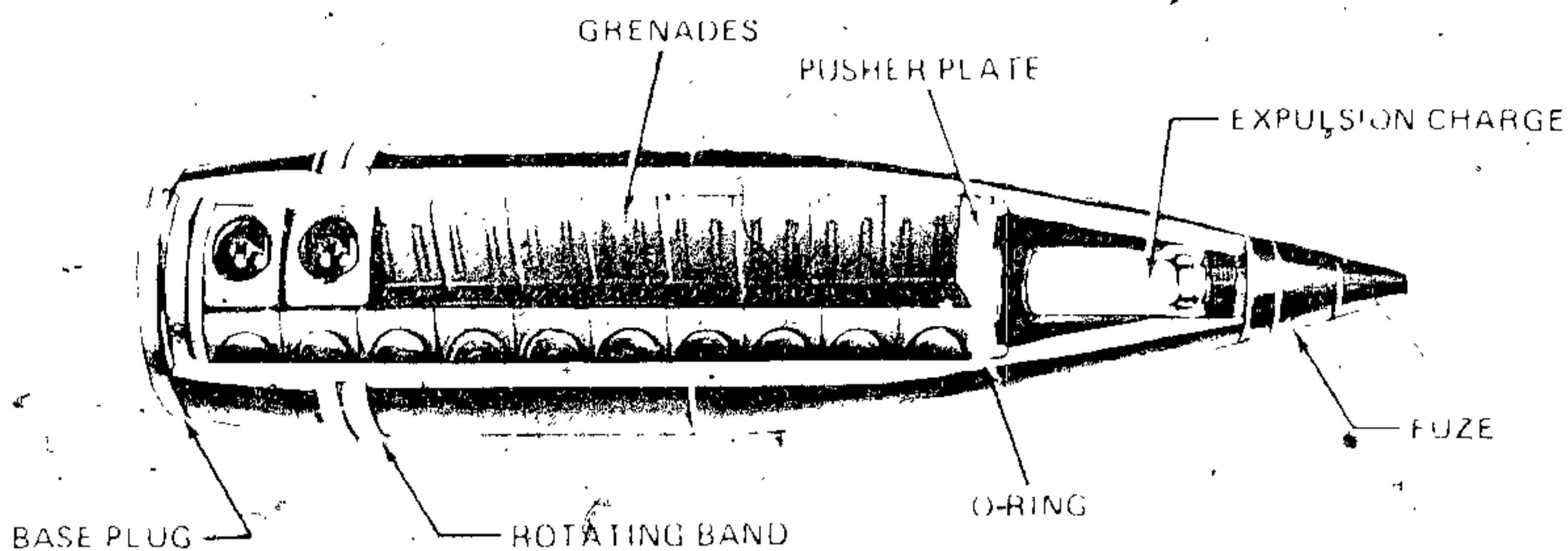
References:

SC 1305/30-1L
 SB 700-20
 AMCP 700-3-3
 TM 9-1025-200-12
 TM 9-1300-251-20
 TM 9-2350-217-10
 TM 9-2350-217-10N

PROJECTILE, 155 MILLIMETER: HE. M449 SERIES



AR199430



AR199430

Type Classification:

Std AMCTC 3982 dtd

Use:

This projectile is used to deliver a concentration of antipersonnel grenades.

Description:

This projectile is of the separate loading type. The fuze, propelling charge, and primer

are handled and loaded separately. The projectile is provided with an eyebolt lifting plug in place of a fuze for handling. The plug must be replaced by a fuze before the projectile is loaded. The projectile contains ten layers of grenades with six grenades in each layer. The grenades are contained by a base plug attached to the projectile with shear pins. An expulsion charge is contained in the nose of the projectile, and separated from the grenades by a pusher plate. The metal rotating band near the base of the projectile is protected during storage and handling by a removable grommet.

Functioning:

When the primer is detonated, the flash ignites the propelling charge producing gases which force the spin-stabilized projectile out of the gun tube and propel it to the target. The fuze, having been set to function at a pre-determined time in flight, initiates the expulsion charge ejecting the entire grenade load from the rear of the projectile. Centrifugal force disperses the grenades radially from the projectile line-of-flight. The M43 grenade is an air-burst submissile which is expelled from its housing on impact and projected upward to burst at 4 to 6 feet above the ground.

Tabulated Data:

Projectile:

Type -----	HE
Weight as fired:	
M449 -----	95.0 lbs
M449E1 -----	95.0 lbs
M449A1	
(M449E2) -----	93.5 lbs
Length:	
W/fuze -----	27.5 in.
W/lifting plug ---	26.9 in.
Body material -----	Forged steel
Color -----	Olive drab w/yel- low diamonds and markings

Filler and weight:

Number of grenades -----	60
Explosive, Comp. A5, each grenade -----	21.25 grams
Explosive, Comp. A5, each projectile -----	2.80 lbs

Type of grenades:

M449 -----	M43
M449E1 -----	M43E1
M449A1	
(M449E2) -----	M43A1, (M43E2)

Expulsion charge -----	M10 propellant, 30 grams
------------------------	-----------------------------

Components:

Propelling charge:

M3, M3A1 -----	Propellant M1, 5.0 lbs (Zones 1-5)
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M4, M4A1 -----	Propellant M1, 13.5 lbs (Zones 3-7)
M119/M119A1 --	Propellant M6, 20.5 lbs (Zone 3)
Primer -----	M82, MK2A4 or MK15
Fuze -----	MT, M565; *MTSQ, M548; or MTSQ, M577
Cannon used with---	M1, M1A1, M1A2, M45, M126, M126E1, M185 and M199

Performance (full charge):

Maximum range ---	14,800 meters
Muzzle velocity ---	563.0 meters/sec

Temperature Limits:

Firing:

Lower limit -----	-40° F (-40° C)
Upper limit -----	+125° F (+51.6° C)

Storage:

Lower limit -----	-65° F (-53.8° C)
Upper limit -----	+165° F (73.9° C)

*Packing ----- Pallet of 8 projectiles

*Pallet:

Weight (loaded):

M449 or M449E1 ---	804 lbs
(M449E2) -----	793 lbs
Dimensions -----	32.0 x 27-1/8 x 13-5/8 in.
Cube -----	6.8 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class--	1.2
Storage compatibility	
group -----	D
DOT shipping class -----	A
DOT designation -----	EXPLOSIVE PRO- JECTILES

DODAC:

M449 and M449E1 ---	1320-D561
(M449A1 M449E2) ---	1320-D562

Projectile drawing

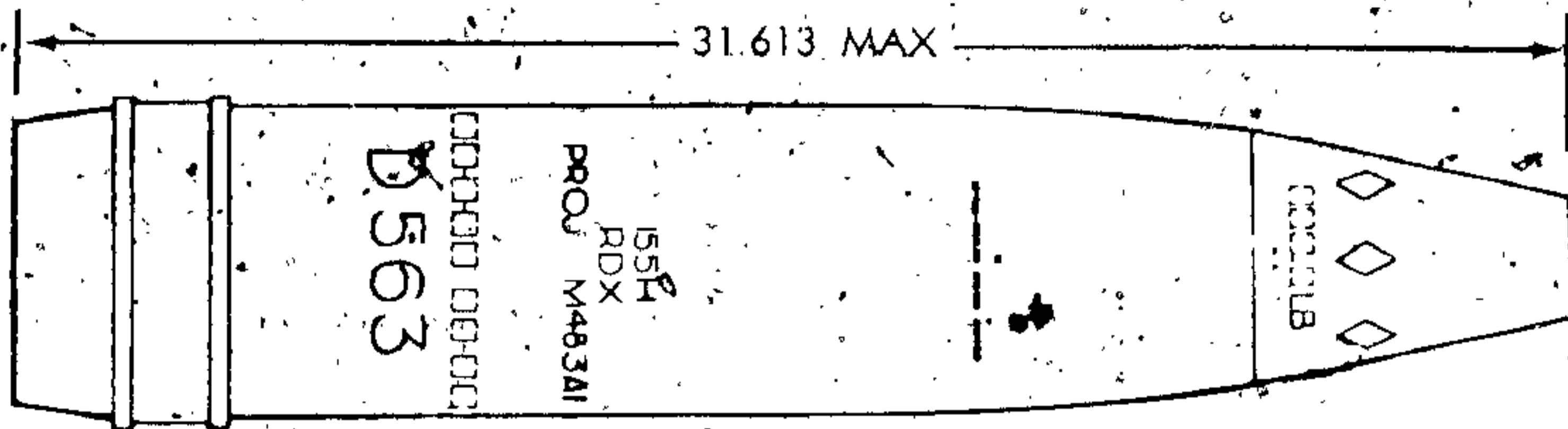
number -----	8875850
Packing drawing number -	7549275

References:

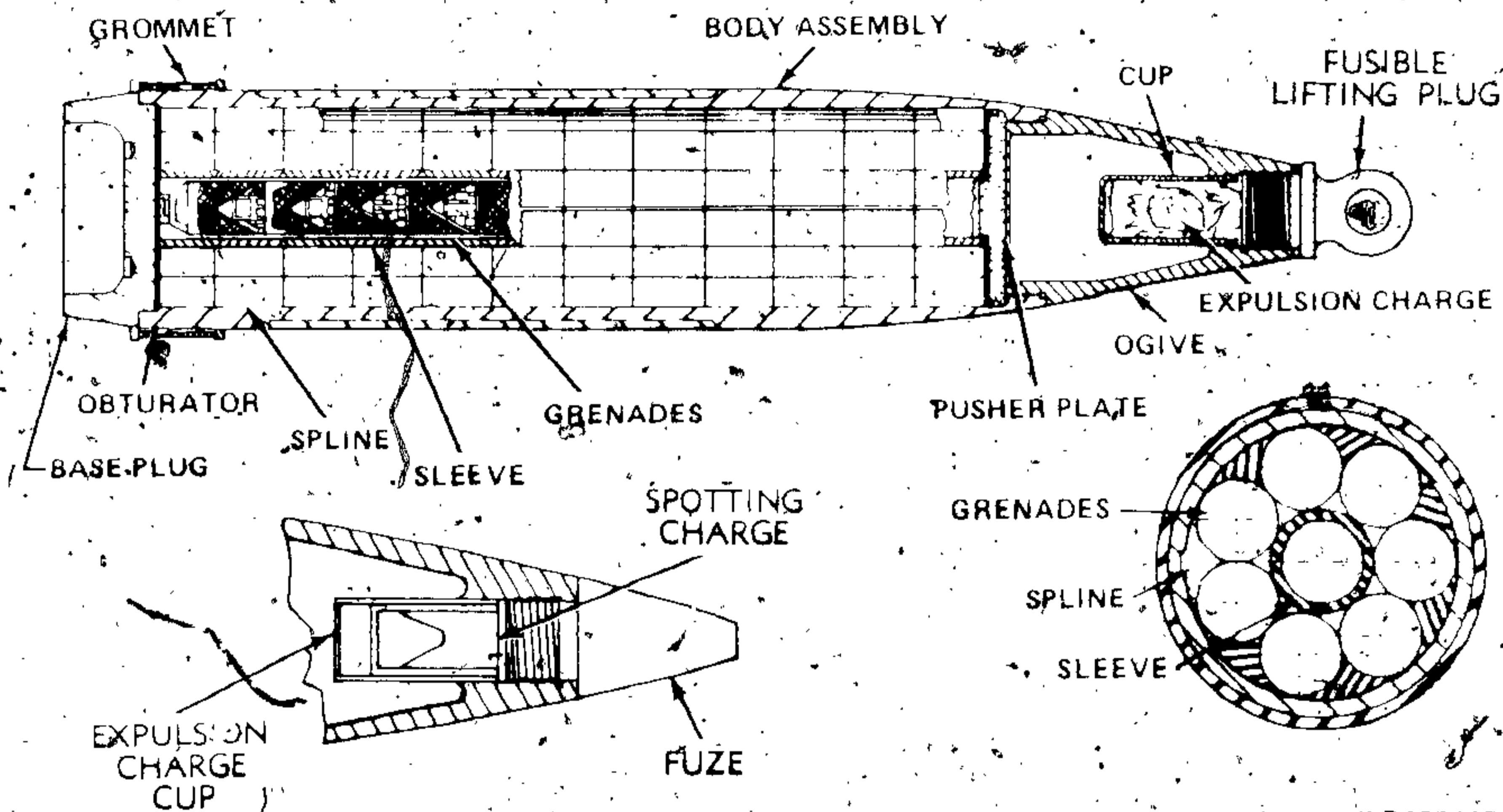
- TM 9-1025-200-12
- TM 9-1300-251-20
- TM 9-1300-251-34
- SC 1305/30-1L
- SB 700-20
- AMCP 700-3-3
- TM 9-2350-217-10N

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PROJECTILE, 155 MILLIMETER, HE, M483A1



AR 199428



AR199427

Type Classification:

Std-A 10756043 dtd 1975

Use:

This projectile is used to deliver submissile dual purpose armor defeating and antipersonnel grenades.

Description:

This projectile is of the separate loading type. The fuze, propelling charge, and primer

are handled and loaded separately. The projectile is provided with a fusible lifting plug in place of a fuze for handling. The plug must be replaced by a fuze before the projectile is loaded. The projectile contains a total of 88 dual-purpose grenades (64 M42 and 24 M46). The grenades are contained by a base plug, with a lefthand thread which is screwed into the base of the projectile. For normal usage, an expulsion charge is contained in a cavity in the nose of the projectile to eject the grenades. If desired, this expulsion charge may be replaced by a spotting charge designed to detonate the entire projectile as if it were a bulk-loaded HE projectile.

The metal rotating band near the base of the projectile is protected during storage and handling by a removable plastic grommet. The M46 Grenades have stronger bodies to carry the load at the rear on setback when fired.

Functioning:

When the primer is detonated, the flash ignites the propelling charge producing gases which forces the spin-stabilized projectile out of the gun and propels it to the target. The fuze, having been set to function at a pre-determined time in flight, initiates the expulsion charge ejecting the entire grenade load from the rear of the projectile. Centrifugal force disperses the grenades radially from the projectile line-of-flight. The M42 and M46 grenades are ground-burst submissiles which explode on impact. With the alternate loading of the spotting charge instead of the expulsion charge, the functioning of the fuze detonates the entire projectile over the target, permitting observation of the projectile fuze functioning in relation to the target.

Tabulated Data:

Projectile:

Type ----- HE
 Weight ----- 102.6 lbs
 Length w/fuze ----- 35.4 in.
 Body material ----- Forged steel/
 aluminum
 Color ----- Olive drab w/yel-
 low diamonds
 and markings

Filler and weight:

Number of gre-
 nades, M42 ----- 64
 Number of gre-
 nades, M46 ----- 24
 Explosive, Comp
 A5, each gre-
 nade ----- 30.5 grams
 Explosive, Comp
 A5, each pro-
 jectile ----- 6.25 lbs
 Expulsion charge - M10 propellant,
 51 grams

Components:

Propelling charge M3- Propellant M1, 5.0
 lbs (zones 1 - 5)
 Propelling charge M4A2 ----- Propellant M1,
 13.5 lbs (Zones
 3-7)
 Primer ----- M82
 Fuze ----- MTSQ, M577
 Cannon used with -- M126/M126A1,
 M185, M199,
 M1A2

Performance (full charge):

Maximum range --- 14,586 meters
 Muzzle velocity --- 560.2 meter/sec

Propelling charge

M119/M119A1 ----- Propellant M6
 20.5 lbs
 Special Single
 Zone (8) for use
 with the M109A1
 and M198 Howitzers

Performance:

Maximum range ---- 17,740 meters
 Muzzle velocity ---- 650 meters/sec

Propelling charge M203

Special Single Zone
 (8S) for use with
 the M198 howitzer

Performance:

Maximum range ---- 23,100 meters

Temperature Limits:

Firing:

Lower limit ----- -40° F (-40° C)
 Upper limit ----- +125° F (51.7° C)

Storage:

Lower limit ----- -65° F (-53.8° C)
 Upper limit ----- +165° F (73.9° C)

*Packing:

Pallet of 8 projec-
 tiles

*Pallet:

Weight (loaded) ---- 874 lbs
 Dimensions ----- 39-3/8 x 29 x
 14-1/2 in.

Cube ----- 9.7 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
class ----- 1:2
Storage compatibility
group ----- D
DOT shipping class ----- A
DOT designation ----- **EXPLOSIVE PROJECTILES**
DODAC ----- 1320-D563
Drawing number ----- 9215220
Top packaging drawing
number ----- 8837839

WEIGHT ZONES

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

Zone	Over lbs	Up to & Incl	Marking
2	99.1	100.3	□ □
3	100.3	101.3	□ □ □
4	101.3	102.6	□ □ □ □
5	102.6	103.6	□ □ □ □ □
6	103.6	104.8	□ □ □ □ □ □

Ballistics:

Howitzer, Self-Propelled, M109A1, M198

Charge	Muzzle velocity (m/s)	Max Range (mtrs)
*1, M3A1, green bag	200.0	3640
*2, M3A1, green bag	224.5	4570
3, M3A1, green bag	253.9	5590
4, M3A1, green bag	293.5	7080
5, M3A1, green bag	349.5	9050
3, M4A2, white bag	334.2	6490
4, M4A2, white bag	310.1	7720

5, M4A2, white bag	363.5	9420
6, M4A2, white bag	445.0	11730
7, M4A2, white bag	535.2	14320

Howitzer, Self-Propelled, M109A1

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)
*1, M3A1, green bag	180.9	2980
*2, M3A1, green bag	216.0	4220
3, M3A1, green bag	263.0	5940
4, M3A1, green bag	304.1	7500
5, M3A1, green bag	358.3	9330
3, M4A2, white bag	297.5	7230
4, M4A2, white bag	337.0	8630
5, M4A2, white bag	386.0	10080
6, M4A2, white bag	460.0	12150
7, M4A2, white bag	546.5	14650
8, M119/M119A1, white bag	650.0	17740

Howitzer -- M198 (199 Cannon)

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)
Propelling Charge - Green bag		
M3A1 M3		
3G	261.9	257.9 2980
4G	303.6	301.6 4220
5G	358.1	356.1 5940
Propelling Charge - White bag		
M4A2 M4A1		
3W	285.2	285.2 7230
4W	326.5	324.5 8630
5W	381.3	378.3 10080
6W	460.7	455.7 12150
7W	546.2	543.2 14650

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)
--------	--------------------------	---------------------

Propelling Charge - M119		
8	655.8	17740

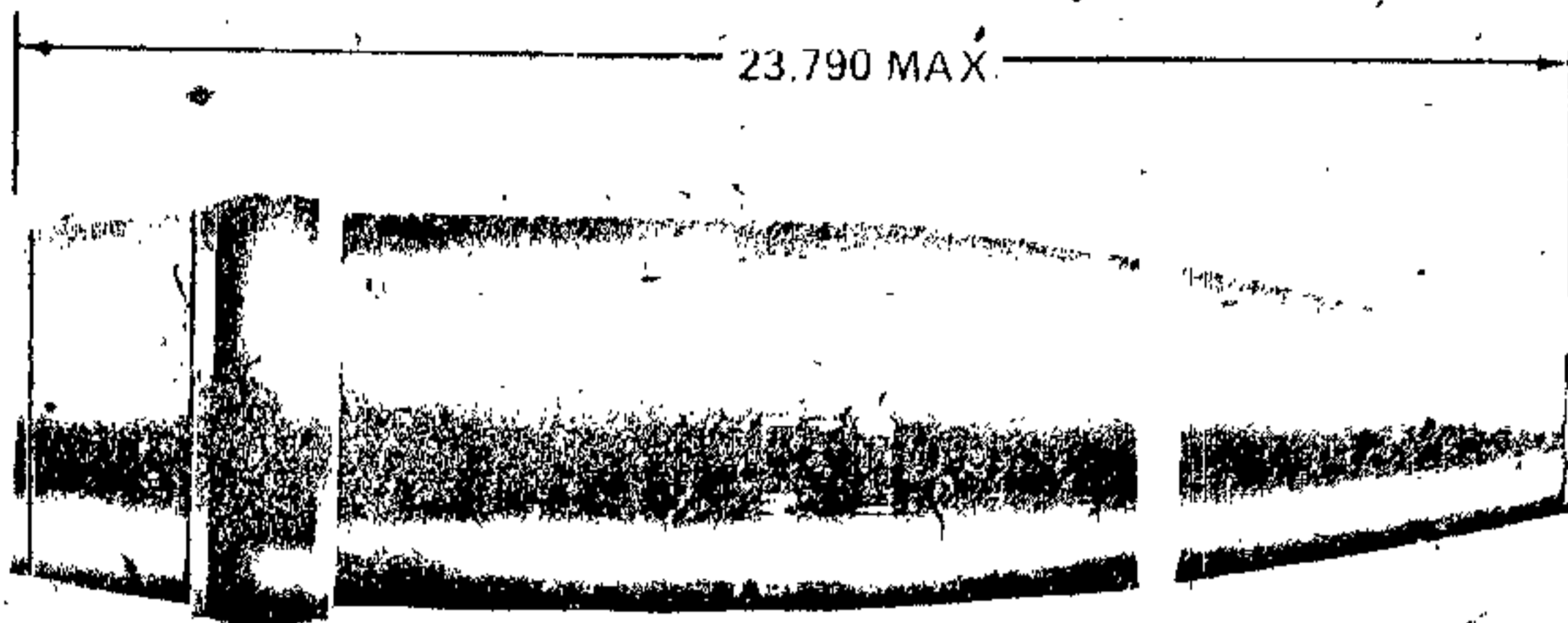
Propelling Charge - M203		
8S	797.0	22400

Firing below charge 3 may result in stichers when fired in M185 and M199 Cannons.

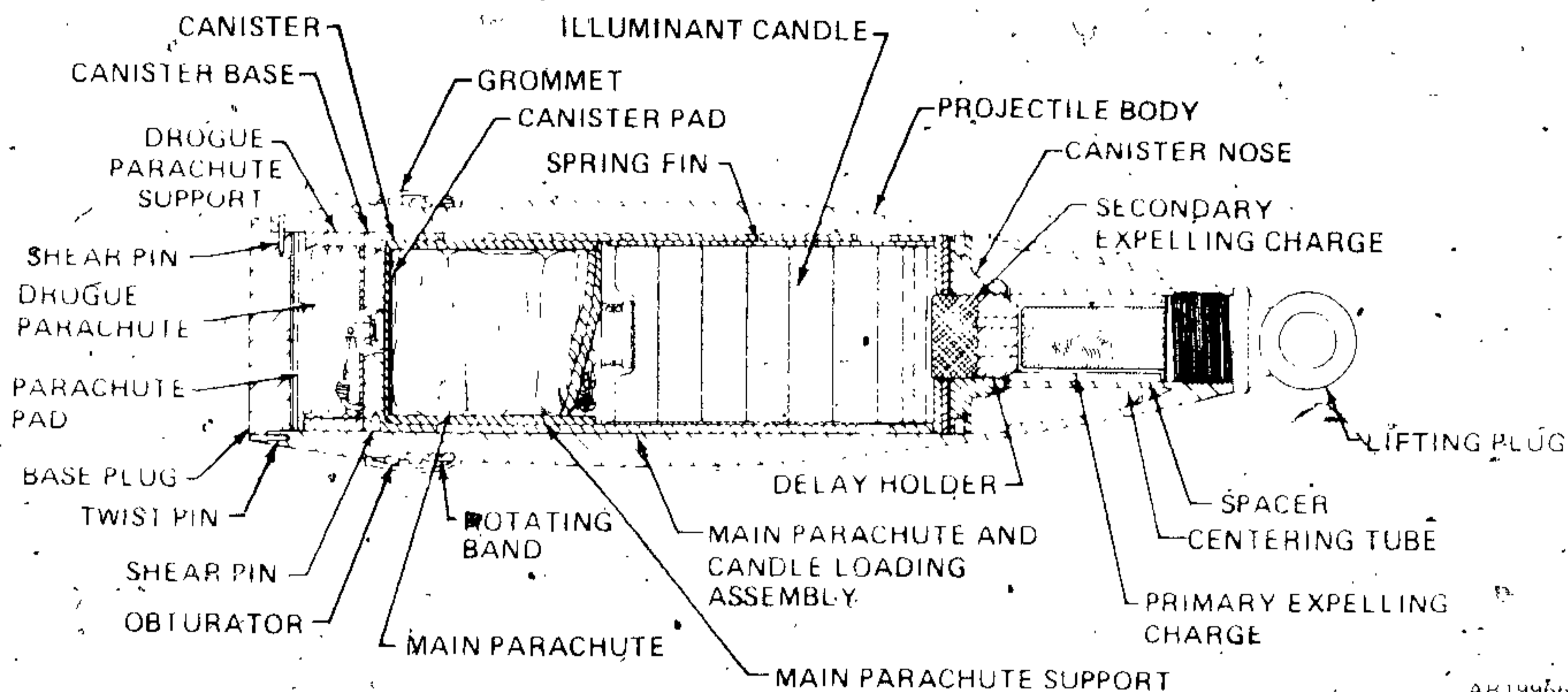
References:

- TM 9-1340-241-12
- TM 9-1300-291-20
- TM 9-1300-251-34
- TM 9-2350-217-10N

PROJECTILE, 155 MILLIMETER: ILLUM, M485 SERIES



AR199669



AR199668

Type Classification:

- M485A2: Std AMCTC dtd 1970
- M485A1: Std AMCTC dtd 1970
- M485: C & T AMCTC dtd 1970

Use:

This projectile is fired from 155mm howitzers and is used to illuminate the battlefield at night or during other conditions of reduced visibility.

Description:

The projectile is a hollow steel shell containing an illuminant canister, a canister expelling charge in the nose, and a drogue parachute in the base. The illuminant canister contains the main parachute and lines, the illuminant candle assembly, a secondary expelling charge and a delay element holder. The outer shell of the canister is fitted with four longitudinal fins. The fins extend under spin forces when the canister is ejected from the projectile. The base of the projectile is closed with

a press-fitted steel plug retained by shear and twist pins. A guiding metal rotating band and a plastic obturating band encircle the projectile near the base and are protected by a grommet during shipment and handling. The projectile uses an MT type fuze. The fuze cavity is fitted with a lifting ring plug for shipment and handling.

Functioning:

When the weapon is fired, the rotating band engages the barrel rifling to impart spin to the projectile for stability in flight. The obturator band expands to prevent leakage of gas pressure past the projectile. The burning propellant charge produces rapidly expanding gases to propel the projectile through the barrel with the velocity required to reach the desired point of function. When the fuze functions, the primary expelling charge ignites, forcing the drogue parachute and canister assembly against the base plate, rupturing the base pins and expelling the canister and parachute. The drogue parachute then deploys and the canister fins extend.

These actions combine to decelerate the canister and stop rotation. The expelling charge also ignites the delay element in the canister nose.

The delay element ignites the secondary expelling charge within the canister after 8 seconds when velocity has been safely reduced. The secondary expelling charge then ignites the candle illuminant, and expels the main parachute and candle loading assembly. With the main parachute open, the illuminant candle descends at 15 feet per second and burns for 120 seconds producing approximately 1,000,000 candlepower.

Difference Among Models:

Model M485A1 has both shear and twist pins retaining the base plug. Model M485 has only shear pins. Model M485A2 has perforated canister fins to decrease the rate of deceleration before the parachute deploys.

Tabulated Data:

Complete round:

Type -----	Illum
Weight w/o fuze ---	92 lbs nom
Length w/o fuze or lifting plug -----	23.79 in. max

Cannon used with----- M1, M1A1, M1A2,
M45, M126,
M126A1, M185,
M199

Projectile:

Body material ----- Forged steel
Color ----- Olive drab w/
white markings
(Later manufacture-Olive drab
w/white markings
and one white band)

Filler and weight --- Illum Compound,
94 oz

Propelling charge --- M3/M4 series,
M119/M119A1

Primer ----- M82, MK2A4

Fuzes ----- MT, M565 series

Temperature Limits:

Firing and Storage:

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

*Packing ----- 8 projectiles on
pallet

*Pallet:

Weight ----- 782 lbs
Dimensions ----- 27-1/8 x 13-5/8
x 32 in.
Cube ----- 6.8 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ---- 2
Storage compatibility group- E or N
DOT shipping class ----- B
DOT designation ----- SPECIAL FIRE-
WORKS, HANDLE
CAREFULLY,
KEEP FIRE AWAY
DODAC ----- 1320-D505
Assembly Dwg. No. ----- 9214150

Ballistics:

Cannon M1A1:

Charge	Muzzle Velocity (mps)	Max Range to Function (mtrs)	Elevation (mils)	Fuze Setting (secs)
Charge 1, M3, green bag	212	2788	796.5	19.5
Charge 2, M3, green bag	241	3858	785.0	24.1
Charge 3, M3, green bag	275	5121	759.1	28.0
Charge 4, M3, green bag	318	6908	794.2	35.3
Charge 5, M3, green bag	381	8675	772.4	39.7
Charge 3, M4A1, white bag	279	5324	774.7	29.3
Charge 4, M4A1, white bag	322	6993	761.9	34.3
Charge 5, M4A1, white bag	382	8670	761.9	39.2
Charge 6, M4A1, white bag	472	10,962	783.2	46.7
Charge 7, M4A1, white bag	576	13,648	783.5	53.8

Cannon M126A1:

Charge	Muzzle Velocity (mps)	Max Range to Function (mtrs)	Elevation (mils)	Fuze Setting (secs)
1, M3A1, green bag	211.4	2949	931.0	24.5
2, M3A1, green bag	239.1	3923	924.8	29.2

3, M3A1, green bag	282.5	5587	920.3	36.0
4, M3A1, green bag	324.7	7236	852.7	39.0
5, M3A1, green bag	385.6	8816	856.6	44.1
3, M4A2, white bag	275.0	5293	921.4	34.9
4, M4A2, white bag	320.7	7057	898.8	40.4
5, M4A2, white bag	380.0	8635	898.7	45.7
6, M4A2, white bag	473.6	10,993	855.0	50.7
7, M4A2, white bag	576.5	13,586	879.2	59.7

Cannon M185:

Charge	Muzzle Velocity (mps)	Max Range to Function (mtrs)	Elevation (mils)	Fuze Setting (secs)
*1, M3A1, green bag	213.6	2970	995.1	26.8
2, M3A1, green bag	240.3	3933	954.7	30.3
3, M3A1, green bag	281.0	5569	874.2	34.0
4, M3A1, green bag	323.3	7155	896.4	40.7
5, M3A1, green bag	381.7	8721	865.6	44.3
3, M4A2, white bag	309.8	6746	865.1	37.9
4, M4A2, white bag	353.2	7949	906.3	43.9
5, M4A2, white bag	408.4	9317	870.0	46.4

Charge	Muzzle Velocity (mps)	Max Range to Function (mtrs)	Elevation (mils)	Fuze Setting (secs)
6, M4A2, white bag	488.9	11,304	885.5	53.4
7, M4A2, white bag	576.5	13,586	878.5	59.7
8, M119/M119A1	696.7	17,086	856.5	68.0

*NOTE: Charge 1 is restricted to emergency combat use only.

Cannon M199:

Charge	Muzzle Velocity (mps)	Max Range to Function (mtrs)	Elevation (mils)
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

Limitations:

Reliability of projectiles M485A1 and M485A2 degrades rapidly when firing at Zones 6 and 7 with fuze settings of 10 seconds or less. Model M485 is restricted to firing at Zones 1 through 6. Model M485 is also restricted to a firing temperature range of 40° F to 145° F.

References:

- AMCP 700-3-3
- SB 700-20
- SC 1305/30-1L
- TM 9-1025-200-12
- TM 9-1300-251-20
- TM 9-2350-217-10
- TM 9-2350-217-10N

projectile near the base. A rocket-off cap is threaded into the base. The cap is removed prior to firing to allow ignition of the rocket motor for extended range. The rocket motor body contains seven pounds of solid rocket propellant arranged in two segmented grains. Each of the three segments of the forward grain contains an ignition pellet. The motor nozzle is recessed in the center of the boat-tail rocket motor base of the projectile, and thrust is along the longitudinal axis.

The M549/M549A1 projectiles have a lifting plug designed to protect the projectile fuze area against accidental damage. The new plug has an oversized (3 3/4 in.) flange. If this protective lifting plug is broken at the neck area, the threaded portion of the plug will remain in the projectile and the projectile cannot be fuzed. No attempt should be made to extract any portion of a broken plug from a projectile; the projectile is not to be used and should be returned to supply point.

The Projectile M549/M549A1 also has a new type of Grommet designed especially to fit the configuration of this projectile. It is of polycarbonate composition.

Functioning:

When the weapon is fired, the rotating band engages the barrel rifling to impart spin to the projectile for stability in flight. The obturator of the rotating band forms a seal to prevent leakage of gas pressure past the projectile. Rapidly expanding gases from the burning propellant charge propel the projectile through the barrel with the velocity necessary to reach the target. Extended range is obtained through rocket assist; the rocket-off cap is removed prior to weapon chambering exposing the pyrotechnic delay assembly in the base of the rocket motor. When the projectile is fired, the propellant gases ignite the delay which burns for approximately 7 seconds and then sets off the rocket igniter to initiate the rocket motor propellant. The rocket motor fires for approximately three seconds. This additional thrust augments the velocity and consequently, the range of the projectile. If a PD or MTSQ or short intrusion proximity fuze is used, the fuze detonates the supplementary charge and

the supplementary charge detonates the warhead filler either on impact or at the preset time. Both proximity fuzes the M728 (long intrusion which requires removal of the supplementary charge) or the M732 (short intrusion) fuzes are restricted from overhead fire. Using the M728 may result in downrange premature. Tests for the M732 have not yet been completed. Detonation on the warhead is on approach to the target.

Difference Between Models:

Model M549 is filled with Comp B; Model M549A1 is filled with TNT.

Tabulated Data:

Complete round:

Type -----	HE, rocket assist
Weight with fuze -----	96 lbs (approx)
Length with fuze -----	34.39 in. max
Length w/o fuze -----	33.78 in. max
Cannon used with -----	M126, M126A1; M185, M1A2, M199

Weight zone information:

		WEIGHT ZONE			
		LOADED PROJECTILE (W/O FUZE)			
		POUNDS			
OVER	Up to and including	MARKS			
3	91.8	93.6	□	□	□
4	93.2	95.0	□	□	□
5	94.6	96.4	□	□	□

Projectile:

Body material ----- Steel
 Color ----- Olive drab w/
 yellow markings

Filler and weight:

M549A1 ----- TNT 15 lbs
 Supp Chg 0.30 lb
 TNT
 M549 ----- Comp B 16 lbs
 Supp Chg 0.30 lb
 TNT

Propelling charge ----- M4 series at Charge
 7 only

Propelling charge ----- M119A1, M203 with
M549A1 projectile
only
Primer ----- M82
Fuzes ----- PD: M557, M739
Prox: M732, M728

Dimensions ----- 14 5/8 x 29 1/8 x
38 3/4 in.
Cube ----- 9.5 cu ft

*NOTE: See SC for complete packing data including NSN's.

Temperature Limits:

Firing:
Lower limit ----- -50° F
Upper limit ----- +145° F
Storage:
Lower limit ----- -65° F
Upper limit ----- +160° F (for periods
not more than 4
hrs per day)

Shipping and Storage Data:	M549	M549A1
Quantity-Distance*Class---	1.1	1.1
Storage compatibility group -----	D	D
DOT shipping class -----	A	A
DOT designation -----	Explosive proj.	Explosive projectile
DODAC -----	T320- D579	1320- D579
Assembly Dwg. No -----	9235999	9235999

*Pallet:
Weight ----- 780 lbs

Ballistics:

Howitzer	Propelling Charge	Charge	Muzzle Velocity (m/s)	Maximum Range (mtrs)
M114A1	M4A2	7	560.8	19,300
M109	M4A2	7	560.8	19,300
M109A1)	M4A2	7	567.5	19,500
M109A2)	M119A1	8	678.2	23,500
M109A3)	M4A2	7	567.5	19,500
M198	M119A1	8	678.2	23,500
	M203	8	828.0	30,100

Limitations:

M549 and M549A1:

The M549/M549A1 cannot be fired if the obturating band is missing or broken.

There are no firing tables for rocket-off firings of the M549/M549A1. The M549/M549A1 will be fired rocket-on only (rocket-off cap removal).

The M549/M549A1 cannot be fired in the M199 cannon if origin wear in the cannon exceeds 0.093 inches.

Use of the M119 propelling charge with the M549/M549A1 is prohibited. Rocket motor ignition failures resulting in short rounds will occur.

A 6000 meter safety zone is required short of the target because of the possibility of rocket motor non-ignition.

Overhead fire with the M728 proximity fuze is prohibited due to the possibility of downrange premature. Overhead fire with the M732 proximity fuze is prohibited due to incomplete test data.

Change 5

3-118.1

M549:

The M549 model cannot be fired with the M203 Propelling Charge.

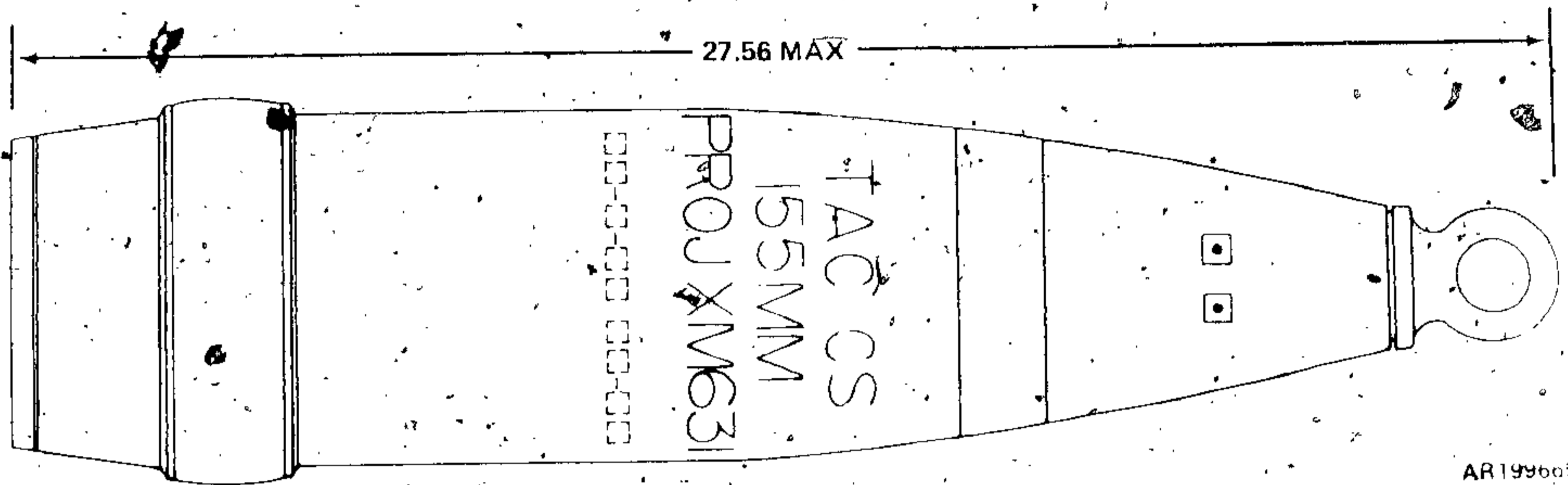
M549A1:

Firing the M549A1 using the M728 proximity fuze and the M203 propelling charge combination is prohibited due to the possibility of premature inbore fuze functioning.

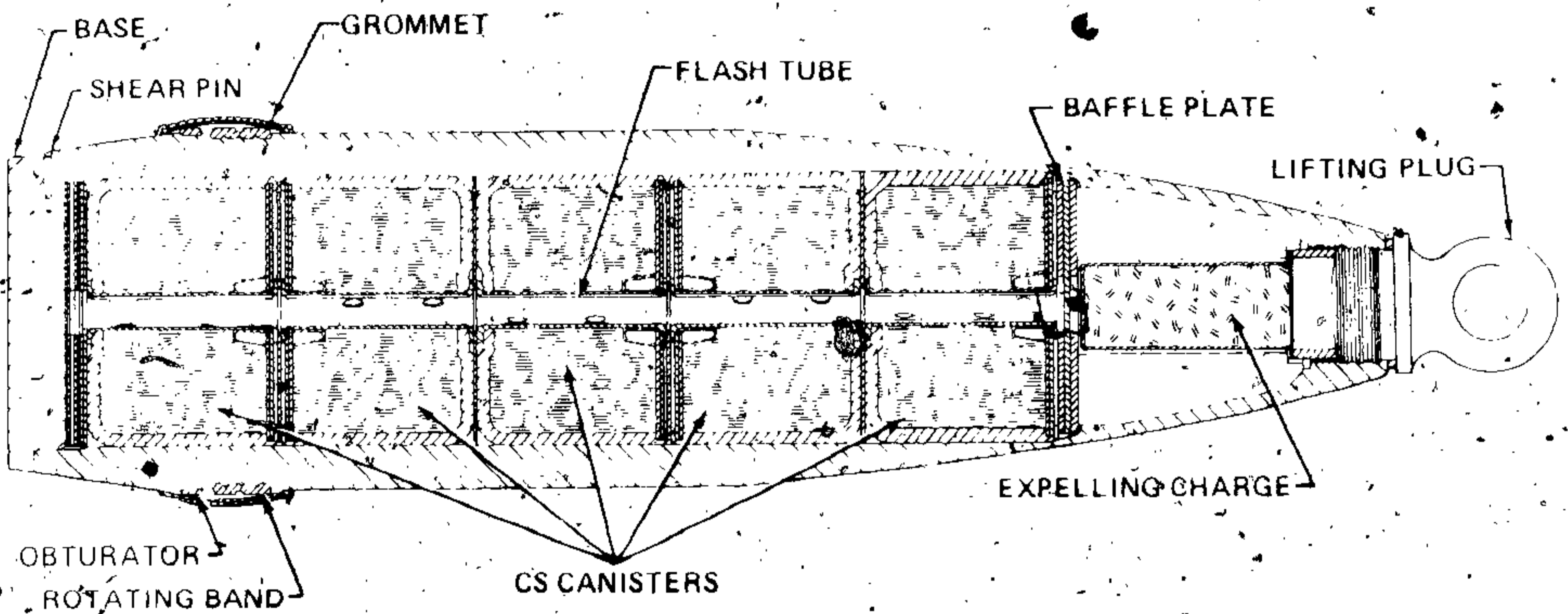
References:

- DARCOM-P 700-3-3
- SB 700-20
- SC 1305/30-IL
- TM 9-1300-251-20
- TM 9-2350-217-10
- TM 9-2350-217-10N

PROJECTILE, 155-MILLIMETER: TACTICAL CS, XM631



AR199605



AR199664

Type Classification:

Use:

This projectile is fired from 155-mm howitzers and is used to harass personnel by emitting CS irritant fumes.

Description:

The base-ejecting type projectile is a hollow steel shell containing five stacked canisters. Each canister is filled with approximately two pounds of CS-Pyrotechnic mix and 0.81 ounce of

starter mix. An expelling charge of 3.36 ounces of black powder in a plastic container is located in the nose of the projectile below the fuze cavity. A baffle plate with a central hole separates the expelling charge from the top canister. A central perforated tube runs through each canister to form a flash tube extending the length of the stack from the expelling charge to the base of the projectile. The base is a steel plug secured by three shear pins. An MTSQ fuze is used with this projectile. For shipment and handling, a lifting plug is installed in the fuze cavity. A gilding metal rotating band and a plastic obturating band encircle the projectile near the base, and are 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 and to the velocity required to reach the target. The rotating band engages the barrel rifling to impart spin to the projectile. The obturating band expands, forming a seal to prevent leakage of gas pressure past the projectile. Functioning of the fuze ignites the expelling charge. The expelling charge flashes through the flash tube to ignite the CS canisters, blow off the base, and expel the burning canisters. The average canister burning time is 90 seconds. The effect of the CS agent on personnel is burning of the eyes, coughing, and difficulty in breathing.

Tabulated Data:

Complete round:

Type ----- Tactical CS
 Weight with fuze ----- 96.75 lbs. (approx.)
 Length w/o lifting
 plug ----- 23.79 in.
 Cannon used with ----- M1, M1A1, M45,
 M126, M126A1,
 M185

Projectile:

Body material ----- Steel
 Color ----- Gray w/red bands
 and red markings
 Filler and weight ----- CS, 14.05 lbs.
 Propelling charge ----- M3/M4 series
 Primers ----- M82, MK2A4
 Fuze ----- MTSQ M548

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 hrs/
 day)

*Packing ----- 8 projectiles on
 pallet

*Pallet:

Weight ----- 782 lbs.
 Dimensions ----- 27-1/8 x 13-5/8
 x 32 in.
 Cube ----- 6.8 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 4
 Storage compatibility
 group ----- A
 DOT shipping class ----- B
 DOT designation ----- TACTICAL CS
 PROJECTILES
 CLASS B
 SPECIAL PERMIT
 NO. 5208
 DODAC ----- 1320-D681
 Assembly Dwg. No. ----- 9220382

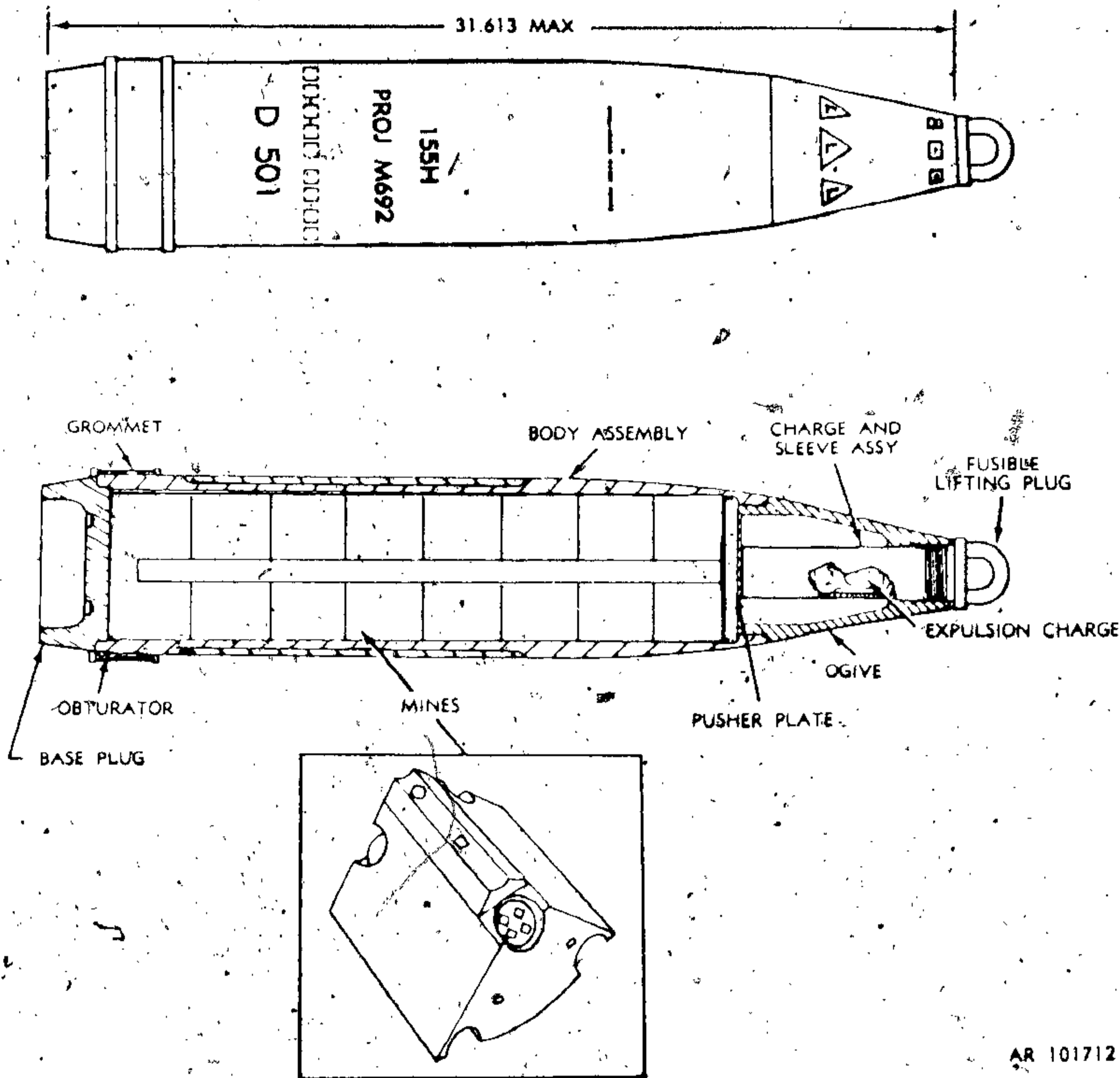
Limitations:

Do not fire with fuze set as issued. If impact detonation is intended instead of time functioning, set the fuze for 90 seconds.

References:

AMCP 700-3-3
 SB 700-20
 SC 1305/30-IL
 TM 9-1025-200-12
 TM 9-1300-251-20
 TM 9-2350-217-10
 TM 9-2350-217-10N

PROJECTILE, 155 MILLIMETER: HE, M692



AR 101712

Type Classification:

Std 01766014

Use:

This projectile is used to deliver submitted antipersonnel mines fired from a 155mm howitzer and is called Area Denial Artillery Munitions (ADAM).

Description:

This projectile is of the separate loading

type. The fuze, propelling charge, and primer are handled separately. The projectile is provided with a fusible lifting plug in place of a fuze for handling. The plug must be replaced by a fuze before the projectile is loaded. The projectile contains a number of antipersonnel mines. The mines are contained by a base plug, with a left-hand thread, which is screwed into the base of the projectile. An expulsion charge is contained in a cavity in the nose of the projectile to eject the mines. The metal rotating band near the base of the projectile is protected during storage and handling by a removable plastic grommet.

Change 5

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Functioning:

When the primer is detonated, the flash ignites the propelling charge producing gases which force the spin-stabilized projectile out of the gun tube and propels it to the target. The M577 fuze having been set to function at a pre-determined time in flight, initiates the expulsion charge ejecting the mines from the rear of the projectile. Centrifugal force disperses the mines radially from the projectile line-of-flight. The mines are completely armed a short time after ground impact. A self-destruct mechanism is activated which initiates the mine after a predetermined time if the munition is not functioned by trip wire or disturbance.

Tabulated Data:

Projectile:

Type ----- HE
 Weight ----- 102.5 lbs without fuze
 Length w/fuze --- 35.4 in.
 Body material --- Forged steel
 Color ----- Olive drab w/yellow triangles and markings

Filler and weight:

Number of mines-- 36
 Explosive, Comp A5, each mine-- 21.25 grams
 Expulsion charge-- M10 propellant, 51 grams

Components:

Propelling charge M3A1 ----- Propellant M1, 5.0 lbs (Zones 1-5)
 Propelling charge M4A2 ----- Propellant M1, 13.5 lbs (Zones 3-7)

M119/M119A1 Special Single Zone (8) for use with the M109A1, M198

Muzzle Velocity (M/S) 650	Max Range (MTRS) 17,740
Primer -----	M82
Fuze -----	MTSQ, M577
Cannon used with-	M185, M199, M1A2, M126, M126A1

Performance (full charge):

Maximum range-- 14,586 meters
 Muzzle velocity-- 560.2 meters/sec

Temperature Limits:

Firing:
 Lower limit ----- -25° F (-31.6° C)
 Upper limit ----- +125° F (51.7° C)
 Storage:
 Lower limit ----- -30° F (-31.1° C)
 Upper limit ----- +165° F (71.1° C)

*Packing ----- Pallet of 8 projectiles
 *Pallet:
 Weight (loaded) ----- 874 lbs
 Dimensions ----- 39-3/8 x 29 x 14-1/2 in.
 Cube ----- 9.7 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class - 1.2
 Storage compatibility group ----- D
 DOT shipping class ----- A
 DOT designation ----- EXPLOSIVE PROJECTILES
 DODAC ----- 1320-D501
 Drawing number ----- 9198316
 Top packaging drawing number ----- 8837839

WEIGHT ZONES

Loaded Proj (w/o fuze, w/o plug)

Zone	Over	Up to & Incl	lbs	Marking
2	99.1	100.3		□ □
3	100.3	101.3		□ □ □
4	101.3	102.6		□ □ □ □ □
5	102.6	103.6		□ □ □ □ □ □ □
6	103.6	104.8		□ □ □ □ □ □ □ □

Ballistics:

Howitzer, Self-Propelled, M109.

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)
*1, M3A1, green bag	200.0	3640
*2, M3A1, green bag	225	4570
3, M3A1, green bag	254	5590
4, M3A1, green bag	293.5	7080
5, M3A1, green bag	349.5	9050
3, M4A2, white bag	334.2	6490
4, M4A2, white bag	310.1	7720
5, M4A2, white bag	363.5	9420
6, M4A2, white bag	445.0	11730
7, M4A2, white bag	535.2	14320

Howitzer, Self-Propelled, M109A1

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)
*1, M3A1, green bag	180.9	2980
*2, M3A1, green bag	216.0	4220
3, M3A1, green bag	263.0	5940
4, M3A1, green bag	304.1	7500
5, M3A1, green bag	358.3	9330
3, M4A2, white bag	297.5	7230
4, M4A2, white bag	337.0	8630
5, M4A2, white bag	386.0	10080
6, M4A2, white bag	460.0	12150
7, M4A2, white bag	546.5	14650
8, M119/M119A1	650.0	17740

*Firing Below Charge 3 may result in stickers when fired in M185 and M199 Cannons.

Howitzer - M198 (M199 Cannon)

Charge	MUZZLE VELOCITY - M/S	Max Range (mtrs)
--------	-----------------------	------------------

Propelling Charge - Green Bag

	M3A1	M3	
3G	261.9	257.9	2980
4G	303.6	301.6	4220
5G	358.1	356.1	5940

Propelling Charge - White Bag

	M4A2	M4A1	
3W	285.2	285.2	7230
4W	326.5	324.5	8630
5W	381.3	378.3	10080
6W	460.7	455.7	12150
7W	546.2	543.2	14650

Propelling Charge - M119/M119A1

8	655.8	17740
---	-------	-------

Howitzer, Towed, M114A2

Firing Tables not compiled at this time.

Weapons fired from:

M109, M109A1, M114A2, M198

Weapon/Propelling Charge/Primer/Combina-
tions:

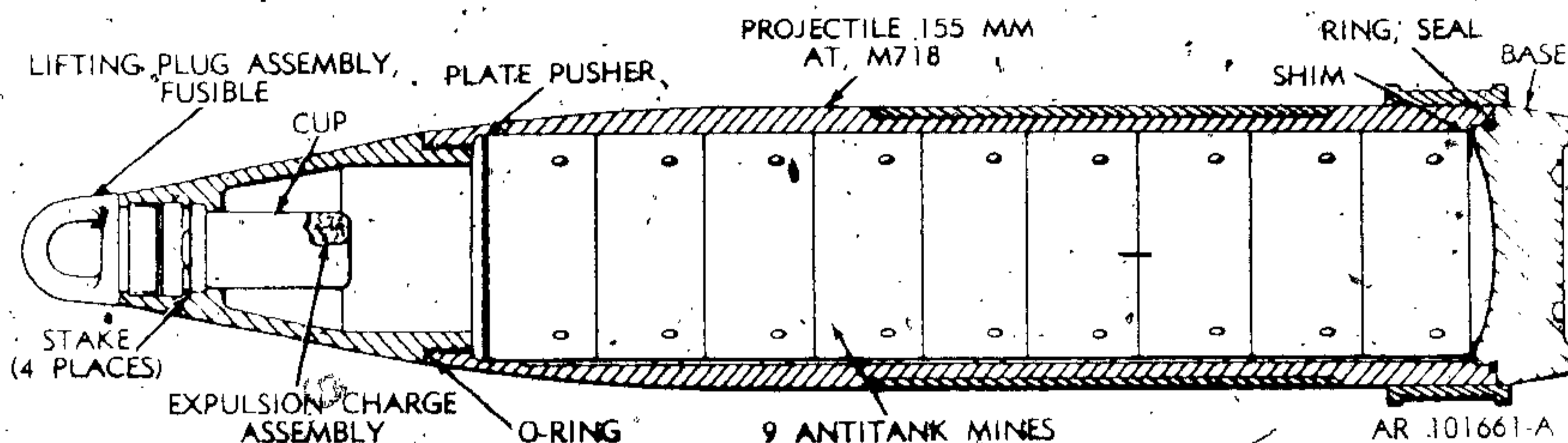
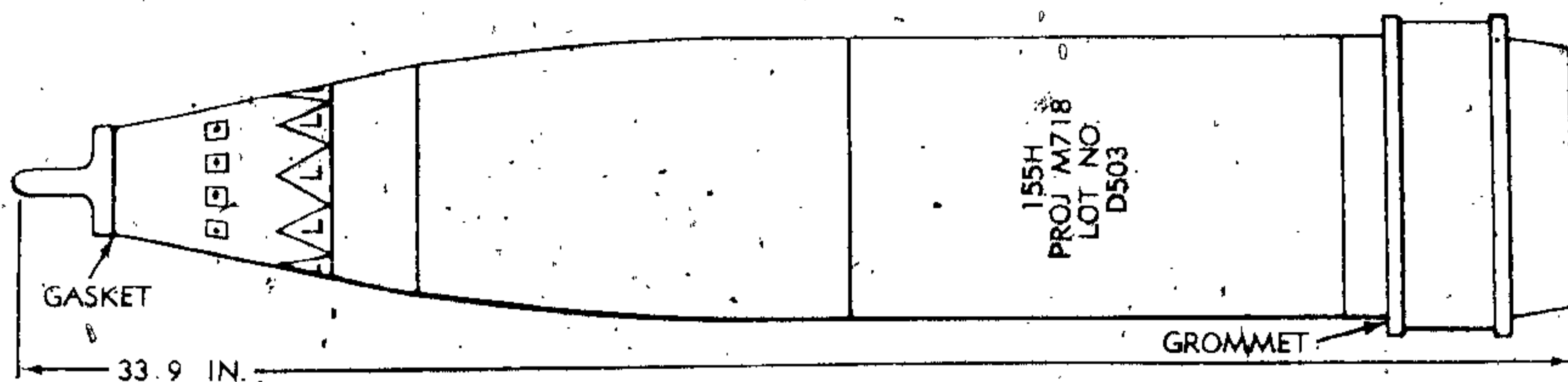
M109/M3A1, M4A2/M82
M109A1/M3A1, M4A2, M119, M119A1/M82
M114A2/M3A1, M4A2/MK2A4, MK15
M198 (1st quarter tube life as weapon testing
not completed/M3A1, M4A2, M119, M119A1/
M82 .

References:

TM 9-1340-241-12
TM 9-1300-251-20
TM 9-1300-251-34
TM 9-2350-217-10N

For classified data pertaining to this item refer
to TM 43-0001-28/1(C).

PROJECTILE, 155 MILLIMETER: AT, M718



Type Classification:

LCC A MSR 02786003 dtd 18 Jan 78

Use:

These projectiles are used to deliver anti-tank mines in front of enemy armored forces to deny, delay access to a particular area for a specific time period. They are called Remote Anti-Armor Mines System (RAAMS).

Description:

The projectiles are of the separate loading type (the fuzes, propelling charges, and primers are handled separately). The projectiles are shipped from the loading plant with fusible lifting plugs to facilitate handling, and as a safety measure. Before firing, the lifting plugs must be replaced with M577 MTSQ fuzes. The projectiles contain a payload of anti-tank mines that are ejected during projectile flight by an expulsion charge. The rotating bands are protected from damage during transportation and handling by plastic grommets.

Functioning:

When the projectile is fired, the primer

ignites the propelling charge which propels the round to the target area. The MTSQ fuze functions at its pre-set time setting, initiating the expulsion charge, which ejects the mines from the projectile. The mines (having been subjected to the required set-back, rotational, and set-forward forces) are armed soon after ground impact. Upon sensing the proximity of tanks the mines initiate. If the mines are not initiated during their intended life span, a circuit is activated causing the mines to self-destruct. A percentage of the mines in each projectile have anti-disturbance mechanisms to discourage attempts at mine field clearing.

Tabulated Data:

Projectile:	
Type -----	Anti-tank (AT)
Weight -----	103 lbs with fuze
Length (w/lifting plug) -----	33.9 in.
Body material -----	Forged steel
Color -----	Olive drab w/yellow markings
Marking drawing ----	9277852, Rev E

Filler and Weight:

Number of mines ----- 9

Change 5

3-124.1

TM 43-0001-28

Explosive ----- PBX 0280 (95 %
RDX, 5 % Estane)
Explosive Wt/mine -- 1.26 lbs
Expulsion charge --- M10 Propellant
(51 ± 1 grams)

DODAC ----- 1320-D503.
Drawing numbers -- 9277852
Top packaging drawing
number ----- 8837839

Components:

Propelling Charges -- M3A1, M4A2, M119,
M119A1
Primers: ----- MK 2A4, MK15, M82
Fuze: ----- MTSQ, M577

Temperature Limits:

Firing:
Lower limit ----- -25° F (-32° C)
Upper limit ----- +145° F (63° C)
Storage:
Lower limit ----- -60° F (-51° C)
Upper limit ----- +160° F (71° C)

Packing Data:

Packing ----- Pallet of 8 pro-
jectiles
Pallet:
Weight (loaded) --- 882 lbs
Dimensions ----- 39-3/8 x 29-1/8 x
14-5/8
Cube ----- 9.7 cu ft

*Check supply catalogs for complete packing data, including national stock numbers.

Shipping and Storage Data:

Quantity-distance
class ----- 1:1
Storage compatibility
group ----- D
DOT shipping class --- Class A Explosive
DOT designation ----- EXPLOSIVE PRO-
JECTILES

WEIGHT ZONES

Loaded Proj (w/o fuze, w/o plug)

Zone	Over Lbs	Up to & Incl	Marking
2	99.1	100.4	□ □
3	100.2	101.5	□ □ □
4	101.1	102.8	□ □ □ □
5	102.4	103.7	□ □ □ □ □
6	103.5	104.8	□ □ □ □ □ □

Ballistics:

Howitzer, Self-Propelling, M109A1

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)
3, M3A1, green bag	263.2	5900
4, M3A1, green bag	305.7	7500
5, M3A1, green bag	360.1	9300
3, M4A2, white bag	295.5	7100
4, M4A2, white bag	335.5	8600
5, M4A2, white bag	386.8	10000
6, M4A2, white bag	462.7	12000
7, M4A2, white bag	548.1	14400
8, M119, prop M6, 20.3 lbs	650.5	17500

Howitzer, Self-Propelled, M109

Howitzer, Towed, M114A2

Firing Tables not compiled at this time.

Howitzer - M198 (M199 Cannon)

Charge	Muzzle Velocity - M/S		Max Range (mtrs)

Propelling Charge - Green Bag

	M3A1	M3	
3G	261.9	257.9	2980
4G	303.6	301.6	4220
5G	358.1	356.1	5940

Propelling Charge - White Bag

	M4A2	M4A1	
3W	285.2	285.2	7230
4W	326.5	324.5	8630
5W	381.3	378.3	10080
6W	460.7	455.7	12150
7W	546.2	543.2	14650

Propelling Charge - M119/M119A1

8	655.8	17740
---	-------	-------

Weapons fired from:

M109, M109A1, M114A2, M198

Weapon/Propelling Charge/Primer/Combina-
tions:

M109/M3A1, M4A2/M82
 M109A1/M3A1, M4A2, M119, M119A1/M82
 M114A2/M3A1, M4A2/MK 2A4, MK15
 M198 (1st quarter tube life) as weapon
 testing not yet completed/M3A1, M4A2,
 M119, M119A1/M82

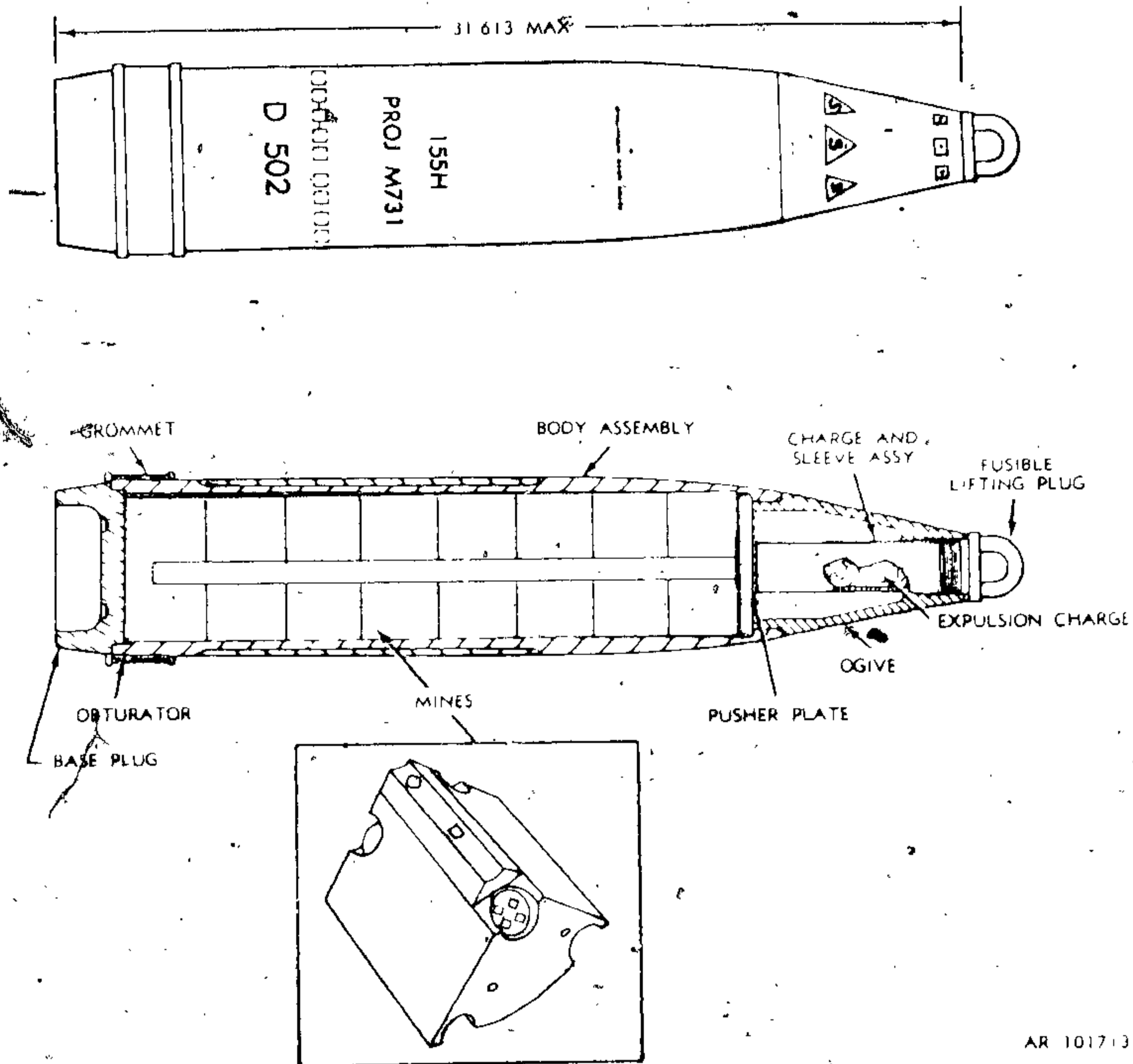
References:

TM 9-1340-241-12
 TM 9-1300-251-20
 TM 9-1300-251-34
 TM 9-2350-217-10N

For classified data pertaining to this item refer
 to TM 43-0001-28-1(C).

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PROJECTILE, 155 MILLIMETER: HE, M731



AR 101713

Type Classification:

●Std 01766014

Use:

This projectile is used to deliver submissiled antipersonnel mines fired from a 155mm howitzer and is called Area Denial Artillery Munitions (ADAM)

Description:

This projectile is of the separate loading type. The fuze, propelling charge, and primer are handled separately. The projectile is provided with a fusible lifting plug in place of a fuze for handling. The plug must be replaced by a fuze before the projectile is loaded. The projectile contains a number of antipersonnel mines. The mines are contained by a base plug, with a left

hand thread, which is screwed into the base of the projectile. An expulsion charge is contained in a cavity in the nose of the projectile to eject the mines. The metal rotating band near the base of the projectile is protected during storage and handling by a removable plastic grommet.

Functioning:

When the primer is detonated, the flash ignites the propelling charge producing gases which force the spin-stabilized projectile out of the gun tube and propels it to the target. The M577 fuze, having been set to function at a predetermined time in flight, initiates the expulsion charge ejecting the mines from the rear of the projectile. Centrifugal force disperses the mines radially from the projectile line-of-flight. The mines are completely armed a short time after ground impact. A self-destruct mechanism is activated which initiates the mine after a

predetermined time if the munition is not functioned by trip wire or disturbance.

Tabulated Data:

Projectile:

Type ----- HE
 Weight ----- 102.5 lbs without fuze
 Length w/fuze --- 35.4 in.
 Body material -- Forged Steel
 Color ----- Olive drab w/yellow triangles and markings

Filler and weight:

Number of mines - 36
 Explosive, Comp A5, each mine - 21.25 grams
 Expulsion charge- M10 propellant, 51 grams

Components:

Propelling charge M3A1 ----- Propellant M1, 5.0 lbs (Zones 1-5)
 Propelling charge M4A2 ----- Propellant M2, 13.5 lbs (Zones 3-7)

M119/M119A1 Special Single Zone (8) for use with the M109A1 only.

Muzzle Velocity (M/S)	Max Range (MTRS)
650	17,740

Primer ----- M82
 Fuze ----- MTSQ, M577
 Cannon used with ----- M185, M199, M1A2, M126, M126A1

Performance (full charge):

Maximum range - 14,586 meters
 Muzzle velocity - 560.2 meters/sec

Temperature Limits:

Firing:

Lower limit ---- -25° F (-32.6°C)
 Upper limit ---- +125° F (51.7°C)

Storage:

Lower limit ----- -30° F (-31.1°C)
 Upper limit ----- +160° F (71.1°C)

*Packing ----- Pallet of 8 projectiles

*Pallet:

Weight (loaded) ----- 874 lbs
 Dimensions ----- 39-3/8 x 29 x 14-1/2 in.
 Cube ----- 9.7 cu ft

*NOTE: See SC for complete packing data including NSN's

Shipping and Storage Data:

Quantity-distance class -- 1.2
 Storage compatibility group ----- D
 DOT shipping class ----- A
 DOT designation ----- EXPLOSIVE PROJECTILES
 DODAC ----- 1320-D502
 Drawing number ----- 9298316
 Top packaging drawing number ----- 8837839

WEIGHT ZONES

Loaded Proj (w/o fuze, w/o plug)

Zone	Over lbs	Up to & Incl. lbs	Markings
2	99.1	100.3	□ □
3	100.3	101.3	□ □ □
4	101.3	102.6	□ □ □ □
5	102.6	103.6	□ □ □ □ □
6	103.6	104.8	□ □ □ □ □ □

Ballistics:

Howitzer, Self-Propelled, M109

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)
*1, M3A1, green bag	200.0	3640
*2, M3A1, green bag	225	4570

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)
3, M3A1, green bag	254	5590
4, M3A1, green bag	293.5	7080
5, M3A1, green bag	349.5	9050
3, M4A2, white bag	334.2	6490
4, M4A2, white bag	310.1	7720
5, M4A2, white bag	363.5	9420
6, M4A2, white bag	445.0	11730
7, M4A2, white bag	535.2	14320

Howitzer, Self-Propelled, M109A1

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)
*1, M3A1, green bag	180.9	2980
*2, M3A1, green bag	216.0	4220
3, M3A1, green bag	263.0	5940
4, M3A1, green bag	304.1	7500
5, M3A1, green bag	358.3	9330
3, M4A2, white bag	297.5	7230
4, M4A2, white bag	337.0	8630
5, M4A2, white bag	388.0	10080
6, M4A2, white bag	460.0	12150
7, M4A2, white bag	546.5	14650
8, M119/M119A1	650.0	17740

*Firing below charge 3 with M185 and M199 Cannons may result in stickers.

Howitzer - M198

Charge	Muzzle Velocity - M/S		Max Range (mtrs)
Propelling Charge - Green Bag			
	M2A1	M3	
3G	261.9	257.9	2980
4G	303.6	301.6	4220
5G	358.1	356.1	5940

Propelling Charge - White Bag

	M4A2	M4A1	
3W	285.2	285.2	7230
4W	326.5	324.5	8630
5W	381.3	378.3	10080
6W	460.7	455.7	12150
7W	546.2	543.2	14650

Propelling Charge - M119/M119A1

8	655.8	17740
---	-------	-------

Propelling Charge M203

8S Not Applicable

Howitzer, Towed, M114A2

Firing Tables not compiled at this time.

Weapons fired from:

M109, M109A1, M114A2, M198

Weapon/Propelling Charge/Primer/Combina-
tions:

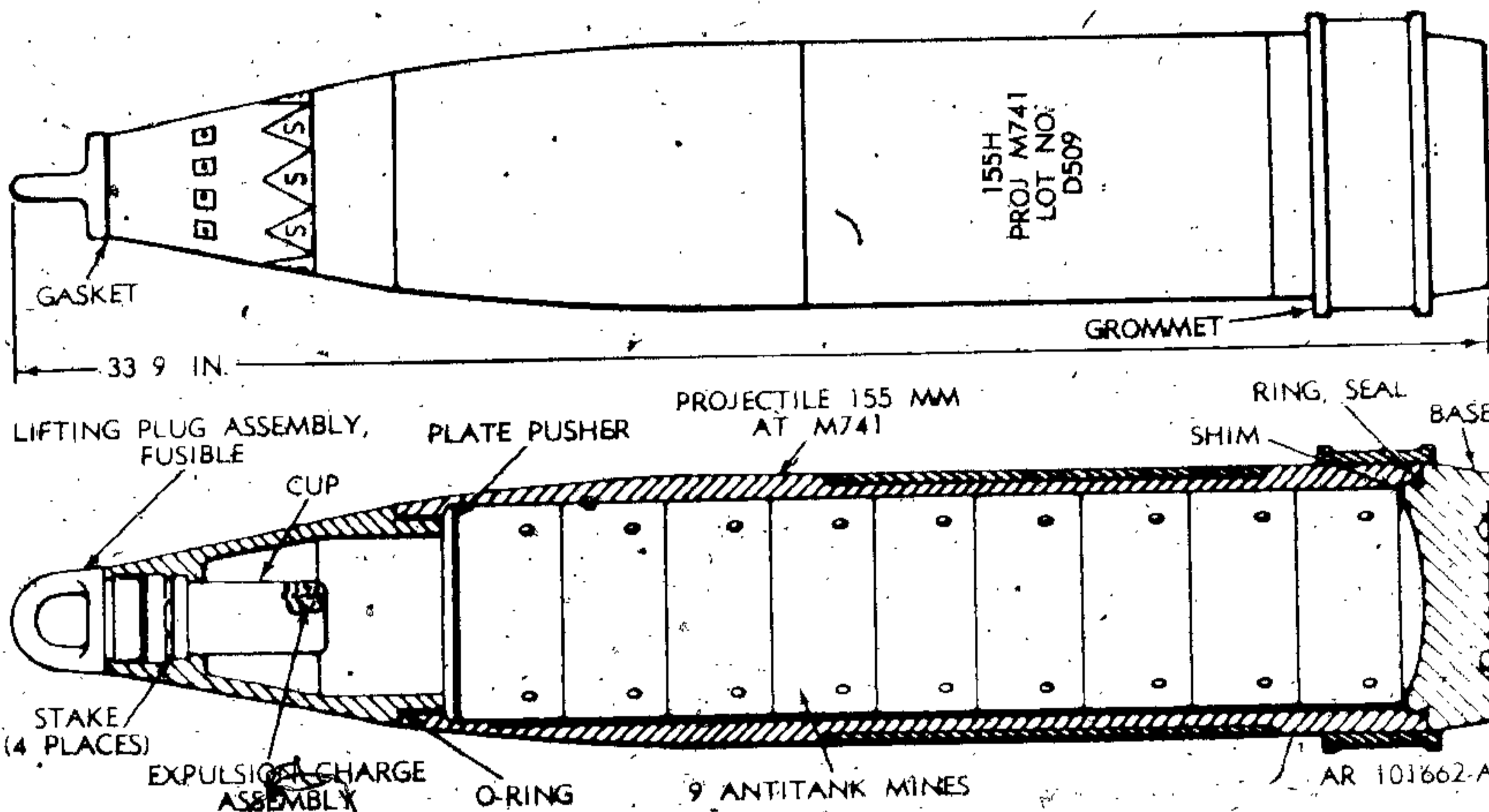
M109/M3A1, M4A2/M82
M109A1/M3A1, M4A2, M119, M119A1/M82
M114A2/M3A1, M4A2/MK2A4, MK15
M198 (1st quarter tube life as weapon testing
not completed/M3A1, M4A2, M119, M119A1/
M82

References:

TM 9-1340-241-12
TM 9-1300-251-20
TM 9-1300-251-34
TM 9-2350-217-10N

For classified data pertaining to this item refer
to TM 43-0001-28/1

PROJECTILE, 155 MILLIMETER: AT, M741



Type Classification:

LCC A MSR 01-786003 dtd 18 Jan 78

Use:

These projectiles are used to deliver anti-tank mines in front of enemy armored forces to deny delay access to a particular area for a specific time period. They are called Remote Anti-Armor Mines System (RAAMS).

Description:

The projectiles are of the separate loading type (the fuzes, propelling charges, and primers are handled separately). The projectiles are shipped from the loading plant with fusible lifting plugs to facilitate handling, and as a safety measure. Before firing, the lifting plugs must be replaced with M577 MTSQ fuzes. The projectiles contain a payload of antitank mines that are ejected during projectile flight by an expulsion charge. The rotating bands are protected from damage during transportation and handling by plastic grommets.

Functioning:

When the projectile is fired, the primer ignites the propelling charge which propels the round to the target area. The MTSQ fuze

functions at its pre-set time setting, initiating the expulsion charge, which ejects the mines from the projectile. The mines (having been subjected to the required set-back, rotational, and set-forward forces) are armed soon after ground impact. Upon sensing the proximity of tanks the mines initiate. If the mines are not initiated during their intended life span, a circuit is activated causing the mines to self-destruct. A percentage of the mines in each projectile have anti-disturbance mechanisms to discourage attempts at mine field clearing.

Tabulated Data:

<u>Projectile:</u>	
Type -----	Anti-tank
Weight -----	103 lbs with fuze
Length with lifting plug -----	33.9 in.
Body material -----	Forged steel
Color -----	Olive drab w/ yellow markings
Marking drawing ---	9278014, Rev E

Filler and Weight:

Number of mines -----	9
Explosive -----	PBX 0280 (95% RDX, 5% Estane)
Explosive Wt/mine ---	1.26 lbs

Change 5

3-128.1

Expulsion charge --- M10 Propellant
(51 ± 1 grams)

WEIGHT ZONES
Loaded Proj (w/o fuze, w/o plug)

Zone	Over Lbs	Up to & Incl	Markings
2	99.1	100.4	□ □
3	100.2	101.5	□ □ □
4	101.1	102.8	□ □ □ □
5	102.4	103.7	□ □ □ □ □
6	103.5	104.8	□ □ □ □ □ □

Components:

Propelling Charges: - M3A1, M4A2, M119,
M119A1
Primers: ----- *MK 2A4, MK 15, M82
Fuze: ----- MTSQ, M577

Ballistics:

Howitzer, Self Propelled, M109A1

Temperature Limits:

Firing:
Lower limit ----- -25° F (-32° C)
Upper limit ----- +145° F (63° C)
Storage:
Lower limit ----- -60° F (-51° C)
Upper limit ----- +160° F (71° C)

Charge	Muzzle velocity (m/s)	Max range (mtrs)
3, M3A1, green bag	263.2	5900
4, M3A1, green bag	305.7	7500
5, M3A1, green bag	360.1	9300
3, M4A2, white bag	295.5	7100
4, M4A2, white bag	335.5	8600
5, M4A2, white bag	386.8	10000
6, M4A2, white bag	462.7	12000
7, M4A2, white bag	548.1	14400
8, M119, prop M8, 20.3 lbs	650.5	17500

Packing Data:

Packing ----- Pallet of 8 projectiles
Pallet:
Weight (loaded) --- 882 lbs
Dimensions ----- 39-3/8 x 29-1/8 x 14-5/8
Cube ----- 9.7 cu ft

Howitzer, Self-Propelled, M109

Howitzer, Towed, M114A2

*Check supply catalogs for complete packing data, including national stock numbers.

Firing Tables not compiled at this time.

Shipping and Storage Data:

Quantity-distance class - 1.1
Storage compatibility group ----- D
DOT shipping class ----- Class A Explosive
DOT designation ----- EX PLOSIVE PRO-JECTILES
DODAC ----- 1320-D509
Drawing number ----- 9278014
Top packaging drawing number ----- 8837839

Weapons fired from:

M109, M109A1, M114A2, M198

Weapon/Propelling Charge/Primer/Combinations:

M109/M3A1, M4A2/M82
M109A1/M3A1, M4A2, M119, M119A1/M82
M114A2/M3A1, M4A2/MK2A4, MK15
M198 (1st quarter tube life as weapon testing not completed/M3A1, M4A2, M119, M119A1/M82

Howitzer - M198 (M199 Cannon)

Charge	Muzzle Velocity - M/S	Max Range (mtrs)
--------	-----------------------	------------------------

Propelling Charge - Green Bag

	M3A1	M3	
3G	261.9	257.9	2980
4G	303.6	301.6	4220
5G	358.1	356.1	5940

Propelling Charge - White Bag

	M4A2	M4A1	
3W	285.2	285.2	7230
4W	326.5	324.5	8630
5W	381.3	378.3	10080
6W	460.7	459.7	12150
7W	546.2	543.2	14650

Propelling Charge - M119/M119A1

8	655.8	17740
---	-------	-------

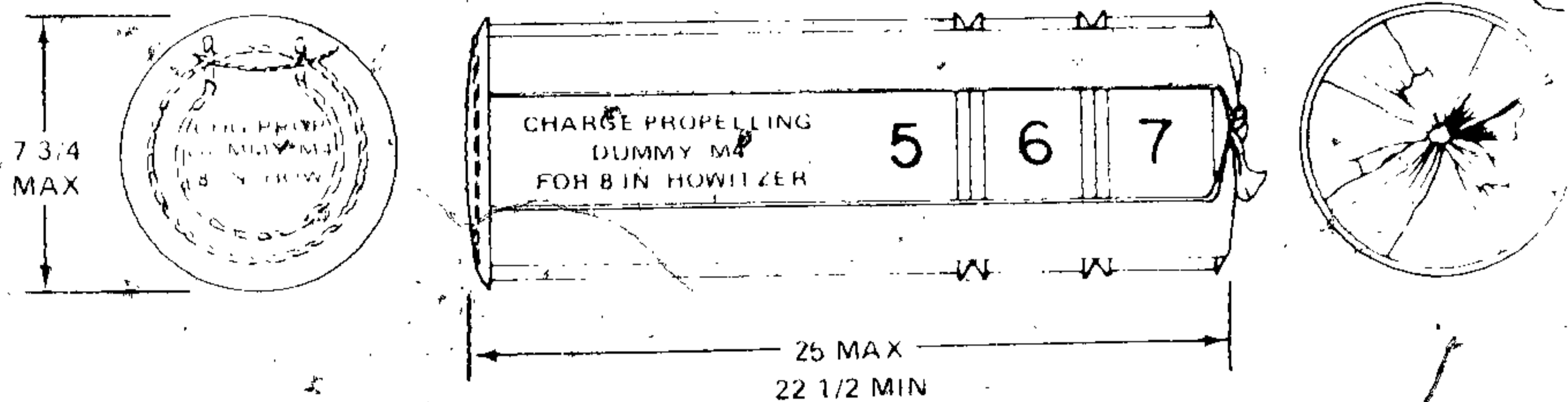
References:

TM 9-1300-251-20
 TM 9-1300-251-34
 TM 9-2350-217-10N

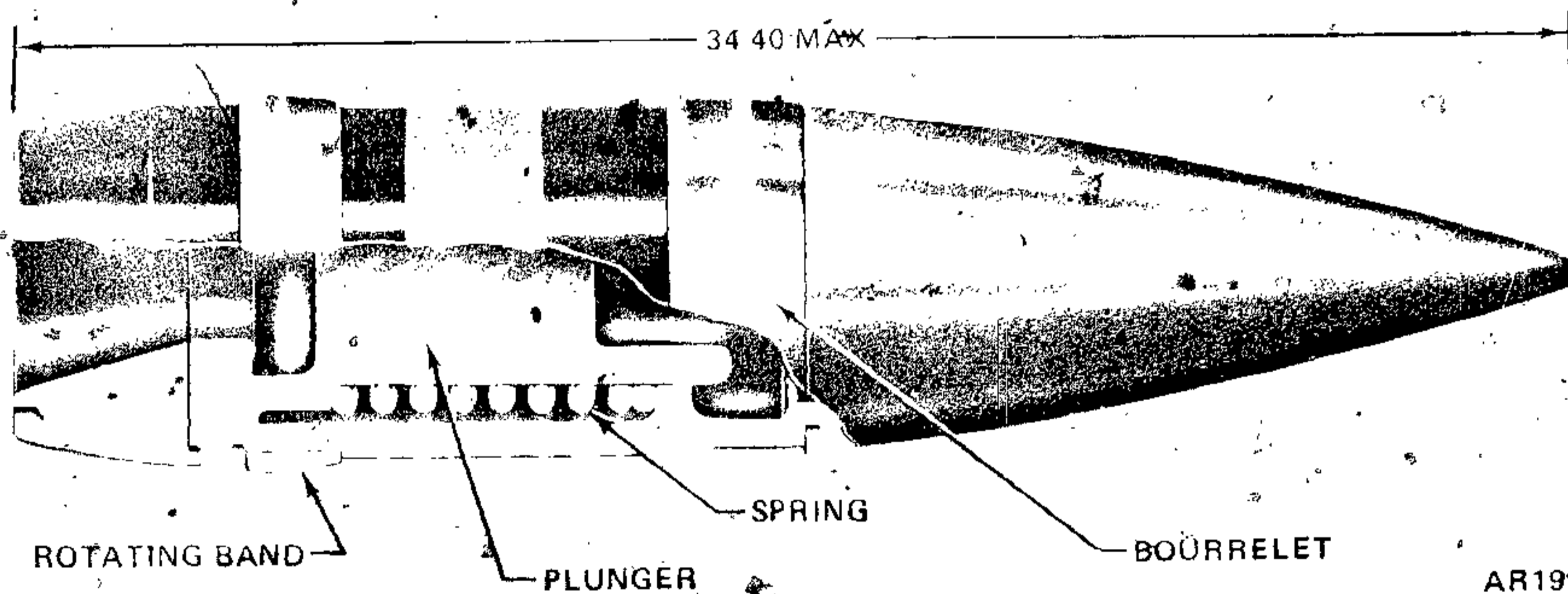
For classified data pertaining to this item refer
 to TM 43-0001-28-1 (C).

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PROJECTILE, 8-INCH: DUMMY, M14 WITH CHARGE, PROPELLING: DUMMY, M4



AR199695



AR199694

Type Classification:

Std OTCM 36841 dtd 1958.

Use:

Dummy Projectile M14 and Dummy Propelling Charge M4 are used together as a drill round to train troops in handling 8-inch ammunition and loading 8-inch howitzers.

Description:

The dummy projectile simulates the standard HE Projectile M106 in exterior shape, weight, and center of gravity. A spring-loaded plunger in the base loosens the projectile in the forcing cone of the barrel by rebound impact after ramming. A bronze rotating band

encircles the steel body just forward of the boattail, and a bronze bourrelet is fitted just behind the nose cone. Dummy Propelling Charge M4 simulates white bag Service Charge M2. The dummy base charge and two increments are filled with wood blocks, weighted with lead to equal the weight of the service charge.

Functioning:

Both Dummy Projectile M14 and Dummy Propelling Charge M4 are inert and do not function. During ramming of the projectile, the internal plunger is driven forward against the plunger spring. On rebound, the plunger impacts the base to loosen the tight fit in the forcing cone resulting from ramming. The

purpose of the mechanism is to ease the extraction of the projectile. Actual extraction is accomplished by manual pulling, using Extractor M7 from the breech of the weapon to engage the base of the projectile.

Tabulated Data:

Complete round:

Type ----- Inert
 Weight:
 Projectile ----- 200 lbs.
 Prop. Charge ----- 30.0 lbs.
 Length:
 Projectile ----- 34.40 in max.
 Prop. Charge ----- 25 in. max.
 Cannon used with ----- M2, M2A1, M2A2
 (M2A1E1), M47
 and XM201

Projectile body
 material ----- Steel
 Charge M4 body
 material ----- Lead - weighted
 wooden blocks,
 fabric covered

Color:

Projectile
 (early mfg) ----- Black or blue
 w/white markings

Projectile
 (recent mfg) ----- Bronze w/white
 markings

Prop. Charge M4 ----- White

Temperature Limits:

* Packing:

Dummy Projectile
 M14 ----- 1 projectile in
 wooden crate

Dummy Charge M4 ----- 1 charge in
 wooden box

* Crate

Weight ----- 235 lbs.
 Dimensions ----- 39-11/16 x 10-13/16
 x 10-13/16 in.
 Cube ----- 2.4 cu. ft.

* Packing Box (Prop Charge):

Weight ----- 51.9 lbs.
 Dimensions ----- 29-9/32 x 9-
 13/16 x 8-7/32 in.
 Cube ----- 1.6 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

DOT designation:

Dummy Projectile --- PROJECTILE
 M14 --- NONEXPLOSIVE
 Dummy Charge ----- DUMMY PROPEL-
 M4 --- LING CHARGE

DODIC:

M14 ----- 1320-D679
 M4 ----- 1320-D677

Assembly Dwg. No.:

M14 ----- 72-1-82
 M4 ----- 8863354

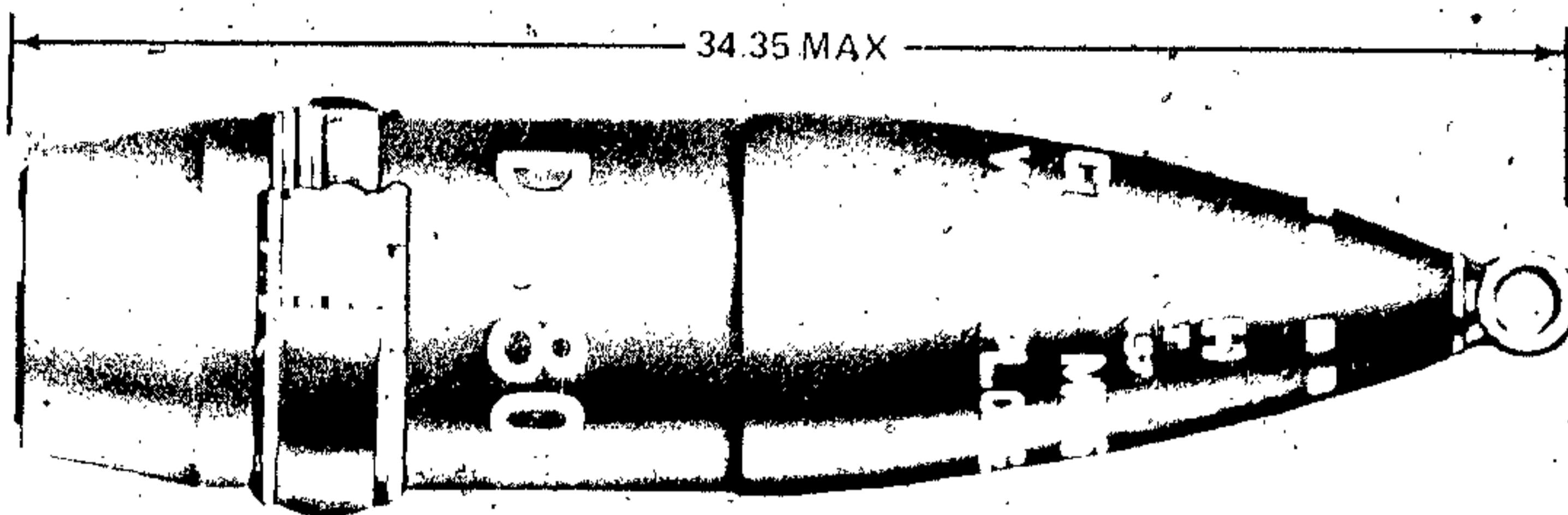
Ballistics:

Not applicable.

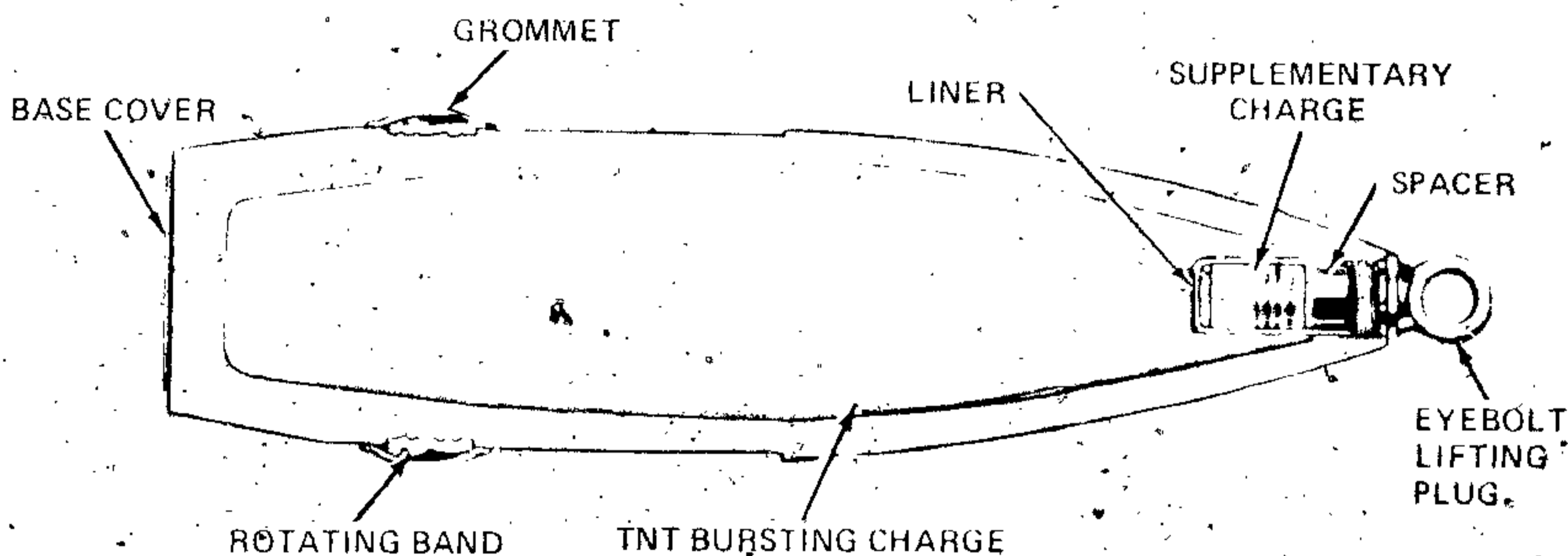
References:

TM 9-2300-216-10
 TM 9-2350-210-12
 TM 9-3004
 SC 1305/30-IL
 SB 700-20
 AMCP 700-3-8

PROJECTILE, 8-INCH: HE, M106



AR199705



AR199704

Type Classification:

Std. OTCM 36841 dtd 1958

Use:

This projectile is used against personnel and materiel, producing blast and fragmentation at the target.

Description:

The projectile consists of a hollow steel forging with a boattailed 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. The nose of the projectile is fitted with a threaded eyebolt-lifting plug to facilitate handling and provide a closure for the fuze ca-

vity. The projectile is made with either a shallow or deep fuze cavity and may be loaded with TNT or Composition B. Deep cavity projectiles contain a supplementary charge in the fuze cavity. A cardboard spacer is placed in the fuze cavity between the supplementary charge and the lifting plug to limit movement of the supplementary charge during shipping and handling. The rotating band is protected by a removable grommet. The loaded projectile is zoned into one of five weight zones ranging from 191.4 to 204.3 pounds. The weight zone of the projectile is indicated by the number squares and prick punch marks on the ogive of the projectile.

Functioning:

The grommet and lifting plug are removed from the projectile and 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 supplementary charge is removed. Fuze arming occurs after firing, during projectile flight downrange. Depending upon the type of fuze fitted, the fuze functions detonating the projectile on impact, after an elapsed time or on sensing of the target.

Tabulated Data:

Projectile:

Type ----- HE
 Weight Zone Information

ZONE	LOADED PROJECTILE (W/O FUZE)		W/O LIFTING PLUG MARKING
	POUNDS	OVER UP TO & INCL	YELLOW SQUARES
2	191.4	194.3	□□
3	193.9	196.8	□□□
4	196.4	199.3	□□□□
5	198.9	201.8	□□□□□
6	201.4	204.3	□□□□□□

Length:

W/o Lifting Plug ----- 31.43 in.
 W/Lifting Plug --- 34.35 in. (max.)

Diameter:

Rotating Band ---- 8.28 in.
 Bourrelet ----- 7.998 (max.)

Body material ----- Steel

Color ----- Olive drab w/ yellow markings

Filler and weight ---- TNT 36.3 lbs.
 Comp. B 38.8 lbs.

Supplementary charge ----- TNT 0.3 lb.

Grommet ----- 3 types, metal w/ wire ties, fiber-glass or plastic w/metal lever

Weapon system information:

	Weapon	Model	Type
Cannon	M115 towed	M110SP	M55SP
Tube	M2A1, M2	M2A2 (M2A1E1)	M47
Prop. Chg.	M1, M2	M1, M2	M1, M2
Primer	MK2A4	M82, MK15	M82, MK15
Fuze PD	M78, M557	Same	Same
Fuze MFSQ	M564, M582	Same	Same
Fuze Prox.	M514, M514B1, M514A1,		M728

Temperature Limits:

Firing:

Lower limit ----- - 40° F
 Upper limit ----- + 125° F

Storage:

Lower limit ----- - 80° F for periods of not more than 3 days
 Upper limit ----- + 160° F for not more than 4 hrs./day

* Packing ----- 6 projectiles on pallet

* Pallet:

Weight ----- 1253 lbs.
 Dimensions ----- 39-1/2 x 28-1/2 x 19-1/4 in.
 Cube ----- 12.4 cu. ft.

Shipping and Storage Data:

Quantity-distance class ----- 6
 Storage compatibility group ----- A
 DOT shipping class ----- A
 DOT designation ----- EXPLOSIVE PROJECTILE
 DODAC ----- 1320-D680
 Drawing number ----- 9207909

Ballistics-(M2, M2A1, M2A2 & M47 Cannons)

	Muzzle Velocity (fps)	Maximum Range (mtrs.)	Chamber Pressure (psi)
Charge 1, M1, green bag	820	5600	
Charge 2, M1, green bag	900	6600	
Charge 3, M1, green bag	1000	8000	
Charge 4, M1, green bag	1150	9700	
Charge 5, M1, green bag or M2, white bag	1380	11,600	
Charge 6, M2, white bag	1640	13,900	
Charge 7, M2, white bag	1950	16,800	

	Muzzle Velocity (fps)	Maximum Range (mtrs.)	Chamber Pressure (psi)
Ballistics (XM201 Cannon)			
Charge 1, M1, green bag	838	5946	
Charge 2, M1, green bag	920	7099	
Charge 3, M1, green bag	1016	8450	
Charge 4, M1, green bag	1181	10,435	
Charge 5, M1, green bag or M2, white bag	1390 1463	12,405 12,987	
Charge 6, M2, white bag	1705	15,209	
Charge 7, M2, white bag	1991	17,901	
Charge 8, XM188E2, white bag	2330	21,300	31,900

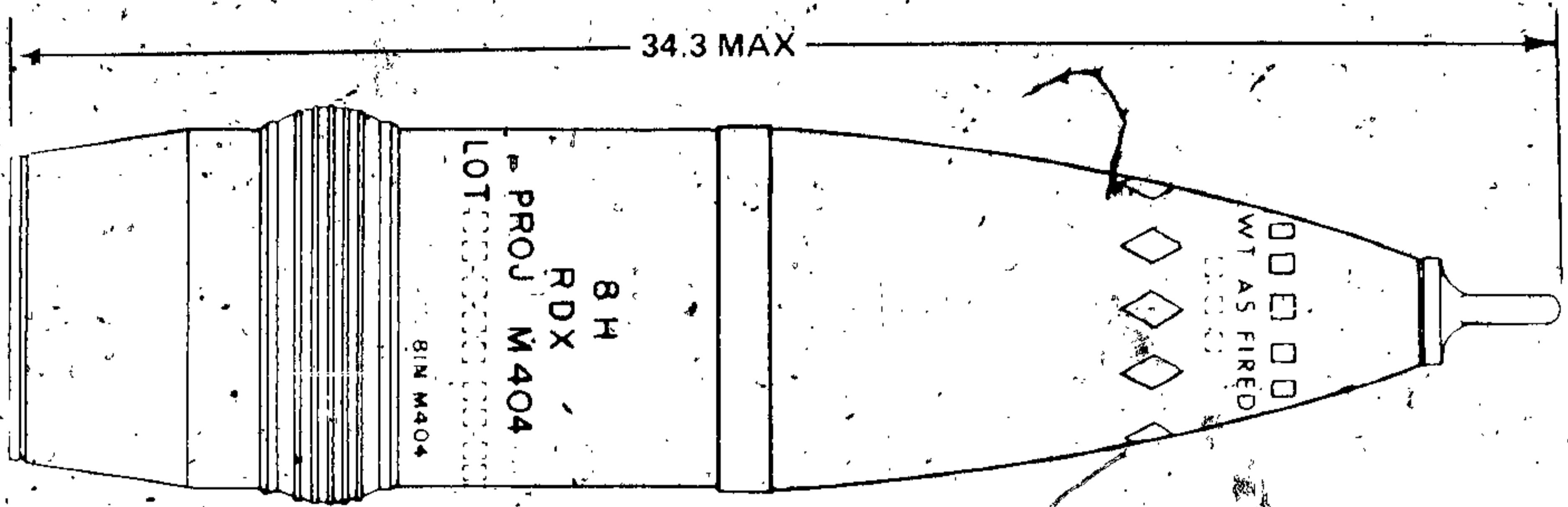
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References:

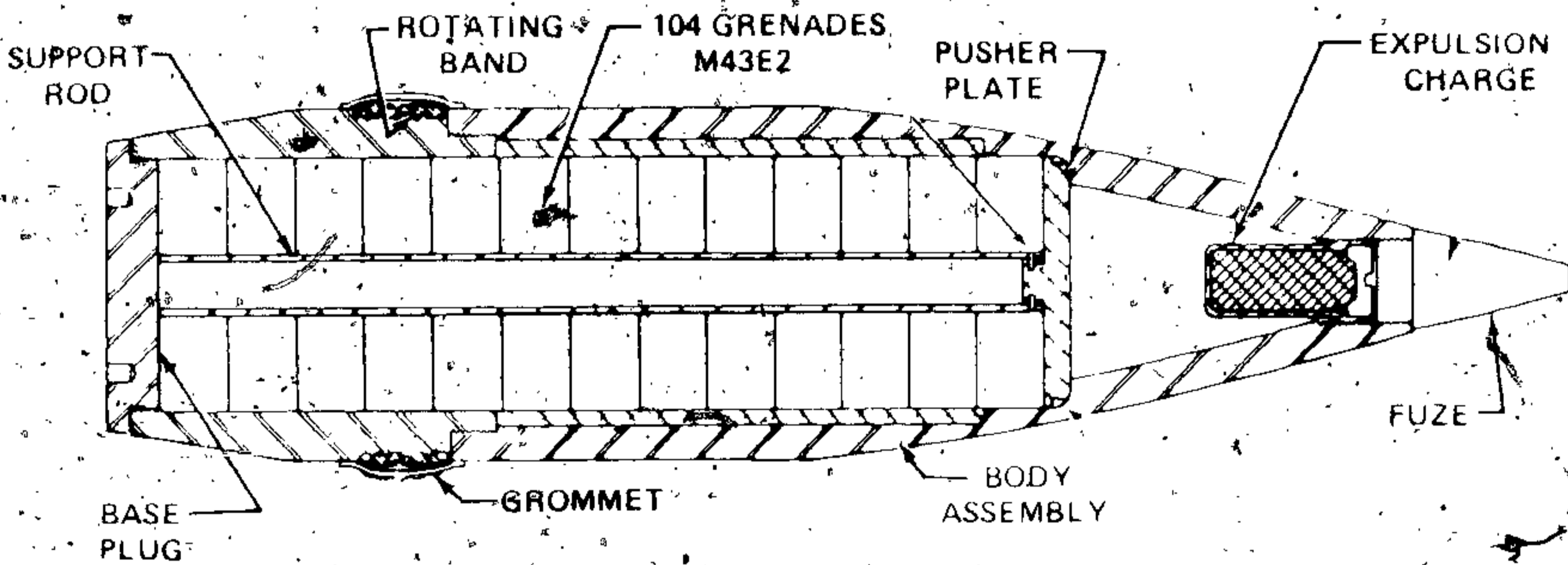
- SC 1305/30-IL
- SB 700-20
- AMCP 700-3-3
- TM 9-2306-216-10
- TM 9-1300-250
- TM 9-1300-206
- TM 9-1300-251-20
- TM 9-1300-251-34
- TM 9-3004
- TM 9-2350-210-12

TM 43-0001-28

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AR 199426-A



AR199425

Type Classification:

Std AMCTC 2873 dtd 1964

Use:

This projectile is used to deliver a concentration of antipersonnel grenades.

Description:

This projectile is of the separate loading type. The fuze, propelling charge, and primer are handled and loaded separately. The projectile is fitted with an eyebolt lifting plug in place of a fuze for handling. The plug must be replaced by a fuze before the projectile is loaded. The projectile contains 13 layers of grenades with 8 grenades in each layer. The

grenades are contained by a base plug which is screwed into the base of the projectile. An expulsion charge is contained in the nose of the projectile and separated from the grenades by a pusher plate. The metal rotating band near the base of the projectile is protected during storage and handling by a removable grommet.

Functioning:

When the primer is detonated, the flash ignites the propelling charge producing gases which force the spin-stabilized projectile out of the gun tube and propel it to the target. The fuze, having been set to function at a pre-determined time in flight, initiates the expulsion charge ejecting the entire grenade load from the rear of the projectile. Centrifugal force disperses the grenades radially from the projectile

line-of-flight. The M43 grenade is an air-burst submissile which is expelled from its housing on ground impact and projected upward to burst at 4 to 6 feet above the ground.

Tabulated Data:

Projectile:

Type ----- HE
 Weight ----- 200 lbs.
 Length:
 W/ fuze ----- 34.9 in.
 W/ lifting plug ----- 34.3 in.
 Body material ----- Forged steel
 Color ----- Olive drab w/ yellow diamonds and markings

Filler and weight:

Number of grenades, M43A1 ---- 104
 Explosive, Comp A5
 each grenade ----- 21.25 grams
 Explosive, Comp A5,
 each projectile ---- 4.87 lbs.
 Expulsion charge ---- M10 propellant,
 60 grams

Components:

Propelling charge --- M1 (Zones 1-5),
 13.6 lbs. M1 propellant; M2 (Zones
 5-7), 28.5 lbs. M1 propellant
 Primer ----- M82, MK2A4,
 MK15
 Fuze ----- MT, M565; MTSQ,
 M548; or MTSQ,
 M577
 Cannon used with ---- M2, M2A1, M2A2,
 M47, or M110 SP
 howitzer

Performance (full charge):

Maximum range ----- 16,788 meters
 Muzzle velocity ----- 587 meters/sec.
 (1950 ft/sec)

Weapon system information:

	Weapon	Model	Type
	M115 towed	M110SP	M55SP
Cannon		M2A2	
Cite	M2A1, M2	(M2A1E1)	M47
Prop. Chg.	M1, M2	M1, M2	M1, M2
Primer	MK2A4	M82, MK15	M82, MK15

Temperature Limits:

Firing:
 Lower limit ----- -40°F (-40°C)
 Upper limit ----- +125°F (51.6°C)
 Storage:
 Lower limit ----- -65°F (-53.8°C)
 Upper limit ----- +165°F (73.9°C)
 *Packing ----- Pallet of 6 projectiles

*Pallet:
 Weight ----- 1,253 lbs.
 Dimensions ----- 39-1/2 x 28-3/8
 x 19-1/4 in.
 Cubes ----- 12.4 cu. ft.
 *NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 1.2
 Storage compatibility
 group ----- D
 DOT shipping class ----- A
 DOT designation ----- EXPLOSIVE
 PROJECTILES

DODAC ----- 1320-D684
 Drawing number ----- 8875941
 Packing drawing
 number ----- 7548346

WEIGHT ZONES

ZONE	LOADED PROJECTILE (W/FUZE, W/O PLUG)		MARKING
	OVER	UP TO & ENCL	
2	193.4	196.3	□□
3	195.9	198.8	□□□
4	198.4	201.3	□□□□
5	200.9	203.8	□□□□□

Ballistics-(M2, M2A1, M2A2 & M47 Cannons)

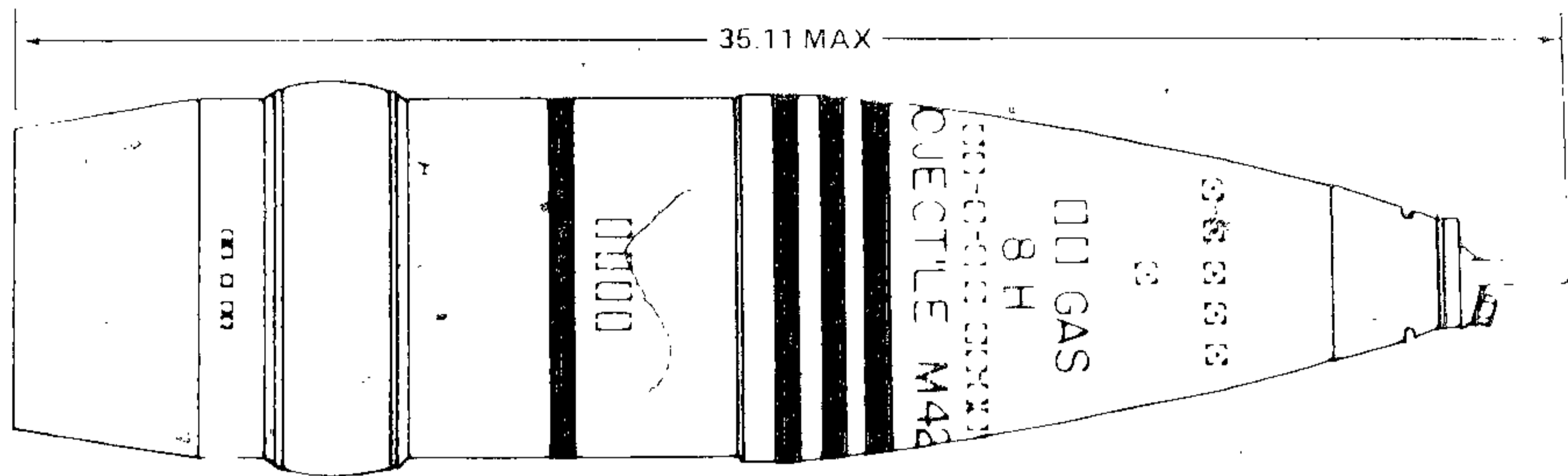
	Muzzle Velocity (fps)	Maximum Range (mtrs.)	Chamber Pressure (psi)
Charge 1, M1, green bag	820	5600	
Charge 2, M1, green bag	900	6600	
Charge 3, M1, green bag	1000	8000	
Charge 4, M1, green bag	1150	9700	
Charge 5, M1, green bag or M2, white bag	1380	11,600	
Charge 6, M2, white bag	1640	13,900	
Charge 7, M2, white bag	1950	16,800	

References:

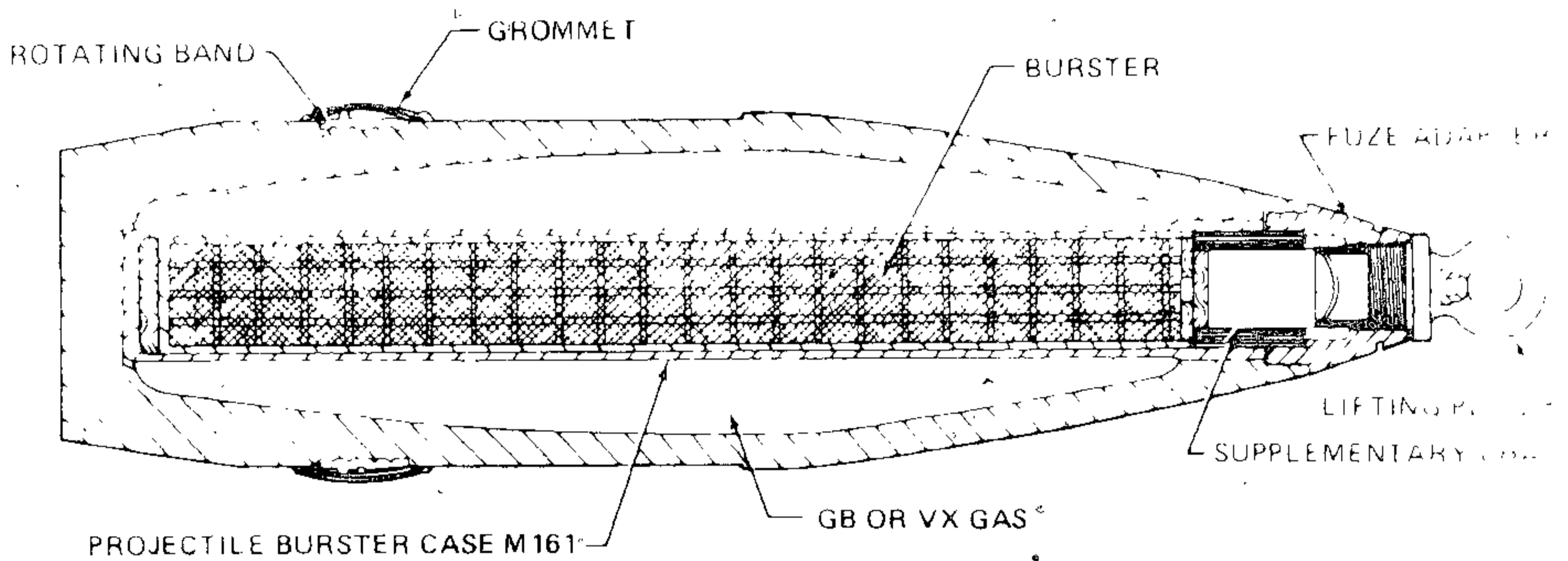
DARCOM P 700-3-3
 SB 700-20
 SC 1305/30-IL
 TM 9-1300-251-20
 TM 9-1300-254-12
 TM 9-2300-216-10
 TM 9-2350-210-12
 TM 9-1300-251-34

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PROJECTILE, 8-INCH: AGENT, GB (non-persistent) AND VX (persistent), M426



AP 39713



Type Classification:

Std OTCM 37836 dtd 1961

Use:

Projectile M426 is used in 8-inch howitzer cannons to deliver and disperse casualty producing agents. When filled with VX agent, the projectile is also used to contaminate habitable areas and thus deny such areas to the enemy.

Description:

The projectile is a hollow steel forging, ballistically similar to the standard HE Projectile M106. A tubular burster casing of thin metal, containing a Composition B4 burster, occupies the center of the shell and seals in the

agent. The remainder of the interior space is filled with 14.5 pounds of liquefied GB (non-persistent, or VX persistent gas. A threaded steel adapter provides a receptacle for a point-detonating or proximity fuze. For shipment and handling, an eyebolt lifting plug is installed in the fuze cavity of the adapter. A rotating band of gilding metal encircles the casing near the rear, and is protected by a grommet.

Functioning:

Ignition of the primer by the breech pin results in ignition of the propellant charge. The burning propellant generates rapidly expanding gases to propel the projectile out of the cannon barrel at the velocity required to reach the target. The rotating band of soft gilding metal is incised by the barrel rifling

and imparts a high rate of spin to the projectile. The snug fit of the rotating band also serves to prevent escape of gas pressure past the projectile. The spin insures stable flight of the projectile. When a point-detonating fuze is employed, impact causes the fuze to detonate the supplementary charge and the supplementary charge detonates the burster tube. The burster ruptures the shell case, releasing the agent. The liquefied agent expands to a gaseous state by heating from the burster charge. If a proximity fuze is fitted, action on the burster tube is direct from the booster element of the fuze, and projectile rupture occurs on approach to the target.

Tabulated Data:

Complete round:

Type -----	GB or VX	
Weight zone information:		Marks
Zone 2	191.4 to 194.3 lbs.	□□
Zone 3	193.9 to 196.4 lbs.	□□□
Zone 4	196.4 to 197.3 lbs.	□□□□
Zone 5	198.9 to 201.8 lbs.	□□□□□
Zone 6	201.4 to 204.3 lbs.	□□□□□
Length:		□
With lifting		
plug -----	35.11 in. max.	
Without lifting		
plug -----	31.37 in. max.	
Cannon used with -----	M2, M2A1, M47,	
	and M2A2	

Projectile:

Body material -----	Forged steel
Color:	
GB -----	Gray w/green markings and 1 green band
	(Later manufacture - 3 green and 1 yellow band)
VX -----	Gray w/green markings and 2 green bands (old markings) 3 green and 1 yellow bands (new markings)
Propelling charge ---	M1 green bag, M2 white bag
Primers -----	MK2A4, M82
Fuzes -----	PD, M557, M508 series; Prox. M514 series, M728

Temperature Limits:

Firing:	
Lower limit -----	- 40° F
Upper limit -----	+ 125° F

Storage:

Lower limit -----	- 80° F (for periods not more than 3 days)
Upper limit -----	+ 160° F (for not more than 4 hrs./day)

- * Packing ----- 6 projectiles on pallet
- * Pallet:
- Weight ----- 1253 lbs.
- Dimensions ----- 39-1/2 x 28-1/2 x 19-1/4 in.
- Cube ----- 12.54 cu. ft.
- * NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class -----	5
Storage compatibility group -----	A
DOT shipping class -----	A
DOT designation -----	EXPLOSIVE PROJECTILE
DODAC:	
GB -----	1320-D696
VX -----	1320-D695
Assembly Dwg. Nos.:	
GB -----	8860620-1
VX -----	8860620-2

Ballistics (M2, M2A1, M2A2 & M47 cannons):

	Muzzle Velocity (fps)	Maximum Range (mtrs.)
Charge 1, M1, green bag	820	5600
Charge 2, M1, green bag	900	6600
Charge 3, M1, green bag	1000	8000
Charge 4, M1, green bag	1150	9700
Charge 5, M1, green bag or M2, white bag	1380	11,600
Charge 6, M2, white bag	1640	13,900
Charge 7, M2, white bag	1950	16,800

Limitations:

References:

SC 1305/30-IL

SC 700-20

AMCP 700-3-3

TM 9-2300-216-10

TM 9-1300-250

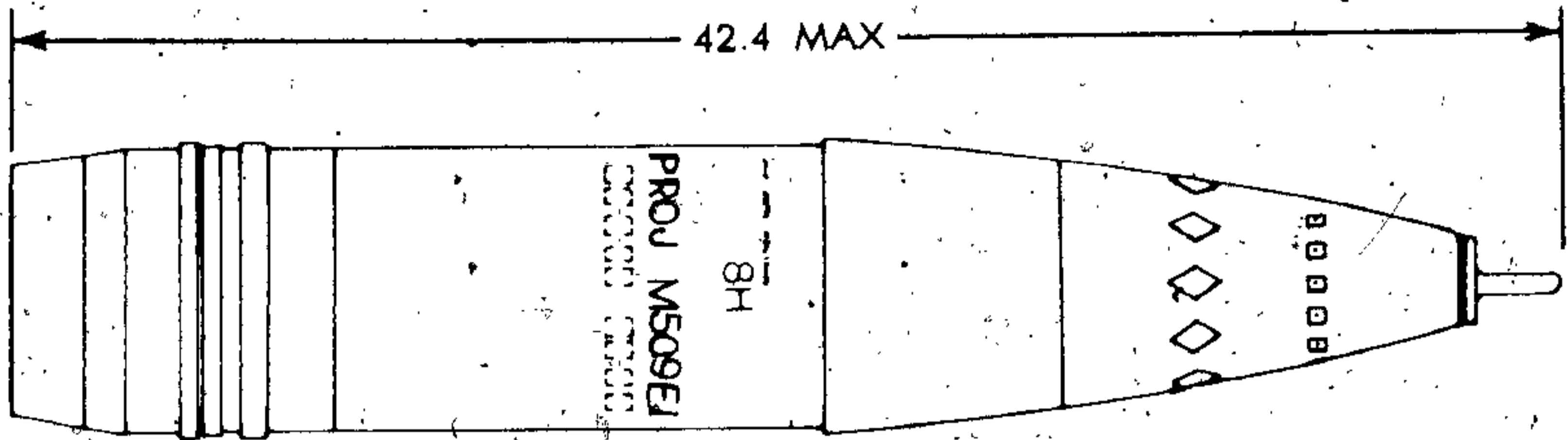
TM 9-1300-206

TM 9-1300-251-20

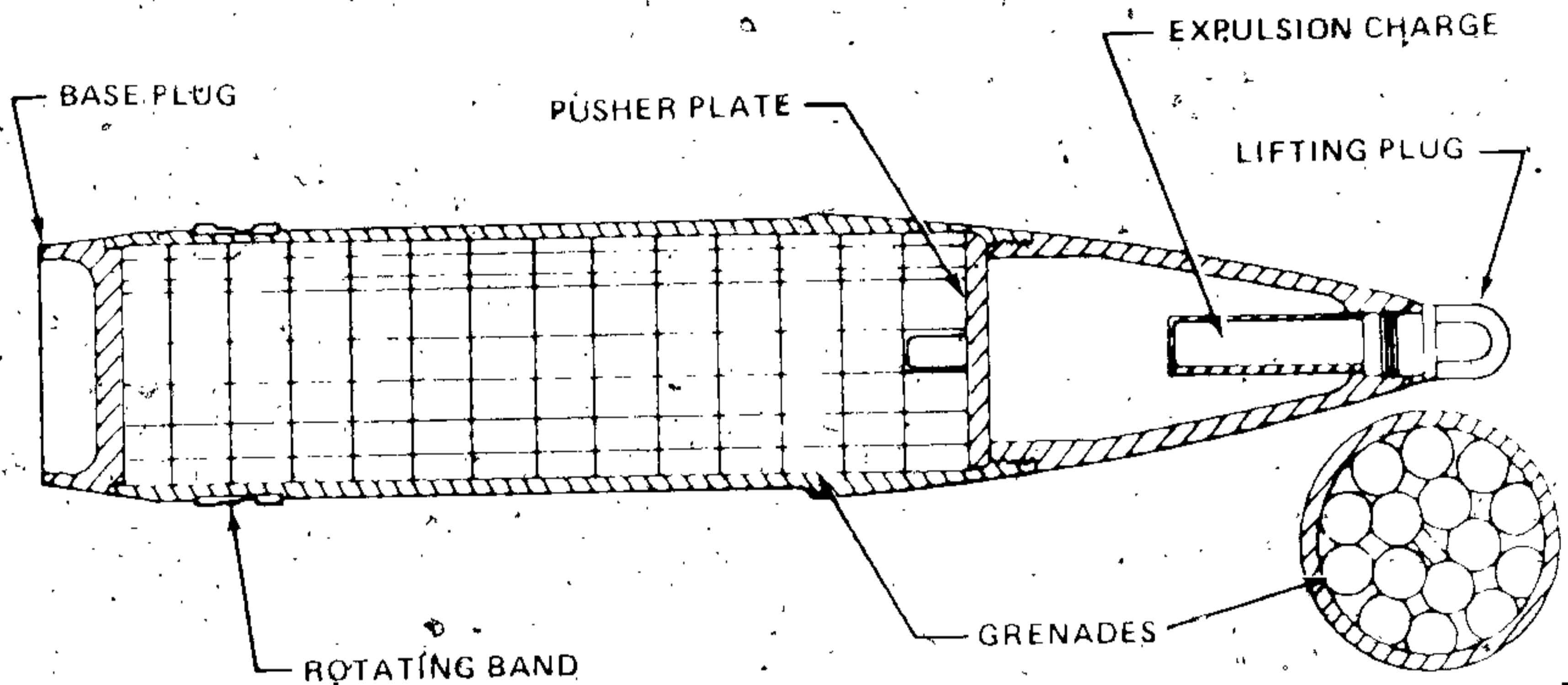
TM 9-1300-251-34

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PROJECTILE, 8-INCH: HE, M509E1



AR 199424-A



AR 199423-A

Type Classification:

Std MSR 02746014 dtd 1974

Use:

This projectile is used to deliver a concentration of antipersonnel/antimateriel grenades.

Description:

This projectile is of the separate loading type. The fuze, propelling charge, and primer are handled and loaded separately. The projectile is provided with an eyebolt lifting plug in place of a fuze for handling. This plug must be replaced by a fuze before the projectile is loaded. The projectile contains 13 layers of grenades with 15 grenades in each layer. The

grenades are contained by a base plug attached to the projectile with five shear pins. For normal use, an expulsion charge is fitted in a cavity in the nose of the projectile to eject the grenades. If desired, this expulsion charge may be replaced by a spotting charge designed to detonate the entire projectile as if it were a bulk-loaded HE projectile. The metal rotating band near the base of the projectile is protected during storage and handling by a removable plastic grommet.

Functioning:

When the primer is detonated, the flash ignites the propelling charge producing gases which force the spin-stabilized projectile out of the gun tube and propel it to the target.

The fuze, having been set to function at a pre-determined time in flight, initiates the expulsion charge ejecting the entire grenade load from the rear of the projectile. Centrifugal force disperses the grenades radially from the projectile line-of-flight. The M42 grenades are ground-burst submissiles which explode on impact. With the alternate loading of the spotting charge in place of the expulsion charge, the functioning of the fuze detonates the entire projectile over the target permitting observation of the projectile fuze functioning in relation to the target.

Tabulated Data:

Projectile:

Type ----- HE
 Weight ----- 206.5 lbs.
 Length:
 W/fuze ----- 43.9 in.
 W/lifting
 plug ----- 42.4 in.
 Body material ----- Forged steel
 Color ----- Olive drab w/yel-
 low diamonds and
 markings

Filler and weight:

Number of gre-
 nades, M42 ----- 195
 Explosive, Comp A5,
 each grenade ----- 30.5 grams
 Explosive, Comp A5,
 each projectile ----- 13.1 lbs.

Expulsion charge ----- M10 propellant, 130
 grams

Components:

Propelling
 charge ----- M1 (Zones 1-5),
 13.6 lbs., M1 pro-
 pellant, M2 (Zones
 5-7), 28.5 lbs., M1,
 propellant.

Primer ----- M82, MK2A4, or
 MK15

Fuze ----- MTSQ, M577

Cannon used with ----- MK10 SP howitzer

Performance (full charge):

Maximum range ----- 16,000 meters.
 Muzzle velocity ----- 594.4 meters/sec.

Temperature Limits:

Firing:

Lower limit ----- -40°F (-40°C)
 Upper limit ----- +125° (+51.6°C)

Storage:

Lower limit ----- -65°F (-53.8°C)
 Upper limit ----- +165°F (73.9°C)

* Packing ----- Pallet of 6 pro-
 jectiles

* Pallet:

Weight ----- 1,253 lbs
 Dimensions ----- 48-1/8 x 31-5/8
 x 22-1/2 in.
 Cube ----- 19.8 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

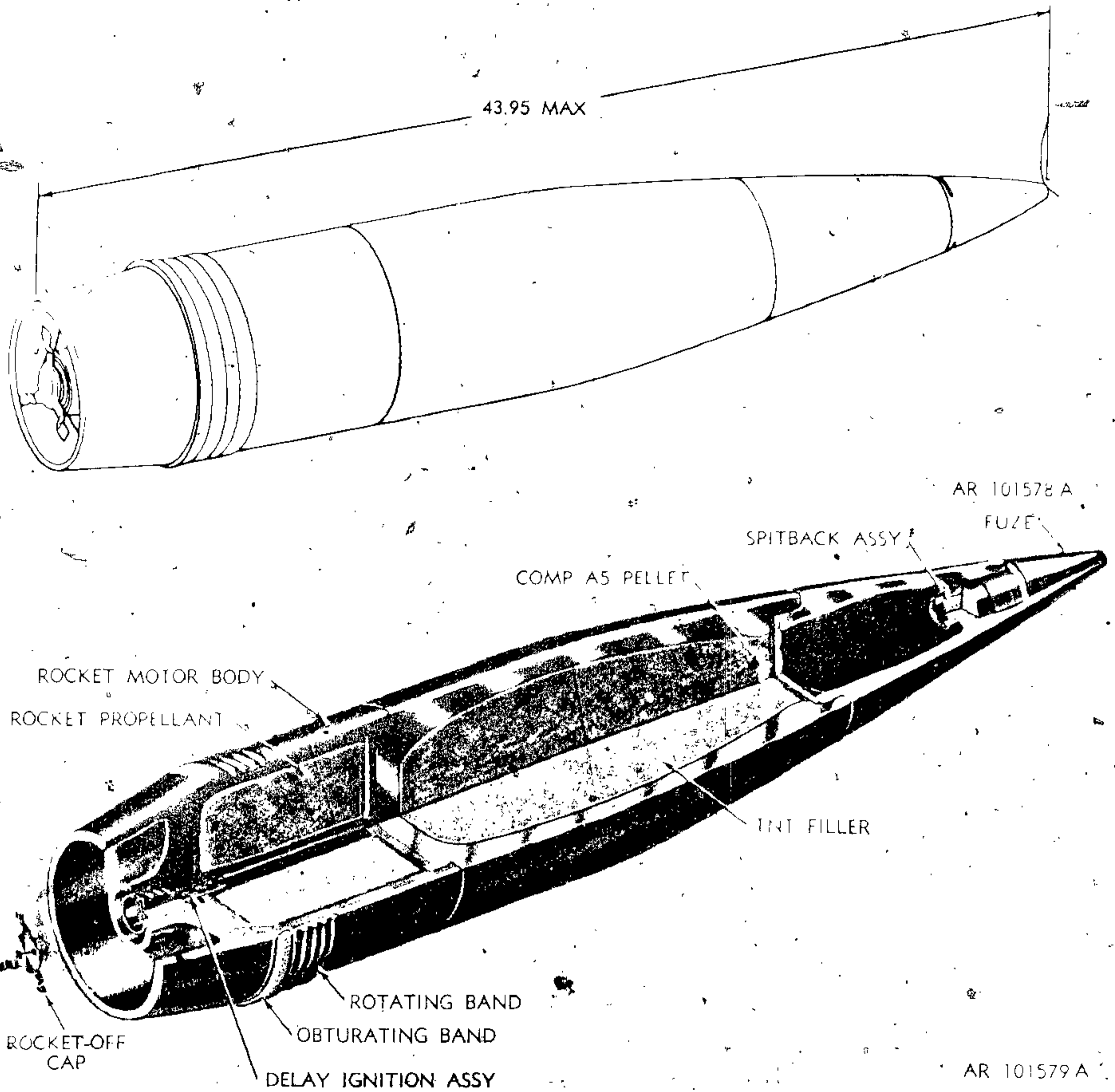
Shipping and Storage Data:

Quantity-distance
 class ----- 1.1
 Storage compatibility
 group ----- D
 DOT shipping class ----- A
 DOT designation ----- EXPLOSIVE PRO-
 JECTILES
 DODAC ----- 1320-D651
 Drawing number ----- 9210140
 Packaging drawing
 number ----- 9229038
 Grommet ----- 9298200

References:

DARCOM P 700-3-3
 SB 700-20
 SC 1305/30-IL
 TM 9-1300-251-20
 TM 9-2300-216-10
 TM 9-1300-251-34

PROJECTILE, 8-INCH: HERA, M650



Type Classification:

Std

Use:

The 8-inch M650 projectile is a high-explosive, rocket-assisted round with extended

range capability. It is intended to be employed against personnel and materiel targets at ranges in excess of those currently attainable with the standard M106 Projectile.

Description:

This Projectile consists of three major

components; an ogive, the warhead and a solid propellant rocket motor. The three components thread together to form a streamlined projectile. The aluminum ogive section contains a spitback booster assembly at the base of the fuze well and will accept fuzes of the shallow cavity type. The high fragmentation steel warhead is filled with TNT explosive. A composition A5 booster pellet is located in the center of the TNT filler at the forward end of the warhead. The alloy steel rocket motor section contains the solid propellant rocket motor grain and delay ignition assembly. A rocket-off cap is threaded onto the nozzle exit cone at the base of the rocket motor. The rocket motor is encircled with a copper welded overlay rotating band, which is backed up by a nylon obturating band. The projectile is fitted with a lifting plug at the nose and a grommet which protects the rotating band during shipping and handling.

Functioning:

The M550 Projectile may be fired either as a ballistic projectile, in the manner of a standard high explosive projectile or in a rocket assisted mode for extended range.

In the rocket motor off mode the projectile is propelled through the bore of the weapon by gas pressure generated by the propelling charge. Spin stabilization is imparted to the projectile through the rotating band. The fuze is armed by a combination of spin and setback. Functioning of the fuze initiates the spitback booster which fires through the hollow ogive assembly to initiate the A5 booster pellet, which in turn functions the TNT filler detonating the warhead. In the rocket motor on mode, the rocket motor cap is removed before firing. This causes a mid-flight rocket motor burn which increases the range over that obtained ballistically.

Tabulated Data:

Complete round:

**WEIGHT ZONES
LOADED PROJECTILE W/O FUZE
W/O GROMMET**

Zone	Over pounds	Up to and incl. pounds	Marks
2	191.4	194.3	□ □
3	193.9	196.8	□ □ □
4	196.4	199.3	□ □ □ □
5(Std)	198.9	201.8	□ □ □ □ □
6	201.4	204.3	□ □ □ □ □ □

Type ----- HE, rocket assisted (HERA)
 Weight (as fired) - 200 lbs (approx)
 Length (w/fired) - 43.95 in. max
 Length (w/lifting plug) ----- 53.23 in. max
 Cannon used with - M201E1 (M110A1E1 SP),
 M201 (M110A1 SP),
 M2A2 (M110 SP)

Projectile:

Body material --- HF-1 Steel
 Windshield material ----- Aluminum
 Color ----- Olive drab w/yellow markings
 Filler and weight - TNT, 25 lbs (approx)
 Propelling charge - M1, M2, M188, M188E1
 Primer ----- M82
 Fuzes (Short Intrusion) ----- PD: M557, M572, M739
 MTSQ: M564, M582
 VT: M732

Rocket Motor:

Body material --- Alloy steel
 Propellant grain - Solid Propellant Nitrocellulose base
 Weight grain ---- 12 lbs
 Delay Assembly:

No. of increments	Weight	Composition
1	300 mg	Flash
5	900 mg (ea)	Delay
1	290 mg	Igniter

Rocket Propellant Grain

Igniter ----- Type 1 Class 3
 Baron Potassium Nitrate
 Pellets - 5.5 grams

Temperature Limits:

Firing:

Lower limit ----- -50°F
 Upper limit ----- +145°F

Storage:

Lower limit ----- -50°F
 Upper limit ----- +145°F

*Packing ----- 6 projectiles on pallet

*Pallet:

Weight ----- 1260 lbs
 Dimensions ----- 22-5/8 x 31-3/4 x 45-5/8 in.
 Cube ----- 20 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class---- 1.2
 Storage compatibility
 group ----- D
 DOT shipping class ----- A
 DOT designation ----- EXPLOSIVE PRO-
 JECTILES
 DODAC ----- 1320-D
 Assembly Dwg. No. ----- 9280132 (Pallet)
 9287994 (Projectile)

Ballistics:

M2A2 cannon (M110 SP Weapon):

	Muzzle velocity	Maximum range		Chamber pressure
		Rocket Off	Rocket On	
M1, Green bag				
Charge 1				
Charge 2				
Charge 3				
Charge 4				
Charge 5				
M2, White bag				
Charge 5				
Charge 6				
Charge 7				

M201E1 cannon (M110A2 SP Howitzer):

	Muzzle velocity	Maximum range		Chamber pressure
		Rocket Off	Rocket On	
M1, Green bag				
Charge 1				
Charge 2				
Charge 3				
Charge 4				
Charge 5				
M2, White bag				
Charge 5				
Charge 6				
Charge 7				
M188, White bag				
Charge 8				
M188E1, White bag				
Charge 8				
Charge 9				

and M201 Cannon (M110A1 SP Weapon):

	Muzzle velocity	Maximum range		Chamber pressure
		Rocket Off	Rocket On	
M1, Green bag				
Charge 1				
Charge 2				
Charge 3				
Charge 4				
Charge 5				
M2, White bag				
Charge 5				
Charge 6				
Charge 7				
M188, White bag				
Charge 8				

Limitations:

None.

References:

DARCOMP 700-3-3
 SB 700-20
 SC 1305/30 IL
 TM 9-1300-251-20
 TM 9-1300-251-34
 TM 9-2300-216-10

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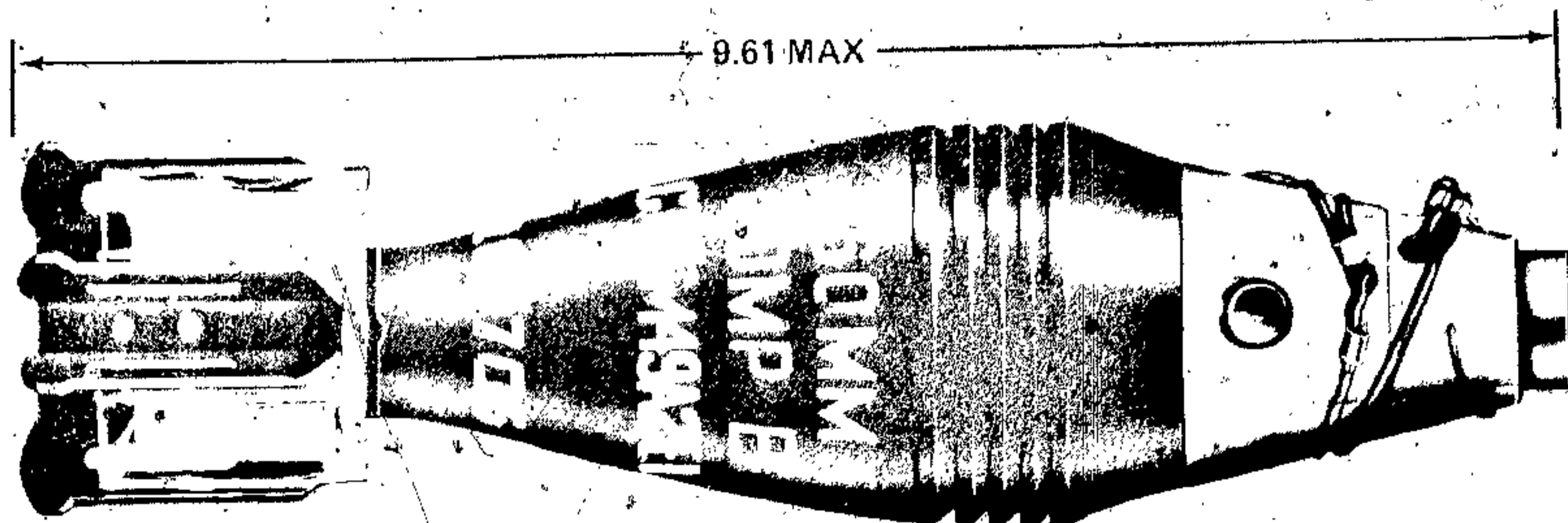
TM 43-0001-28

CHAPTER 4

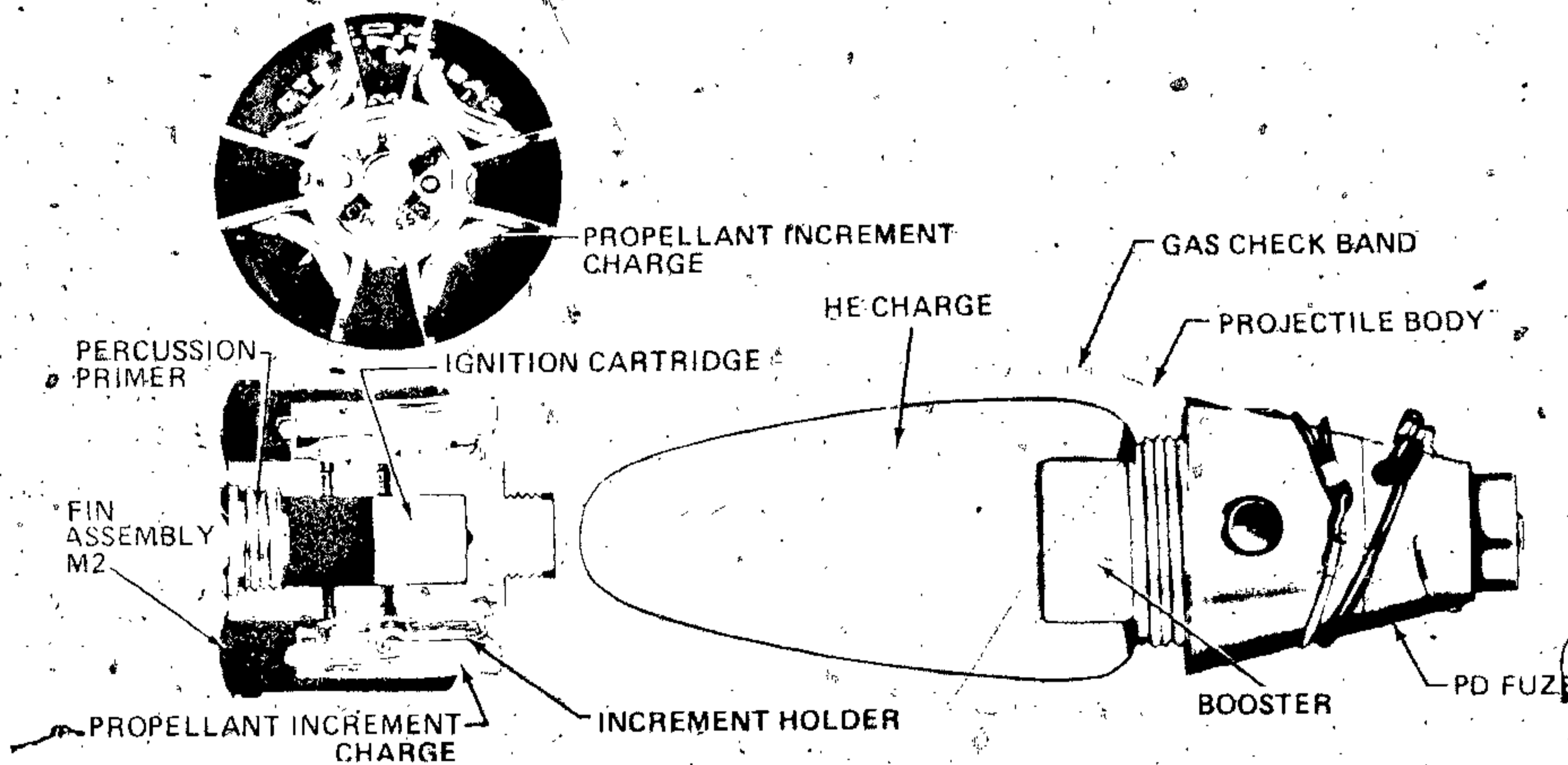
AMMUNITION FOR MORTARS

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CARTRIDGE, 60-MILLIMETER: HE, M49A3 (M49A2E1) AND M49A2



AR199518



AR199517

Type Classification:

M49A3: Std AMCTC 6632 dtd 1969
 M49A2: Std OTCM 37119 dtd 1959

Use:

This cartridge is fired in 60-mm Mortars M2 or M19 for use against personnel and materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body, a point-detonating fuze (staked), a fin assembly, four increments of propellant charge, an ignition cartridge, and a percussion primer. The projectile body is of pearlitic malleable iron, and is threaded internally at the nose to

accept the fuze and at the base to accept the fin assembly. The body is filled with Composition B high explosive.

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 flash from 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 mortar tube and propel it to the target. The projectile is fin-stabilized in flight. The point-detonating fuze functions on impact, detonating the fuze booster charge and, in turn, the high explosive charge. The high explosive charge shatters the projectile

body, producing near optimum fragmentation and blast effect at the target.

Difference Between Models:

The projectile body of the M49A2 is of forged steel, and is filled with flaked TNT.

Tabulated Data:

Complete round:

Type ----- HE
 Weight w/fuze ----- 3.07 lbs.
 Length w/fuze ----- 9.61 in.

Projectile:

Body material:
 M49A3 ----- Cast PMI
 M49A2 ----- Forged steel
 Color ----- Olive drab w/yellow markings

Filler and weight:

M49A3 ----- Comp. B, 0.42 lb.
 M49A2 ----- TNT, 0.34 lbs.

Components:

Ignition cartridge ----- M5A1
 Propellant charge ----- M3A1
 Percussion primer ----- M32
 Fin assembly --- M2
 Fuze ----- PD, M525 series
 PD, M717

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° (for period not more than 4 hrs/day)

* Packing: One round in fiber container; 10 containers in wooden box.

* Packing Box:

Weight ----- 49 lbs.
 Dimensions ----- 17-9/16 x 12-1/8 x 8-7/32 in.
 Cube ----- 1.3 cu. ft.

* NOTE: See SC for complete packing data including NSN's:

Shipping and Storage Data:

Quantity-distance class ----- 5.
 Storage compatibility group ----- E
 DOT shipping class --- A
 DOT designation-AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
 DODAC ----- 1310-B632
 Drawing number ----- 9207925

<u>Ballistics</u>	<u>Muzzle Velocity</u>	<u>Maximum Range</u>	
<u>Charge</u>	<u>(fps)</u>	<u>(yds)</u>	<u>(Meters)</u>
0 *	189	332	303
1	292	784	716
2	377	1204	1101
3	449	1594	1458
4	518	1978	1809

* Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 4 is the ignition cartridge and 4 increment charges.

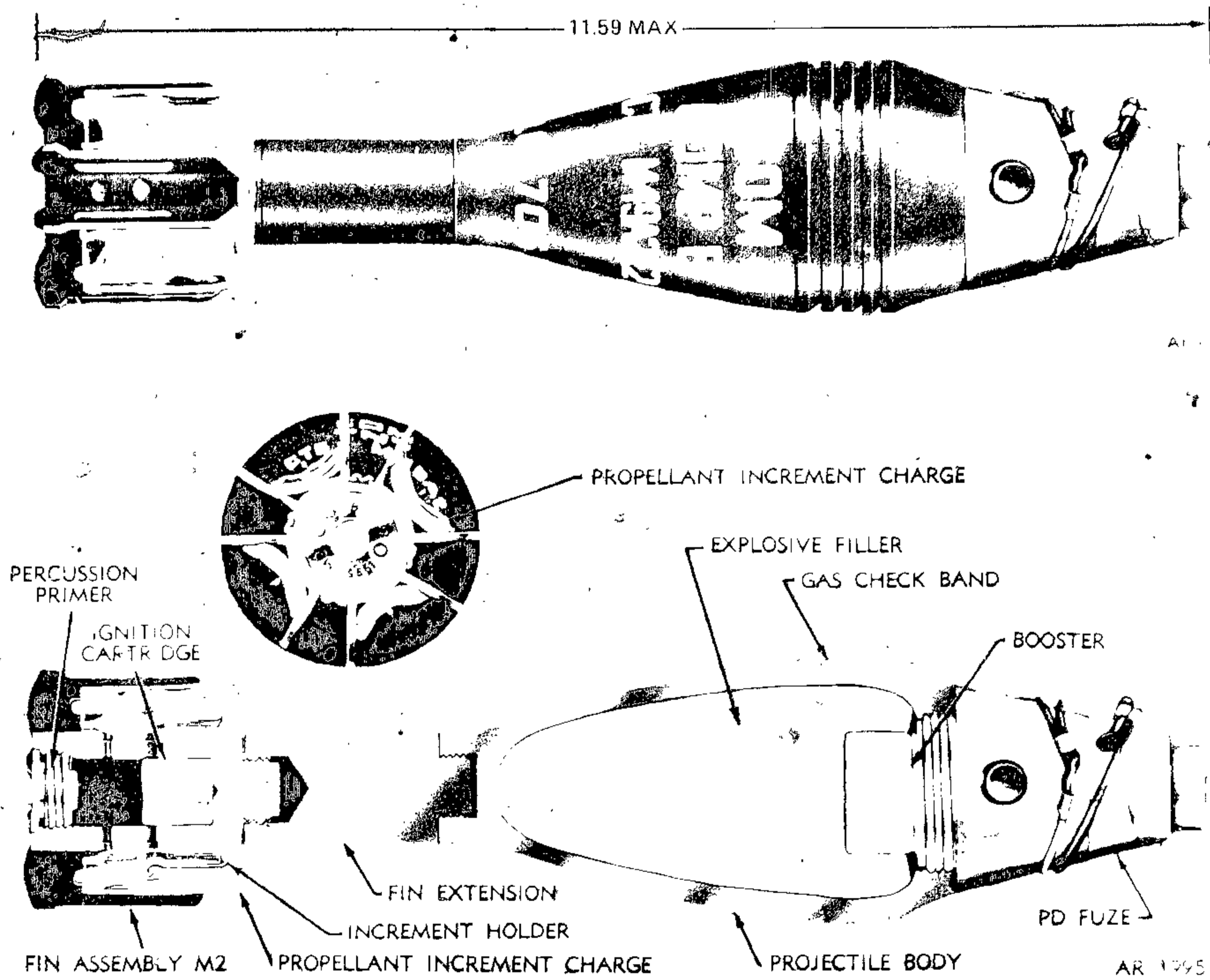
Limitations:

Although this cartridge is safe for firing at standard temperatures, excessive pressure may develop at Charge 4 below 0° F. Maximum allowable rate of fire: 30 rounds-per-minute for periods not exceeding one minute; 18 rounds-per-minute for periods not exceeding 4 minutes; 8 rounds-per-minute indefinitely.

References:

FM 23-85
 SC 1305/30-IL
 TM 9-3071-1
 TM 9-1015-215-12

CARTRIDGE, 60-MILLIMETER: HE, M49A4 (M49A2E2)



Type Classification:

- CON MSR 11756003 (M49A4)
- OBS MSR 11756003 (M49A2)

Use:

This cartridge is fired in 60-mm Mortars M2 and M19 for use against personnel and light materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body, a point-detonating fuze (staked), a fin

assembly with a 2-inch extension, four increments of propellant charge, an ignition cartridge, and a percussion primer. The projectile body is of forged steel or pearlitic malleable iron, and is threaded internally at the nose to accept the fuze and at the base to accept the fin extension. The body is filled with Composition B high explosive.

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

flash from the primer ignites the ignition cartridge, and the cartridge ignites the propelling charge. Rapidly expanding 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 point-detonating fuze functions on impact, detonating the fuze booster charge and, in turn, the Composition B high explosive. The bursting charge shatters the projectile body, producing near optimum fragmentation and blast effect at the target.

Tabulated Data:

Complete round:

Type ----- HE
 Weight w/fuze-- 03.25 lbs.
 Length w/fuze-- 11.59 in.

Projectile:

Body material-- Forged steel or cast PMI
 Color ----- Olive drab w/yellow markings

Filler and weight ----- Comp. B, 0.42 lbs.

Components:

Ignition cartridge ----- M5A2
 Propellant charge ----- M181
 Percussion primer ----- M32
 Fin assembly -- M2 plus extension
 Fuze ----- PD, M525 series; PD, M717

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 hrs/day)

*Packing ----- 1 round in fiber container; 12 containers in wooden box.

*Packing Box:

Weight ----- 55.5 lbs.
 Dimensions ----- 16-1/16 x 13-5/8 x 11-5/16 in.
 Cube ----- 1.4 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 4
 Storage compatibility group ----- E
 DOT shipping class - A
 DOT designation-AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES

DODAC ----- 1310-B632
 Drawing number ----- 9220179

Ballistics:	Muzzle Velocity (fps)	Maximum Range (yds)	(Meters)
Charge			
0*	169	280	256
1	247	700	639
2	373	1163	1069
3	450	1587	1452
4	520	1985	1814

*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 4 is the ignition cartridge and 4 increment charges.

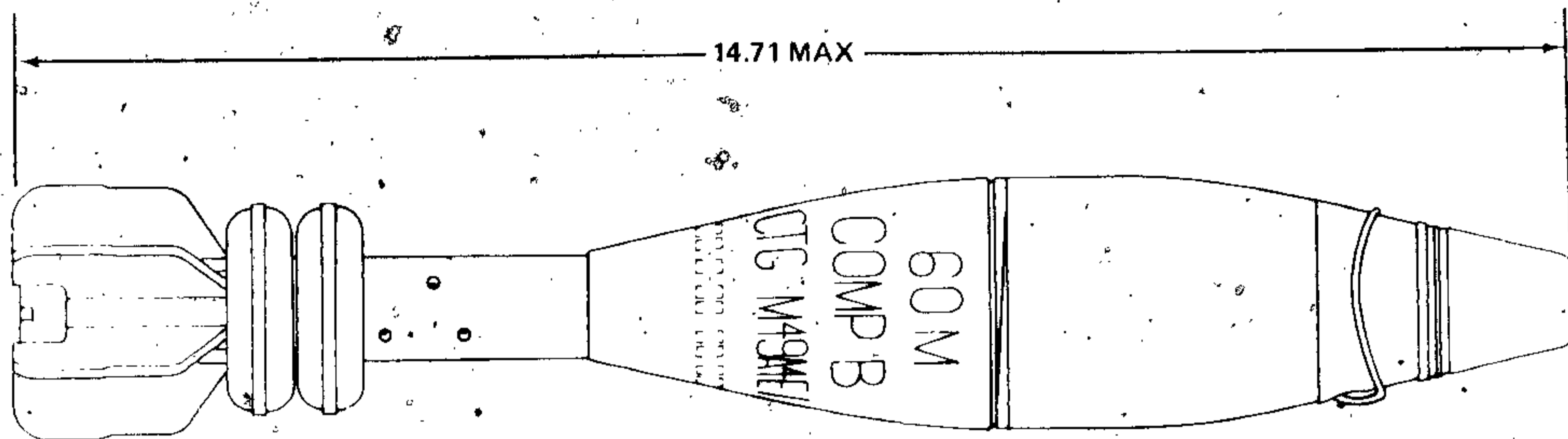
Limitations:

Excessive short rounds may occur when this round is fired at temperatures below 0° F. Maximum allowable rate of fire: 30 rounds-per-minute for periods not exceeding 1 minute; 18 rounds-per-minute for periods not exceeding 4 minutes; 8 rounds-per-minute indefinitely.

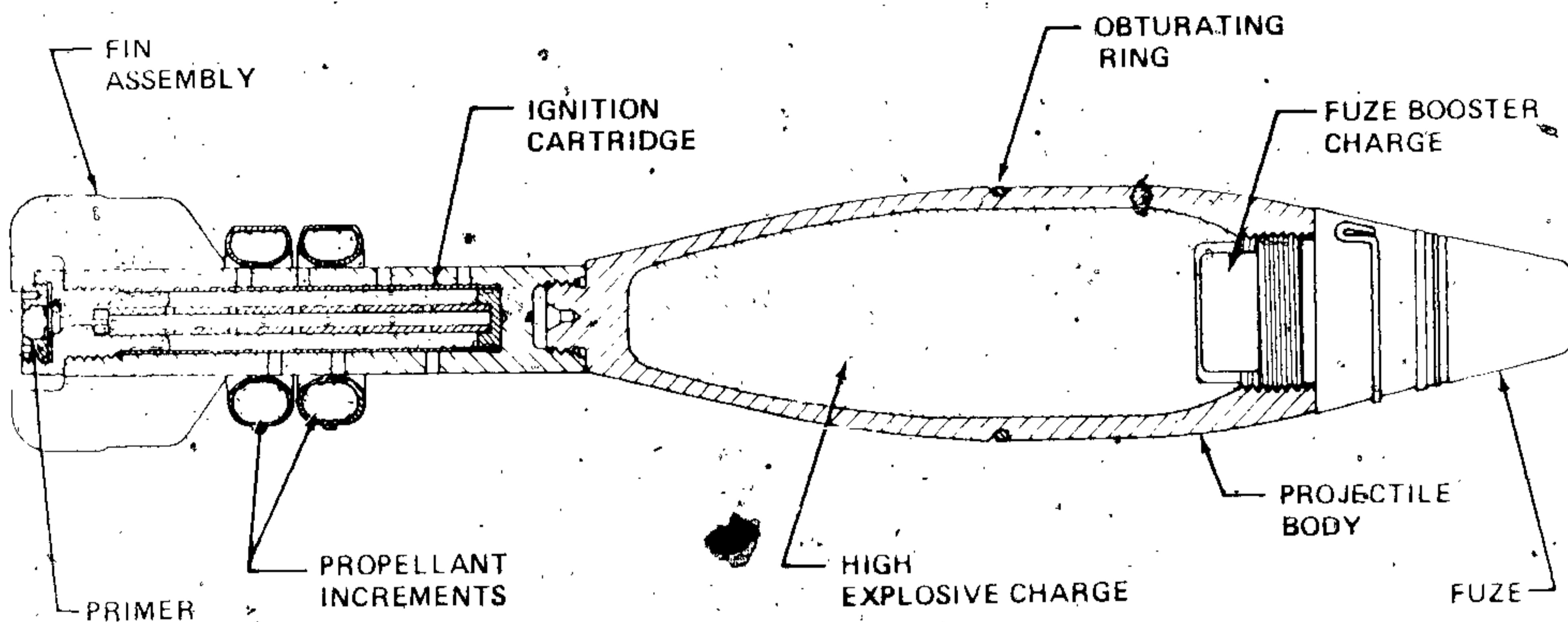
References:

FM 23-85
 SC 1305/30-IL
 TM 9-3071-1
 TM 9-1015-215-12

CARTRIDGE, 60-MILLIMETER: HE, M49A5 (M49A4E1)



AR199514



AR199513

Type Classification:

Delrin obturating ring. The body is loaded with Composition B high explosive.

Use:

This cartridge is used against personnel and light materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body, a fin assembly, two increments of propellant charge, and an ignition cartridge with a percussion primer. The alloy steel projectile body is internally threaded at the nose to accept the fuze, externally threaded at the base to accept the fin assembly, and grooved to hold the

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 flash from 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 mortar tube and propel it to the target. The projectile is fin-stabilized in flight. The point-detonating fuze functions on impact, detonating the fuze booster charge and, in turn, the Composition B high explosive. The bursting charge shatters the

projectile body, producing near optimum fragmentation and blast effect at the target.

Tabulated Data:

Complete round:

Type ----- HE
 Weight w/fuze --- 3.90 lbs.
 Length w/fuze --- 14.71 in.
 Cannon used with-M19

Projectile:

Body material --- Alloy steel
 Color ----- Olive drab w/yellow markings

Filler and

weight ----- Comp. B, 0.79 lb.

Components:

Ignition cartridge ----- XM702
 Propellant charge ----- XM204
 Percussion primer ----- M35
 Fin assembly --- XM25
 Fuze ----- PD, XM935

Temperature Limits:

Firing:

Lower limit -----
 Upper limit -----

Storage:

Lower limit ----- -65 ° F (for period not more than 3 days)
 Upper limit ----- +160 ° (for period not more than 4 hrs/day)

*Packing ----- 1 round in fiber container; 8 containers in metal box; 2 metal boxes in wirebound box.

*Packing Box:

Weight ----- 100 lbs.
 Dimensions -----
 Cube ----- 2.0 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

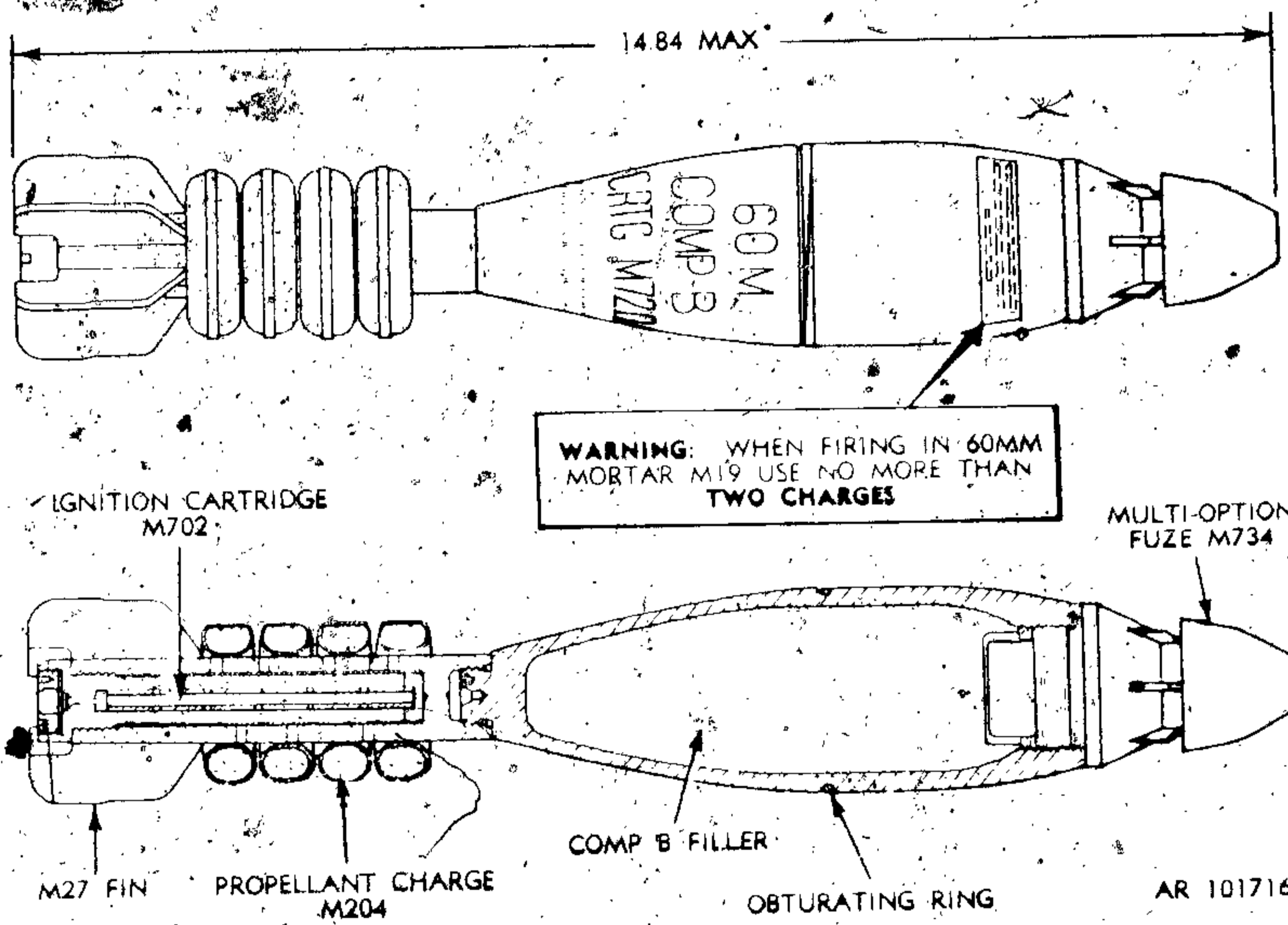
Shipping and Storage Data:

Quantity-distance class ----- 4
 Storage compatibility group ----- E
 DOT shipping class ----- A
 DOT designation-AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
 DODAC ----- 1310-
 Drawing number ----- 9241292

References:

DÉP 9-1310-422-12
 FM 23-85
 SC 1305/30-IL
 TM 9-3071-1
 TM 9-1015-215-12

CARTRIDGE, 60-MILLIMETER: HE, M720



Type Classification:

Std LTR, DAMA-WSW dated 26 July 1977

Use:

This cartridge is fired in the 60-MM M224 Mortar in the Lightweight Company System. It is used against troops (either in the open or in foxholes), light vehicles, light bunkers and similar targets.

Description:

The complete round consists of a projectile body, a multi-option fuze, a fin assembly, four increments of propellant charge, ignition cartridge and obturating ring. The projectile body is of alloy steel and is threaded internally at the nose to accept the fuze and at the base to accept the fin assembly. The body is filled with Composition B high explosive.

Functioning:

When the cartridge is loaded, it slides down the mortar tube. The firing pin at the bottom of the tube initiates the primer. The flash from the primer ignites the ignition cartridge, which in turn ignites the propellant charge. Rapidly expanding gases from the burning propellant expands the obturating ring, accelerating the cartridge and propelling it in-flight. Stabilization in flight is accomplished by aerodynamic and spin action of the fin assembly.

Tabulated Data:

Complete round:

Type	HE
Weight w/fuze	3.75 lb
Length w/fuze	14.85 in.
Cannon used with	M19, M224

Projectile:

Body material ----- Alloy steel
 Color ----- Olive drab
 Filler and weight ----- Comp B

Components:

Ignition cartridge ----- M702
 Propellant charge ----- M204
 Percussion primer ----- M35
 Fun assembly ----- M27
 Fuze ----- Multi-Option
 M734

Temperature Limits:

Firing:

Lower limit ----- -50°F
 Upper limit ----- +145°F

Storage:

Lower limit ----- -80°F (for period
 not more than 3
 days)
 Upper limit ----- +160°F (for
 period not more
 than 4 hrs/day)

*Packing:

1 round in fiber
 container; 8 fiber
 containers in
 metal container;
 2 metal containers
 in wirebound box.

*Packing Box:

Weight ----- 112 lbs
 Dimensions ----- 14-15/16" x 13-
 3/16" x 17-3/4 in.
 Cube ----- 2.1 cu ft

*Note: See SC for complete packing data in-
 cluding NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 1.2
 Storage compatibility -----
 group ----- E
 DOT shipping class ----- A
 DOT marking ----- AMMUNITION FOR
 CANNON W/EX-
 PLOSIVE PRO-
 JECTILE
 DODAC ----- 1310-B642
 Drawing number ----- 9275526

Ballistics:

Charge	Muzzle Velocity (FPS)	Min Range (Meters)	Max Range (Meters)
0*	210	70	400
1	415	250	1340
2	560	350	2150
3	680	500	2890
4	810	650	3490

*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one propellant charge; Charge 4 is the ignition cartridge and 4 propellant charges.

Limitations:

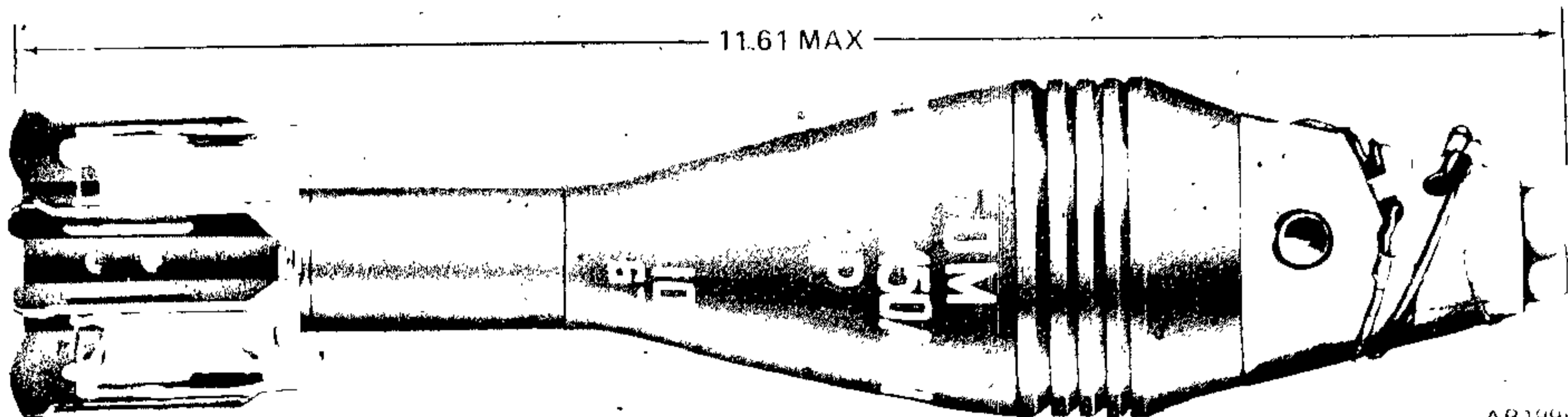
Do not fire the M720 cartridge in the M19 mortar above propellant charge 2.

Do not fire the M720 cartridge with charge greater than 1 in the hand held mode.

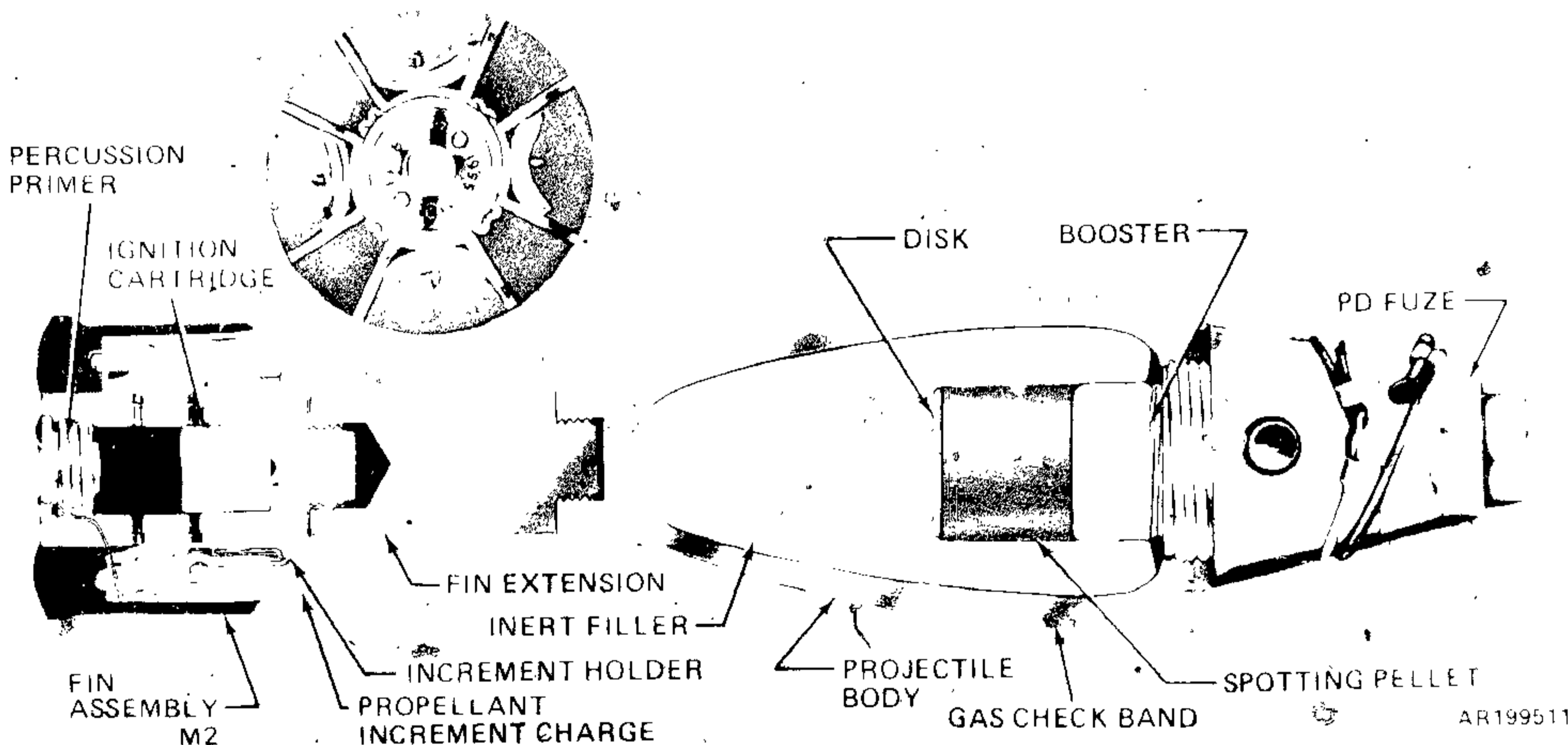
References:

- FM 23-85
- SC 1305/30-IL
- TM 9-1010-223-10
- TM 9-1025-215-12
- TM 9-1300-251-20
- TM 9-1300-251-34
- TM 9-3071-1

CARTRIDGE, 60-MILLIMETER: TARGET PRACTICE, M50A3 (M50A2E1)



AR199-12



AR199511

Type Classification:

C & T AMCTC 6632 dtd 1969

Use:

This cartridge is fired in 60-mm Mortars M2 and M19 for target practice, and contains a spotting charge for observation.

Description:

The complete round consists of a projectile body, a point-detonating fuze, a fin assembly with a 2-inch extension, four increments of propellant charge, and an ignition cartridge with a percussion primer. The projectile body is of forged steel or pearlitic malleable iron and is threaded internally at the nose to

accept the fuze and at the base to accept the fin extension. The body is loaded with an inert plaster filler to simulate the weight and ballistic characteristics of a high explosive cartridge. A pellet of black powder for a spotting charge is loaded in a cavity just below the booster casing of the fuze.

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 flash from 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 mortar tube and propel it to the target. The projectile is

stabilized in flight. The point-detonating fuze functions on impact, detonating the fuze booster charge and the spotting charge.

Fabulated Data:

Complete round:

Type ----- TP
 Weight w/fuze --- 03.15 lbs.
 Length w/fuze --- 11.61 in.
 Projectile: C
 Body material --- Forged steel or cast PMI
 Color ----- Blue w/white markings and brown band
 Filler and weight ----- Inert, 0.29 lb.
 Spotting charge --- Black powder, 0.05 lb.
 Components:
 Ignition cartridge ----- M5A1
 Propellant charge ----- M181
 Percussion primer ----- M32
 Fin assembly --- M2 plus extension
 Fuze ----- PD, M525 series

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 hrs/day)

*Packing ----- 1 round in fiber container; 10 containers in wooden box

*Packing Box:

Weight ----- 49.0 lbs.
 Dimensions ----- 17-9/16 x 12-1/8 x 8-7/32 in.
 Cube ----- 1.3 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 4
 Storage compatibility group ----- E
 DOT shipping class ----- A
 DOT designation-AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
 DODAC ----- 1310-B633
 Drawing number ----- 9220383

Ballistics:	Muzzle Velocity (fps)	Maximum Range (yds)	(Meters)
Charge			
0*	169	280	256
1	247	700	639
2	373	1163	1069
3	450	1587	1452
4	520	1963	1814

*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 4 is the ignition cartridge and 4 increment charges.

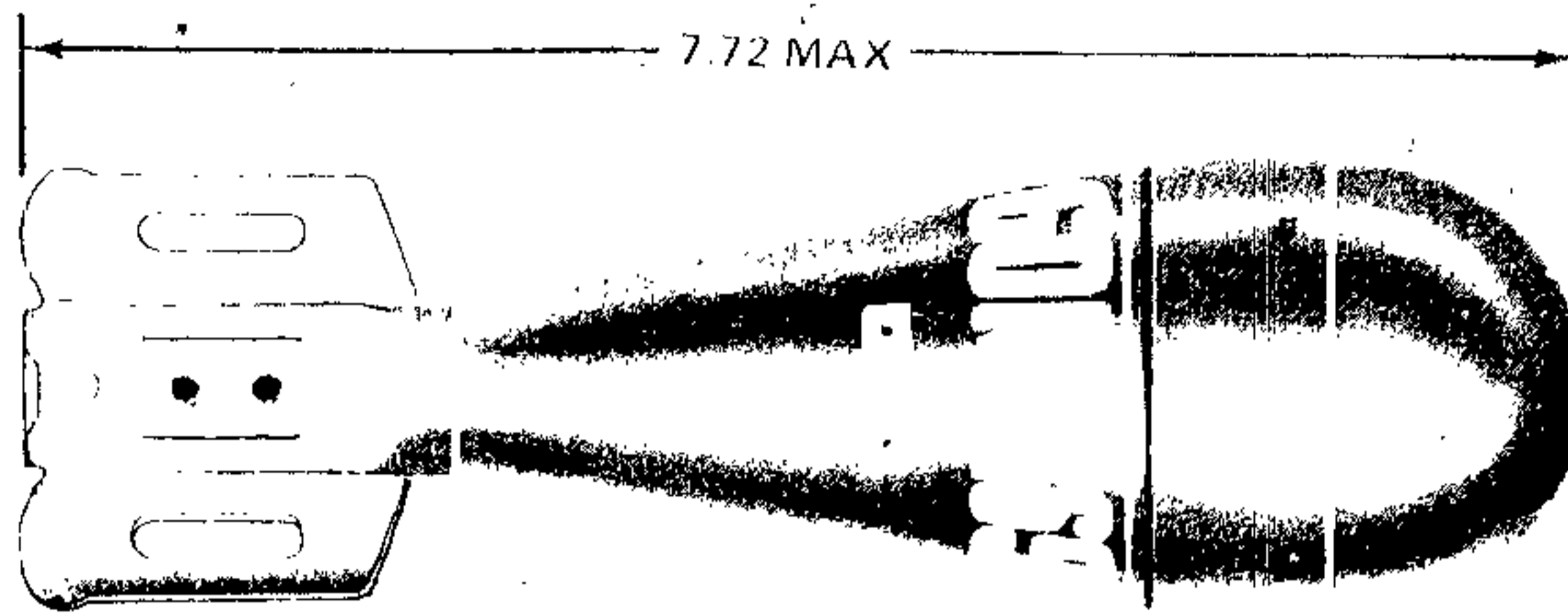
Limitations:

Excessive short rounds may occur when this round is fired at temperatures below 0° F. Maximum allowable rate of fire: 30 rounds-per-minute for periods not exceeding 1 minute; 18 rounds-per-minute for periods not exceeding 4 minutes; 8 rounds-per-minute indefinitely.

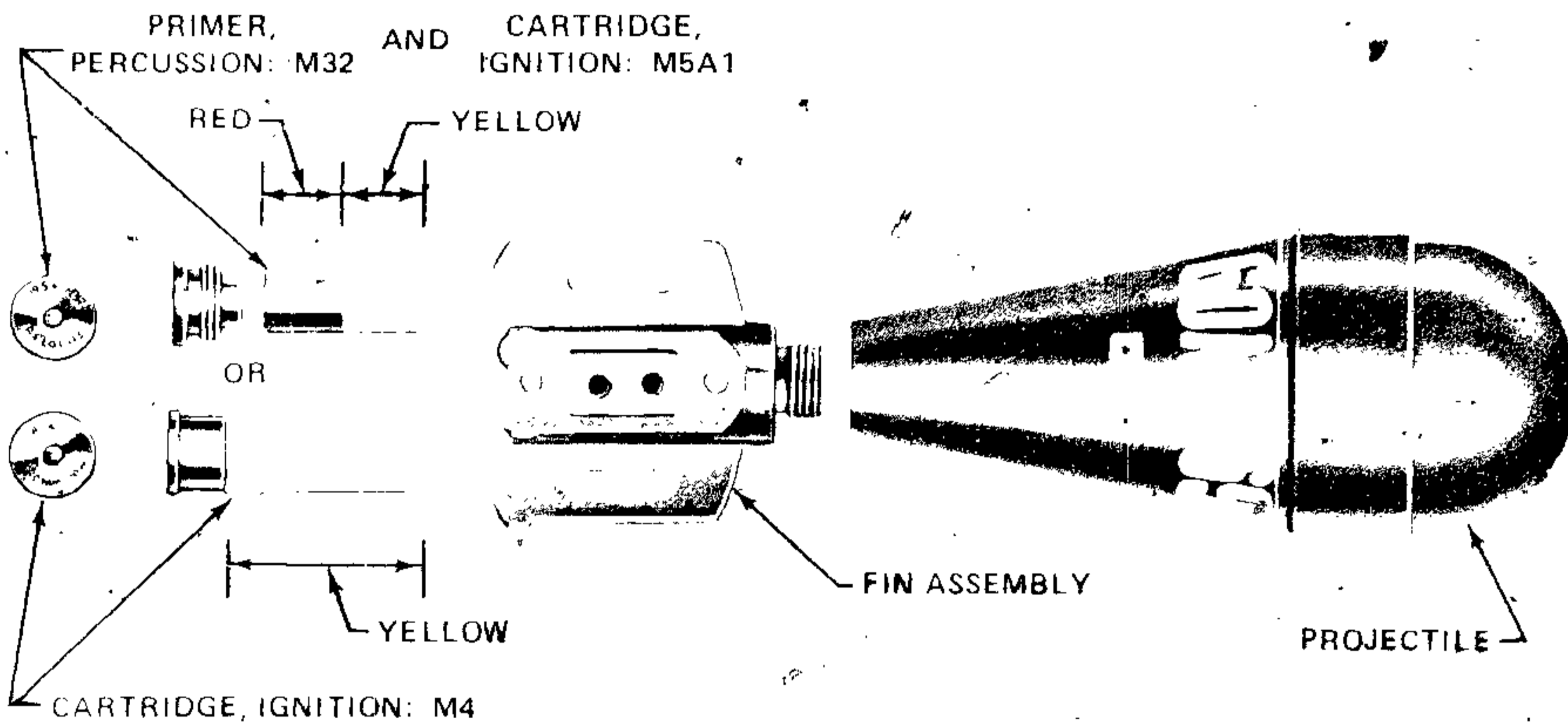
References:

SC 1305/30-IL
 TM 9-3071-1
 TM 9-1015-215-12

CARTRIDGE, 60-MILLIMETER: TRAINING, M69



AR199510



AR199509

Type Classification:

Std OTCM 37119 dtd 1959

Use:

This cartridge is used for training in the loading and firing of 60 Millimeter Mortars M2 and M19.

Description:

Unlike other mortar ammunition, the components of this round are issued separately. This facilitates replacement of damaged, worn, or expended parts. The complete round consists of an inert projectile, a fin assembly, an ignition cartridge, and a percussion primer.

The pear-shaped, cast iron projectile has no provision for a fuze, and is internally threaded at the base to accept the fin assembly.

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 detonates the ignition cartridge. Since this round is fired only at Charge 0, the gases from the ignition cartridge expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. Since the cartridge is inert, there is no detonation upon impact, and the cartridge may be recovered for reuse.

Tabulated Data:

Complete round:

Type ----- Training
 Weight assembled 4.43 lbs.
 Length assembled 7.72 in.

Projectile:

Body material ----- Cast iron
 Color:
 Old mfg. ----- Black or blue w/white markings
 New mfg. ----- Bronze w/whitemarkings
 Filler and weight -- Inert

Components:

Ignition cartridge-- M5A1 or M4 (complete)
 Propellant charge-- None
 Percussion primer----- M32
 Fin assembly ----- M5 (or modified M-2)
 Fuze ----- None

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 hrs/day)

*Packing -----

A training kit used in the field holds ten training cartridges and accessories.

*Packing Box:

Weight ----- 65 lbs.
 Dimensions ----- 21-7/16 x 18-5/16 x 7-27/32 in.
 Cube ----- 1.4 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class-----
 Storage compatibility group--
 DOT shipping class--
 DOT designation----- AMMUNITION FOR CANNON WITH INERT PROJECTILES
 DODAC ----- 1310-B629
 Drawing number ----- 9222994

Ballistics:

Charge ----- 0
 Muzzle velocity ----- 46.4 mps
 Maximum range ----- 193 meters

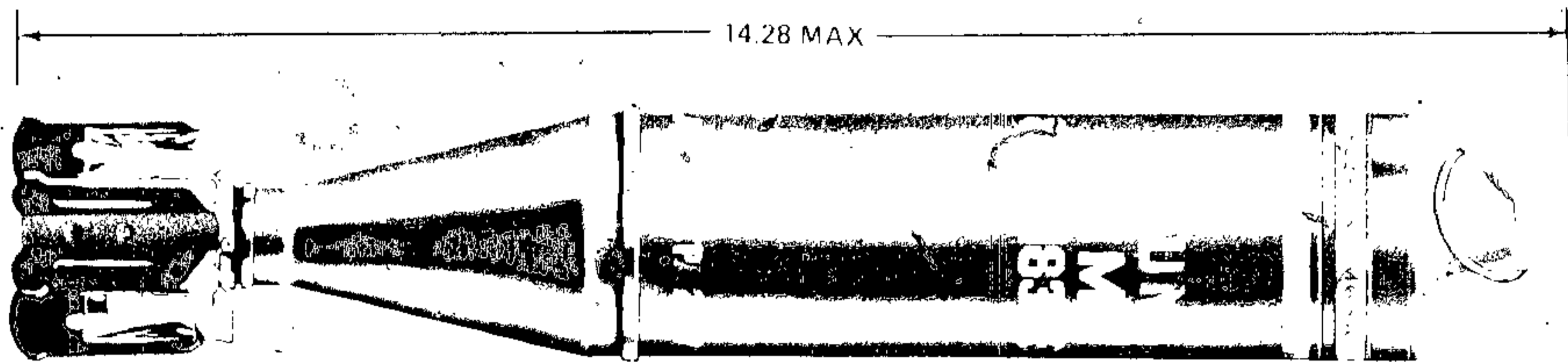
Limitations:

This round is to be fired at Charge 0 only.

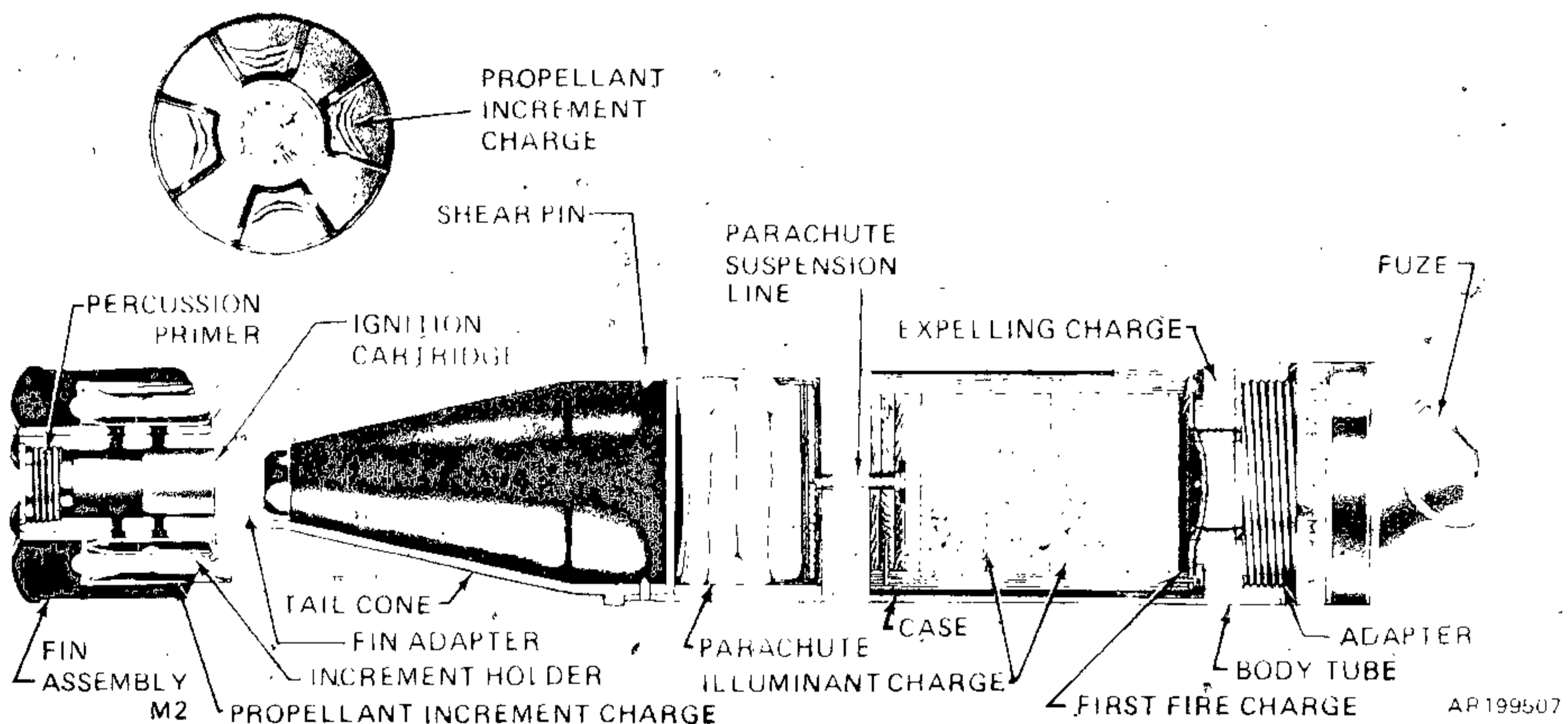
References:

* SC 1305/30 IL
 TM9-3071-1
 TM 9-1015-215-12

CARTRIDGE, 60-MILLIMETER: ILLUMINATING, M83A3, M83A2, AND M83A1



AR149507



Type Classification:

M83A3: Std AMCTC 8346 dtd 1971
 M83A2&A1: C&T OTCM 37119 dtd 1959

Use:

This cartridge provides illumination for observation during night missions.

Description:

The complete round consists of a body tube, a tail cone assembly, an illuminant charge, a parachute assembly, a time fuze, a fin assembly with four increments of propellant charge, an ignition cartridge, and a percussion primer.

The nose of the thin-walled steel body tube is fitted with a steel adapter, which is internally threaded to accept the fuze. The cone is fitted with an internally threaded adapter to accept the fin assembly, and is attached to the body tube with four equally spaced shear pins. The illuminant assembly, which consists of a first fire charge and an illuminant charge, is contained in a boxboard casing which is attached to the parachute with a suspension line. An expelling charge directly below the fuze, ejects the illuminant and parachute assembly.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer is

the ignition cartridge strikes the firing pin in the base cap of the mortar. The flash from the primer ignites the ignition cartridge. The cartridge ignites the propellant charge, and the gases from the propellant charge expel the projectile from the mortar tube and propel it to the desired height. The projectile is fin-stabilized in flight. The time fuze functions approximately 15 seconds after firing, detonating the expelling charge and igniting the first-fire charge through a length of quickmatch. The expelling charge separates the cone from the tube allowing the parachute and illuminant assembly to fall free. The first-fire charge ignites the illuminant charge, and the parachute deploys to support the burning charge.

Tabulated Data:

NSN -----

Complete round:

Type ----- Illuminating
 Weight w/fuze ----- 4.15 lbs.
 Length w/fuze ----- 14.28 in.

Projectile:
 Body material ----- Steel tubing
 Color ----- White w/black marking
 Filler and weight --- Illuminant, 0.49 lb.

Illuminant charge:

	M83A3	M83A2	M83A1
Burn time	32 sec.	32 sec.	25 sec.
Candlepower	250,000	250,000	145,000

Components:

Ignition cartridge -- M5A2
 Propelling charge:
 M83A3 ----- M182
 M83A2 & M83A1 - M3A1
 Percussion primer - M32
 Fin assembly ----- M2
 Fuze ----- Time, M65A1

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 hrs/day)

*Packing ----- One round in jungle-wrapped fiber or metal container; multiple packing of fiber/metal containers in wooden box.

*Packing Box:

Weight ----- 57 lbs.
 Dimensions ----- 18-15/16 x 10-3/4 x 11-27/32 in.
 Cube ----- 1.4 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class - 4
 Storage compatibility group ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES

DODAC ----- 1310-B627
 Drawing number ----- M83A3, 9207516
 M83A2, 75-1-143

Ballistics:

Chg	Muzzle Velocity	Horizontal Range	Height of Burst	Elevation	
	(fps)	(yds) (mtrs)	(yds)(mtrs)	(deg)	(min)
2*	312	475 434	170 155	68	00
2	312	500 457	157 144	66	45
3	374	525 480	145 133	65	30
4	434	875 800	152 139	51	45
		1100 1006	175 160	45	15

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

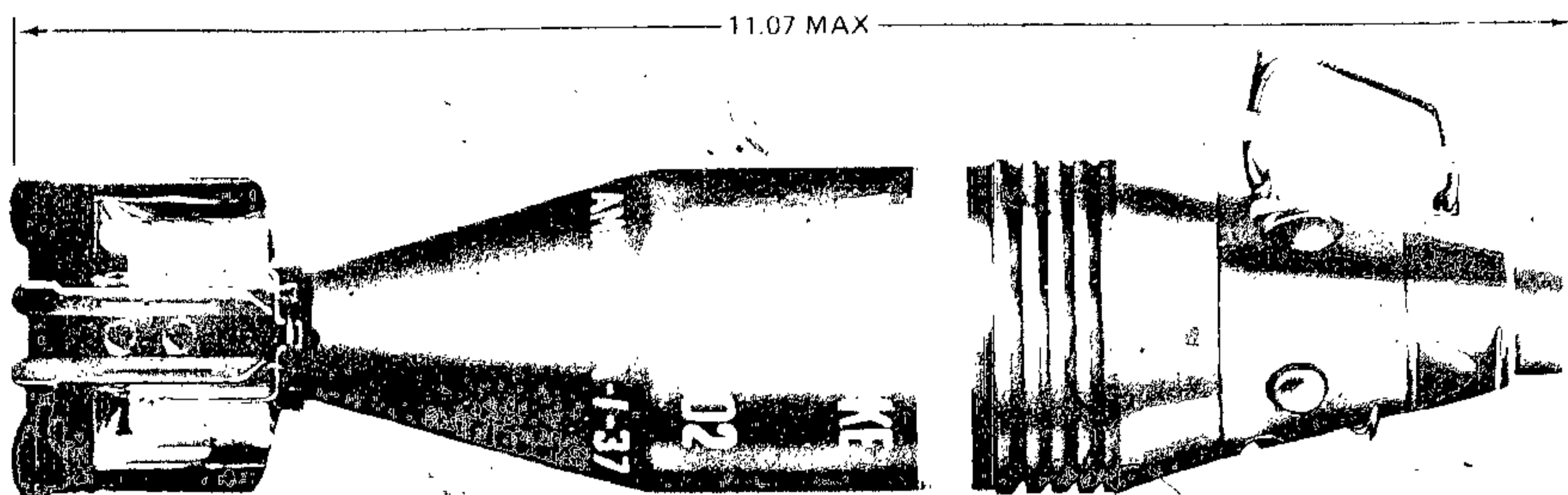
Limitations:

Firing this cartridge below Charge 2 will result in duds.

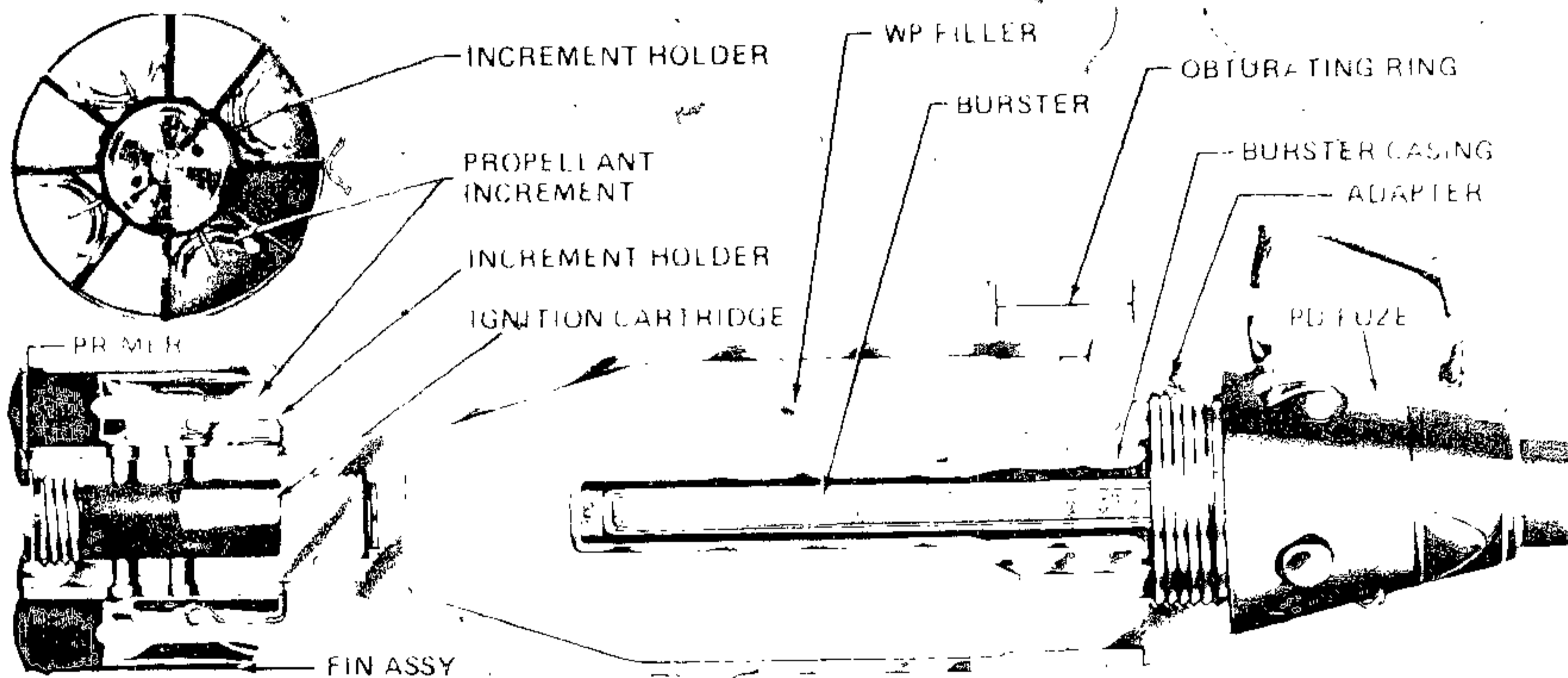
References:

AMCP 700-3-3
 SC 1305/30 IL
 TM 9-1015-215-12
 TM 9-3071-1

CARTRIDGE, 60-MILLIMETER: SMOKE, WP, M302



AR199506



AR199505

Type Classification:

C & T OICM 37119 dtd 1959

Use:

This smoke cartridge is fired in 60-mm Mortars M2 or M19 and is used for screening and spotting.

Description:

The complete round consists of a projectile with a PD Fuze, a fin assembly, four propellant increments, an ignition cartridge, and a percussion primer. The projectile body is of relatively thin-walled steel construction with cylindrical side walls, a conical base, and is filled with a charge of white phosphorous. The

projectile base is internally threaded to accept the fin assembly. The projectile nose is fitted with a steel adapter, threaded to accept the fuze and designed to hold the casing of the fuze assembly. One of two types of burster assemblies is used, differing only in the diameter of the steel burster casing. Both are of the same designation. The burster contains a charge of tetryl pellets under pressure, and the burster casing is press-fitted into the adapter on the projectile nose.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer of the ignition cartridge strikes the firing pin of the base cap of the mortar. The flash from the

primer ignites the ignition cartridge. The ignition cartridge ignites the propellant charge, and gases from the propellant charge expel the projectile from the mortar and propel it to the target. The projectile is fin-stabilized in flight. The PD fuze functions on impact, detonating the burster charge which ruptures the projectile and disperses the white phosphorous filler. The white phosphorous ignites on contact with the air producing a cloud of dense white smoke.

Tabulated Data:

Complete round:

Type ----- Smoke, WP
 Weight w/fuze ----- 3.98 lbs.
 Length w/fuze ----- 11.07 in.

Projectile:

Body material ----- Forged steel
 Color, old mfg ----- Gray w/yellow band and yellow markings
 Color, new mfg ----- Light green w/yellow band and light red markings
 Filler and weight --- WP, 0.75 lb.
 Burster charge ----- Tetryl, 0.38 oz.

Components:

Ignition cartridge -- M5A1
 Propellant charge -- M3A1
 Percussion primer - M32
 Projectile burster -- M19
 Fin assembly ----- M2
 Fuze ----- PD, M527-series

Temperature Limits:

Firing:

Lower limit ----- -45°F
 Upper limit ----- +125°F

Storage:

Lower limit ----- -45°F
 Upper limit ----- +145°F

*Packing ----- One round in fiber container;
 six containers in wooden box

*Packing Box:

Weight ----- 49.0 lbs.
 Dimensions ----- 15-3/8 x 13-11/16 x 8-15/32 in.
 Cube ----- 1.04 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class - 5
 Storage compatibility group ----- A
 DOT shipping class ----- A
 DOT designation --- AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
 DODAC ----- 1310-B630
 Drawing number ----- 9205340

Charge	Ballistics:	Maximum Range	
	Muzzle Velocity (fps)	(yd)	(meters)
0*	156	244	219
1	244	570	520
2	316	912	833
3	380	1260	1154
4	439	1610	1472

*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 4 is the ignition cartridge and four increment charges.

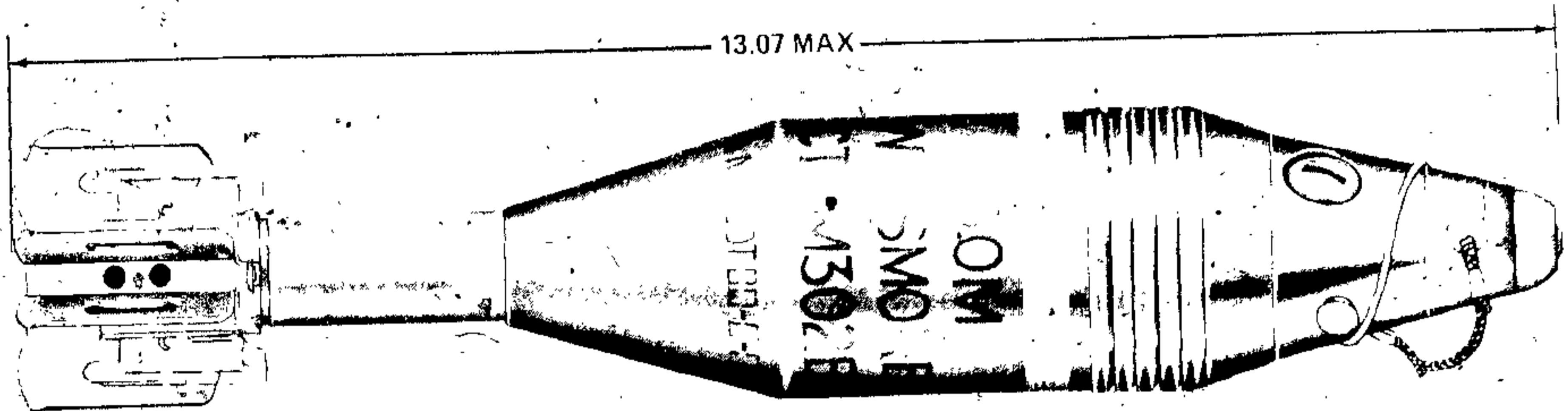
Limitations:

- a. Excessive short rounds may occur when this round is fired at temperatures below 0°F.
- b. Store and transport WP rounds at temperatures below 141.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will re-solidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

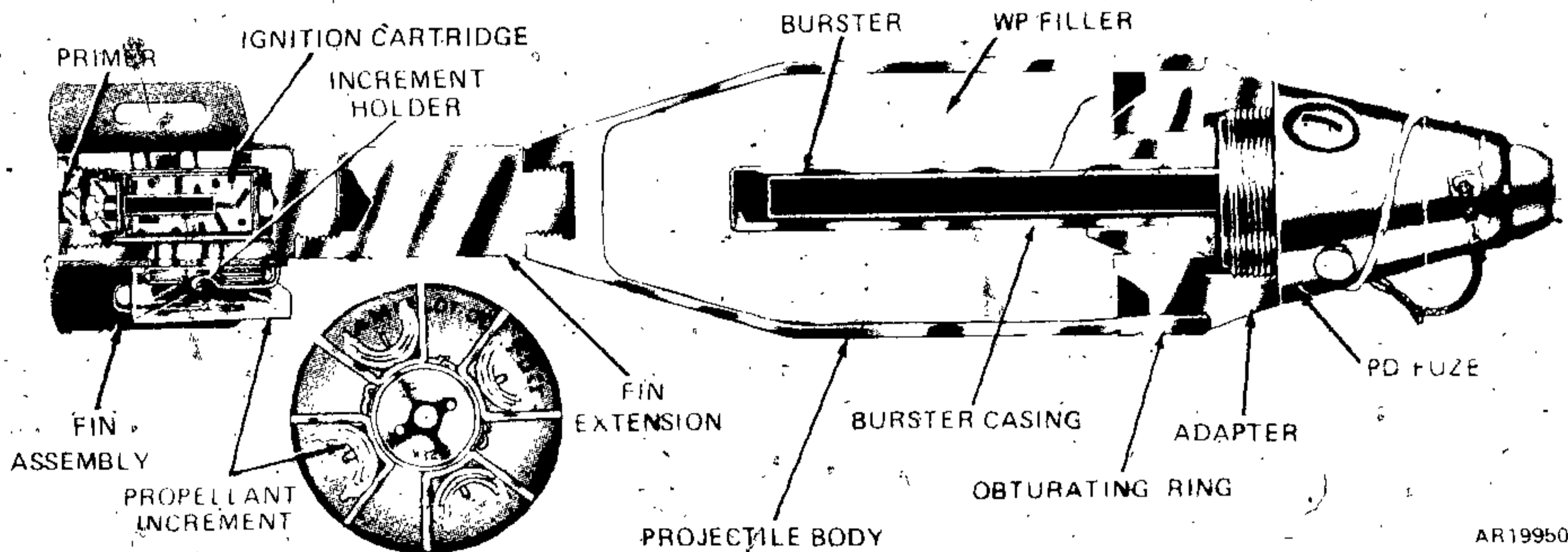
References:

- AMCP 700-3-3
- TM 9-1015-215-12
- TM 9-3071-1
- SB 700-20
- SC 1305/30IL

CARTRIDGE, 60-MILLIMETER: SMOKE, WP, M302A1 (M302E1)



AR199504



AR199503

Type Classification:

C&T OLCM 37119 dtd 1959

Use:

This smoke cartridge is fired in 60-mm Mortars M2 or M19 and is used for screening and spotting.

Description:

The complete round consists of a projectile body with a PD fuze, a fin assembly and a 2-inch extension, four increments of propellant charge, an ignition cartridge, and a percussion primer. The projectile body is a relatively thin-walled steel cylinder with a conical base, and is filled with a charge of white phosphorous. The base is internally threaded to accept the fin assembly. The projectile nose is fitted with a steel adapter, internally threaded to accept the

fuze, and designed to hold the sleeve of the burster assembly. One of two types of burster assemblies is used, differing only in the construction of the steel burster casing. Both carry the same designation. The burster charge consists of tetryl pellets under pressure, and the burster casing is press-fitted into the adapter in the projectile nose.

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 flash from the primer ignites the ignition cartridge. The ignition cartridge ignites the propellant charge, and the gases from the propellant charge expel the projectile from the mortar tube and propel it to the target. The PD-fuze functions on impact, detonating the burster charge, which ruptures the projectile and disperses the white

phosphorous filler. The white phosphorous ignites on contact with air, producing a cloud of dense white smoke.

Tabulated Data:

Complete round:

Type-----Smoke (WP)
 Weight w/ fuze -----4.10 lbs.
 Length w/ fuze -----13.07 in.

Projectile:

Body material -----Forged steel
 Color-----Light green w/yel-
 low band and light
 red markings
 Filler and weight---WP, 0.75 lb.
 Burster charge ----Tetryl, 0.38 oz.

Components:

Ignition cartridge -- M5A2
 Propellant charge-- M181
 Percussion primer - M32
 Projectile burster-- M19
 Fin assembly -----M2 plus extension
 Fuze-----PD, M527B1

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 hrs, day)

*Packing -----One round in fiber
 container;
 nine containers in
 wooden box.

*Packing Box:

Weight -----56.6 lbs.
 Dimensions-----17-3/4 x 10-7/8 x
 11-27/32 in.
 Cube -----1.3 cu. ft.

*NOTE. See SC for complete packing data in-
 cluding NSN's.

Shipping and Storage Data:

Quantity-distance class - 5
 Storage compatibility
 group -----A
 DOT shipping class* -----A
 DOT designation ---- AMMUNITION FOR
 CANNON WITH
 SMOKE PROJECTILES

DODAC -----1310-B630
 Drawing number -----9215575

Ballistics: Charge	Muzzle Velocity	Maximum Range	
	(fps)	(meters)	(yds)
0*	156	195	213
1	244	488	535
2	316	839	916
3	380	1164	1272
4	439	1448	1582

*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 4 is the ignition cartridge and four increment charges.

Limitations:

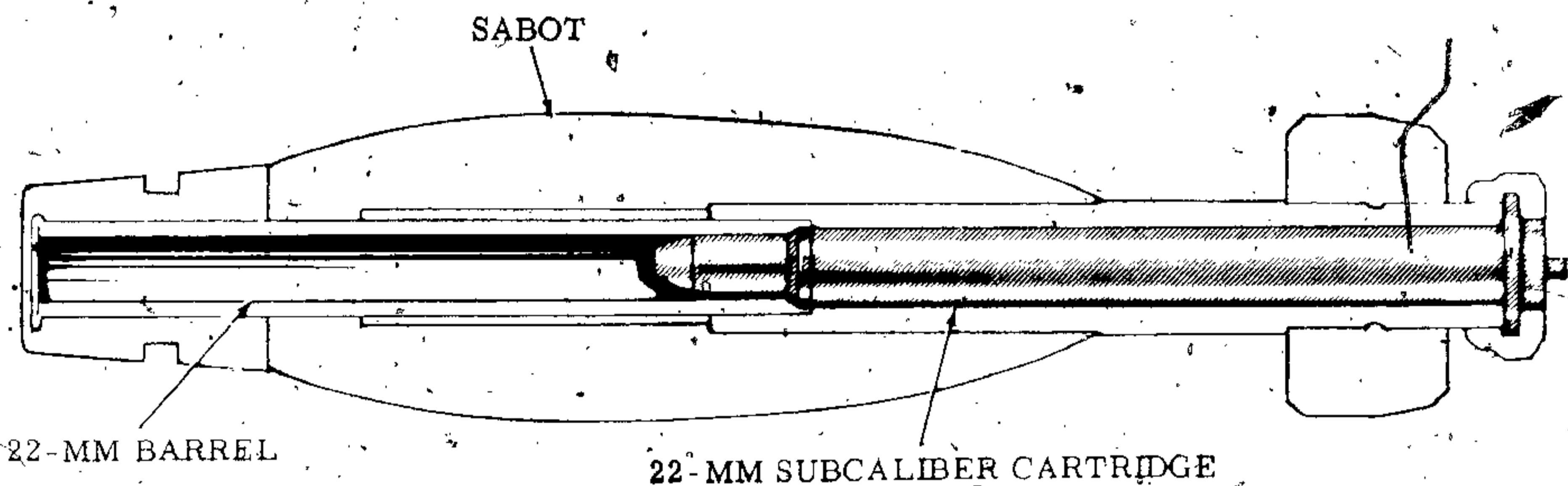
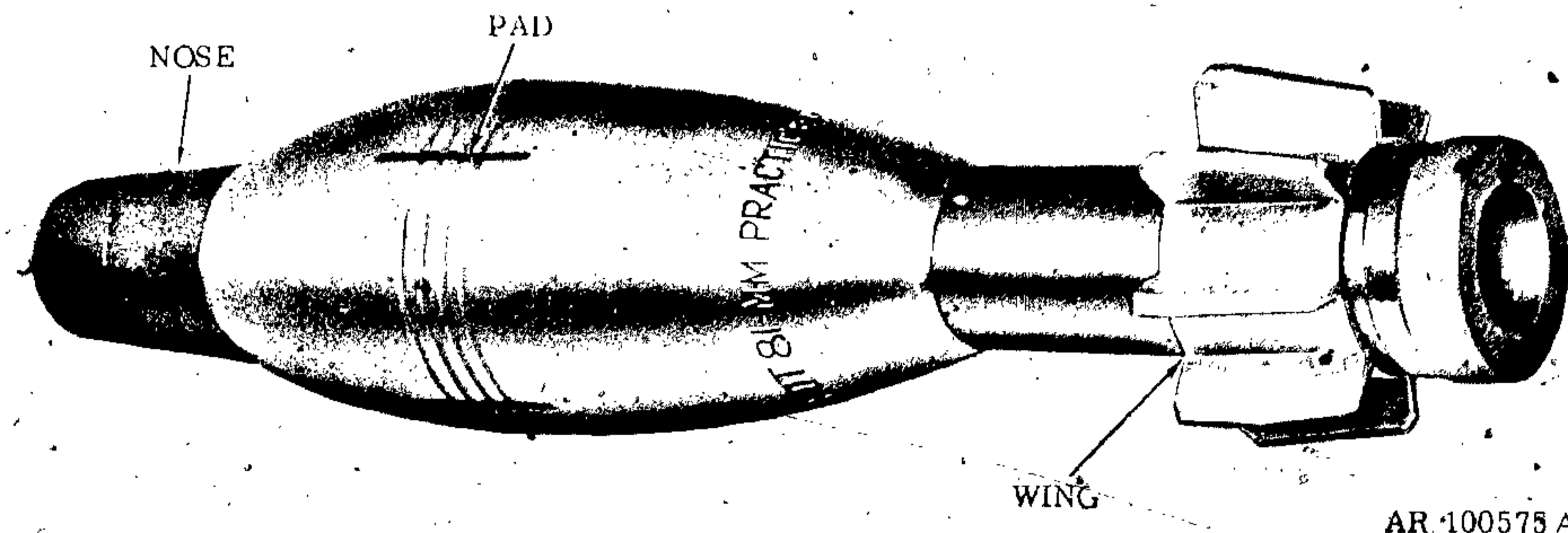
a. Excessive short rounds may occur when this round is fired at temperatures below 0°F. Maximum allowable rate of fire: 30 rounds-per-minute for periods not exceeding 1 minute, 18 rounds-per-minute for periods not exceeding 4 minutes; 8 rounds-per-minute indefinitely.

b. Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will re-solidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

References:

- AMCP 700-3-3
- TM 9-1015-215-12
- TM 9-3071-1
- SB 700-20
- SC 1305/30IL

CARTRIDGE, 81MM: MORTAR TRAINING DEVICE, 81MM SABOT (INERT) M1 AND 22MM SUB-CALIBER PRACTICE CARTRIDGE M744, M745, M746 AND M747



Type Classification:

Std MSR 05756032

Use:

The 81mm Sabot (Inert) is a training device for all 81mm Mortars.

Description:

The Sabot is designed to fire a 22mm sub-caliber practice cartridge M744, M745, M746, or M747 (Charges 1, 2, 3, or 4 respectively) as a training device in all model 81mm mortars. The Sabot with 22mm sub-caliber practice cartridges provides realistic mortar firing training at distances which correspond to range firing distances in the ratio of 1 to 10. The sub-caliber

device can be fired using standard mortar and sighting and fire control equipment and special firing table in the same manner as standard service mortar ammunition.

The aluminum body Sabot has the bore-reading dimensions and configuration of an 81mm mortar cartridge. It contains an insert 22mm barrel (not rifled) placed longitudinally to receive the 22mm sub-caliber cartridge which is loaded in the magazine just prior to firing. The shaft of the Sabot has stabilizer wings and guide pads to guide the Sabot as it travels up the mortar tube when fired. On firing the loaded Sabot is ejected from the mortar barrel and hits the ground within 1-5 yards (depending upon charge fired) in front of the mortar while the 22mm practice cartridge flies on to its target. The Sabot may be used as a dummy round when

TM 43-0001-28

not loaded with a 22mm practice cartridge. The Sabot is rugged and can be reloaded and fired again up to 1000 times for training purposes. It is stored (INERT) in a packing box containing 3 rounds.

22mm Sub-Caliber Practice Cartridge:

The cartridge consists of the projectile with stabilizer fins and cartridge case (divided chambers). The projectile has a steel body flattened at the tip. The wingshaft assembly, press-fit into the projectile body, contains the stabilizer fins (spring steel wrapped around the shaft) to stabilize flight. The wingshaft assembly also serves to seal the base of the projectile body. The projectile body contains the impact fuze and smoke signal charge. The propelling and ejection charges are contained in two separate chambers, located in the jet housing assembly, which is threaded into the base of the cartridge case. A flash tube hole between the chambers permits ignition of the propelling charge by the ejection charge. The cartridges are manufactured in a variety of four propellant charges. Each charge can be identified by notches on the jet screw assembly. One notch designates M744 (charge 1), two notches designate M745 (charge 2), etc.

Functioning:

The protective plastic cap covering the percussion cap of the sub-caliber cartridge must be removed prior to firing. When the practice round is loaded into the Sabot the device is ready for firing. When the Sabot with the sub-caliber cartridge is dropped into the mortar tube, the percussion cap strikes the firing pin of the mortar and is ignited. The percussion cap ignites the ejection charge in the jet housing assembly. The gasses emerge through the axial holes in the jet screw assembly initiating travel of the Sabot and sub-caliber cartridge up the mortar tube. Simultaneously the ejection charge ignites the sub-caliber projectile propelling charge, also contained in the jet housing assembly. This propels the sub-caliber projectile out of the cartridge case and through the barrel of the Sabot. As the Sabot leaves the muzzle of the mortar, the sub-caliber projectile clears the barrel of the Sabot. The Sabot impacts the ground within 1-5 yards (depending on charge fired) of the mortar tube, while the sub-caliber projectile continues its flight down range.

Tabulated Data:

81mm Sabot:

Type -----	Practice
Weight -----	8.5 lbs
Length -----	15.618 in.
Cannon used -----	M1, M29, M29A1
Body material -----	Aluminum/Steel

22mm sub-caliber practice cartridge:

Type -----	Practice
Weight -----	1.097 lb
Length w/percussion cap -----	9.697 in.
Length w/o percussion cap -----	9.618 in.

Propelling Charge:

Black powder weight:

Charge 1 -----	.03 oz
Charge 2 -----	.04 oz
Charge 3 -----	.06 oz
Charge 4 -----	.08 oz

Temperature Limits:

Firing:

Lower limit -----	-40° F
Upper limit -----	+120° F

Storage:

Lower limit -----	-40° F
Upper limit -----	+120° F

Packing:

81mm Sabot -----	3 round/packing box
22mm practice cartridges -----	1 per polystyrene compartment; 100 cartridges per box

Packing Box:

Sabot

Weight -----	50 lbs
Dimensions -----	19 x 20 x 6 1/2 in.

Cartridges

Weight -----	120 lbs
Dimensions -----	23 x 21 3/4 x 13 3/8 in.
Cube -----	3.9

Shipping & Storage Data:

Quantity-distance class ----- 1.4
 Storage compatibility
 group ----- S
 DOT Classification ----- C
 DOT Designation ----- PRACTICE
 AMMUNITION
 EXPLOSIVE C

Drawing Numbers.

Sabot 81mm practice M1	9287906 -	DODAC
Cartridge Subcaliber		N/A*
22mm Practice:		
Charge 1 M744	9287907 - 1305-	
	A680	
Charge 2 M745	9287908 - 1305-	
	A681	
Charge 3 M746	9287909 - 1305-	
	A682	
Charge 4 M747	9287910 - 1305-	
	A683	

*Sabot 81mm Practice M1 is a reuseable item
 DODAC not required

Ballistics.

Muzzle velocity:

Charge 1	-----	148 ft/sec (45 meter/ sec)
Charge 2	-----	164 ft/sec (50 meter/ sec)
Charge 3	-----	197 ft/sec (60 meter/ sec)
Charge 4	-----	230 ft/sec (70 meter/ sec)

Maximum effective range:

Charge 1	-----	639 ft (195 meter)
Charge 2	-----	770 ft (235 meter)
Charge 3	-----	1082 ft (330 meter)
Charge 4	-----	1427 ft (435 meter)

References:

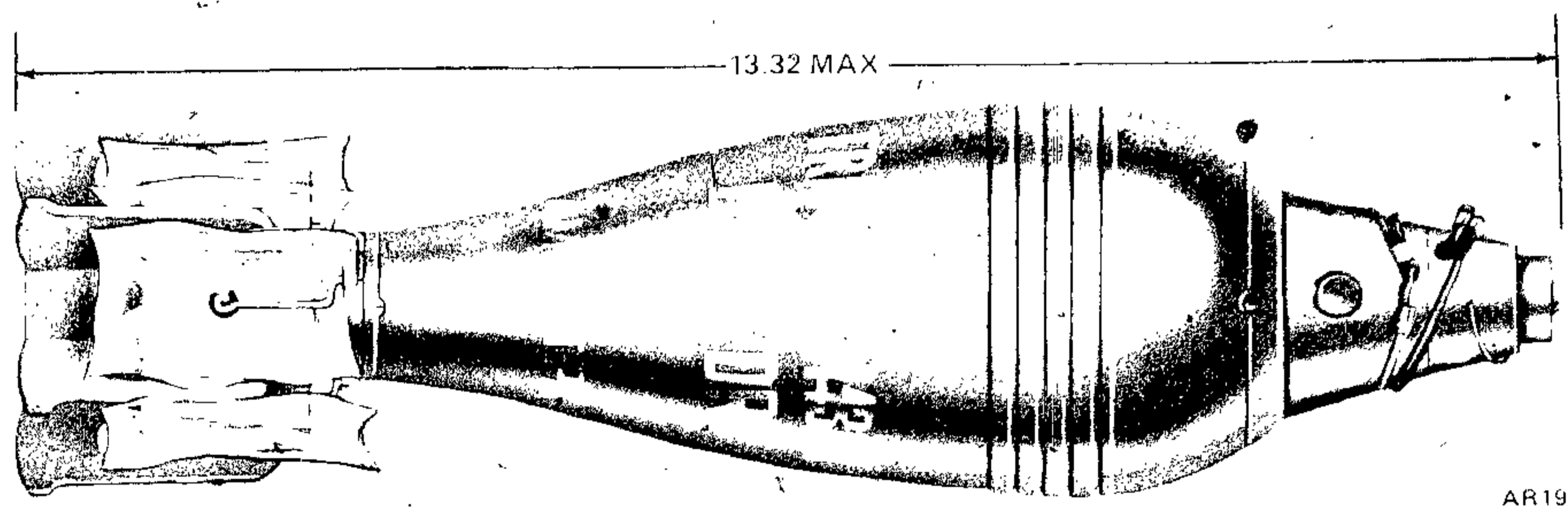
TM 9-1015-200-12
 TM 9-1300-251-20
 TM 1315-249-12&P



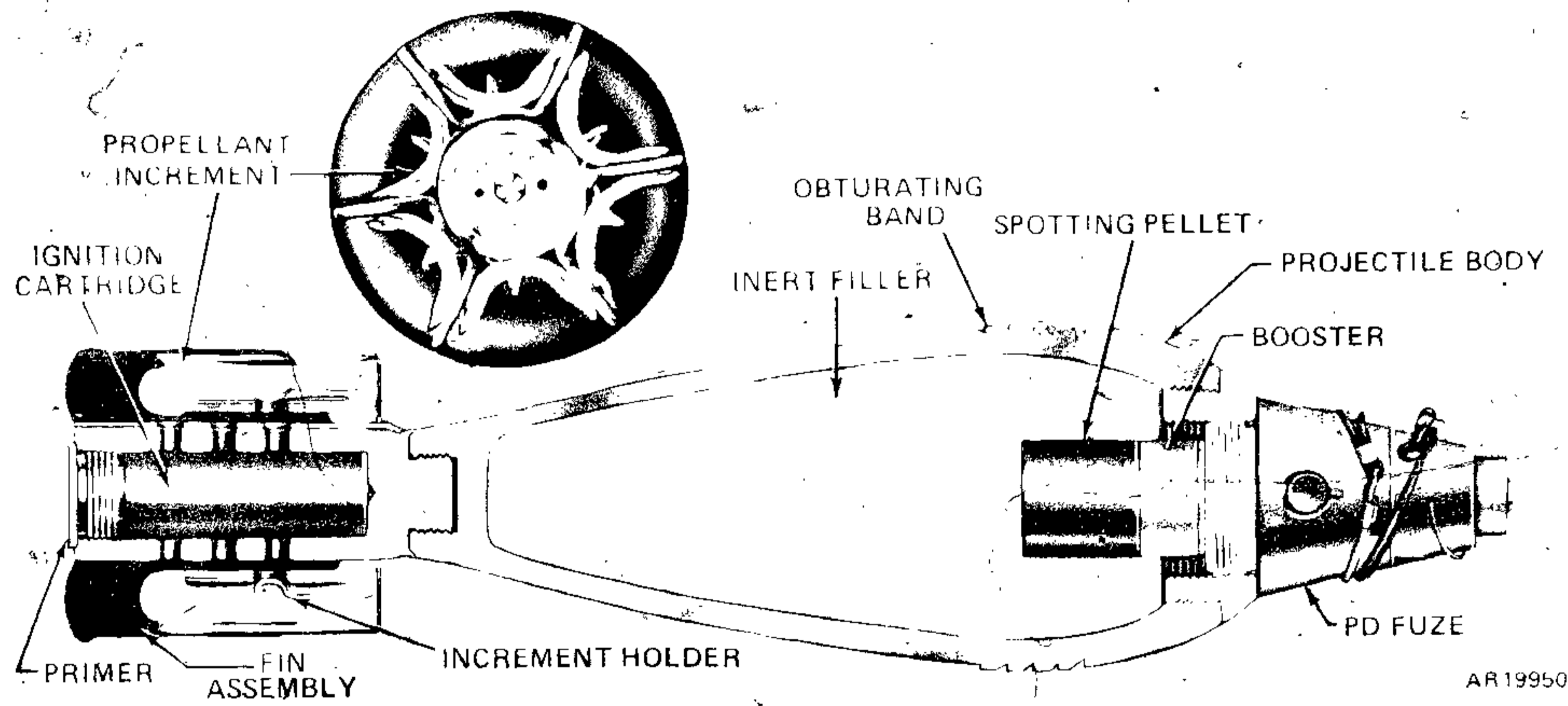
TM 43-0001-28

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CARTRIDGE, 81-MILLIMETER: TARGET PRACTICE, M43A1



AR199502



AR199501

Type Classification:

C&T AMCTC 6267 dtd 1968

Use:

This cartridge is used for target practice and contains a spotting charge for observation.

Description:

The complete round consists of a projectile body, a PD fuze, a fin assembly, a propellant charge, an ignition cartridge, and a percussion primer. The projectile body is of forged steel and is threaded internally at the nose to accept the fuze and at the base to accept the fin assembly. The body is loaded with an inert plaster filler to simulate the weight

and ballistic characteristics of a high explosive cartridge. A pellet containing a spotting charge of black powder is loaded in a cavity just below the booster charge of the fuze.

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 detonates the ignition cartridge, the cartridge ignites the propellant charge, and gases from the propellant charge expel the projectile and propel it to the target. The projectile is stabilized in flight. The PD fuze functions on impact, detonating the fuze booster charge and the spotting charge.

Difference Among Models:

One series has a modified fuze in which the tetryl booster charge has been replaced with a black powder booster charge.

Tabulated Data:

*Complete round:

Type ----- TP
 Weight ----- 07.29 lbs.
 Length ----- 13.32 in.
 Cannon used with ---- M1, M29, M29A1

Projectile:

Body material ----- Forged steel
 Color:
 Old ----- Blue or black w/
 white markings
 New ----- Blue w/white
 markings
 Filler and weight ---- Inert, 1.29 lbs.
 Spotting charge ----- BP, 24.8 ± 1.5
 grams

*Components:

Ignition cartridge ---- M8
 Propellant charge ---- M1A1
 Percussion
 primer ----- M34
 Fin assembly ----- M3
 Fuze ----- PD, M52A1B1

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 hrs/
 day)

Packing ----- 1 round in fiber
 container; 4 fiber
 containers in
 wooden box.

*Packing Box:

Weight ----- 49.8 lbs
 Dimensions ----- 17-3/4 x 9-11/16
 x 10-15/32 in.
 Cube ----- 1.0 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 4-
 Storage compatibility
 group ----- E.
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES
 DODAC ----- 1315-C227
 Drawing number ----- 75-1-89

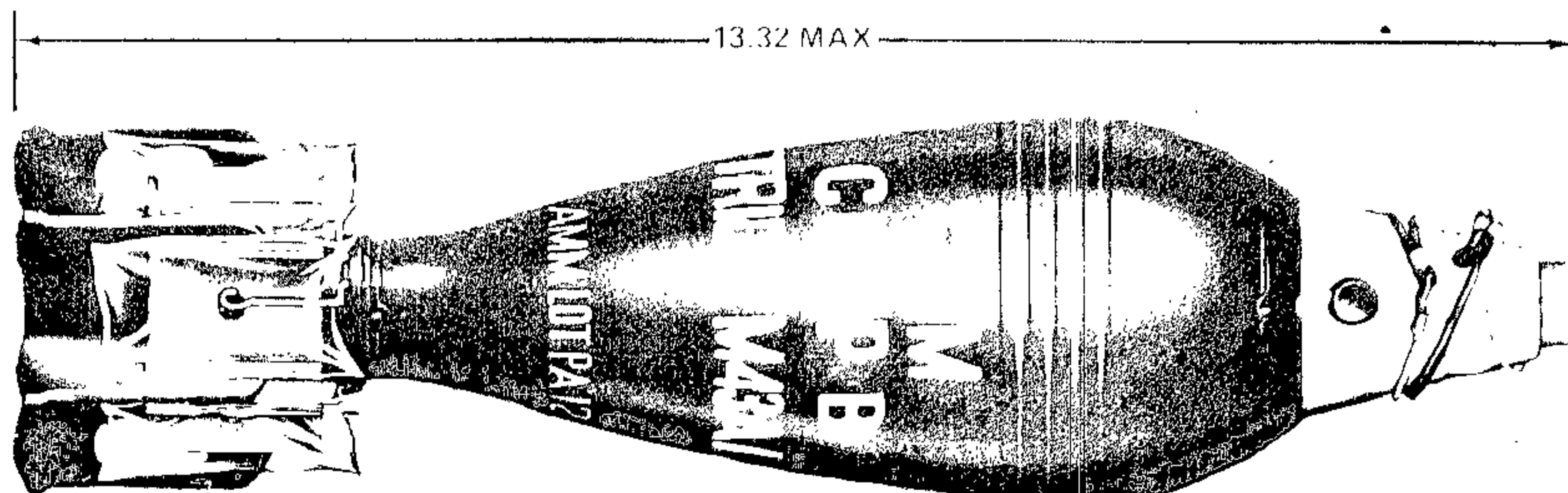
Ballistics: Charge	Muzzle Velocity (fps)	Maximum Range	
		(meters)	(yds)
0*	238	517	565
1	351	1024	1111
2	443	1511	1649
3	519	1947	2120
4	590	2349	2560
5	656	2700	2950
6	719	3016	3290
7	779	3292	3590
8	834	3701	4050

*Charge 0 is the ignition cartridge only;
 Charge 1 is the ignition cartridge and one
 increment charge; Charge 8 is the ignition
 cartridge and eight increment charges.

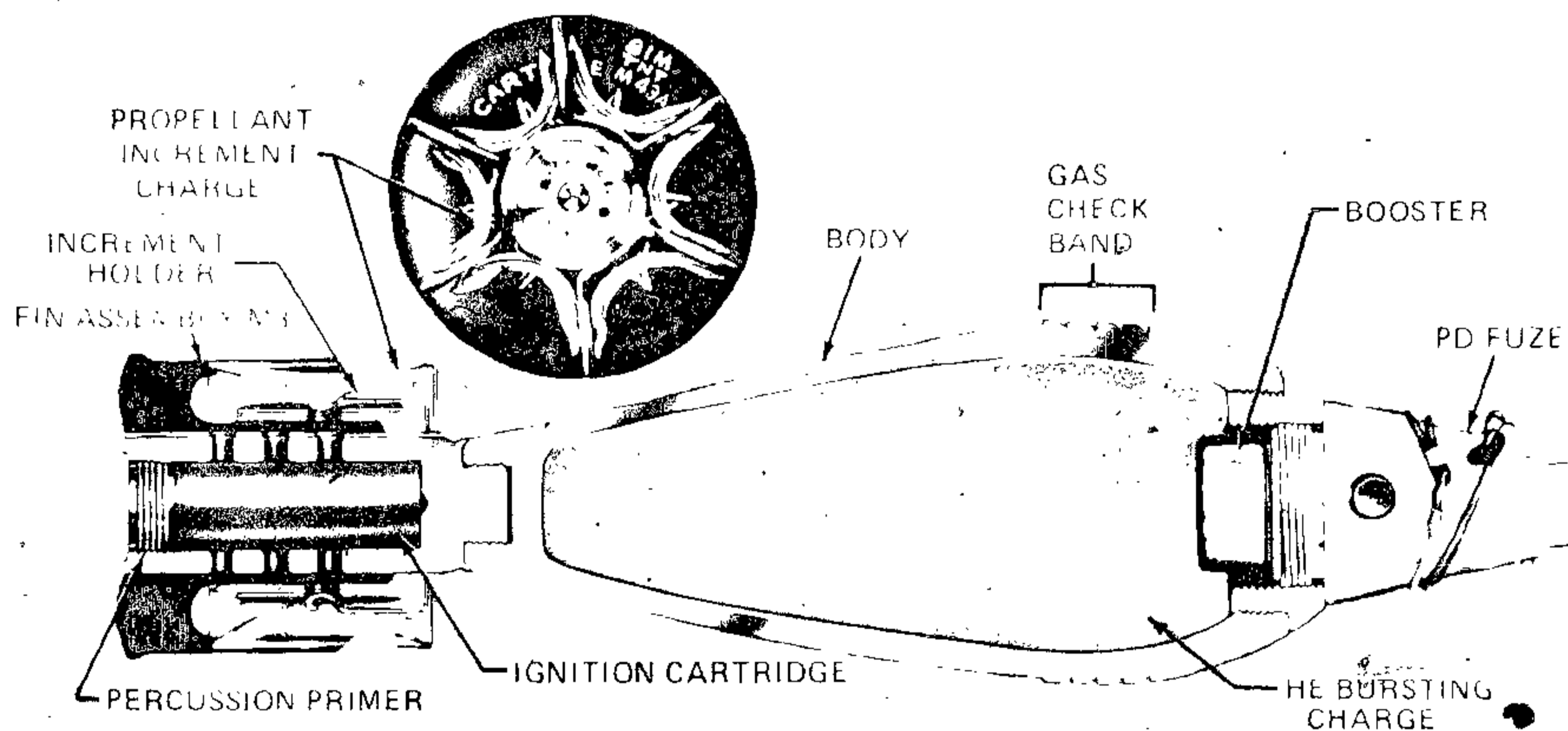
References:

AMC P 700-3-3
 SB 700-20
 SC 1305/30-IL
 TM 9-3071-1
 TM 9-1015-200-12
 TM 9-1300-251-20

CARTRIDGE, 81-MILLIMETER: HE, M43A1 AND M43A1B1



AR199576



AR199499

Type Classification:

OBS 11756003

Use:

This cartridge is used against personnel and light materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body, a point detonating fuze, a fin assembly, a propellant charge, and an ignition charge with a percussion primer. The projectile body is of forged steel, and is threaded internally at the nose to accept the fuze and at the base to accept

the fin assembly. The projectile body is filled with Composition B high explosive.

Functioning:

When the cartridge is loaded into the mortar tube until the percussion primer of the ignition cartridge strikes the base cap of the mortar. The primer ignites the propellant charge. Rapidly expanding gases from the burning propellant expel the projectile from the tube and propel it to the target. The projectile is fin-stabilized in flight. The PD fuze functions on impact detonating the booster charge and, in turn, the high explosive charge. The bursting charge shatters the projectile body, producing near optimum fragmentation and blast effect at the target.

Difference Between Models:

The two cartridges differ only in some minor metal parts.

Tabulated Data:

Complete round:

Type -----HE
 Weight -----07.15 lbs.
 Length -----13.32 in.
 Cannon used with--M1, M29, M29A1

Projectile:

Body material ----Forged steel
 Color -----Olive drab w/yellow markings
 Filler and weight--Comp. B, 01.29 lbs.

Components:

Ignition cartridge--M8 or M6
 Propellant charge--M1A1
 Percussion
 primer-----M34
 Fin assembly-----M3
 Fuze-----PD, M525 series
 PD, M717

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 hrs/day)

*Packing -----1 round in fiber containers; 4 containers in wooden box

*Packing Box:

Weight -----49.8 lbs.
 Dimensions -----17-3/4 x 9-11/16 x 10-15/32 in.
 Cube -----1.0 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class -----4
 Storage compatibility group -----E
 DOT shipping class-----A
 DOT designation -----

AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES

DODAC -----1315-C225
 Drawing number -----9218433

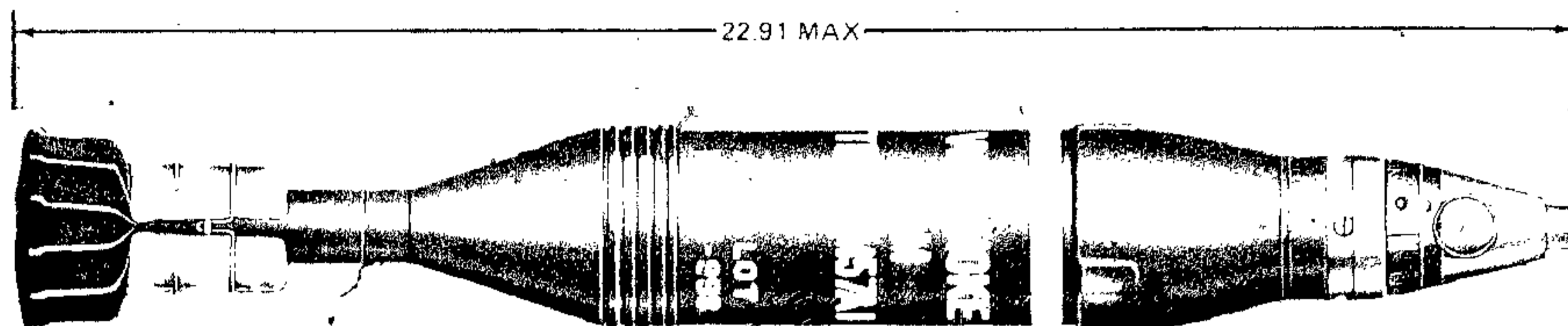
Ballistics: Charge	Muzzle Velocity	Maximum Range	
	(fps)	(meters)	(yds)
0*	238	517	565
1	351	1029	1111
2	443	1511	1649
3	519	1947	2120
4	590	2349	2560
5	656	2700	2950
6	719	3016	3290
7	779	3292	3590
8	834	3701	4050

*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 8 is the ignition cartridge and eight increment charges.

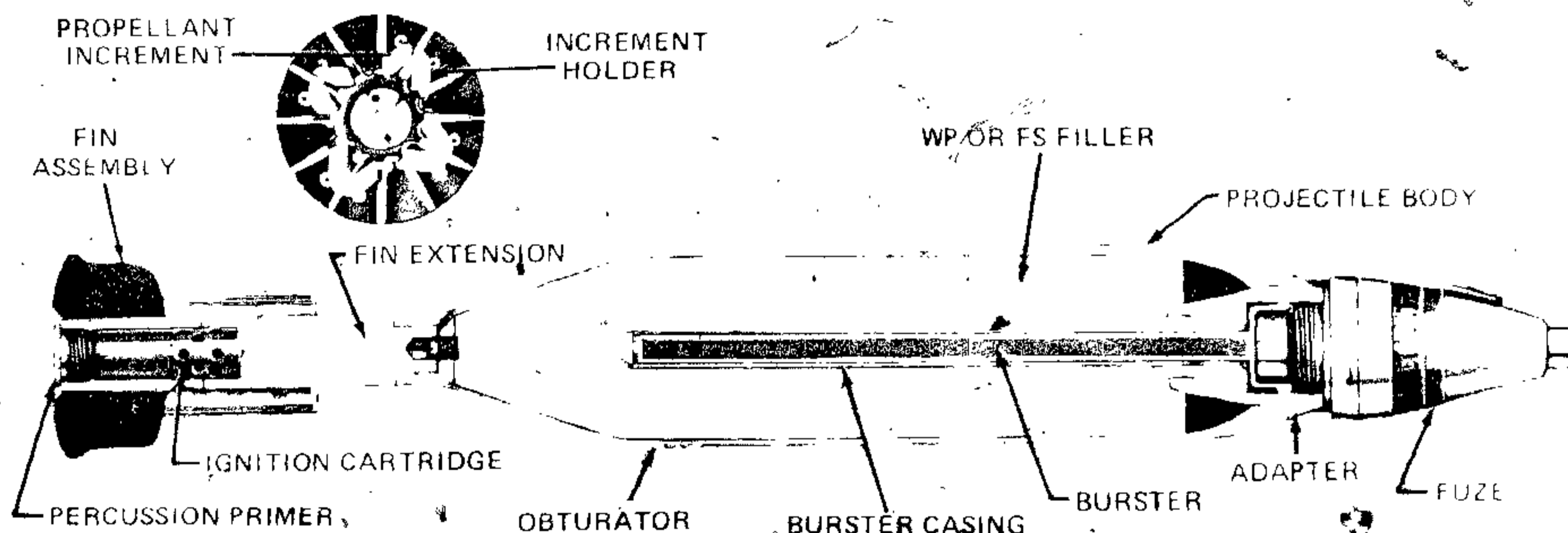
References:

DARCOM P 700-3-3
 SB 700-20
 SC 1305/30-IL
 TM 9-3071-1
 TM 9-1015-200-12
 TM 9-1300-251-20

CARTRIDGE, 81-MILLIMETER: SMOKE, WP, M57A1 AND M57



AR199498



AR199497

Type Classification:

- With WP Filler: CON 11756003
- With FS Filler: OBS OTCM 37196 dtd 1961

Use:

This cartridge is used against personnel and materiel as an incendiary device and also to produce screening smoke.

Description:

The complete round consists of a projectile body with a burster assembly, a point-detonating fuze, a fin assembly, a propellant charge, and an ignition cartridge with a percussion primer. The projectile body is of relatively

thin-walled steel, and is filled with white phosphorous (WP) or a liquid smoke filler (FS). The base of the projectile is internally threaded to accept the fin assembly, and the nose is fitted with a steel adapter. The adapter is internally threaded to accept the fuze and is designed to hold the burster assembly. The burster assembly is a thin-walled steel tube filled with tetryl and extends into the smoke charge.

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 with the velocity required to reach the target. The fuze functions on impact, detonating the burster charge which ruptures the projectile and disperses the chemical filler. Both WP and FS react spontaneously on contact with the air. WP ignites producing a dense white smoke and some incendiary effect, while FS, combining with the moisture in the air, creates a cloud-like smoke screen without burning.

Difference Between Models:

The M57 is fitted with the M4 fin assembly and the M57A1 uses the M4A1 assembly. These differ in minor manufacturing details only. Cartridges with liquid smoke filler (FS) are classified as obsolete.

Tabulated Data:

Complete round:

Type ----- Smoke
 Weight ----- 11.38 lbs.
 Length ----- 22.91 in.
 Cannon used with ----- M1, M29, M29A1
 Projectile
 Body material ----- Steel
 Color ----- Grey w/yellow markings
 Filler and weight ----- WP, 4.06 lbs.
 Burster charge ----- Tetryl, 0.08 lbs.

Components:

Burster assembly --- M1
 Ignition cartridge --- M6
 Propellant charge --- M2A1
 Percussion
 primer ----- M34
 Fin assembly ----- M4, M4A1
 Fuze ----- FD, M52A1, M525

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 1 hrs/day)

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

*Packing Box:

Weight ----- 43.0 lbs.
 Dimensions ----- 28 x 9-11/16 x 6-15/32 in.
 Cube ----- 1.0 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 4
 Storage compatibility group ----- A
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
 DODAC ----- 1315-C230
 Drawing number ----- 75-1-93

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (meters)	Range (yds)
1*		630	700
2		1199	1300
3		1646	1800
4		2169	2872

*Charge 1 is the ignition cartridge and one increment charge; Charge 4 is the ignition cartridge and four increment charges.

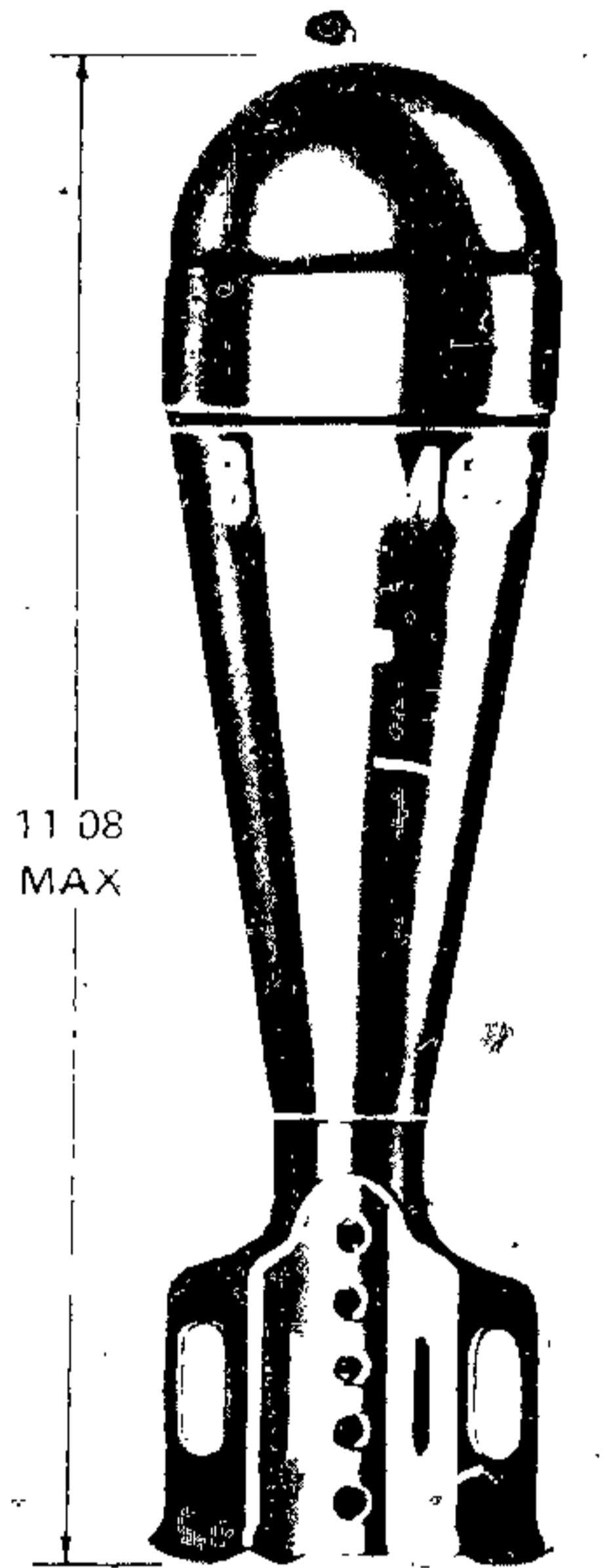
Limitations:

Store and transport WP rounds at temperatures below 111.4° F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

References:

- DARCOM P 700-3-3
- SB 700-20
- SC 1305/30-IL
- TM 9-1015-200-12
- TM 9-1300-251-20
- TM 9-3071-1

CARTRIDGE, 81-MILLIMETER: TRAINING, M68



11.08
MAX

B-ASSEMBLED
AR199496



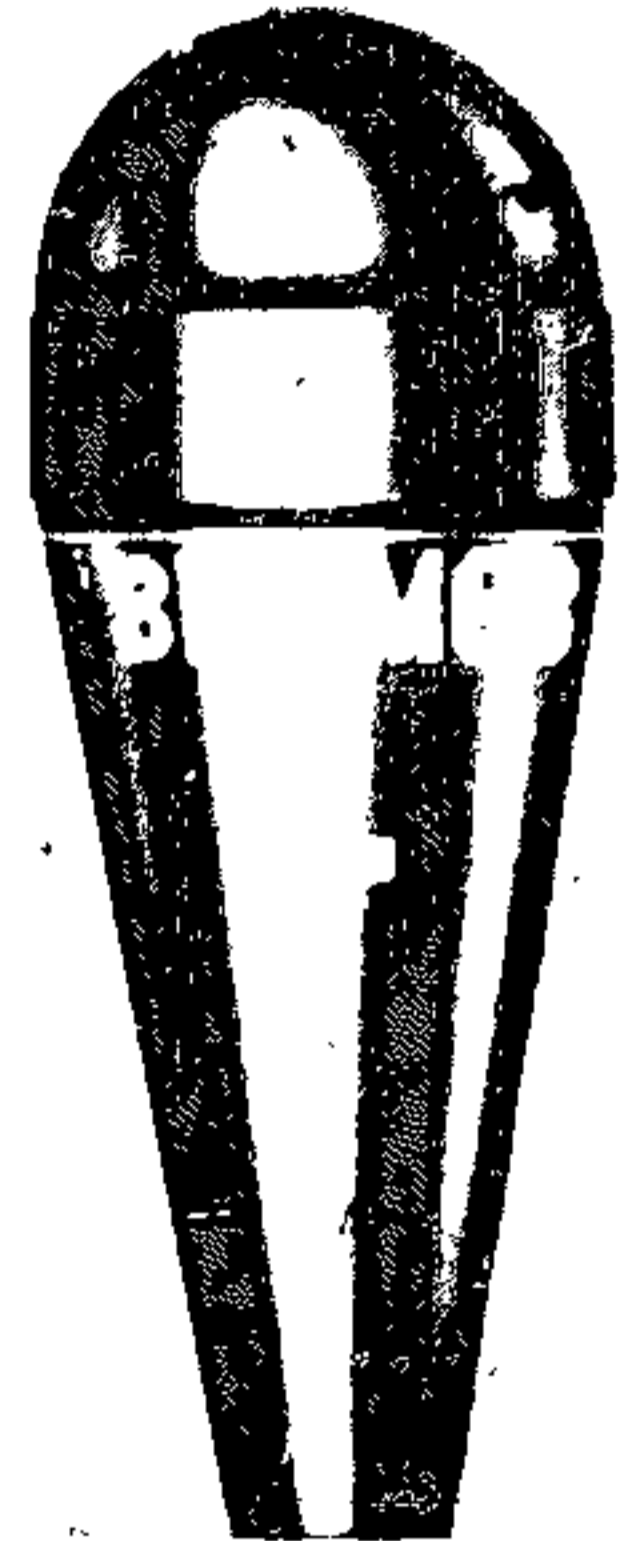
FIN ASSEMBLY



CARTRIDGE IGNITION: M3
OR



PRIMER,
PERCUSSION: AND CARTRIDGE,
M34 IGNITION:
M6



PROJECTILE

AR199495

Type Classification:

Std OTCM 36841 dtd 1958

Use:

This cartridge is used for training in the loading and firing of the 81-mm mortar.

Description:

Unlike other mortar ammunition, the components of this round are issued separately to facilitate replacement of damaged, worn, or expended parts. The complete round consists of an inert projectile, a fin assembly, and an ignition cartridge. The pear-shaped, cast iron projectile has no provision for a fuze, and is

internally threaded at the base to accept the fin assembly.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer of the ignition cartridge strikes the firing pin on the base cap of the mortar. The primer ignites the ignition cartridge. Since this round is fired only at Charge 0, the gases from the ignition cartridge expel the projectile from the mortar tube and propel it to the target. The projectile is fin stabilized in flight. Since the projectile is inert, there is no detonation on impact, and the cartridge may be recovered for reuse.

TM 43-0001-28

Tabulated Data:

Complete round:

Type ----- Training
 Weight, assembled --- 10.79 lbs.
 Length, assembled --- 11.08 in.
 Cannon used with --- M1, M29, M29A1
 Projectile
 Body material ----- Cast iron
 Color ----- Black w/white markings.
 (Later manufacture - no paint or bronze body)
 Filler and weight ---- Inert
 Components
 Ignition cartridge --- M6 or M3
 Propellant charge --- None
 Percussion primer --- M34
 Fin assembly ----- M6
 Fuze ----- None

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 hrs/day)

*Packing ----- A training kit used in the field holds ten training cartridges and accessories.

*Packing Box:
 Weight ----- 51.0 lbs.
 Dimensions ----- 25-11/16 x 13-9/16 x 6-11/32 in.

• Cube ----- 1.4 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 4
 Storage compatibility group ----- E
 DOT shipping class ----- B
 DOT designation ----- AMMUNITION FOR CANNON WITH INERT PROJECTILES
 DODAC ----- 1315-C228
 Drawing number ----- 75-2-302

Ballistics:

Charge ----- 0
 Muzzle velocity ----- 173 fps.
 Maximum range ----- 284 meters

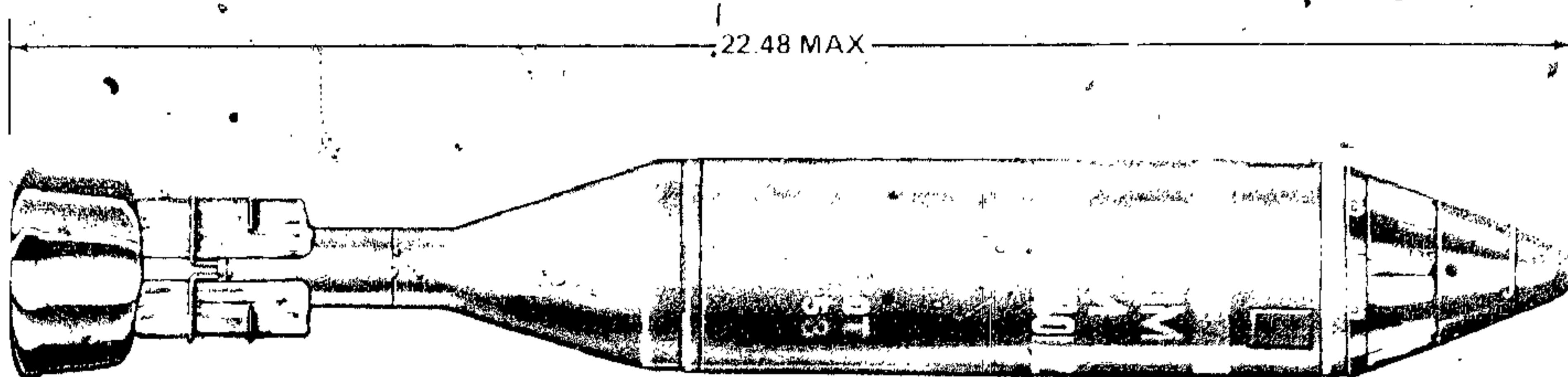
Limitations:

This round is to be fired at Charge 0 only.

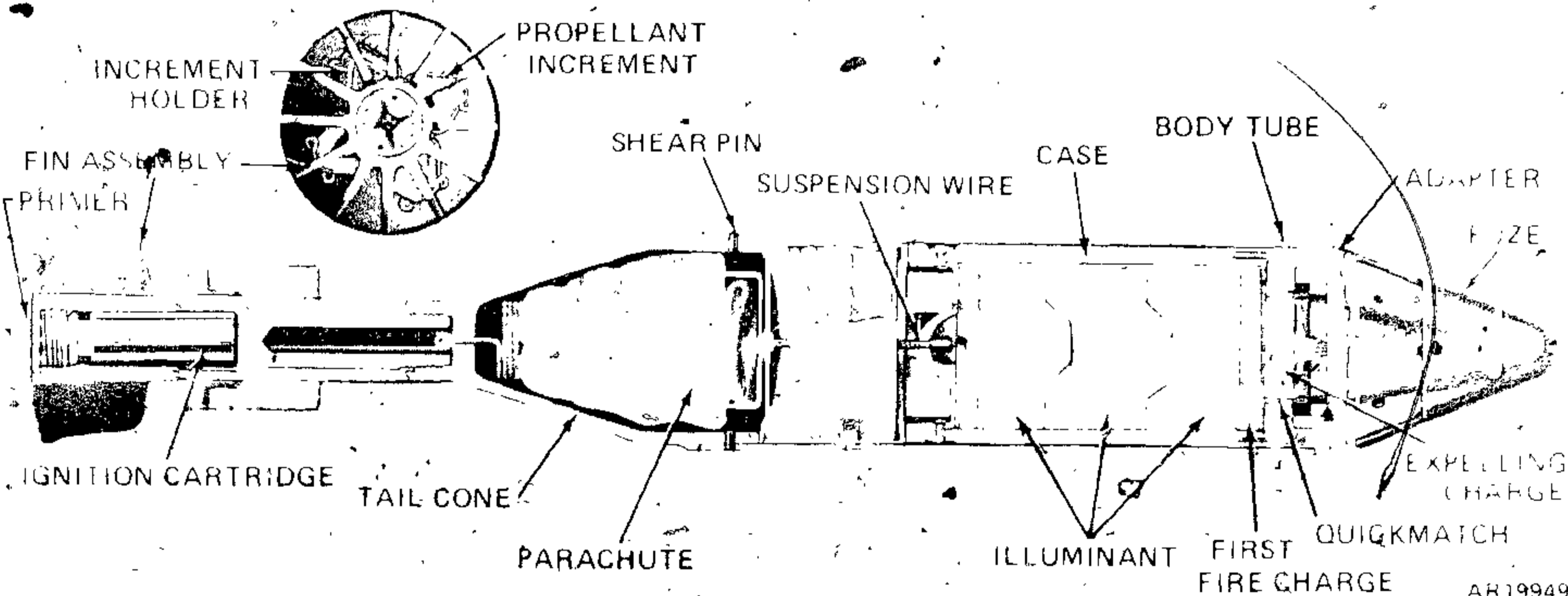
References:

AMCP 700-3-3
 SB 700-20
 SC 1305/30-IL
 TM 9-1015-200-12
 TM 9-1300-251-20
 TM 9-3071-1

CARTRIDGE, 81-MILLIMETER: ILLUMINATING, M301A2 AND M301A1



AR199494



AR199493

Type Classification:

Std OTCM 36841 dtd 1958

Use:

This cartridge 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 fin assembly, and is attached to the body tube with four equally spaced shear pins. The illuminant assembly consists 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 of the ignition cartridge strikes the firing pin of 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 lbs.
 Length ----- 22.48 in.
 Cannon used with ---- M1, M29, M29A1

Projectile:

Body material ----- Steel tube
 Color:
 Old ----- Gray w/white band & white markings
 New ----- White w/black markings

Filler and weight ---- Illum., 1.37 lbs.

Components:

Ignition cartridge ---- M6
 Propellant charge ---- M2A1
 Percussion primer ----- M34
 Fin assembly ----- M4A1
 Fuze ----- Time, M84

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 hrs/day)

*Packing ----- 1 round in jungle wrapped fiber or metal container. three fiber/metal containers in wooden box.

*Packing Box:

Weight ----- 53.6 lbs.
 Dimensions ----- 30-9/16 x 13-15/16 x 6-25/32 in.
 Cube ----- 1.9 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 4
 Storage compatibility group ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES
 DODAC ----- 1315-C226
 Drawing number ----- 8865058

Ballistics:

Charge	Muzzle Velocity	Range to burst	
	(fps)	(meters)	(yds)
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.

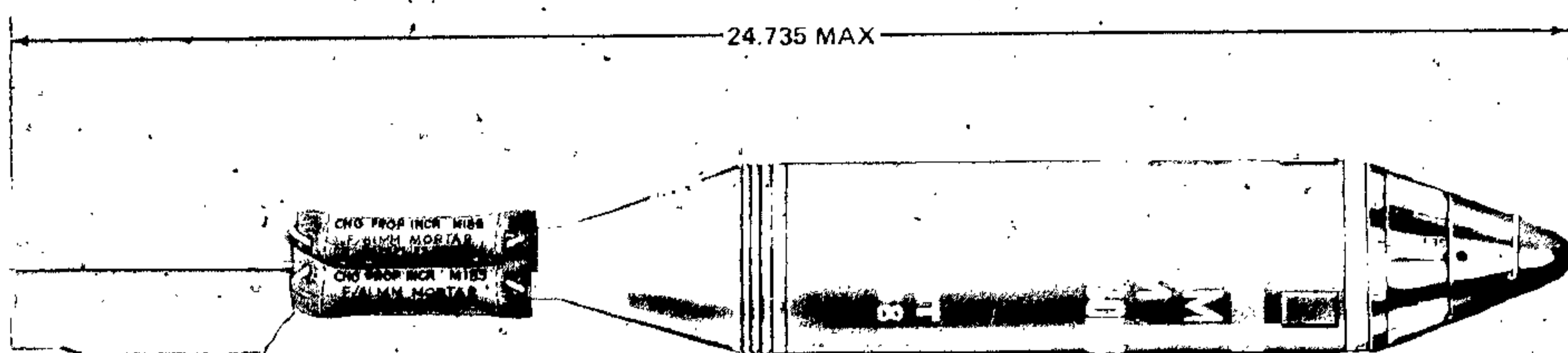
Limitations:

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

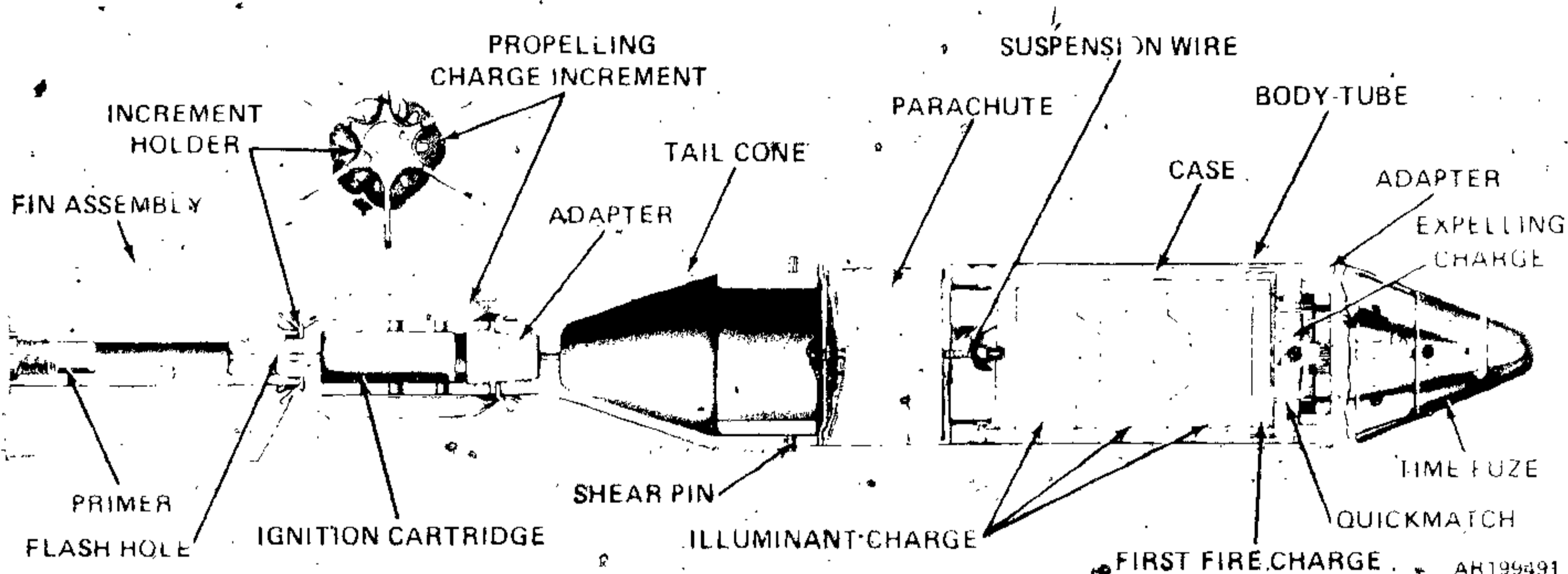
References:

AMCP 700-3-3
 SB 700-20
 SC 1305/30-IL
 TM 9-1015-200-12
 TM 9-1300-251-20
 TM 9-3071-1

CARTRIDGE, 81-MILLIMETER: ILLUMINATING, M301A3



AR199492



AR199491

Type Classification:

Std AMCTC 6390 dtd 1968

Use:

This cartridge 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 a cartridge housing and propellant increment charges, 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 may be internally or externally threaded, depending upon the model. Models that are internally threaded require an adapter for attaching the fin assembly. The tail cone is attached to the body 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 hub of the fin assembly strikes

The firing pin in the base cap of the mortar... burning primer flashes through the central hole in the cartridge housing, igniting the... cartridge. The cartridge ignites the... charge, and rapidly expanding gases... the burning propellant expel the projec-... the tube and propel it to the... The projectile is fin-stabilized in... actioning of the time fuze detonates... propelling charge and ignites the first-fire... by means of a length of quick... propelling charge also separates the cone... the tube, allowing the illuminant candle... parachute assembly to fall free. The... fire charge ignites the illuminant, and... parachute deploys to support the candle... time is at least 60 seconds with a... of 500,000 candlepower.

Interchange Between Models:

The assembly attaches with or without adap-... depending upon design of the tail cone.

Related Data:

- Complete round:
- Type ----- Illuminating
 - Weight ----- 10.1 lbs.
 - Length ----- 24.735 in.
 - Cannon used with ----- M1, M29, M29A1
- Projectile:
- Body material ----- Steel tube
 - Color ----- White w/black markings
 - Filler and weight ----- Illum., 1.37 lbs.
- Components:
- Ignition cartridge ----- M66E1
 - Propellant charge ----- M185
 - Percussion primer ----- M71A2
 - Fin assembly ----- M158
 - Fuze ----- Time, M84A1

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 hrs/day)
- Packing ----- 1 round in jungle wrapped fiber or metal container.
 8 fiber/metal containers in wooden box.

*Packing Box:

- Weight ----- 53.6 lbs.
- Dimensions ----- 30-9/16 x 13-15/16 x 6-25/32 in.
- Cube ----- 1.9 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

- Quantity-distance class ----- 4
- Storage compatibility group ----- E
- DOT shipping class ----- A
- DOI designation ----- AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES
- DODAC ----- 1315-C226
- Drawing number ----- 9220705

Ballistics:

Charge	Fuze Setting (Sec)	Horizontal Range (meters)	Height of burst (meters)	Elevation (mils)
3*	20.6	250	600	1501.1
3	19.93	250	600	1501.1
3	15.9	1050	600	1042.1
4	19.8	1550	600	1004.3
5	22.1	2050	600	942.6
6	26.1	2450	600	967.4
7	27.6	2950	600	904.7
8	29.8	3150	600	885.9

*Charge 3 is the ignition cartridge and three increment charges. Charge 8 is the ignition cartridge and eight increment charges.

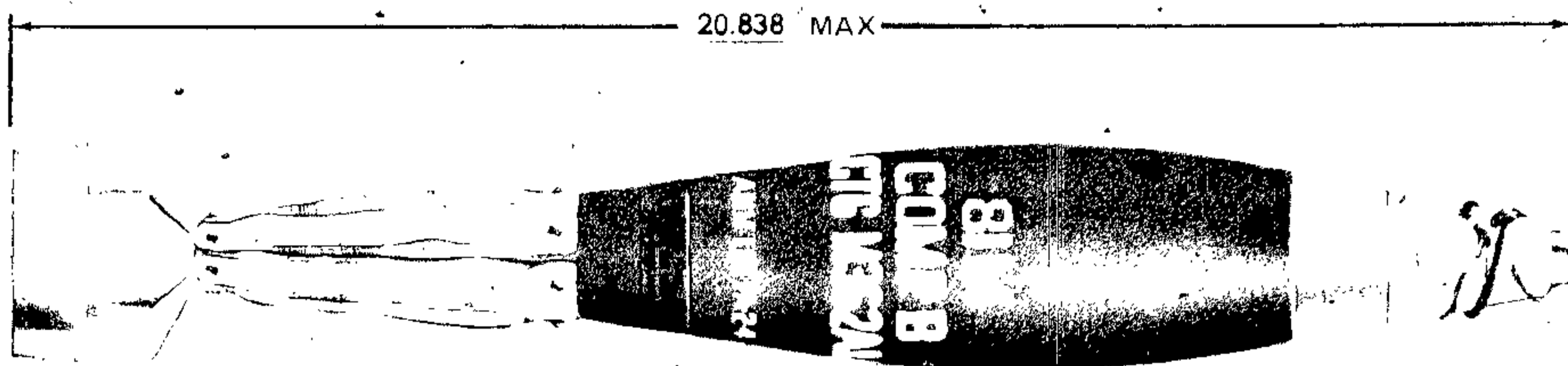
Limitations:

Firing with less than three propellant increment charges (Charge 3) is not authorized. Exposure of the propelling charge to moisture can produce short rounds.

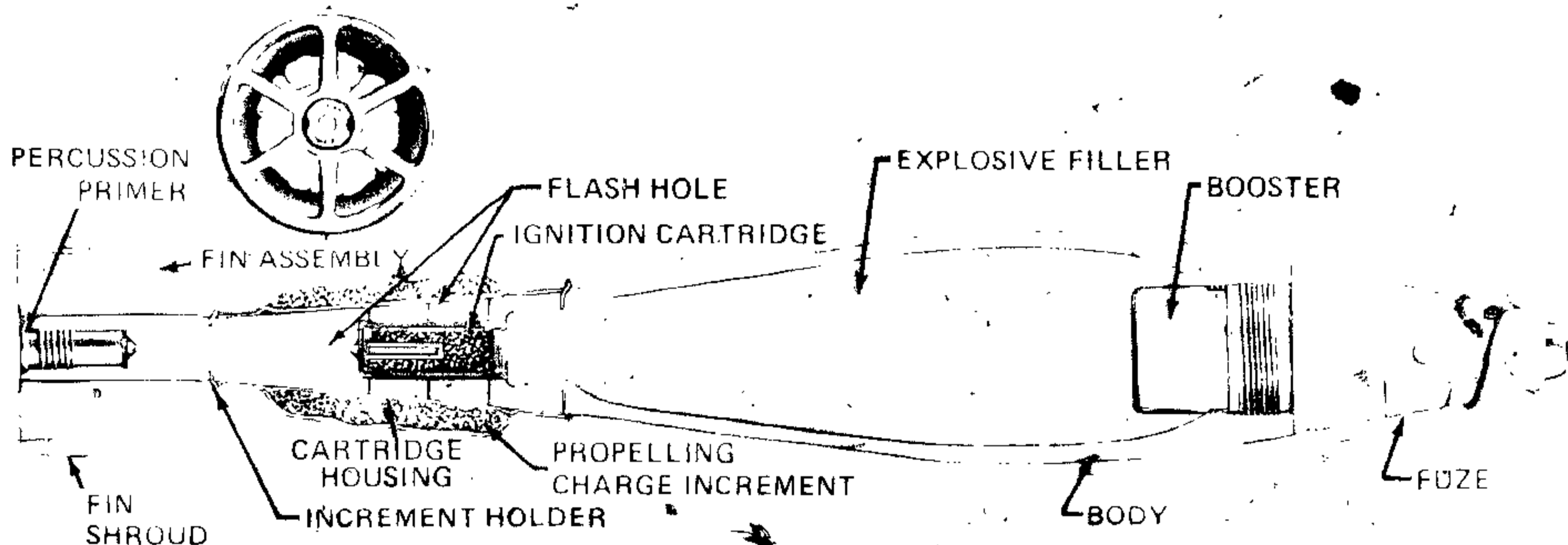
References:

- AMCP 700-3-3
- SB 700-20
- SC 1305/30-IL
- TM 9-1015-200-12
- TM 9-1300-251-20
- TM 9-7031-1

CARTRIDGE, 81-MILLIMETER: HE, M362A1 AND M362



AR199490



AR199489

Type Classification:

M362A1: Std AMCTC 1770 dtd 1964
 M362: CON 11756003

Use:

This cartridge is used against personnel and materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body, a point-detonating or a proximity fuze, a fin assembly that includes a cartridge housing and propellant increment charges, an ignition charge, and a percussion primer. The projectile body is of pearlitic malleable iron,

and is threaded internally at the nose to accept the fuze and externally at the base to accept the fin assembly. The projectile body is filled with Composition B high explosive.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the hub of the fin assembly strikes the firing pin in the base cap of the mortar. The burning primer flashes through the central flash hole in the cartridge housing, igniting the ignition cartridge. The cartridge ignites the propellant charge. Rapidly expanding gases from the burning propellant expel the projectile from the tube and propel it to the target. The projectile is fin-stabilized in flight. Functioning of the fuze detonates the fuze-booster charge and

in turn, the high explosive charge. Depending upon the type of fuze used, the projectile bursts over or on the target, producing near optimum fragmentation and blast effect.

Difference Between Models:

The projectile body of the M362 is of forged steel.

Tabulated Data:

Complete round:

Type ----- HE
 Weight w/fuze ----- 9.42 lbs.
 Length w/fuze ----- 20.838 in. max.
 Cannon used with ---- M1, M29, M29A1

Projectile:

Body material ----- M362A1; cast PMI
 M362, forged steel
 Color ----- Olive drab w/yellow
 markings
 Filler and weight --- Comp. B. 2.10 lbs.

Components:

Ignition cartridge --- M66
 Propellant charge --- M5
 Percussion primer --- M71, M71E1
 Fin assembly ----- M141
 Fuze ----- PD, M524 series
 PD, M526 series
 PD, M716
 PRX, M517
 PRX, M532

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 hrs/day)

* Packing ----- 1 round in fiber
 container, 3 con-
 tainers in wooden
 box

* Packing Box:

Weight ----- 51.0 lbs.
 Dimensions ----- 25-11/16 x 13-9/16
 x 6-11/32 in.
 Cube ----- 1.4 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 4
 Storage compatibility
 group ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES
 DODAC ----- 1315-C222
 1315-C223
 Drawing number ----- M362A1, 8838144
 M362, 7549034

Ballistics:

Charge	Muzzle	Maximum Range	
	Velocity (fps)	(meters)	(yds)
0*	181	297	324
1	298	777	849
2	397	1301	1430
3	480	1791	1951
4	554	2246	2450
5**	620	2657	2910
6*	673	3027	3300
7	722	3327	2740
8	775	3618	3940

* Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 8 is the ignition cartridge and eight increment charges.

** Charge 5 is the maximum authorized for firing in Mortar M1.

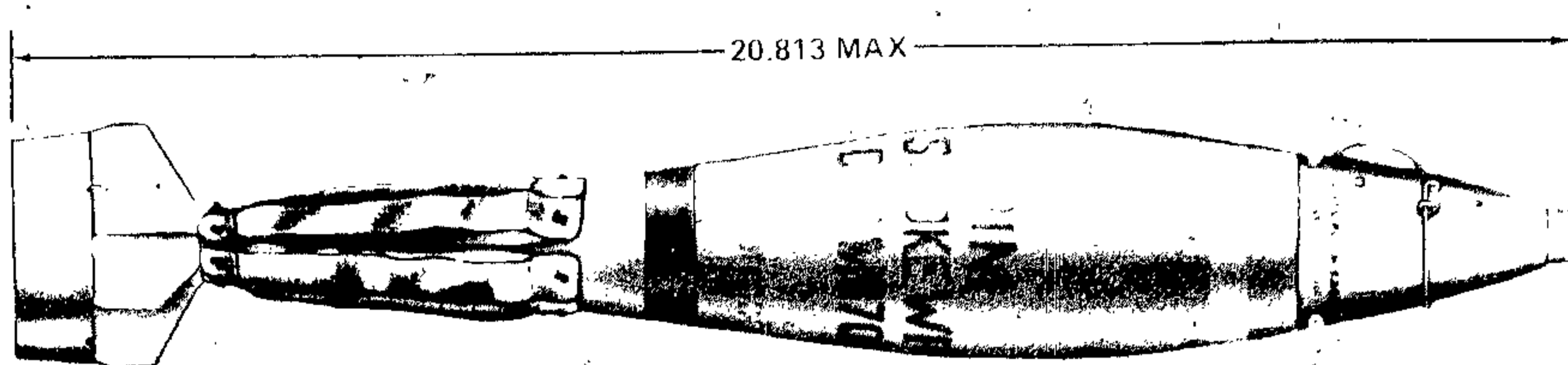
Limitations:

See above chart.

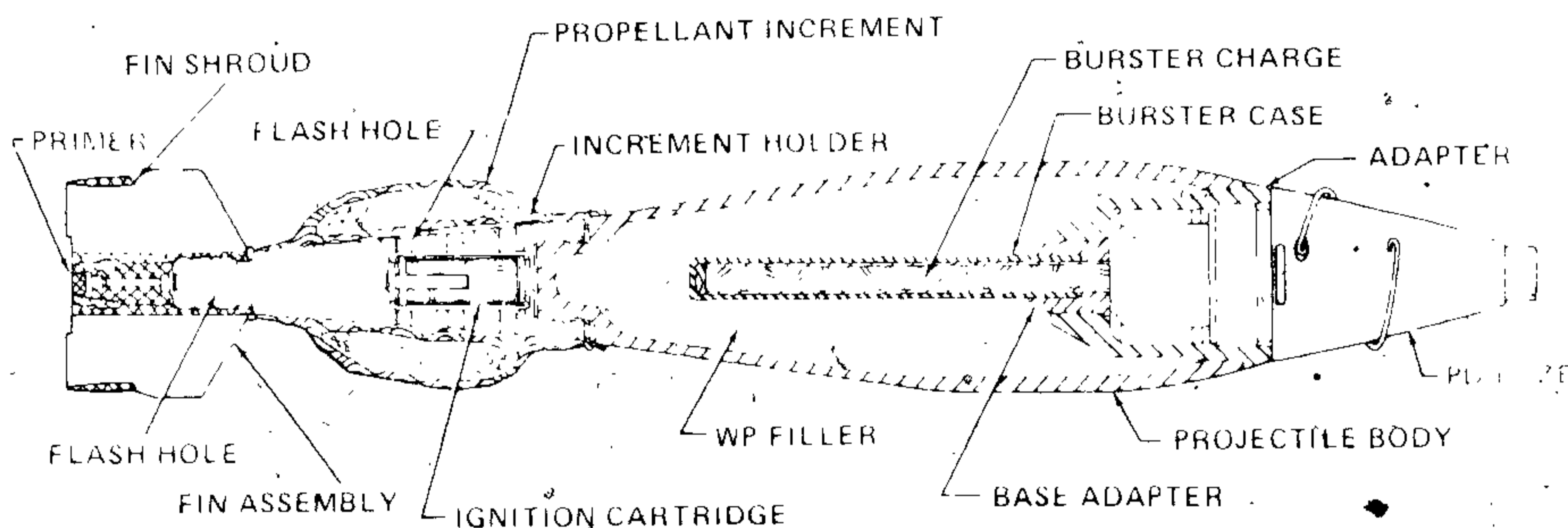
References:

TM 9-1015-200-12
 TM 9-1300-251-20
 TM 9-7031-1
 SC 1305/30-IL

CARTRIDGE, 81-MILLIMETER: SMOKE, WP, M370



AR199488



AR199487

Type Classification:

Std. AMCTC 2048 dtd 1964

Use:

This cartridge is used to produce a smoke screen.

Description:

The complete round consists of a projectile body with a burster assembly, a point-detonating fuze, a fin assembly that includes a cartridge housing, a propellant charge, an ignition charge, and a percussion primer. The projectile body is of relatively thin-walled steel, and is filled

with white phosphorous. The base of the projectile is externally threaded to accept the cartridge housing of the fin assembly. The base of the projectile is fitted with a steel adapter designed to hold the burster casing, and internally threaded to accept the fuze. The burster casing is a thin-walled steel cylinder press-fitted to the adapter and containing a burster charge of RDX.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer of the hub of the fin assembly strikes the fuze pin in the base cap of the mortar. The primer flashes through the central flash hole

in the cartridge housing, igniting the ignition cartridge. The cartridge ignites the propellant charge. Rapidly expanding gases from the burning propellant expel the projectile from the tube and propel it to the target. The projectile is fin-stabilized in flight. The PD fuze functions on impact, detonating the burster charge which ruptures the projectile and disperses the white phosphorous filler. WP ignites spontaneously on contact with the air producing dense white smoke.

Tabulated Data:

Complete round:
 Type ----- SMOKE (WP)
 Weight ----- 9.34 lbs.
 Length ----- 20.813 in.
 Cannon used with ---- M1, M29, M29A1

Projectile:
 Body material ----- Steel
 Color:
 Old ----- Grey w/yellow band and yellow markings:
 New ----- Light green w/yellow band and light red markings.
 Filler and weight ---- WP, 1.60 lbs.
 Burster charge ---- RDX, 0.025 lbs.

Components:
 Booster assembly --- M47
 Ignition cartridge ----- M66
 Propellant charge --- M5
 Percussion primer ----- M71E1
 Fin assembly ----- M141
 Fuze ----- PD, M524A4
 PD, M526 series

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 hrs/day)

* Packing ----- 1 round in fiber container; 3 fiber containers in wooden box

* Packing Box:

Weight ----- 51.0 lbs.
 Dimensions ----- 25-11/16 x 13-9/16 x 6-11/32 in.
 Cube ----- 1.4 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 5
 Storage compatibility group ----- A
 DOT shipping class ----- A
 DOT designation ---- AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
 DODAC ----- 1315-C234.
 Drawing number ----- 8848900

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (meters) (yds)
0*		274 300
1		640 700
2		1188 1300
3		1691 1850
4		2148 2350
5**		2661 2920
6		2926 3200
7		3292 3600
8		3646 3987

* Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 8 is the ignition cartridge and eight increment charges.

** Charge 5 is the maximum authorized for firing in Mortar M1.

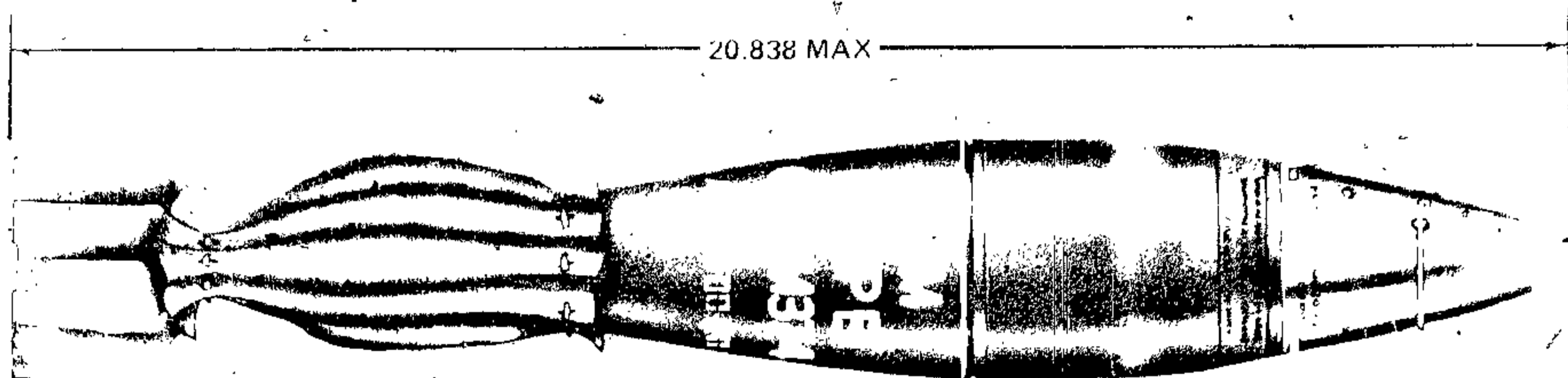
Limitations:

Store and transport WP rounds at temperatures below 111.4° F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

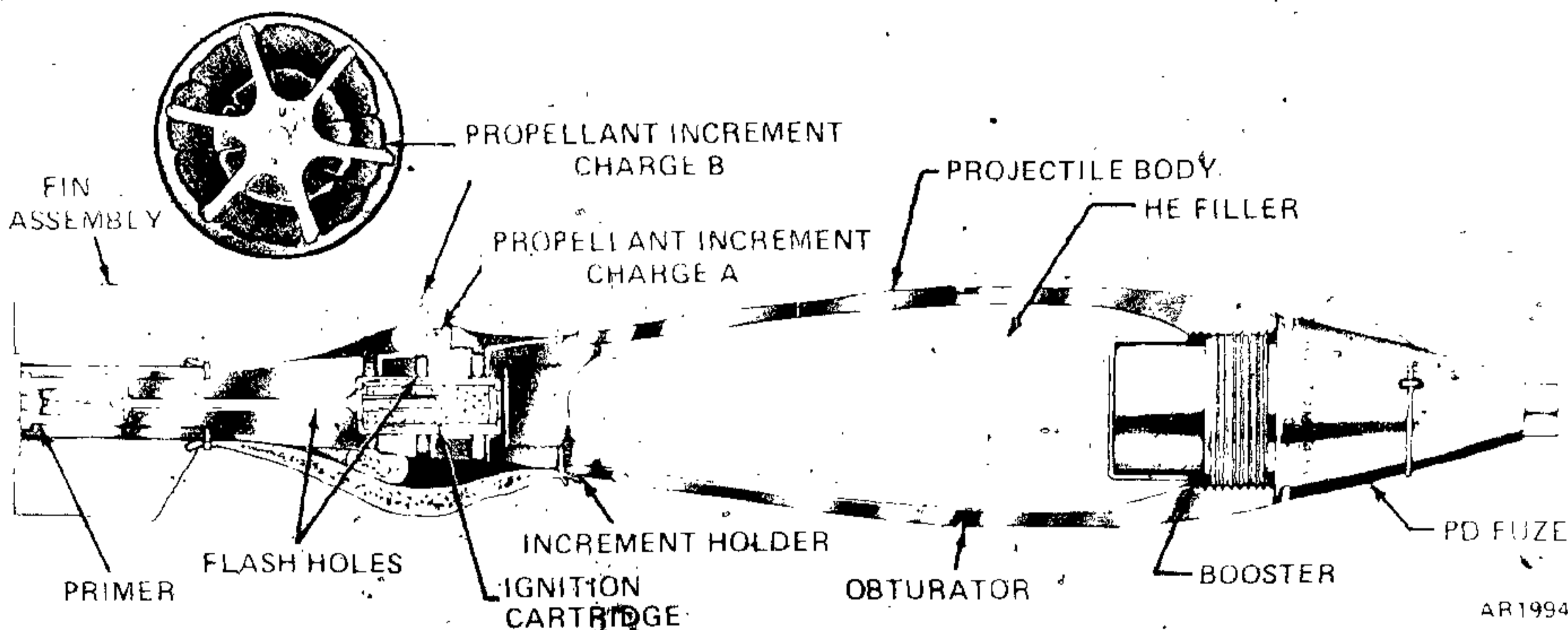
References:

- AMCP 700-3-3
- TM 9-1015-215-12
- TM 9-3071-1
- SB 700-20
- SC 1305/30IL

CARTRIDGE, 81-MILLIMETER: HE M374A2 AND M374



AR 19486



AR199485

Type Classification:

Std ICC-1-1-75 (M374A2)
CON 11756003 (M374)

Use:

This cartridge is used against personnel and materiel, producing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body, a point-detonating or proximity fuze, a fin assembly that includes a cartridge housing, a propellant charge with two types of increment charges, an ignition charge, and a percussion primer. The projectile body is threaded internally at the nose to accept the

fuze and externally at the base to accept the fin assembly. The projectile is filled with Composition B high explosive. The fins are canted 5° to produce spin.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the hub of the fin assembly strikes the firing pin in the base cap of the mortar. The burning primer flashes through the central hole in the cartridge housing to ignite the ignition cartridge. The cartridge ignites the propellant charge, and rapidly expanding gases from the burning propellant expel the projectile from the tube and propel it to the target. The projectile is fin-stabilized in flight. Functioning of the fuze detonates the fuze booster charge and

turn, the high explosive charge. Depending upon the type of fuze used, the projectile bursts either over or on the target producing near optimum fragmentation and blast effect.

Differences Among Models:

The projectile body may be of forged steel or pearlitic malleable iron. Early production used the M66 ignition cartridge with the M149 fin assembly while later series used the M285 cartridge and M170 fin assembly. Model M374A2 is a modification of M374 to include moisture-proof ignition system, moisture-resistant propelling charges, and improved protective packaging.

Tabulated Data:

Complete round:
 Type ----- HE
 Weight ----- 9.34 lbs.
 Length ----- 20.838 in.
 Cannon used with ----- M1, M29, M29A1
 Projectile:
 Body material ----- Forged steel, or cast steel
 Color ----- Olive drab w/yellow markings
 Filler and weight ----- Comp. B. 2.10 lbs.
 Components:
 Ignition cartridge ----- M66A1 with fin assy M149
 M285 with fin assy M170
 Propellant charge --- M90 (A and B)
 Percussion primer ----- M71A2
 Fin assembly ----- M149 with ignition ctg. M66A1
 M170 with ignition ctg. M285
 Fuze ----- PD, M524 series
 PD, M526 series
 PD, M567
 PD, M716
 Prox., M532

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 hrs/day)

* Packing ----- 1 round per fiber container in jungle wrap, 1 round per plastic container in barrier bag; 3 containers per wooden box.

* Packing Box:
 Weight ----- 51.0 lbs.
 Dimensions ----- 26-3/16 x 13-15/16 x 6-25/32 in.
 Cube ----- 1.4 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 4
 Storage compatibility group ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES.
 DODAC ----- 1315-C236, 1315-C256
 Drawing number ----- W/fuze, 8881026
 W/o fuze, 9225283

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (meters)	(yds)
0*	210	403	442
1	341	1001	1095
2	433	1529	1674
3	505	1988	2175
4	577	2475	2710
5**	656	2955	3237
6	709	3416	3740
7	764	3831	4190
8	814	4197	4598
9	856	4500	4932

* Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 9 is the ignition cartridge and nine increment charges. (NOTE: Increment A is used as Charge 1 and will be one of the increments assembled when firing above Charge 1.)

** Charge 5 is the maximum authorized for firing in Mortar M1.

Limitations:

Firing with more than five propellant increment charges (Charge 5) is not authorized in Mortar M1. When firing as many as 10 cartridges with maximum charge (Charge 9) in Mortar M29, the rate of fire will not exceed

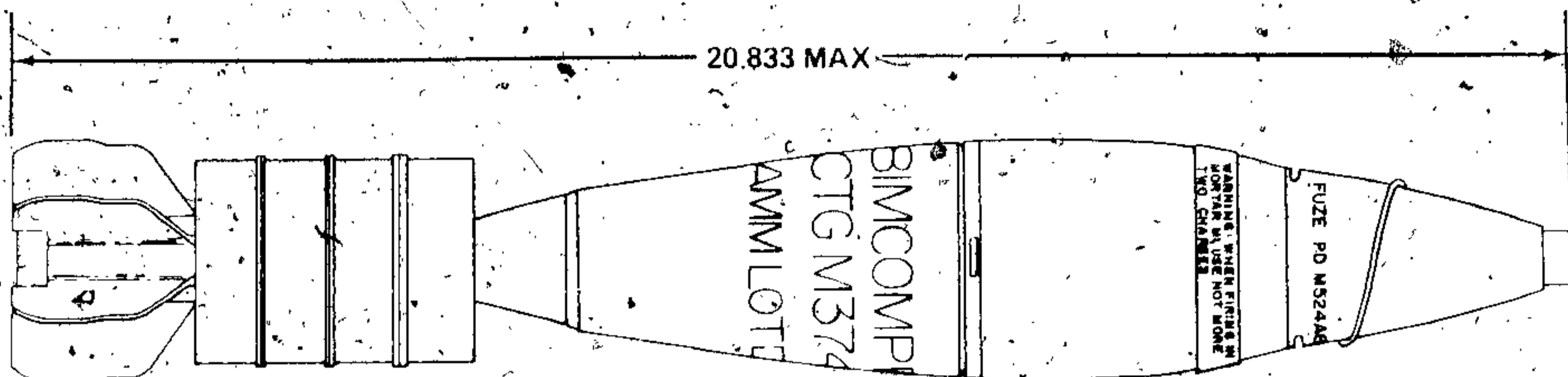
12 rounds-per-minute. Occasional short rounds will occur when firing at Charge 3 or below.

References:

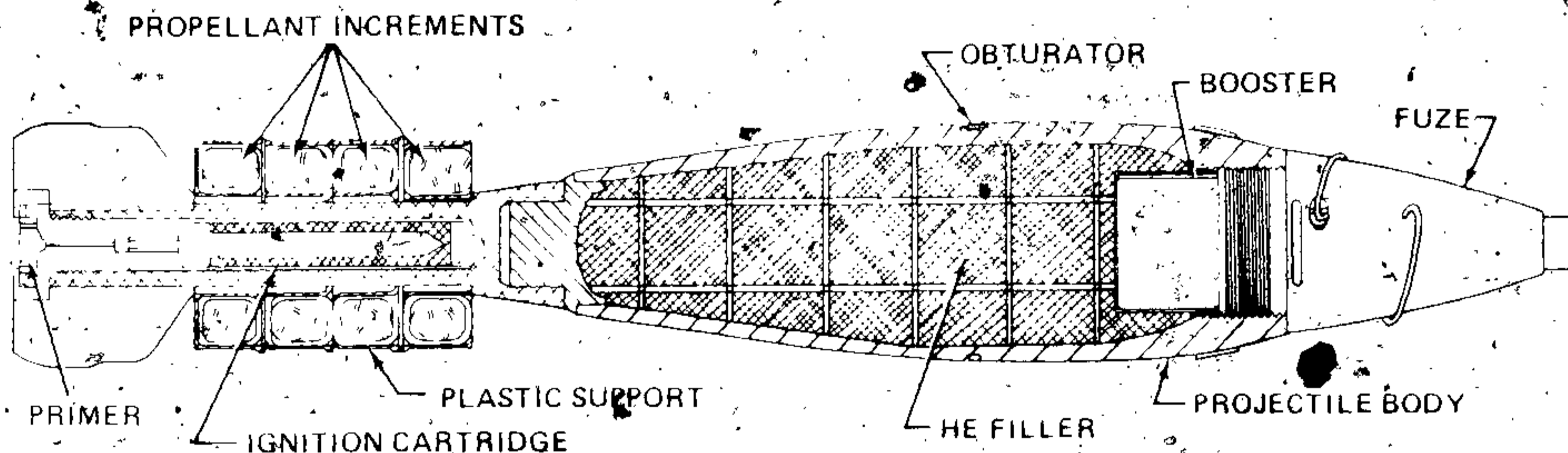
TM 9-3071-1
TM 9-1015-200-12
TM 9-1300-251-20

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CARTRIDGE, 81-MILLIMETER: HE, M374A3 (M374A2E1)



AR199480



AR199479

Type Classification:

STANDARD LCC-A (1975)

Use:

This cartridge is used against personnel and materiel, providing both blast and fragmentation effects.

Description:

The complete round consists of a projectile body, a point-detonating fuze, a fin assembly, four propellant charge increments, an ignition cartridge, and a percussion primer. The steel alloy body is threaded internally at the nose to accept the fuze, and threaded externally at the base to accept the fin assembly.

The projectile body is filled with Composition B high explosive. The aluminum ignition cartridge assembly contains a Percussion Primer M35, a black powder pellet, and approximately 115 grains of Propellant M9. Surrounding the fin assembly are four horseshoe-shaped Propelling Charge XM195 increments. Each Propelling Charge XM195 increment consists of a water-repellant cloth bag containing approximately 440 grams of Propellant M10 encased in a sealed cellulose nitrate container. A protective plastic propelling charge support surrounds the four propelling charge increments.

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. Functioning of the fuze detonates the fuze booster charge, in turn, detonating the high explosive charge. The projectile bursts on the target, producing near optimum blast and fragmentation effect.

Tabulated Data:

Complete round:

Type ----- HE
 Weight ----- 9.50 lbs.
 Length ----- 20.813 in. (20.833
 when assembled
 with Fuze PD,
 M524A6)
 Cannon used with ---- M1, M29, and M29A1
 Projectile:
 Body material ----- Steel alloy
 Color ----- Green w/yellow
 markings.
 Filler and weight ---- Comp. B, 2.10 lbs.
 Fuze ----- PD, M567; PD,
 M524A6 (Alter-
 nate)
 Fin assembly ----- XM24
 Propelling charge:
 Propellant ----- XM195
 Ignition cartridge ---- XM299
 Primer ----- Perc., M35
 Performance:

Charge	Muzzle Velocity (fps)	Maximum Range (meters)	Maximum Range (yds)
(0) ignition cartridge only	222	454	504
(1) ignition cartridge and 1 increment charge	438	1,633	1,814
(2) ignition cartridge and 2 increment charges	608	2,866	3,184
(3) ignition cartridge and 3 increment charges	750	4,013	4,459
(4) ignition cartridge and 4 increment charges	879	4,800	5,333

Maximum range ----- 5,333 yards
 Muzzle velocity ----- 879 fps

Temperature Limits:

Firing:
 Lower limit -----
 Upper limit -----
 Storage:
 Lower limit ----- -65°F (for period not
 more than 3 days)
 Upper limit ----- +160°F (for period not
 more than 4 hrs/day)

* Packing ----- 1 round per fiber con-
 tainer in jungle wrap;
 3 containers in wire-
 bound box.

* Packing Box:

Weight ----- 58.0 lbs.
 Dimensions ----- 25-1/8 x 15-1/4 x 7-9/16 in.
 Cube ----- 1.7 cu ft

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- E
 Storage compatibility
 group ----- 4
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES.
 DODAC ----- 1315-C256
 Drawing number ----- P9241291

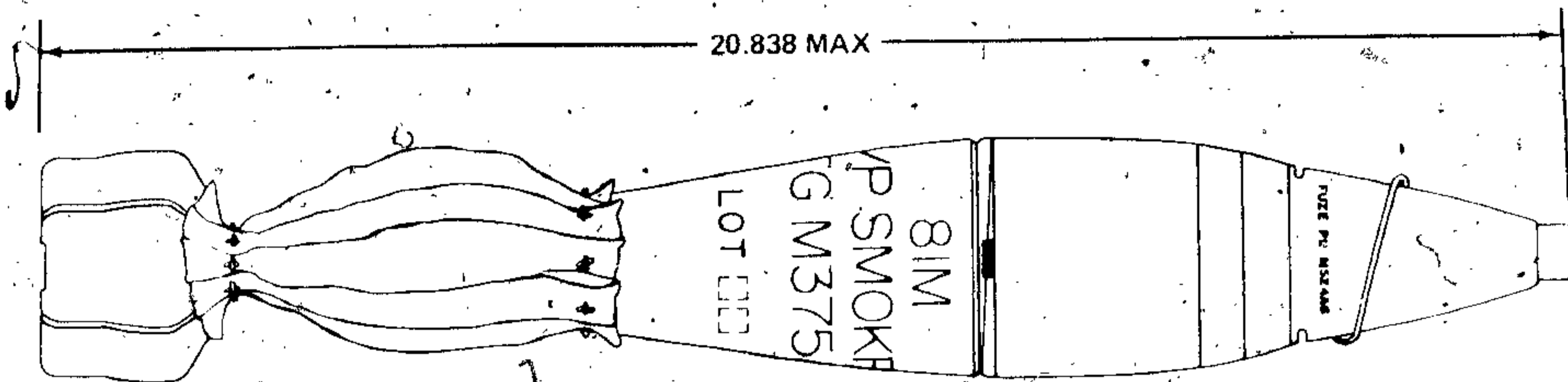
Limitations:

Firing with more than two propellant incre-
 ments (Charge 2) is not authorized in Mortar
 M1.

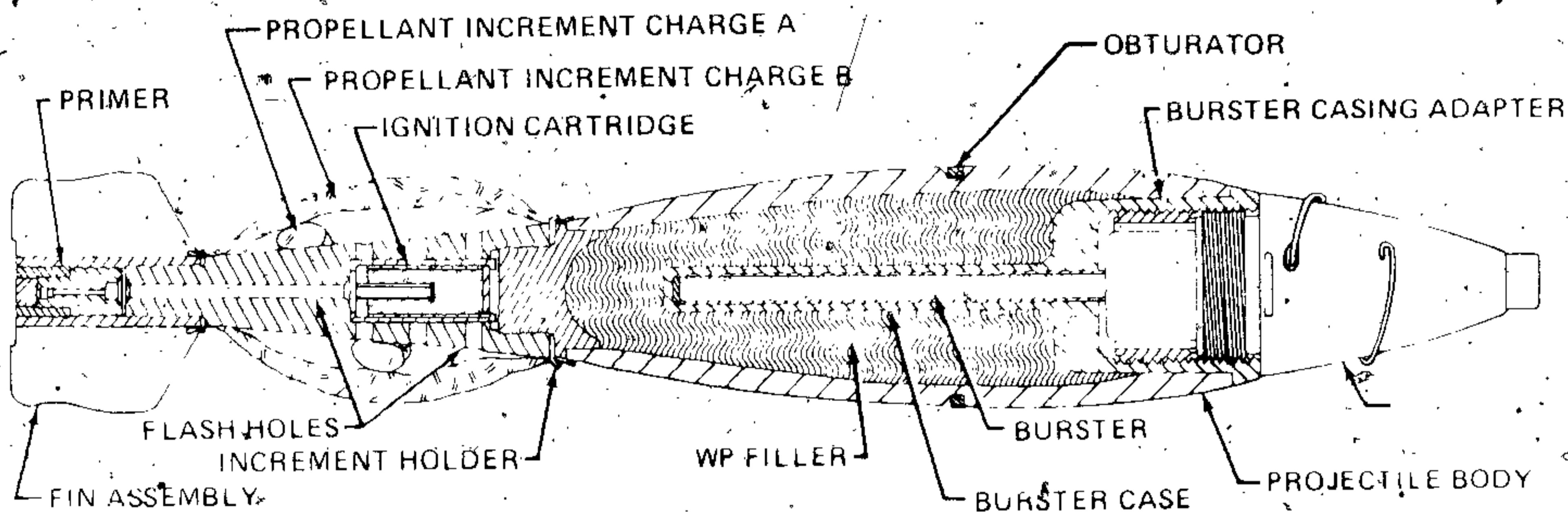
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1015-200-12
 TM 9-1300-251-20
 TM 9-3071-1

CARTRIDGE, 81-MILLIMETER: SMOKE, WP, M375A2 AND M375A1



AR199474



AR199473

Type Classification:

Std AMCTCM 7321 dtd 1969

Use:

This cartridge is used to produce a screening smoke and as an incendiary device against personnel and materiel.

Description:

The complete round consists of a projectile body with burster assembly, a PD or proximity fuze, a fin assembly that includes a cartridge housing, a propellant charge including two types of increment charges, an ignition cartridge, and

a percussion primer. The base of the projectile is externally threaded to accept the fin assembly. The projectile nose is fitted with an internally threaded adapter designed to receive the fuze and hold the burster assembly. The burster assembly consists of a burster casing containing a small RDX burster charge. The burster casing is press-fitted into the adapter in the nose. The projectile is loaded with a white phosphorous filler. The fins are caulked at 5 degrees at the rear to spin-stabilize the projectile in flight.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in

the hub of the fin assembly strikes the firing pin in the base cap of the mortar. The burning primer flashes through the central flash hole in the cartridge housing, igniting the ignition cartridge. The cartridge ignites the propellant charge. The propellant gases expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. Functioning of the fuze detonates the burster charge, which ruptures the projectile, dispersing the white phosphorous. The white phosphorous ignites on contact with the air, producing a cloud of dense white smoke with some incendiary effect.

Difference Between Models:

Models are identical except that the fin assembly with M375A2 is M170, while M375A1 uses M149 fin assembly. Also, M375A2 has a moisture-proof ignition system and propelling charge.

Tabulated Data:

Complete round:

Type ----- Smoke, WP
 Weight ----- 9.34 lbs.
 Length ----- 20.838 in.
 Cannon used with ---- M1, M29, & M29A1

Projectile:

Body material----- Forged steel, or cast pearlitic malleable iron
 Color ----- Light green w/yellow band and light red markings
 Filler and weight ---- WP, 1.60 lbs.
 Fuze ----- PD, M524 series, PD, M526 series, PD, M567, PD, M716, or Prox., M532
 Fin assembly ----- M170 (M375A2) M149 (M375A1)

Propelling charge:

Propellant ----- M90A1 (A&B)
 Ignition cartridge --- M285 (M375A2) M66A1 (M375A1)
 Primer ----- Perc., M71A1 or M71A2

Performance:

Charge	Muzzle Velocity (fps)	Maximum Range (meters)	(yds)
(0) Ignition cartridge only	210	403	442

(1) Ignition cartridge and 1 increment charge	341	1,001	1,095
(2) Ignition cartridge and 2 increment charges	433	1,529	1,674
(3) Ignition cartridge and 3 increment charges	505	1,988	2,175
(4) Ignition cartridge and 4 increment charges	577	2,475	2,710
(5) Ignition cartridge and 5 increment charges	656	2,995	3,237
(6) Ignition cartridge and 6 increment charges	709	3,416	3,740
(7) Ignition cartridge and 7 increment charges	764	3,831	4,190
(8) Ignition cartridge and 8 increment charges	814	4,197	4,598
(9) Ignition cartridge and 9 increment charges	856	4,500	4,932

Maximum range ----- 4,932 yards
 Muzzle velocity ----- 856 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 1 round per fiber)

* Packing ----- 1 round per fiber 4 rnds container in jungle wrap, or 1 round per plastic container in barrier bags 3 containers in wooden box.

* Packing Box:

Weight ----- 51.0 lbs.
 Dimensions ----- 26-13/16 x 13-15/16 x 6-25/32 in.
 Cube ----- 1.4 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 5

Storage compatibility -
 group ----- A
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITH
 'SMOKE PROJEC-
 TILES
 DODAC ----- 1315-C276
 Drawing number ----- -9240953 (M375A2)
 9251985 (M375A1)

Limitations:

Increment A is used as Charge 1 and will be one of the increments assembled when firing above Charge 1. Firing with more than five propellant increment charges (Charge 5) is not

authorized in Mortar M1. When firing as many as ten cartridges with maximum charge (Charge 9) in Mortar M29, the rate of fire will not exceed 12 rounds per minute. Occasional short rounds will occur when firing at Charge 3 or below in Mortar M29.

b. Store and transport WP rounds at temperatures below 111.4^oF (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will re-solidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

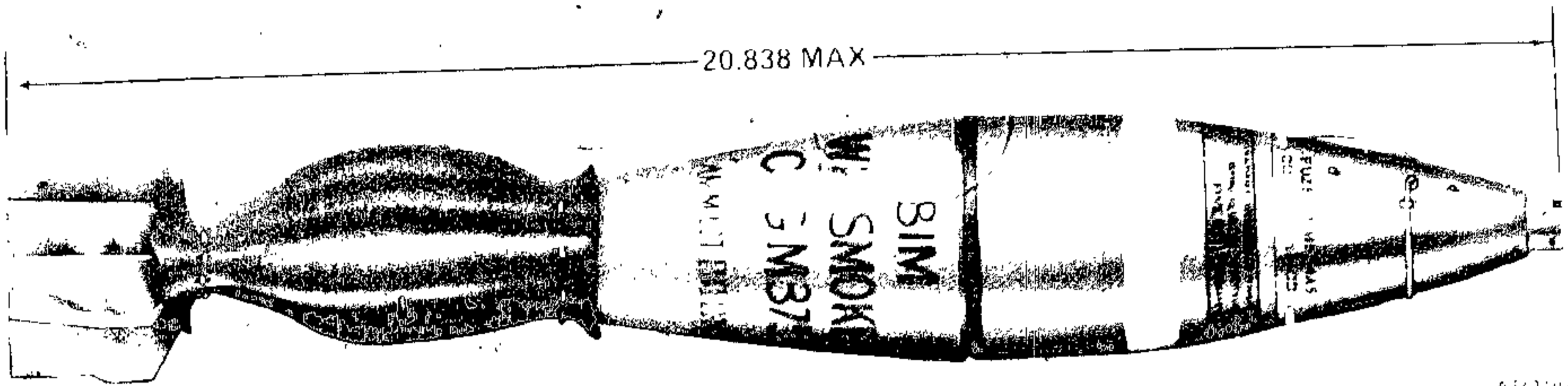
References:

AMCP 700-3-3
 TM 9-1015-215-12
 TM 9-3071-1
 SB 700-20
 SC 1305/30IL

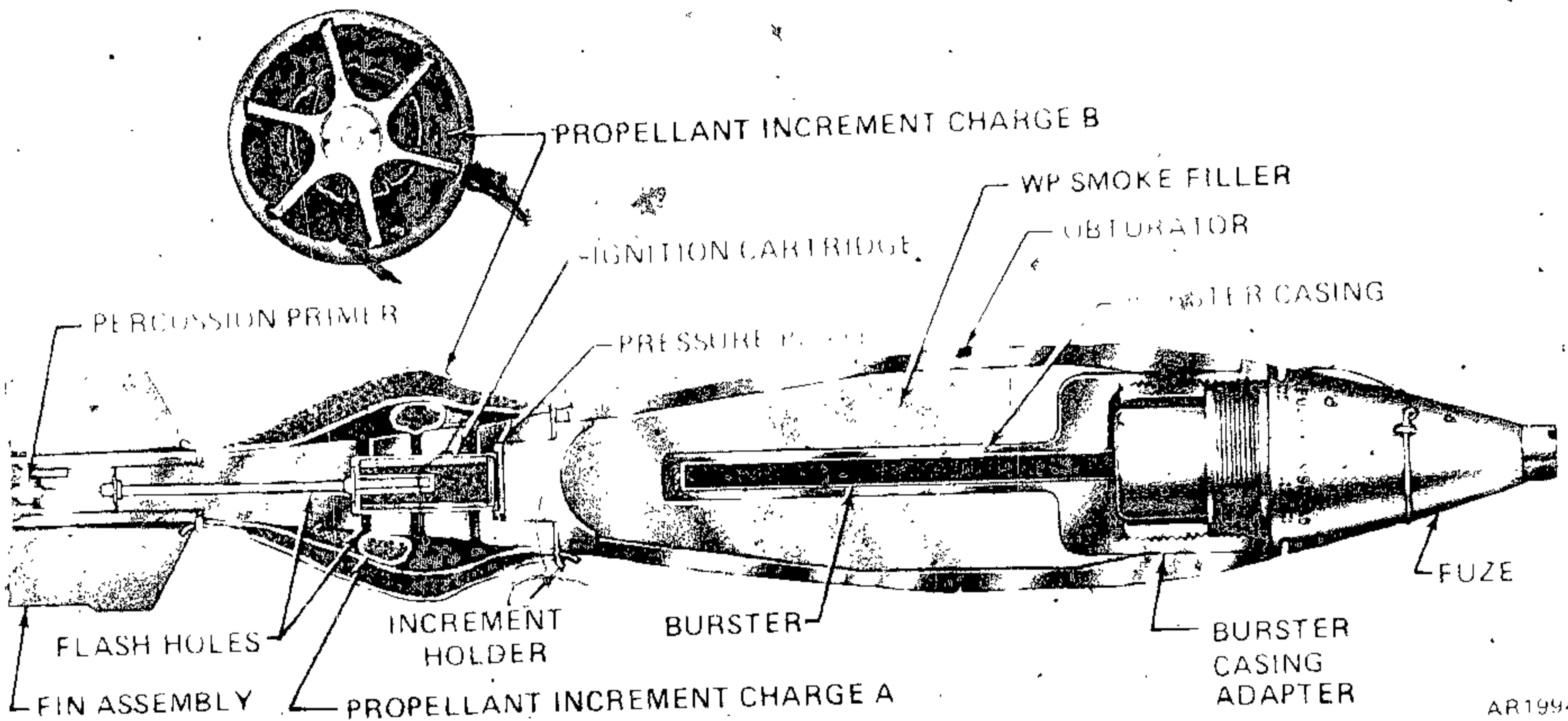
TM 49-0001-28

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CARTRIDGE, 81-MILLIMETER, SMOKE, WP, M375



AR199476



AR199477

Type Classification: ▼

Std AMCITC 7379 dtd 1969

Use

This cartridge is used to produce a screening smoke and as an incendiary device against personnel and materiel.

Description:

The complete round consists of a projectile body with burster assembly, a PD or proximity fuze, a fin assembly that includes a cartridge housing a propellant charge including two types of increment charges, an ignition cartridge, and a percussion primer. The base of the projectile is externally threaded to accept

the fin assembly. The projectile nose is fitted with an internally threaded adapter designed to receive the fuze and hold the burster assembly. The burster assembly consists of a burster casing containing a small RDX burster charge. The burster casing is press-fitted into the adapter in the nose. The projectile is coated with a white phosphorus filler. The fins are canted at 5 degrees at the rear to stabilize and stabilize the projectile in flight.

Functioning:

When the cartridge is loaded, it slides into the mortar tube and the percussion primer on the hub of the fin assembly strikes the percussion primer in the base cap of the mortar. The percussion primer flashes through the central flash hole in the cartridge housing, igniting the propellant

cartridge. The cartridge ignites the propellant charge. The propellant gases expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. Functioning of the fuze detonates the burster charge, which ruptures the projectile, dispersing the white phosphorous. The white phosphorous ignites on contact with the air, producing a cloud of dense white smoke with some incendiary effect.

Tabulated Data:

Complete round:

Type ----- Smoke, WP
 Weight ----- 9.34 lbs.
 Length ----- 20.838 in.
 Cannon used with ---- M1, M29, & M29A1

Projectile:

Body material----- Forged steel, or cast pearlitic malleable iron
 Color----- Light green w/yellow band and light red markings
 Filler and weight ---- WP, 1.60 lbs.
 Fuze ----- PD, M524 series, PD, M526 series, PD, M557, PD, M716, or Prox., M532

Fin assembly ----- M149

Propelling charge:

Propellant ----- M90 (A&B)
 Ignition cartridge ---- M66A1
 Primer ----- Perc., M71A2

Performance:

Charge	Muzzle Velocity	Maximum Range	
	(fps)	(meters)	(yds)
(0) Ignition cartridge only	210	403	442
(1) Ignition cartridge and 1 increment charge	341	1,001	1,095
(2) Ignition cartridge and 2 increment charges	433	1,529	1,674
(3) Ignition cartridge and 3 increment charges	505	1,988	2,175
(4) Ignition cartridge and 4 increment charges	577	2,475	2,710
(5) Ignition cartridge and 5 increment charges	656	2,995	3,237

(6) Ignition cartridge and 6 increment charges	709	3,416	3,740
(7) Ignition cartridge and 7 increment charges	764	3,831	4,190
(8) Ignition cartridge and 8 increment charges	814	4,197	4,598
(9) Ignition cartridge and 9 increment charges	856	4,500	4,932

Maximum range ----- 4,932 yards
 Muzzle velocity ----- 856 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 5

* Packing ----- 1 round per fiber container in jungle wrap, or 1 round per plastic container in barrier bag; 3 containers in wooden box.

* Packing Box:

Weight ----- 51.0 lbs.
 Dimensions ----- 26-13/16 x 13-15/16 x 6-25/32 in.
 Cube ----- 1.4 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 5
 Storage compatibility group ----- A
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
 DODAC ----- 1315-C276
 Drawing number ----- 8885264

Limitations:

Increment A is used as Charge 1 and will be one of the increments assembled when firing

above Charge 1. Firing with more than five propellant increment charges (Charge 5) is not authorized in Mortar M1. When firing as many as ten cartridges with maximum charge (Charge 9) in Mortar M29, the rate of fire will not exceed 12 rounds per minute. Occasional short rounds will occur when firing at Charge 3 or below in Mortar M29.

b. Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

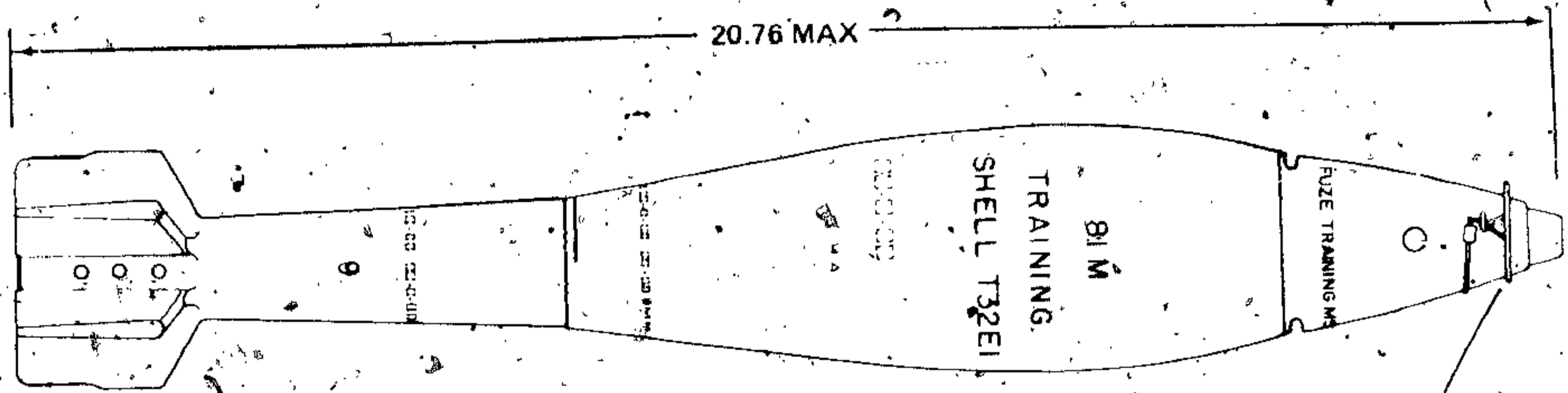
References:

SC 1305/30-IL
SB 700-20
AMCP 700-8-3

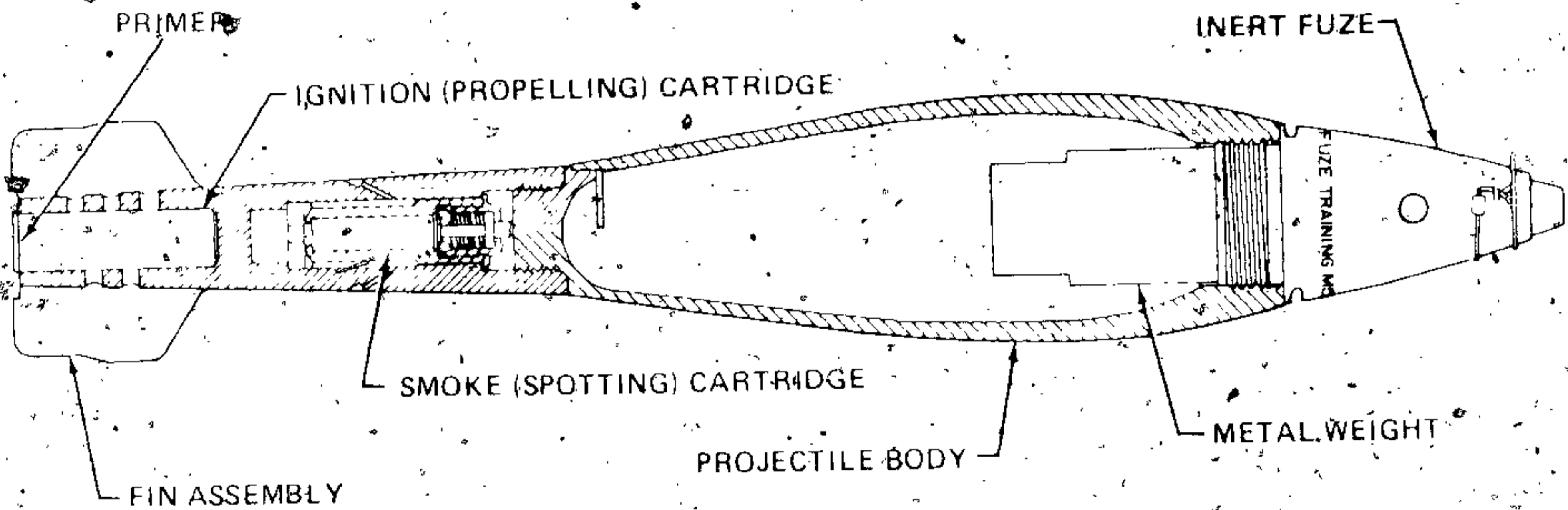
TM 9-1015-200-12
TM 9-1300-251-20
TM 9-3071-1

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CARTRIDGE, 81-MILLIMETER: TRAINING, M445 (T32E1)



AR199472



AR199471

Type Classification:

Std. OTCM 37767 dtd 1961

Use:

This cartridge is used for training in the loading and firing of the 81-mm mortar.

Description:

Unlike other mortar ammunition, the components of this round are issued separately. This facilitates replacement of damaged, worn, or expended parts. The complete round consists of a projectile body, a training fuze, and a fin assembly designed to hold an ignition cartridge and a smoke cartridge. The projectile is internally threaded at the nose to accept the

training fuze, and externally threaded at the base to accept the fin assembly.

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. Since this round is fired only at Charge 0, the gases from the ignition cartridge expel the projectile from the mortar tube and propel it to the target. The smoke cartridge detonates on impact, providing a spotting charge. The ignition and smoke cartridges are replaceable, and the round is designed for reuse.

Tabulated Data:

Complete round:

Type ----- Training
 Weight ----- 9.58 lbs.
 Length ----- 20.76 in.
 Cannon used with --- M1, M29, M29A1

Projectile:

Body material ----- Bar steel
 Color:
 Old ----- Black or blue w/white markings
 New ----- Bronze w/white markings
 Filler and weight --- Steel weight, 2.19 lbs
 Fuze ----- Inert., M531
 Fin assembly ----- M151

Propelling charge:

Ignition cartridge --- M100
 Primer ----- Perc.

Performance:

Maximum range --- 172 meters
 Muzzle velocity --- 41.3 mps.

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 hrs/day)

*Packing ----- 1 training cartridge, 3 fin assemblies, and 3 dummy fuzes in wooden box

*Packing Box:

Weight ----- 45.0 lbs
 Dimensions ----- 28-5/16 x 6-13/32 x 12-11/16 in.
 Cube ----- 1.3 cu ft

*Note: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 4
 Storage compatibility group ----- E
 DOT shipping class --- B
 DOT designation --- AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
 DODAC ----- 1315-C228
 Drawing number ----- P87815

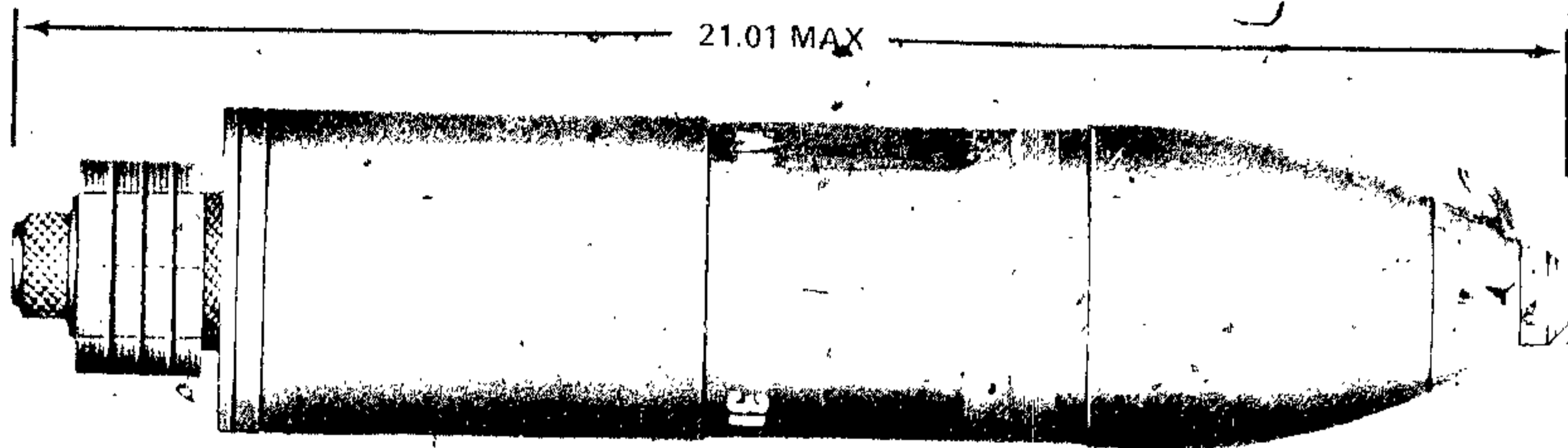
Limitations:

This round is to be fired at Charge 0 only.

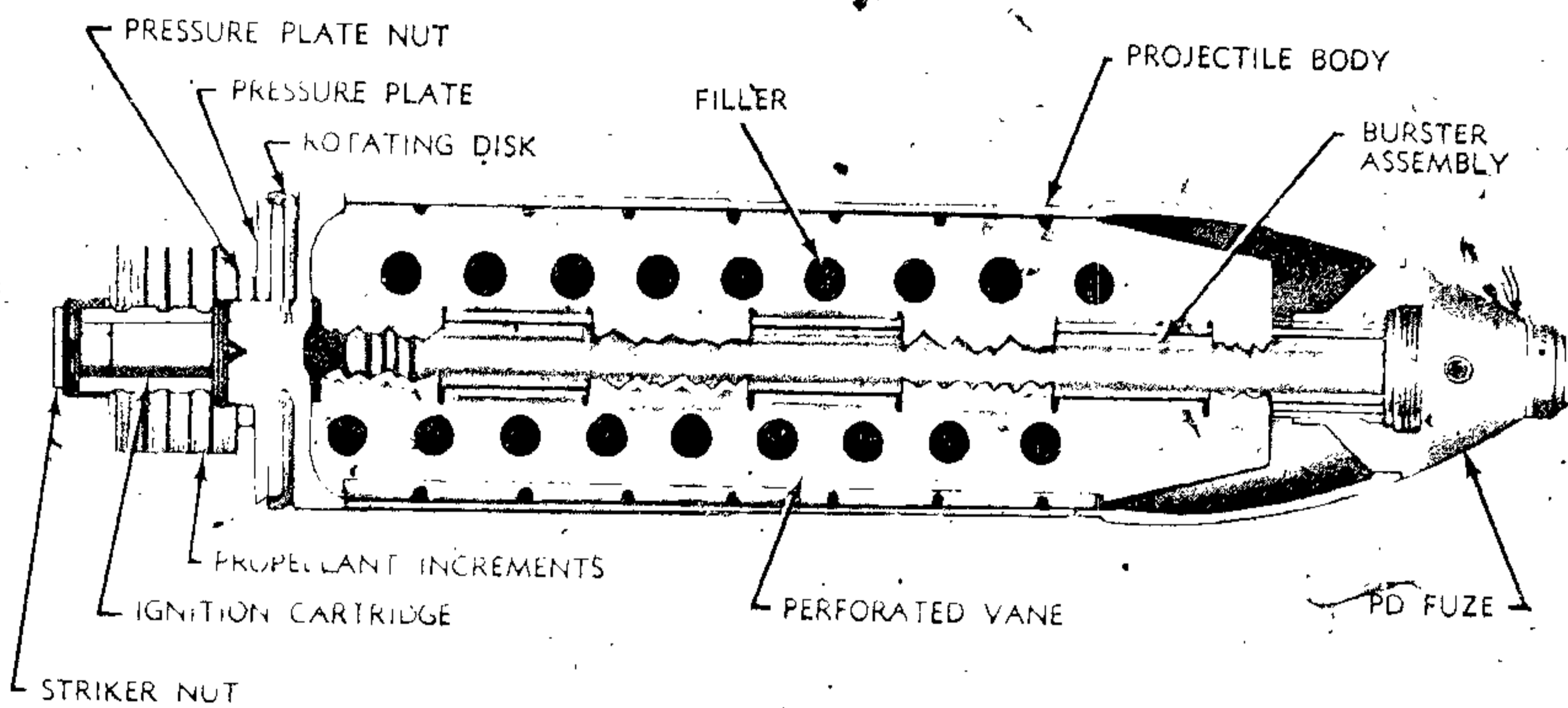
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3

CARTRIDGE, 4.2-INCH: GAS, M2A1 and M2



AR199468



AR 199467

Type Classification:

M2A1: Std OTCM 36841 dtd 1958
 M2: Std OTCM 37119 dtd 1960

Use:

This cartridge is used for casualty effect and may be filled with either non-persistent gases (CNB, CNS, CK or CG), or persistent gases (H, HD or HT).

Description:

The complete round consists of a projectile body, a PD fuze with an integral burster, and a tail assembly. The body contains a perforated vane assembly welded to the inside of the body and is designed to accommodate the burster

tube that extends from the fuze. 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.

Functioning:

When the cartridge is released, it slides down the mortar tube until the percussion primer strikes the firing pin. The blast 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. The perforated

vane causes the liquid filler to rotate with the projectile to reduce the possibility of erratic flight. The fuze functions on impact, detonating the burster charge which ruptures the projectile and disperses the gas filler.

Difference Between Models:

Cartridge M2 differs slightly from Cartridge M2A1 in the design of the obturating mechanism.

Tabulated Data:

Complete round:

Type ----- Agent
 Weight ----- 24.67 lbs.
 Length ----- 21.01 in.
 Cannon used with --- M2, M30

Projectile:

Body material ----- Steel
 Color:
 Persistent ----- Gray w/2 green bands
 and green markings
 Non-persistent --- Gray w/1 green band
 and green markings

Filler and weight --- Gas, 5.75 to 8.00
 lbs.

Ignition cartridge --- M2*
 Propelling charge --- M6*
 Fuze ----- PD, M8 (with M14
 burster)

Performance (full charge):

Maximum range ----- 4,460 meters
 Muzzle velocity ----- 255.8 mps

*NOTE: See separate data sheets.

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 hrs/day)

*Packing ----- 1 round in fiber con-
 tainer; 2 containers
 in wooden box.

*Packing Box:

Weight ----- 75.0 lbs.
 Dimensions ----- 27-1/16 x 11-1/8 x
 7-7/32 in.
 Cube ----- 1.3 cu. ft.

*NOTE: See SC for complete packing data in-
 cluding NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 5
 Storage compatibility
 group ----- A
 DOT shipping class --- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITH GAS
 PROJECTILES
 DODAC ----- CNB, CNS-1315-C701
 H, HD, HT-1315-C703
 Drawing number ----- 75-1-284

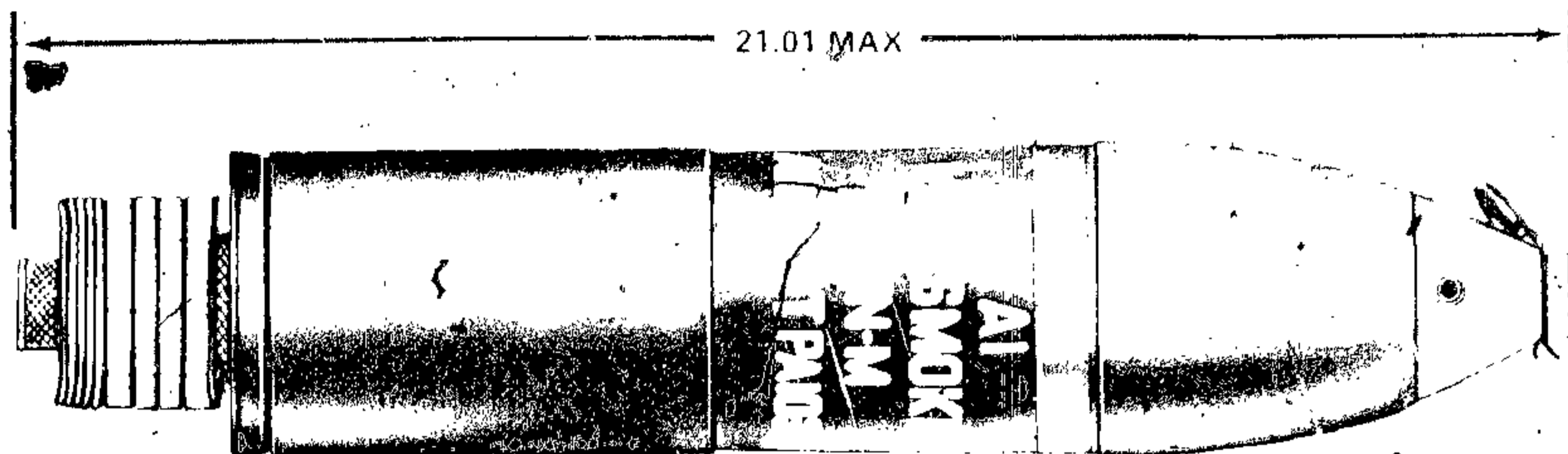
Limitations:

Short rounds may occur when Cartridge M2A1
 is fired with fewer than seven increments.

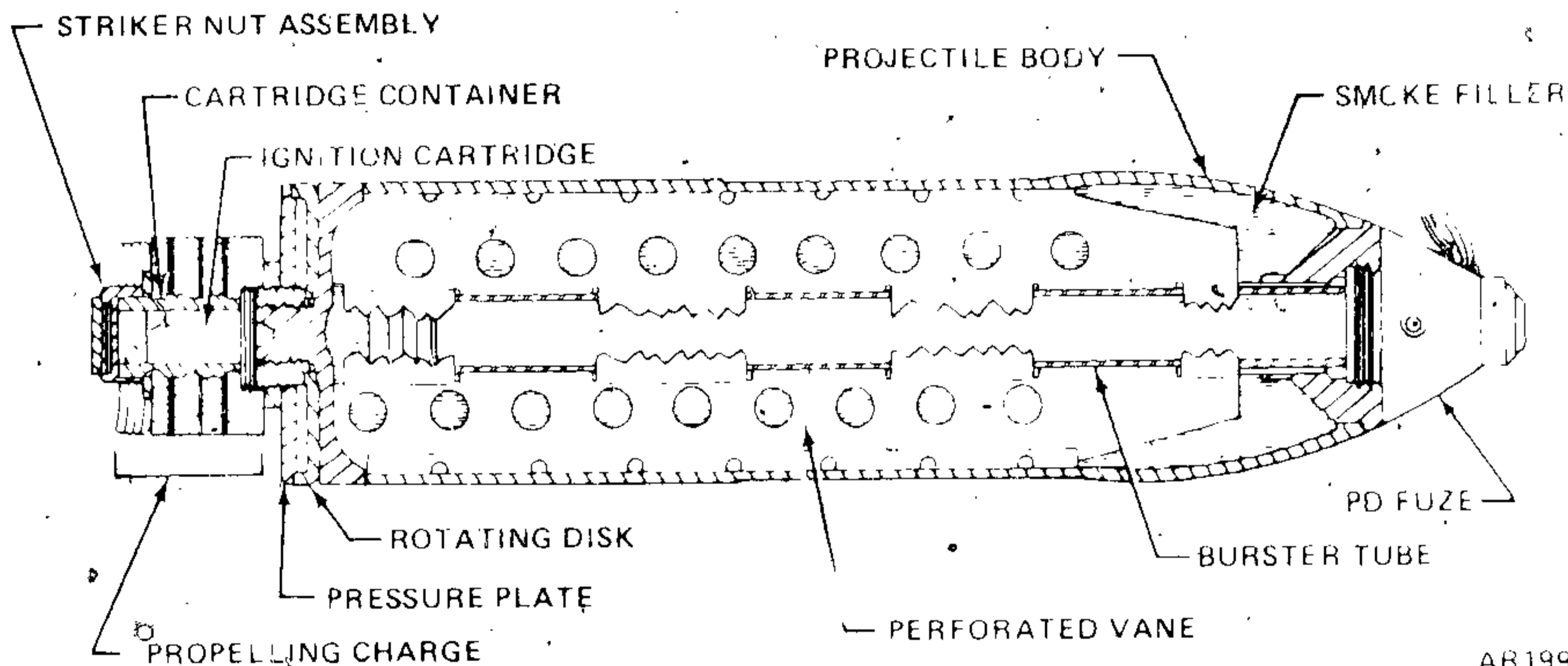
References:

SC 305/30-IL
 TM 9-1015-215-12
 TM 9-1300-251-20
 TM 9-1320-241-12

CARTRIDGE, 4.2 INCH: SMOKE, PWP OR WP, M2A1 & M2



AR199466



AR199465

Type Classification:

OBS 11756003

Use:

This cartridge is used against personnel and materiel as an incendiary device, and to produce a screening smoke.

Description:

The complete round consists of a projectile body, a PD fuze with an integral burster, and a tail assembly. The body contains a perforated vane assembly welded to the inside of the body and designed to accommodate the burster tube that extends from the fuze. 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.

Functioning:

When the cartridge is released it slides down the mortar tube until the percussion primer strikes the firing pin. The blast 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. On impact the functioning of the fuze detonates the burster charge which shatters the projectile casing, dispersing the filler. On contact with the air

the WP (or PWP) filler ignites creating a dense white smoke with some incendiary effect.

Difference Between Models:

Cartridge M2 differs slightly from Cartridge M2A1 in the design of the obturating mechanism.

Tabulated Data:

Complete round.

Type ----- Smoke
 Weight ----- 24.91 lbs.
 Length ----- 21.01 in.
 Cannon used with ---- M2, M30

Projectile:

Body material ----- Steel
 Color ----- Gray w/yellow band and yellow markings

Filler and weight ---- WP, 7.50 lbs.

Components:

Ignition cartridge ---- M2*
 Propelling charge ---- M6*
 Fuze ----- PD, M8 (with M14 burster)

Performance (full charge):

Maximum range ----- 4,460 meters
 Muzzle velocity ----- 255.8 mps

*NOTE: See separate data sheets.

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 not more than 4 hrs/day)

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

* Packing Box:

Weight ----- 70.0 lbs.
 Dimensions ----- 27-1/6 x 11-1/8 x 7-7/32 in.
 Cube ----- 1.3 cu. ft.

*NOTE: See SC for complete packing data including NFN's.

Shipping and Storage Data:

Quantity-distance class ----- 5
 Storage compatibility group ----- A
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
 DODAC ----- 1315-C708
 Drawing number ----- 75-1-284

Limitations:

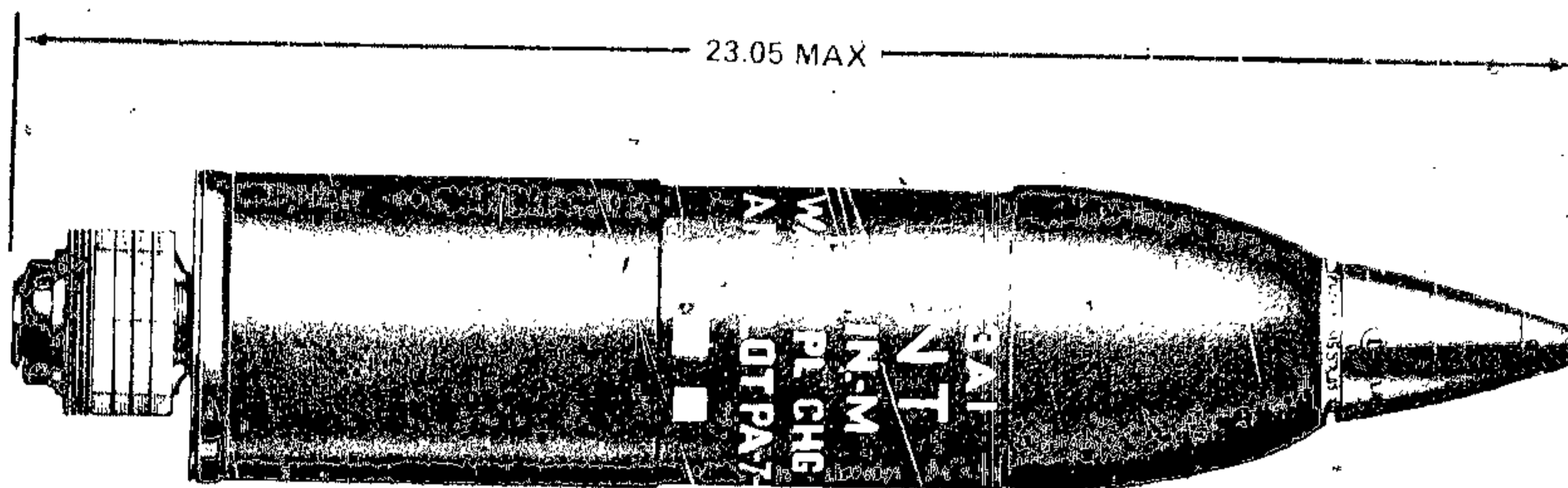
a. Short rounds may occur when Cartridge M2A1 is fired with fewer than seven increments.

b. Store and transport WP rounds at temperatures below 111.4° F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will re-solidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

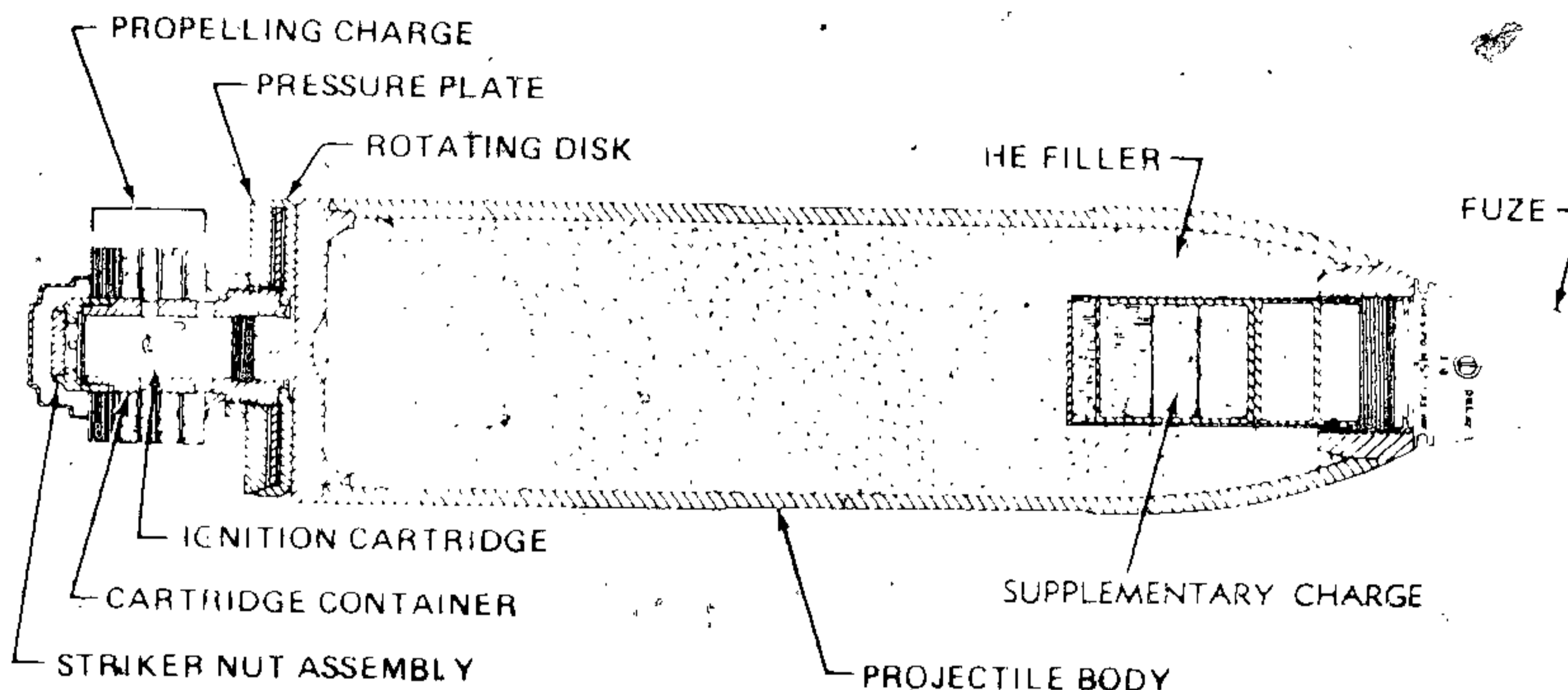
References:

- SC 1305/30-IL
- TM 9-1015-215-12
- TM 9-1300-251-20
- TM 9-1320-241-12

CARTRIDGE, 4.2-INCH: HE, M3A1 & M3



AR199464



AR199463

Type Classification:

OBS 11756003

Use:

This cartridge is used against personnel and materiel, providing both fragmentation and blast effect.

Description:

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

of TNT. This charge is removed to accommodate certain proximity fuzes. The tail assembly consists of a pressure plate and rotating disk, 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. The functioning of the fuze detonates the supplementary charge (when used) and the high explosive charge. Depending on the type of fuze used, the projectile bursts either over or on the target producing near optimum fragmentation and blast effect.

Difference Between Models:

The fuze well on the M3 cartridge is designed to accommodate the burster tube of the M9 fuze. In addition, the physical dimensions of the two models are slightly different.

Tabulated Data:

Complete round:

Type ----- HE
 Weight ----- 26.20 lbs.
 Length ----- 23.05 in.
 Cannon used with ----- M2, M30
 Projectile
 Body material ----- Steel
 Color ----- Olive drab w/yel-
 low markings
 Filler and weight ----- TNT 7.80 lbs.
 Supplementary
 charge ----- TNT, 0.365 lb.

Components

Ignition cartridge --- M2*
 Propelling charge --- M6*
 Fuze:
 M3 ----- PD, M9
 M3A1 ----- PD, M557, MTSQ,
 M520 series, M564;
 Prox. M513 series

*NOTE: See separate data sheets.

Performance (full charge):

Maximum range ----- 4,610 meters
 Muzzle velocity ----- 258 mps

Temperature Limits:

Firing:

Lower limit ----- - 40° F
 Upper limit ----- + 125° F

Storage:

Lower limit ----- - 80° (for period not
 more than 3 days)
 Upper limit ----- + 160° F (for period not
 more than 4 hrs/day)

* Packing ----- 1 round in fiber con-
 tainer; 2 fiber con-
 tainers in wooden
 box.

* Packing Box:

Weight ----- 76 lbs.
 Dimensions ----- 31-5/16 x 11-13/16
 x 7-3/8 in.
 Cube ----- 1.6 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 7
 Storage compatibility
 group ----- G
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES
 DODAC ----- 1315-C704
 Drawing number ----- 75-1-285

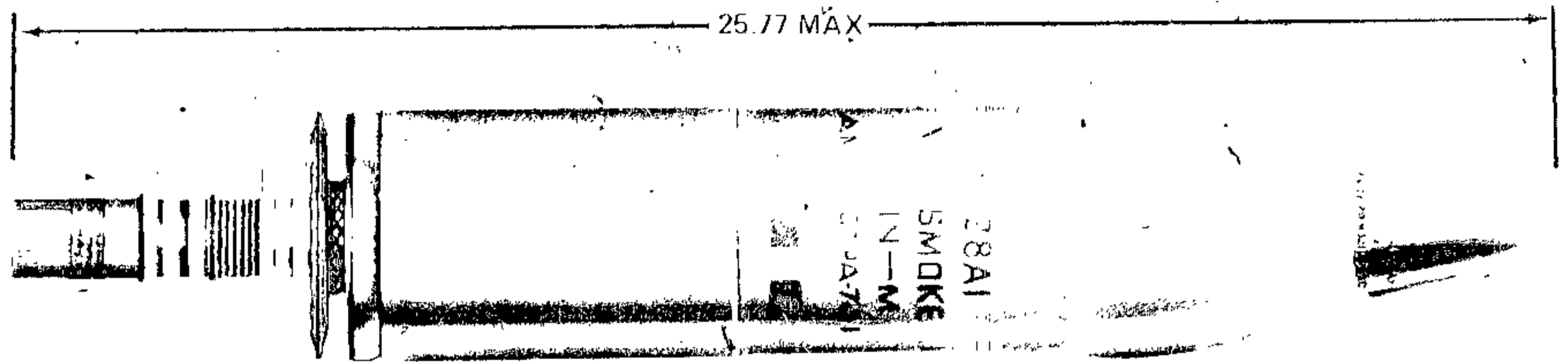
Limitations:

Minimum charge for firing Cartridge M3A1
 with a proximity fuze is ten increments.

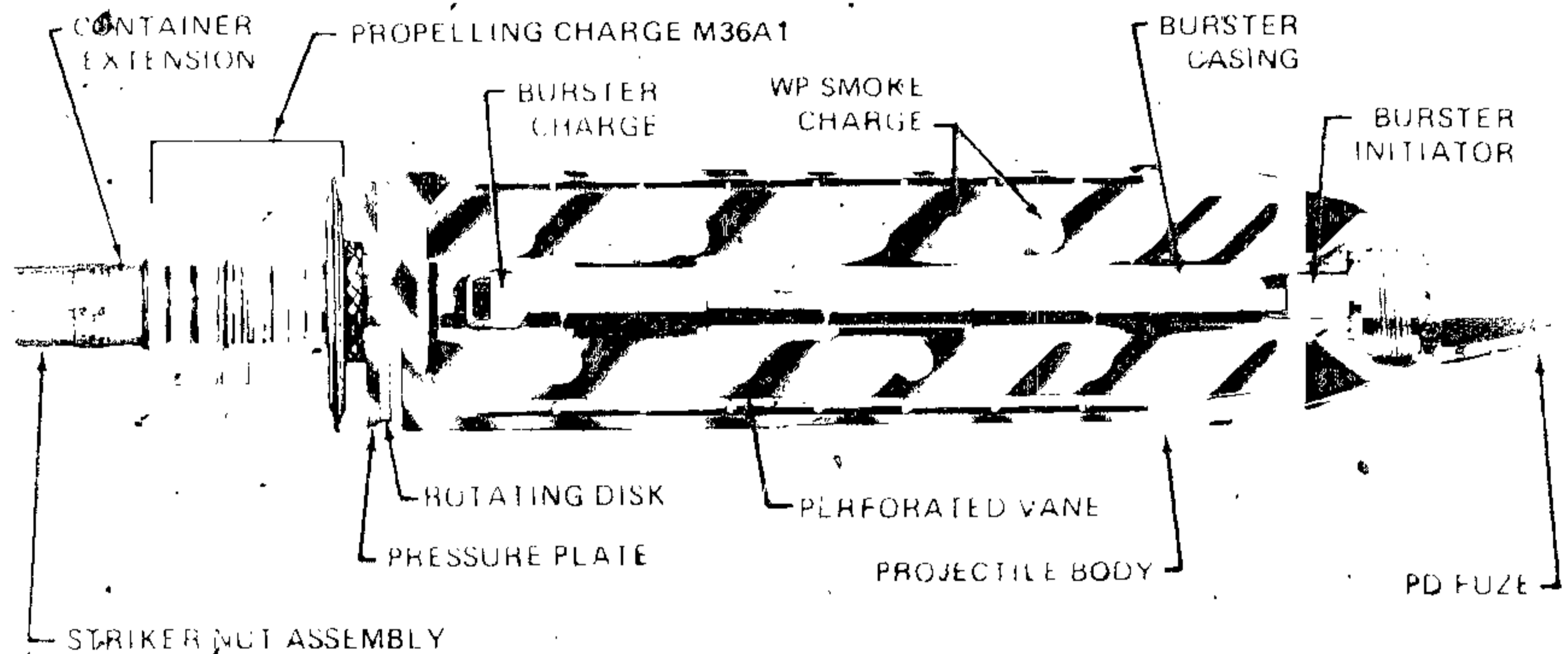
References:

SC 1305/30-IL
 TM 9-1015-215-12
 TM 9-1300-251-20
 TM 9-1320-241-12

CARTRIDGE, 4.2-INCH: SMOKE, WP, M328A1 AND M328



AR199452



AR199451

Type Classification:

Std AMCIC 124 dtd 1962 (M328A2)
CON 11756003 (M328)

Use:

These cartridges are used to produce a screening smoke.

Description:

The complete round consists of a projectile body, a PD fuze, and a tail assembly. The projectile body contains a perforated vane assembly, and is designed to accommodate a burster casing containing an initiator charge and a burster charge. Cartridges loaded prior to

1963 have a tetrytol burster charge attached. After 1963 use a Composition B burster charge. The tail assembly consists of a pressure plate and rotating disk, a propelling charge, a striker nut assembly, a cartridge container and extension, and an ignition cartridge.

Functioning:

When the cartridge is released, it slides down the mortar tube until the percussion primer strikes the firing pin. The friction of 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 rotating disk, which expands the rotating disk, forcing it into the rifling of the tube. The spin imparted to

the projectile as it leaves the weapon, stabilizes it in flight. The PD fuze functions on impact, activating the burster initiator which detonates the burster charge. The burster charge shatters the projectile body, dispersing the WP filler. White phosphorous ignites on contact with the air, producing a dense white smoke with some incendiary effect.

Differences Between Models:

Cartridge M328 is similar to M328A1 as illustrated except that M328 uses Ignition Cartridge M2 and Propelling Charge M36. See separate data sheets for details of Ignition Cartridges M2 and M2A2, and Propelling Charges M36 and M36A1.

Tabulated Data:

Complete round:

Type ----- WP
 Weight ----- 28.66 lbs.
 Length ----- 25.77 in.
 Cannon used with -- M2, M30

Projectile:

Body material ----- Steel
 Color:
 Old ----- Gray w/yellow band and yellow markings
 New ----- Light green w/yellow band and light red markings
 Filler and weight -- WP, 8.4 lbs. (M328A1)
 WP, 7.5 lbs. (M328)

Components:

	<u>M328A1</u>	<u>M328</u>
Ignition cartridge	M2A2*	M2*
Propelling charge	M36A1*	M36*
Burster assembly	M35	M35
Burster initiator	M13	M13
Fuze	PD, M48A3 (w/adapter), M521	PD, M48A3 (w/adapter), M54

*NOTE: See separate data sheets

Performance (full charge):

Maximum range --- 5650 meters
 Muzzle velocity --- 299 mps.

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 hrs d.)

*Packing ----- 1 round in fiber container; 1 container in wooden box.

*Packing Box:

Weight ----- 76 lbs.
 Dimensions ----- 31-15/16 x 11-13/16 x 7-3/8 in.
 Cube ----- 1-6 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 5
 Storage compatibility group ----- A
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH SMOKE PROJECTILES.
 DODAC ----- 1315-C708
 Drawing number ----- 8797829

Limitations:

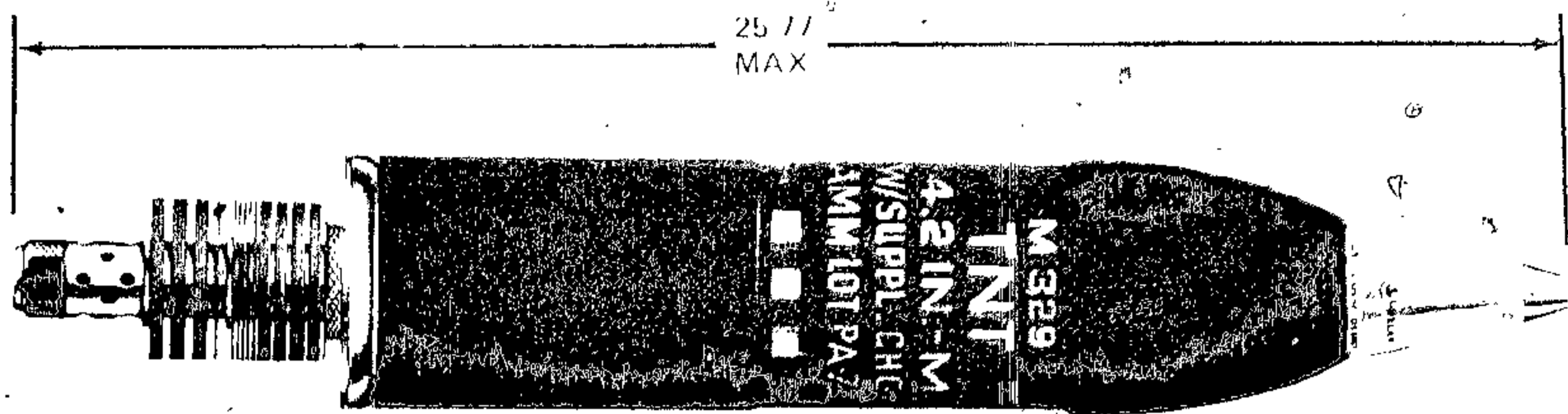
Short rounds may occur when firing with fewer than ten increments.

Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

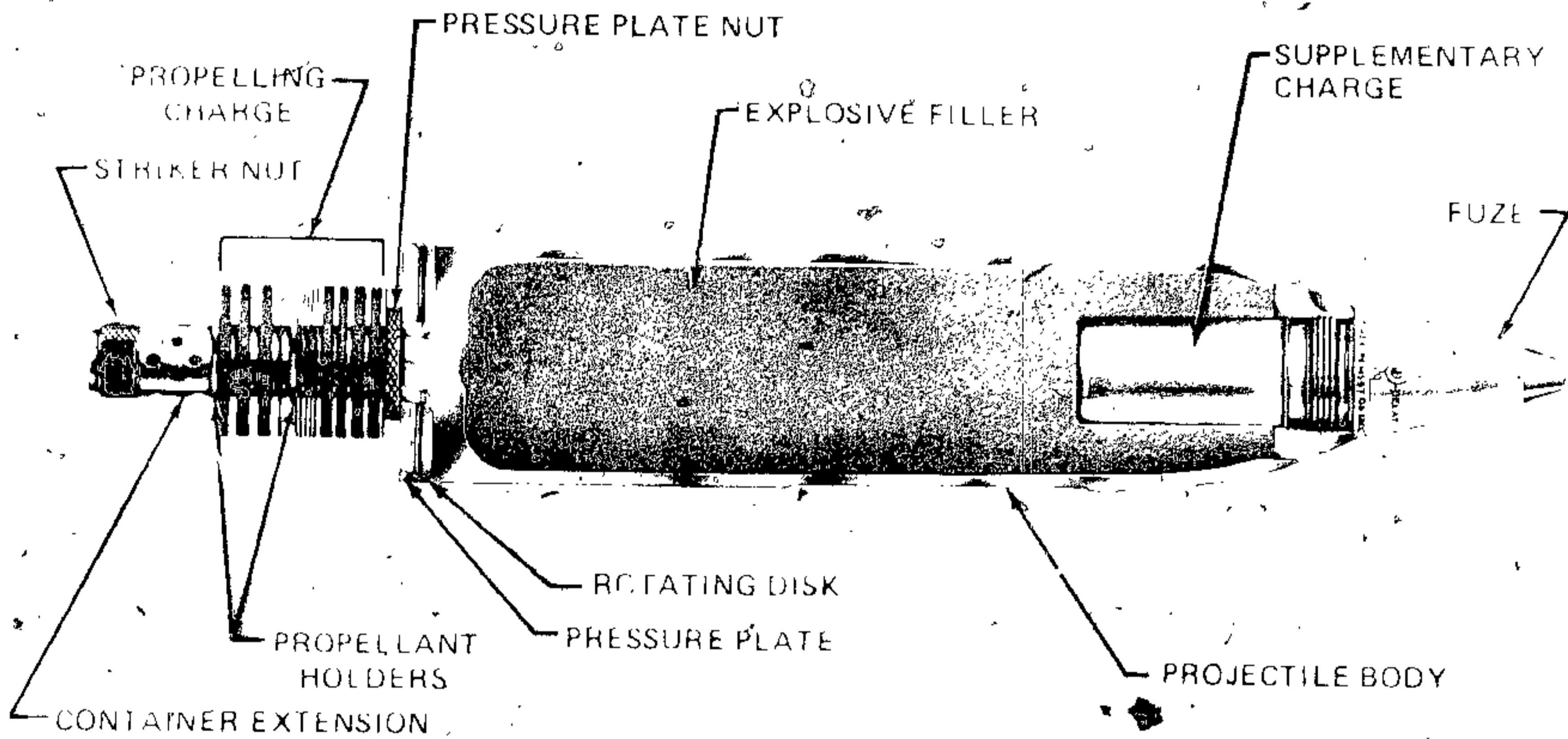
References:

- SC 1305/30-IL
- TM 9-1015-215-12
- TM 9-1300-251-20
- TM 9-1320-241-12

CARTRIDGE, 4.2-INCH: HE, M329 and M329B1



AR199448



AR199447

Type Classification:

Std AMCIC 124 dtd 1962 (M329B1)
CON 11756003

Use:

These cartridges are used against personnel and materiel, providing both fragmentation and blast effect.

Description:

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 of TNT; this charge is removed to accommodate

deep-intrusion proximity fuzes. The tail assembly includes a pressure plate and rotating disk, 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 disk, engaging it in the rifling of the tube. The spin, imparted to the projectile as it leaves the,

TM 43-0001-28

weapon, stabilizes it in flight. Functioning of the fuze detonates the supplementary charge and, in turn, the high explosive charge. Depending upon the type of fuze used, the projectile bursts either over or on the target, producing near optimum fragmentation and blast effect.

Difference Between Models:

M329B1 has a projectile body made from a forging with an integral base.

Tabulated Data:

Complete round:

Type ----- HE.
Weight ----- 27.07 lbs.
Length ----- 25.77 in.
Cannon used with ---- M2, M30

Projectile:

Body material ----- Steel tube
Color ----- Olive drab w/yel-low markings
Filler and weight ---- TNT, 7.08 lbs.
Supplementary charge ----- TNT, 0.365 lb.

Components:

Ignition cartridge ---- M2*
Propelling charge --- M36*
Fuzes ----- PD, M557
 MTSQ, M520 series,
 M564
 Prox, M513 series

*NOTE: See separate data sheets.

Performance (full charge):

Maximum range ----- 5420 meters
Muzzle velocity ----- 294 mps

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 hrs/day)

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

*Packing Box:

Weight ----- 76 lbs.
Dimensions ----- 31-15/16 x 11-13/16 x 7-3/8 in.
Cube ----- 1.6 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Storage and Shipping Data:

Quantity-distance class ----- 7
Storage compatibility group ----- G
DOT shipping class ----- A
DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ----- 1315-C704
Drawing number ----- 75-1-301 (M329) 8863682 (M329B1)

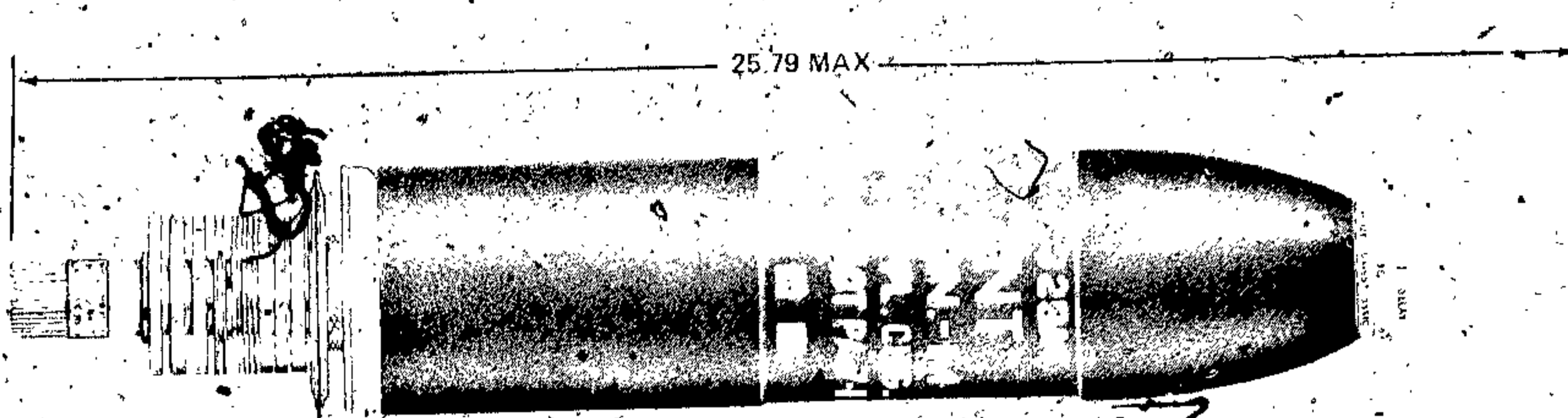
Limitations:

Short rounds may occur when firing with less than seven increments. Minimum charge for firing with a proximity fuze is ten increments.

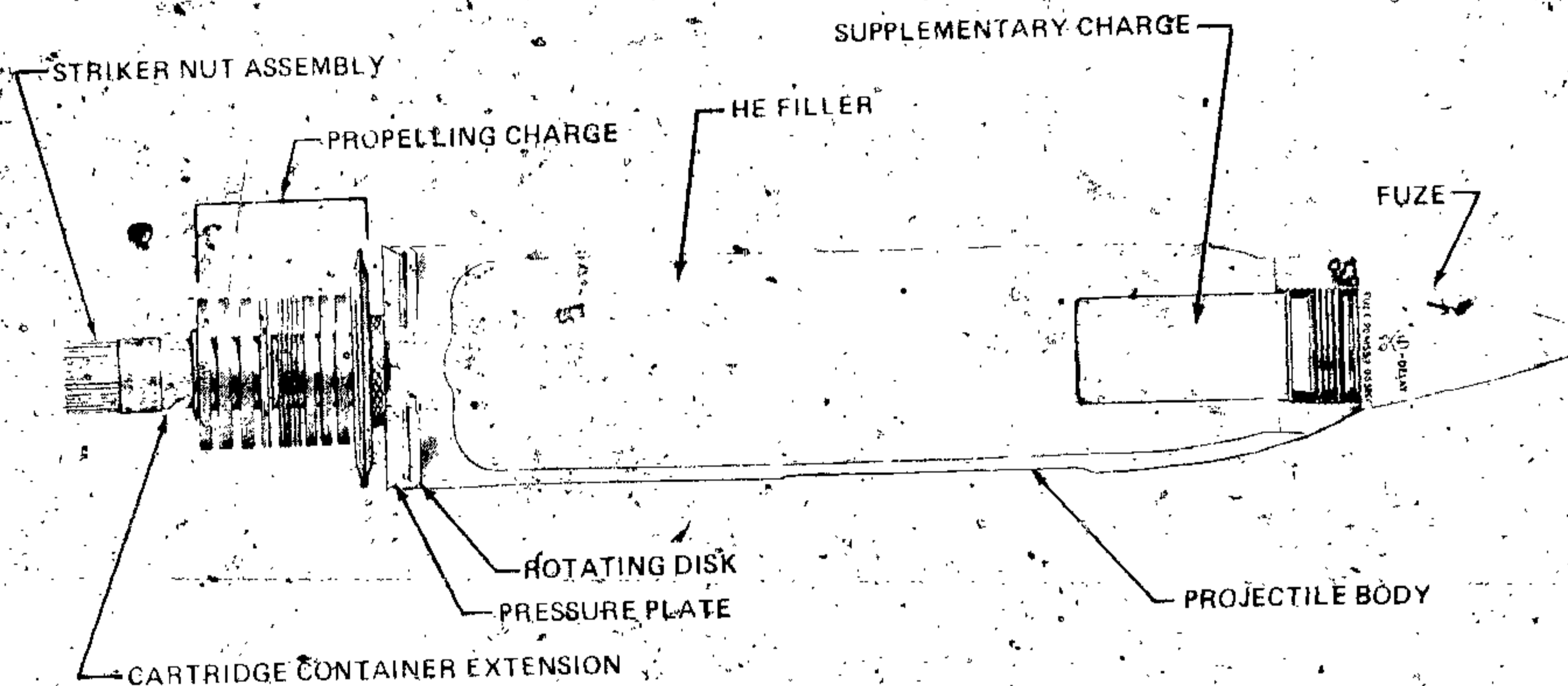
References:

SC 1305/30-IL
TM 9-1015-215-12
TM 9-1300-251-20
TM 9-1320-241-12

CARTRIDGE, 4.2-INCH: HE, M329A1



AR199450



AR199449

Type Classification:

Std (LCC-B) 01756033

Use:

This cartridge is used against personnel and materiel, providing both fragmentation and blast effect.

Description:

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

of TNT; this charge is removed to accommodate certain proximity fuzes. 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. The functioning of the fuze detonates the supplementary charge and, in turn, the high explosive charge. Depending on the type of fuze used, the projectile bursts either over or on target, producing near optimum fragmentation and blast effect.

Tabulated Data:

Complete round:

Type ----- HE
 Weight ----- 27.07 lbs.
 Length ----- 25.79 in.
 Cannon used with ----- M2, M30

Projectile:

Body material ----- Steel tube
 Color ----- Olive drab w/white markings
 Filler and weight ----- TNT, 7.08 lbs.
 Supplementary charge ----- TNT, 0.365 lb.

Components:

Ignition cartridge ----- M2A2*
 Propelling charge ----- M36A1*
 Fuze ----- PD, M557, MTSQ, M520 series or M564, Prox., M513 series

*NOTE: See separate data sheets.

Performance (full charge):

Maximum range ----- 5,850 meters
 Muzzle velocity ----- 299 mps

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 hrs/day)

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

*Packing Box:

Weight ----- 76 lbs.
 Dimensions ----- 31-5/16 x 11-13/16 x 7-3/8 in.
 Cube ----- 1.6 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 7
 Storage compatibility group ----- G
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
 DODAC ----- 1315-C704
 Drawing number ----- 8863685

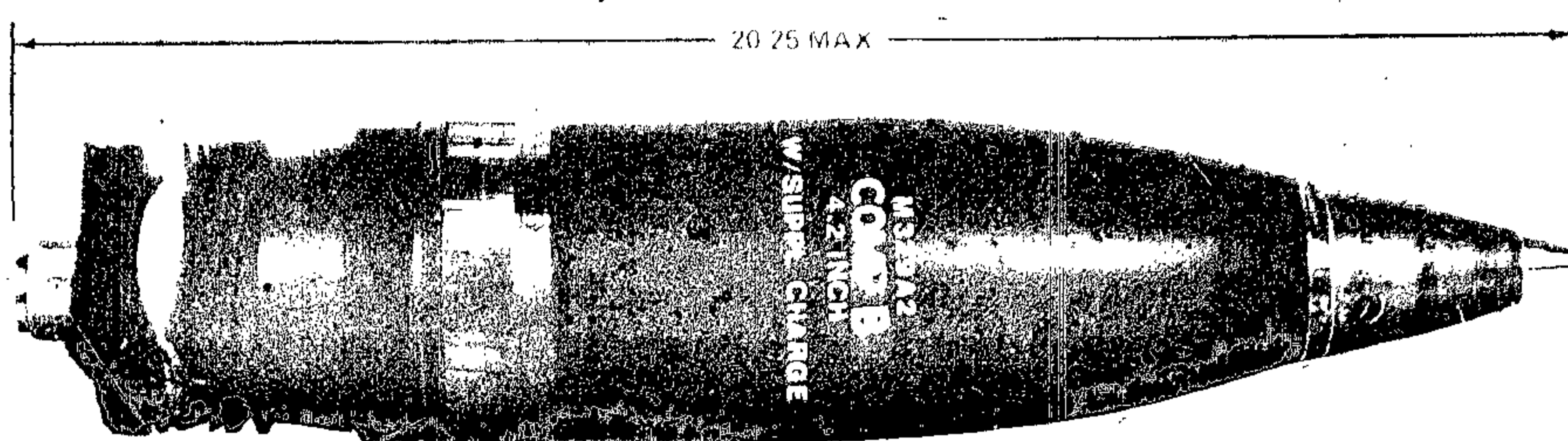
Limitations:

Short rounds may occur when firing with fewer than ten increments. Minimum charge for firing with a proximity fuze is ten increments.

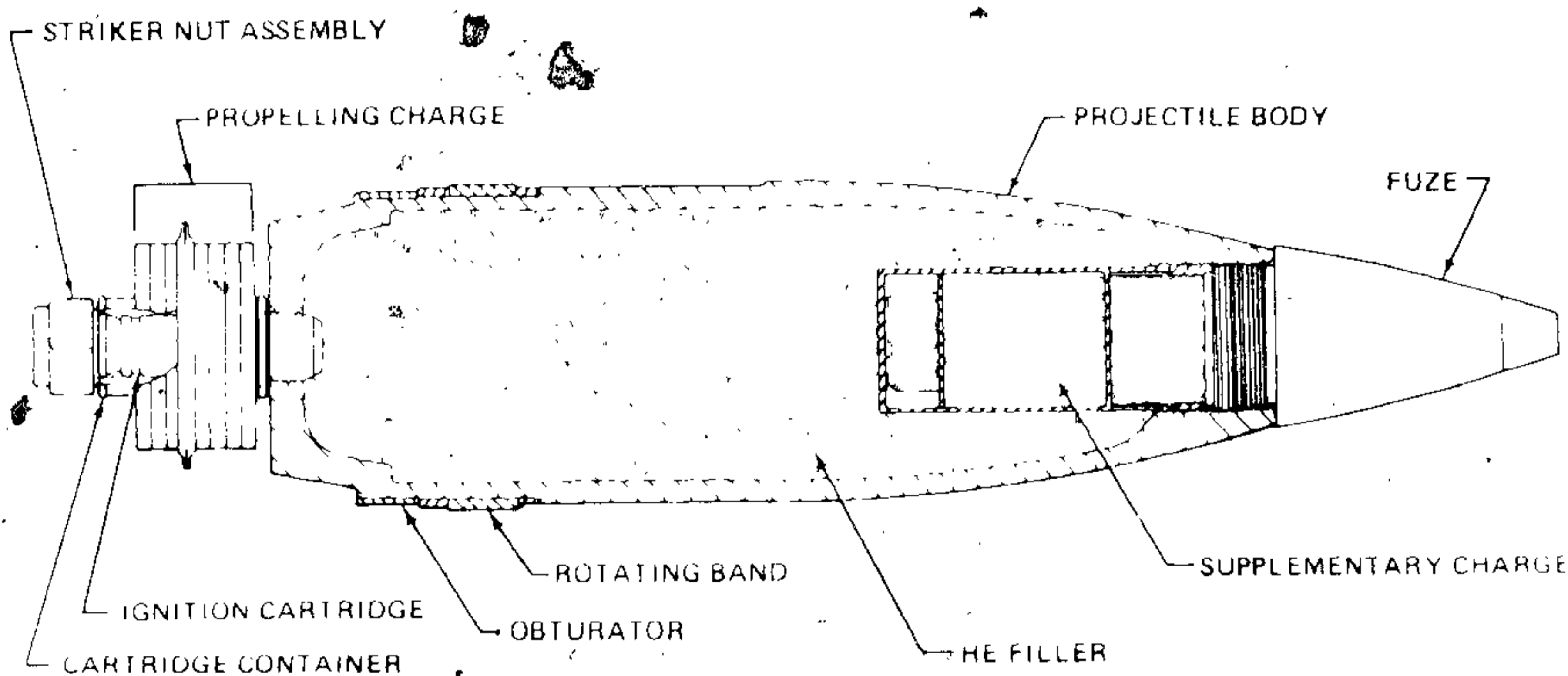
References:

SC 1305/30-IL
 TM 9-1015-215-12
 TM 9-1300-251-20
 TM 9-1320-241-12

CARTRIDGE, 4.2-INCH: HE, M329A2 (M329A1E1)



AR199446



AR199446

Type Classification:

Std LCC-A MSR 01756033

Use:

This cartridge is used against personnel and materiel providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body, a fuze, and a tail assembly. The forged steel body has a preengraved rotating band and a neoprene rubber obturating ring near the base, and is designed to accommodate an impact, delay, or proximity fuze. Below the nose is a

deep fuze cavity containing a TNT supplementary charge which is removed when using a long-intrusion proximity fuze. The tail assembly consists of a cartridge container and ignition cartridge, a propelling charge, and a striker nut assembly.

Functioning:

The cartridge is positioned so that the preengraved rotating band aligns with the rifling grooves in the bore of the tube. When the cartridge is released, it slides down the barrel tube until the striker point in the striker nut assembly strikes the weapon firing pin. The striker point functions the percussion primer of the ignition cartridge. The flash from the primer ignites the ignition cartridge which in turn

ignites the propelling charge. The gas from the propelling charge exerts pressure on the base of the projectile, expands the obturator, and forces the projectile back up the tube. The preengraved rotating band is engaged in the rifling and imparts spin to the projectile. The spin stabilizes the projectile in flight. Functioning of the fuze detonates the supplementary charge and, in turn, the high explosive charge. Depending upon the type of fuze used, the projectile bursts either over or on the target, producing near optimum fragmentation and blast effect.

Tabulated Data:

Complete round:

Type ----- HE
 Weight ----- 22.00 lbs.
 Length ----- 20.25 in.
 Cannon used with -- M2, M30

Projectile:

Body material ---- Forged steel
 Color ----- Olive drab w/yellow markings
 Filler and weight -- Comp. B. 5.75 lbs.

Components:

Ignition cartridge-- M2A2*
 Propelling charge-- M36A2*
 Fuzes ----- PD, M557
 MTSQ, M548
 Prox., M728, **M732**

Performance (full charge):

Maximum range --- 6600 meters
 Muzzle velocity --- 308 mps.

*NOTE: See separate data sheets.

Temperature Limits:

Firing:

Lower limit ----- -65°F
 Upper limit ----- +160°F

Storage:

Lower limit ----- -65°F (for period not more than 3 days)
 Upper limit ----- +160°F (for period not more than 4 hrs/day)

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

*Packing Box:

Weight ----- 63 lbs.
 Dimensions ----- 25-3/4 x 11-11/16 x 6-3/8 in.
 Cube ----- 1.4 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance

class ----- 7
 Storage compatibility group ----- G
 DOT shipping class --- A
 DOT designation ---- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES

DODAC ----- 1315-C704
 Drawing number ----- 9235654

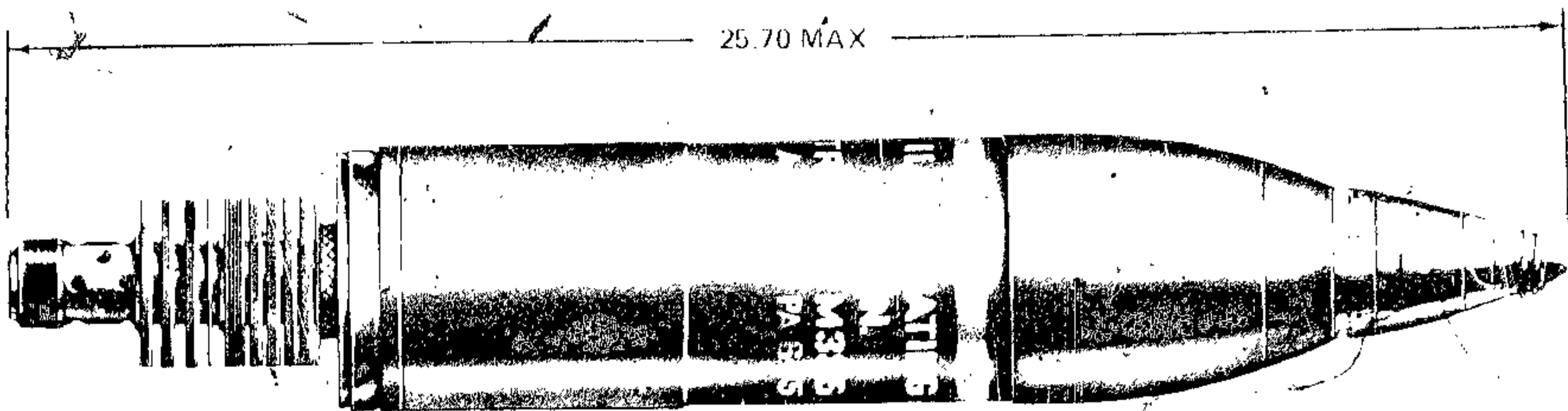
Limitations:

The supplementary charge must be removed from the nose cavity before attempting to install a long-intrusion proximity fuze.

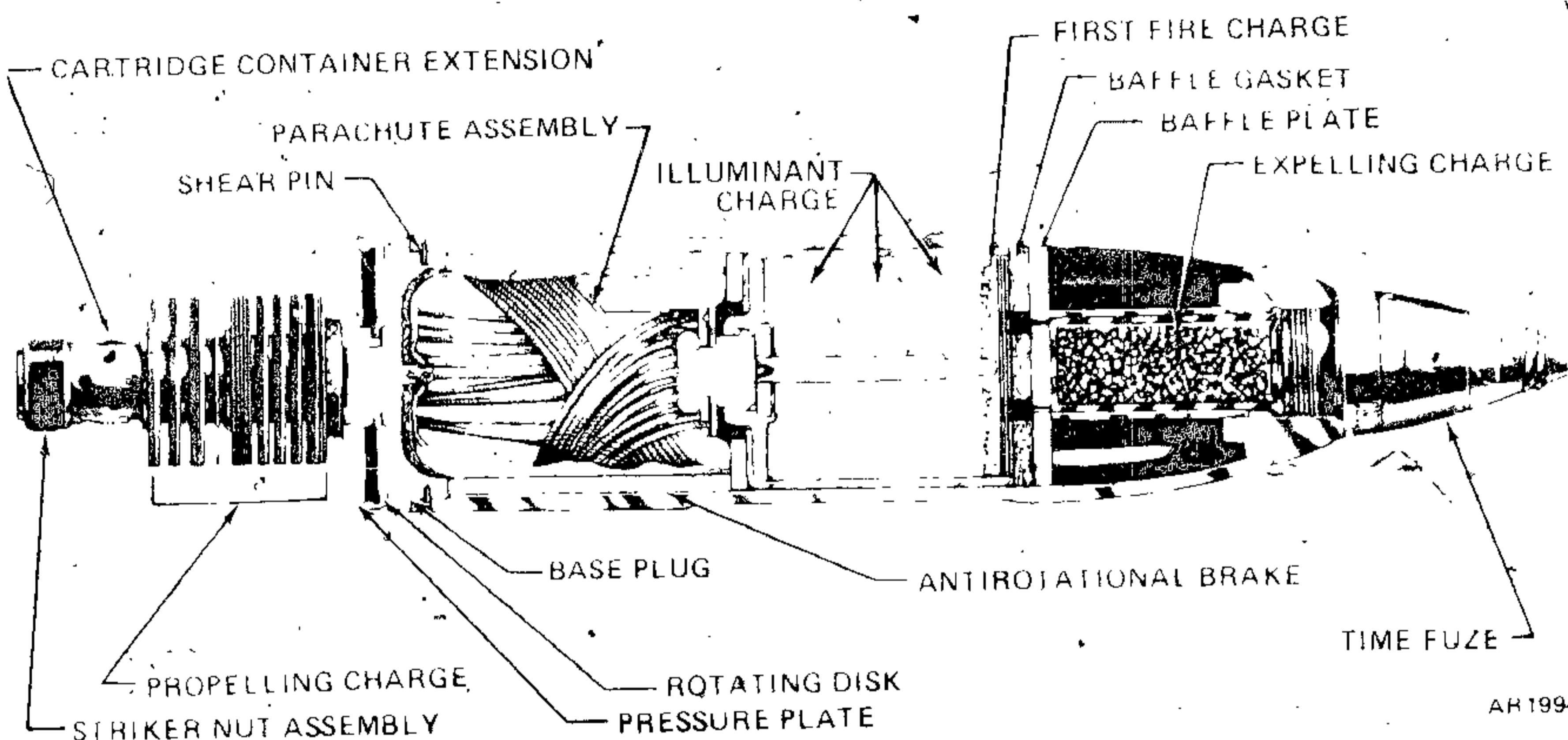
References:

SC 1305 30-IL
 TM 9-1015-215-12
 TM 9-1300-251-20
 TM 9-1320-241-12

CARTRIDGE, 4.2-INCH ILLUMINATING, M335A1 AND M335



AR199444



AR199443

Type Classification:

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

Use:

This cartridge is used for target and battle-field 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 anti-rotational 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 approximately 70 seconds at 500,000 candlepower for the M335A1, and 60 seconds for the M335.

Differences Between Models:

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

Tabulated Data:

Complete round:

Type ----- Illuminating
 Weight ----- 26.00 lbs.
 Length ----- 25.70 in.
 Cannon used with -- M2, M30

Projectile:

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

Components:

	<u>M335</u>	<u>M335A1</u>
Ignition cartridge --	M2*	M2A1*
Propelling charge --	M36*	M36A1*
Fuze -----	MTSQ, M501	MT, M562

Performance (full charge):

	<u>M335</u>	<u>M335A1</u>
Maximum range ---	4800	5290
	meters	meters
Muzzle velocity ---	290 mps.	301.7 mps.

*NOTE: See separate data sheets.

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 hrs/day)

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

*Packing Box:

Weight ----- 76.0 lbs.
 Dimensions ----- 31-5/16 x 11-13/16 x 7-5/8 in.
 Cube ----- 1.6 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

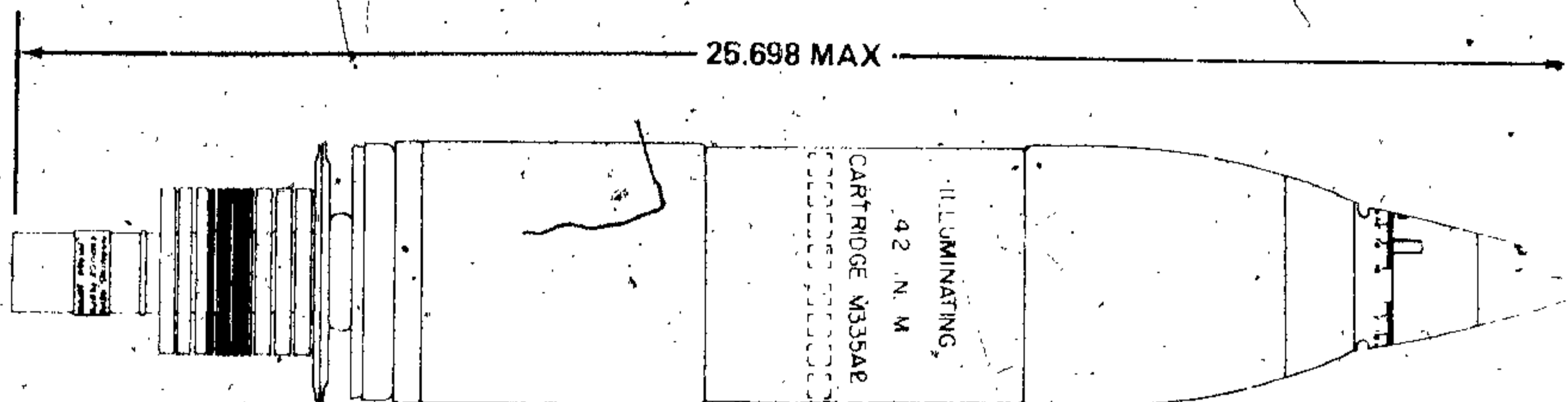
Shipping and Storage Data:

Quantity, distance class ----- 5
 Storage compatibility group ----- E
 DOT shipping class --- A
 DOT designation ----- AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES
 DODAC ----- 1315-C706
 Drawing number ----- 8833724 (M335A1)
 8833741 (M335)

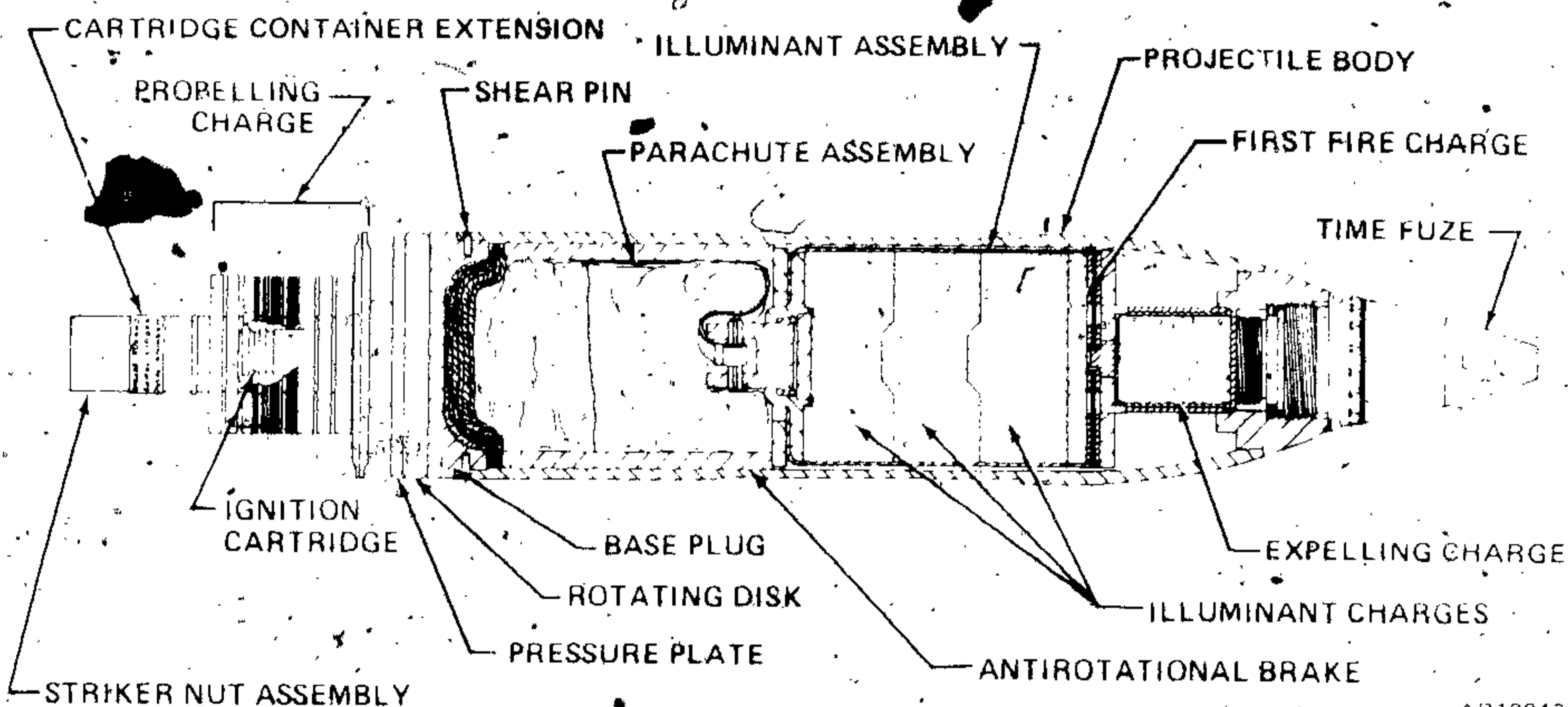
References:

SC 1305, 30 IL
 TM 9-1015-215-12
 TM 9-1300-251-20
 TM 9-1320-241-12

CARTRIDGE, 4.2-INCH, ILLUMINATING: M335A2



AR199438



AR199437

Type Classification:

Std AMCTC 3881 dtd 1965

Use:

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

Description:

The complete round consists of a projectile body with a detachable base plug, a time 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 disk, 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 charge. The gases from the propelling charge exert pressure on the pressure plate at the base of the projectile which expands the rotating disk,

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 fuze, the expelling charge is ignited, expelling the illuminant and parachute assemblies through the base of the projectile body and igniting the first-fire charge. The first-fire charge ignites the illuminant charge; the spring-loaded brakes extend to stop rotation, and the parachute deploys. Burning time is approximately 90 seconds at 850,000 candlepower.

Tabulated Data:

Complete round:

Type ----- Illuminating
 Weight ----- 26.00 lbs.
 Length ----- 25.698 in.
 Cannon used with ----- M2, M30

Projectile:

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

Components:

Ignition cartridge ----- M2A2*
 Propelling charge ----- M36A1*
 Fuze ----- MT, M565

*NOTE: See separate data sheets.

Performance (full charge)

Maximum range ----- 5490 meters
 Muzzle velocity ----- 305.1 mps

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 hrs/day)

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

* Packing Box:

Weight ----- 76.0 lbs.
 Dimensions ----- 31-5/16 x 11-13/16 x 7-5/8 in.
 Cube ----- 1.6 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

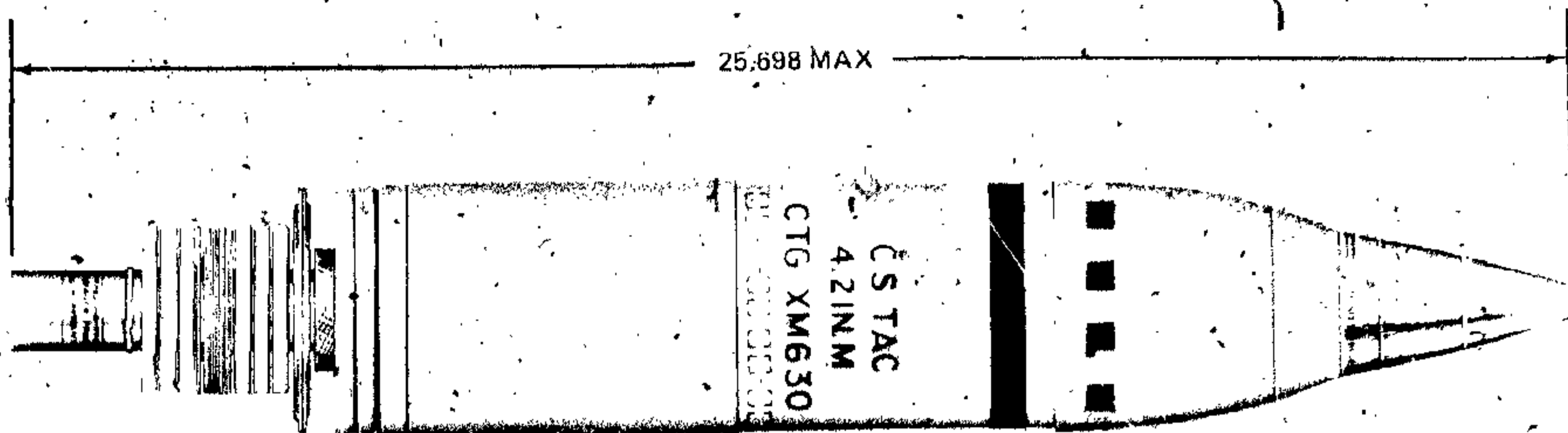
Shipping and Storage Data:

Quantity-distance class ----- 5
 Storage compatibility group ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES
 DODIC ----- 1315-C706
 Drawing number ----- 8886595

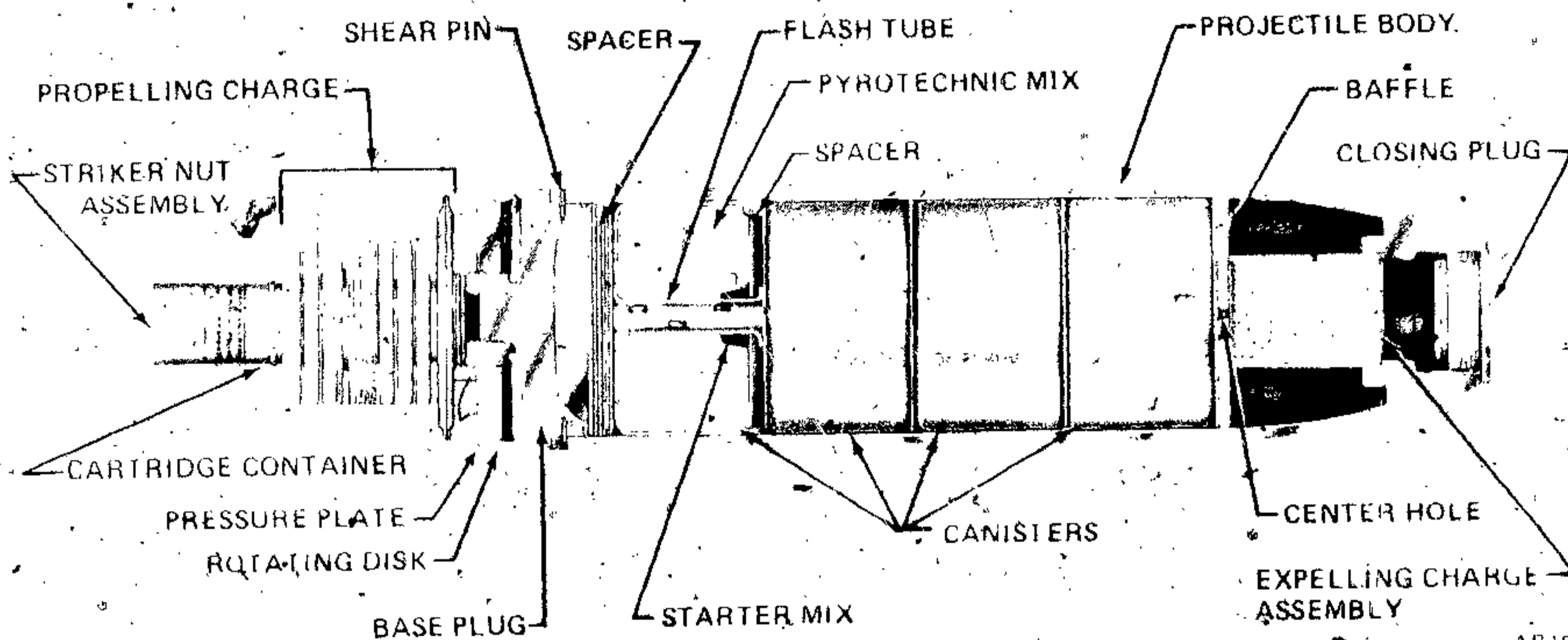
References:

SC 1305/30-IL
 TM 9-1015-2/5-12
 TM 9-1300-251-20
 TM 9-1320-241-12

CARTRIDGE, 4.2-INCH: TACTICAL CS, M630



AR199442



AR199441

Type Classification:

Std AMCTC 8233 dtd 1971

Use:

This cartridge is used to harass personnel by emitting irritant fumes.

Description:

The complete round consists of a projectile body with a detachable base plug, a time fuze, 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 body contains four canisters of CS pyrotechnic mix, each with a small charge of starter mix. An aluminum baffle separates the expelling charge from the canisters, and chipboard spacers separate the canisters from each other. The baffle, the spacers, and the canisters have a center hole allowing the flash from the expelling charge to provide ignition. 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 disk, 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 time fuze, the expelling charge is ignited. Flash from the expelling charge ignites each of the canisters, and the burning canisters are expelled from the projectile body. Average burning time of each canister is 60 seconds, producing a gas which causes extreme burning of the eyes, coughing, difficulty in breathing, and chest tightness.

Tabulated Data:

Complete round:

Type ----- Tactical CS
 Weight ----- 27.07 lbs.
 Length ----- 25.698 in.
 Cannon used with ---- M2, M30

Projectile:

Body material ----- Steel
 Color ----- Gray w/red band and red markings
 Filler and weight ---- CS, 4.0 lbs.
 Expelling charge ---- BP, 0.16 lbs.

Components:

Ignition cartridge --- M2A2*
 Propelling charge --- M36A1*
 Fuze ----- MT, M565; MTSQ, M548.

*NOTE: See separate data sheets.

Performance (full charge):

Maximum range ----- 5,650 meters
 Muzzle velocity ----- 299 mps.

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 hrs/day)

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

* Packing Box:

Weight ----- 76.0 lbs.
 Dimensions ----- 31-5/16" x 11-13/16" x 7-3/8 in.
 Cube ----- 1.6 cu. ft.

* NOTE: See SC for complete packing data, including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 5
 Storage compatibility group ----- A
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH TACTICAL CS PROJECTILES CLASS B DOT SPECIAL PERMIT NO. 5208
 DODAC ----- 1315-C710
 Drawing number ----- 9220299

Limitations:

Firing with less than ten increments of propellant can result in short rounds.

References:

SC 1305/30-IL
 TM 9-1015-215-12
 TM 9-1300-251-20
 TM 9-1320-241-12
 TM 9-1320-241-12

TM 43-0001-28

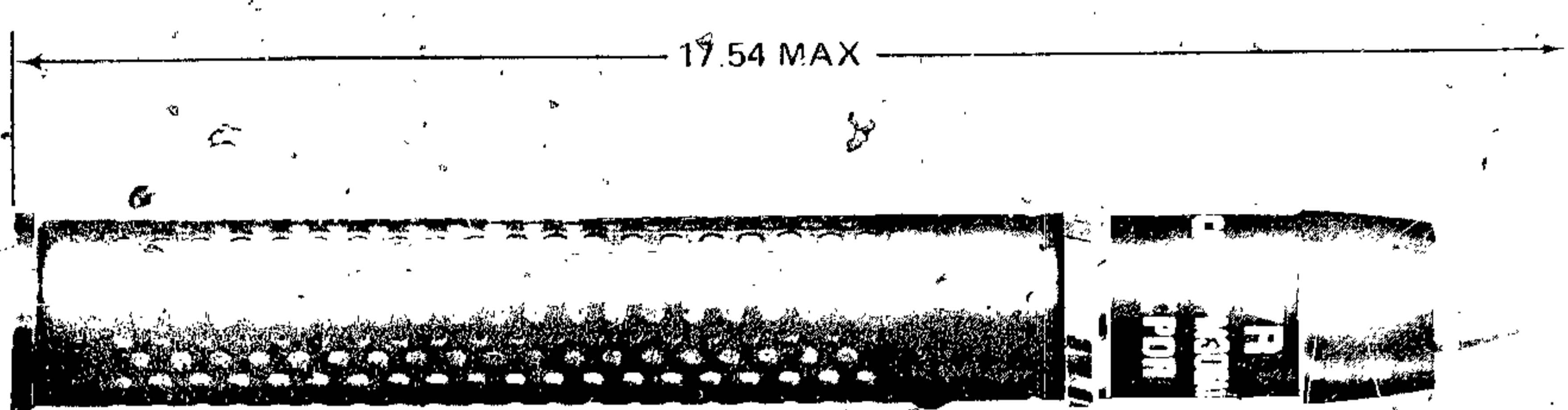
CHAPTER 5

AMMUNITION FOR RECOLLESS RIFLES

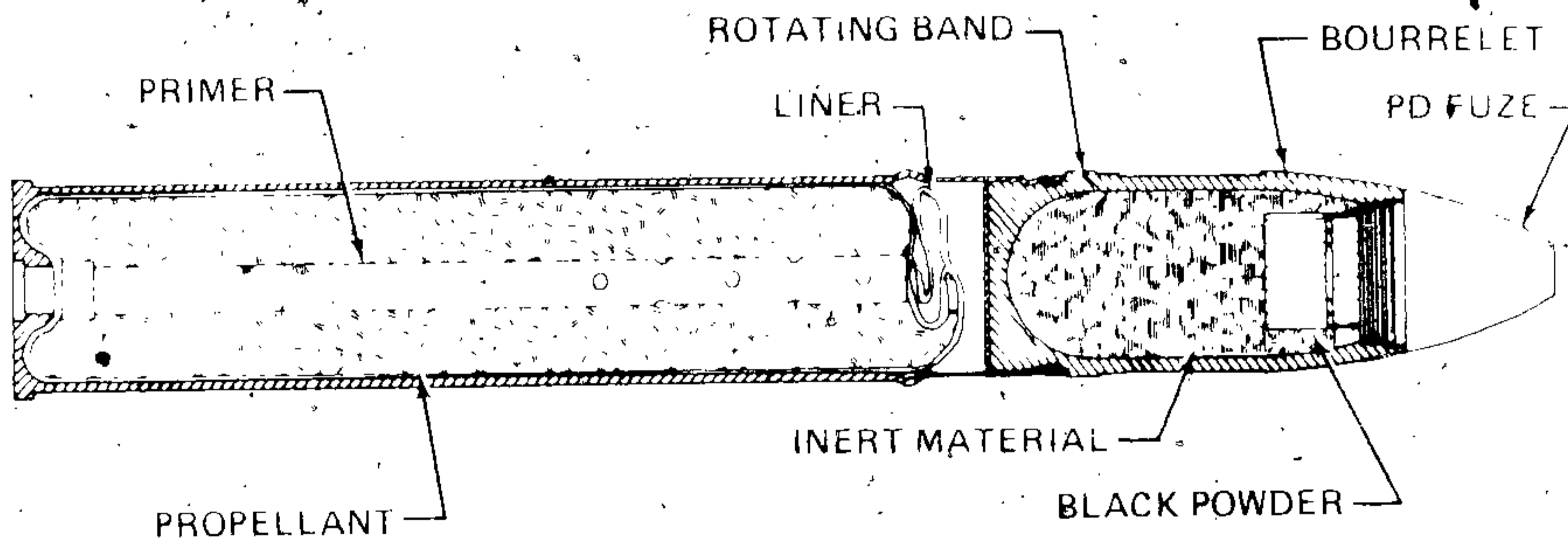
TM 43-0001-28

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CARTRIDGE, 57-MILLIMETER: TP, M306A1



AR199769



AR199768

Type Classification:

Cont OTCM 37119 dtd 1959

Use

This cartridge is used in 57-mm recoilless rifles for target practice.

Description:

The cartridge consists of a perforated metal cartridge case, containing a plastic liner, which is crimped to a steel projectile. The cartridge case liner is loosely filled with propellant and the cartridge case is equipped with a percussive primer. The primer ignition tube extends through the length of the propelling charge. The projectile resembles the HE round M306A1

with the same shape and preengraved rotating band; however instead of high explosive filler, the target practice round contains only a small black powder marking charge. The projectile is equipped with a PD fuze. This target practice round has the same ballistics as the HE round.

Functioning:

The black powder flash from the primer ignites the propelling charge when the primer is struck by the firing pin of the weapon. The burning propellant generates gases to propel the projectile through the barrel to the target. Recoil is eliminated because some gas pressure escapes through the perforated cartridge case, and then through the apertures in the rifle breechblock. The rotating band engages

the barrel rifling to spin the projectile for stability in flight. Fuze detonation ignites the black powder charge in the projectile to produce flash and smoke for marking the impact point.

Tabulated Data:

Complete round:

Type ----- TP
 Weight ----- 5.4 lbs.
 Length ----- 17.54 in.
 Cannon used with ---- M18A1, M18

Projectile:

Body material ----- Forged steel
 Color ----- Blue or black
 with white markings
 Filler and weight ---- Inert material,
 6.46 oz. Black powder, 1.1 oz.

Components:

Cartridge case ----- M30A1B1
 Propelling charge ---- M10
 Primer ----- M60A1
 Fuze ----- PD, M503A1 or
 M503

Performance:

Maximum range ----- 4508 meters
 Muzzle velocity ----- 1200 fps

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 hrs./
 day)

* Packing ----- 1 round in fiber
 container; 4 con-
 tainers in wooden
 box

* Packing Box:

Weight ----- 39.0 lbs.
 Dimensions ----- 22-1/8 x 7-5/8
 x 8-1/2 in.
 Cube ----- 0.82 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 4
 Storage compatibility
 group ----- E
 DOT shipping class ---- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES
 DODAC ----- 1310-B588
 Drawing number ----- 75-1-252

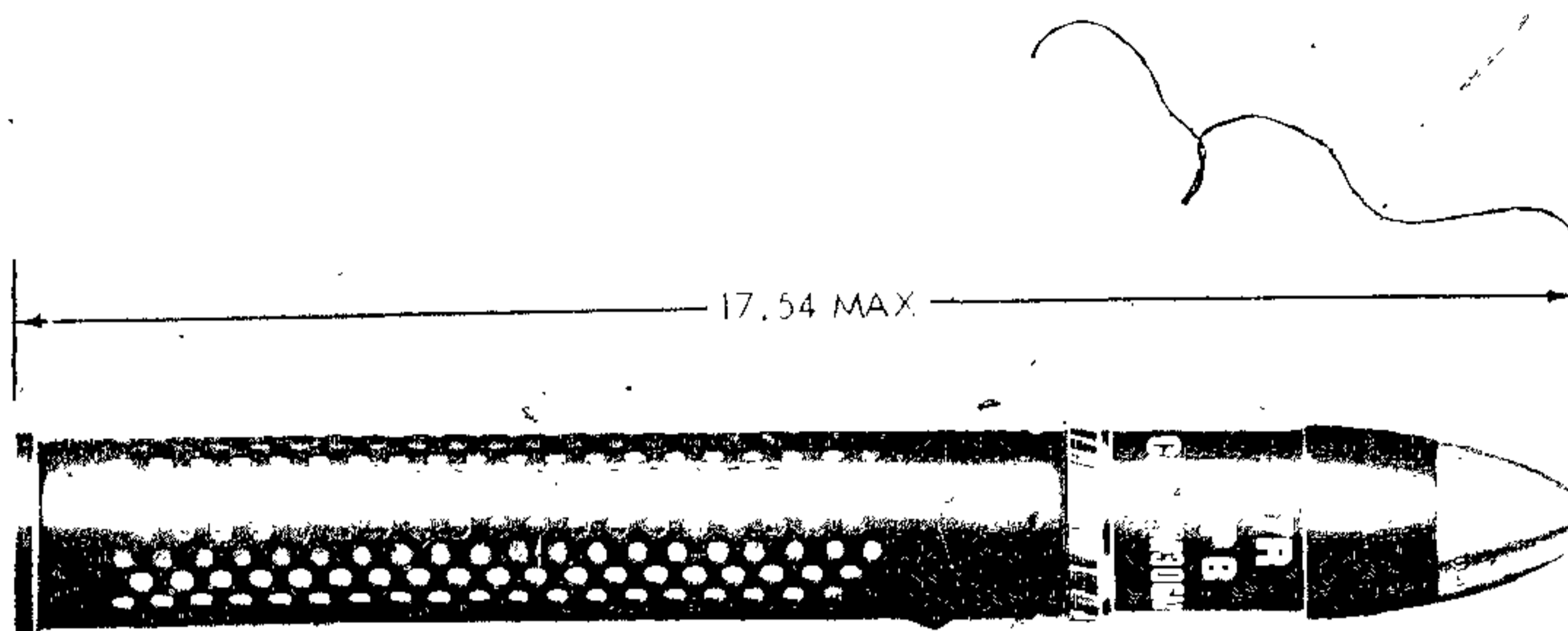
Limitations:

Because M60 primers rupture occasionally, gun bores must be inspected for fragments after each firing.

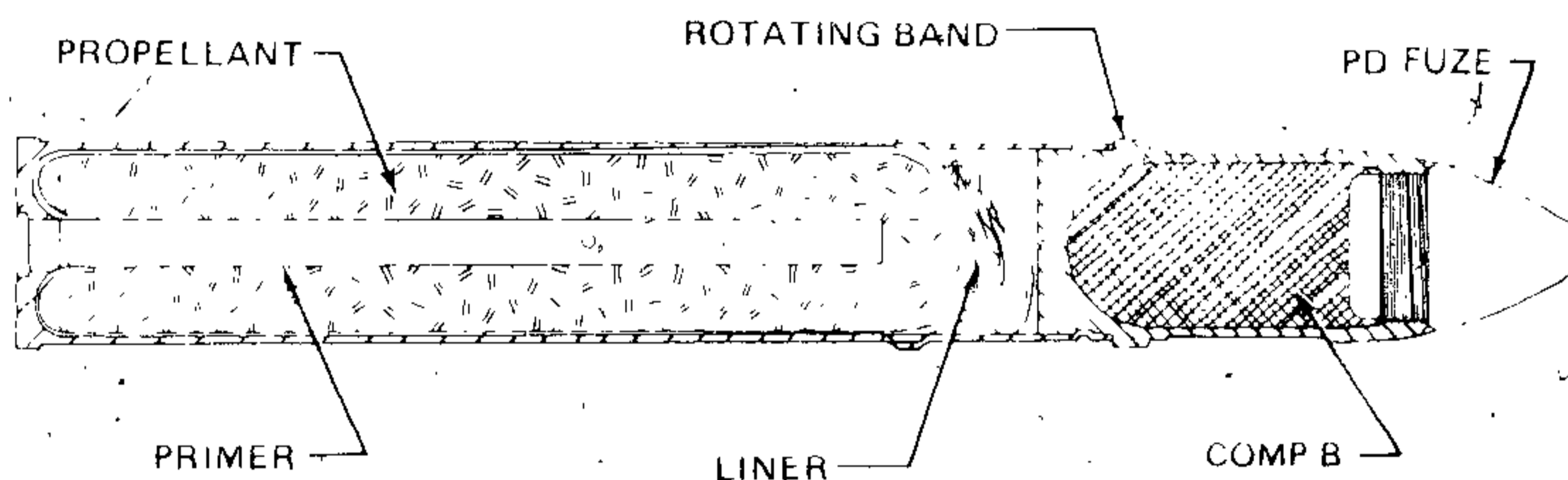
References:

SC 1305/30-II
 SB 700-20
 AMCP 700-3-3
 TM 9-1300-251-20

CARTRIDGE, 57-MILLIMETER: HE, M306A1 AND M306



AR199777



AR199776

Type Classification:

M306A1 -----C & T OTCM 37119 dtd 1959.
 M306 -----C & T OTCM 37119 dtd 1959.

Use:

High Explosive Cartridge M306A1 is designed for blast, fragmentation and mining. The cartridge is used with Rifles M18A1 and M18.

Description:

HE Cartridge M306A1 consists of a perforated cartridge case containing a plastic liner and percussion primer. The propelling charge is loosely loaded into the liner. The

cartridge case is crimped to a high-explosive projectile with a square base, a short internally threaded ogive and integral, pre-engraved rotating band. The projectile contains an explosive charge of Composition B or TNT. Projectiles are fuze with point-detonating (PD) Fuze M503A2, M503A1 or M503 which function on direct impact or graze. There is a bourrelet on the rear of the ogive and another immediately in front of the rotating band. The cartridge is spin-stabilized in flight.

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 breech-block. 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 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.

Difference Between Models:

Cartridge HE, M306 is similar to Cartridge M306A1, differing principally in the design of the crimping groove.

Tabulated Data:

Complete round:

Type ----- HE
 Weight ----- 5.46 lbs.
 Length ----- 17.54 in.
 Cannon used with ---- M18, M18A1
 Projectile:
 Body material ----- Forged steel
 Color ----- Olive drab w/yel-
 low markings
 Filler and weight ---- M306A1: Comp. B.
 0.55 lb.
 M306: TNT
 0.55 lb.

Components:

Cartridge case ----- M30A1B1 or
 M30A1B2
 Propelling charge --- M10
 Primer ----- M60, M60A1 or
 M46
 Tracer ----- N/A
 Fuze ----- PD, M503 series

Performance:

Maximum range ----- 4,508 meters
 Muzzle velocity ----- 1,200 fps

Temperature Limits:

Firing:

Lower limit ----- 65° F
 Upper limit ----- + 160° F

Storage:

Lower limit ----- 80° F (for not
 more than 3
 days)
 Upper limit ----- + 160° F (for not
 more than 4 hrs./
 day)

* Packing ----- 1 round in fiber
 container; 6 fiber
 containers in
 wooden box

* Packing Box:

Weight ----- 51 lbs.
 Dimensions ----- 21-1/2 x 10-7/16
 x 8-3/16 in.
 Cube ----- 1.1 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 4
 Storage compatibility --- E
 DOT shipping class ---- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILE
 DODAC ----- 1310-B586
 Drawing number ----- 9215030

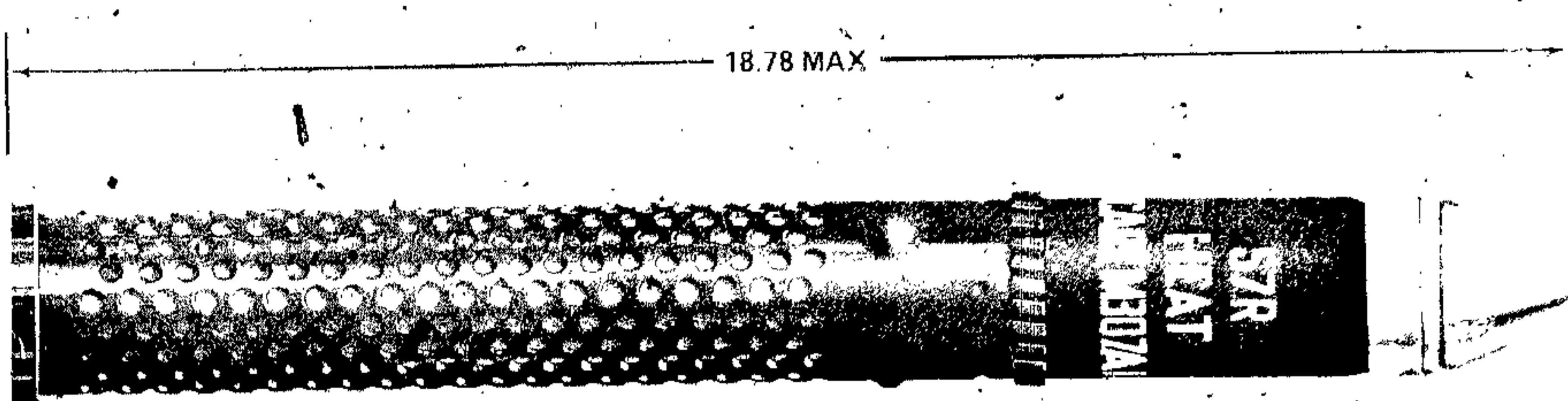
Limitations:

Because M60 primers rupture occasionally, gun bores must be inspected for fragments after each firing.

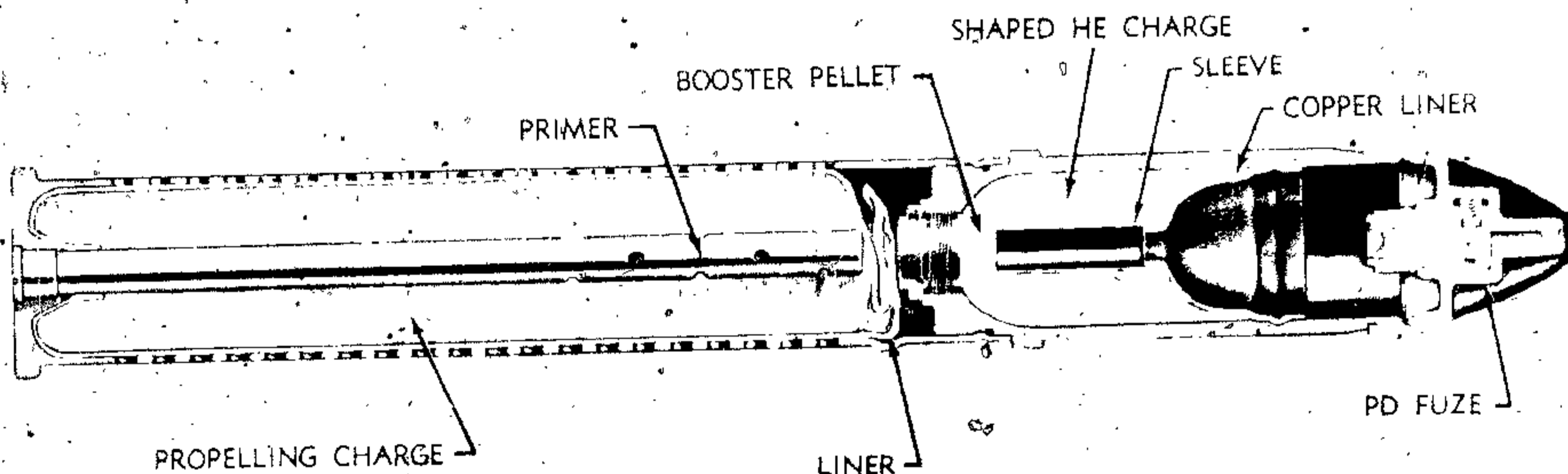
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1300-251-20

CARTRIDGE, 57-MILLIMETER: HEAT, M307A1 AND M307



AR199775



AR 199774

Type Classification:

Cont OTCM, 37119 dtd 1959

Use:

This cartridge is employed against armored targets and used with 57-mm Rifles M18 and M18A1.

Description:

HEAT Cartridge M307A1 includes a perforated metal cartridge case containing a plastic liner and a percussion primer and is crimped to the projectile just behind the pre-engraved rotating band of the projectile. The projectile forward cap is threaded to receive

a point detonating fuze. A hemispherical copper liner crimped to the interior of the projectile forms a shaped charge to the rear and space forward to provide the standoff necessary for penetration. A steel sleeve brazed to the neck of the copper liner provides a passage from the fuze to a booster pellet in the base of the projectile. The booster pellet extends into the high explosive charge.

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 release of some gas

pressure through apertures in the rifle breech-block. The rotating band engages the barrel rifling to spin the projectile. The fuze functions upon impact and fires through the steel sleeve to the booster pellet. Detonation of the explosive charge collapses the copper liner and creates a focussed, high velocity shock wave containing a jet of metal particles that penetrates the interior of the target.

Difference Between Models:

M307 uses a paperlined Cartridge Case M30 and Percussion Primer M46.

Tabulated Data:

Complete round:

Type ----- HEAT
 Weight ----- 5.43 lbs.
 Length ----- 18.78 in.
 Cannon used with ---- M18, M18A1

Projectile:

Body material ----- Forged steel
 Color ----- Olive drab w/yellow marking
 Filler and weight ---- Comp B or 50-50 Pentolite-0.40 lbs.

Booster weight and type ----- Integral (tetryl)

Components:

Cartridge case ----- M30A1 or M30A1B1
 Propelling charge --- M10
 Primer ----- M60 or M60A1
 Fuze ----- PI, M90, or M90A1

Performance:

Maximum range ----- 4,443 meters
 Muzzle velocity ----- 1,200 fps

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 hrs/day)

* Packing ----- 1 round per fiber container; 6 fiber containers in wooden box

* Packing Box:

Weight ----- 51.5 lbs.
 Dimensions ----- 23 x 10-7/16 x 8-11/32 in.
 Cube ----- 1.2 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 4
 Storage compatibility --- E
 DOT shipping class ---- A
 DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
 DODAC ----- 1310-B587
 Drawing number ----- 75-1-215

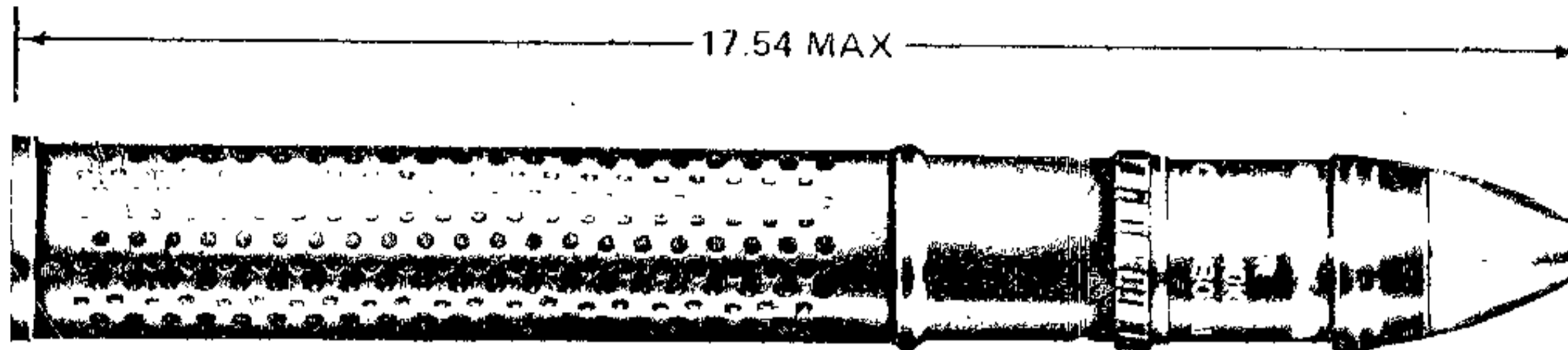
Limitations:

Because M60 primers rupture occasionally, gun bores must be inspected for fragments after each firing.

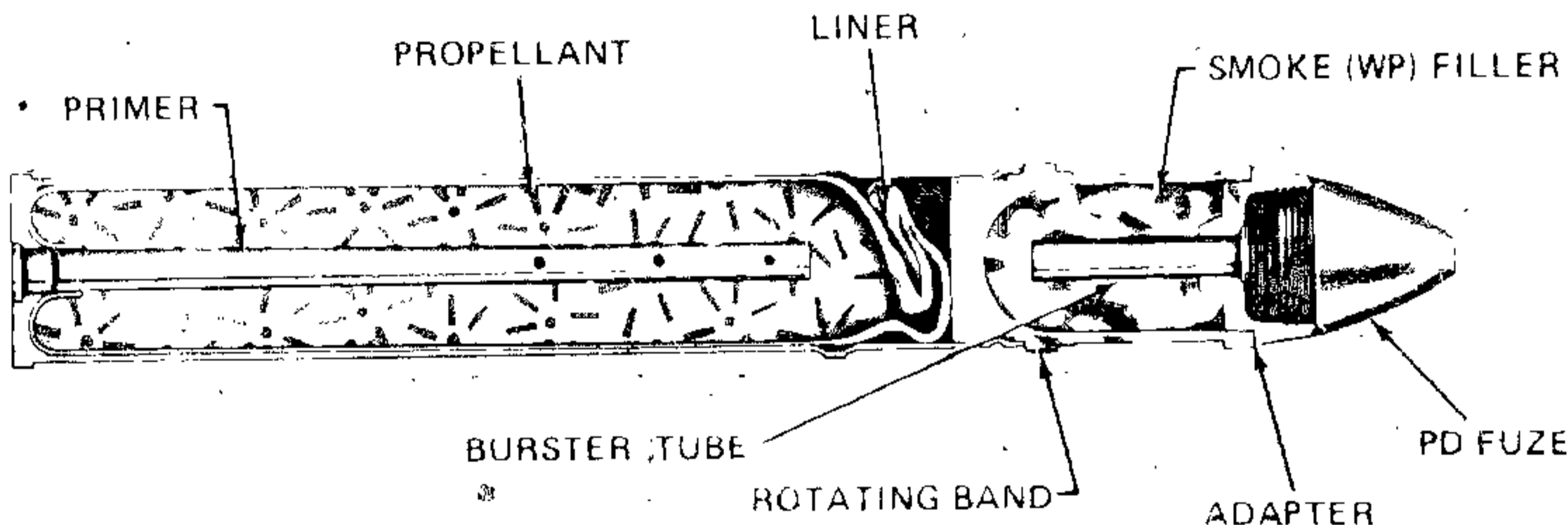
References:

SC 1305/30-EL
 SB 700-20
 AMCP 700-3-3
 TM 9-1300-251-20

CARTRIDGE, 57-MILLIMETER: SMOKE, WP, M308A1 AND M308



AR199773



AR199772

Type Classification:

Cont OTCM 37119 dtd 1959

Use:

This cartridge is used in 57-mm recoilless Rifles M18A1 and M18 and is intended primarily for screening and spotting.

Description:

WP Cartridge M308A1 includes a perforated cartridge case containing a plastic liner and a percussion primer. The propelling charge is loosely loaded into the plastic liner. The cartridge case is crimped to the projectile just behind the preengraved rotating band. A steel adapter forms the front

end of the projectile. The burster is press-fitted into the adapter, and the fuze is threaded into the adapter. The projectile is filled with white phosphorous.

Functioning:

The primer ignites the propellant when struck by the weapon firing pin, and the propellant generates gases to propel the projectile through the barrel. Recoil is eliminated because the design of the cartridge case permits the controlled release of some gas pressure through apertures in the rifle breech block. The rotating band engages the barrel rifling to spin the projectile for stability in flight. On impact the fuze functions to detonate the burster tube. The burster ruptures

the projectile and disperses the white phosphorous filler. White phosphorous ignites spontaneously on contact with air, emitting a dense white smoke.

Difference Between Models:

M308 uses a paper-lined cartridge case and Percussion Primer M46.

Tabulated Data:

Complete round:

Type ----- Smoke WP
 Weight ----- 5.43 lbs.
 Length ----- 17.54 in.
 Cannon used with ----- M18A1, M18

Projectile:

Body material ----- Forged steel
 Color:
 Old ----- Gray with yellow band and yellow markings
 New ----- Light green with black markings
 Filler and weight ----- WP, 0.37 lb.
 Burster ----- M21, 0.19 oz. tetryl

Components:

Cartridge case:
 M308A1 ----- M30A1B1
 M308 ----- M30
 Propelling charge ----- M10
 Primer:
 M308A1 ----- M60A1
 M308 ----- M46
 Fuze ----- PD, M503 series

Performance:

Maximum range ----- 4143 m.
 Muzzle velocity ----- 1,200 fps.

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 hrs./day)

* Packing ----- 1 round in fiber container; 6 containers in wooden box

* Packing Box:
 Weight ----- 51.0 lbs.
 Dimensions ----- 21-9/16 x 10-7/16 x 8-3/16 in.
 Cube ----- 1.1 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 5.
 Storage compatibility group ----- A
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
 DODAC ----- 1310-B590
 Drawing number ----- 9215427

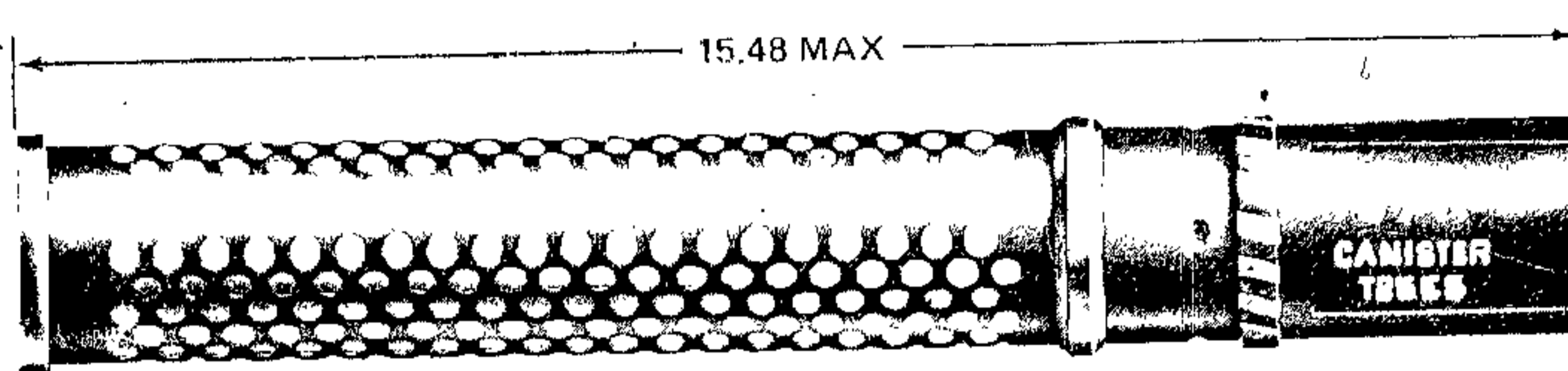
Limitations:

Store and transport WP rounds at temperatures below 111.4° F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

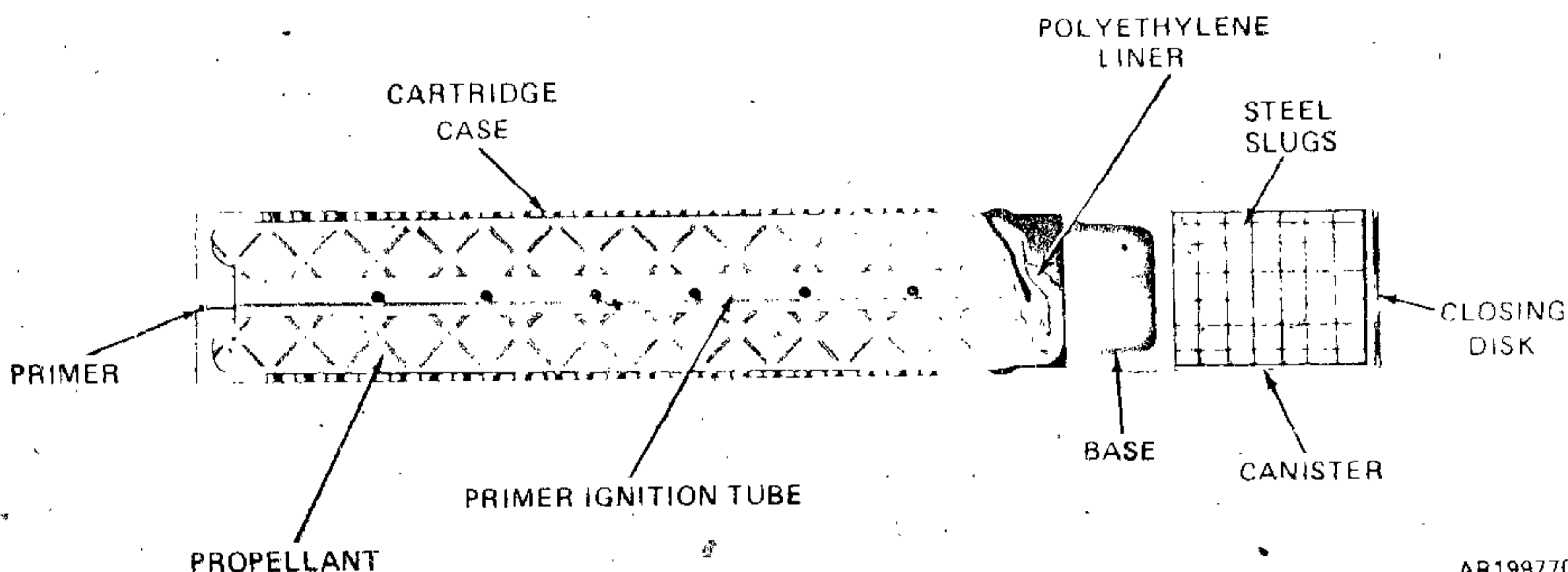
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1300-251-20

CARTRIDGE, 57-MILLIMETER: CANISTER, T25E5



AR199771



AR199770

Type Classification:

LP AMCTC 7875 dtd 1970

Use:

This canister cartridge is fired from 57-mm recoilless rifles for antipersonnel effect at close range.

Description:

The cartridge consists of a perforated metal cartridge case crimped to a cylindrical canister projectile. The cartridge case contains a polyethylene liner which is loosely filled with propellant and is equipped with a percussion primer. The primer ignition tube extends through the length of the propelling charge.

The canister case is loaded with 154 or 176 stacked, cylindrical steel slugs. The thin steel case has four equally spaced slots extending from the nose to within 1/4 inch of a pre-engraved rotating band near the base. The canister is closed at the front by crimping and welding to a steel disk, and at the rear by a heavy steel base.

Functioning:

When the primer is struck by the firing pin of the weapon, flame from the primer blast power ignites the propellant. The burning propellant generates gases to propel the canister through the barrel, and spin is provided by the rotating band engaging the barrel rifling. The coil is eliminated because the design of the cartridge case permits the controlled release

of some gas pressure through apertures in the rifle breechblock. Breakup of this projectile is initiated by fracture at the body grooves under forces encountered in firing. The payload of steel slugs is dispersed by centrifugal action after breakup of the canister at the rifle muzzle. The slugs are thrown forward in a conical pattern.

Tabulated Data:

Complete round:

Type ----- Antipersonnel
 Weight ----- 5.43 lbs.
 Length ----- 15.48 in.
 Cannon used with ---- M18A1, M18

Projectile:

Body material ----- Steel
 Color:
 Old ----- Black w/white markings
 New ----- Olive drab w/white markings
 Filler and weight ---- Steel slugs, 1.8 lbs.

Components:

Cartridge case ----- M30A1B1 or M30A1B2
 Propelling charge ---- M10
 Primer ----- M60A1

Performance:

Maximum range ----- 160 m.
 Muzzle velocity ----- 1,200 fps.

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 hrs./day)

* Packing ----- 1 round in fiber container; 6 containers in wooden box

* Packing Box:

Weight ----- 49.0 lbs.
 Dimensions ----- 19-5/8 x 10-1/2 x 8-13/32 in.
 Cube ----- 1.0 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distant class ----- 4
 Storage compatibility group ----- E
 DOT shipping class ----- B
 DOT designation ----- AMMUNITION FOR CANNON WITH SOLID PROJECTILE
 DODAC ----- 1310-B585
 Drawing number ----- 9215708

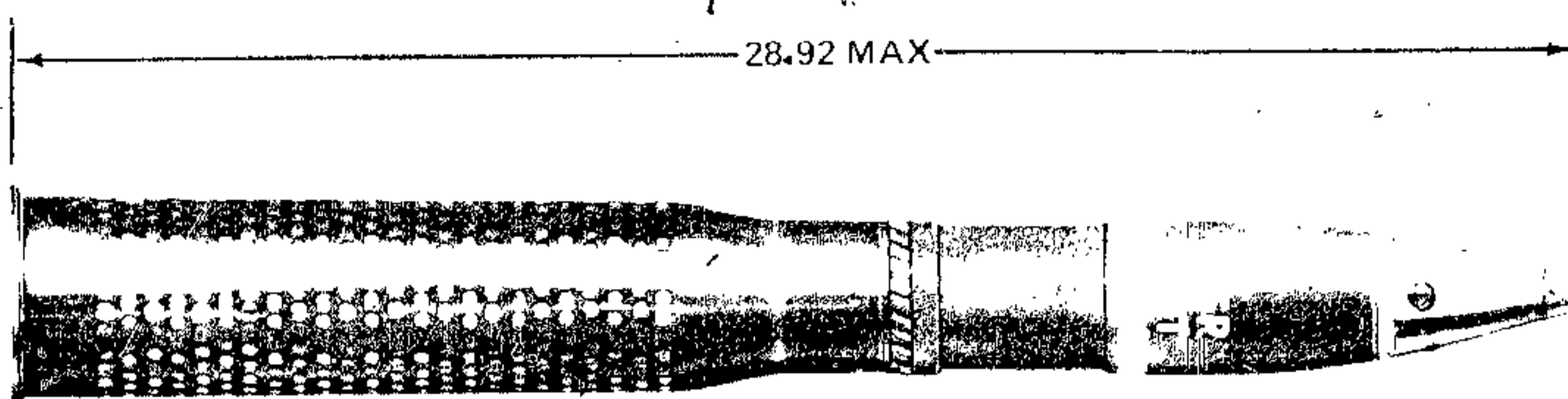
Limitations:

Canister may not be fired overhead of friendly troops.

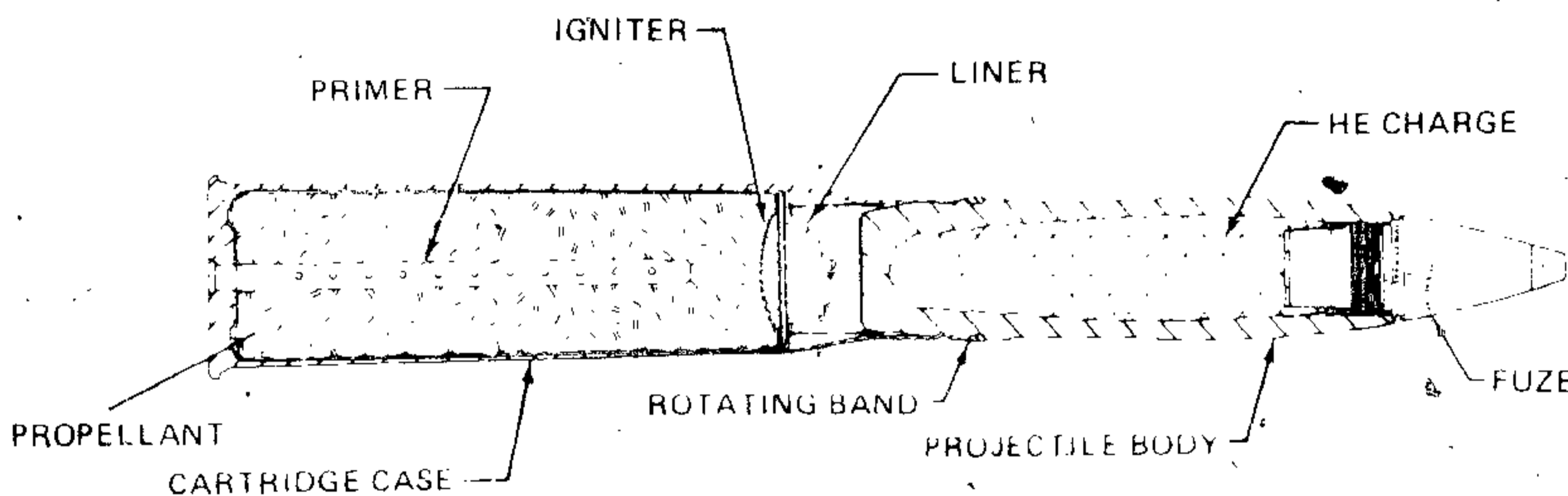
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1300-251-20

CARTRIDGE, 75-MILLIMETER: HE, M309A1 AND M309



AR199767



AR199767

Type Classification:

Cont OTCM 37119 dtd 1958

Use:

This cartridge is fired from 75-mm recoil-less rifles and is used for blast, fragmentation, and mining effects.

Description:

The cartridge consists of a perforated metal cartridge case crimped to a hollow steel projectile. The cartridge case contains a plastic liner which is filled loosely with propellant. An igniter charge is positioned on top of the propellant. A percussion primer is fitted in the base with an igniter tube extending through

the propelling charge. The projectile is fitted with either a point detonating or mechanical time, superquick fuze in the nose, and is filled with TNT. The rotating band near the base is pre-engraved to match the bore rifling of the weapon. A bourrelet at the rear of the projectile and another forward of the rotating band are provided as bearing surfaces for the projectile in the rifle bore.

Functioning:

When the weapon firing pin strikes the primer, flame from the primer blast primer ignites the propelling charge. The burning propellant generates rapidly expanding gases which propel the projectile through the rifle barrel and to the target. Recoil is eliminated by a

some gas pressure escapes through the perforated cartridge case, and is controlled by apertures in the rifle breechblock. The rotating band engages the bore rifling to spin the projectile for stability in flight. On impact, fuze functioning detonates the high explosive, producing blast and fragmentation.

Difference Between Models:

M309 has a paper-lined cartridge case, and does not have the igniter charge on top of the propelling charge.

Tabulated Data:

Complete round:

Type ----- HE
 Weight with fuze ----- 22.37 lbs.
 Length with fuze ----- 28.92 in.
 Cannon used with ----- M20

Projectile:

Body material ----- Forged steel
 Color ----- Olive drab w/yellow markings
 Filler and weight ----- TNT, 1.49 lbs.

Components:

Cartridge case:
 M309A1 ----- M31A1
 M309 ----- M31
 Propelling charge --- M10
 Primer ----- M47B2 or M47
 Fuze ----- PD, M51 Series or M557; MTSQ, M520A1

Performance:

Maximum range ----- 6364 meters
 Muzzle velocity ----- 990 fps

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 hrs./day)

* Packing ----- 1 cartridge in fiber container; 2 containers in wooden box

* Packing Box:

Weight ----- 73.0 lbs.
 Dimensions ----- 34-1/4 x 11-5/16 x 7-9/32 in.
 Cube ----- 1.64 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

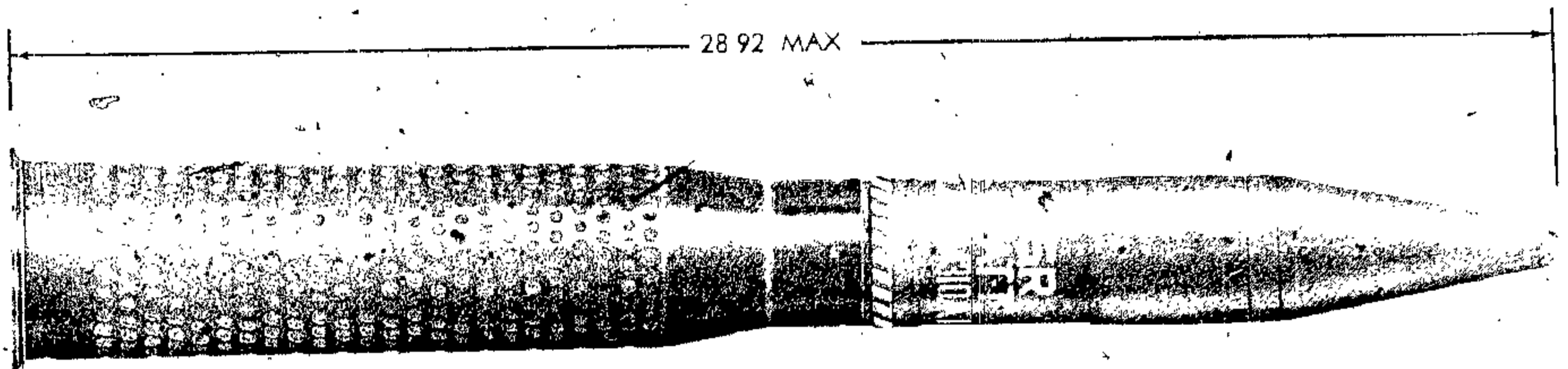
Shipping and Storage Data:

Quantity-distance class ----- 4
 Storage compatibility group ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
 DODAC ----- 1315-C051
 Drawing number ----- 75-1-221

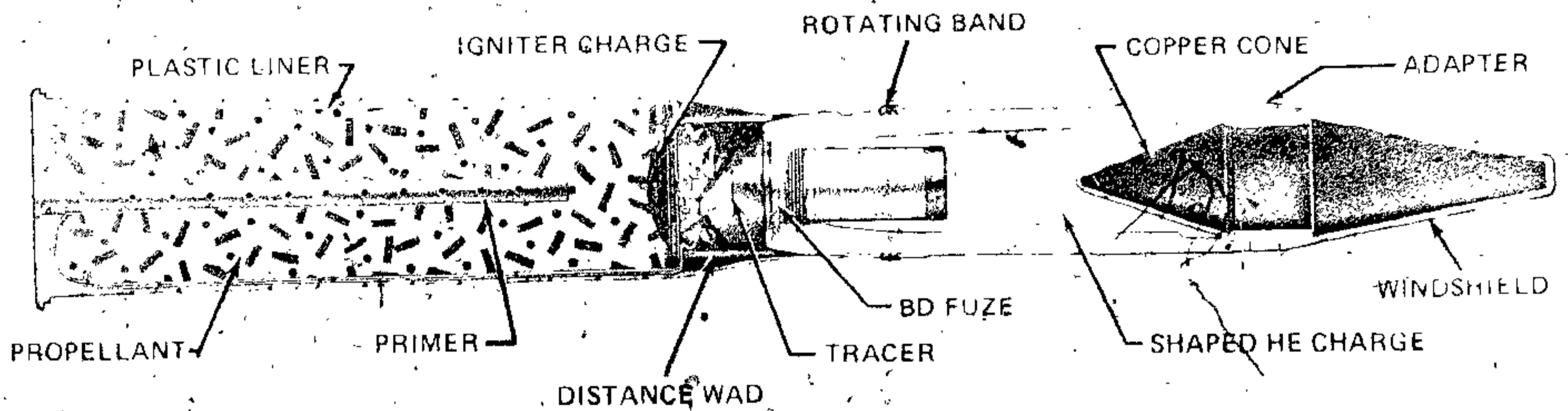
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1300-251-20

CARTRIDGE, 75-MILLIMETER: HEAT-T, M310A1 AND M310



AR 199763



AR199762

Type Classification:

Cont OTCM 37119 dtd 1959

Use:

This cartridge is fired in 75-mm recoilless rifles against armored targets.

Description:

This cartridge consists of a perforated metal cartridge case, containing a plastic liner, crimped to a high explosive antitank projectile. The liner is loosely filled with propellant, with an igniter charge on top, and all retained by a distance wad. A percussion primer is fitted in the base with an igniter tube extending through

the propelling charge. The hollow steel projectile of M310A1 is filled with Comp B around an internal copper cone to shape the charge. The nose of the shell is covered by a windshield threaded to a steel nose adapter. The space within the cone, adapter, and windshield provide the appropriate standoff distance for the shaped charge. The base of the projectile carries a base-detonating fuze. A rotating band near the base is pre-engraved to match the weapon rifling.

Functioning:

The primer ignites the propelling charge when struck by the firing pin of the weapon. The burning propellant generates rapidly expanding gases to propel the projectile through

the barrel. Recoil is eliminated because some of the gas pressure escapes through the perforated cartridge case and release is controlled through apertures in the breechblock of the rifle. The propelling charge also ignites the tracer in the M10 fuze to provide visibility of the trajectory. The rotating band engages the barrel rifling to spin the projectile for stability in flight. On impact, the fuze functions to detonate the shaped charge and collapse the internal cone. This action generates a focussed high velocity shock wave. The intensity of the shock wave causes failure of the target armor, and a jet of metal particles penetrates the interior of the target.

Difference Between Models:

M310 has a paper-lined cartridge case and the projectile is 50/50 pentolite loaded. There is no igniter charge in the propelling charge.

Tabulated Data:

Complete round:

Type -----HEAT-T
 Weight -----21.06 lbs.
 Length -----28.92 in.
 Cannon used with ---M20

Projectile:

Body material -----Forged steel
 Color -----Olive drab w/yel-
 low markings

Filler and weight:

M310A1-----Comp B, 1.0 lb.
 M310 -----50/50 pentolite,
 .89 lb.

Components:

Cartridge case:

M310A1-----M31A1
 M310 -----M31
 Propelling charge---M10
 Primer -----M47B2 or M47
 Tracer -----M5
 Fuze -----BD, M91A1

Performance:

Maximum range ----6575 meters
 Muzzle velocity ----1000 fps

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 hrs./
 day)

* Packing ----- 1 cartridge in
 fiber container;
 2 containers in
 wooden box

* Packing Box:

Weight -----73.0 lbs.
 Dimensions-----34-1/4 x 11-5/16
 x 7-9/32 in.
 Cube-----1.64 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

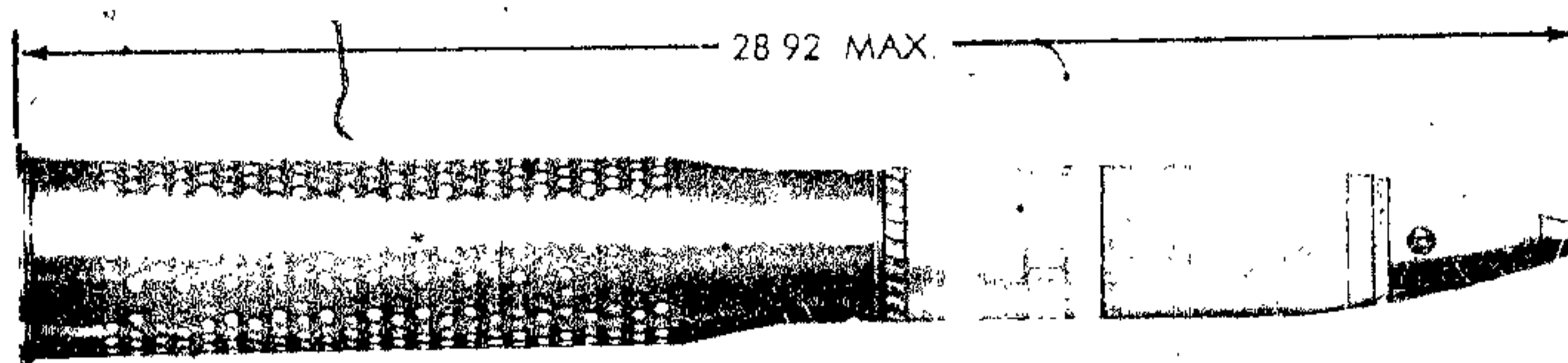
Shipping and Storage Data:

Quantity-distance
 class -----4
 Storage compatibility
 group -----E
 DOT shipping class----A
 DOT designation -----AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES.
 DODAC -----1315-C052
 Drawing number -----75-1-222

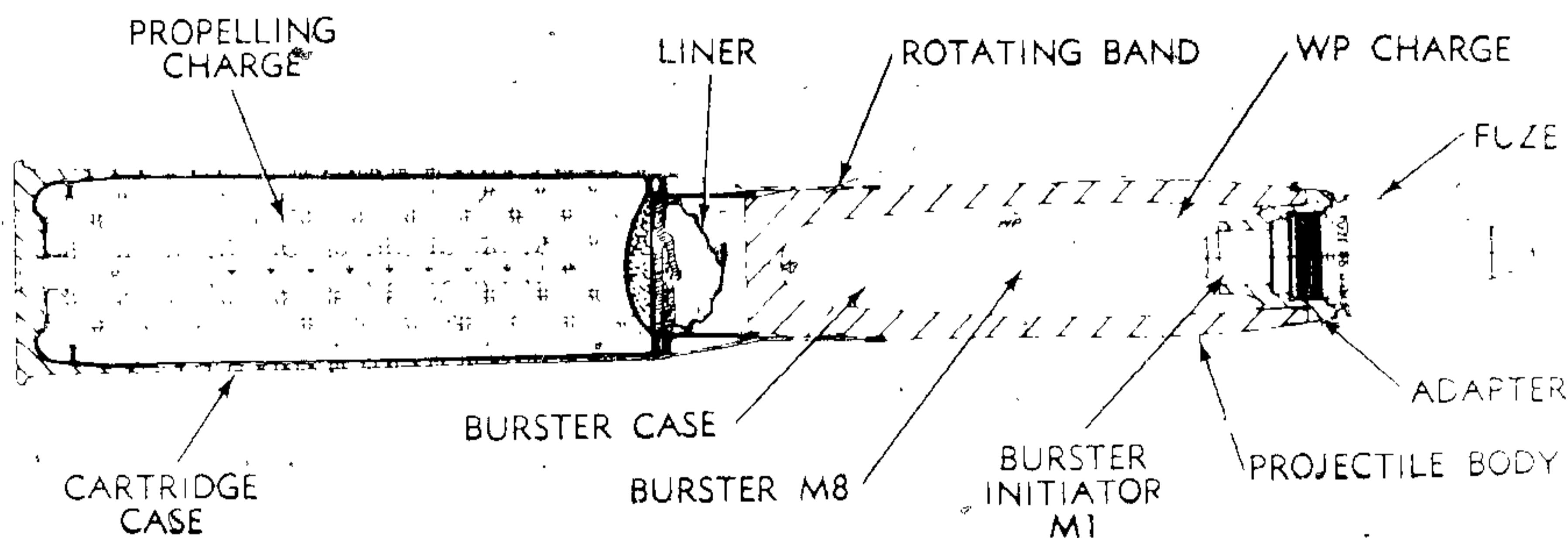
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1300-251-20

CARTRIDGE, 75-MILLIMETER: SMOKE, WP, M311A1 and M311



AR 199765



AR 199764

Type Classification:

Cont OTCM 37119 dtd 1959

Use:

This cartridge is used in 75-mm recoilless rifles for screening and spotting.

Description:

The cartridge consists of a perforated metal cartridge case containing a plastic liner which is crimped to a hollow steel projectile. The liner is filled with loose propellant and an igniter charge is positioned on top of the propellant. A percussion primer is assembled in the base of the cartridge case. The igniter tube of the primer extends through

the propelling charge. The projectile is filled with white phosphorus. The projectile has a pre-engraved rotating band near the base. Two bourrelets, one behind the ogive and one just ahead of the rotating band, provide bearing surfaces for the projectile in the weapon barrel. An adapter at the nose accommodates the burster tube and is threaded to accept the point-detonating fuze. The burster tube holds a tetryl charge and is press-fitted into the adapter to seal in the WP projectile contents.

Functioning:

The primer ignites the propelling charge when struck by the weapon firing pin. Rapidly expanding gases from the burning propellant provide the force to propel the projectile through the barrel and to the target. Recoil

is eliminated because the cartridge case design permits controlled escape of some gas pressure through apertures in the rifle breech-block. The rotating band engages the barrel rifling to spin the projectile. On impact the fuze detonates the burster charge to rupture the projectile and disperse the white phosphorous. WP ignites spontaneously on contact with air and produces a dense white smoke.

Difference Between Models:

M311 has a paper-lined cartridge case, and does not have the igniter charge on top of the propelling charge.

Tabulated Data:

Complete round:

Type -----Smoke (WP)
 Weight -----23.20 lbs.
 Length -----28.92 in.
 Cannon used with ---M20

Projectile:

Body material-----Forged steel
 Color-----Gray w/yellow band and yellow markings
 Filler and weight ---WP, 1.35 lbs.
 Burster casing-----M6: initiator M1 and burster M8, 1.01 oz. tetryl

Components:

- Cartridge case:
 M311A1-----M31A1
 M311-----M31
 Propelling charge---M10
 Primer-----M47B2 or M47
 Fuze-----PD, M48A3, M57 (MOD)

Performance:

Maximum range ----6364 m.
 Muzzle velocity----990 fps.

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 hrs./day)

* Packing ----- 1 cartridge in fiber container; 2 containers in wooden box

* Packing Box:

Weight -----73.0 lbs.
 Dimensions-----34-1/4 x 11-15/16 x 7-9/32 in.
 Cube -----1.64 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class -----5
 Storage compatibility group -----A
 DOT shipping class ----A
 DOT designation -----AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
 DODAC -----1315-C056
 Drawing number-----75-1-225

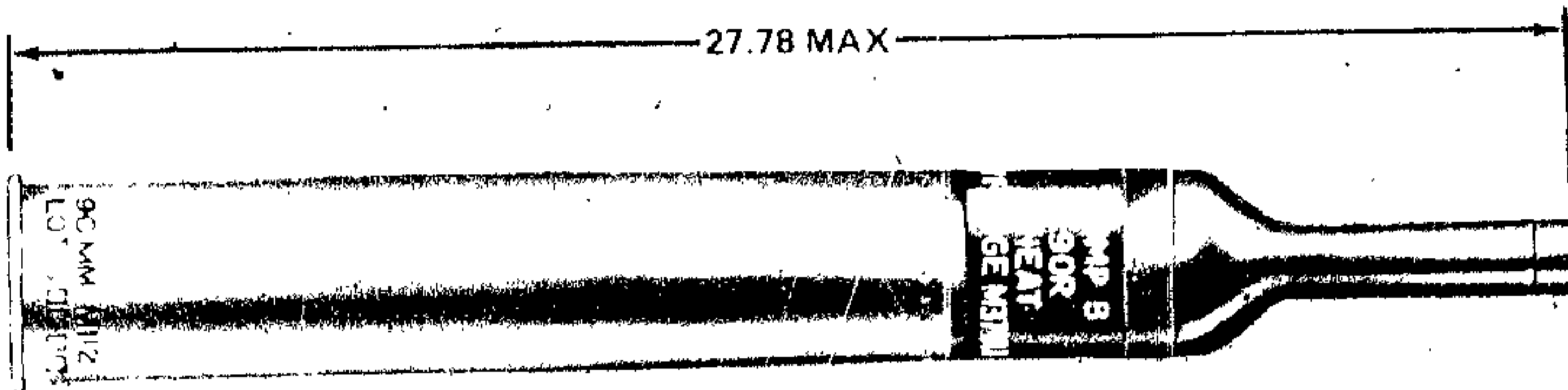
Limitations:

Rounds should be stored and transported on their bases when temperatures exceed 111.4° F, the melting point of WP, to avoid cavities in the filler.

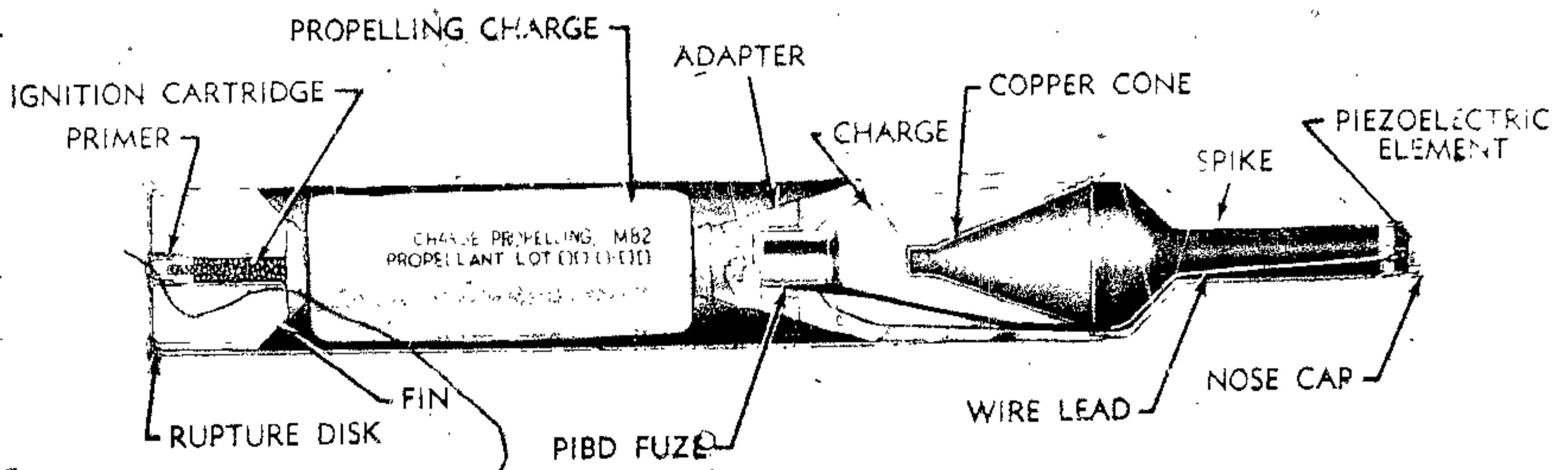
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1300-251-20

CARTRIDGE, 90-MILLIMETER: HEAT, M371A1



AR199759



AR 199758

Type Classification:

Std: AMCTC 4265 dtd 1966

Use:

This cartridge is used in 90-mm recoilless rifles and is intended primarily for defeat of armor. There is also some limited effectiveness against fixed targets and personnel through blast and fragmentation.

Description:

The cartridge consists of an aluminum cartridge case and a steel projectile containing a

shaped charge of high explosive. A percussion primer with a black powder ignition cartridge is assembled to the base of the round. A rupture disk is held in place in the base of the cartridge case by the primer. The propelling charge is contained in a bag installed around the fin assembly which contains the primer ignition cartridge. The projectile has a stand-off spike, containing a piezoelectric element and a paper insulating cup, which is threaded to the body. An internal copper cone shapes the charge. The point initiating base detaching fuze is contained in an adapter threaded to the base. The adapter is threaded to the fin assembly. The fins provide in-flight stability.

Functioning:

The primer ignites the propelling charge when struck by the firing pin of the weapon. The burning propellant generates rapidly expanding gases to propel the projectile out of the barrel and to the required velocity. Recoil is minimized by blowout of the rupture disk and controlled pressure relief through apertures in the breechblock. The projectile is stabilized in flight by the tail fins. On impact, crushing of the piezoelectric unit triggers the fuze. The standoff spike provides the optimum distance from the target surface for explosion of the shaped charge. The detonation collapses the copper cone and creates a focussed, high velocity shock wave. The intensity of the shock wave causes failure of the target armor, and a jet of metal particles penetrates the interior.

Tabulated Data:

Complete round:

Type -----HEAT
 Weight with fuze ---9.25 lbs.
 Length -----27.78 in.
 Cannon used with ---M67

Projectile:

Body material-----Steel and aluminum
 Color/
 Old mfg. -----Olive drab w/yel-
 low markings
 New mfg.-----Black w/yellow
 markings

Filler and
 weight-----Comp B, 1.72 lbs.

Components:

Cartridge case ----M112
 Propelling charge---M82
 Primer:

M371A1-----M92A1
 M371 -----M78

Fuze-----PIBD, M530A1,
 M530

Performance:

Maximum range ----400 meters
 Muzzle velocity----213 mps.

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 hrs./
 day)

*Packing----- 1 round in fiber
 container; 1 con-
 tainer in wooden
 box

*Packing Box:

Weight -----42 lbs.
 Dimensions-----32-15/16 x 9-7/8
 x 6-3/8 in.
 Cube-----1.3 cu. ft.

*NOTE: See SC for complete packing data
 including NSN's.

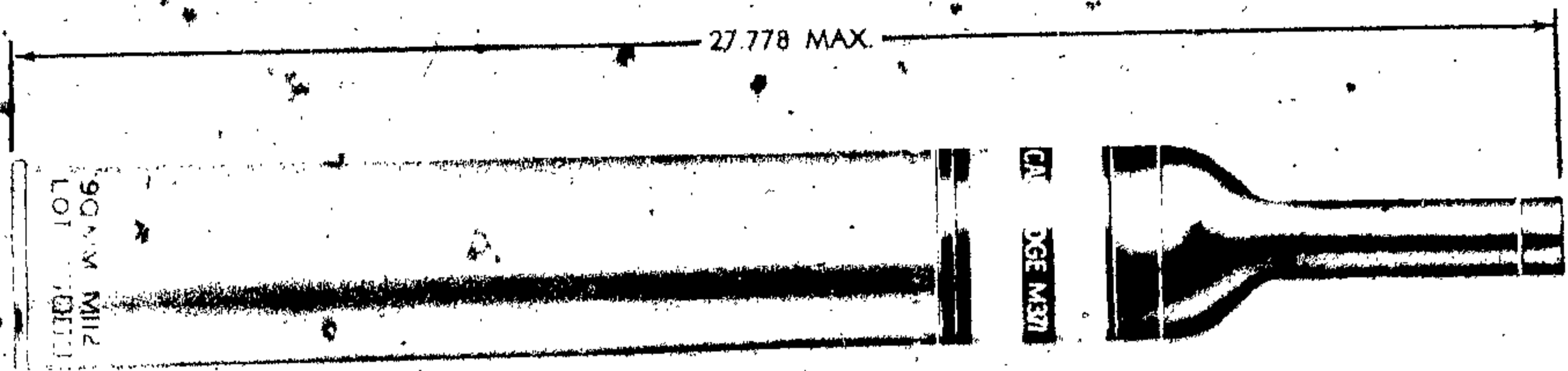
Shipping and Storage Data:

Quantity-distance
 class -----5
 Storage compatibility
 group -----E
 DOT shipping class---A
 DOT designation-----AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES.
 DODAC -----1315-C282
 Drawing number -----8863468

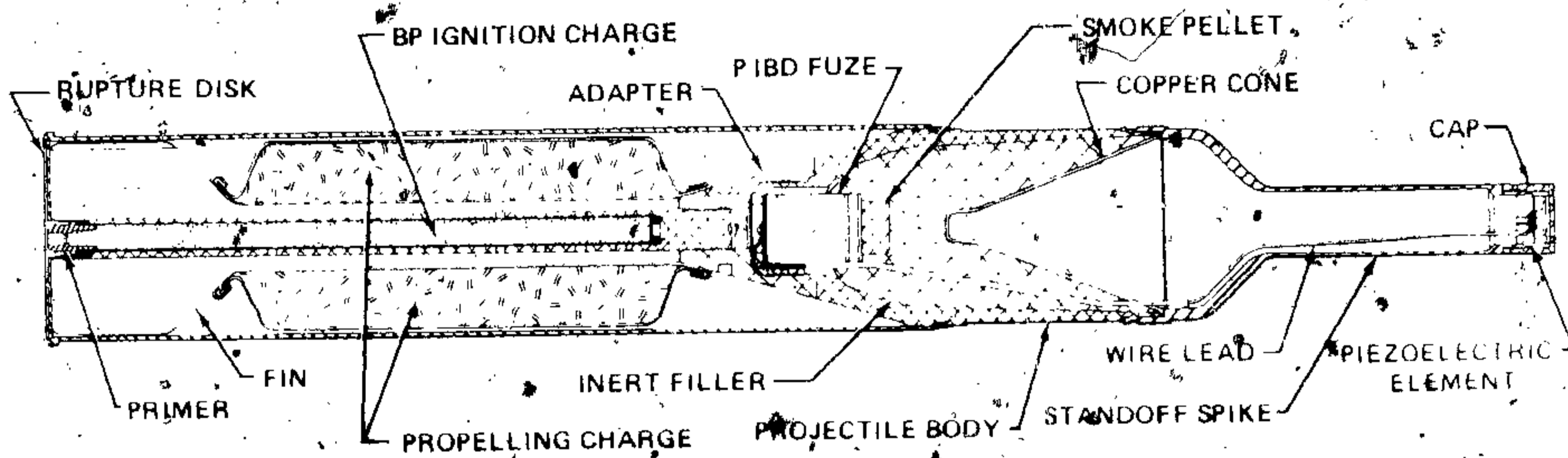
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1015-223-12
 TM 9-1300-251-20

CARTRIDGE, 90-MILLIMETER: PRACTICE, M371



AR 199757



AR 199756

Type Classification:

Std. QTCM 37136, dtd 1959

Use:

This cartridge is used to train personnel armed with the 90-mm recoilless rifles in handling and use of HEAT rounds.

Description:

The cartridge resembles 90-mm HEAT round M371A1 and has similar ballistic characteristics, except that the high explosive filler is replaced with inert material of the same weight. A standoff spike with piezoelectric element in the nose cap is threaded to the nose of the projectile, and an adapter and fin are threaded to the base. The point initiating, base detonating fuze is housed in the adapter and a

smoke pellet is installed immediately ahead of the fuze. A copper cone in the projectile shapes the inert filler to maintain a ballistic match with the service round. The bagged propellant in the cartridge case surrounds the fin. The base of the cartridge case holds a percussion primer and a rupture disk. The black powder ignition charge of the primer is contained within the fin.

Functioning:

When the firing pin of the weapon strikes the primer, it ignites the propelling charge. The burning propellant generates rapidly expanding gases to propel the projectile out of the barrel and to the target. The fin stabilizes the projectile in flight. On impact, distortion of the piezoelectric element induces an electric current to function the PIBD fuze and ignite the smoke pellet for marking.

Tabulated Data:

Complete round:

Type ----- Practice.
Weight ----- 9.25 lbs.
Length ----- 27.778 in.
Cannon used with ----- M67

Projectile:

Body material ----- Aluminum alloy
Color ----- Blue or black *
 w/white markings
Filler and weight ----- Inert Ex 1.79 lbs.
 Pellet Mox 2B

Components:

Cartridge case ----- M112
Propelling charge ----- XM82
Primer ----- XM92
Fuze ----- PIBD, M530

Performance:

Effective range ----- 400 m.
Muzzle velocity ----- 213 mps.

Temperature Limits:

Firing:

Lower limit ----- - 40° F
Upper limit ----- + 125° 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 ----- 1 round in fiber
 container; 2 con-
 tainers in wooden
 box

*Packing Box:

Weight ----- 47 lbs.
Dimensions ----- 32-15/16 x 9-7/8
 x 6-3/8 in.
Cube ----- 1.3 cu. ft.

*NOTE: See SC for complete packing data
including NSN's.

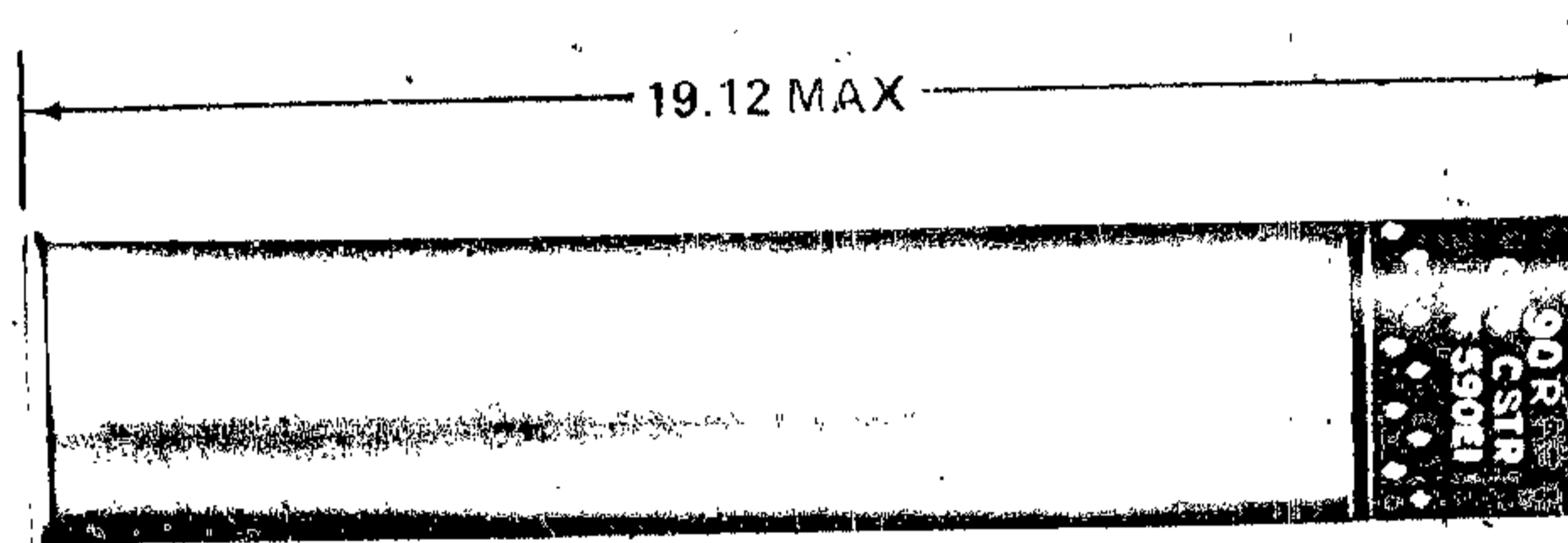
Shipping and Storage Data:

Quantity-distance
class ----- 5
Storage compatibility
group ----- E
DOT shipping class ----- A
DOT designation ----- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES
DODAC ----- 1315-C283
Drawing number ----- 8865243

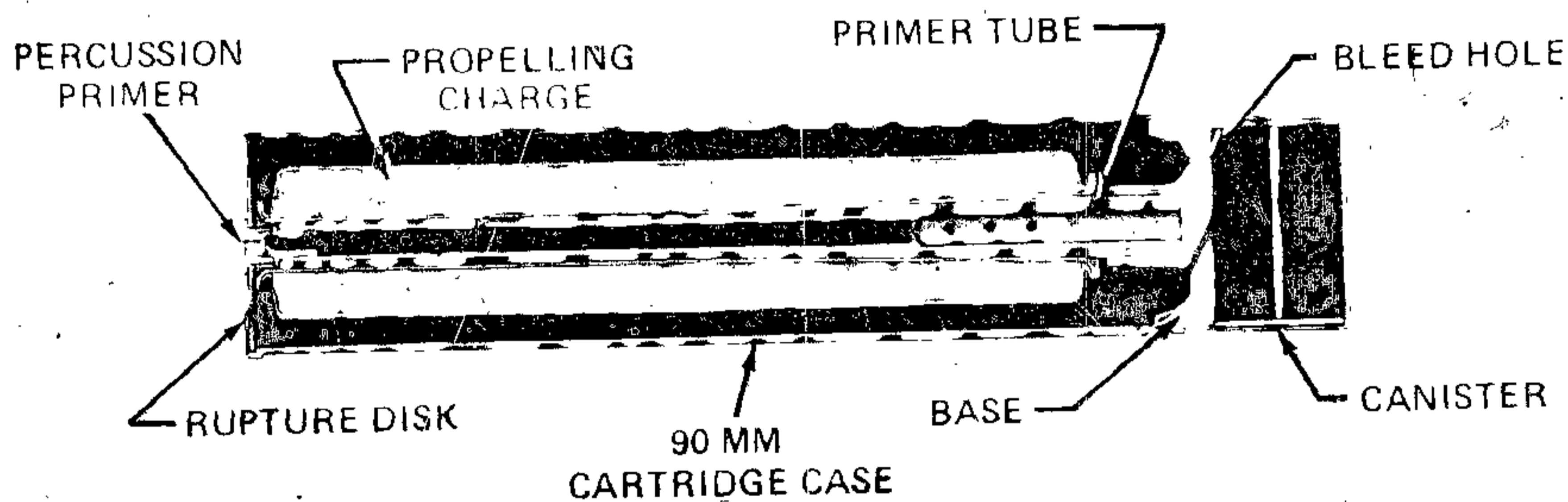
References.

SC 1305/30-IL
SB 700-20
AMCP 700-3-3
TM 9-1013-223-12
TM 9-1300-251-20

CARTRIDGE, 90 MILLIMETER CANISTER, ANTIPERSONNEL, M596 (XM590E1)



AR199761



AR199760

Type Classification:

Std AMCTC 8601 dtd 1971

Use:

This cartridge is used in 90-mm recoilless rifles for close-in defense against massed attack by infantry, or for attacking enemy troops concealed by vegetation.

Description:

The cartridge consists of an aluminum cartridge case crimped to an aluminum canister filled with steel flechettes. The cartridge case is perforated and the base contains a rupture disk. A percussion primer is assembled through the rupture disk into a perforated flash

tube that is threaded into the base of the cartridge. The cartridge case is filled with a base propellant in a silk bag arranged around the primer tube. The canister projectile has a blunt forward end and a heavy aluminum base with three bleed holes to the cartridge case. The sides are scored to facilitate splitting when the round is fired.

Functioning:

The primer ignites the propellant when struck by the firing pin of the weapon. The burning propellant generates rapidly expanding gases to propel the canister out of the case. Recoil is minimized by blowout of the rupture disk in the base and controlled pressure release through apertures in the breechblock.

the same time, the bleed holes in the canister base permit gas pressure to build up inside the canister. When the projectile leaves the muzzle, the pressure ruptures the canister along the score marks to release the flechettes.

Tabulated Data:

Complete round:

Type -----Cnstr anti-personnel
 Weight -----6.79 lbs.
 Length -----19.12 in.
 Cannon used with ---M67

Projectile:

Body material-----Aluminum
 Color -----Olive drab w/white markings and white diamonds

Filler and weight -----2400 flechettes; 2.5 lbs.

Components:

Cartridge case -----M112
 Propelling charge -----M178
 Primer-----M92A1

Performance:

Effective range-----200 meters
 Muzzle velocity -----1200 fps

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 hrs./day)

*Packing ----- 1 round in fiber container; 6 containers in wire-bound box

* Packing Box:

Weight -----58 lbs.
 Dimensions-----22-5/8 x 13-1/2 x 10-1/16 in.
 Cube-----1.8 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class -----4
 Storage compatibility group -----E
 DOT shipping class-----A
 DOT designation -----AMMUNITION FOR CANNON WITH SOLID PROJECTILES
 DODAC -----1315-C410
 Drawing number -----9214567

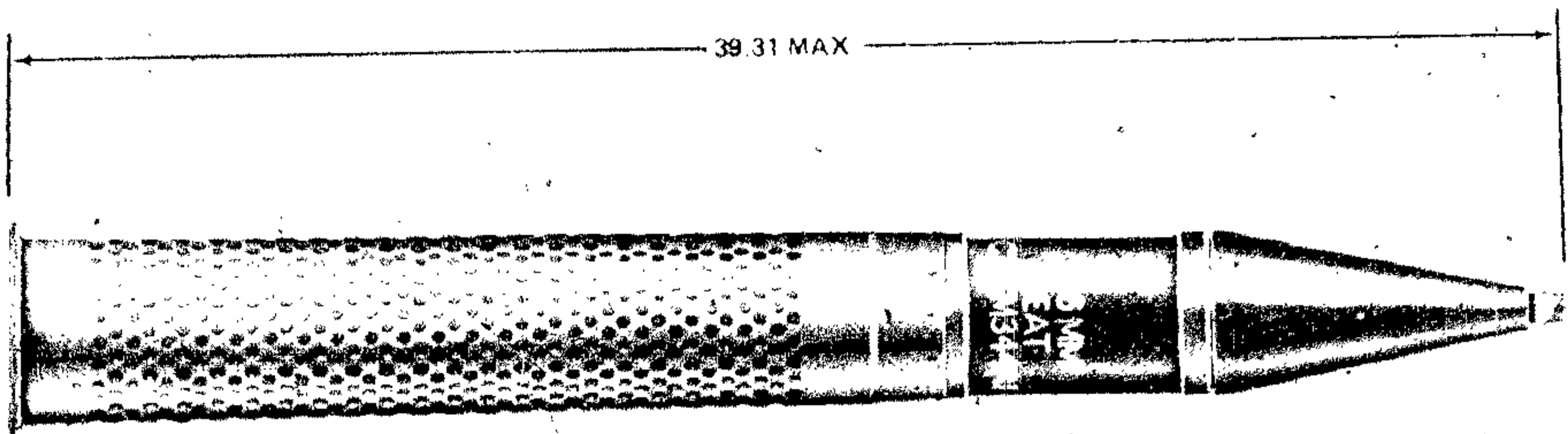
Limitations:

Canister may not be fired overhead of friendly troops.

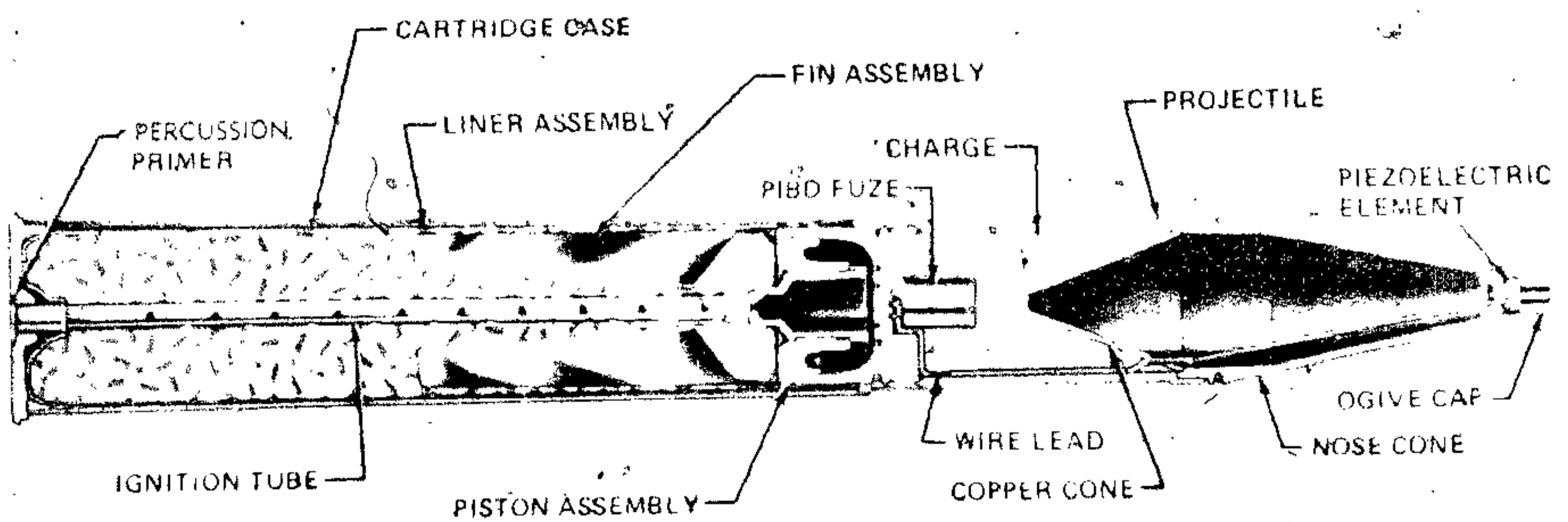
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1015-223-12
 TM 9-1300-251-20

CARTRIDGE, 106-MILLIMETER: HEAT, M344A1 AND M344



AR199753



AR199752

Type Classification:

Std OTCM 37119 dtd 1958

Use:

This cartridge is used in 106-mm recoilless rifles against armored targets.

Description:

The cartridge consists of a perforated, plastic-lined steel cartridge case crimped to a steel projectile containing a shaped charge. The nose cone adapter of the projectile carries a cap with a piezoelectric element to initiate the PIBD fuze in the base. A copper cone within the projectile shapes the charge. The hollow

space within the cone and the adapter provides the appropriate standoff distance between target and shaped charge. A steel adapter threaded to the base of the projectile supports the fuze, six folding fins, and a piston assembly for opening the fins. The cartridge case is loosely filled with propellant, and the base is filled with a percussion primer. The ignition tube of the primer extends through the propelling charge

Functioning:

The primer ignites the propelling charge when struck by the firing pin. The burning propellant generates rapidly expanding gases to propel the projectile through the barrel and to the target. Recoil is eliminated by controlled escape of propellant gases to the rear.

through openings in the breechblock. Gas pressure also builds up in the piston in the projectile base. When the projectile leaves the muzzle, the piston moves rearward to extend the fins for stability in flight. On impact, distortion of the piezoelectric element generates an electrical charge and initiates fuze functioning to detonate the projectile. Explosion of the shaped charge collapses the copper cone and focuses a high velocity shock wave and a jet of metal particles that penetrates the target.

Difference Between Models:

M344 has a propelling charge of 8.1 lbs. M10, and the design of the projectile charge-shaping cone is different from M344A1.

Tabulated Data:

Complete round:

Type ----- HEAT
 Weight ----- 37.23 lbs.
 Length ----- 39.31 in.
 Cannon used with ---- M40A1, M40A1C
 Projectile:
 Body material ----- Steel
 Color:
 Old mfg. ----- Olive drab w/yel-
 low markings
 New mfg. ----- Black w/yellow
 markings
 Filler and weight ---- Comp. B, 2.79 lbs.

Components:

Cartridge case:
 M344A1 ----- M94B1
 M344 ----- M93 or M93B1
 Propelling
 charge ----- M26 (M344A1)
 M10 (M344)
 Primer ----- M57
 Fuze ----- PIBD, M509A1

Performance:

Maximum range --- 3000 m.
 Muzzle velocity --- 502.9 mps

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
 hrs./day).

* Packing ----- 1 round in fiber
 container; 2 con-
 tainers in wooden
 box

* Packing Box:

Weight ----- 120 lbs.
 Dimensions ----- 45-1/16 x 12-5/8
 x 7-11/16
 Cube ----- 2.5 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

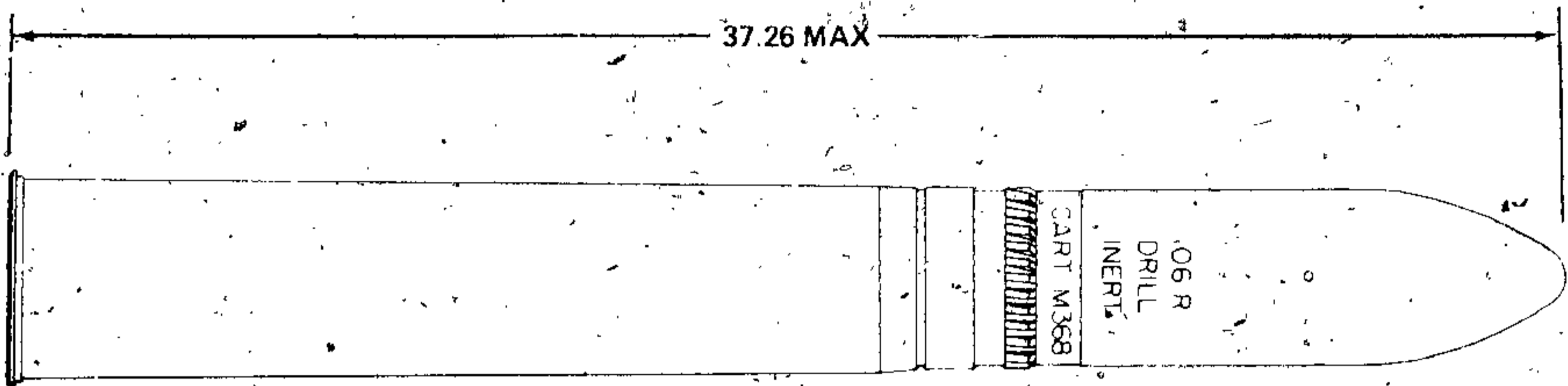
Shipping and Storage Data:

Quantity-distance
 class ----- 5
 Storage compatibility
 group ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES
 DODAC ----- 1315-C650
 Drawing number ----- 7549097 (M344A1)
 75-1-319 (M344)

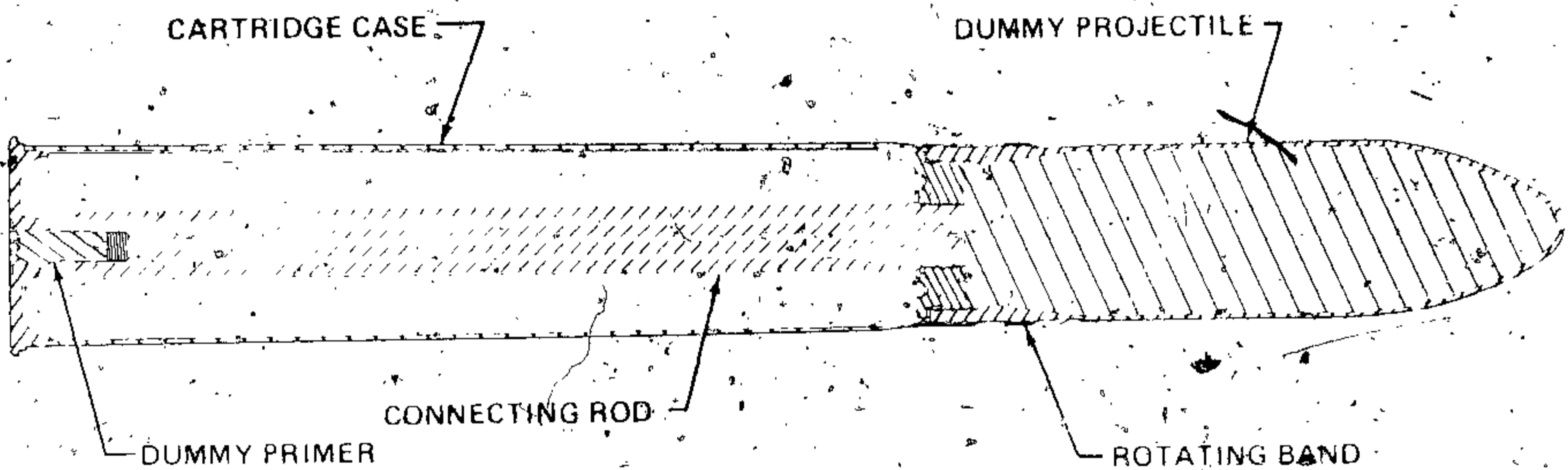
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1000-205-12
 TM 9-1300-251-20

CARTRIDGE, 106-MILLIMETER: DUMMY, M368



AR199751



AR199750

Type Classification:

Std OTCM 36685 dtd 1958

Use:

This cartridge is used to train gun crews in loading and unloading ammunition for 106-mm recoilless rifles.

Description:

The cartridge simulates HEP-T Cartridge M346A1, but because it is a drill round is completely inert and contains no propellant. A dummy cartridge case is crimped to a dummy projectile, and the components are further connected by a metal rod threaded into the base plug of the dummy projectile on one end and

onto a dummy primer in the base of the cartridge case. A preengraved rotating band encircles the dummy projectile near the base for engagement with the barrel rifling of the weapon.

Functioning:

The round has no function other than practice loading.

Tabulated Data:

Complete round:	
Type -----	Dummy
Weight -----	37.93 lbs.
Length -----	37.26 in.
Cannon used with ----	M40A1, M40A1C

Projectile:

Body material-----Steel
 Color:
 Old -----Black or blue
 w/white markings
 New -----Bronze w/white
 markings
 Filler and
 weight -----Filler E, 7.75 lbs.
 Cartridge case -----M94B1
 Primer-----Dummy

*Packing -----1 round in fiber
 container; 2 con-
 tainers in wooden
 box

*Packing Box:
 Weight -----127.6 lbs.
 Dimensions-----44-5/8 x 12-13/16
 x 7-31/32 in.
 Cube-----2.6 cu. ft.

*NOTE: See SC for complete packing data
 including NSN's.

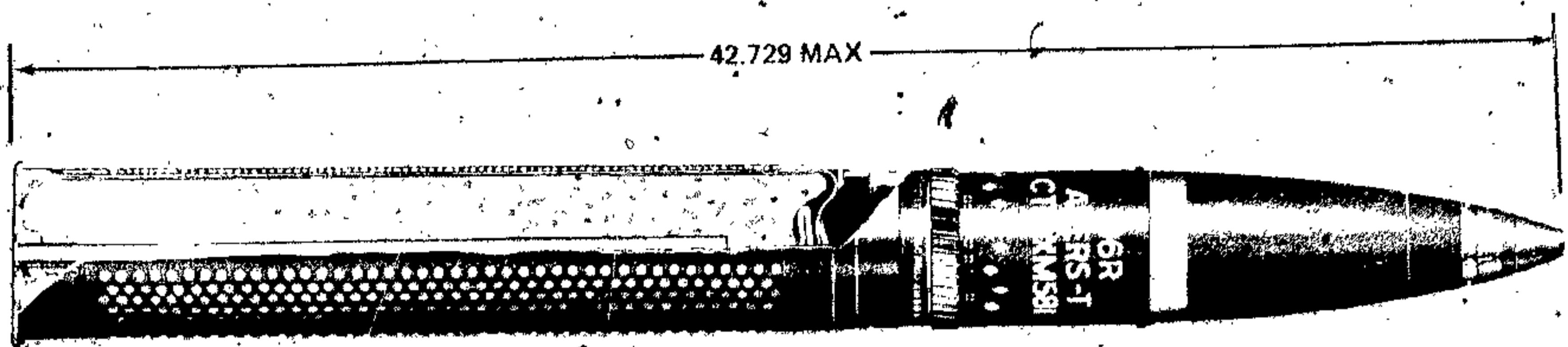
Shipping and Storage Data:

DOT designation -----AMMUNITION NON
 EXPLOSIVE
 DODAC -----1315-C654
 Drawing number -----8596153

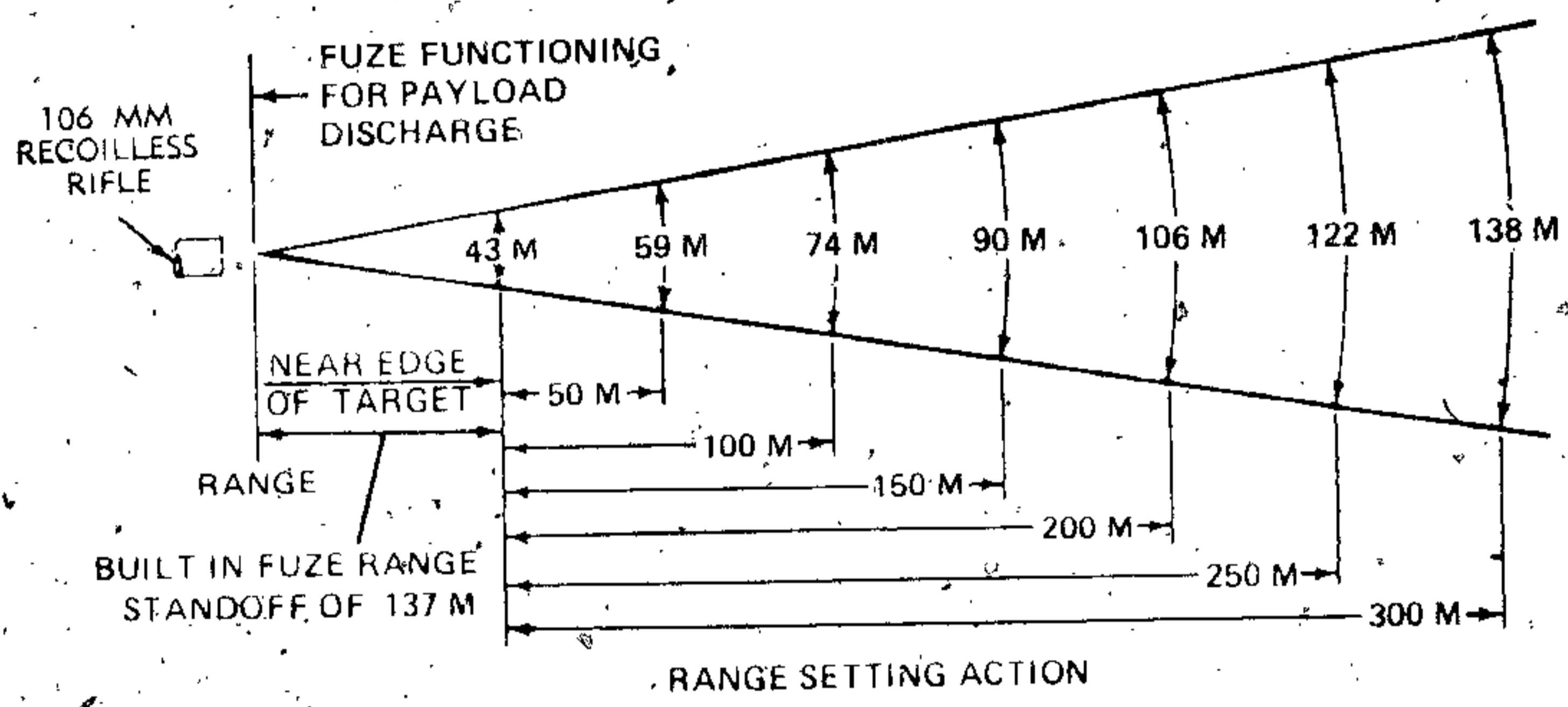
References:

SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1000-205-12
 TM 9-1300-251-20

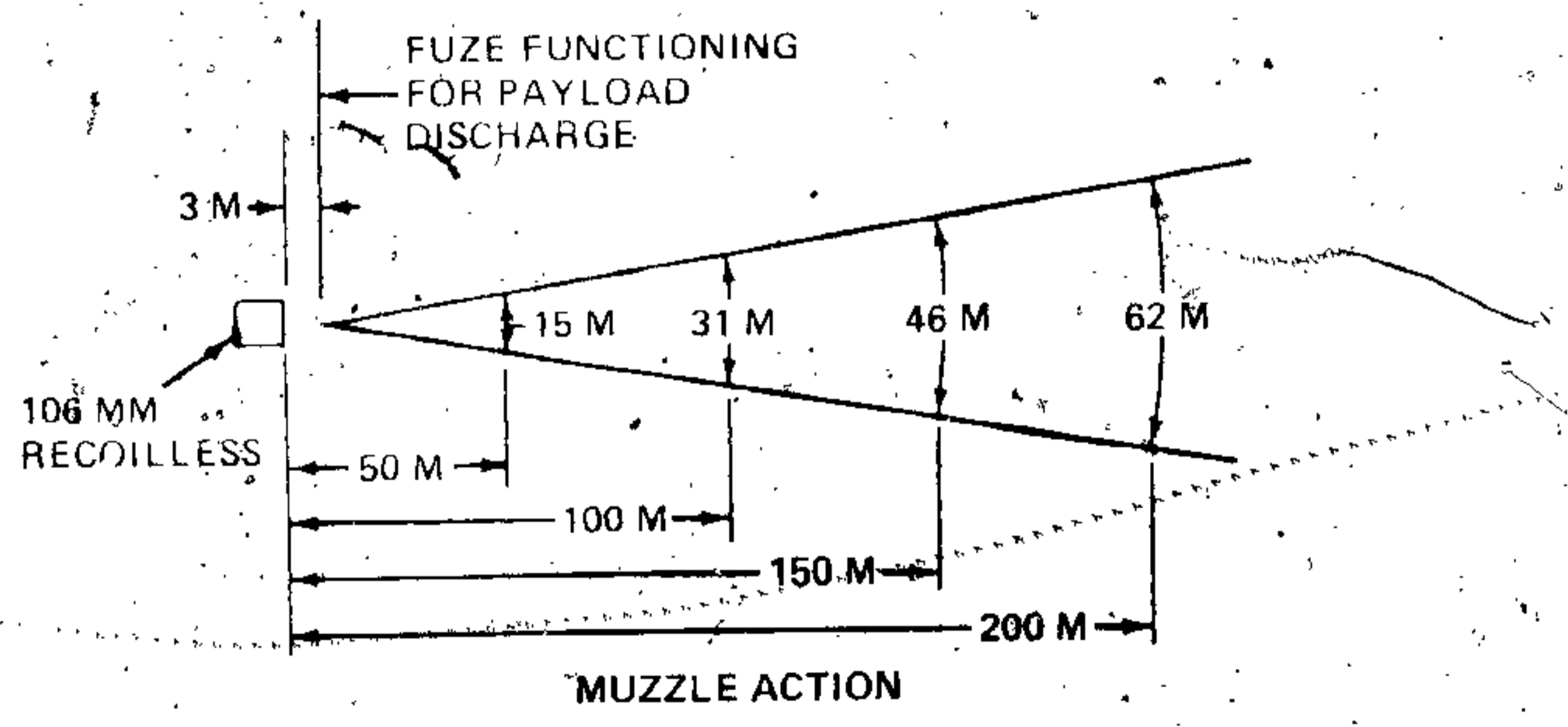
CARTRIDGE, 106-MILLIMETER: APERS-T, M581



AR199755



AR199754



AR199725

Type Classification:

Std AMCTC 8416 dtd 1971

Use:

This cartridge is fired from 106-mm recoilless rifles to cause personnel casualties.

Description:

A perforated metal cartridge case is crimped to a projectile fitted at the nose with a fuze adapter. The propelling charge is contained within a plastic cartridge case liner.

The base of the cartridge case contains a percussion primer with the igniter tube extending through the propelling charge. The projectile is loaded with 8 gram flechettes packed in separate bays, and also carries yellow dye marker in the two aft bays. The fuze adapter is equipped with four radially-spaced detonators for splitting the projectile. A fifth detonator with relay charge is installed for igniting an expelling charge in the base through a flash-tube formed by the flechette bays. Two indexing buttons are provided on the forward bour-relet to facilitate indexing of the pre-engraved rotating band with the barrel rifling of the weapon. A tracer is threaded into the base of the projectile.

Functioning:

The primer ignites the propelling charge when struck by the firing pin of the rifle. The burning propellant ignites the tracer and generates rapidly expanding gases to propel the projectile through the barrel. Spin is provided by the rotating band for stability in flight, and trajectory visibility is provided by the tracer. Recoil is eliminated by controlled escape of propellant gases to the rear through openings in the breechblock. The fuze commences arming immediately upon firing, and will function on muzzle action or range, according to the setting. When the fuze functions, the four radial detonators in the adapter rupture the shell case. Simultaneously, the axial detonator and relay explode the expelling charge in the base. The combination of forward force and centrifugal force from rotation results in a conical forward dispersion of flechettes. The yellow dye marks the function point.

Tabulated Data:

Complete round:

Type ----- Apers
 Weight ----- 41.29 lbs.
 Length ----- 42.729 in.
 Cannon used with ----- M40A1

Projectile:

Body material ----- Aluminum and steel
 Color:
 Old mfg. ----- Black w/white markings
 New mfg. ----- Olive drab w/yellow band and white markings

Filler and weight:

Flechettes ----- 10.9 lbs.
 Expelling charge ----- M9, 1.23 oz. flake propellant
 Yellow dye ----- 11 grams
 Detonators ----- (4) M86 (XM86); (1) XM87 with relay M7

Components:

Cartridge case ----- M94B1
 Propelling charge --- M26
 Primer ----- M57
 Tracer ----- M13
 Fuze ----- MT, M592

Performance:

Maximum range ----- 3,300 m.
 Muzzle velocity ----- 438 mps.

Temperature Limits:

Firing:
 Lower limit ----- - 40° F
 Upper limit ----- + 125° 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 ----- 1 round fiber container; 2 containers in wooden box

*Packing box:

Weight ----- 134 lbs.
 Dimensions ----- 49-5/8 x 13 x 8-1/4 in.
 Cube ----- 2.9 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 5
 Storage compatibility group ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
 DODAC ----- 1315-C660
 Drawing number ----- 9210603

Limitations:

Firing overhead of exposed friendly troops is prohibited.

References:

- SC 1305/30-IL
- SB 700-20
- AMCP 700-3-3
- TM 9-1000-205-12
- TM 9-1300-251-20

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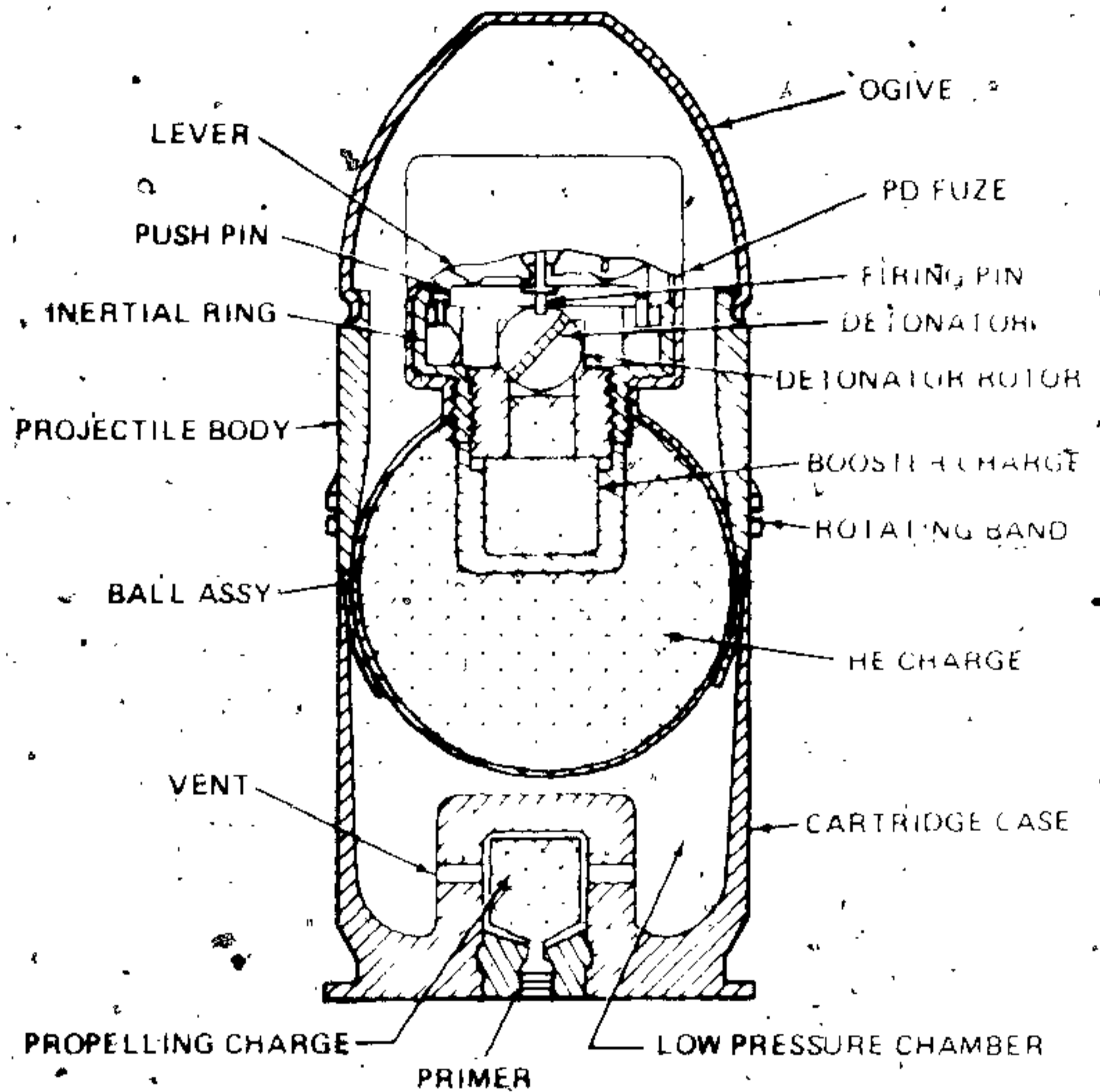
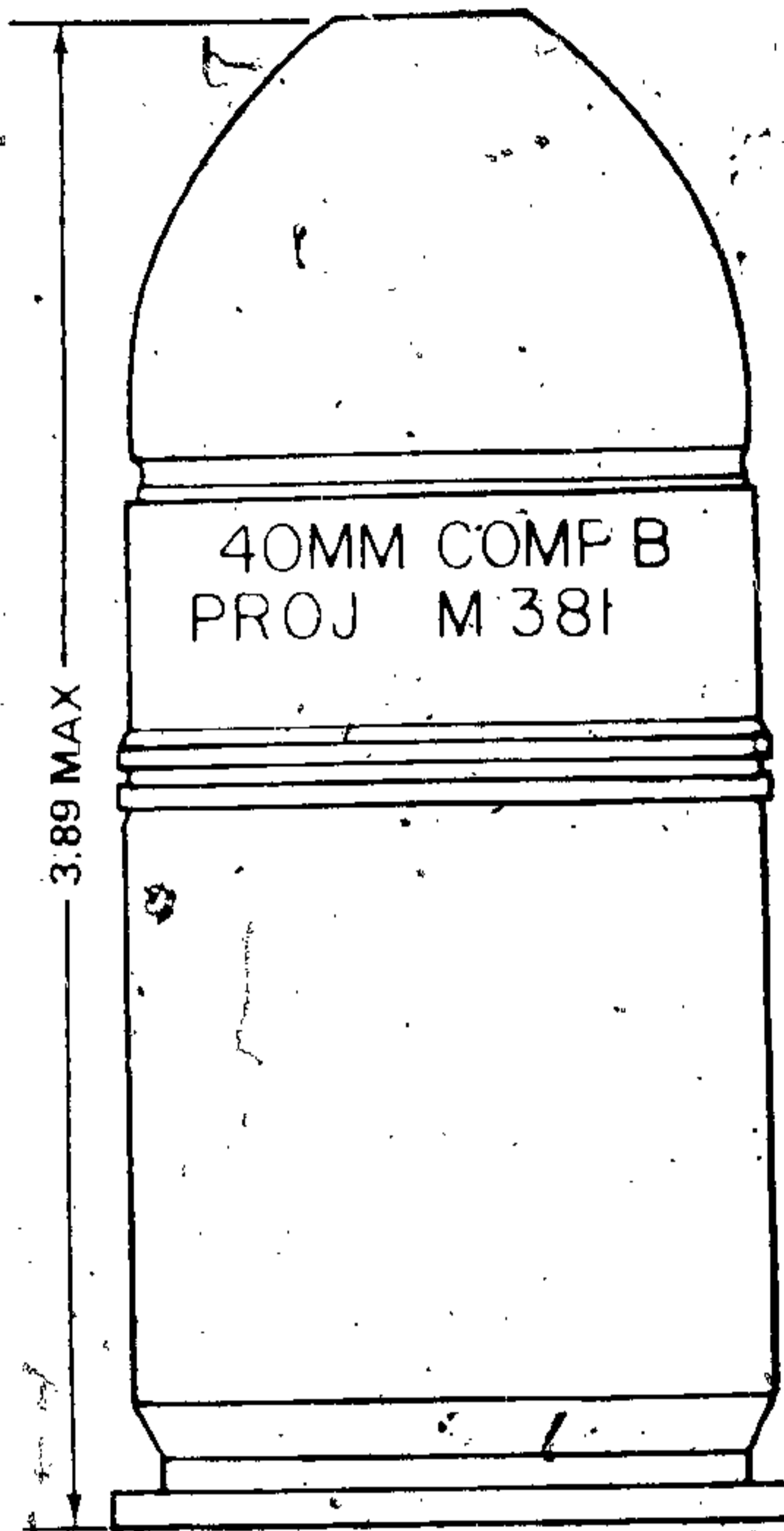
TM 43-0001-28

CHAPTER 6

AMMUNITION FOR GRENADE LAUNCHERS

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CARTRIDGE, 40-MILLIMETER: HE, M381.



AR199575

AR199576

Type Classification:

Std AMCTC 9392 dtd 1972

Use:

This cartridge is a high explosive round designed to inflict personnel casualties from ground burst effect, and is fired from 40-mm Grenade Launcher M79 or the M203 (attached to the M16/M16A1 rifle).

Description:

The cartridge is a fixed round of ammunition consisting of a projectile assembly and a cartridge case assembly. The projectile has a hollow, one-piece aluminum body containing rotating bands. A hollow aluminum ogive is fitted

to the front end of the projectile. A hollow steel ball assembly containing the bursting charge is fitted into the rear of the projectile body. A booster charge with a PD fuze is threaded into a well in the forward side of the ball. The projectile assembly is press-fitted into a cartridge case. The case is a hollow, aluminum, two-chambered cylinder with an annealed brass propellant cup fitted into the cartridge base. The cup contains the propelling charge with a percussion primer in the center. The cup acts as a high-pressure chamber and the hollow cavity in the case, which surrounds the cup, acts as a low-pressure chamber. The fuze contains an inertial ring operating through push pins and levers upon a detonator.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge in the high-pressure chamber. The burning propelling charge generates sufficient pressure to rupture the propellant cup forcing the expanding gases through vent holes into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher tube to impart spin of 3600 RPM to the projectile. The pressure created by the expanding propellant gases in the low-pressure chamber forces the projectile through the launcher barrel with a muzzle velocity of 76 meters per second (250 fps). Setback force from firing causes the firing pin in the fuze to be withdrawn from the rotor ball detent, and centrifugal force from projectile rotation causes the rotor ball assembly to align the detonator with the explosive train. The fuze arms after the projectile has traveled approximately 2.4 to 3 meters (8 feet) from the launcher. Upon graze or impact with the target, inertia causes the inertial ring to act on the push pins, pivoting the levers inward to force the firing pin into the detonator. The detonator ignites the booster charge, and the booster detonates the explosive charge, producing blast and fragmentation of the projectile body.

Fabulated Data:

Complete round:

Type ----- HE
 Weight ----- 0.503 lbs
 Length ----- 3.89 in.
 Weapons used with ----- 40-mm Grenade Launchers M79 and M203 (attached to M16/M16A1 rifle)

Projectile:

Body material ----- Aluminum skirt and steel wire ball
 Color ----- Olive drab w/yellow markings & yellow ogive
 Filler ----- Composition B, 32 grams
 Fuze ----- PD, M552

Propelling charge:

Cartridge case ----- M118
 Propellant ----- M9, 330 mg.
 Primer ----- Perc., M42

Performance:

Maximum range ----- 400 meters
 Muzzle velocity ----- 76 mps (250 fps)

Temperature Limits:

Firing:

Lower limit ----- -45°F (-42.8°C)
 Upper limit ----- +125°F (51.6°C)

Storage:

Lower limit ----- -65°F (-53.8°C)
 Upper limit ----- +165°F (73.9°C)

*Packing ----- 6 rounds in bandoleer; 12 bandoleers (72 rounds) per wooden box

*Packing Box:

Weight ----- 54 lbs. (24.5 kg)
 Dimensions ----- 17-3/4 x 14-1/8 x 11-15/32 in.
 (45.0 x 36.2 x 29.3 cm)
 Cube ----- 1.7 cu. ft. (.0475m³)

*NOTE: See SC for complete packing data including NSN's.

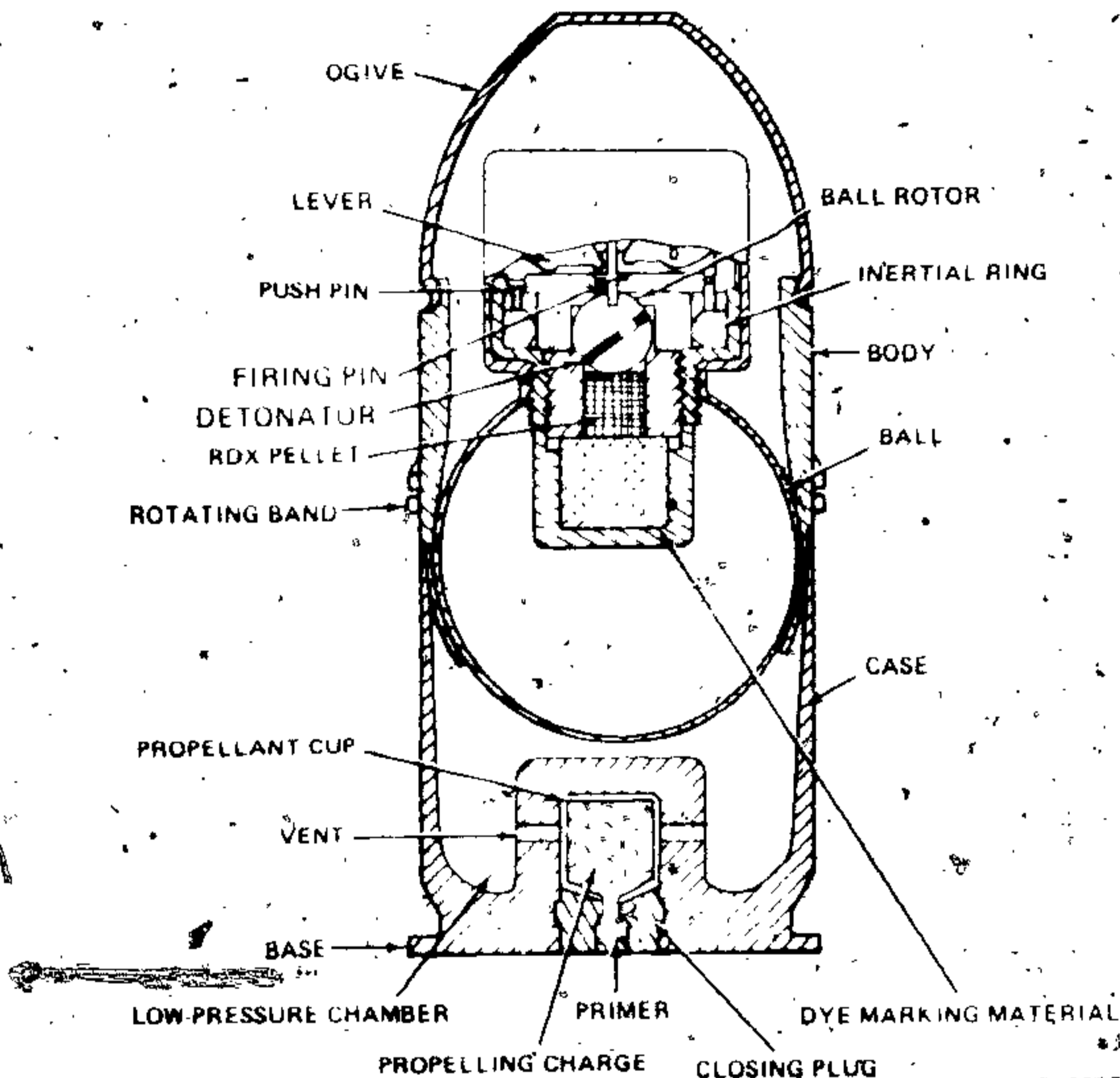
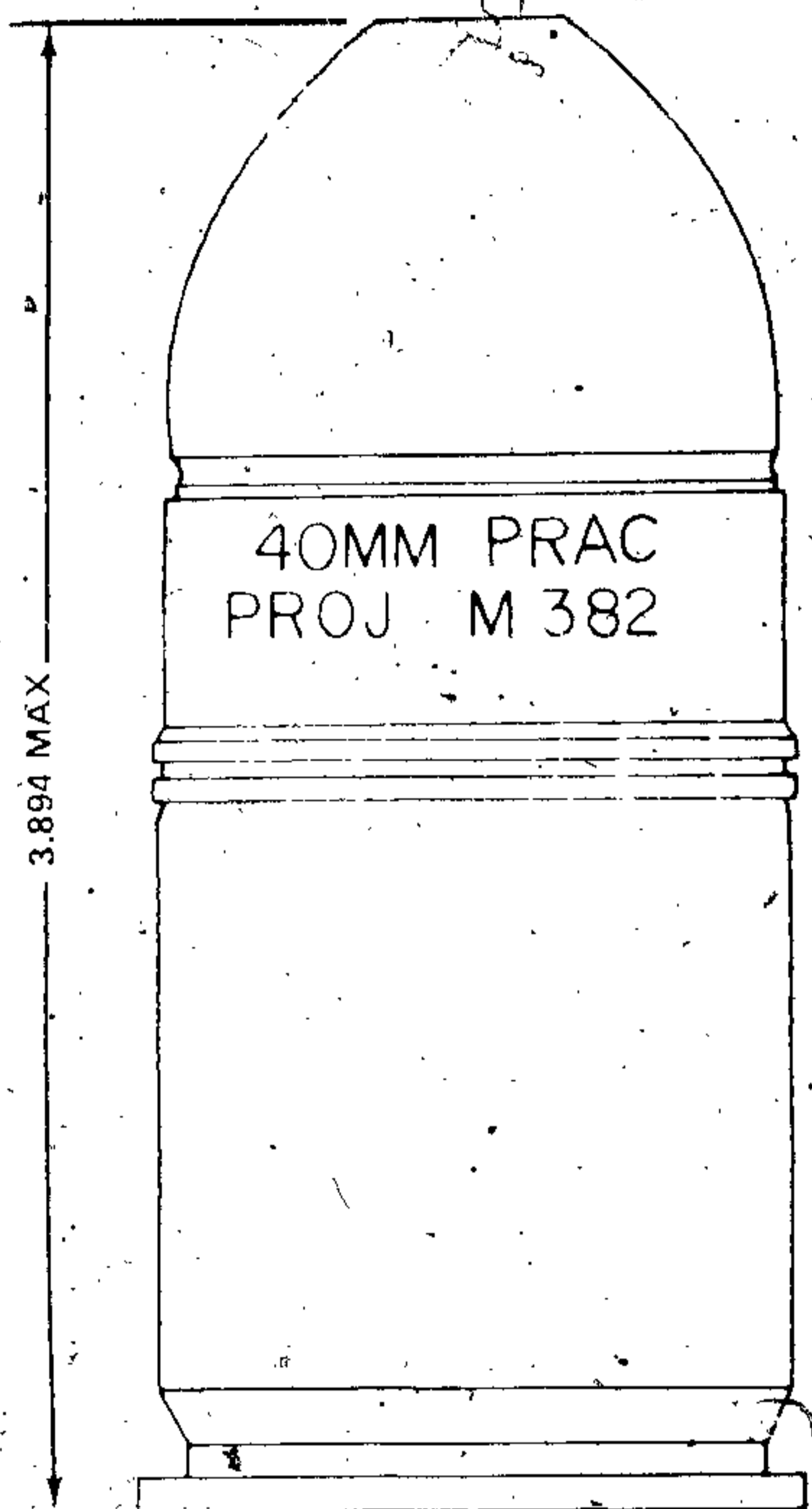
Shipping and Storage Data:

Quantity-distance class - 4
 Storage compatibility group ----- E
 DOT shipping class ----- A
 DOT designation -- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
 DODAC ----- 1310-B568
 Cartridge drawing number ----- 8835941
 Packing drawing numbers ----- 8835104, 8835105

References:

SC 1305/30-IL
 SB 700-20
 TM 9-1005-249-10
 TM 9-1010-205-10
 TM 9-1010-221-10

CARTRIDGE, 40-MILLIMETER: PRACTICE, M382



AR199574

Type Classification:

Std AMCTC 2681 dtd 1964

Use:

This cartridge is a practice impact type round fired from 40-mm Grenade Launchers M79 or the M203 (attached to the M16/M16A1 rifle).

Description:

This cartridge is a fixed round of ammunition consisting of a projectile body and a cartridge case assembly containing a propelling charge and a percussion primer. A hollow,

aluminum ogive is fitted to the front end of the projectile. Fitted in the rear of the projectile is a hollow steel ball assembly containing a yellow dye marking material. An RDX booster pellet with a PD fuze assembly is threaded into a cavity at the forward side of the ball assembly. The projectile assembly is press-fitted into the cartridge case. The case is a hollow aluminum bichambered cylinder with an annealed brass propellant cup assembly fitted into the center of the cartridge base. The cup contains the propelling charge with a percussion primer in the center and acts as a high-pressure chamber. The hollow cavity in the case, which surrounds the cup, acts as a low-pressure chamber. The fuze contains an inertial ring operating through push pins and levers on the firing pin.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge in the high pressure chamber. The burning propelling charge generates sufficient pressure to rupture the propellant cup and to force the expanding gases from the burning propellant through vent holes into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher tube imparting a spin of 3600 rpm to the projectile and a muzzle velocity of 76 mps. The pressure created by the expanding propellant gases in the low-pressure chamber forces the projectile through the launcher barrel. After the projectile leaves the launcher tube, setback force causes the firing pin in the fuze to be withdrawn from the ball detent, and centrifugal force created by rotation of the projectile causes the rotor ball assembly to align the detonator with the explosive train. The fuze arms after the projectile has traveled approximately 2.4 to 3 meters (8 feet) from the launcher. Upon graze or impact with the target, the inertial force from impact causes the inertial ring to act on the push pins, pivoting the levers inward, and forcing the firing pin into the detonator. The detonator explodes the RDX-booster pellet which shatters the chamber and emits a yellow puff of smoke to simulate the explosion of a service round.

Tabulated Data:

Complete round:

Type ----- **Practice**
 Weight ----- **.50 lb**
 Length ----- **3.89 in.**
 Weapon used with ----- **40-mm Grenade Launchers M79, M203 (attached to M16/M16A1 rifle)**

Projectile:

Body material ----- **Aluminum skirt and steel ball.**
 Color ----- **Olive drab w/yellow markings**

Filler and weight ----- **Yellow dye, 4.54 grams (inert)**

Fuze ----- **PD, M552**

Propelling charge:

Cartridge case ----- **M118**

Propellant ----- **M9, 330 mg.**

Performance:

Maximum range ----- **400 meters**

Muzzle velocity ----- **76 mps (250 fps)**

Temperature Limits:

Firing:

Lower limit ----- **-45°F (-42.8°C)**

Upper limit ----- **+125°F (51.6°C)**

Storage:

Lower limit ----- **-65°F (-53.8°C)**

Upper limit ----- **+165°F (73.9°C)**

***Packing**

----- **72 rounds per bandoleer; 12 bandoleers (72 rounds) per wooden box**

***Packing Box:**

Weight ----- **54 lbs. (24.5 kg)**

Dimensions ----- **17-3/4 x 14-1/8 x 11-15/32 in. (45.0 x 36.2 x 29.3 cm)**

Cube ----- **1.7 cu ft (0.0475 m³)**

***NOTE: See SC for complete packing data including NSN's.**

Shipping and Storage Data:

Quantity-distance class - 1

Storage compatibility

group ----- **B, E, N**

DOT shipping class ----- **B**

DOT designation ----- **SMALL ARMS AMMUNITION**

DODAC ----- **1310-B577**

Cartridge drawing

number ----- **8844607**

Packing drawing

number ----- **8835104, 8835105**

References:

SC 1305/30-IL

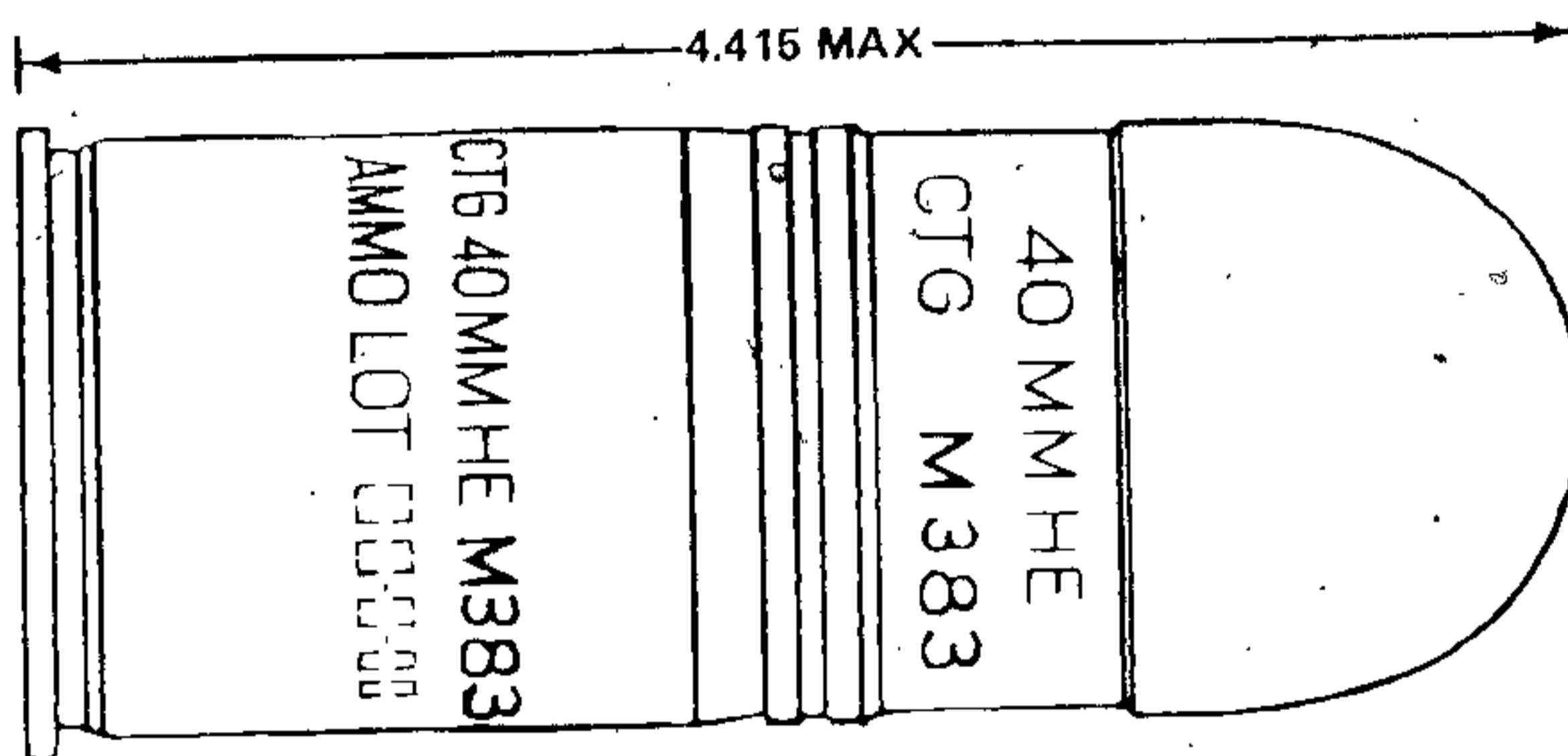
SB 700-20

TM 9-1010-205-10

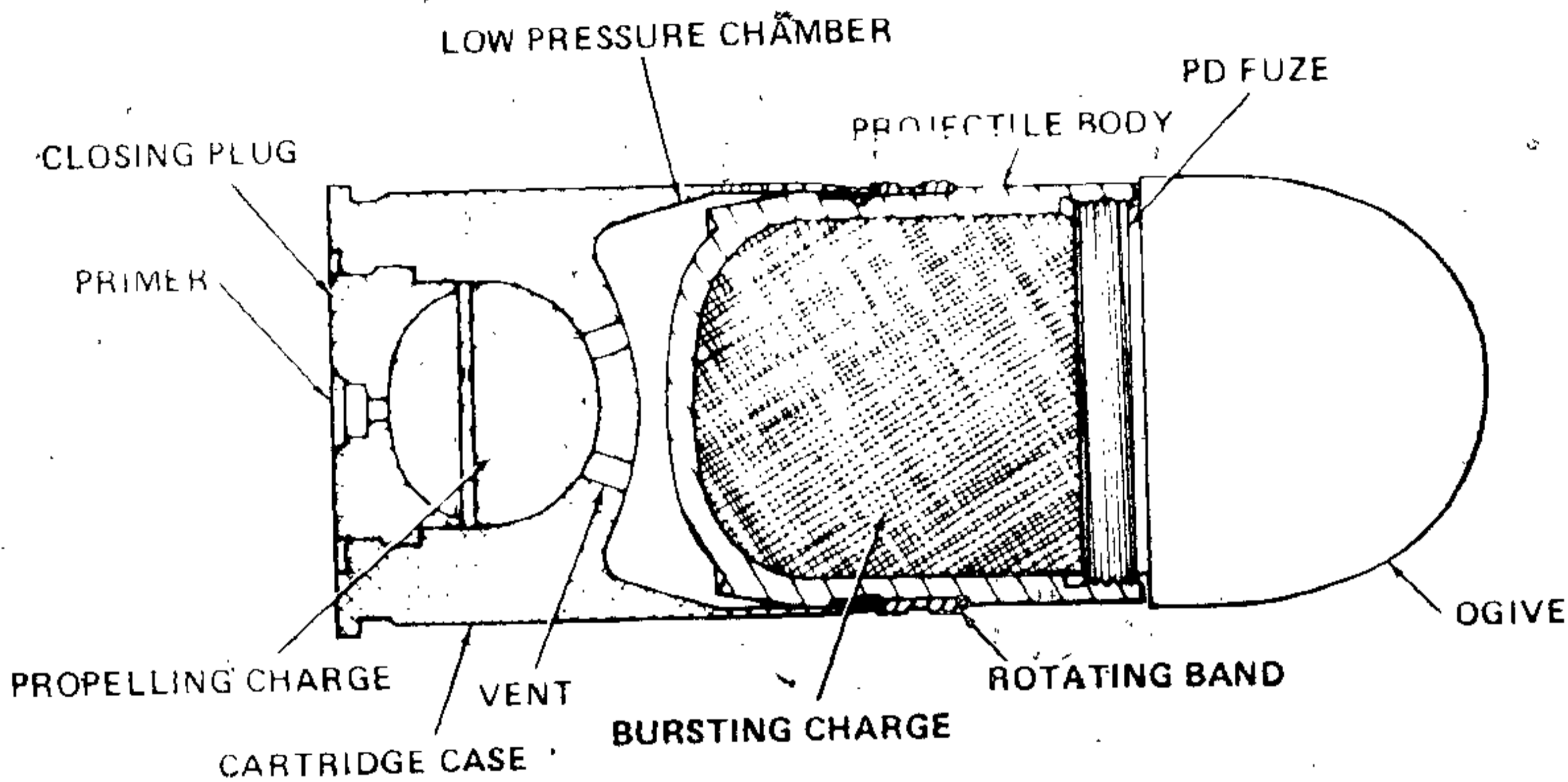
TM 9-1010-221-10

TM 9-1005-249-10

CARTRIDGE, 40-MILLIMETER: HE, M383



AR199572



AR199571

Type Classification:

Std AMCTC 8664 dtd 1971

Use:

This cartridge is a high explosive round designed to inflict personnel casualties in the target area using ground burst effect, and is fired from M75 or M129 40-mm grenade launchers and the U.S. Navy 40-mm machine gun MK19 Mod 1, at ranges up to 2200 meters. The cartridge is issued completely assembled in linked belts of 50 rounds.

Description:

This cartridge is a fixed round of ammunition consisting of a one-piece internally embossed

steel projectile body with a metal rotating band, and a cartridge case assembly containing the propelling charge and percussion primer. A PD fuze is threaded into the front end of the projectile and is enclosed with an aluminum ogive. The projectile cavity contains a Composition A5 bursting charge. The projectile assembly is press-fitted into a cartridge case. The case is a hollow bichambered aluminum cylinder with an aluminum closing plug fitted into the open well of the propellant chamber in the cartridge base. The propelling charge is contained in the spherical high-pressure propellant chamber. This chamber has vent holes in the top, and is sealed at the bottom by the closing plug. The hollow chamber in the upper section of the case acts as a low-pressure chamber. A percussion primer is crimped into the center opening in the closing plug.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge. Gases from the burning propellant in the high-pressure chamber are forced through the vent holes into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher barrel imparting a spin of 12,000 rpm to the projectile. The expanding gases in the low-pressure chamber force the projectile through the barrel with a muzzle velocity of 244 mps. After the projectile leaves the launcher tube, setback forces cause the fuze setback pin, which keeps the rotor out of line with the detonator, to be disengaged from the rotor. The rotor is secured in position by a centrifugal lock which engages the star wheel in the timing mechanism of the fuze assembly. The centrifugal lock releases the star wheel and arming of the fuze begins when the projectile attains sufficient spin. The rotor springs start rotation of the rotor which is sustained by centrifugal force. The escapement assembly delays arming of the fuze for approximately 0.07 to 0.16 seconds. The rotor is then locked in the armed position, and the fuze is armed at approximately 18 to 36 meters from the launcher tube. Upon graze or impact with the target, the inertial force from impact causes bracket weights to pivot inward forcing the firing pin into the detonator. Concurrently, the detonator detonates the explosive charge causing a blast and fragmentation of the projectile body.

Tabulated Data:

Complete round:

Type ----- HE
 Weight ----- 0.75 lb
 Length ----- 4.415 in.
 Weapons used with --- M75, M129 40-mm
 grenade launchers
 MK19 Mod 1 40-mm
 machine gun

Projectile:

Body material ----- Blank and draw steel
 Color ----- Olive drab w/white
 markings and yellow
 ogive

Filler and weight ---- RDX, Comp. A5,
 54.5 grams

Fuze ----- PD, M533

Propelling charge:

Cartridge case ----- M169

Propellant ----- M2, 4.64 grams

Primer ----- Perc., FED 215

Performance:

Maximum range ----- 2,200 meters

Muzzle velocity ----- 244 mps (795 fps)

Arming distance ----- 18 to 36 meters

Temperature Limits: (59 - 118 ft)

Firing:

Lower limit ----- -45°F (-42.8°C)

Upper limit ----- +125°F (51.6°C)

Storage:

Lower limit ----- -65°F (-53.8°C)

Upper limit ----- +165°F (73.9°C)

*Packing ----- 50 rounds in linked
 belt

*Packing Box:

Weight ----- 53 lbs. (24.0 kg)

Dimensions ----- 25-11/16 x 16-1/4
 x 6-27/32 in.
 (65.2 x 41.2 x 17.5
 cm)

Cube ----- 1.7 cu. ft. (0.0475
 M³)

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class - 4

Storage compatibility

group ----- E

DOT shipping class ----- A

DOT designation ----- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES

DODAC ----- 1310-B571

Cartridge drawing
 number ----- 9241371

Packing drawing
 number ----- 9251995

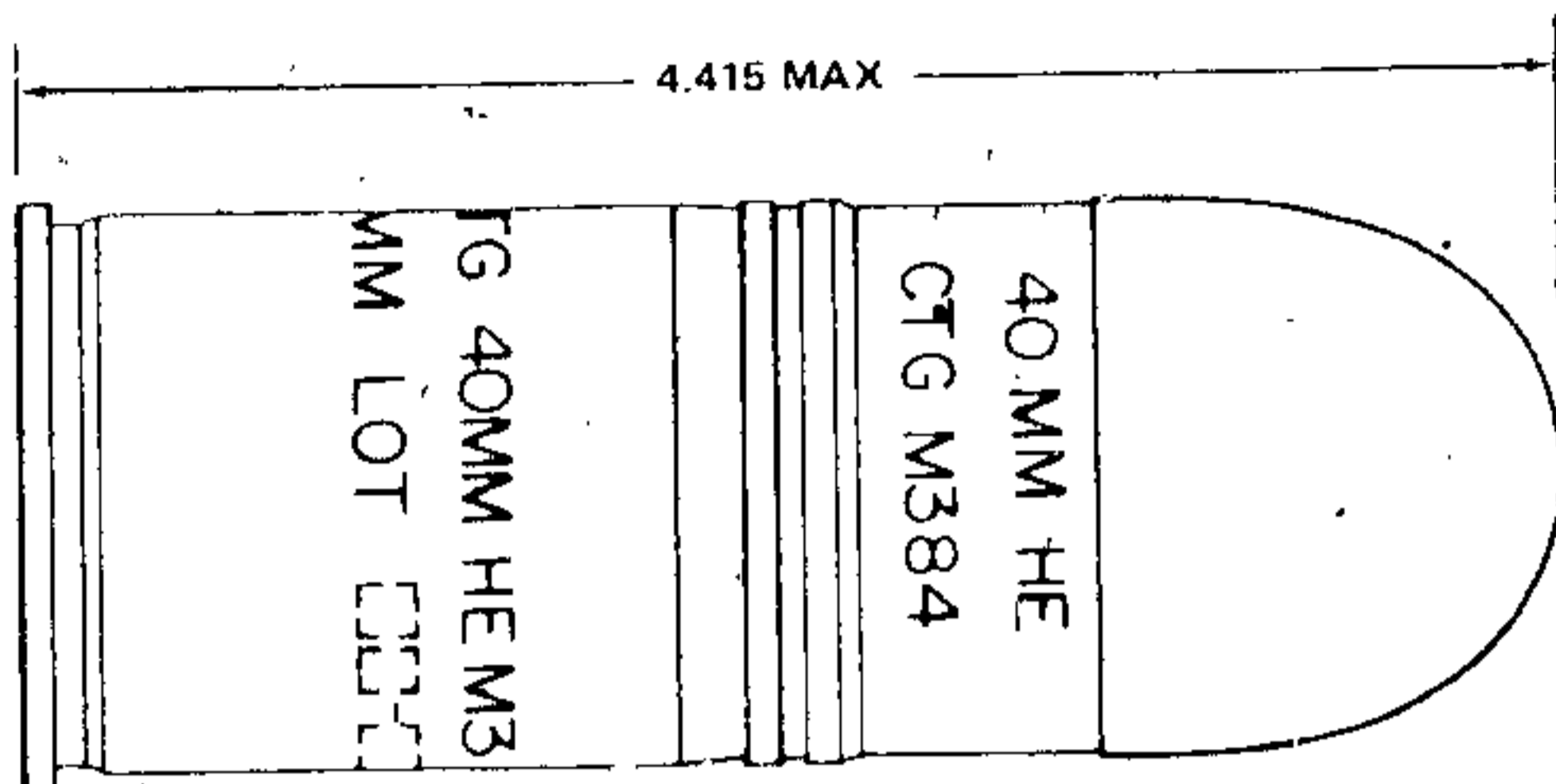
References:

SC 1305/30-IL

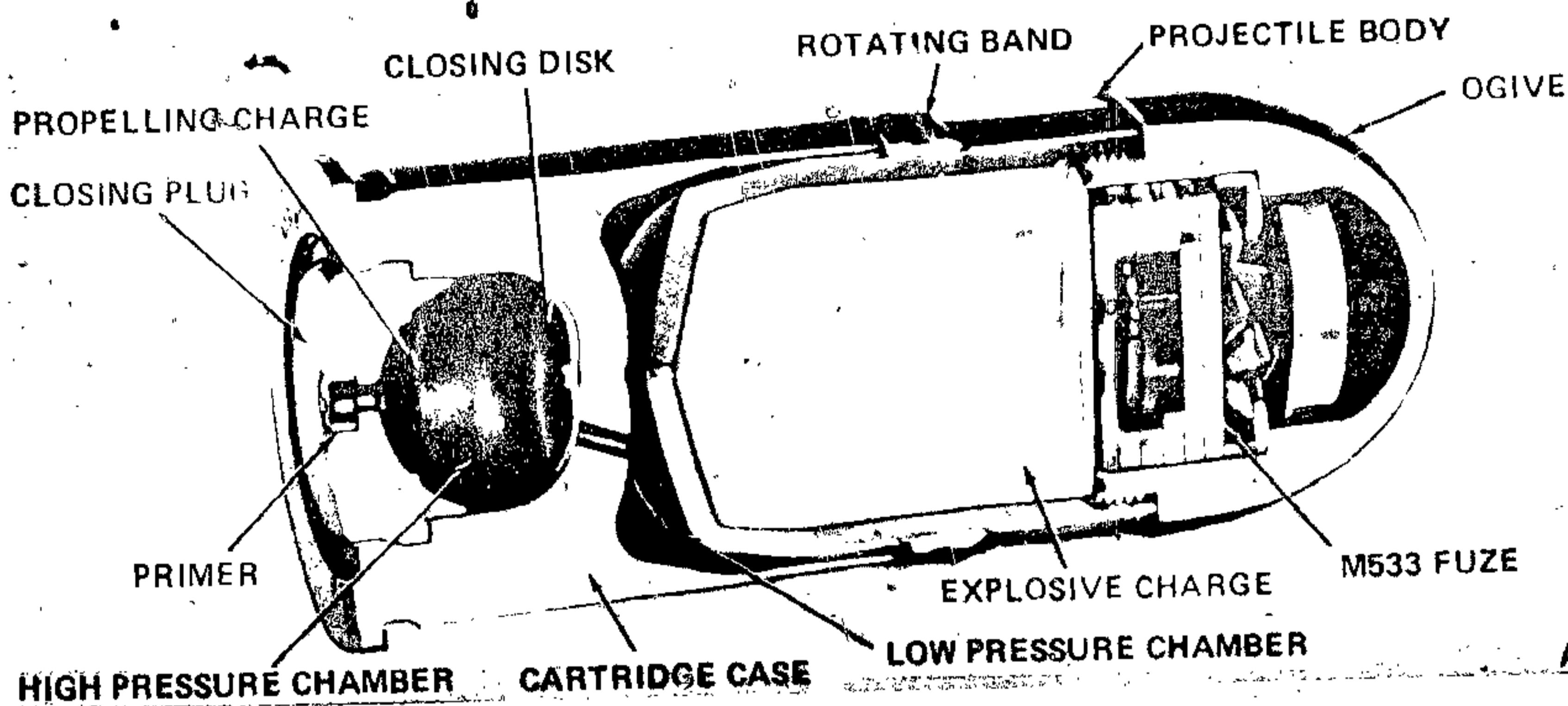
SB 700-20

TM 9-1300-251-20

CARTRIDGE, 40-MILLIMETER: HE. M384



AR199570



AR199569

Type Classification:

Std AMCTC 8664 dtd 1971

Use:

This cartridge is a high explosive round designed to inflict personnel casualties in the target area using ground burst effect, and is fired from M75 and M129 40-mm grenade launchers or the U. S. Navy 40-mm machine gun MK19 Mod 1, at ranges up to 2200 meters. The cartridge is issued fully assembled in linked belts of 50 rounds.

Description:

This cartridge is a fixed round of ammunition consisting of a one-piece, internally

embossed steel projectile body with a metal rotating band and a cartridge case assembly containing the propelling charge and percussion primer. A PD fuze is threaded into the front end of the projectile, and is enclosed with an aluminum ogive. The projectile cavity contains a Composition A5 bursting charge.

The projectile assembly is press-fitted into a cartridge case. The case is a hollow bichambered aluminum cylinder with an aluminum closing plug fitted into the open well of the propellant chamber in the cartridge base. The propelling charge is contained in the spherical high-pressure propellant chamber. This chamber has vent holes in the top and is sealed at the bottom by the closing plug. The hollow chamber in the upper section of the case

TM 43-0001-28

acts as a low-pressure chamber. A percussion primer is crimped into the center opening in the closing plug.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge. Gases from the burning propellant expand in the high-pressure chamber and are forced through the vent holes into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher barrel imparting a spin of 12,000 rpm to the projectile. The expanding gases in the low-pressure chamber force the projectile through the barrel with a muzzle velocity of 244 mps.

After the projectile leaves the launcher tube, setback force causes the fuze rotor setback pin to be disengaged from the rotor. The rotor is secured in position by a centrifugal lock which engages the star wheel in the timing mechanism of the fuze assembly. The centrifugal lock releases the star wheel and arming of the fuze begins when the projectile attains sufficient spin. The rotor springs start rotation of the rotor which is sustained by centrifugal force. The escapement assembly delays arming of the fuze for approximately 0.07 to 0.16 seconds. The rotor is then locked in the armed position, and the fuze is armed at approximately 18 to 36 meters from the launcher. Upon graze or impact with the target, inertial force from impact causes bracket weights to pivot inward forcing the firing pin into the detonator. Concurrently, the detonator detonates the explosive charge which in turn detonates the bursting charge producing blast and fragmentation of the projectile body.

Tabulated Data:

Complete round:

Type ----- HE
Weight ----- 0.75 lb
Length ----- 4.415 in.
Weapons used with -- M75, M129
grenade launchers
MK 19 Mod 1 40-
mm machine gun

Projectile:

Body material----- Plate steel
Color----- Olive drab w/ yellow markings and yellow ogive
Filler and weight ---- Comp. A5, 54.5 grams
Fuze ----- PD, M533

Propelling charge:

Cartridge case ----- M169
Propellant ----- M2, 4.64 grams
Primer----- Perc., FED 215

Performance:

Maximum range ----- 2,200 meters
Muzzle velocity----- 244 mps (795 fps)
Arming distance ---- 18 to 36 meters
(59 - 118 ft)

Temperature Limits:

Firing:

Lower limit----- -45°F (-42.8°C)
Upper limit ----- +125°F (51.6°C)

Storage:

Lower limit----- -65°F (-53.8°C)
Upper limit ----- +165°F (73.9°C)

*Packing----- 50 rounds in linked belt

*Packing Box:

Weight ----- 53 lbs.
Dimensions----- 25-11/16 x 16-1/4 x 6-27/32 in.
Cube----- 1.7 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

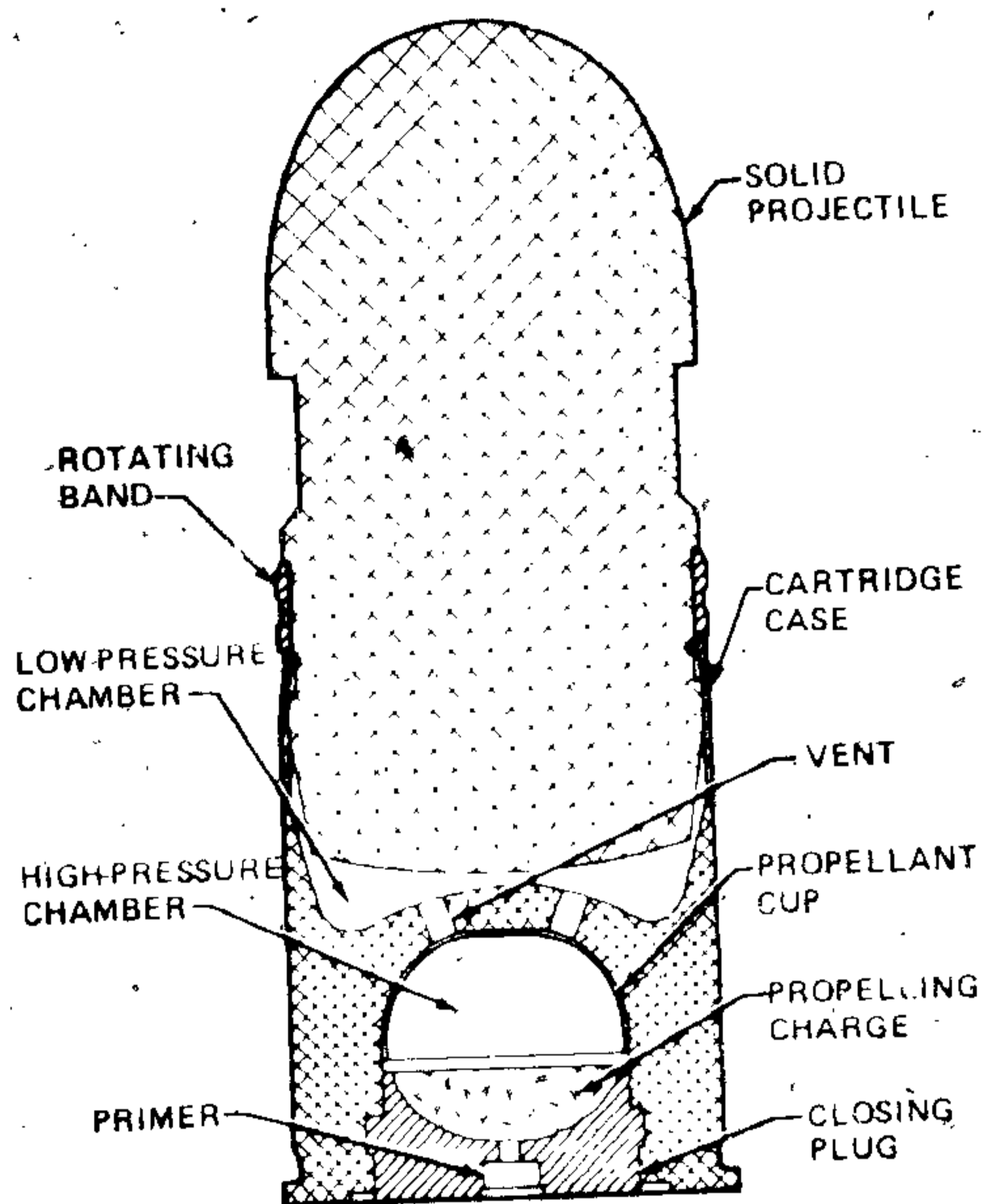
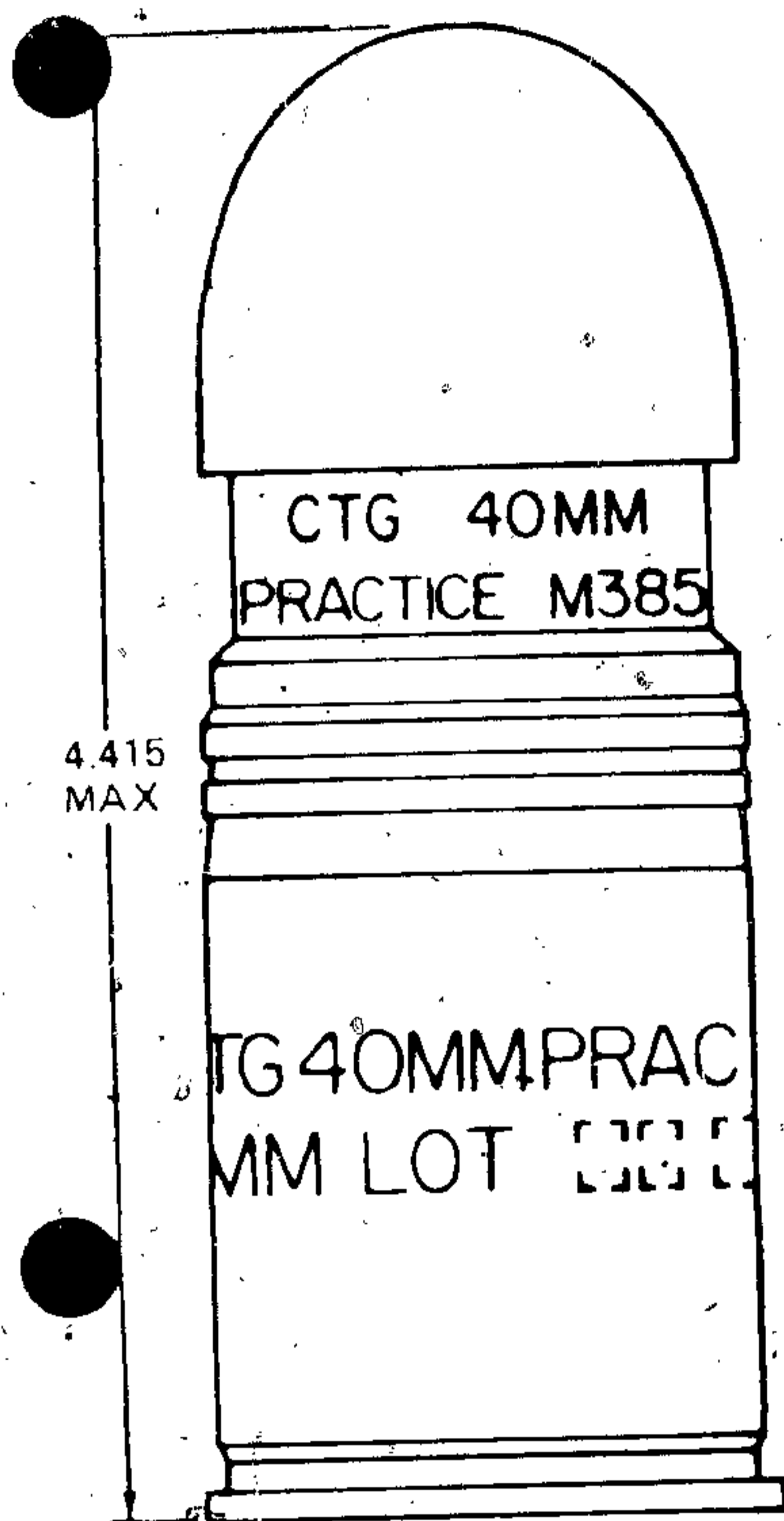
Shipping and Storage Data:

Quantity-distance class - 4
Storage compatibility group ----- E
DOT shipping class----- A
DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC----- 1310-B470
Cartridge drawing number ----- 8886397
Packing drawing number ----- 9251995

References:

SC 1305/30-II
SB 700-20
TB9-1310-247-12

CARTRIDGE, 40-MILLIMETER: PRACTICE, M385



AR199568

AR199567

Type Classification:

Std AMCTC 2177 dtd 1964

Use:

This cartridge is fired from 40-mm Grenade Launchers M75 and M129 and 40-mm Machine Gun MK19 Mod 1. The cartridge is designed only for practice or for proof testing weapons.

Description:

This cartridge is a fixed round of ammunition. It consists of a one-piece, solid inert aluminum projectile body together with a metal rotating band which is press-fitted into an aluminum bichambered cartridge case assembly. The case contains the propelling charge and percussion primer.

The propelling charge is contained in a spherical high-pressure propellant chamber with vent holes in the top. The chamber is sealed at the bottom with an aluminum base plug which is crimped to the base of the cartridge case. The hollow upper chamber in the case acts as a low-pressure chamber. A percussion primer is crimped into the center of the case closing plug.

Functioning:

The weapon firing pin strikes the percussion primer to ignite the propelling charge. The expanding gases from the burning propellant are forced from the high-pressure chamber, through vent holes into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher tube imparting a spin of 12,000 rpm to the projectile. The

expanding gases in the low-pressure chamber force the projectile through the tube with a muzzle velocity of 244 meters per second. Because it is inert, the projectile does not function upon impact with the target.

Tabulated Data:

Complete round:

Type ----- Practice
 Weight ----- 350 grams
 Length ----- 4.415 in.
 Weapons used with --- M75, M129 40-mm Grenade Launchers
 MK19, Mod 1 40-mm machine gun

Projectile:

Body material ----- Bar Alloy Aluminum
 Color ----- Blue w/white markings

Propelling charge:

Cartridge case ----- M169
 Propellant ----- M2, 4.46 grams
 Primer ----- Perc., FED 215

Performance:

Maximum Range ----- 2,200 meters
 Muzzle velocity ----- 244 mps (795 fps)

Temperature Limits:

Firing:

Lower limit ----- -25°F (-31.5°C)
 Upper limit ----- +110°F (43°C)

Storage:

Lower limit ----- -30°F (-34°C)
 Upper limit ----- +145°F (62.5°C)

*Packing ----- 50 rounds in linked belt

*Packing Box:

Weight ----- 53 lbs.
 Dimensions ----- 25-11/16 x 16-1/4 x 6-27/32 in.
 Cube ----- 1.7 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

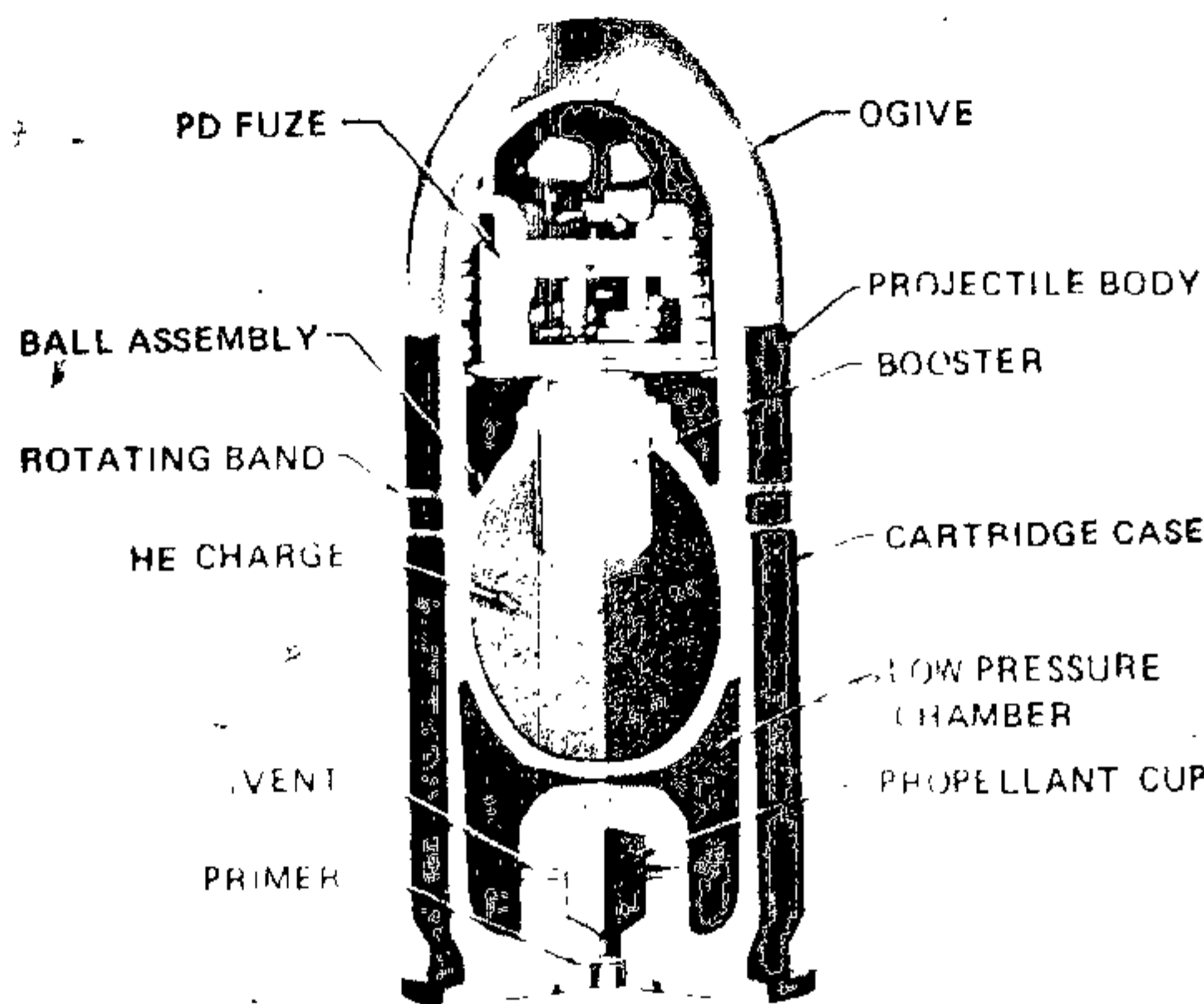
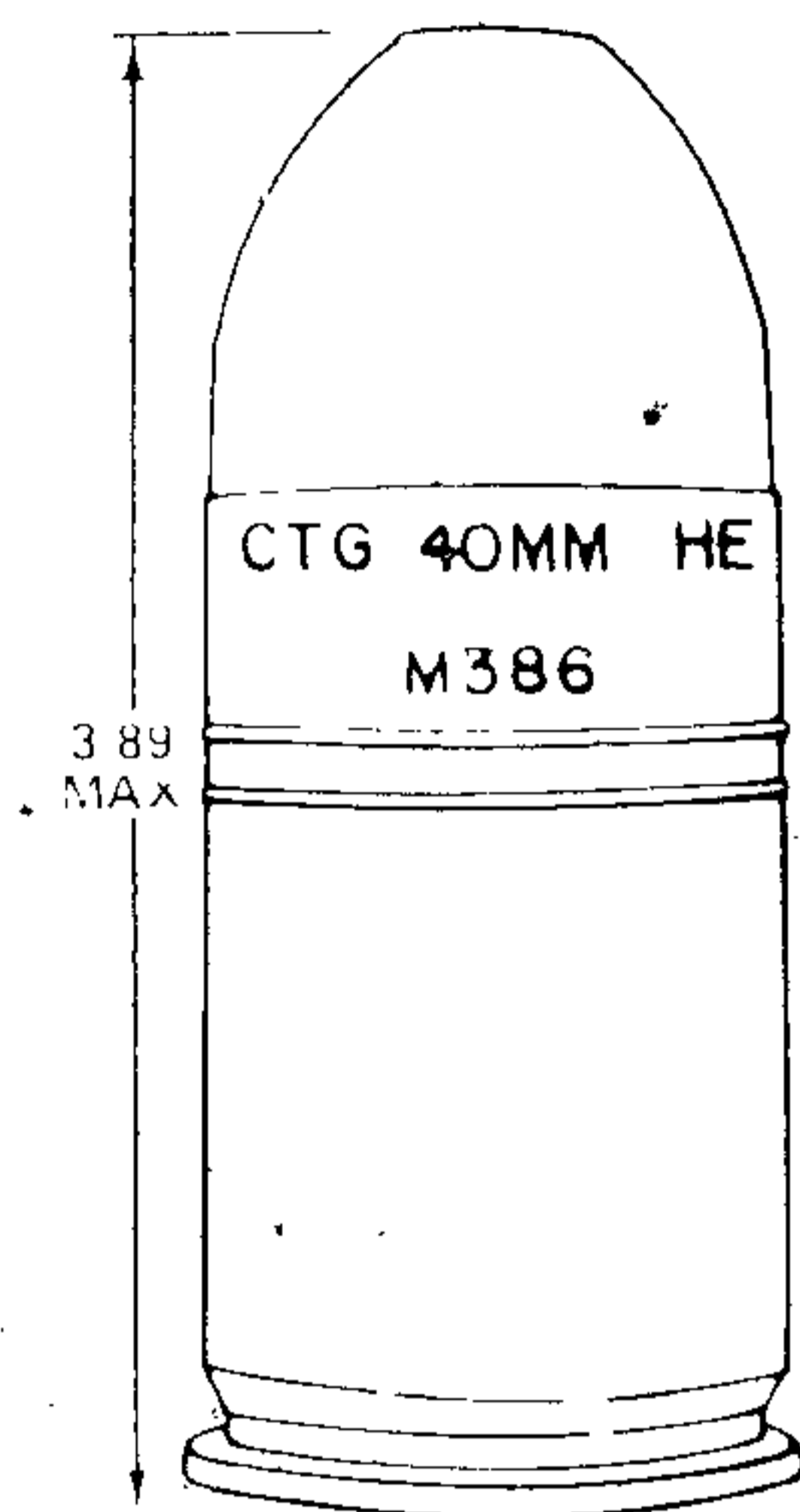
Quantity-distance class - 1.3
 Storage compatibility group ----- E
 DOT shipping class ----- C
 DOT designation ----- CARTRIDGES, PRACTICE AMMUNITION

DODAC ----- 1310-B480
 Cartridge drawing number ----- 8886326
 Packing drawing number ----- 9251995

References:

SC 1305/30-IL
 SB 700-20
 TB 9-1310-247-12

CARTRIDGE, 40-MILLIMETER: HE, M386



AR199566

AR199566

Type Classification:

Std OTCM 37638 dtd 1960

Use:

This cartridge is a high explosive round designed to inflict personnel casualties from ground burst effect and is fired from 40-mm Grenade Launchers M79 and M203 (attached to the M16/M16A1 rifle).

Description:

The cartridge is a fixed round of ammunition consisting of an aluminum projectile body with a rotating band, and cartridge case containing the propelling charge and percussion primer. A steel ball shaped assembly containing the high explosive charge is fitted into the rear of the projectile. The ball assembly has an open

well on the forward side. A PD fuze with booster charge is threaded into the well. The fuze is covered by an aluminum ogive forming the nose of the projectile. The projectile body is press-fitted into the cartridge case. The case is a bi-chambered aluminum cylinder with an annealed brass propellant cup fitted into the center of the base. The cup contains the propelling charge and the percussion primer is fitted in the center. The cup acts as a high-pressure chamber while the cavity in the case surrounding the cup acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge in the high-pressure chamber. The burning propelling charge generates sufficient pressure to rupture the propellant cup and force the expanding gases

through the vent holes into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher tube imparting spin to the projectile. The pressure created by the expanding propellant gases in the low-pressure chamber forces the projectile through the tube with a muzzle velocity of 76 meters per second. After the projectile leaves the launcher tube, setback causes a fuze setback pin to move rearward and clear the fuze rotor which is held in an unarmed position by a firing pin, centrifugal lock, and the setback pin in the fuze assembly. Centrifugal force, generated by the rotation of the projectile, causes three pivoted inertial weights and the fuze centrifugal lock to move outward. This action causes the spring loaded firing pin and lock to retract from the rotor and gear train, respectively. The rotor, now free to rotate, aligns the fuze detonator with the explosive train. A fuze escapement mechanism delays arming by controlling rotor movement. The fuze arms after the projectile has traveled at least 14 meters (45 feet) from the launcher tube. Upon impact with the target, the firing pin is forced into the detonator. The detonator triggers the booster charge, in turn, detonating the high-explosive bursting charge, producing a blast and fragmentation of the projectile body.

Tabulated Data:

Complete round:

Type ----- HE
 Weight ----- .50 lb
 Length ----- 3.89 in.
 Weapons used with ----- M79, M203 40-mm
 grenade launchers
 (attached to M16/
 M16A1 rifle)

Projectile:

Body material ----- Aluminum skirt and
 steel ball with ex-
 plosive filler
 Color ----- Olive drab w/yellow
 markings & yellow
 ogive
 Filler ----- Composition B, 32
 grams
 Fuze ----- PD, M551

Propelling charge:

Cartridge case ----- M118
 Propellant ----- M9, 330 milligrams
 Primer ----- Perc., M42, FED
 100

Performance:

Maximum range ----- 400 meters
 Muzzle velocity ----- 76 mps (250 fps)

Temperature Limits:

Firing:

Lower limit ----- -45°F (-42.8°C)
 Upper limit ----- +125°F (51.6°C)

Storage:

Lower limit ----- -65°F (-53.8°C)
 Upper limit ----- +165°F (73.9°C)

*Packing ----- 6 rounds per bando-
 leer; 12 bandoleers (72
 rounds) per box

*Packing Box:

Weight ----- 54 lbs.
 Dimensions ----- 17-3/4 x 14-1/8 x
 11-15/32 in.
 Cube ----- 1.7 cu ft.

*NOTE: See SC for complete packing data in-
 cluding NSN's.

Shipping and Storage Data:

Quantity-distance class - 4
 Storage compatibility
 group ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES

DODAC ----- 1310-8574

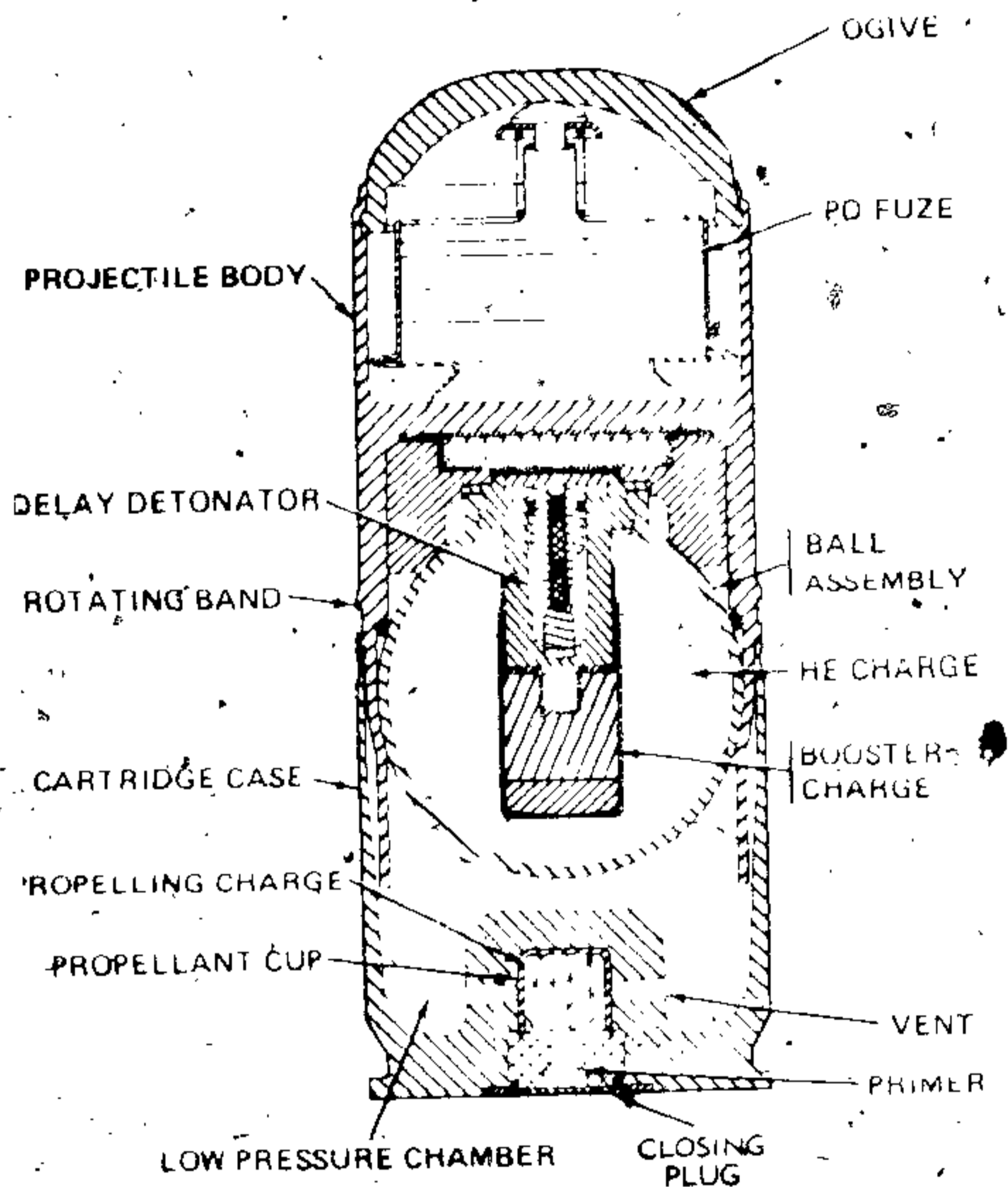
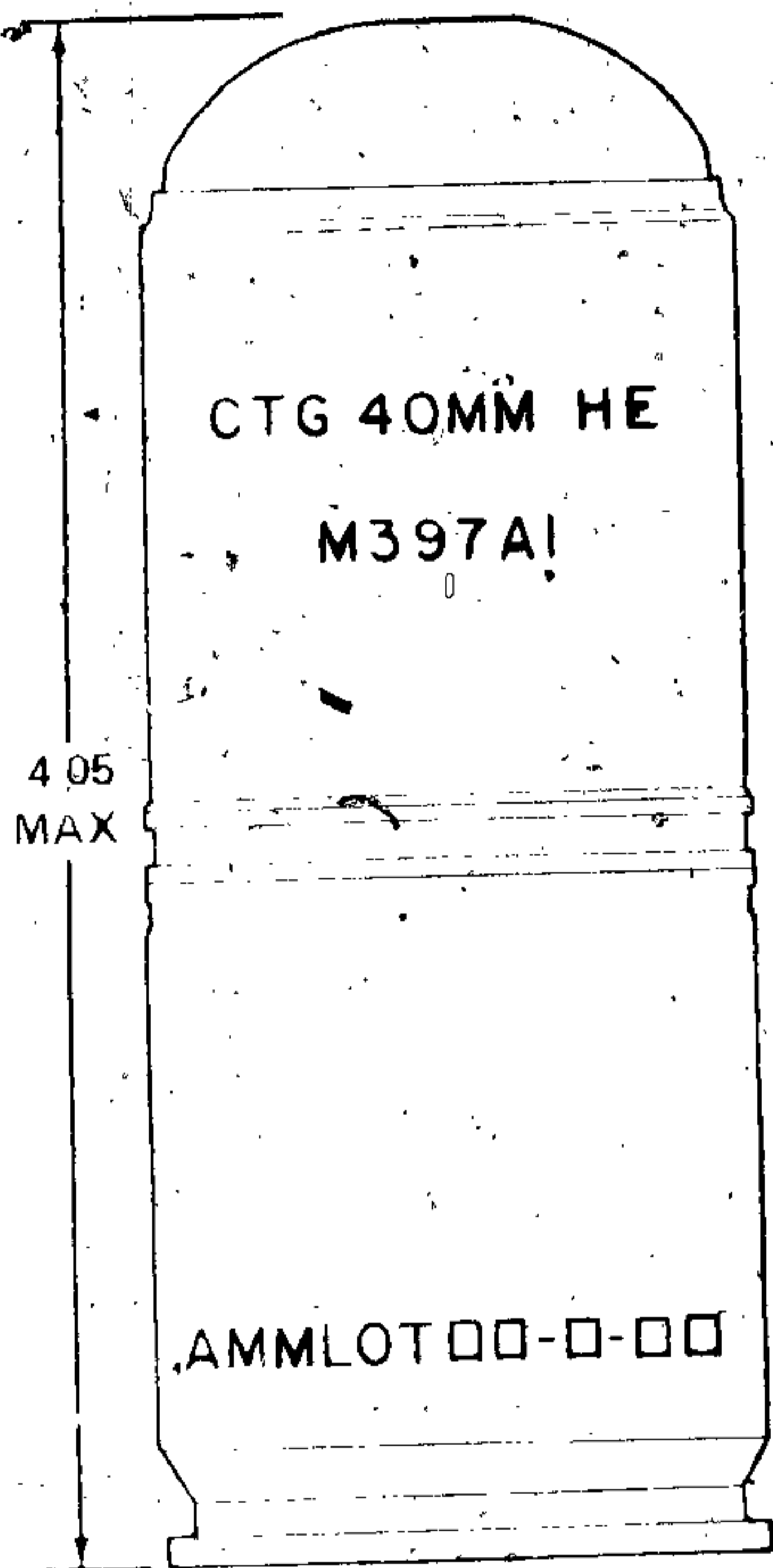
Cartridge drawing
 number ----- 8835951

Packing drawing
 number ----- 8835948

References:

SC 1305/30-IL
 SB 700-20
 TM 9-1005-249-10
 TM 9-1310-202-12
 TM 9-1010-205-10
 TM 9-1010-221-10

CARTRIDGE, 40-MILLIMETER: HE, M397A1



AR199561

AR199562

Type Classification:

Std MSR, 08746022 dtd 1974

Use:

This cartridge is a high explosive round designed to inflict personnel casualties using air burst effect, and is fired from 40-mm Grenade Launchers M79 and M203 (attached to the M16/M16A1 rifle).

Description:

This cartridge is a fixed round of ammunition consisting of a one-piece steel projectile body with a metal rotating band and a cartridge

case assembly containing the propelling charge and percussion primer. A hollow ogive is fitted to the front end of the projectile. A hollow steel ball assembly containing a delay detonator, a booster charge, and an HE bursting charge, is fitted into the rear end of the projectile. A PD fuze assembly is threaded into the front opening of the ball assembly. The projectile assembly is press-fitted into a cartridge case. The case is a hollow bicampered aluminum cylinder with an annealed brass propellant cup assembly fitted into the center of the cartridge base. The cup contains the propelling charge and a percussion primer in the center. The cup acts as a high-pressure chamber, and the hollow cavity in the case, which surrounds the cup, acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge in the high-pressure chamber. The burning propelling charge generates sufficient pressure to rupture the propellant cup forcing the expanding gases from the burning propellant through the vent holes into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher tube, imparting spin to the projectile. The pressure, created by the expanding propellant gases in the low-pressure chamber, forces the projectile through the tube with a muzzle velocity of 76 meters per second. When the projectile is fired, setback forces cause the fuze setback pin to retract from the fuze rotor causing the bellyville type washer to be crushed. This permits the fuze housing assembly containing the rotor to retract from the stationary fuze firing pin. In the unarmed position, a setback pin, a firing pin, and a centrifugal lock in the fuze assembly, combine to prevent movement of the rotor. This keeps the fuze detonator from aligning with the separation charge assembly. Centrifugal force, from rotation of the projectile, causes the centrifugal lock to retract from the fuze gear train. The rotor, now free to rotate, lines up the detonator with the separation charge assembly. A fuze escape-ment mechanism delays arming by controlling rotor movement. The fuze arms after the projectile has traveled at least 14 meters (45 feet) from the launcher tube. Upon impact with the target, the M55 detonator within the setback sleeve and housing assembly is driven forward into the firing pin. In turn, the detonator ignites the separation charge assembly which initiates the delay detonator of the auxiliary fuze in the ball assembly. Gas pressure drives the delay detonator into the armed position. Concurrently, the ball assembly with the auxiliary fuze ejects from the rear of the projectile into the air. The pyrotechnic delay detonator in the ball assembly detonates the booster charge, in turn, detonating the bursting charge 80 milliseconds after ejection. This results in a blast and fragmentation of the ball assembly 5 feet above the impact point. This cartridge functions with improved performance on snow targets in comparison to the performance of M397 and M406.

Tabulated Data:

Complete round:

Type ----- HE
 Weight ----- .51 lb

Length ----- 4.05 in.
 Weapons used
 with ----- M79, M203 40-mm
 grenade launchers
 (attached to M16/
 M16A1 rifle)

Projectile:

Body material ---- Aluminum skirt with
 steel ball containing
 explosive filler
 Color ----- Olive drab w/yellow
 markings & yellow
 ogive
 Filler ----- OCTOL, 32 grams
 Fuze ----- PD, M536E1

Propelling charge:

Cartridge case --- M118
 Propellant ----- M9, 330 mg.
 Primer ----- M42, FED100

Performance:

Maximum range -- 400 meters
 Muzzle velocity -- 76 mps (250 fps)
 Arming delay
 distance ----- 14 to 27 meters
 (45 to 90 feet).

Temperature Limits:

Firing:

Lower limit ----- -45°F (-42.8°C)
 Upper limit ----- +125°F (51.6°C)

Storage:

Lower limit ----- -65°F (-53.8°C)
 Upper limit ----- +165°F (73.9°C)

*Packing ----- 6 rounds per bando-
 leer; 12 bandoleers (72
 *Packing Box: ----- rounds) per box
 Weight ----- 58 lbs.
 Dimensions ----- 17-3/4 x 14-1/8 x 11-
 15/32 in.
 Cube ----- 1.7 cu. ft.

*NOTE: See SC for complete packing data in-
 cluding NSN's.

Shipping and Storage Data:

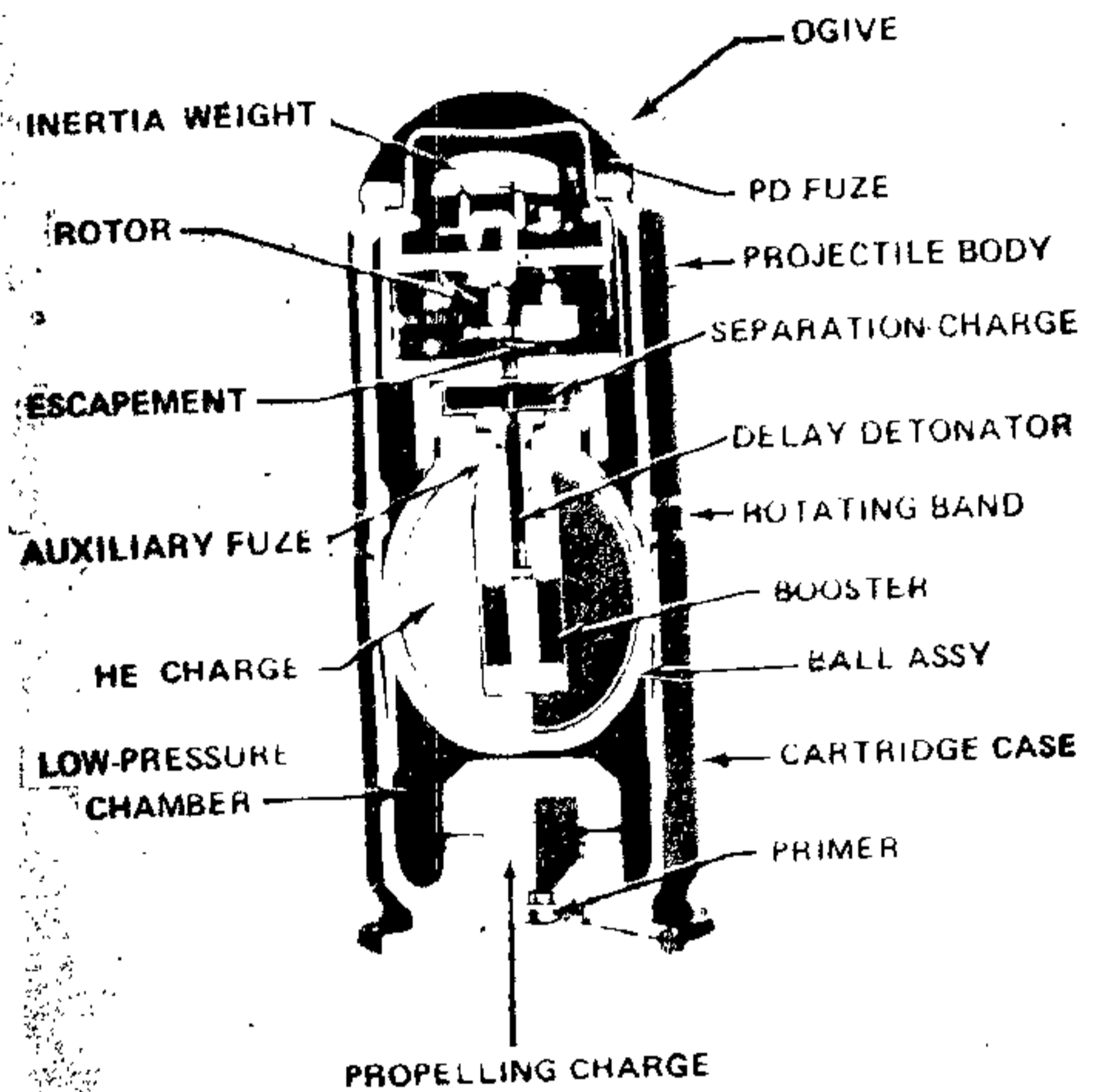
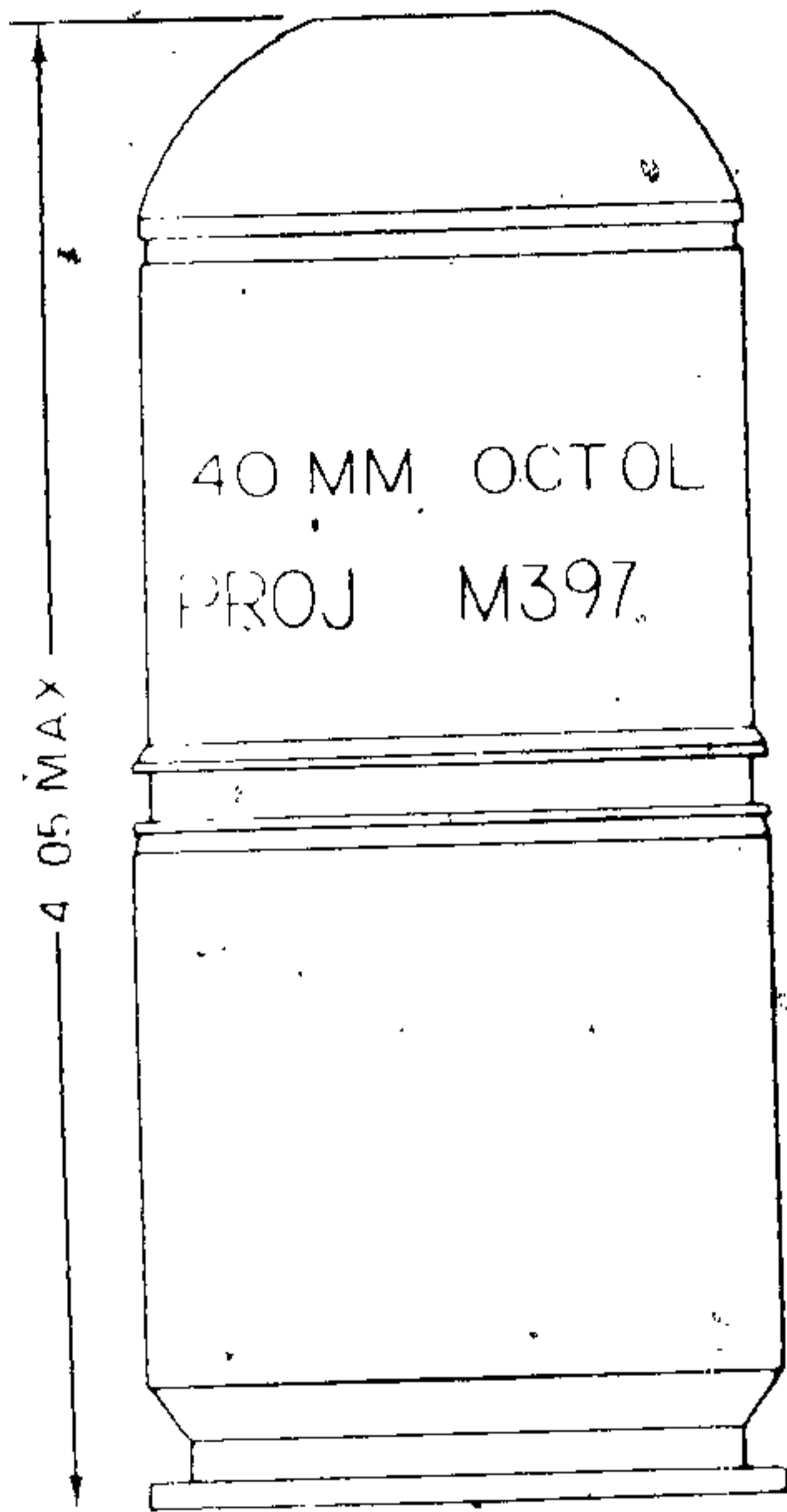
Quantity-distance class - 4
 Storage compatibility
 group ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES
 DODAC ----- 1310-B569
 Cartridge drawing
 number ----- P9233158
 Packing drawing
 number ----- 882362

References:

- SC 1305/30-10
- SB 700-20
- TM 9-1005-249-10
- TM 9-1310-202-12
- TM 9-1010-205-10
- TM 9-1010-221-10

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CARTRIDGE, 40-MILLIMETER: HE, M397



AR199563

AR199564

Type Classification:

Std MSR 08746022 dtd 1974

Use:

This cartridge is a high explosive round designed to inflict personnel casualties using air burst effect, and fired from 40-mm Grenade Launchers M79 and M203 (attached to the M16/M16A1 rifle).

Description:

The cartridge is a fixed round consisting of an aluminum projectile body with rotating band press-fitted into a cartridge case containing a propelling charge and percussion primer. A hollow steel ball assembly containing the HE charge and a delay detonator is fitted into the

rear of the projectile. A PD fuze with a separation charge is threaded into a well on the front side of the ball. The cartridge case is a bichambered aluminum cylinder with an annealed brass cup pressed into the center of the base. The cup contains the propelling charge and the percussion primer extends into the center of the charge. The cup constitutes a high-pressure chamber, and the hollow cavity in the case surrounding the cup acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the primer to ignite the propelling charge. The burning propellant ruptures the propellant cup, and the expanding gases are vented into the low-pressure chamber to propel the projectile through

the tube with a muzzle velocity of 76 meters per second. The rotating band engages the spiral lands in the launcher tube to impart spin to the projectile. Setback from firing withdraws a lock pin from the fuze rotor. After the projectile leaves the launcher, centrifugal force from rotation withdraws the firing pin from the rotor and releases a centrifugal lock from the fuze gear train. The rotor then turns, restrained by an escapement mechanism, to line up the rotor detonator with the separation charge. This rotor movement is complete when the projectile has traveled at least 14 meters (45 feet) from the weapon. Upon impact, the fuze firing pin is driven into the detonator to explode the separation charge. The separation charge ejects the high explosive assembly upward from the rear of the projectile and simultaneously ignites the delay charge. Detonation and fragmentation of the HE ball thus occurs at approximately 5 feet above the ground impact point.

Tabulated Data:

Complete round:

Type ----- HE
 Weight ----- 0.51 lb
 Length ----- 4.05 in
 Weapons used with -- M79, M203 40-mm
 grenade launchers
 (attached to
 M16/M16A1 rifle)

Projectile:

Body material ----- Aluminum skirt
 and steel ball con-
 taining explosive
 filler
 Color ----- Olive drab w/yel-
 low markings &
 yellow ogive
 Filler ----- OCTOL, 32 grams
 Fuze ----- PD, M536

Propelling charge:

Cartridge case ----- M118
 Propellant ----- M9, 330 mg.
 Primer ----- M42, FED 100

Performance:

Maximum range ----- 400 meters
 Muzzle velocity ----- 76 mps (250 fps.)
 Arming distance ----- 14 to 27 meters

Temperature Limits:

(45 - 90 feet)

Firing:

Lower limit ----- -45°F (-42.8°C)
 Upper limit ----- +125°F (51.6°C)

Storage:

Lower limit ----- -65°F (-53.8°C)
 Upper limit ----- +165°F (73.9°C)

*Packing ----- rounds packed in
 plastic bandoleer; 12
 bandoleers (72 rounds)
 per box

*Packing Box:

Weight ----- 58 lbs.
 Dimensions ----- 17 3/4 x 14 1/8
 x 11 15/32 in.
 Cube ----- 1.7 cu. ft.

*NOTE: See SC for complete packing data
 including NSN's.

Shipping and Storage Data:

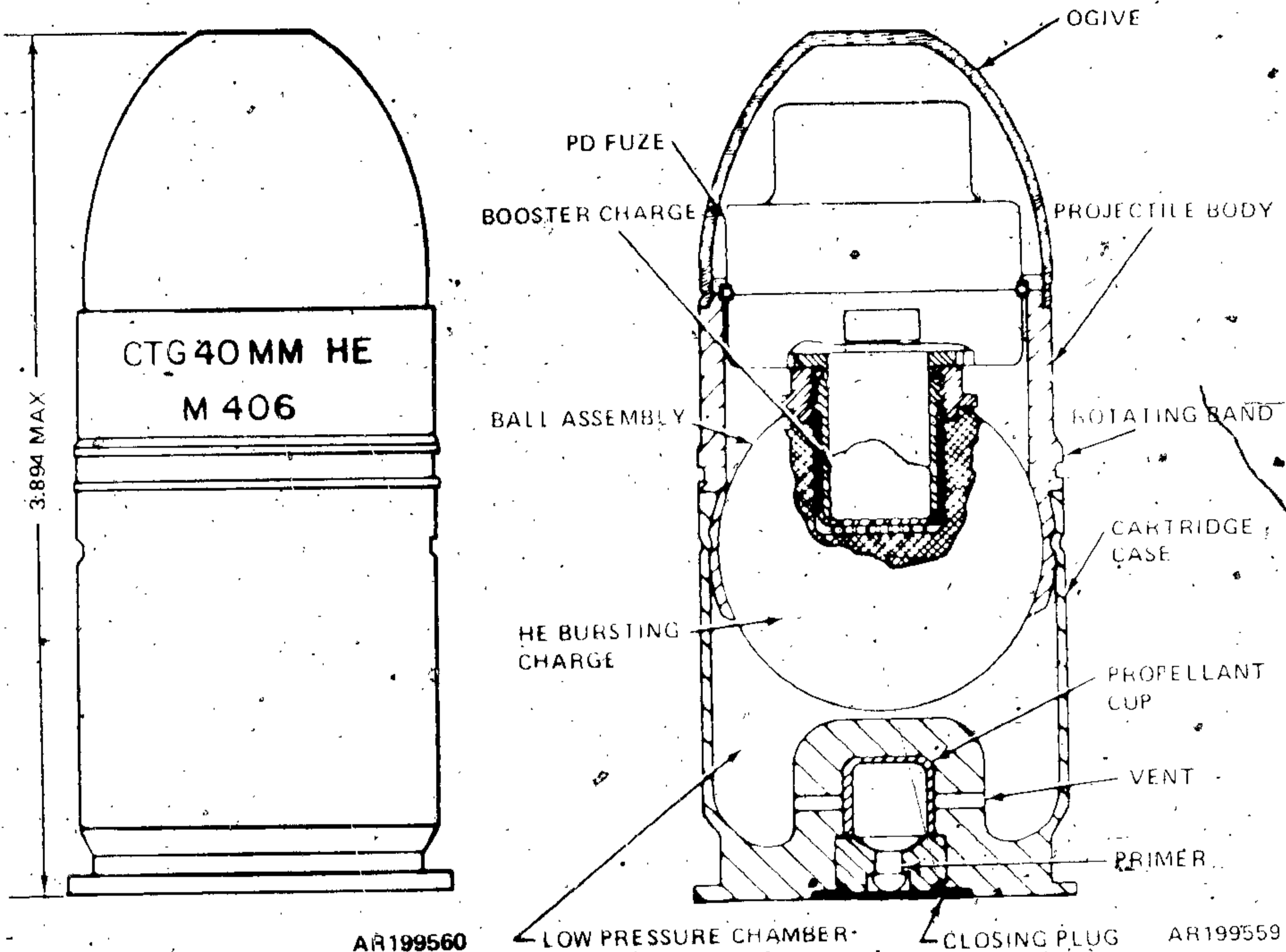
Quantity-distance class - 4
 Storage compatibility
 group ----- E
 DOT shipping class ----- A
 DOT designation ----- 3-AMMUNITION
 FOR CANNON
 WITH EXPLOSIVE
 PROJECTILES

DODAC ----- 1310-B569
 Cartridge drawing
 number ----- 8883461
 Packing drawing
 number ----- 8882362

References:

SC 1305/30-IL
 SB 700-20
 TM 9-1005-249-10
 TM 9-1310-202-12
 TM 9-1010-205-10
 TM 9-1010-221-14

CARTRIDGE, 40-MILLIMETER: HE M406



Type Classification:

Std AMCTC 9392 dtd 1972

Use:

This cartridge is a high explosive round designed to inflict personnel casualties using ground burst effect, and is fired from 40-mm Grenade Launchers M79 or M203 (attached to the M16/M16A1 rifle).

Description:

This cartridge is a fixed round of ammunition consisting of an aluminum projectile body with a rotating band and a cartridge

case assembly containing the propelling charge and percussion primer. A hollow aluminum ogive is fitted to the front end of the projectile. A steel ball assembly containing a booster charge and a bursting charge is fitted in the rear end of the projectile. A PD fuze assembly is threaded into the front opening of the ball assembly. The projectile assembly is press-fitted into a cartridge case. The case is a hollow bichambered aluminum cylinder with an annealed brass propellant cup assembly fitted into the center of the cartridge base. The cup contains the propelling charge and a percussion primer in the center. It acts as a high-pressure chamber while the hollow cavity in the case, which surrounds the cup, acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge in the high-pressure chamber. The burning propelling charge generates sufficient pressure to rupture the propellant cup forcing the expanding gases through the vent holes into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher tube imparting a spin of 3,600 rpm to the projectile. The pressure created by the expanding propellant gases in the low-pressure chamber force the projectile through the tube with a muzzle velocity of 76 meters per second. When the projectile is fired, setback forces cause the fuze setback pin to retract from the fuze rotor. The rotor is held in an unarmed position by a firing pin, a centrifugal lock, and the setback pin in the fuze assembly. Centrifugal force, generated by the rotation of the projectile, causes the three pivoted inertia weights and the centrifugal lock in the fuze to move outward. In turn, the spring loaded firing pin and the lock retract from the rotor and fuze gear train, respectively. The rotor, now free to rotate, lines up the fuze detonator with the explosive train. A fuze escapement mechanism delays arming by controlling rotor movement. The fuze arms after the projectile has traveled at least 14 meters (45 feet) from the launcher tube. Upon impact with the target, the firing pin is forced into the detonator. Concurrently, the detonator triggers the booster charge, in turn, detonating the high explosive bursting charge, which produces a blast and fragmentation of the projectile body. The projectile body is wire wrapped so that fragmentation is more uniform on impact.

Tabulated Data:

Complete round:

Type ----- HE
 Weight ----- 0.503 lbs
 Length ----- 3.894 in.
 Weapons used
 with ----- M79, M203 40-mm
 grenade launchers
 (attached to M16,
 M16A1 rifle)

Projectile:

Body material --- Aluminum skirt with
 steel ball

Color ----- Olive drab w/yellow
 markings & yellow
 ogive

Filler and weight -Comp. B, 32 grams
 Fuze ----- PD, M551

Propelling charge:

Cartridge case --- M118
 Propellant ----- M9, 330 mg.
 Primer ----- M42, FED100

Performance:

Maximum range -- 400 meters
 Muzzle velocity -- 76 mps (247 fps)
 Arming distance - 14 to 27 meters

Temperature Limits: (45 - 90 feet)

Firing:

Lower limit ----- -45°F (-42.8°C)
 Upper limit ----- +125°F (51.6°C)

Storage:

Lower limit ----- -65°F (-53.8°C)
 Upper limit ----- +165°F (73.9°C)

*Packing ----- 6 rounds per bando-
 leer; 12 bandoleers (72
 rounds) per box

*Packing Box:

Weight ----- 54 lbs.
 Dimensions ----- 17-3/4 x 14-1/8 x 11-
 15/32 in.
 Cube ----- 1.7 cu ft

*NOTE: See SC for complete packing data in-
 cluding NSN's.

Shipping and Storage Data:

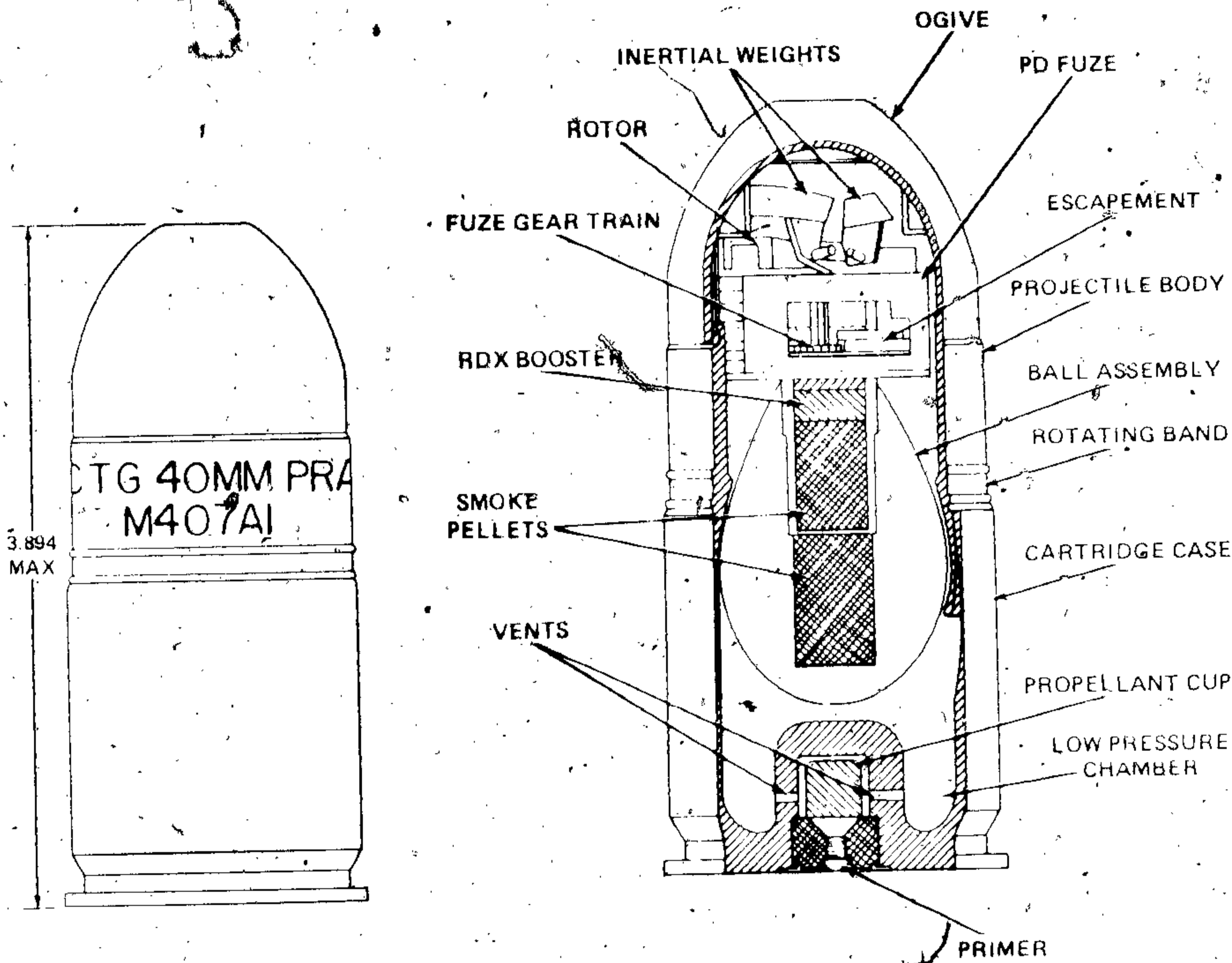
Quantity-distance
 class ----- 4
 Storage compatibility
 group ----- E
 DOT shipping class -- A
 DOT designation ---- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES.

DODAC ----- 1310-B588
 Cartridge drawing
 number ----- 8835950
 Packing drawing
 number ----- 8835104, 8835105

References:

SC 1305/30-IL
 SC 700-20
 FM 9-1005-249-10
 TM 9-1310-202-12
 TM 9-1010-205-10
 TM 9-1010-221-10

CARTRIDGE, 40-MILLIMETER: PRACTICE, M407A1



AR199558

AR199557

Type Classification:

Std AMCTC 2681 dtd 1964

Use:

This cartridge is a fixed practice type ammunition designed to be fired from 40-mm Grenade Launchers M79 and M203 (attached to the M16/M16A1 rifle).

Description:

This cartridge is a fixed round of ammunition consisting of an aluminum projectile body with a rotating band and a cartridge case assembly. A hollow aluminum ogive is fitted to the front end of the projectile. A plastic ball assembly containing an RDX booster pellet

and two yellow smoke pellets is fitted into the rear end of the projectile. A PD fuze assembly is threaded into the front opening of the ball assembly. The projectile assembly is press-fitted into a cartridge case. The case is a hollow bichambered aluminum cylinder with an annealed brass propellant cup assembly crimped into the center of the cartridge base. The cup contains the propelling charge and percussion primer in the center. The cup acts as a high-pressure chamber while the hollow cavity in the case, which surrounds the cup, acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge in

the high-pressure chamber. The burning propelling charge generates sufficient pressure to rupture the propellant cup and to release the expanding propellant gases through the vent holes into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher tube imparting a spin of 3,600 rpm to the projectile. The pressure, created by the expanding propellant gases in the low-pressure chamber, forces the projectile through the tube with a muzzle velocity of 76 meters per second. When the projectile is fired, setback forces cause the fuze setback pin to retract from the fuze rotor. The rotor is held in an unarmed position by a firing pin, a centrifugal lock, and the setback pin in the fuze assembly. Centrifugal force, generated by the rotation of the projectile, causes the three pivoted inertia weights and the centrifugal lock in the fuze, to move outward. In turn, the spring loaded firing pin and the lock retract from the rotor and fuze gear train, respectively. The rotor, now free to rotate, lines up the fuze detonator with the explosive train. A fuze escapement mechanism delays arming by controlling rotor movement. The fuze arms after the projectile has traveled at least 14 to 27 meters (45 to 90 feet) from the launcher tube. Upon impact with the target, the firing pin is forced into the detonator. Concurrently, the detonator ignites the RDX booster pellet which fragments the plastic ball and ignites the two yellow smoke pellets, causing a puff of yellow smoke which simulates explosive impact.

Tabulated Data:

Complete round:

Type-----Practice
 Weight-----.50 lb
 Length-----3.894 in.
 Weapons used with---M79, M203
 40-mm grenade
 launchers (attached
 to M16/M16A1 rifle)

Projectile:

Body material----- Aluminum skirt
 and plastic ball
 Color----- Blue w/white
 markings
 Filler and weight ---- Yellow dye
 Fuze ----- PD, M551

Propelling charge:

Cartridge case ----- M118
 Propellant ----- M9, 330 mg.
 Primer----- M42, FED 100

Performance:

Maximum range ----- 400 meters
 Muzzle velocity ----- 76 mps (287 fps)

Temperature Limits:

Firing:
 Lower limit----- -25°F (-31.5°C)
 Upper limit----- +110°F (43°C)

Storage:

Lower limit ----- -30°F (-34°C)
 Upper limit ----- +145°F (62.5°C)

*Packing----- 6 rounds per bandoleer; 12 bandoleers (72 rounds) per box

*Packing Box:

Weight ----- 54 lbs.
 Dimensions----- 17 3/4 x 14 1/8
 x 11 15/32 in.
 Cube----- 1.7 cu. ft

*NOTE: See SC for complete packing data including NSN's.

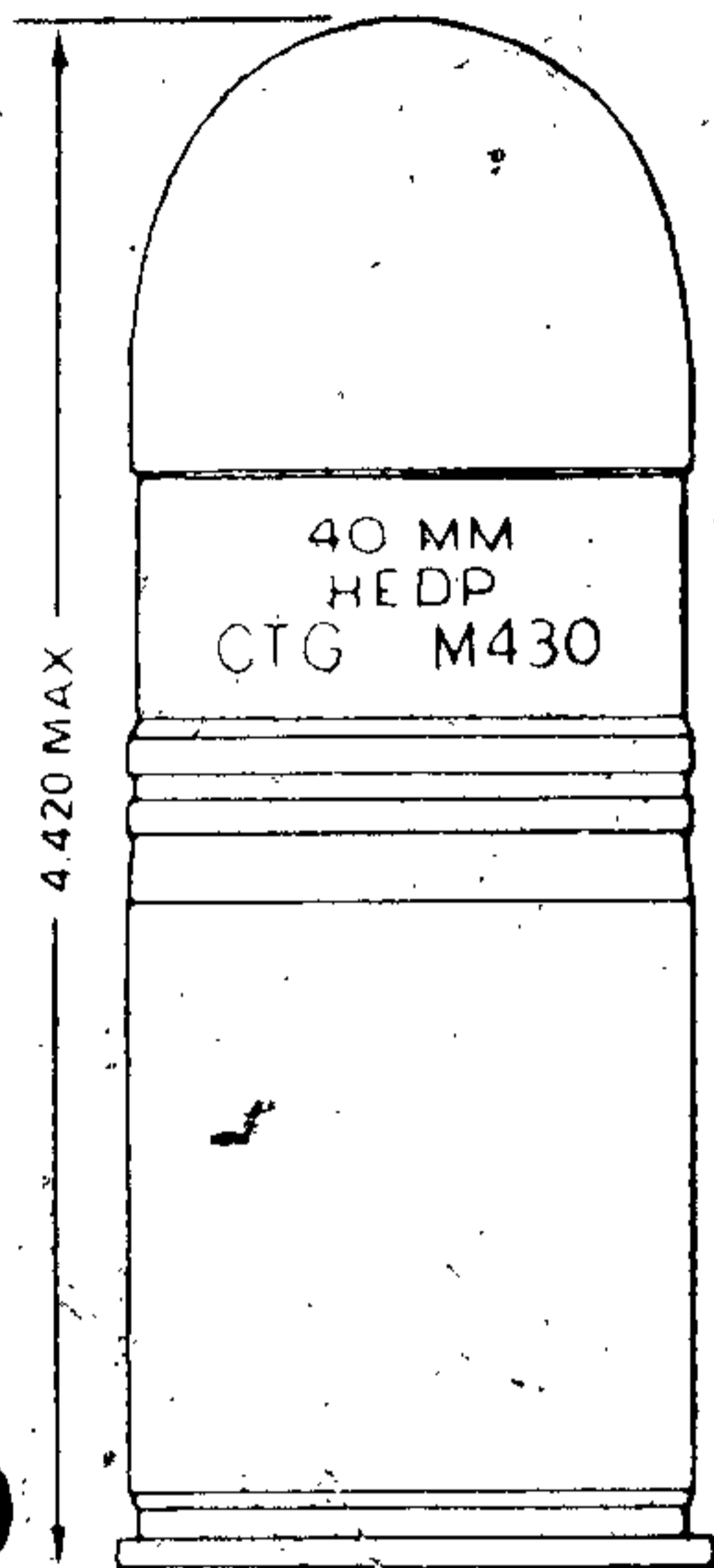
Shipping and Storage Data:

Quantity-distance class - 1
 Storage compatibility
 group ----- B, E or N
 DOT shipping class----- C
 DOT designation----- CARTRIDGES,
 PRACTICE AMMUNITION.
 DODIC ----- 1310-B577
 Cartridge drawing
 number ----- 8835952
 Packing drawing
 number ----- 8835104, 8835105

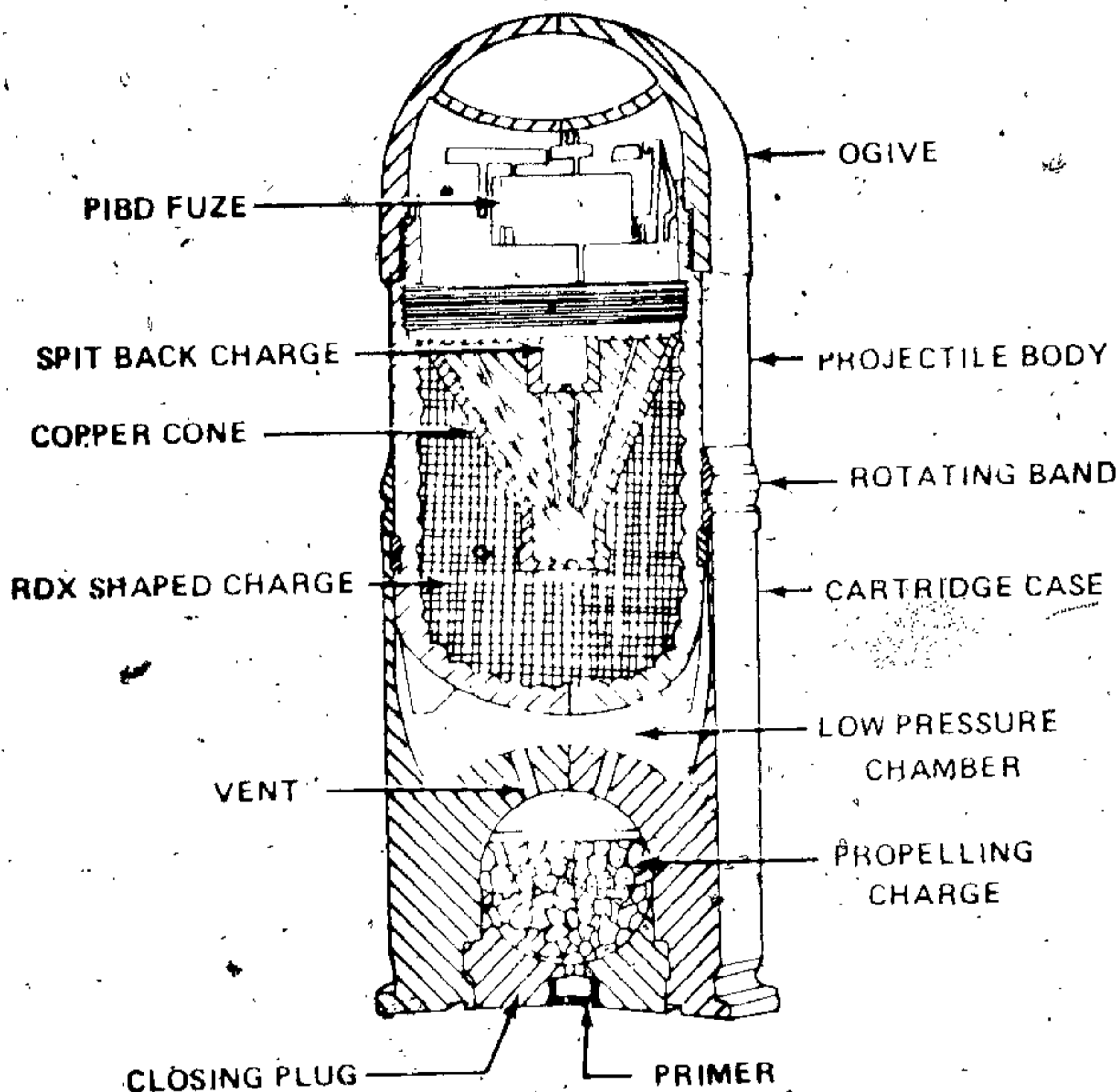
References:

SC 1305/30-IL SB 700-20
 TM 9-1005-249-10
 TM 9-1010-205-10
 TM 9-1010-221-10

CARTRIDGE, 40-MILLIMETER: HEDP, M430



AR 199556-A



AR199555

Type Classification:

Std AMCTC 8664 dtd 1971

Use:

This cartridge is a high explosive, dual purpose, impact type round designed to penetrate two inches of steel armor at 0 angle of obliquity and inflict personnel casualties in the target area. It is fired from 40-mm Grenade Launchers M75 and M129, and from the 40-mm Machine Gun MK19 Mod 1.

Description:

This cartridge is a fixed round of ammunition consisting of an internally embossed one-piece steel projectile body together with a metal rotating band which is fitted to a cartridge case assembly. A PIBD fuze assembly with a copper B spitback charge and copper

cone liner is threaded into the open well of the projectile cavity. The fuze assembly seals the front end of the projectile cavity which contains the high explosive shaped charge. The projectile assembly is press-fitted into a cartridge case. The case is a hollow bichambered aluminum cylinder with a metal closing plug crimped into the open well of the propellant chamber in the cartridge base. The propellant chamber, which contains the propelling charge, has vent holes in the top and is sealed at the bottom by a closing plug. A percussion primer is crimped into the center opening in the closing plug. The propellant chamber acts as a high-pressure chamber, and the upper hollow cavity in the case acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge. Pressure, generated by the burning propellant in the high-pressure chamber, forces the expanding

gases through the vent holes into the low-pressure chamber, and propels the projectile forward. The rotating band around the projectile engages the rifling in the launcher tube imparting a spin of 12,000 rpm to the projectile. The expanding gases in the low-pressure chamber force the projectile through the barrel with a velocity of 242 meters per second. When the projectile is fired, setback force causes the fuze setback pin to move rearward from the fuze rotor. The rotor is held out of line with the fuze detonator by the setback pin and fuze centrifugal lock which engages the star wheel of the fuze timing mechanism. When the projectile attains sufficient spin, the centrifugal lock releases the star wheel and arming begins. The rotor springs start rotation of the rotor which is sustained by centrifugal force. A fuze escapement assembly, which engages the rotor gear, delays arming of the fuze. After the projectile has traveled 18 to 30 meters from the launcher tube, the rotor is locked in the armed position and the fuze is armed. Upon impact with the target, the firing pin is driven into the detonator, which in turn initiates the spitback charge, producing a jet which initiates the RDX explosive charge. Concurrently, the Comp B filler detonates, producing an armor piercing jet of molten metal and fragmentation of the projectile body.

Tabulated Data

Complete round:

Type ----- HEDP
 Weight ----- 0.75 lb
 Length ----- 4.42 in.
 Weapons used
 with ----- M75, M129, 40-mm
 Grenade Launchers,
 M19 Mod 1 40-mm
 machine gun

Projectile:

Body material ----- Blank and draw steel
 w/copper cone
 Color ----- Olive drab w/yellow
 markings & yellow
 ogive

Filler and weight - Comp A5, 38 grams
 Fuze ----- PIBD, M549
 Propelling charge:
 Cartridge case --- M169
 Propellant ----- M2, 4.64 grams
 Primer ----- Perc., FED215

Performance:

Maximum range -- 2,200 meters
 Muzzle velocity -- 244 mps (795 fps)
 Arming distance --- 18 to 30 meters

Temperature Limits: (59 - 98 feet)

Firing:

Lower limit ----- -65°F (-53.8°C)
 Upper limit ----- +125°F (51.6°C)

Storage:

Lower limit ----- -65°F (-53.8°C)
 Upper limit ----- +165°F (73.9°C)

*Packing ----- 50 rounds in linked
 belt

*Packing Box:

Weight ----- 53 lbs.
 Dimensions ----- 25-11/16 x 16-1/4 x
 6-27/32 in.
 Cube ----- 1.7 cu. ft.

*NOTE: See SC for latest packing data including NSN's.

Shipping and Storage Data:

Quantity-distance

class ----- 1.1

Storage compatibility

group ----- E

DOT shipping class -- A

DOT designation ----- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES.

DODAC ----- 1310-B542

Cartridge drawing

number ----- 9205427

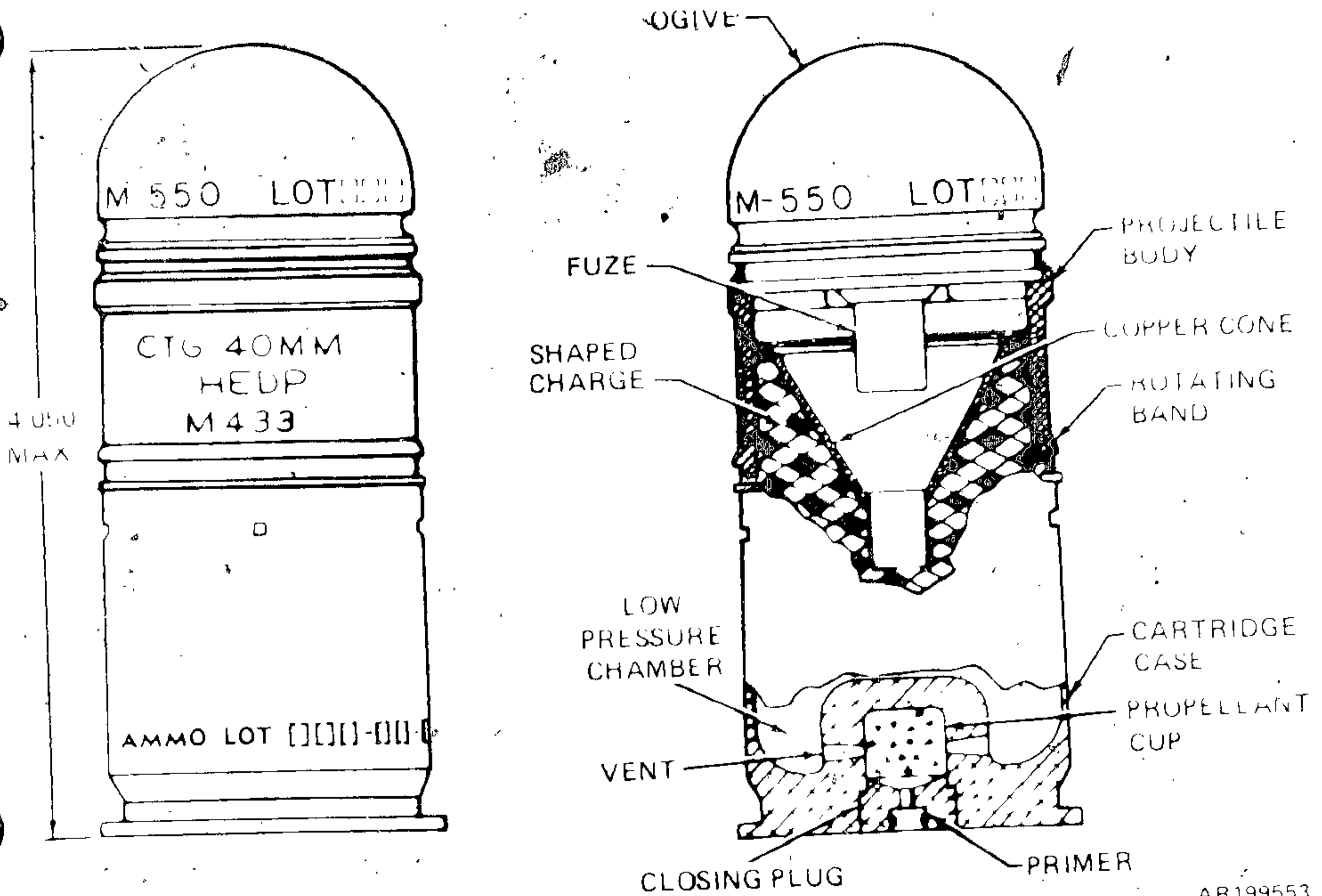
Packing drawing

number ----- 9251995

References:

SC 1305/30-IL
 SB 700-20

CARTRIDGE, 40-MILLIMETER: HEDP, M433



AR199554

AR199553

Type Classification:

Std AMCTC 8306 dtd 1971

Use:

This cartridge is a dual purpose impact type round which is designed to penetrate at least two inches of steel armor at 0 angle of obliquity and inflict personnel casualties in the target area. It is fired from 40-mm Grenade Launchers M79 and M203 (attached to the M16/M16A1 rifle).

Description:

The cartridge is a fixed round of ammunition consisting of a one-piece, aluminum projectile body with rotating band, and a cartridge case assembly. A hollow aluminum ogive is fitted to the front end of the projectile. A PIBD fuze assembly with an RDX spittack charge and copper cone fuze is fitted to the opening of the projectile cavity. The cavity is sealed by the fuze assembly and contains the high explosive shaped

charge. The projectile assembly is press-fitted into the cartridge case assembly. The case is a hollow bichambered aluminum cylinder with a steel closing plug crimped into the opening of the annealed brass propellant cup assembly in the cartridge base. The propellant cup has vent holes in the sides, is sealed in the bottom by the closing plug, and contains the propelling charge. A percussion primer is crimped into the center of the closing plug. The propellant cup acts as a high pressure chamber, and the upper hollow cavity in the case acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the percussion primer, which ignites the propelling charge. Pressure created by the burning propellant in the high-pressure chamber causes the propellant cup to rupture. The propellant gases escape through vent holes into the low-pressure chamber. The rotating band around the projectile

engages the rifling in the launcher tube to impart a spin of 3750 RPM to the projectile. Expanding gases in the low-pressure chamber force the projectile through the tube with a muzzle velocity of 76 meters per second. After the projectile leaves the launcher tube, initial rotation causes the fuze detent to free the fuze rotor. Centrifugal force causes three hammer weights to move radially outward, allowing a conical spring to move the firing pin forward, disengaging the rotor. Dynamic imbalance of the rotor causes it to rotate to the armed position, aligning the M55 detonator with the firing pin and the spitback shaped charge. A fuze escapement mechanism retards rotor movement, delaying arming until the projectile has traveled at least 45 feet from the launcher tube. Upon impact with the target, the firing pin is driven into the detonator, triggering the spitback shaped charge and producing a jet blast which detonates the HE bursting charge. Detonation of the bursting charge forms an armor-piercing jet of molten metal and fragmentation of the projectile body.

Tabulated Data:

Complete round:

Type ----- HEDP
 Weight ----- 0.507 lb
 Length ----- 4.05 in.
 Weapons used
 with ----- M79, M203 40-mm
 grenade launchers
 (attached to M16/
 M16A1 rifle)

Projectile:

Body material --- Aluminum skirt with
 steel cup attached
 Color ----- Olive drab w/white
 markings & yellow
 ogive
 Filler and weight -- Comp A5, 45 grams
 Fuze ----- PIBD, M550

Propelling charge:

* Cartridge case --- M118
 Propelling charge M9, 330 mg.
 Primer ----- M42, FED 100

Performance:

Maximum range -- 400 meters
 Muzzle velocity -- 76 mps (250 fps)
 Arming distance -- 14 to 27 meters
 (45 - 90 ft)

Temperature Limits:

Firing:

Lower limit ----- -45°F (-42.8°C)
 Upper limit ----- +125°F (51.6°C)

Storage:

Lower limit ----- -65°F (-53.8°C)
 Upper limit ----- +165°F (73.9°C)

* Packing ----- 6 rounds in bandoleer,
 12 bandoleers (72
 rounds) per box

* Packing Box:

Weight ----- 53.5 lbs.
 Dimensions ----- 17-3/4 x 14-1/8 x 11-
 15/32 in.
 Cube ----- 1.7 cu ft

* NOTE: See SC for latest packing data including NSN's.

Storage and Shipping Data:

Quantity-distance

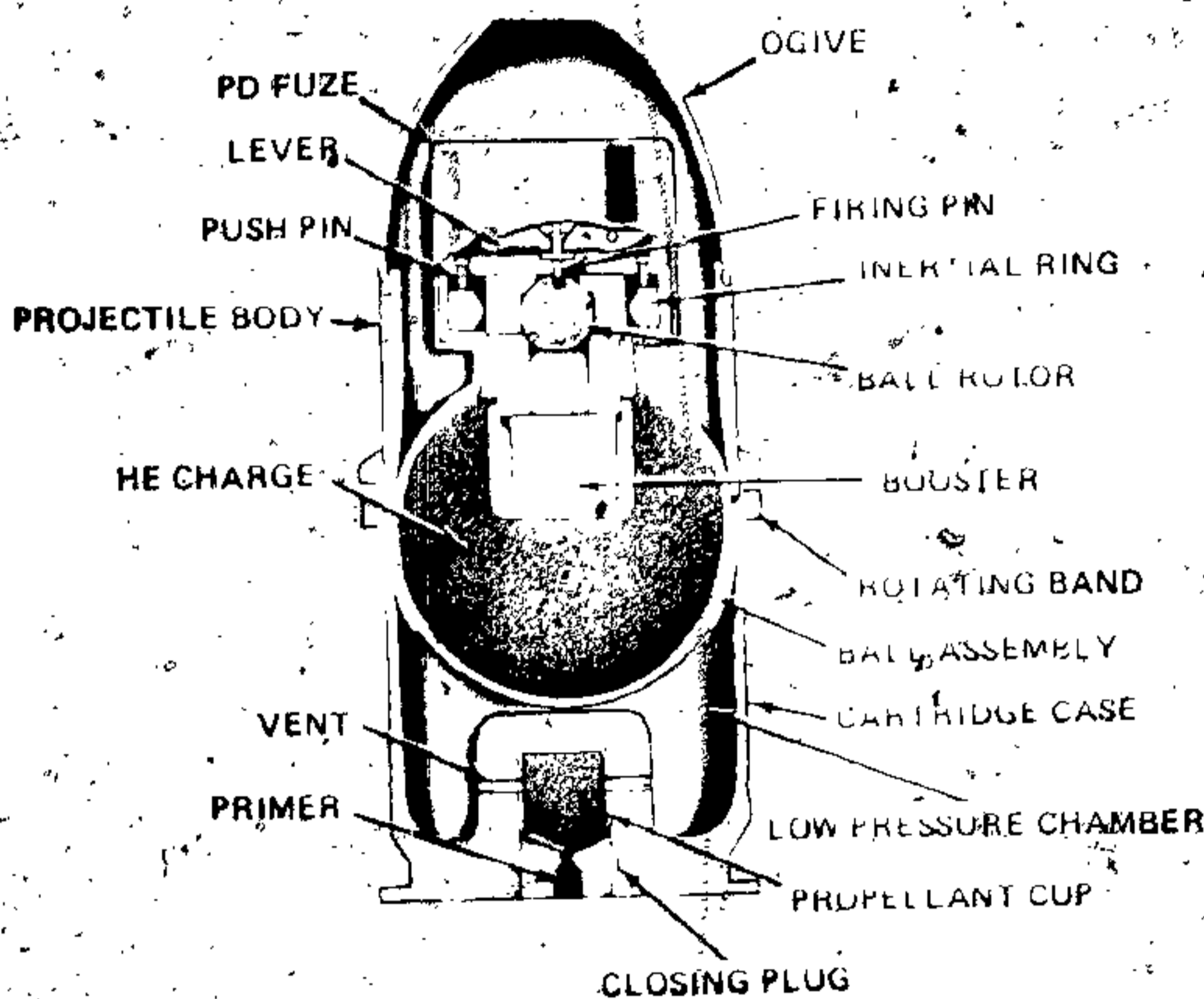
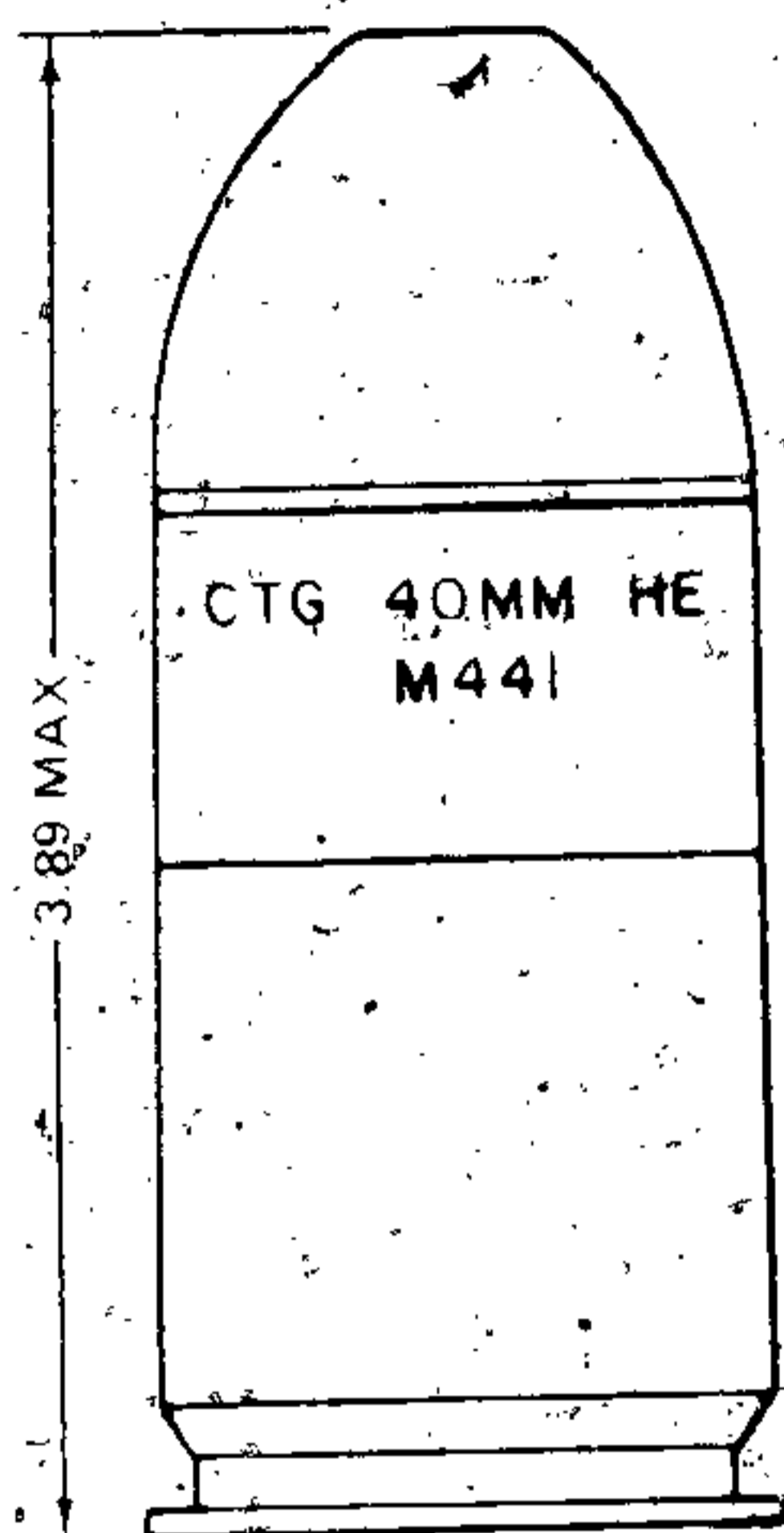
class ----- 1
 Storage compatibility
 group ----- E
 DOT shipping class -- A
 DOT designation ---- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES

DODAC ----- 1310-B546
 Cartridge drawing
 number ----- 8886371
 Packing drawing
 number ----- 8830104, 8835105

References:

SC 1305/30-IL
 SB 700-20
 TM 9-1005-249-10
 TM 9-1010-205-10
 TM 9-1010-221-10

◦ CARTRIDGE, 40-MILLIMETER: HE, M441



AR199551

AR199552

Type Classification:

Std OTCM 37638 dtd 1960

Use:

This cartridge is a high explosive round designed to inflict personnel casualties using ground burst effect. It is fired from 40-mm Grenade Launchers M79 and M203 (attached to the M16/M16A1 rifle).

Description:

The cartridge is a fixed round of ammunition consisting of a projectile body with a rotating band and a cartridge case assembly. A hollow aluminum ogive is fitted to the front of the projectile. A PD fuze with a booster charge is threaded into the opening of a steel ball assembly crimped into the projectile base. The ball assembly contains an HE bursting charge.

The projectile assembly is press-fitted into the aluminum cartridge case. The case is a hollow bichambered cylinder with a metal closing plug crimped into the cartridge case. The propellant cup assembly is sealed by the closing plug in the bottom, and contains the propelling charge. A percussion primer is crimped into a center opening in the closing plug. The propellant cup assembly acts as a high-pressure chamber, and the hollow cavity in the case surrounding the cup acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the primer igniting the propelling charge. Gases from the burning propellant expand in the high-pressure chamber. This pressure ruptures

the propellant cup, forcing the gases to escape through the vents into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher tube imparting spin to the projectile. Expanding gases in the low-pressure chamber force the projectile through the tube with a muzzle velocity of 76 meters per second. At the time of firing, setback causes the firing pin to be withdrawn from the fuze rotor detent. Prior to this action, the detonator in the rotor is held out of line with the explosive train. With the rotor free, centrifugal force causes the rotor ball to turn and align the detonator with the firing pin. The fuze arms after the projectile has traveled approximately 2 to 4 meters (8 feet) from the launcher tube. Upon graze or impact, inertia throws the inertial ring forward against the push pins. The push pins pivot the levers inward to drive the firing pin into the detonator. The detonator initiates the booster charge to detonate the high explosive charge resulting in blast and fragmentation of the projectile body.

Tabulated Data:

Complete round:

Type ----- HE
 Weight ----- .503 lb
 Length ----- 3.89 in.
 Weapons used with ----- M79, M203 40-mm
 grenade launchers
 (attached to M16/
 M16A1 rifle)

Projectile:

Body material ----- Aluminum skirt with
 steel ball containing
 explosive filler
 Color ----- Olive drab w/yel-
 low markings and
 yellow ogive
 Filler and weight ----- Comp. B, 32 grams
 Fuze ----- PD, M552

Propelling charge:

Cartridge case ----- M118
 Propellant ----- M9, 330 mg.
 Primer ----- Perc., M42

Performance:

Maximum range ----- 400 meters
 Muzzle velocity ----- 76 mps (250 fps)

Temperature Limits:

Firing:

Lower limit ----- -45°F (-42.8°C)
 Upper limit ----- + 125°F (51.6°C)

Storage:

Lower limit ----- -65°F (-53.8°C)
 Upper limit ----- + 165°F (73.9°C)

* Packing ----- 6 rounds per bando-
 leer; 12 bandoleers (72

* Packing Box: rounds) per box

Weight ----- 53 lbs.

Dimensions ----- 17-3/4 x 14-1/8
 x 11-15/32 in.

Cube ----- 1.7 cu. ft.

NOTE: See SC for complete packing data including NSN's.

Storage and Shipping Data:

Quantity-distance
 class ----- 4

Storage compatibility

group ----- E

DOT shipping class ----- A

DOT designation ----- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES

DODAC ----- 1310-B575

Cartridge drawing

number ----- 9884459

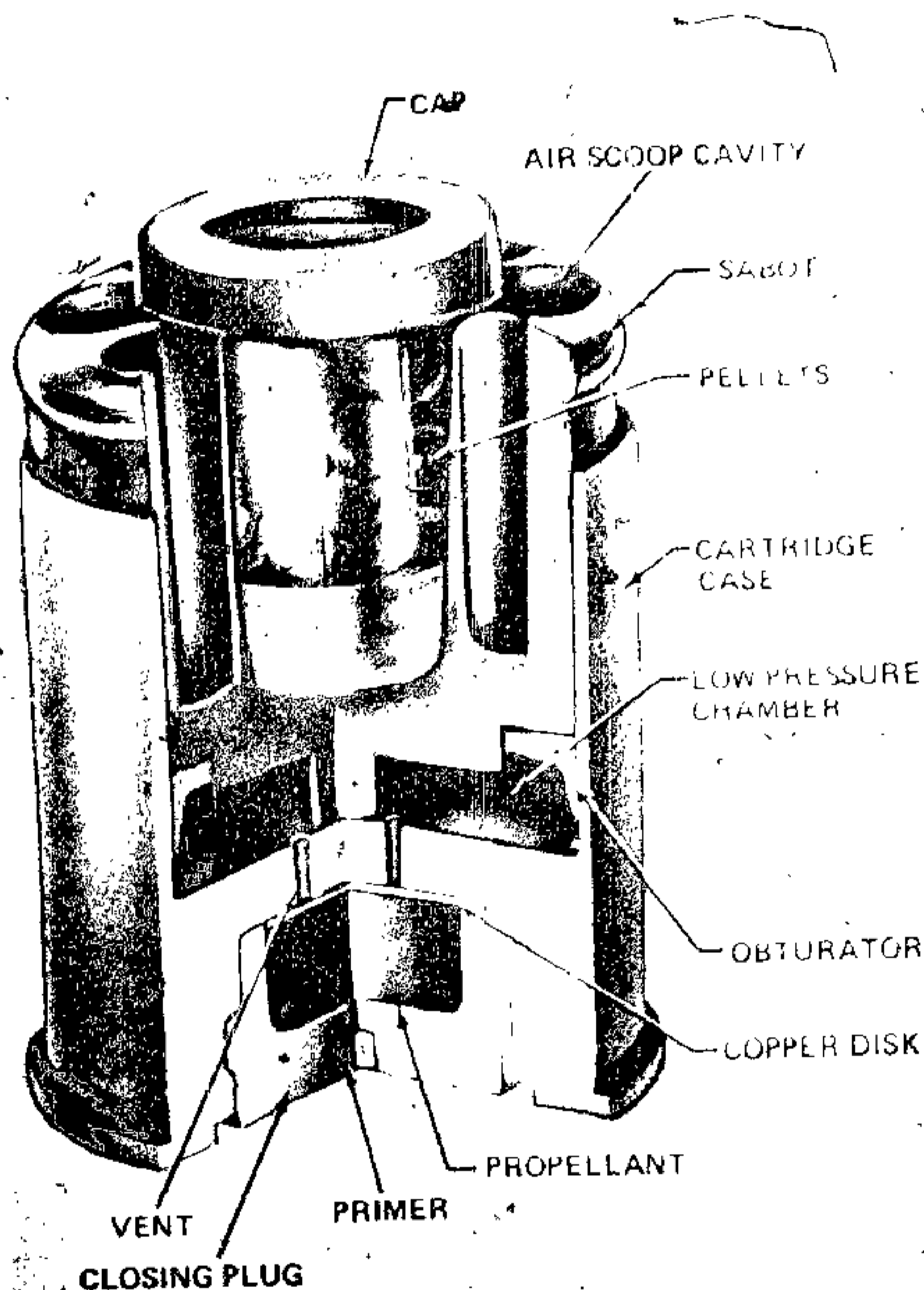
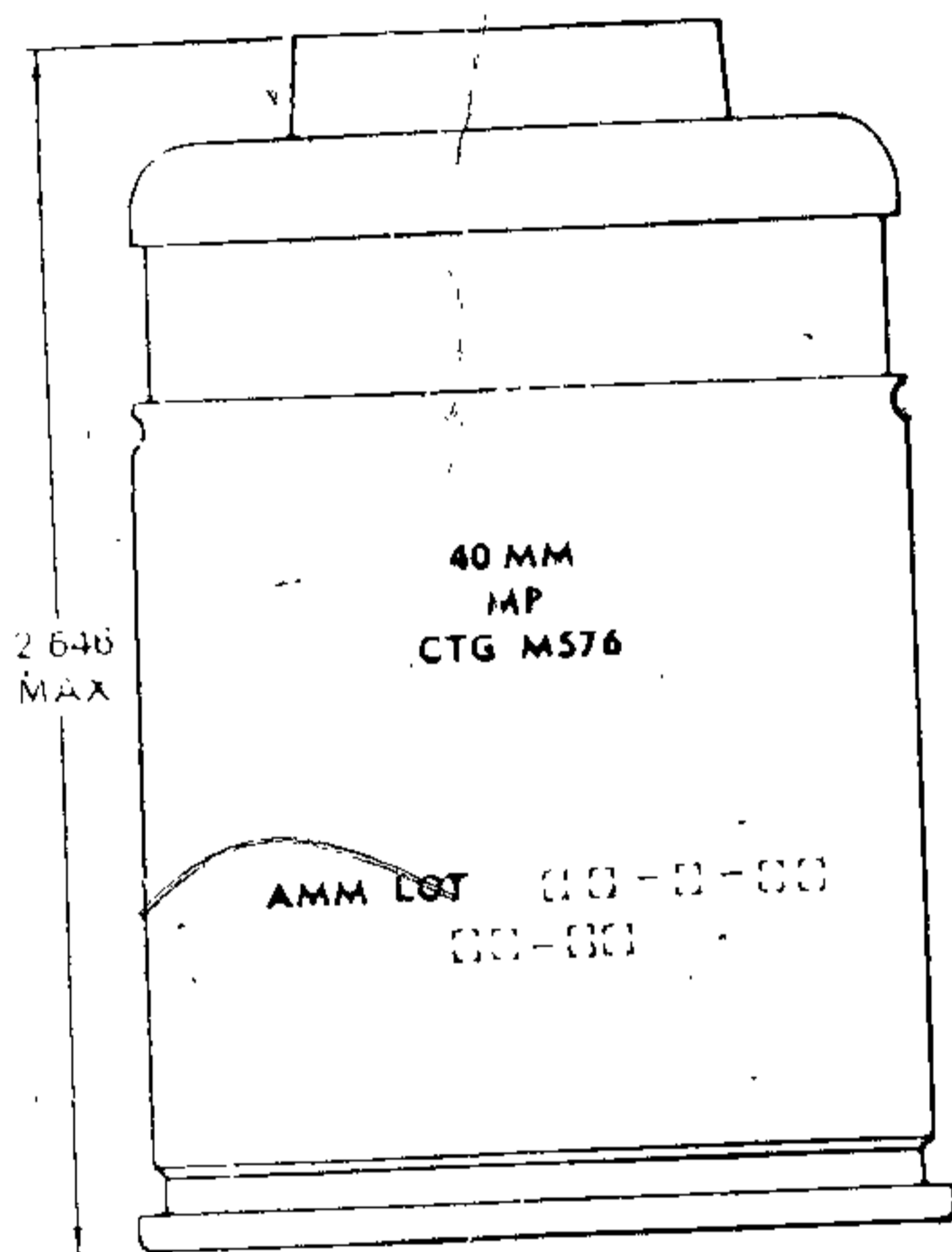
Packing drawing

number ----- 8835105

References:

- SC 1905/30-IL
- SB 700-20
- TM 9-1005-249-10
- TM 9-1010-205-10
- TM 9-1010-221-14
- TM 9-1310-202-12

CARTRIDGE, 40-MILLIMETER: MULTIPLE PROJECTILE, M576



AR199547

AR199548

Type Classification:

Std AMCTC 8417 dtd 1971

Use:

This cartridge is intended for use in counter-insurgency and conventional operations in jungle environments, particularly during periods of poor visibility where personnel targets appear at short distances without warning and are vulnerably exposed only fleetingly. It is designed to be fired from 40-mm Grenade Launchers M79 and M203 (attached to the M16/M16A1 rifle).

Description:

The cartridge is a fixed round of ammunition consisting of a multiple projectile assembly and a cartridge case assembly. The projectile assembly includes a polyethylene sabot carrier with one center cavity and several smaller cavities around the outside perimeter. A plastic pellet cup filled with 20 metal pellets is fitted into the center cavity and is covered by a stainless steel cap. The outer cavities act as air scoops. An obturator on the rear of the sabot serves as a propellant gas seal between the cartridge case and the sabot. The projectile assembly is crimped into the cartridge case. The case is a

hollow chambered cylinder with a metal closing plug crimped into the open well of the propellant chamber in the cartridge base. The propellant chamber acts as a high-pressure chamber and has ten vent holes in the top sealed by a copper disk. The upper hollow cavity in the case serves as a low-pressure chamber. A percussion primer is crimped into a center opening in the closing plug.

Functioning:

The weapon firing pin strikes the primer which ignites the propelling charge. Gases from the burning propellant expand in the high-pressure chamber. The pressure ruptures the copper disk allowing the expanding gases to escape through the vent holes into the low-pressure chamber. Continuing gas expansion forces the projectile through the launcher tube. Setback force from cartridge ignition causes the pellet cup in the sabot carrier to move rearward. This movement disengages the cap from the pellet cup. Upon reaching the muzzle, the sabot carrier and pellet cup are discarded allowing the metal pellets free flight to the target.

Tabulated Data:

Complete round:

Type ----- Multiple projectile
 Weight ----- 0.254 lbs
 Length ----- 2.646 in.
 Cannon used with -- M79, M203, 40-mm
 grenade launchers
 (attached to M16/
 M16A1 rifle).

Projectile:

Body material ---- Molded polyethylene
 plastic
 Color ----- Black w/white
 markings
 Filler and weight -- 20 metal pellets, 24
 grams

Propelling charge:

Cartridge case ---- M199
 Propellant ----- M2, 186 mg.
 Primer ----- Perc., 0.45 cal.,
 Remington, No. 2-
 1/2

Performance:

Effective range --- 30 meters
 Muzzle velocity --- 269 mps (885 fps)

Temperature Limits:

Firing:

Lower limit ----- -45°F (-42.8°C)
 Upper limit ----- +125°F (51.6°C)

Storage:

Lower limit ----- -65°F (-53.8°C)
 Upper limit ----- +165°F (73.9°C)

*Packing

6 rounds per bando-
 leer; 12 bandoleers (72
 rounds) per wirebound
 wooden box

*Packing Box:

Weight ----- 34 lbs.
 Dimensions ----- 16-1/4 x 13-1/4 x
 10-11/16 in.
 Cube ----- 1.3 cu ft

*NOTE: See SC for complete packing data in-
 cluding NSN's.

Storage and Shipping Data:

Quantity-distance

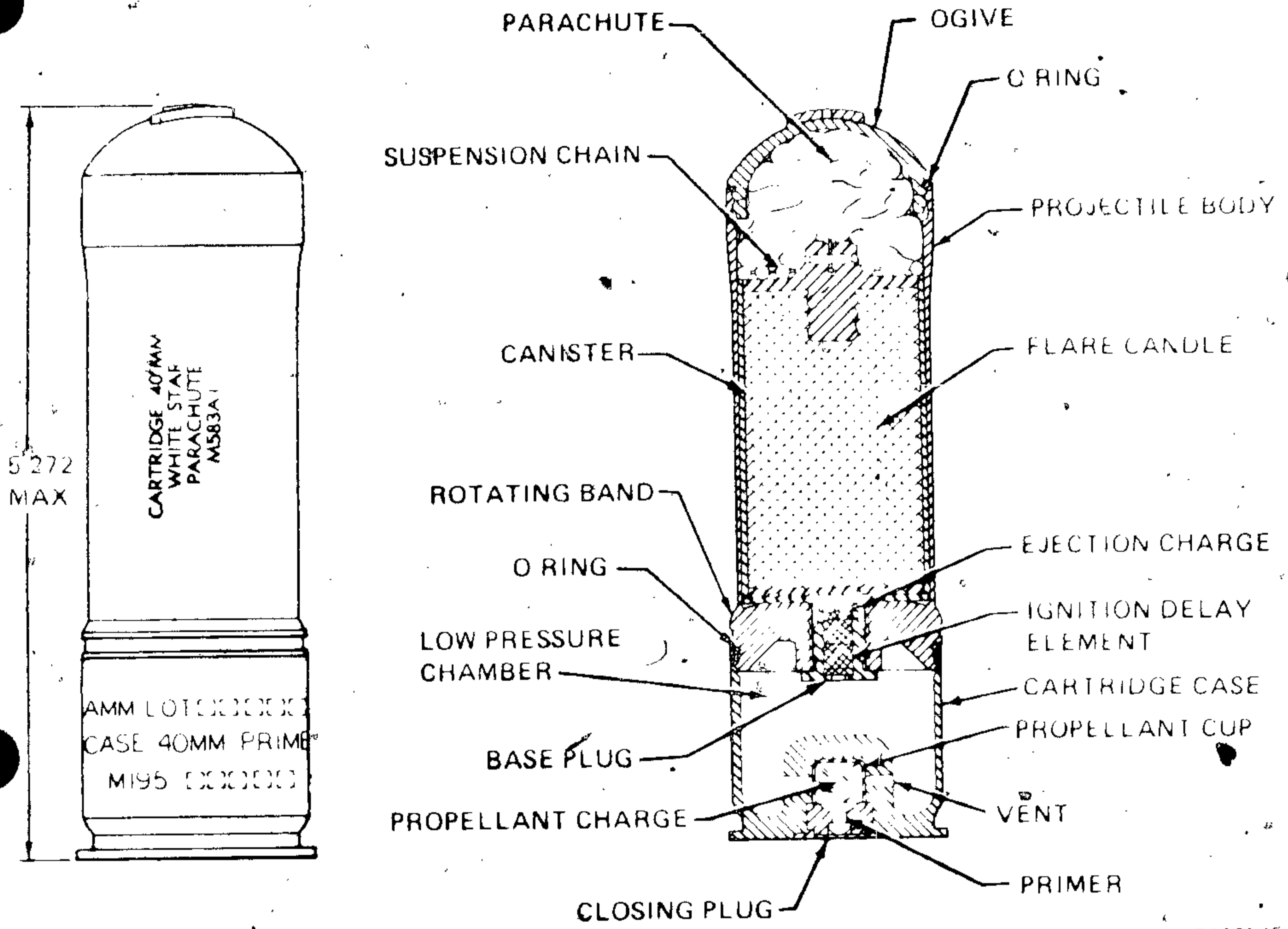
class ----- 1
 Storage compatibility
 group ----- E
 DOT shipping class --- C
 DOT designation ---- SMALL ARMS
 AMMUNITION

DODAC ----- 1310-B534
 Cartridge drawing
 number ----- 10542398
 Packing drawing
 number ----- 8835105

References:

SC 1305/30-IL
 SB 700-20
 TM 9-1005-249-10
 TM 9-1010-205-10
 TM 9-1010-221-10

CARTRIDGE, 40-MILLIMETER: PARACHUTE, WHITE STAR, M583A1;
GREEN STAR, M661; AND RED STAR, M662



AR199546

AR199545

Type Classification:

M583A1 - Std AMCTC 9096 dtd 1972

M661 - Std LCC-A

M662 - Std LCC-A

Use:

These cartridges are designed for illumination and signaling with less weight and bulk and greater accuracy than comparable hand-held signals. They are fired from 40-mm Grenade Launchers M79 and M203 (attached to the M16/M16A1 rifle).

Description:

The cartridge is a fixed round of ammunition consisting of a projectile assembly and a cartridge case assembly. The projectile has a

one-piece, hollow aluminum body with a metal rotating band. A plastic ogive, embossed with a raised letter for night identification of payload, is snapped into an O-ring in the front opening of the projectile cavity. The cavity contains a pyrotechnic flare candle assembly, and an integral ignition/ejection charge attached to a 20-inch diameter parachute. The projectile has a 4-5 second delay ignition element crimped into the center opening of a metal delay carrier. The projectile is press-fitted into an O-ring in the front opening of the cartridge case. The case is a hollow bichambered cylinder with a metal closing plug crimped into the base of the cartridge case. The propellant cup is seated on the bottom by the closing plug. The cup acts as a high-pressure chamber, and the cavity in the case surrounding the cup acts as a low-pressure chamber.

A percussion primer is crimped into a center opening in the closing plug.

Functioning:

The weapon firing pin strikes the primer igniting the propelling charge. Gases from the burning propellant expand in the high-pressure chamber. This pressure ruptures the propellant cup, and the pressure escapes through the vent holes into the low-pressure chamber, propelling the projectile forward with the velocity required to reach the burst altitude. The burning propellant also ignites the 5-second delay element in the base of the projectile. The rotating band engages the rifling in the launcher tube to impart a spin of 3750 RPM to the projectile. At the end of the delay, the delay element ignites the ejection charge. The ejection charge ignites the candle and blows the candle assembly out through the top of the projectile body. The attached parachute deploys upon ejection to lower the candle at 7 fps. The candle burns for approximately 40 seconds

The candle functions at an altitude of 500 to 700 feet when fired vertically and is visible to an air observer at a slant range of at least 3 miles from 3000 feet altitude.

Tabulated Data:

Complete round:

Type ----- Parachute, white star
 Weight ----- .49 lb
 Length ----- 5.272 in.
 Weapons used with --- M79, M203 40-mm grenade launchers (attached to M16/M16A1 rifle)

Projectile:

Body material ----- Impact or bar alloy aluminum
 Color ----- White w/black markings
 Filler and weight ---- Illum comp:
 M583A1 - 93 grams
 M661 - 85 grams
 M662 - 85 grams

Average candlepower (min):

M583A1 - 90,000
 M661 - 8,000
 M662 - 20,000

Propelling charge:

Cartridge case ----- M195
 Propellant ----- M9, 330 mg.
 Primer ----- Perc., M42

Performance:

Burst height ----- 183 meters, (QE=85°) (approx.)
 Muzzle velocity ----- 76 mps (250 fps)

Temperature Limits:

Firing:

Lower limit ----- -45°F (-42.8°C)
 Upper limit ----- + 125°F (51.6°C)

Storage:

Lower limit ----- - 65°F (-53.8°C)
 Upper limit ----- + 165°F (73.9°C)

Packing ----- 22 rounds per metal box;
 2 metal boxes (44 rounds)
 *Packing Box: per wirebound wooden box

Weight ----- 45.9 lbs.
 Dimensions ----- 14-5/8 x 12-13/16
 x 9-1/8 in.

Cube ----- 1.0 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

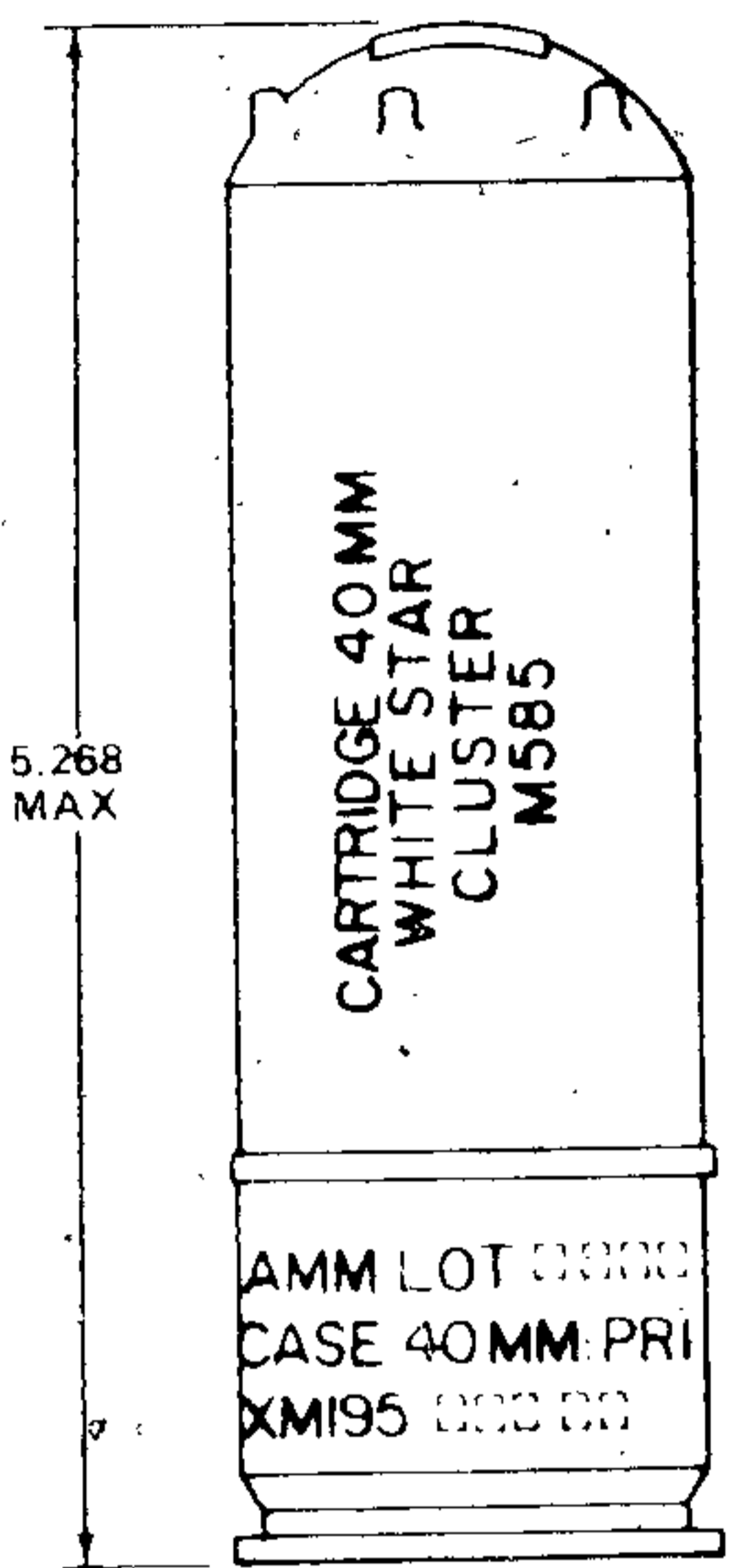
Quantity-distance class ----- 1:3
 Storage compatibility group ----- G
 DOT shipping class ----- C
 DOT designation ----- SIGNAL FLARE
 HANDLE CAREFULLY
 KEEP FIRE AWAY
 DODAC ----- 1310-B535 (M583A1)
 1310-B504 (M661)
 1310-B505 (M662)

Cartridge drawing number ----- 9243881
 Packing drawing number ----- 9209204, 9209205

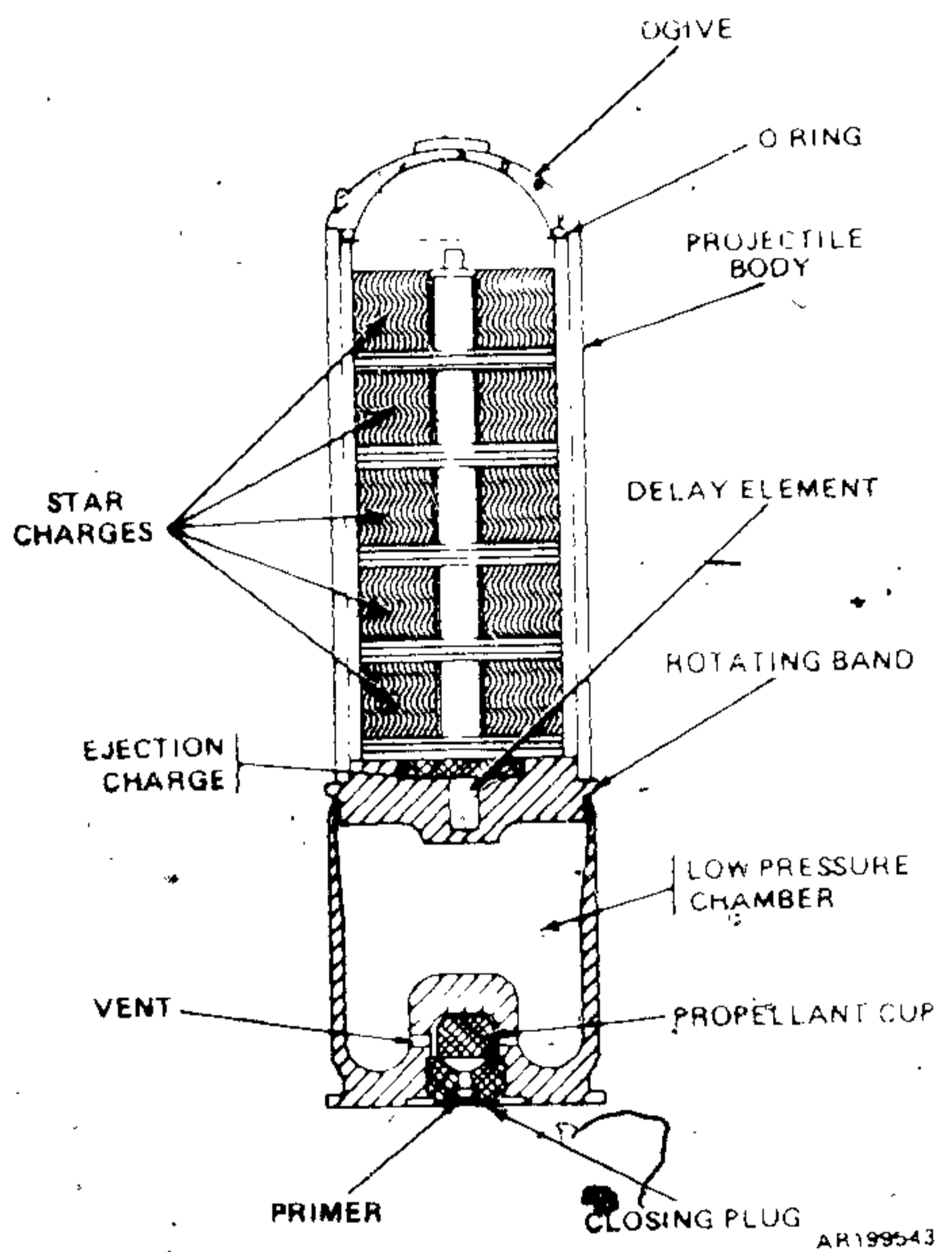
References:

SC 1305/30-IL
 SB 700-20
 TM 9-1005-249-10
 TM 9-1010-205-10
 TM 9-1010-221-10

CARTRIDGE, 40-MILLIMETER: CLUSTER, WHITE STAR, M585



AR199644



AR199543

Type Classification:

Reclassified Std LCC-B

Use:

The cartridge is designed for illumination and signaling with less weight and bulk and greater accuracy than comparable hand-held signals. It is fired from 40-mm Grenade Launchers M79 and M203 (attached to the M16/M16A1 rifle).

Description:

The cartridge is a fixed round of ammunition consisting of a projectile assembly and a cartridge case assembly. The projectile has a

one-piece, hollow aluminum body with a rotating band. A plastic ogive, embossed with a raised "W" for night identification of payload color and five raised dots to identify a cluster round, is snapped into an O ring in the front opening of the projectile cavity. The cavity contains an illuminant candle assembly of five white star charges and a black powder ejection charge. The star charges are contained in phenolic-coated Kraft paper and mounted on a base plug of similar material over the ejection charge. A 5-second delay pyrotechnic ignition charge is fitted into the center of the projectile base. The projectile assembly is fitted into the cartridge case. The case is a hollow bicam-bored cylinder with a metal closing plug crimped into the base of the cartridge case.

The propellant cup is ←
 sealed at the bottom by the closing plug. The cup acts as a high-pressure chamber, and the cavity surrounding the cup in the cartridge case acts as a low-pressure chamber. A percussion primer is crimped into a center opening in the closing plug.

Functioning:

The weapon firing pin strikes the primer igniting the propelling charge. Gases from the burning propellant expand in the high-pressure chamber. The pressure ruptures the propellant cup and the gas pressure escapes through the vents into the low-pressure chamber. The expanding gases propel the projectile through the launcher tube with a muzzle velocity of 76 mps and reaches a burst altitude of 550 feet at a quadrant elevation of 85 degrees. The burning propellant also ignites the delay element in the base of the projectile. Within 4 to 5 seconds after firing, the delay element ignites the ejection charge. The ejection charge ignites the star charges and blows the candle assembly out through the top of the projectile body. The individual stars burn for approximately 7 seconds during free fall and produce 55,000 candlepower.

Tabulated Data:

Complete round:

Type ----- Cluster, white star
 Weight ----- .41 lb
 Length ----- 5.268 in.
 Weapons used with ----- M79, M203 40-mm
 grenade launchers
 (attached to M16/
 M16A1 rifle)

Projectile:

Body material ----- Impact or bar alumi-
 num alloy
 Color ----- White w/black
 markings
 Filler and weight ----- Illum, 85 grams
 (each pellet 17
 grams)

Propelling charge:

Cartridge case ----- M195
 Propellant ----- M9, 330 mg.
 Primer ----- Perc., M42

Performance:

Burst height ----- 167 meters (QE-85°
 approx.)
 Muzzle velocity ----- 76 mps (250 fps)

Temperature Limits:

Firing:

Lower limit ----- -45°F
 Upper limit ----- +125°F

Storage:

Lower limit ----- -65°F
 Upper limit ----- +165°F

*Packing ----- 22 rounds per metal box;
 2 metal boxes (44 rounds)
 per wirebound wooden box

*Packing Box:

Weight ----- 45.9 lbs.
 Dimensions ----- 14-5/8 x 12-13/16 x
 9-1/8 in.
 Cube ----- 1.0 cu. ft.

*NOTE: See SC for complete packing data in-
 cluding NSN's.

Shipping and Storage Data:

Quantity-distance

class ----- 1.3

Storage compatibility

group ----- G

DOT shipping class ----- C

DOT designation --- SIGNAL FLARE
 HANDLE CAREFULLY
 KEEP FIRE AWAY

DODAC ----- 1310-B536

Drawing number ----- 9207987

Packing drawing
 number ----- 920904, 920905

References:

SC 1305/30-IL

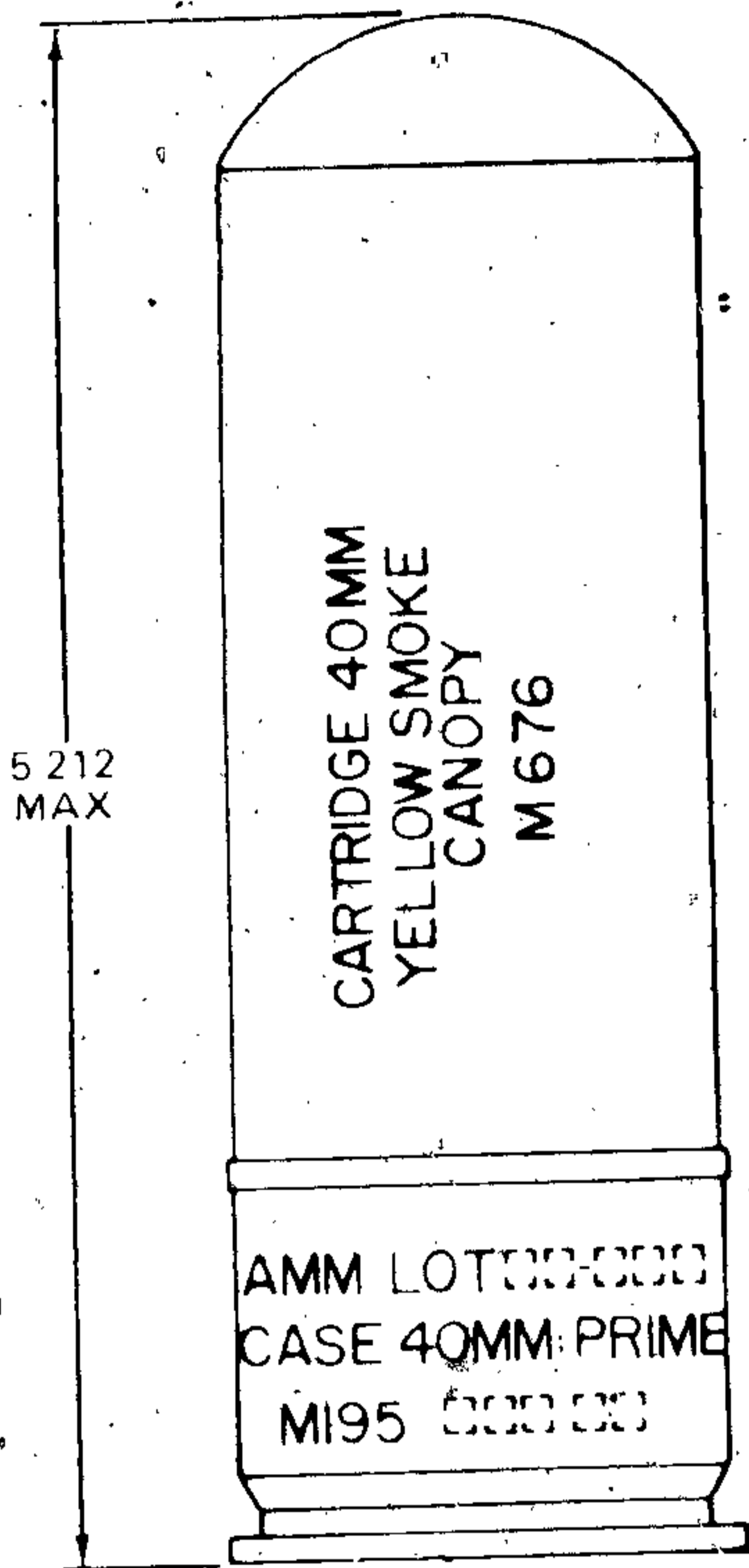
SB 700-20

TM 9-1005-249-10

TM 9-1010-205-10

TM 9-1010-221-10

CARTRIDGE, 40-MILLIMETER: CANOPY, YELLOW SMOKE, M676



AR198542

Type Classification:

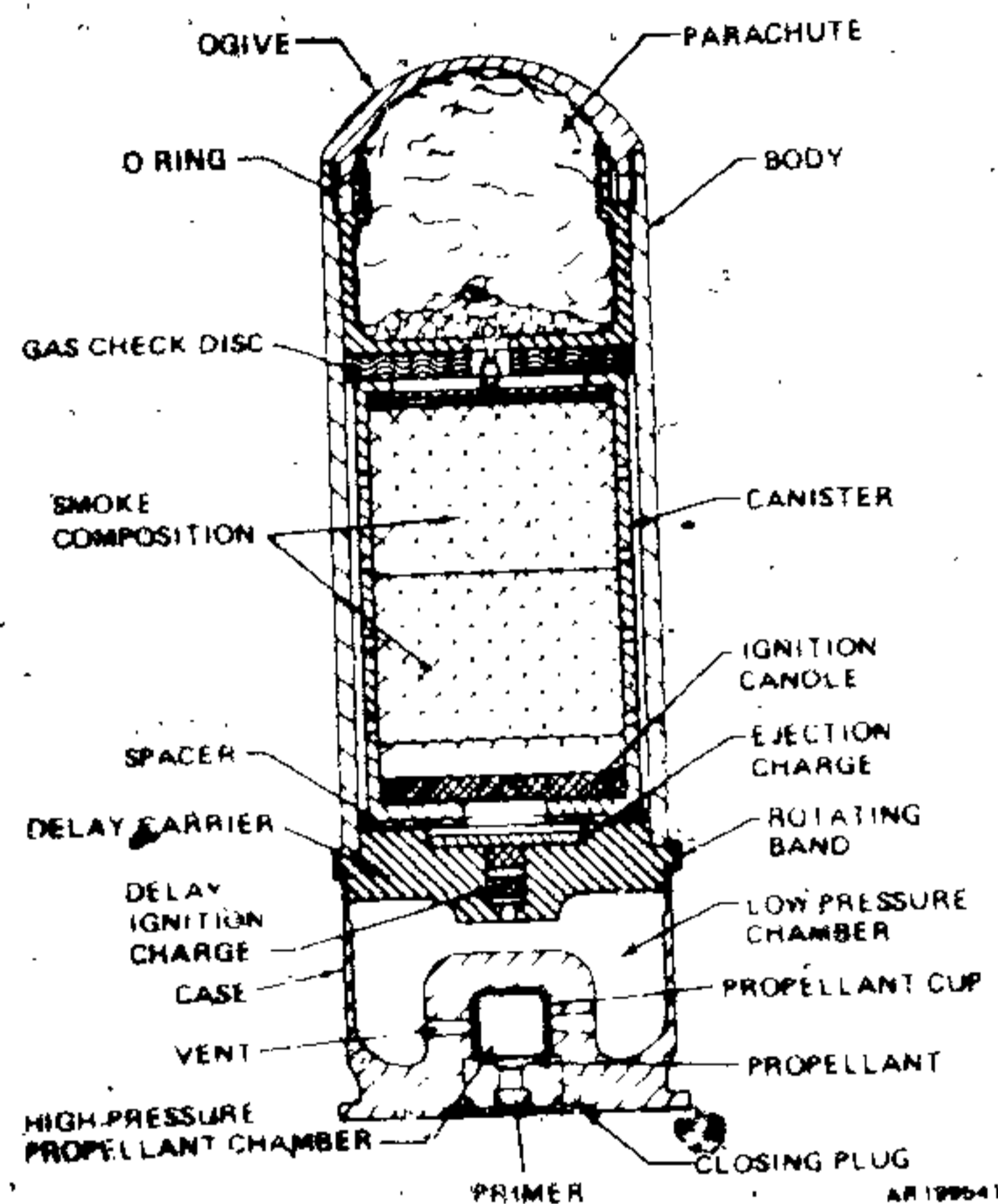
Std LCC-B

Use:

This cartridge is designed for accurately marking the position of a man or unit located beneath moderately thick foliage for aerial observation. The cartridge has the advantage of less weight and bulk and greater accuracy than comparable existing signals. It is fired from 40-mm Grenade Launchers M79 and M203 (attached to the M16/M16A1 rifle).

Description:

The cartridge is a fixed round of ammunition consisting of a projectile assembly and a



cartridge case assembly. The projectile is a hollow, one-piece aluminum body with a rotating band. A plastic ogive is snapped into an O ring in the front opening of the projectile cavity. The color of the ogive denotes smoke color. The cavity contains a pyrotechnic ignition candle and an aluminum canister containing yellow smoke composition attached to a rotating "X" type parachute. A 2 second ignition delay element is crimped into the center of the metal delay carrier. The delay carrier is threaded into the projectile base. A cavity above the delay element contains an ejection charge pellet consisting of 1.2 grams of black powder. The igniter and smoke canister are seated above the ejection charge in the projectile cavity. The projectile assembly is press-fitted into an O ring in the cartridge case opening. The case is a hollow aluminum

bichambered cylinder with a metal closing plug crimped into the base of the cartridge case. The propellant cup is sealed in the bottom by the closing plug. A percussion primer is fitted into the center of the closing plug. The cup acts as a high-pressure chamber, and the cavity around the cup in the cartridge case acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the primer igniting the propelling charge. Gases from the burning propellant expand in the high-pressure chamber. This pressure causes the propellant cup to rupture, forcing the gases to escape through the vent holes into the low-pressure chamber to propel the projectile through the launcher barrel with a muzzle velocity of 76 mps and reaches a burst altitude of 300 feet at a quadrant elevation of 85 degrees. Concurrently, the propellant gases ignite a 2 second delay element in the base of the projectile. The rotating band engages the rifling in the launcher barrel to impart a spin of 3750 RPM to the projectile. Approximately two seconds after firing, the delay element ignites the ejection charge. The ejection charge ejects the smoke canister and parachute assembly out the top of the projectile body and simultaneously ignites the smoke candle. The parachute deploys upon ejection. The smoke canister descends emitting a 90 second smoke signal and becomes entangled in the dense foliage by means of the "X" type parachute.

Tabulated Data:

Complete round:

Type ----- Canopy, yellow smoke
 Weight ----- .48 lb
 Length ----- 5.212 in.
 Weapons used with --- M79, M203 40-mm grenade launchers (attached to M16/M16A1 rifle)

Projectile:

Body material----- Impact or bar aluminum alloy
 Color ----- Light green w/black markings
 Filler and weight ---- Yellow smoke composition, 59 grams

Propelling charge:

Cartridge case ----- M195
 Propellant ----- M9, 330 mg.
 Primer----- Perc., M42

Performance:

Burst height ----- 81 meters (QE-85°) (approx.)
 Muzzle velocity ----- 76 mps (250 fps)

Temperature Limits:

Firing:

Lower limit----- -45°F
 Upper limit ----- + 125° F

Storage:

Lower limit----- - 65° F
 Upper limit ----- + 165° F

*Packing----- 22 rounds per metal box; 2 metal boxes (44 rounds) per wirebound wooden box

*Packing Box:

Weight ----- 45.9 lbs.
 Dimensions----- 14-5/8 x 12-13/16 x 9-1/8 in.
 Cube----- 1.0 cu. ft.

*NOTE: See SC for complete packing data including NSN's

Storage and Storage Data:

Quantity-distance

class ----- 1, 3

Storage compatibility

group ----- G

DOT shipping class----- C

DOT designation ----- SMOKE SIGNALS.
 HANDLE CAREFULLY
 KEEP FIRE AWAY

DODAC ----- 1310-B475

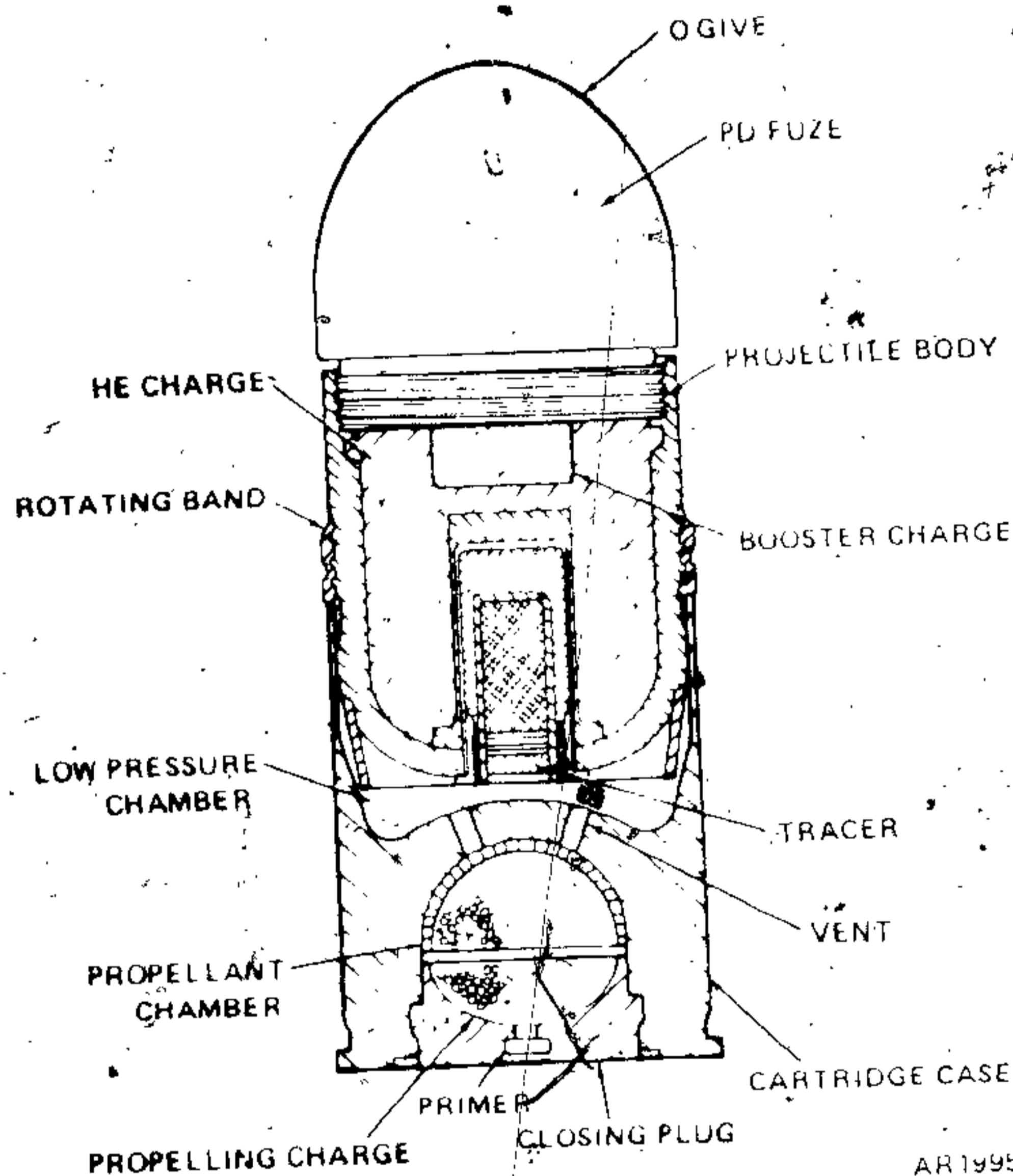
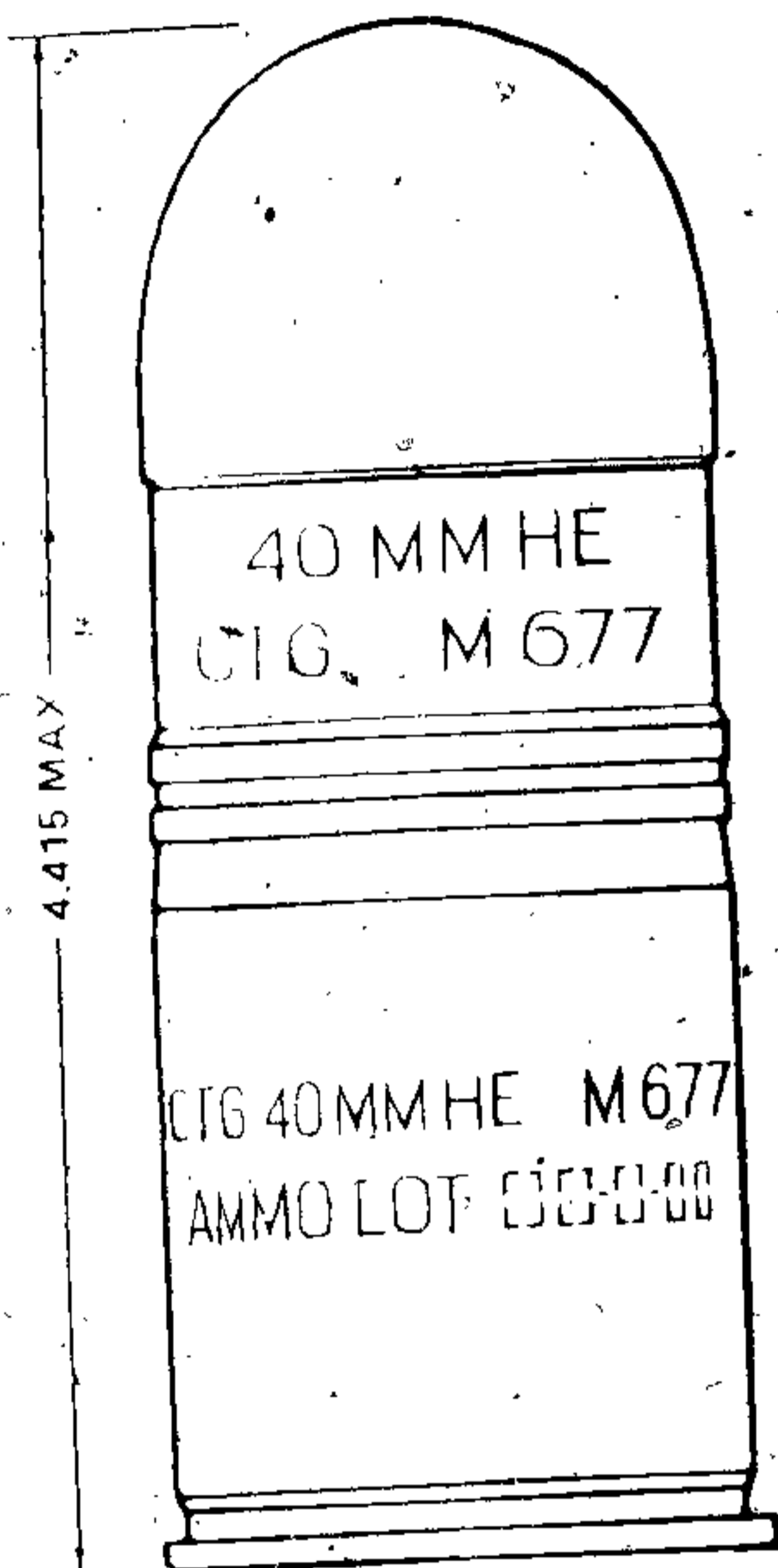
Drawing number----- 9229370

Packing drawing number ----- 9209204, 9209205

References:

SC 1305/30-IL
 SB 700-20
 TM 9-1005-249-10
 TM 9-1010-205-10
 TM 9-1010-221-10

CARTRIDGE, 40-MILLIMETER: HE-T, M677



AR199540

AR199539

Type Classification:

Not type classified.

Use:

This cartridge is a high explosive round containing a tracer element for flight tracking purposes designed to inflict personnel casualties in the target area from ground burst effect. It is fired from 40-mm Grenade Launchers M75 and M129, and from 40-mm Machine Gun MK19 Mod 1.

Description:

This cartridge is a fixed round of ammunition consisting of an internally embossed one-piece steel projectile body with a metal rotating band, and a cartridge case assembly containing a

propelling charge and a percussion primer. A PD fuze is threaded into the front end of the projectile. The projectile cavity contains a high explosive bursting charge and an RDX booster pellet seated below the fuze. A tracer element is threaded into the opening in the center of the projectile base. The projectile assembly is press-fitted into a cartridge case. The case is an aluminum bichambered cylinder with a metal closing plug crimped into the open well of the propellant chamber in the base. The propelling charge is contained in the spherical high-pressure propellant chamber. The chamber has vents in the top and is sealed in the bottom by the closing plug. The hollow chamber in the upper section of the case acts as a low-pressure chamber. A percussion primer is crimped into the center opening in the closing plug.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge. Gases from the burning propellant expand in the high-pressure chamber. This pressure forces the gases through the vents into the low-pressure chamber and propels the projectile forward. The rotating band around the projectile engages the rifling in the launcher tube, imparting a spin of 12,000 rpm to the projectile. The expanding gases in the low-pressure chamber ignite the tracer element and force the projectile through the tube with a velocity of 244 meters per second. When the projectile is fired, setback forces cause the fuze setback pin, which keeps the fuze rotor out of alignment with fuze detonator, to be pulled out of the rotor. The rotor is secured in position by a fuze centrifugal lock which engages the star wheel in the fuze timing mechanism. The centrifugal lock releases the star wheel and arming of the projectile begins when the projectile attains sufficient spin. The rotor springs start rotation of the rotor which is sustained by centrifugal force. The fuze escapement assembly engages the rotor gear delaying arming of the fuze for approximately .07 to .16 seconds. The rotor is then locked in the armed position, and the fuze is armed approximately 18 to 36 meters from the launcher. The tracer element provides flight trace and burns for approximately ten seconds after ignition. Upon impact or graze with the target, inertial forces from impact cause the fuze bracket weights to pivot inward and force the fuze firing pin into the detonator. Concurrently, the detonator triggers the booster charge, in turn, detonating the bursting charge and causing a blast and fragmentation of the projectile body.

Tabulated Data:

Complete round:

Type -----HE-T
 Weight -----.75 lb
 Length -----4.415 in.
 Cannon used with ---M75, M129 40-mm Grenade Launchers
 MK19 Mod 1 40-mm machine gun

Projectile:

Body material -----Plate steel
 Color -----Olive drab w/yellow markings & yellow ogive.
 Filler and weight ---Cyclotol 70, 30, 45 grams
 Fuze -----PD, M533
 Propelling charge:
 Cartridge case -----M169
 Propellant -----M2, 4.64 grams
 Primer -----Perc., PFD 215
 Performance:
 Maximum range ----2,200 meters
 Muzzle velocity ----244 mps (795 fps)

Temperature Limits:

Firing:

Lower limit ----- -45°F
 Upper limit ----- +125°F

Storage:

Lower limit ----- -65°F
 Upper limit ----- +165°F

*Packing ----- 50 rounds in linked belt

*Packing Box:

Weight ----- 53 lbs.
 Dimensions ----- 25-11 16 x 16-1/4 x 6-27/32 in.
 Cube ----- 1.7 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance

class ----- 4

Storage compatibility

group ----- E

DOT shipping class --- A

DOT designation --- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES

DODAC ----- None assigned

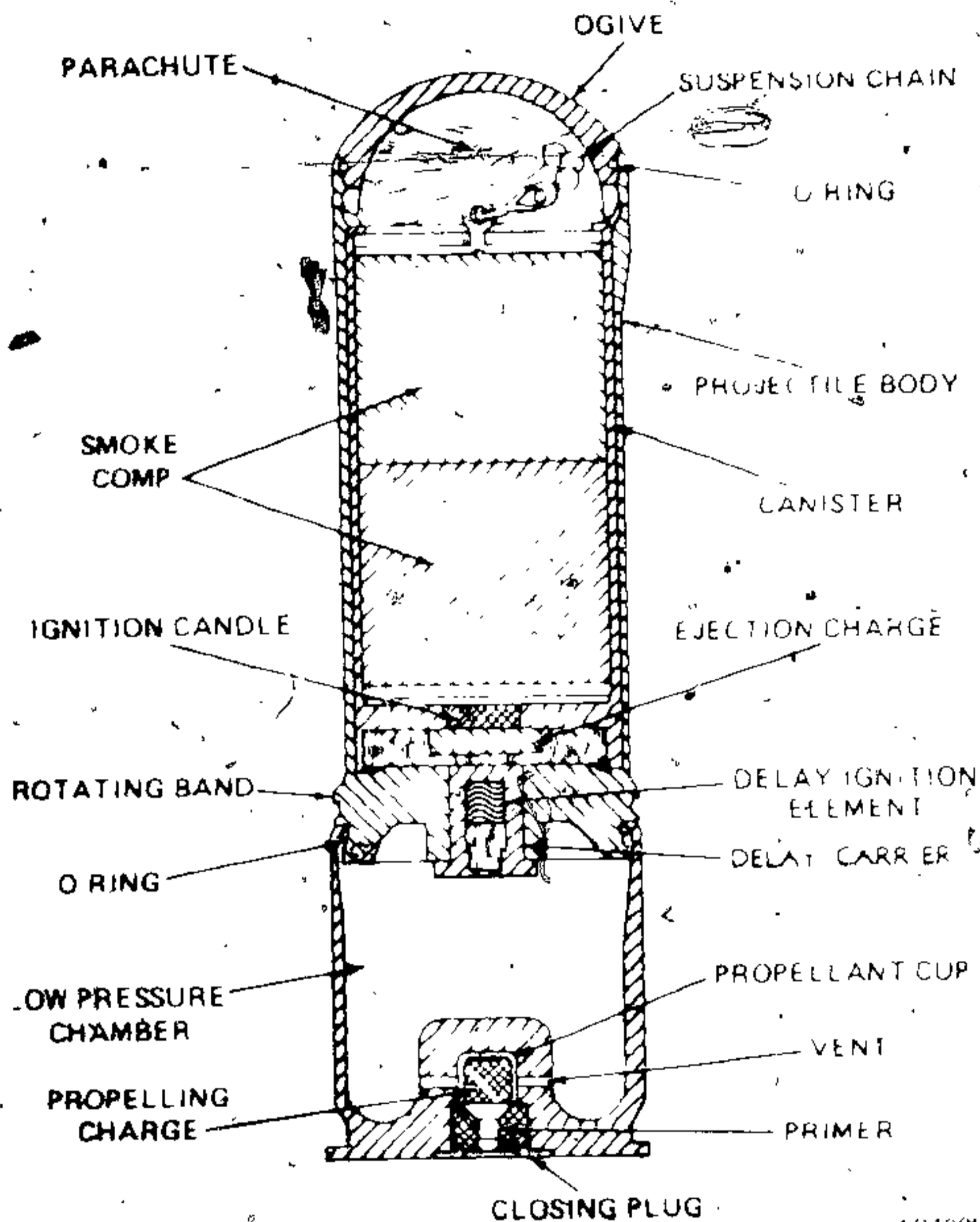
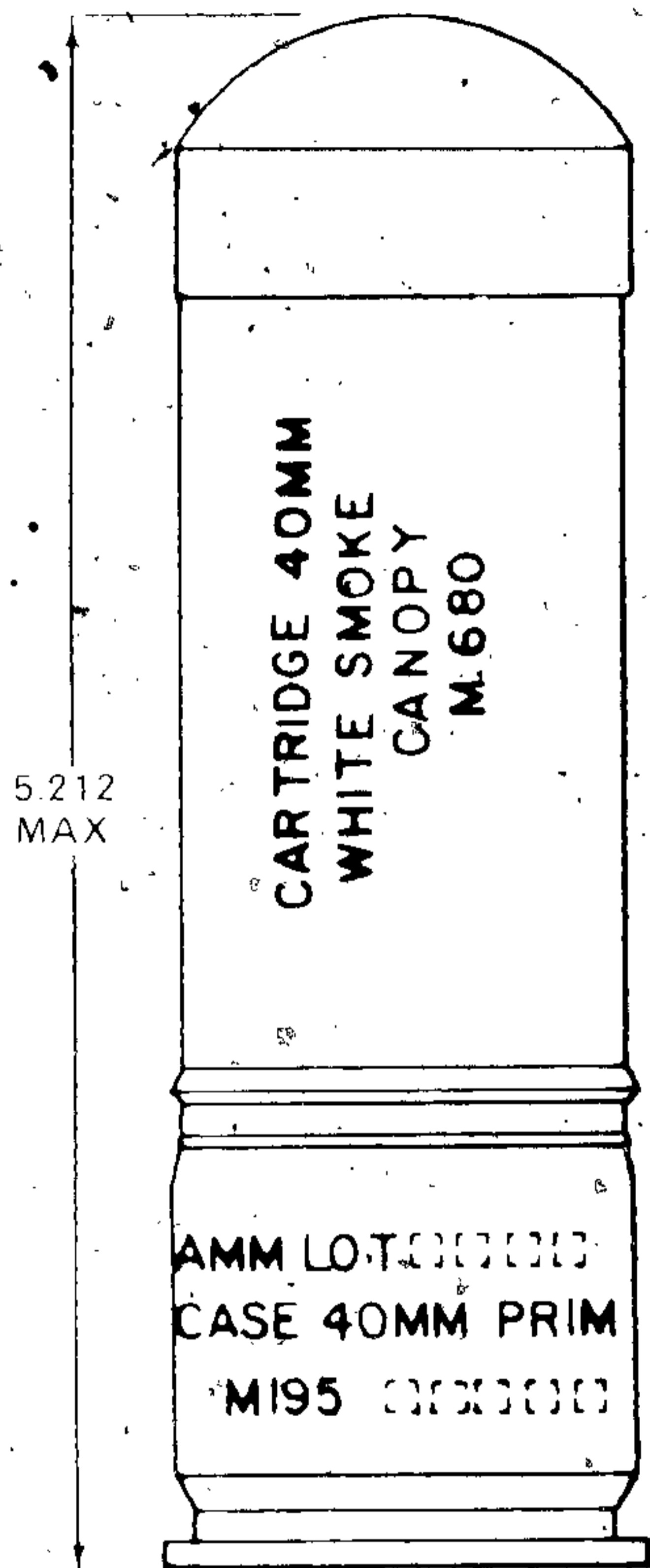
Drawing number ----- 9234424

Packing drawing number ----- 9251995

References:

SC 1305/30-IL
 SB 700-20

CARTRIDGE, 40-MILLIMETER: CANOPY, WHITE SMOKE, M680



AR199538

AR199537

Type Classification:

Std LCC-B

Use:

This cartridge is designed for accurately marking the position of a man or unit located beneath moderately thick foliage for aerial observation. This cartridge has the advantage of less weight and bulk and greater accuracy over comparable existing signals. It is fired from 40-mm Grenade Launchers M79 and M203 (attached to the M16/M16A1 rifle).

Description:

This cartridge is a fixed round of ammunition consisting of a projectile assembly and a cartridge case assembly. The projectile body is a hollow one-piece aluminum body with a metal rotating band. A plastic ogive is snapped into an O-ring in the front opening of the projectile cavity. The color of the ogive denotes smoke color. The cavity contains a pyrotechnic ignition candle and an aluminum canister containing white smoke composition attached to a rotating "X" type parachute. A 2 second delay ignition element is crimped into the center of

the metal delay carrier. The carrier is threaded into the projectile base. A cavity above the delay element contains an ejection charge pellet, which consists of 1.2 grams of black powder. The igniter and smoke canister are seated above the ejection charge in the projectile cavity. The projectile assembly is press-fitted into the O-ring in the cartridge case opening. The case is a hollow aluminum bichambered cylinder with a metal closing plug crimped into the base of the cartridge case. The propellant cup is sealed in the bottom by the closing plug. A percussion primer is crimped into the center opening of the closing plug. The cup assembly acts as a high-pressure chamber, and the cavity in the case, which surrounds the cup, acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the percussion primer, igniting the propelling charge. Gases from the burning propellant expand in the high-pressure chamber. This pressure causes the propellant cup to rupture forcing the gases to escape through the vent holes into the low-pressure chamber and propels the projectile through the launcher barrel. The rotating band around the projectile engages the rifling in the launcher barrel imparting a spin of 3750 RPM to the projectile. The expanding gases in the low-pressure chamber force the projectile through the barrel with a muzzle velocity of 76mps and reaches a maximum burst height of 300 feet at a quadrant elevation of 85 degrees. Concurrently, the propellant gases ignite the 2 second delay element in the base of the projectile. Approximately two seconds after ignition, the delay element ignites the ejection charge and ignition candle. The ignition candle ignites the white smoke composition in the smoke canister. The ejection charge ejects the smoke canister and parachute out the front end of the projectile. The parachute deploys upon ejection. The smoke canister descends, emitting a 90 second smoke signal and becomes entangled in the dense foliage by means of the "X" type parachute.

Tabulated data:

Complete round:

- Type ----- Canopy, white smoke
- Weight ----- .48 lb
- Length ----- 5.212 in.
- Weapons used with ----- M79, M203, 40-mm grenade launchers (attached to M16/M16A1 rifle)

Projectile:

- Body material ----- Impact or bar aluminum alloy
- Color ----- Light green w/black markings
- Filler and weight --- White smoke composition, 59 grams

Propelling charge:

- Cartridge case ----- M195
- Propellant ----- M9, 330 mg.
- Primer ----- Perc., M42

Performance:

- Burst height ----- 91 meters (QE-85°) (approx.)
- Muzzle velocity ----- 76 mps (250 fps)

Temperature Limits:

Firing:

- Lower limit ----- -45°F
- Upper limit ----- +125°F

Storage:

- Lower limit ----- -65°F
- Upper limit ----- +165°F

*Packing ----- 22 rounds per metal box; 2 metal boxes (44 rounds)

*Packing Box: ----- per wooden box

- Weight ----- 45.9 lbs.
- Dimensions ----- 14-5/8 x 12-13/16 x 9-1/8 in.
- Cube ----- 1.0 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

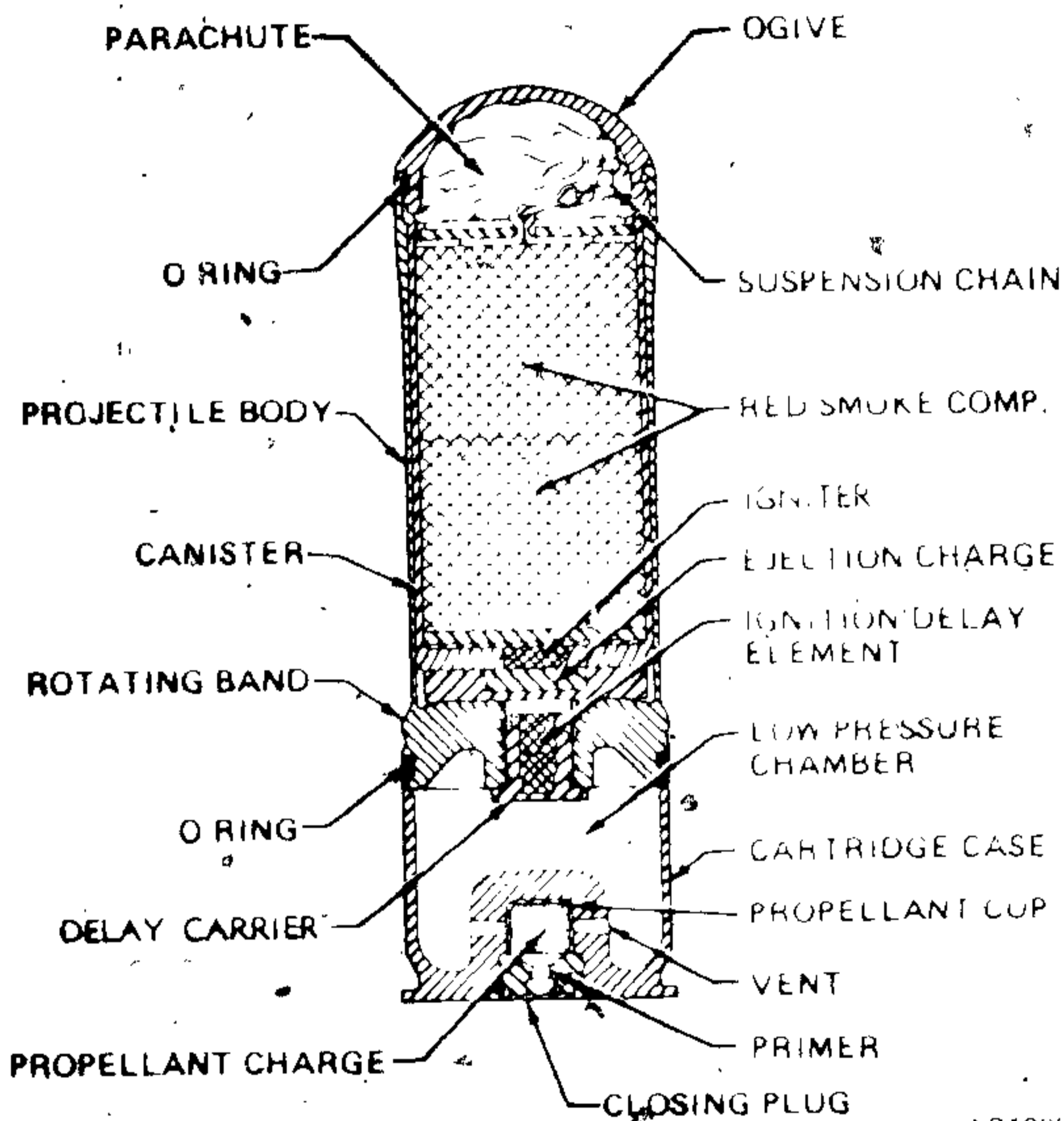
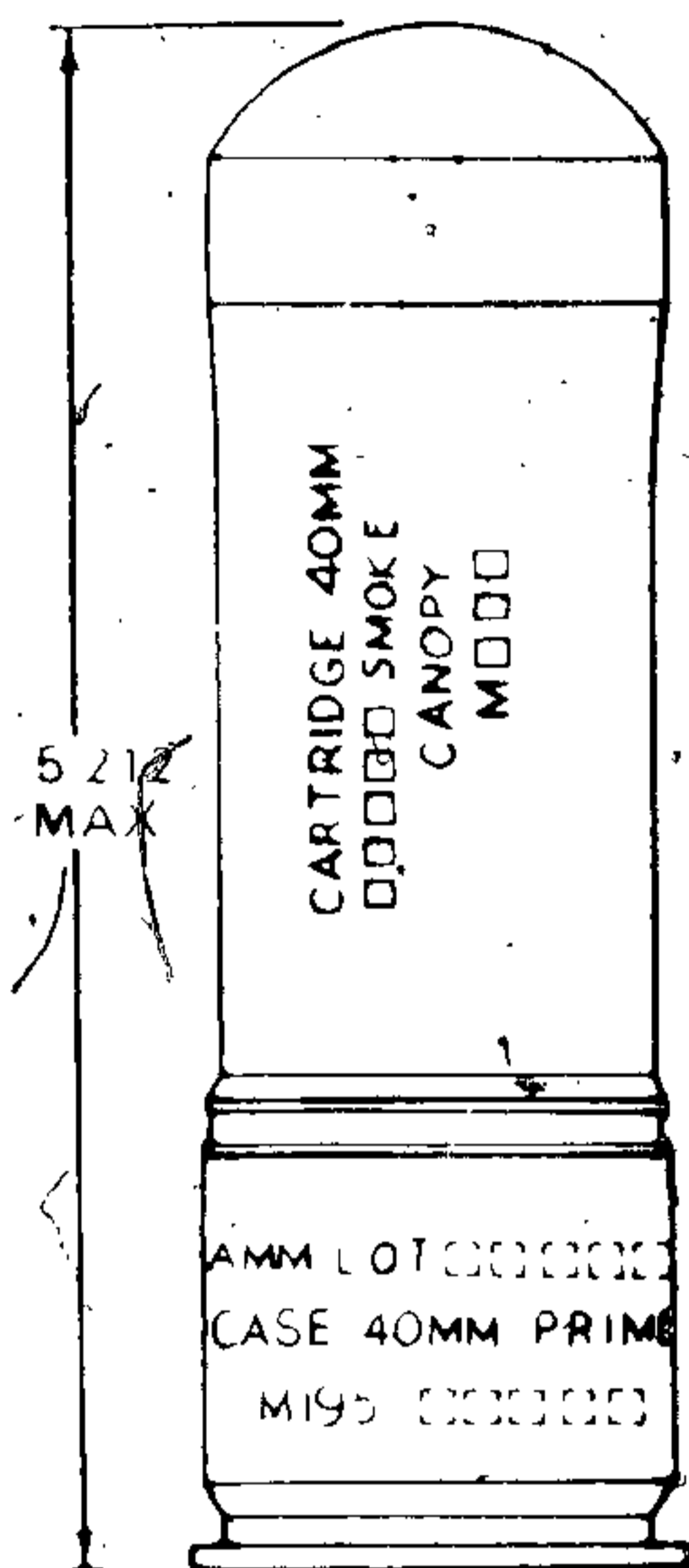
- Quantity-distance class ----- 1.3
- Storage compatibility group ----- G
- DOT shipping class ----- C
- DOT designation ----- SMOKE SIGNALS HANDLE CAREFULLY KEEP FIRE AWAY

- DODAC ----- 1310-B477
- Drawing number ----- 9235365
- Packing drawing number ----- 9209204, 9209205

References:

- SC 1305/30-IL
- SB 700-20
- TM 9-1005-249-10
- TM 9-1010-205-10
- TM 9-1010-221-10

CARTRIDGE, 40-MILLIMETER: CANOPY, RED SMOKE, M682



AR199533

AR199535

Type Classification:

Std LCC-B

Use:

This cartridge is designed for accurately marking the position of a man or unit located beneath moderately thick foliage for aerial observation. This cartridge has the advantage of less weight and bulk and greater accuracy over comparable existing signals. It is fired from 40-mm Grenade Launchers M79 and M203 (attached to the M16/M16A1 rifle).

Description:

This cartridge is a fixed round of ammunition consisting of a projectile assembly and a

cartridge case assembly. The projectile body is a hollow, one-piece aluminum body with a metal rotating band. A plastic snap-on ogive is snapped into the O-ring in the front opening of the projectile cavity. The color of the ogive denotes smoke color. The cavity contains a pyrotechnic igniter and an aluminum canister containing red smoke composition attached to a rotating "X" type parachute. A 2 second delay ignition element is crimped into the center of a metal delay carrier (base plug). The delay carrier is threaded into the projectile base. The ejection disk above the delay element contains an ejection charge pellet which consists of 1.2 grams of black powder. The igniter and smoke canister are seated above the ejection disk in the projectile cavity. The projectile assembly is press-fitted into the O-ring in the cartridge case opening. The case is a hollow, aluminum bichambered

cylinder with a metal closing plug crimped into the base of the cartridge case. The propellant cup is sealed in the bottom by the closing plug, and contains the propelling charge. A percussion primer is crimped into the center opening of the closing plug. The cup assembly acts as a high-pressure chamber, and the cavity in the base, which surrounds the cup, acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge. Gases from the burning propellant expand in the high-pressure chamber. This pressure causes the propellant cup to rupture, forcing the gases through the side vents into the low-pressure chamber and propels the projectile through the launcher barrel. The rotating band around the projectile engages the rifling in the launcher barrel imparting a spin of 3750 RPM to the projectile. The expanding gases in the low-pressure chamber force the projectile through the barrel with a muzzle velocity of 76 mps and reaches a maximum burst height of 300 feet at a quadrant elevation of degrees. Concurrently, the propellant gases ignite the 2-second delay element in the base of the projectile. Approximately two seconds after ignition, the delay element ignites the ejection charge and igniter. The igniter ignites the red smoke composition in the smoke canister. The ejection charge ejects the smoke canister and parachute out of the front end of the projectile. The parachute deploys upon ejection. The smoke canister descends emitting a 90 second smoke signal and becomes entangled in the dense foliage by means of the "X" type parachute.

Tabulated Data:

Complete round:
 Type ----- Canopy, red smoke
 Weight ----- .48 lb
 Length ----- 5.212 in.
 Weapons used with --- M79, M203, 40-mm
 grenade launchers
 (attached to M16/
 M16A1 rifle)

Projectile:

Body material----- Impact or bar.
 aluminum alloy
 Color----- Light green w/black
 markings
 Filler and weight ---- Red smoke com-
 position, 80 grams

Propelling charge:

Cartridge case ----- M195
 Propellant ----- M9, 330 mg.
 Primer ----- Perc., M42

Performance:

Burst height ----- 91 meters (QE=85)
 (approx.)
 Muzzle velocity ----- 76 mps (250 fps)

Temperature Limits:

Firing:

Lower limit ----- -45°F
 Upper limit ----- + 125° F

Storage:

Lower limit ----- - 65 F
 Upper limit ----- + 165° F

*Packing----- 22 rounds per metal box
 2 metal boxes (44 rounds)
 per wirebound wooden

*Packing Box:

Weight ----- 45.9 lbs.
 Dimensions----- 14-5/8 x 12-13/16
 x 9-1/8 in.
 Cube----- 1.0 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

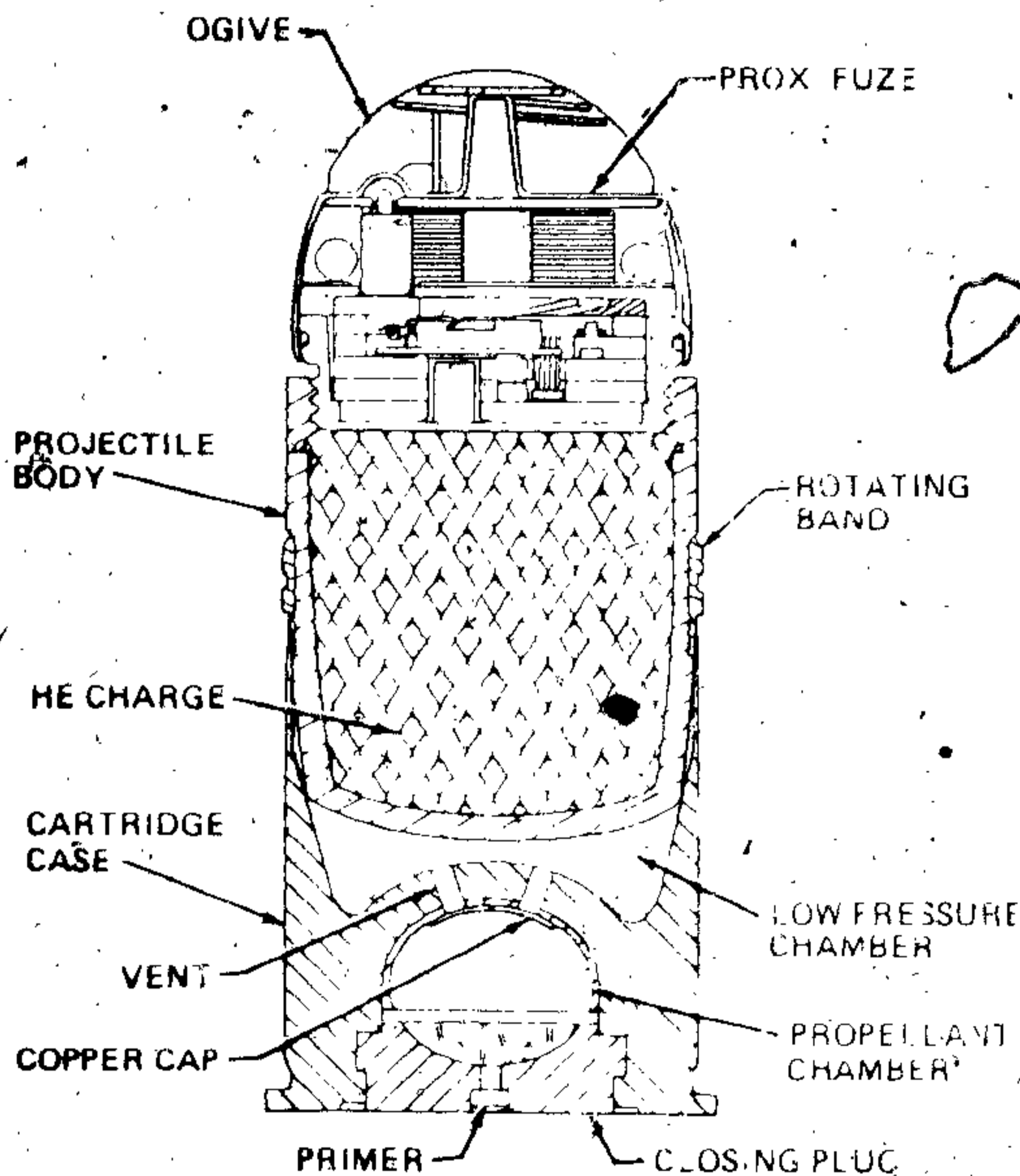
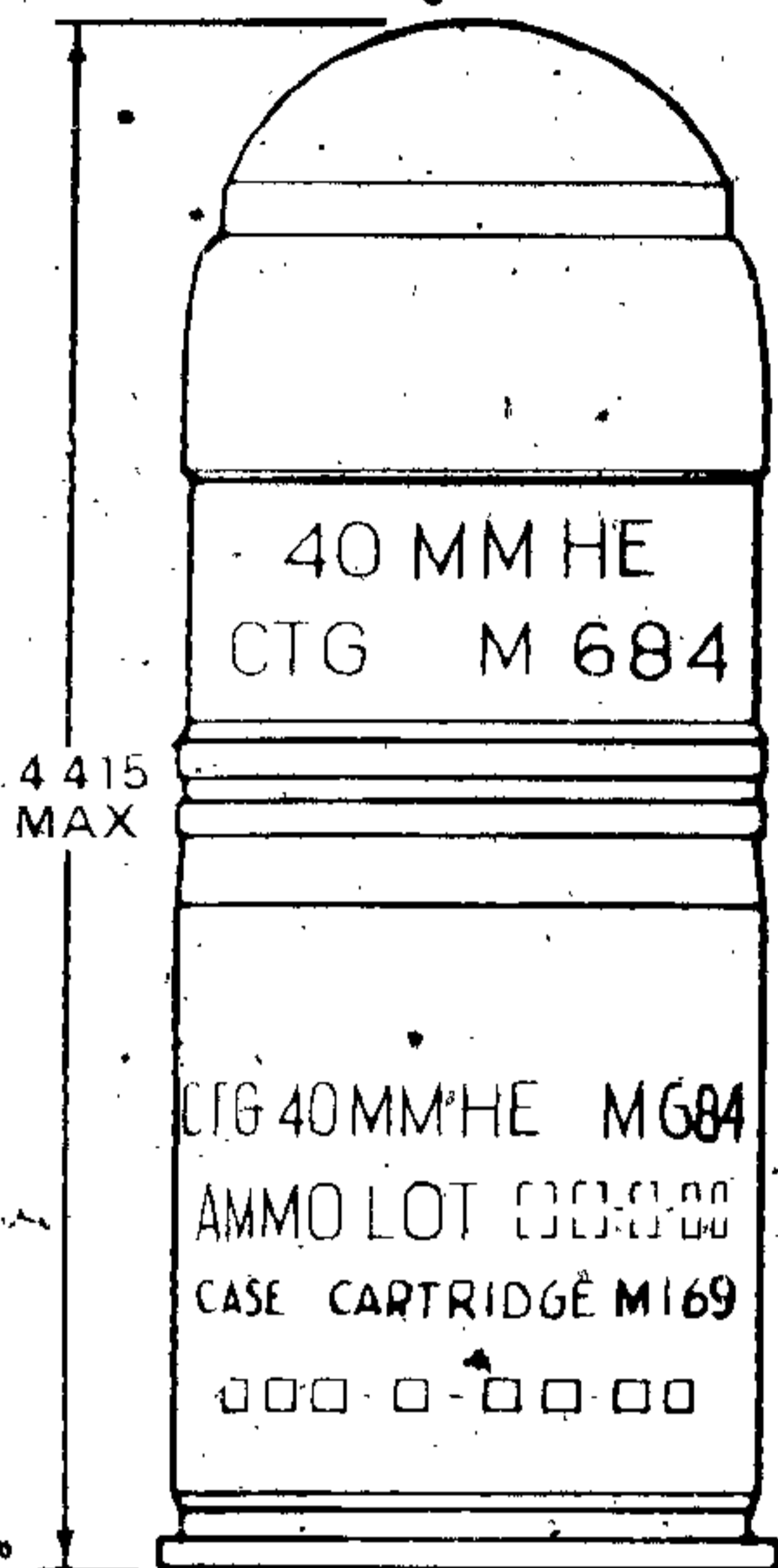
Quantity-distance
 class ----- 1.3
 Storage compatibility
 group ----- G
 DOT shipping class ----- C
 DOT designation ----- SMOKE SIGNALS
 HANDLE CAREFULLY
 KEEP FIRE AWAY

DODAC----- 1310-B479
 Drawing number----- 9235963
 Packing drawing
 number ----- 9209204, 9209205

References:

SC 1305/30-IL
 SB 700-20
 TM 9-1005-249-10
 TM 9-1010-205-10
 TM 9-1010-221-10

CARTRIDGE, 40-MILLIMETER: HE, M684



AR199534

AR199533

Type Classification:

CONT MSR 03736153 dtd 1973

Use:

This cartridge is a high explosive round designed to inflict personnel casualties from air burst effect. It is fired from M75 and M129 grenade launchers and is issued completely assembled in linked belts of 50 rounds.

Description:

This cartridge is a fixed round of ammunition consisting of a one-piece, internally embossed steel body with a metal rotating band, and a cartridge case containing the propelling charge and percussion primer. The projectile cavity contains a Composition A5 bursting charge ← An electric proximity fuze is threaded into the front opening of

the projectile. The fuze assembly includes all solid-state circuitry, liquid reserve power supply, electronic detonator, mechanical safety arming mechanism, and an independent mechanical impact element. The projectile assembly is press-fitted into a cartridge case. The case is a hollow bichambered aluminum cylinder, with an aluminum closing plug crimped into the open well of the propellant chamber in the cartridge base. The propelling charge is contained in the spherical high-pressure propellant chamber. This chamber has vent holes in the top, and is sealed at the bottom by the closing plug. The hollow chamber in the upper section of the case acts as a low-pressure chamber. A percussion primer is crimped into the center opening in the closing plug.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge.

Gases from the burning propellant expand in the high-pressure chamber. The rotating band around the projectile engages the rifling in the launcher barrel, imparting a spin of 12,000 RPM to the projectile. The expanding gases in the low-pressure chamber force the projectile through the barrel with a muzzle velocity of 244 meters per second. After the projectile leaves the launcher, the fuze arms mechanically at a distance of 18 to 36 meters. Electronic arming occurs at approximately 125 meters from the launcher. Air burst functioning will occur after this distance upon approach to the target. The target reflects the CW transmission of the fuze. The fuze detects the reflected radio wave and discriminates between the reflected wave and other radio signals emanating from normal communications systems or other near-by fuzes. When the proper reflected signal is obtained near approach to the target, the firing circuit is energized causing initiation of the electronic detonator. In turn, the high explosive bursting charge detonates causing an air burst and projectile fragmentation at an optimum height above the target. The burst height will vary depending upon the ability of the target to reflect radio waves and the angle of approach. In the event the electronic circuitry fails or the electronic sensor fails to initiate the explosive train, impact or graze with the target will cause the mechanical fuze to initiate the explosive train.

Fabulated Data:

Complete round:

Type ----- HE
 Weight ----- 2.74 lb.
 Length ----- 4.415 in.
 Weapons used with --- M75, M125 40-mm
 grenade launchers

• Projectile

Body material ----- Impact steel
 Color ----- Olive drab w/yel-
 low markings and
 translucent ogive
 Filler and weight --- Comp. A5, 53
 grams
 Fuze ----- Electronic prox-
 imity, M598

Propelling charge:

Cartridge case ----- M169
 Propellant ----- M2, 4.64 grams
 Primer ----- Perc., Federal
 No. 215

Performance:

Maximum range ----- 2,200 meters
 Muzzle velocity ----- 244 mps (795 fps)
 Arming distance --- 18 to 36 meters
 (59 - 118 feet)

Temperature Limits:

Firing:

Lower limit ----- -45° F
 Upper limit ----- + 125° F

Storage:

Lower limit ----- - 65° F
 Upper limit ----- + 165° F

*Packing ----- 50 rounds per unit
 in linked belt

*Packing Box:

Weight ----- 53 lbs.
 Dimensions ----- 25-11/16 x 16-1/4
 x 6-27/32 in.
 Cube ----- 1.7 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance

class ----- 4

Storage compatibility

group ----- E

DOT shipping class ----- A

DOT designation ----- AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PROJEC-
 TILES

DODAC ----- 1310-B573

Cartridge drawing

number ----- 9247850

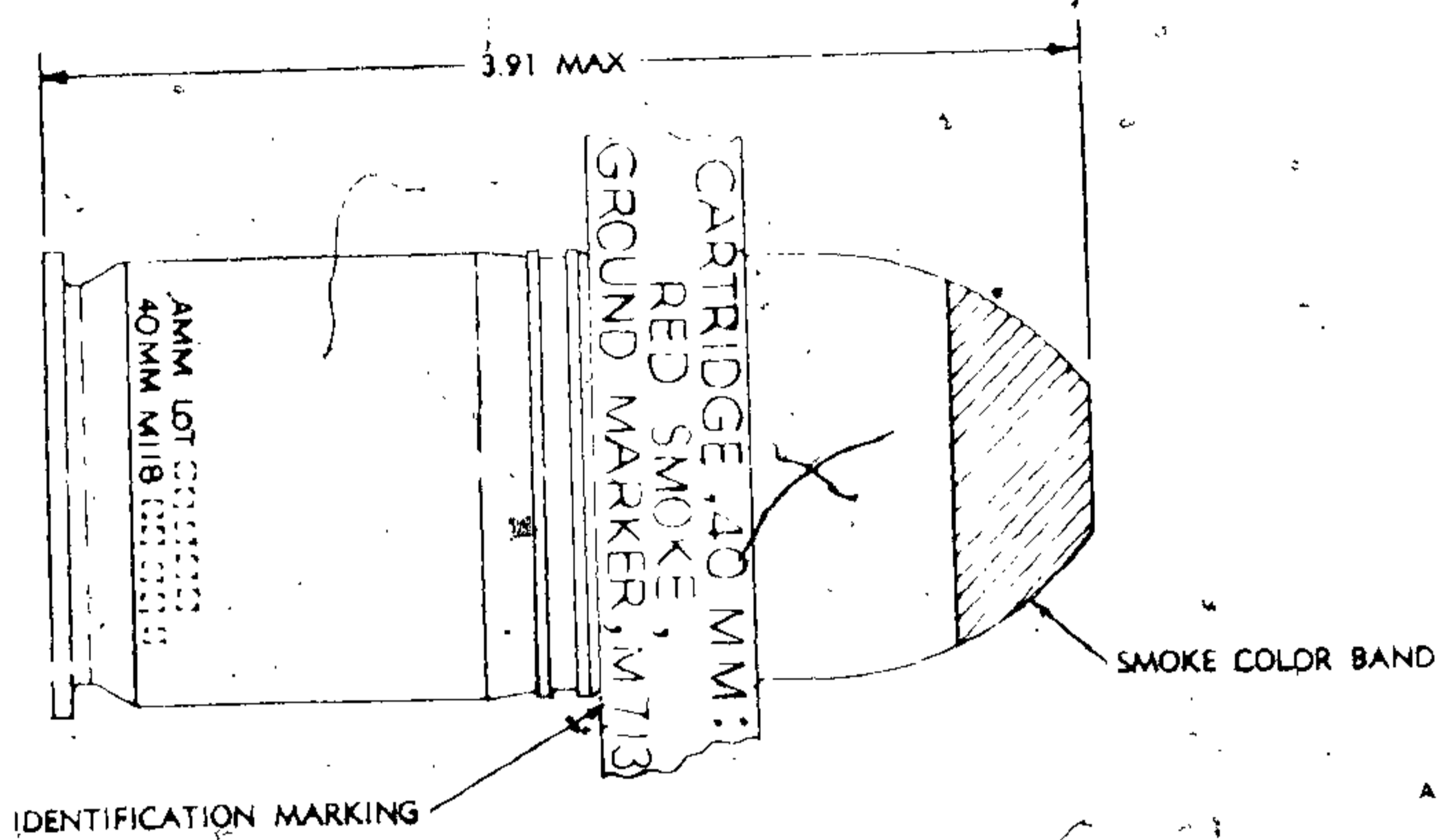
Packing drawing

number ----- 9251995

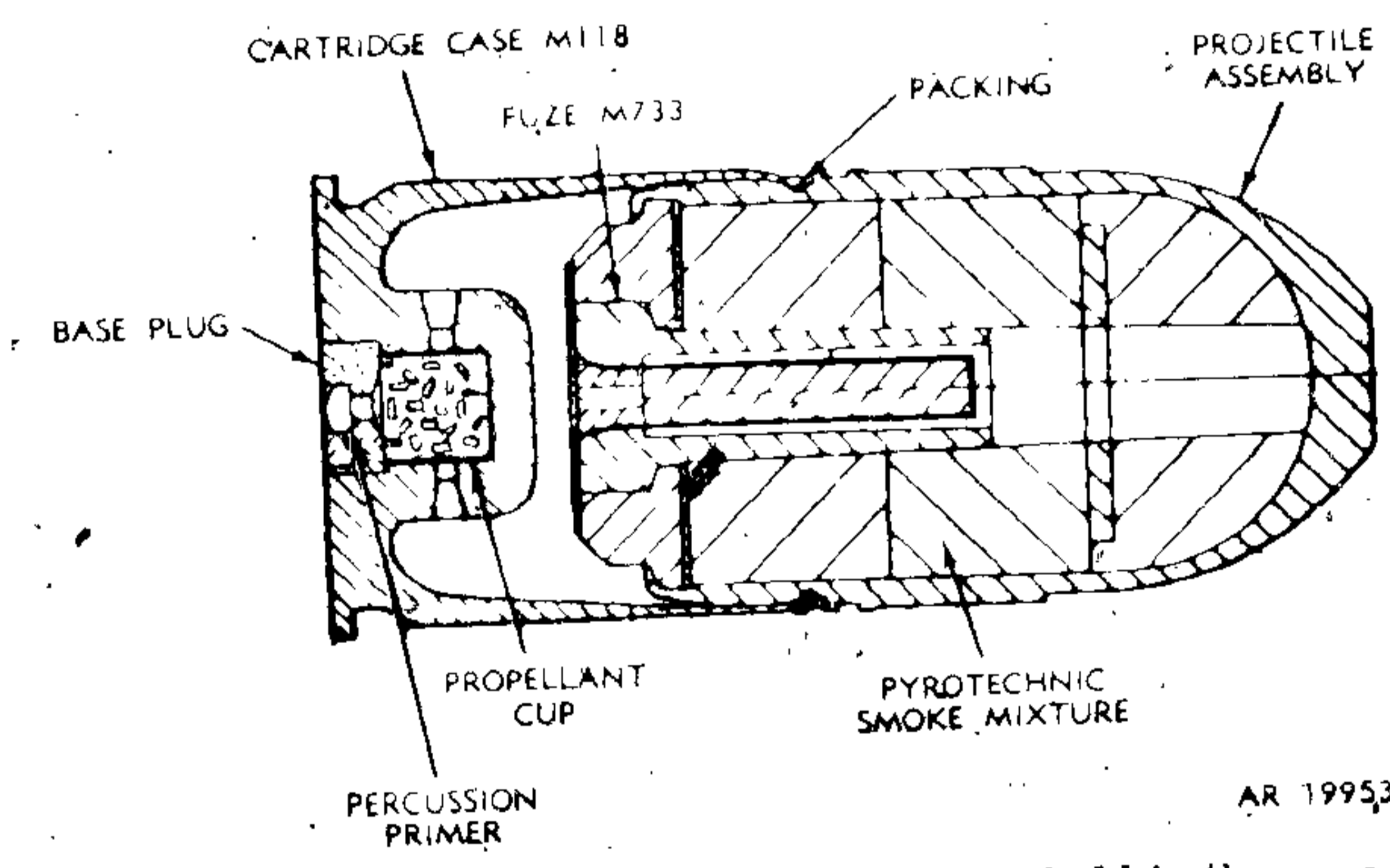
References:

SC 1305/30-IL
 SB 700-20

CARTRIDGE, 40-MILLIMETER: GROUND MARKER, RED SMOKE, M713;
GREEN SMOKE, M715; AND YELLOW SMOKE, M716



AR 199532



AR 199531-A

Type Classification:

Std LCC-A

Use:

These cartridges are used to provide aerial identification and location of troops on the ground and are designed to be fired from 40-mm Grenade Launchers M79 and M203 (attached to the M16/M16A1 rifle).

Description:

The cartridges consist of a cartridge case, a projectile with pyrotechnic smoke payload, and a pyrotechnic impact fuze. The cartridge case is a dual-chambered aluminum container housing a brass propellant cup. The propellant

cup is held in the case by a crimped base plug which provides a pressure-type waterproof seal. The base plug houses a percussion primer. The projectiles utilize a one-piece, aluminum body-ogive and a steel base. The payload consists of a pyrotechnic smoke mixture pressed into the body-ogive, with a cylindrical cavity in the center. The fuze is cemented to the base of the projectile and protrudes into the cylindrical cavity of the smoke mixture. The fuze is designed to arm at a minimum of 15 meters and a maximum of 45 meters from the muzzle of the weapon.

Functioning:

Upon firing, the primer ignites the propelling charge. In turn, the projectile is accelerated down the launcher barrel, where a spin

of 3,750 rpm is imparted by the barrel rifling. A muzzle velocity of approximately 250 fps is attained. In addition to launching the projectile, the propellant gases ignite the first fire mixture of the fuze in the base of the projectile. The first fire mixture ignites a high-temperature transfer mixture contained in the steel cup. The transfer mixture burns during the first 15 meters of projectile flight. When the projectile is between 15 and 45 meters from the launcher muzzle, heat transfer through the steel cup ignites the delay mixture. Upon impact, the delay casing breaks and the burning portion flies forward out of the fuze support, contacting and igniting the pyrotechnic smoke mixture. Ignition of the smoke mixture causes a buildup of pressure, which dislodges the fuze support at the aft end of the projectile thus allowing smoke to be emitted at the aft end of the projectile. Projectile impact prior to the minimum arming distance (15 meters) results in a dud. Between 15 and 45 meters from the launcher muzzle, the fuze may or may not function on impact. In the event the fuze fails to function upon impact, the output mixture provided in the front end of the delay casing acts as a backup to the impact feature. When the flame reaches this point (8 to 10 seconds after launch), the output mixture flashes and ignites the smoke mixture.

Difference Among Models:

Color of smoke

Tabulated Data:

Complete round:

Type ----- Ground marker, smoke
 Weight ----- .49 lb
 Length ----- 3.91 in.
 Weapons used with --- M79, M203 40-mm grenade launchers (attached to M16/M16A1 rifle)

Projectile:

Body material ----- Aluminum
 Color ----- Light green w/ black markings
 Filler and weight --- Smoke mixture, 75 grams
 Fuze ----- Impact, pyrotechnic, M733

Propelling charge:

Cartridge case ----- M118
 Propellant ----- M9, 330 mg.
 Primer ----- Perc., FED100

Performance:

Maximum range ----- 400 meters
 Muzzle velocity ----- 76 mps (250 fps)

Temperature Limits:

Firing:

Lower limit ----- -45°F
 Upper limit ----- + 125°F

Storage:

Lower limit ----- - 65° F
 Upper limit ----- + 165° F

*Packing ----- 22 rounds per metal box;
 2 metal boxes per wire-bound wooden box

*Packing Box:

Weight ----- 45.9 lbs.
 Dimensions ----- 14-5/8 x 12-13/16 x 9-1/8 in.
 Cube ----- 1.0 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 1.3
 Storage compatibility group ----- G
 DOT shipping class ----- C
 DOT designation ----- SMOKE SIGNALS
 HANDLE CAREFULLY
 KEEP FIRE AWAY
 DODAC ----- M713 - 1310-B506
 M715 - 1310-B503
 M716 - 1310-B509

Cartridge drawing

number ----- M713 - 9323251
 M715 - 9323261
 M716 - 9323265

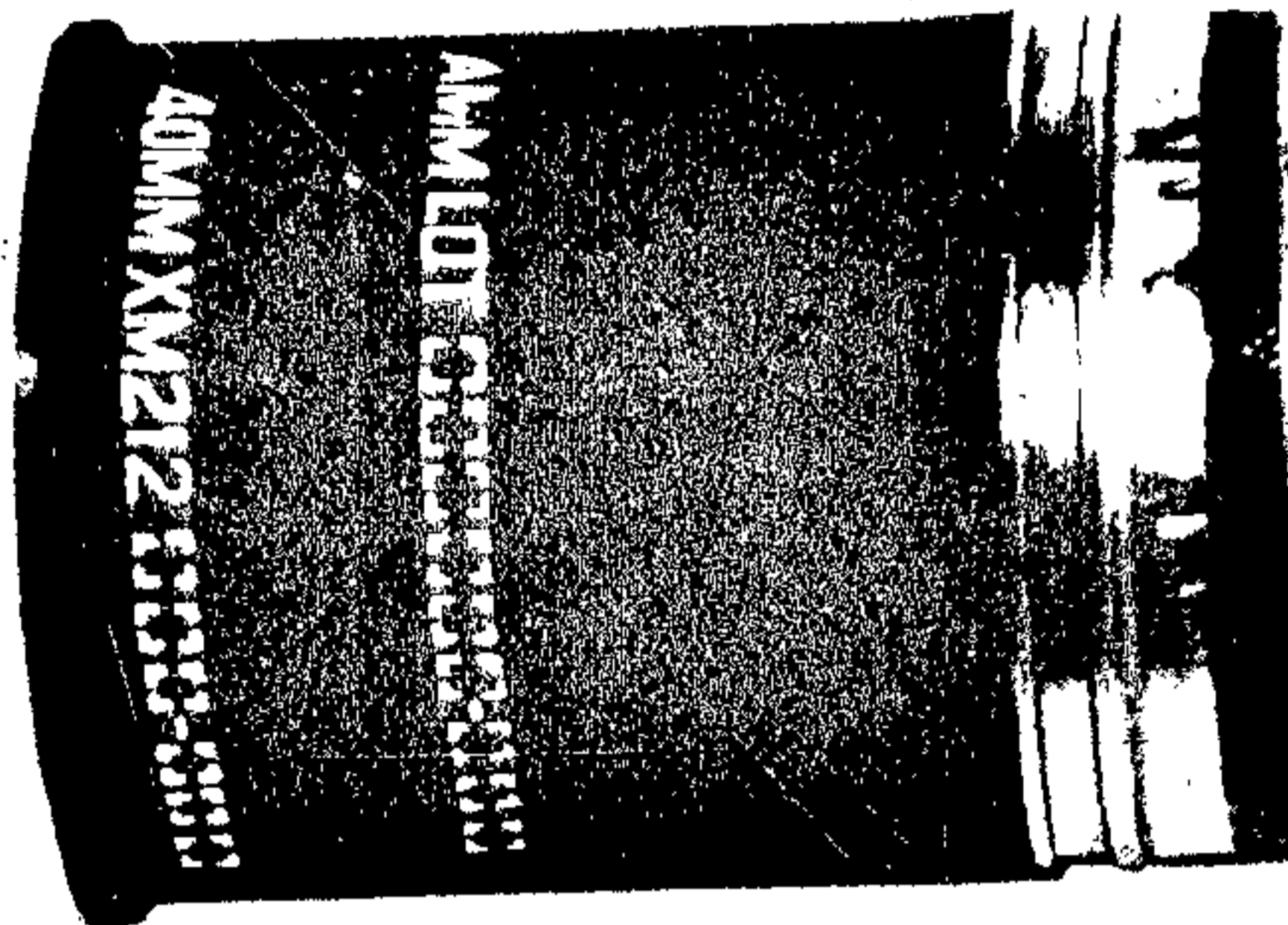
Packing drawing

number ----- 9209204, 9209205

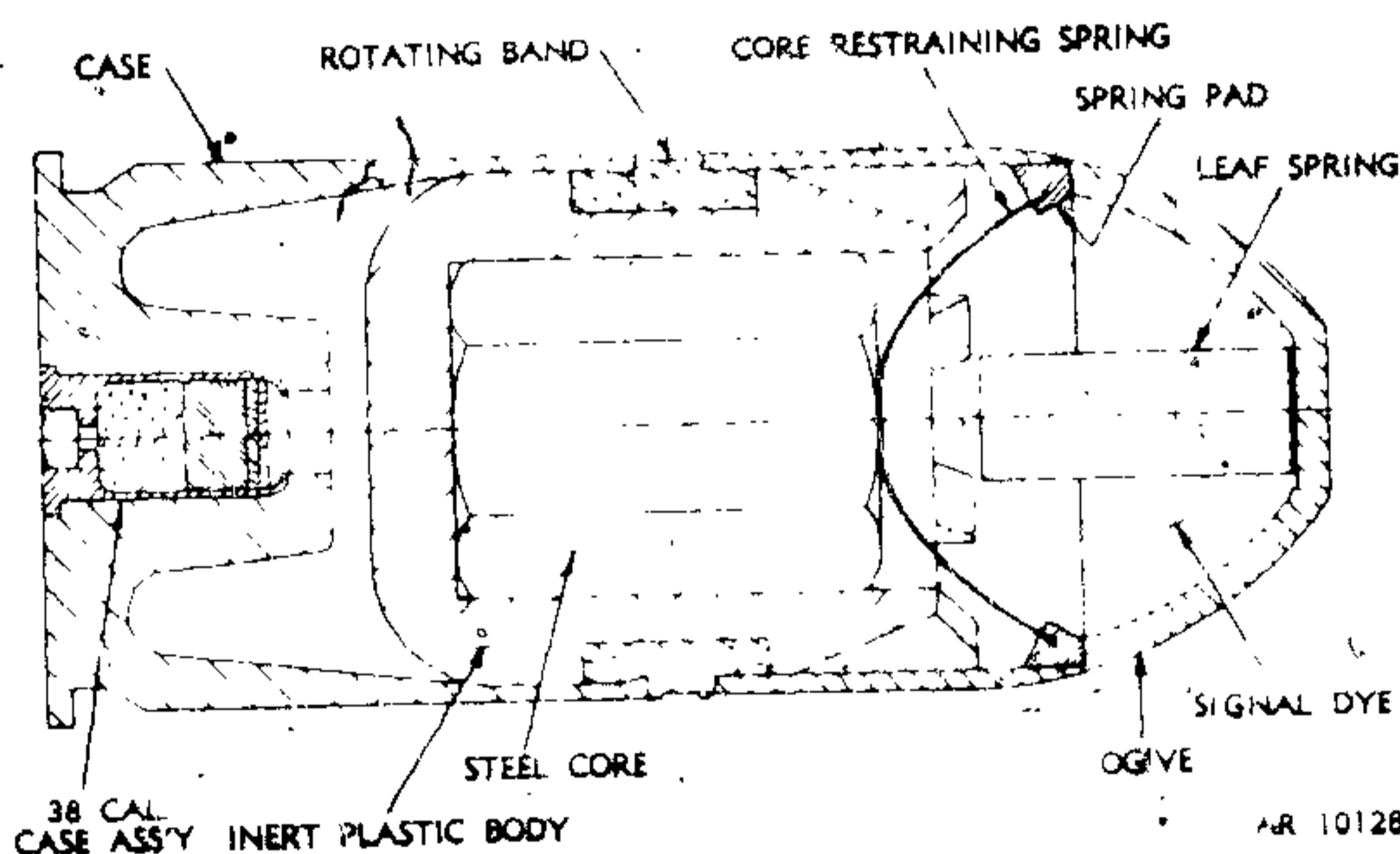
References:

SC 1305/30-IL
 SB 700-20
 TM 9-1005-249-10
 TM 9-1010-205-10
 TM 9-1010-221-10

CARTRIDGE, 40-MM: PRACTICE, M781



AR 101226



AR 101280

Type Classification:

None assigned.

Use:

This cartridge is a fixed, practice-type ammunition designed to be fired from 40-mm Grenade Launchers M79 and M203 (attached to the M16 M16A1 rifle).

Description:

This cartridge is a fixed round of ammunition consisting of a plastic projectile body with a rotating band and a cartridge case assembly. A hollow plastic ogive is filled with a high visibility yellow-orange dye. The projectile assembly is attached to a cartridge case with an attached adhesive substance. The case is

a hollow bichambered plastic cylinder. A .38 caliber blank cartridge is press-fitted into the base of the cartridge case and provides the gas pressure needed to propel the projectile through the launcher barrel.

Functioning:

The weapon firing pin strikes the .38 caliber blank cartridge primer igniting the propellant charge. The burning propelling charge generates sufficient pressure to release the expanding propellant gases through the vent line into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher tube imparting a spin of 3,600 rpm to the projectile. The pressure, created by the expanding propellant gases in the low-pressure chamber, forces the projectile through the tube with a velocity of 76 meters

Upon impact with the target, the projectile ruptures and releases the dye forming a patch of yellow-orange smoke which indicates explosive impact.

Related Data:

N 1310 01 050-7967

Cartridge Data:

Type ----- Practice
 Weight ----- 205 gms
 Length ----- 4.05
 Weapons used with M79, M203 (attached to M16, M16A1 rifle) 40-mm grenade launchers.

Case Data:

Case material ----- Plastic
 Color ----- Blue w white markings
 Primer and weight ----- Orange dye
 Fuze ----- None

Propellant Charge:

Cartridge case ----- M212
 Propellant ----- M9, 340 mg
 Primer ----- No. 1 1/2 (commercial)

Performance:

Maxium range ----- 400 meters
 Muzzle velocity ----- 76 mps (250 fps)

Temperature Limits:

Firing
 Lower limit ----- -25°F
 Upper limit ----- +110°F

Storage
 Lower limit ----- -25°F
 Upper limit ----- +110°F

* Packing ----- 75 rounds per box

* Packing Box:

Weight ----- 53 lbs
 Dimensions ----- 22 3/8" x 11 1/2" x 11-5/8"

Cube ----- 1.7 cu ft

*NOTE: See SC for complete packing data.

Shipping and Storage Data:

Quantity-distance class ----- 1 4
 Storage compatibility group ----- B, E, or N
 DOT shipping class ----- C
 DOT designation ----- CARTRIDGE PRACTICE AMMUNITION

DODIC ----- 13519
 Cartridge Dwg. No. ----- 9322240
 Packing Dwg. No. ----- 9325896

References:

SC 1305 30-IL SB ~~700~~ 20
 TM 9-1005-249-10
 TM 9-1010-205-10
 TM 9-1010-221-10

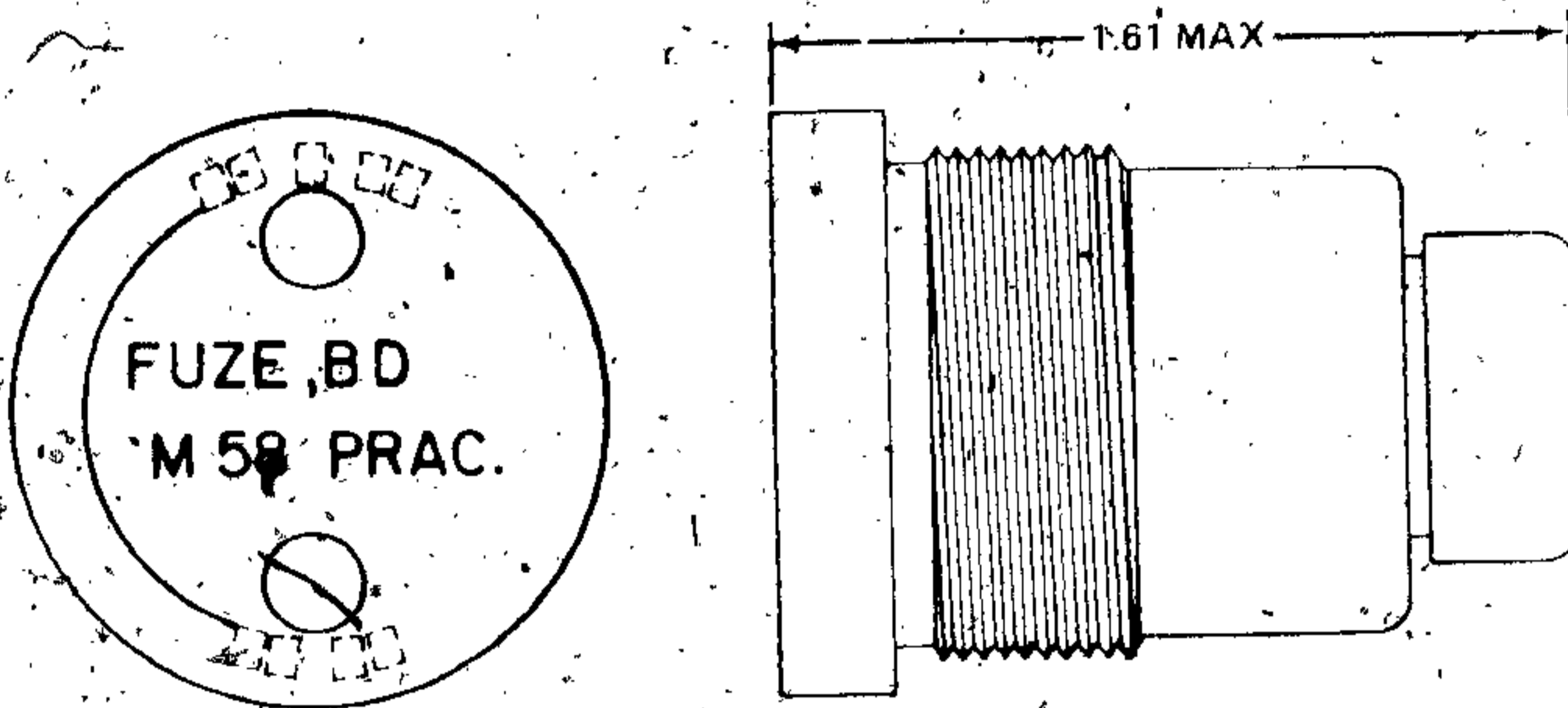
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CHAPTER 7

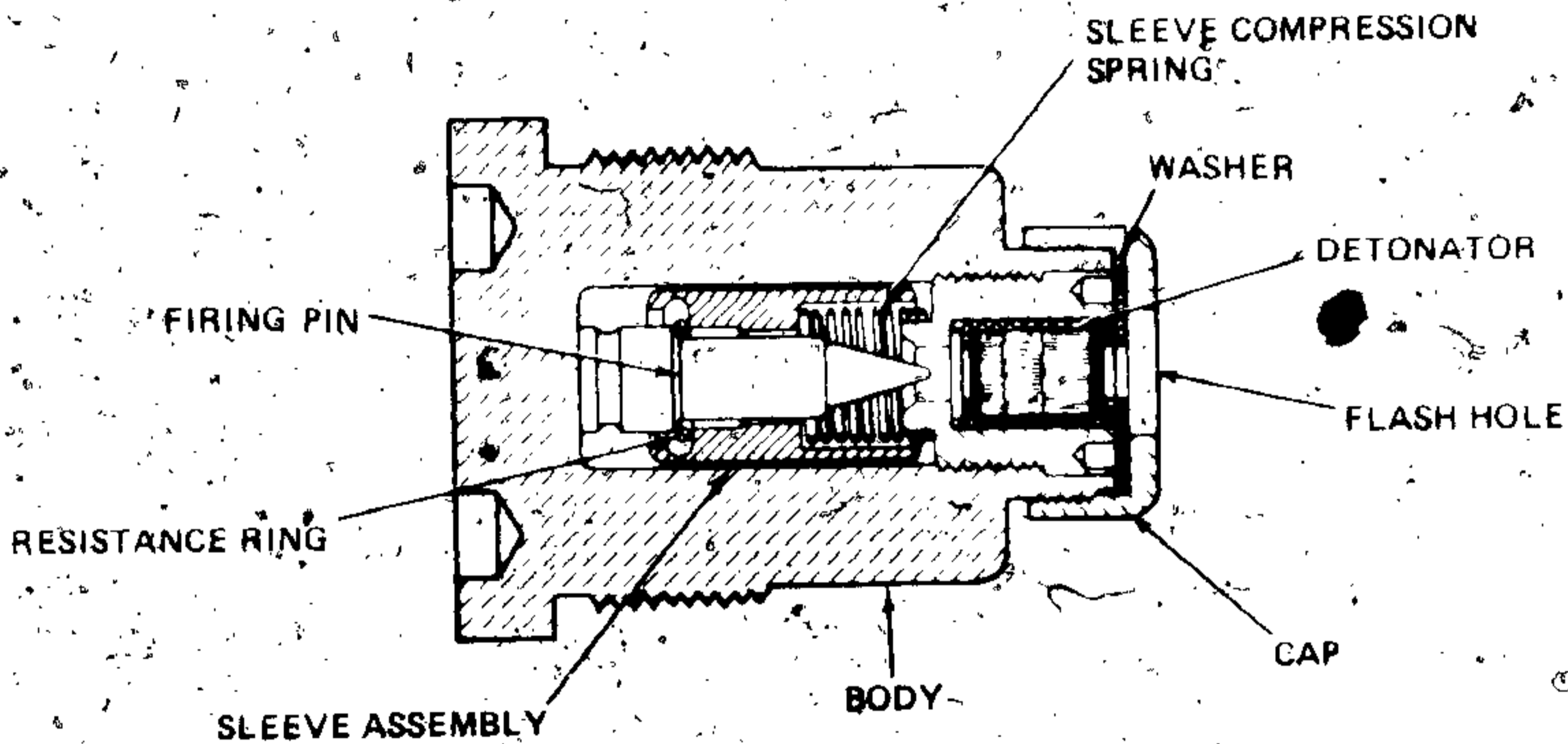
FUZES

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FUZE, BASE DETONATING: M58, PRACTICE



AR199945



AR199944

Type Classification:

Std OTCM 37119 of 1 1959

Use:

Base Detonating Fuze M58 Practice is used with target practice cartridges for 37-mm sub-caliber guns.

Description:

The fuze has a brass or steel body containing the firing pin and a spring-loaded sleeve assembly. A resistance ring holds the firing pin at the rear of the sleeve and away from the detonator prior to firing; there are no

bore-safety provisions or external safety devices. The detonator is housed in a brass detonator holder forward of the firing pin. A brass or steel cap and aluminum washer close the forward end of the fuze. A hole is provided in the closing cap to allow detonator flash-through.

Functioning:

Setback from weapon firing forces the resistance ring back over the shoulder of the firing pin and into a groove near the back of the firing pin, locking the pin in a more forward position in the sleeve. During the flight of the projectile, the combined firing pin and sleeve assembly is held out of contact with the detonator by the sleeve compression spring. Upon impact,

inertia of the sleeve and firing pin overcomes the spring and drives the pin into the detonator.

Explosive Components:

Detonator M18.

Tabulated Data:

Type -----	BD
Weight -----	0.29 lb.
Length Overall -----	1.61 in.
Thread size -----	1.02-18NS-3 (LH)
Assembly Dwg. Nos.:	
Practice -----	73-1-191

Limitations:

None.

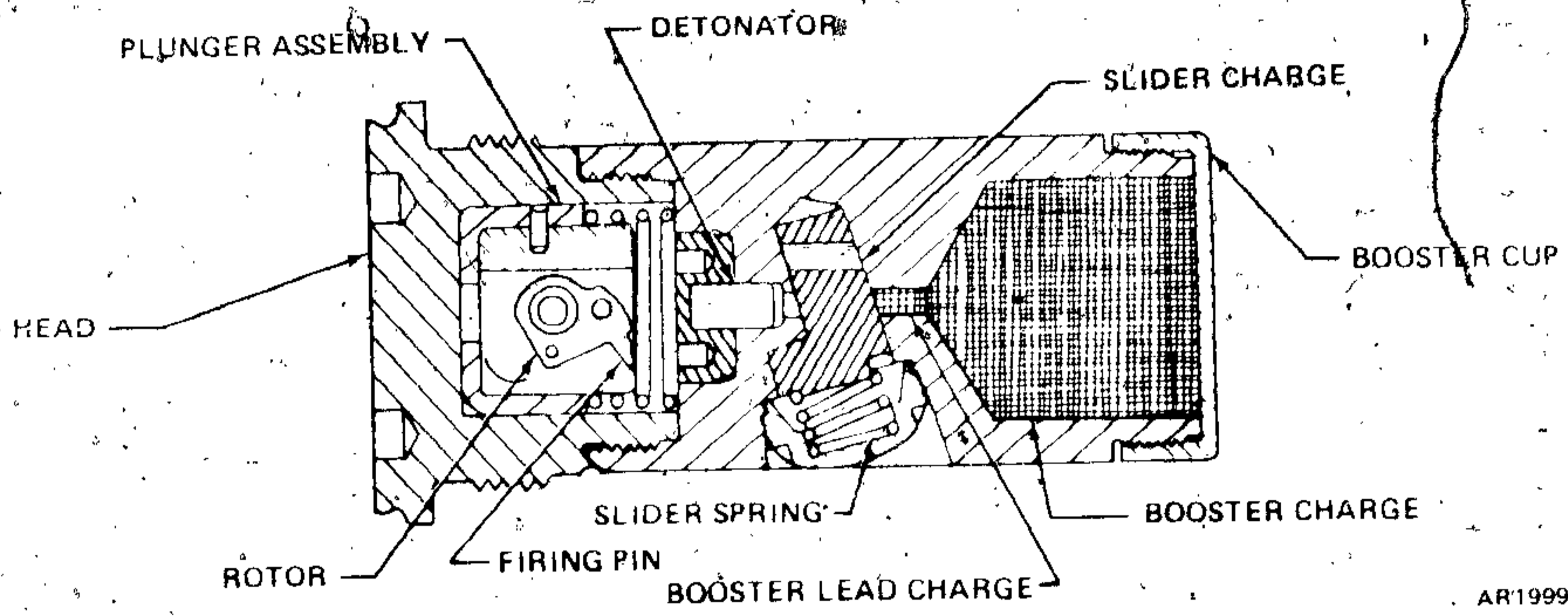
Reference:

TM 9-1015-203-12
 TM 9-1025-200-12
 TM 9-1300-251-20

Temperature Limits:

Refer to complete round for upper and lower limits.

FUZE, BASE DETONATING: M62 SERIES



AR199947

Type Classification:

Std AMCTC 4266 dtd 1966

Use:

Base detonating fuzes of the M62 Series are the non-delay type. M62A1 is used with 75-mm and 105-mm recoilless rifle with HEAT and HEP cartridges. The M62A2 is used with 165-mm guns with HEP cartridge. (The illustration shows the M62A2).

Description:

The steel head of the fuze contains a spring-loaded inertial-type plunger assembly containing the rotor-mounted firing pin. The firing pin is retained in the unarmed position by spring-loaded safety pins (not shown in illustration). The plunger assembly is contained in a steel housing and uses one compression spring. A detonator is located in a holder just forward of the plunger assembly. Bore safety is provided by a spring-loaded slider located between the detonator and the booster lead charge. The slider functions as an interrupter in the unarmed position, but also carries a tetryl charge, aligned when the slider moves to the armed position, so the slider charge becomes a part of the detonator train. A tetryl booster charge is retained in the base by a brass cup threaded over the fuze body.

Functioning:

Centrifugal force withdraws the safety pins to permit the rotor to turn and align the firing pin with the detonator. Centrifugal force also moves the slider transversely against the slider spring to align the slider charge between the detonator and the booster charge. Rotational speed required for slider arming is not less than 2350 RPM nor more than 3650 RPM. During projectile flight the firing pin is held out of contact with the detonator by the plunger assembly spring. Upon impact, the inertia of the plunger overcomes the spring and drives the firing pin into the detonator to initiate the explosive train to the projectile.

Difference Between Models:

In Fuze M62, the plunger assembly is contained in a light brass housing and uses two small compression springs. In Fuze M62A1, a different detonator is used.

Tabulated Data:

Type	-----	BD
Weight	-----	1.27 lbs.
Length	-----	3.46 in.
Thread size	-----	1.5 in.-12NS-1 (LH)
Assembly Dwg. Nos.:		
M62A2	-----	8886414
M62A1	-----	73-2-168

Temperature Limits:

Refer to complete round for upper and lower limits.

Explosive Components:

M62A2 ----- Detonator M58,
tetryl slider charge,
tetryl booster lead
charge, and tetryl
booster charge.

M62A1 -----

Detonator M22,
tetryl slider charge,
tetryl booster lead
charge, and tetryl
booster charge.

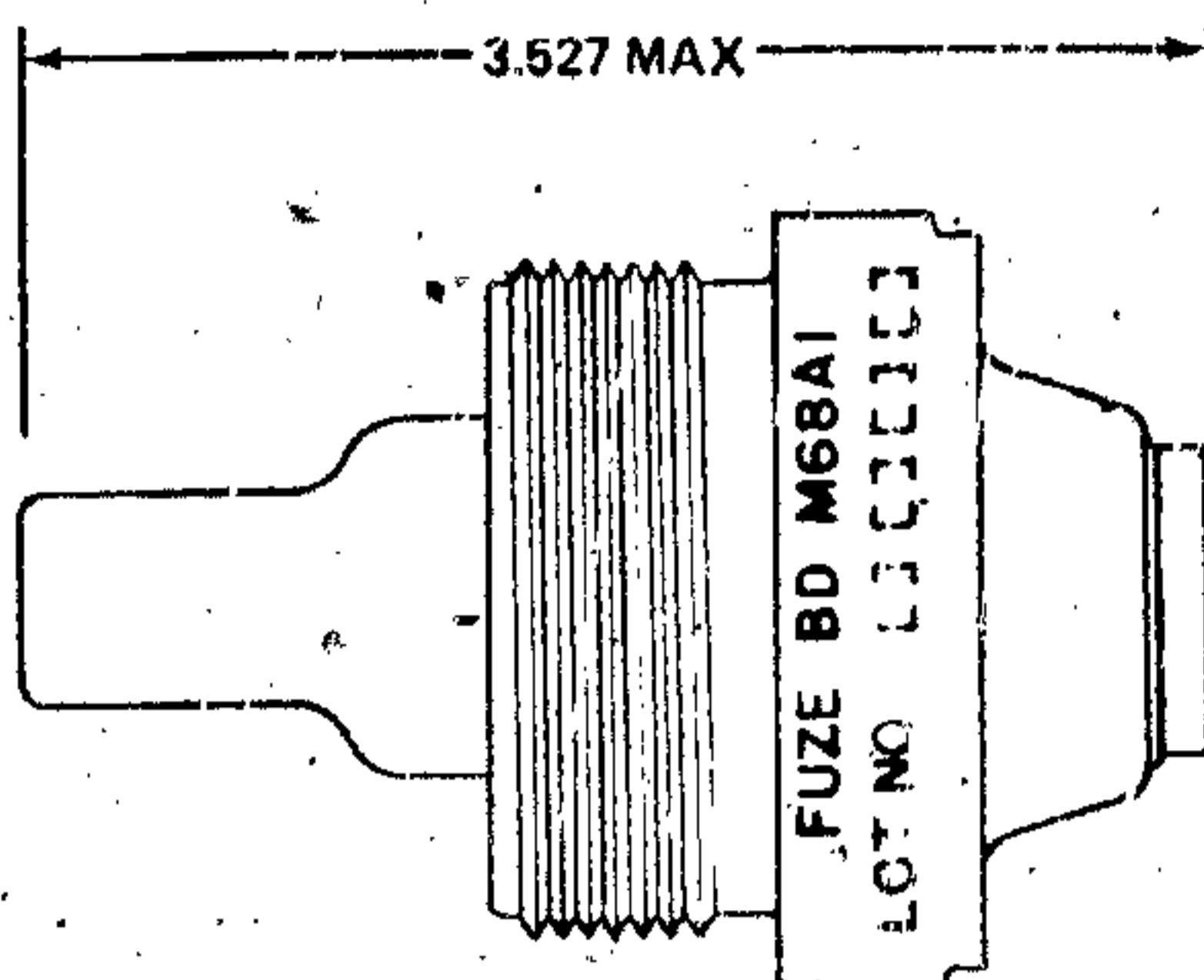
Limitations:

None

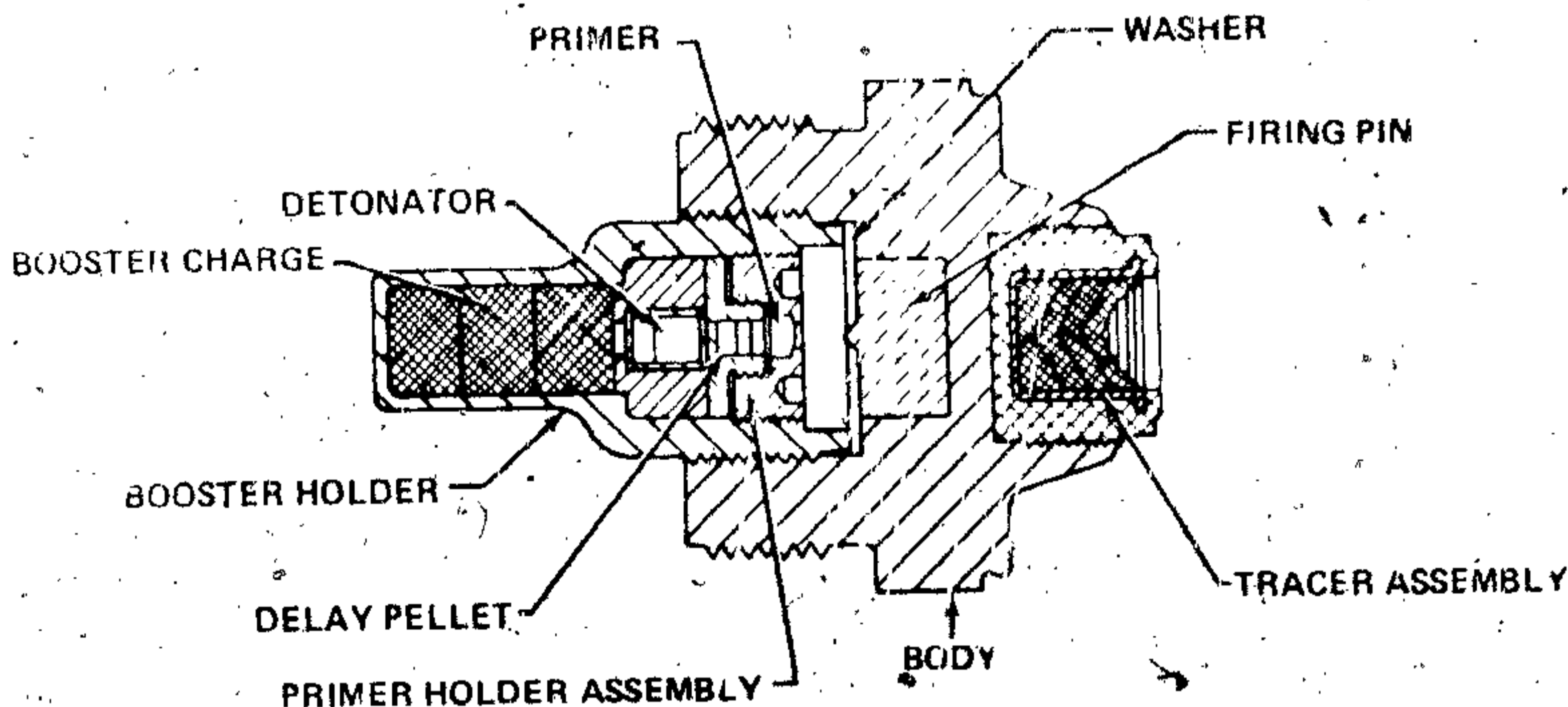
Reference:

TM 9-1300-251-20
TM 9-2350-222-10

FUZE, BASE DETONATING: M68 SERIES



AR199955



AR199954

Type Classification:

Std OTCM 36841 dtd 1958

Use:

Base Detonating Fuzes M68 series are delay-action fuzes used with 90-mm gun, APC-T cartridges.

Description:

Fuzes are of the simple inertia type, without bore-safe provision. The body of the fuze is threaded externally to fit the projectile base cavity, and is threaded internally to receive a booster holder assembly containing a tetryl booster charge and a detonator. The booster

holder assembly, in turn, is threaded internally to receive a primer holder assembly containing a primer and black powder delay pellet. The firing pin is contained within the fuze body and is restrained prior to impact by a soft steel washer. The base of the fuze is threaded internally to receive a tracer assembly. The tracer assembly is contained in the base of the fuze.

Functioning:

The tracer composition in the base of the fuze is ignited by the flash of the propelling charge and provides a visible trace for at least 3 seconds. There is no other action until impact, when the inertia of the firing pin breaks the soft steel washer, and the

Primer impact strikes the primer. The primer flash ignites the black powder delay pellet. After a burning time of 0.01 second, the delay pellet ignites the detonator which fires the booster charge to detonate the filler of a projectile.

Difference Between Models:

Size M68A1 is slightly larger, but lighter than fuze M68; otherwise the fuzes are identical in design.

Fuze M68 contains primer No. 26

Fuze M68A1 contains primer No. 31

M68 tracer is press fit.

M68A1 tracer is threaded

Tabulated Data

Type -----	BD
Weight	
M68A1 -----	1.44 lbs.
M68 -----	1.56 lbs

Length Overall:

M68A1 ----- 3.527 in.

M68 ----- 3.46 in.

Thread size ----- 2.0 in.-10NS-1 (LH)

Assembly Dwg. Nos.:

M68 series ----- 73-2-181

Temperature Limits:

Refer to complete round for upper and lower limits

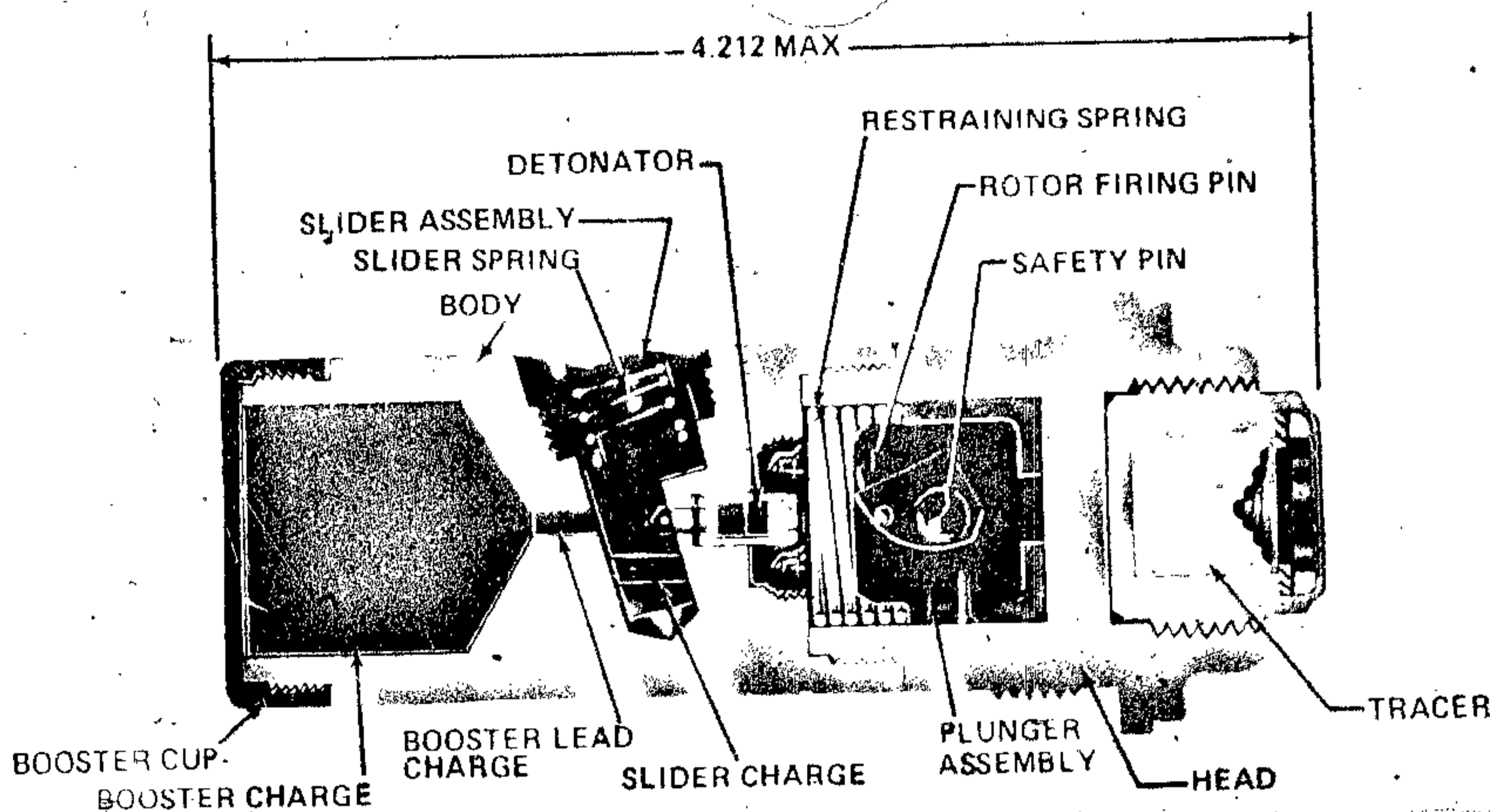
Explosive Components:

Primer, No. 26 (M68), No. 31 (M68A1), black powder delay pellet, Detonator M17, tetryl booster Charge, and Tracer Assembly M5.

References:

- TM 9-1015-219-35
- TM 9-1300-251-20
- TM 9-2350-224-10
- TM 9-7012

FUZE, BASE DETONATING: M91 SERIES

Type Classification:

Std OTCM 37119 dtd 1959.

Use:

Base Detonating Fuzes M91 series are non-delay type used with HEAT-T cartridge in 105-mm howitzers and with HEP cartridge in 106-mm guns when tracer is required.

Description:

Fuzes of the M91 series consist of a steel head and body, brass booster cup, and a tracer. The head contains a spring-loaded plunger assembly with a rotor-mounted firing pin. The firing pin is retained in the unarmed position by spring-loaded safety pins. The body contains a detonator, a slider assembly with slider charge, a booster lead-charge and a tetryl booster charge retained by a threaded cup. The tracer is contained in a steel or aluminum alloy cup threaded into the head. Bore safety is provided by the spring-loaded slider. In the unarmed position the slider acts as an interrupter, but in the armed position the slider charge is aligned between the detonator and the booster lead charge to become part of the detonation train.

Functioning:

The tracer is ignited by the propelling charge and provides a luminous trace during the flight of the projectile. When projectile rotation speed after firing reaches at least 1700 RPM, but less than 3600 RPM, centrifugal force withdraws the rotor lock pins to permit the rotor to turn and align the firing pin with the detonator. Centrifugal force also moves the slider transversely against the slider spring to align the slider charge between the detonator and the booster lead charge. Rotational speed required for slider arming is not less than 2400 RPM nor more than 3600 RPM. During projectile flight the firing pin is held out of contact with the detonator by the plunger assembly spring. Upon impact, the inertia of the plunger overcomes the spring and drives the firing pin into the detonator.

Difference Among Models:

Fuze M91 contains a M22 detonator and an integral press fit tracer.

Fuze M91A1 contains a M22 detonator and a M5A2B1 tracer assembly.

Fuze M91A2 contains a M58 detonator and a M5A2B1 tracer assembly.

Tabulated Data:

Type ----- BD
 Weight ----- 1.40 lbs.
 Overall Length:
 M91A2 and M91A1 -- 4.212 in.
 M91 ----- 4.11 in.
 Thread size ----- 1.50 in. -12NS-1
 (LH)
 Assembly Dwg. Nos. :
 M91A2 ----- 8887308 (Rev 4)
 M91A1 ----- 73-2-239
 M91 ----- 73-2-239

Temperature Limits:

Refer to complete round for upper and lower limits.

Explosive Components:

Detonator M58 (M91A2); Detonator M22 (M91 and M91A1); tetryl slider charge, tetryl booster lead charge, and tetryl booster charge.

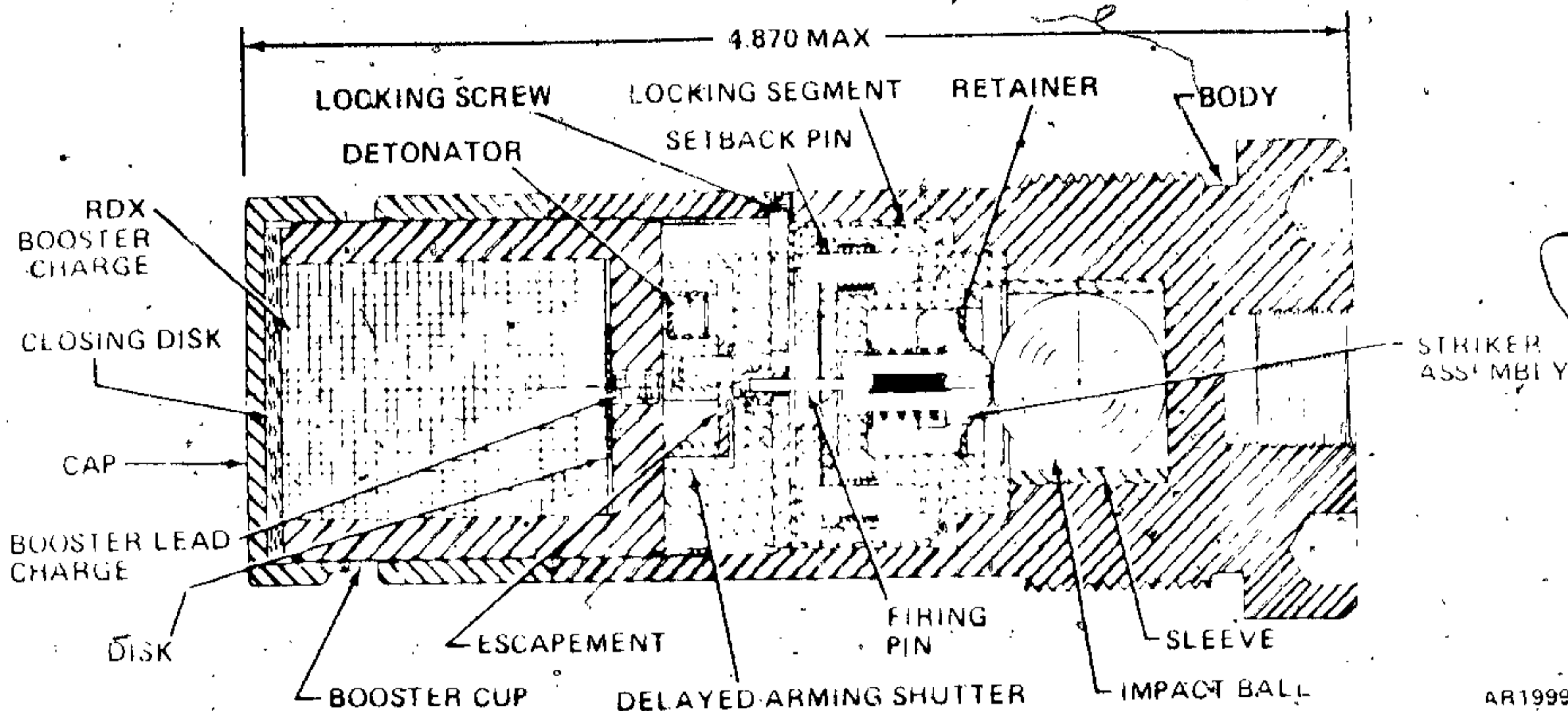
Limitations:

None.

References:

- TM 9-1015-203-12
- TM 9-1015-234-12
- TM 9-1300-251-20
- TM 9-2350-217-10

FUZE, BASE DETONATING: M534A1



AR199951

Type Classification:

Std OTCM 37930 dtd 1959.

Use:

Base Detonating Fuze M534A1 is used with HEP-T and WP-T ammunition in 105-mm guns.

Description:

The fuze has an aluminum body with a threaded base flange. A steel impact ball is housed in a sleeve near the rear of the fuze body. A spring-loaded striker assembly containing the firing pin is located just forward of the impact ball and is locked, when in the unarmed position, by setback pins and a spin-activated locking segment. The detonator and escapement mechanism is carried in a spin-activated delayed arming shutter ahead of the striker, and is out of line in the unarmed condition. The booster lead charge and RDX booster charge are contained in a booster cup threaded into the forward end of the fuze body and the cup is closed with a threaded cap.

Functioning:

The fuze becomes armed when centrifugal force from projectile rotation moves the locking segment to the armed position (6000 to 8500 RPM), thus releasing the striker assembly,

and moves the delayed arming shutter to align the detonator with the firing pin (7000 to 8500 RPM). This delayed arming provides a safety distance from the muzzle of at least 26 feet. Upon either impact or graze, the impact ball drives the striker and firing pin forward into the detonator. The detonator flash fires the booster lead charge and the booster charge to detonate the projectile.

Tabulated Data:

Type	-----	BD
Weight	-----	1.007 lbs.
Overall length	-----	4.870 in.
Assembly Dwg. No.	-----	8860724
Thread size	-----	1.8 in. - 12UNS-2A (LM)

Temperature Limits:

Refer to complete round for upper and lower limits.

Explosive Components:

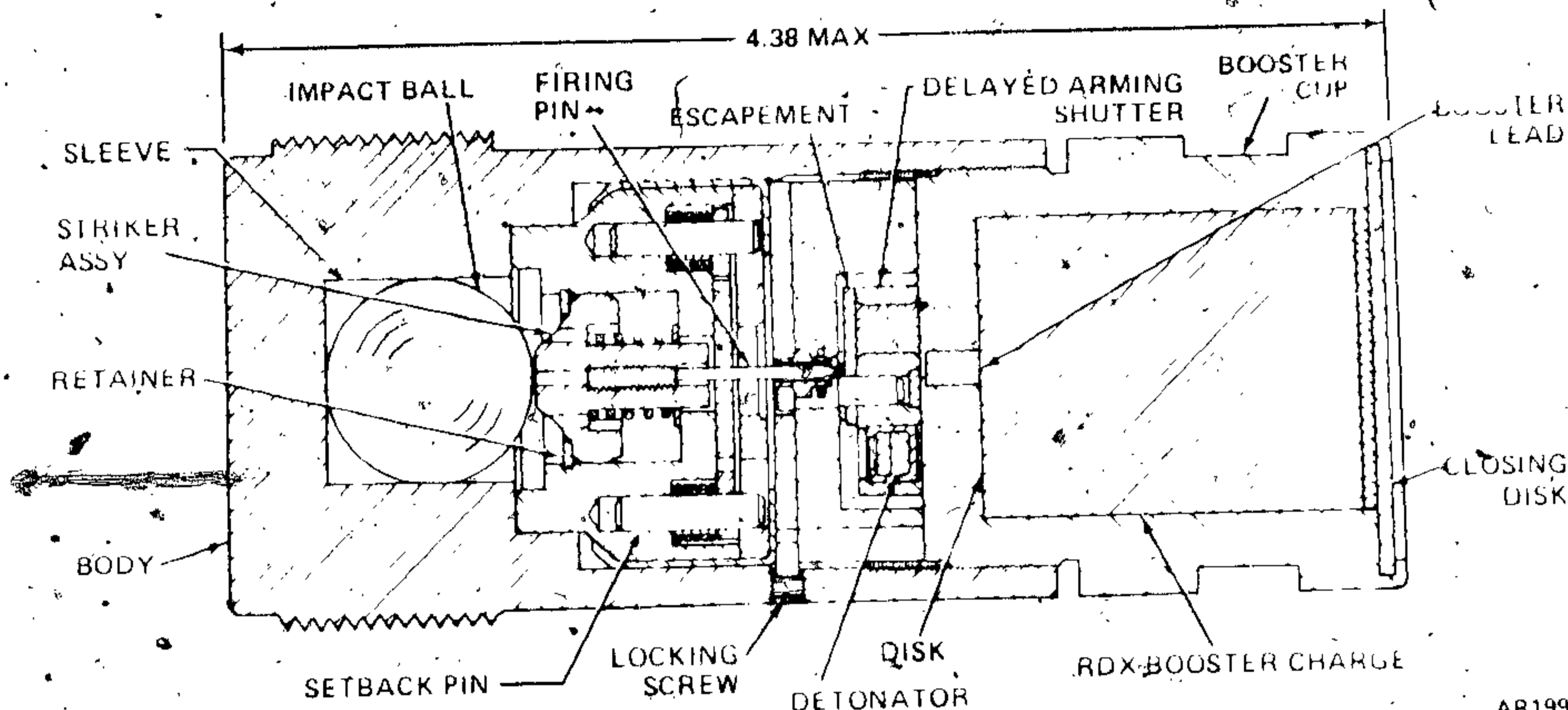
Detonator M61, RDX booster lead charge, and RDX booster charge.

References:

- TM 9-1300-251-20
- TM 9-2350-210-12

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FUZE, BASE DETONATING: M578



AR199953

Type Classification:

Std AMCTC 3325 dtd 1965

Use:

Base Detonating Fuze M578 is used with HEP ammunition fired from 105-mm gun cannons.

Description:

The fuze has a steel body. A steel impact ball is housed in the rear of the fuze body. A spring-loaded striker assembly containing the firing pin is located just forward of the impact ball and is locked when in the unarmed position by setback pins and a spin-activated locking segment. The detonator and escapement mechanism are carried in a spin-activated delayed arming shutter ahead of the striker, and are out of line in the unarmed condition. The booster lead charge and RDX booster charge are contained in a booster cup threaded into the forward end of the fuze body. Earlier models have slightly different exterior configuration.

Functioning:

The fuze becomes armed when centrifugal force from projectile rotation moves the locking segment to the armed position (6000 to

8500 RPM), thus releasing the striker assembly, and moves the delayed arming shutter to align the detonator with the firing pin (7000 to 8500 RPM). This delayed arming provides a safety distance from the muzzle of at least 26 feet. Upon either impact or graze, the impact ball drives the striker and firing pin forward into the detonator. The detonator flash fires the booster lead charge and the booster charge to detonate the projectile.

Tabulated Data:

Type	BD
Weight	1.876 lbs.
Overall length	4.38 in.
Thread size	1.8 in. -12UNS-2A
Assembly Dwg. No.	8886434

Temperature Limits:

Refer to complete round for upper and lower limits.

Explosive Components:

Detonator M61, RDX booster lead charge, and RDX booster charge.

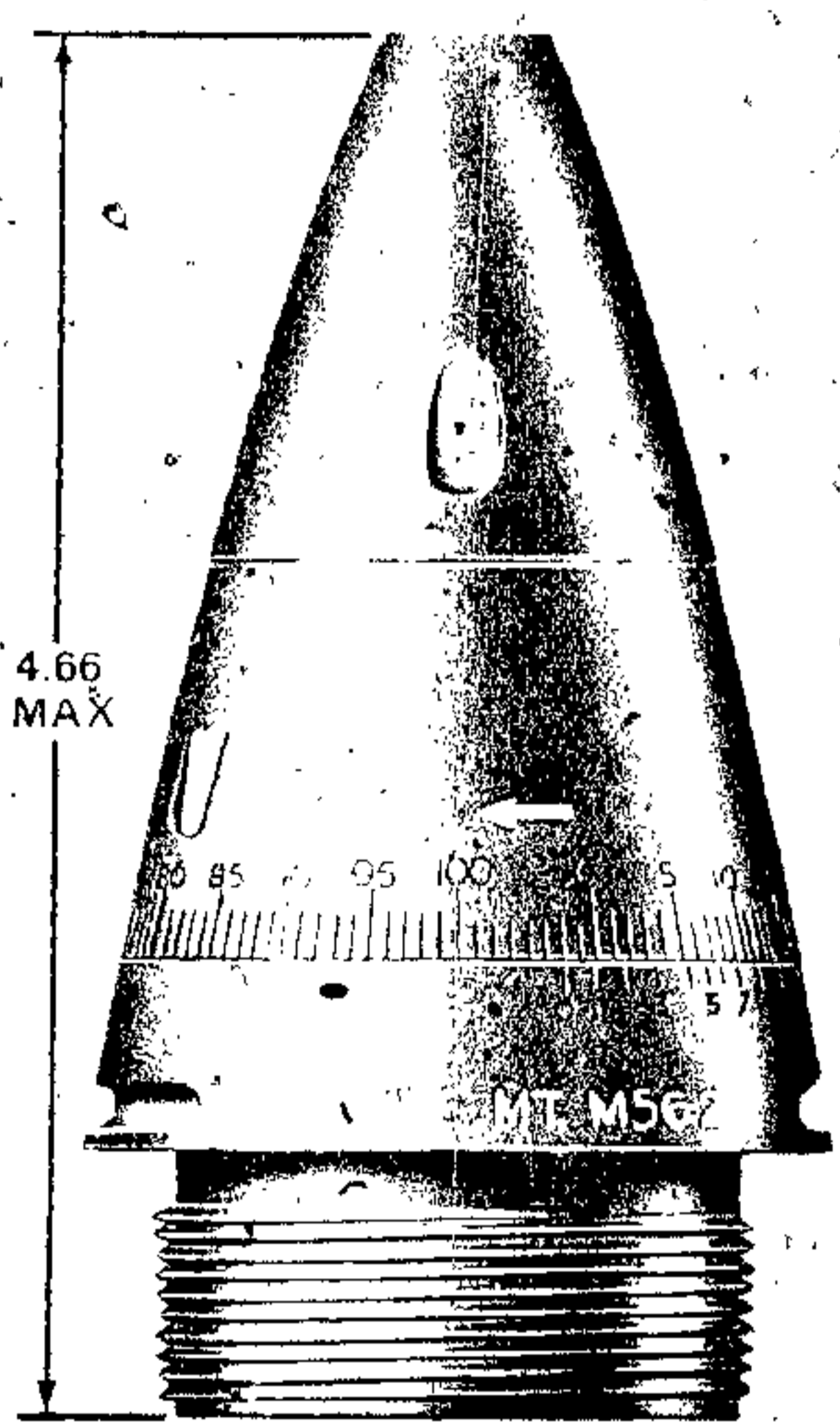
References:

- TM 9-1300-251-20
- TM 9-2350-210-12

TM 43-0001-28

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FUZE, MECHANICAL TIME: M562

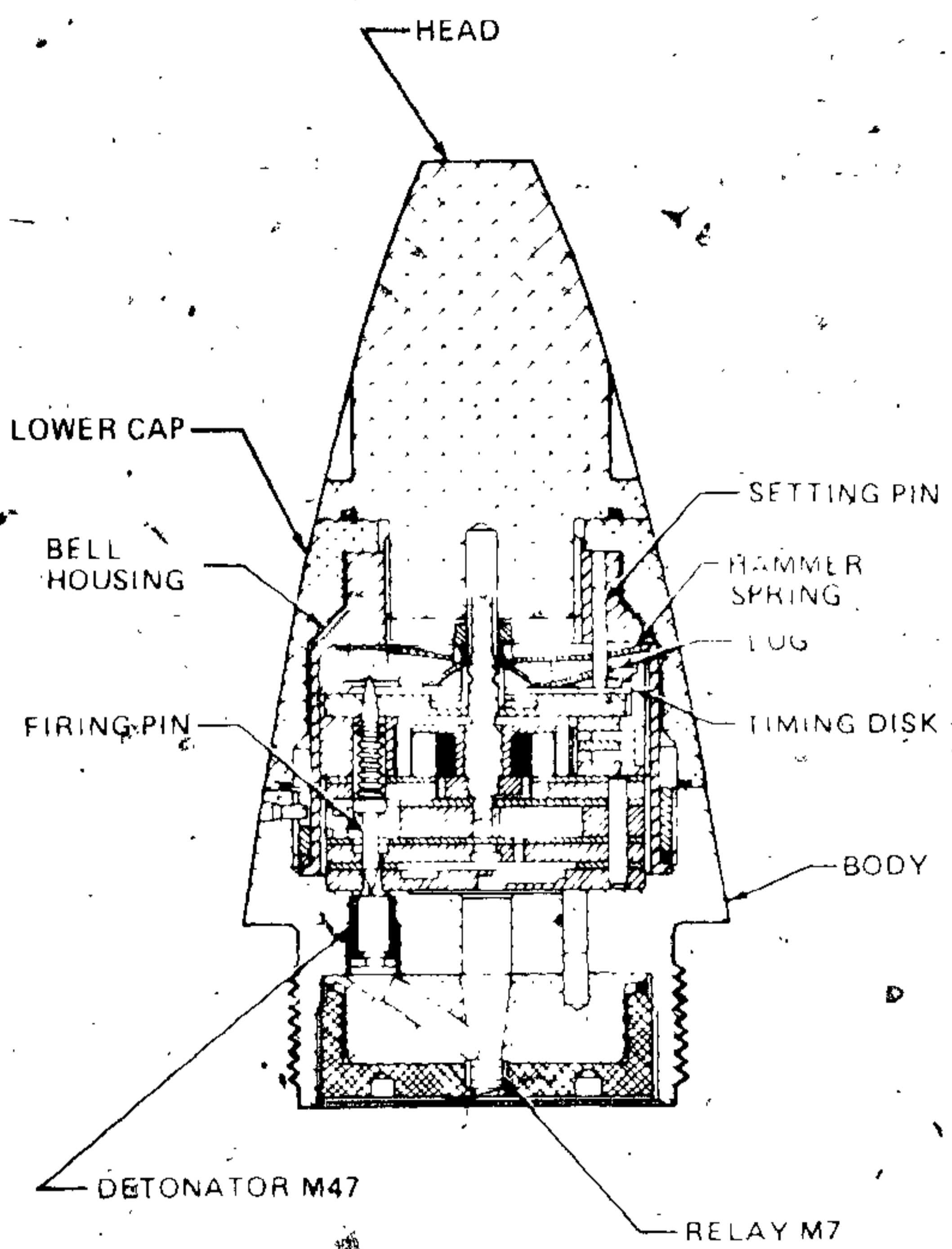


4.66
MAX

80 85 90 95 100 5 10
57

MT M562

AR199909



AR199908

Type Classification:

Std AMCTC 267 dtd 1962

Use:

Fuze M562 is a mechanical time type used with 4.2-inch mortar illuminating cartridges.

Description:

The aluminum head is threaded into the bell housing under the lower cap. The rotatable lower cap has an exterior scale graduated in seconds from 0 to 100, plus a safety line stamped S. The movement is a spring-driven clockwork and escapement mechanism to provide the fuze functioning time desired.

The steel body of the fuze contains a detonator near the top and a relay in a retainer at the base. A fuze setting line and vernier scale are inscribed on the exterior.

Functioning:

When the lower cap is rotated to set the time, the timing disk of the movement is rotated also by means of a setting pin lodged in an upraised lug on the disk. When the cartridge is fired, setback causes a hammer spring to strike the upraised lug, releasing the disk from the setting pin. Centrifugal force releases the detents (not shown) holding the timing movement. When the timing disk has rotated to the preset time, a notch in the disk engages the firing arm. The firing arm slides

TM 43-0001-28

into the notch and turns, permitting the spring-loaded firing pin to strike the detonator and initiate the explosive train.

Tabulated Data:

Type ----- MT
Weight ----- 1.56 lbs.
Length:
 Visible ----- 3.76 in.
 Overall ----- 4.66 in.
Thread size ----- 2-12 UNS-1
Assembly Dwg. No. - 10520791

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 4hrs/day)

*Packing ----- 8 fuzes in metal container; 2 containers in wirebound box

*Packing Box:

Weight ----- 45.2 lbs.
Dimensions ----- 14-7/8 x 12-13/16 x 9-1/4 in.
Cube ----- 1.0 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 1
Storage compatibility group ----- B, N & E
DOT shipping class ----- C
DOT designation --- TIME FUZES

DODAC ----- 1390-N283

Explosive Components:

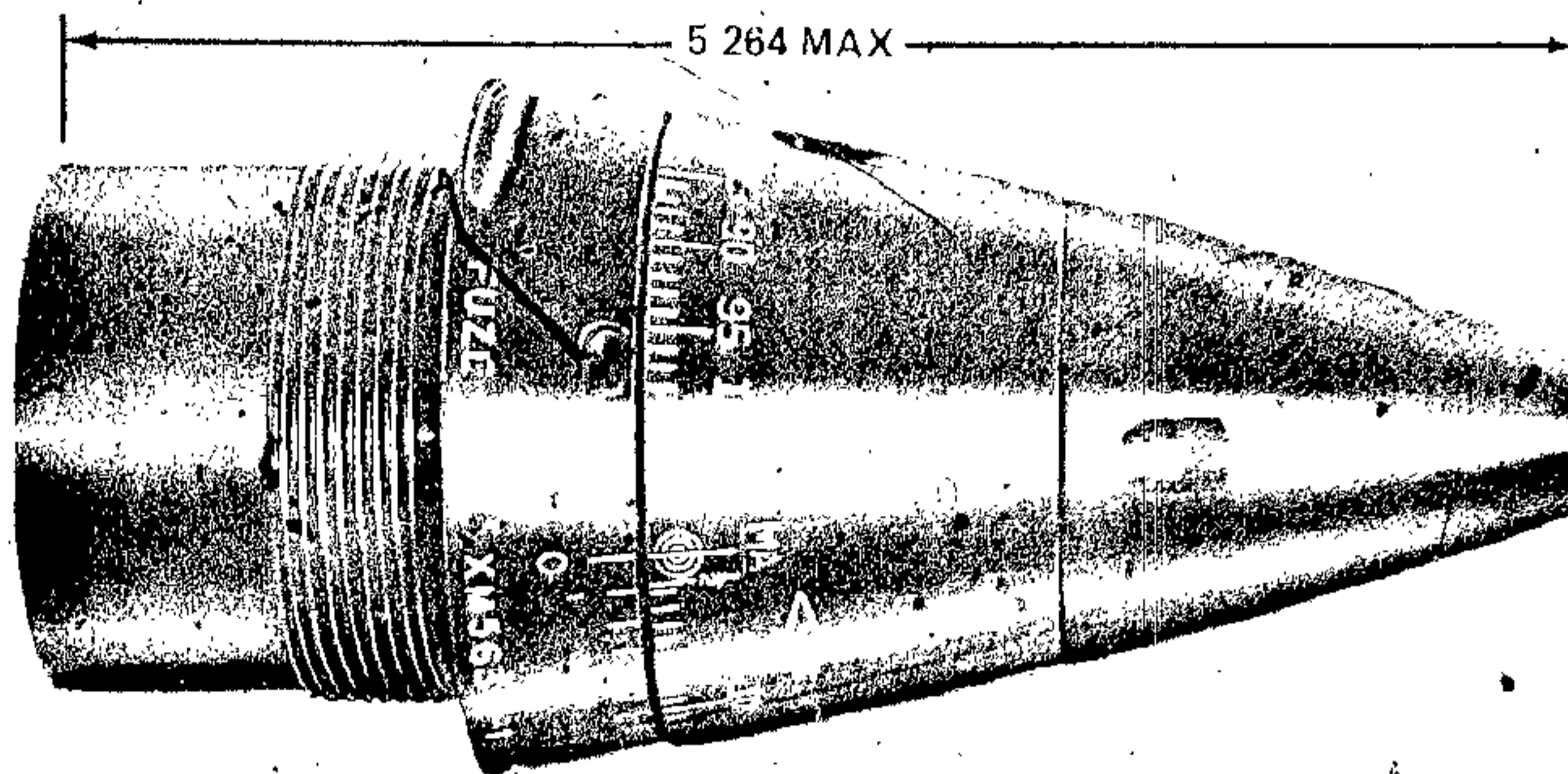
Detonator M47 and Relay M7.

References:

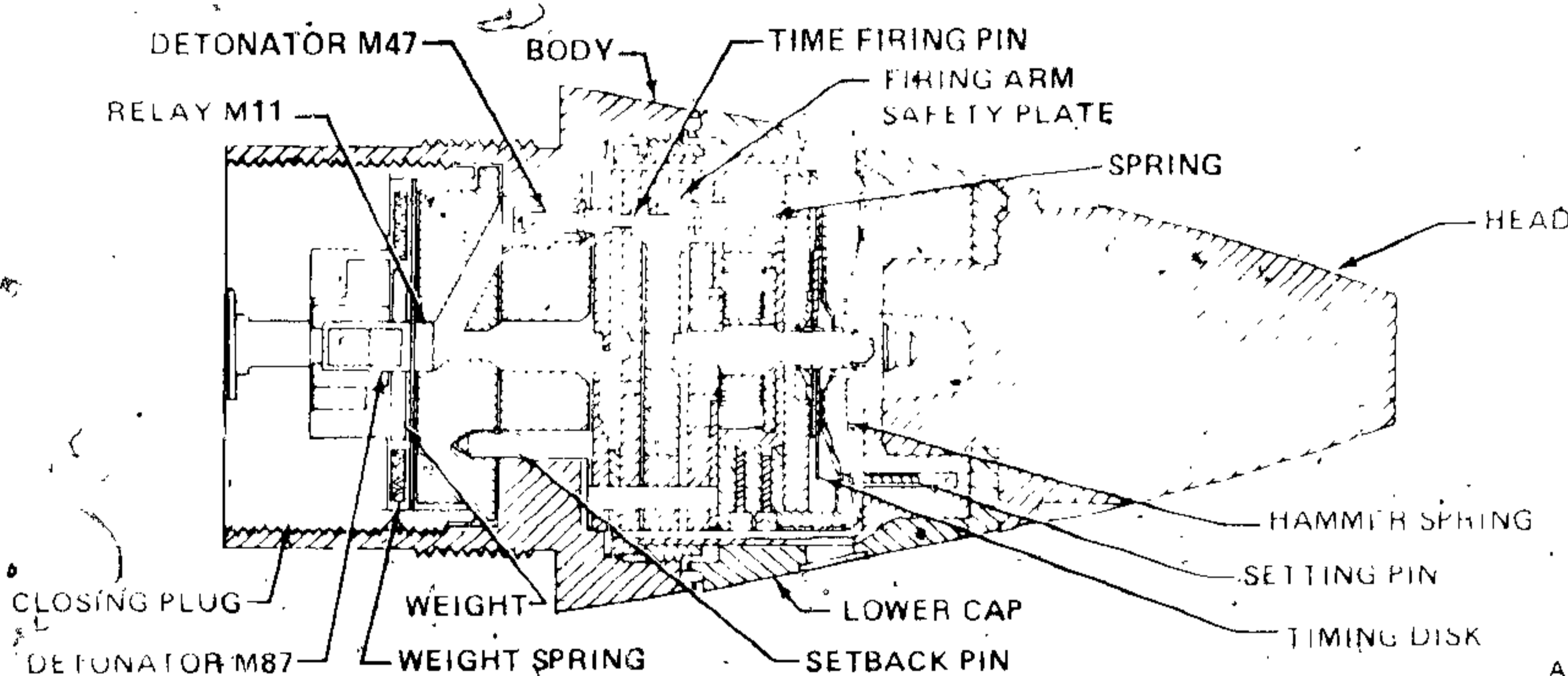
TM 9-1015-215-12
TM 9-1300-251-20
SC 1340/98-IL



FUZES, MECHANICAL TIME: XM563 SERIES



AR199935



AR199934

Type Classification:

LP AMCTC 8269, dtd 1971

Use:

Mechanical time fuzes of the M563 series are used to function flechette-loaded 105-mm Cartridge M546.

Description:

Mechanical Time M563 series fuzes are comprised of a solid aluminum head, a lower cap assembly with time graduation in seconds which houses a setting pin and hammer spring; a fuze body which contains the clockwork timing mechanism, the muzzle action feature, the

detonator-holder plug assembly, and the vernier scale for accurate times settings to a tenth of a second. The lower cap time graduations contain an MA designation for muzzle action, a 1/2 second setting for minimum downrange functioning, and whole-second increments for pre-set downrange functioning. The vernier scale for fractional-second time settings and reference zero line time indication are contained on exterior of the body. Detonator M47 is positioned directly under the timing movement firing pin. The detonator holding plug assembly contains Detonator M87 centrally located between Relay M11 positioned in the closing plug. Between Relay M11 and Detonator M87 two overlapping centrifugally operated weights provide safety in handling.

Functioning:

When the fuze is set, turning the lower cap rotates the timing disk proportionately by means of the setting pin, engaged in an upraised lug on the disk. Upon firing, setback forces the hammer spring to strike the upraised lug, releasing the timing disk from the setting pin. As projectile spin rate increases, centrifugal force releases the detents securing the timing movement, and the timing disk begins to turn. At the same time, centrifugal force causes the safety weights in the base of the fuze to move aside to clear the detonation path between Relay M11 and Detonator M87. When the disk has rotated for the preset time, the notch in the disk releases the firing arm. The firing arm turns, moving the firing arm safety plate so that the firing pin strikes Detonator M47 to initiate the explosive train to the projectile. If muzzle action was selected, the fuze will function immediately as the projectile leaves the muzzle. This is accomplished by the combination of angular acceleration and setback forces releasing the alpha weights or setback pins depending on the fuze used, which in turn, releases the centrifugal weights exposing the notch in the timing disk activating the firing pin sequence for functioning of the M47 detonator and initiation of the fuze explosive train. If another range was set, fuze function will occur so as to result in optimum flechette dispersion for the range; for setting between 200 and 500 meters, the fuze will function 100 meters short of the range set. For longer range settings up to 4400 meters, functioning will occur 75 meters short of the range set.

Difference Between Models:

Fuze XM563E1 has a larger timing disk than Fuze XM563E2. The muzzle action feature in Fuzes XM563E1 and XM563E2 is activated by four alpha weights and two centrifugal weights. In Fuzes XM563E3 and XM563E4, the alpha weights are replaced by four setback pins. The M563 (XM563E4) differs from the XM563E3 in the escapement mechanism in which an improved configuration of balance lever and spring is used.

Tabulated Data:

Type ----- MT
Weight ----- 1.41 lbs.
Length:
Visible ----- 3.764 in.
Overall ----- 5.264 in.
Assembly Dwg. Nos.:
M563 ----- 10520688
XM563E2 ----- 10535651
XM563E1 ----- 8864490

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 hrs. /day)

Packing ----- Fuzes are assembled to Cartridge M546 and are not packed as a separate item of issue.

Explosive Components:

Detonator M47, Relay M11, and Detonator M87.

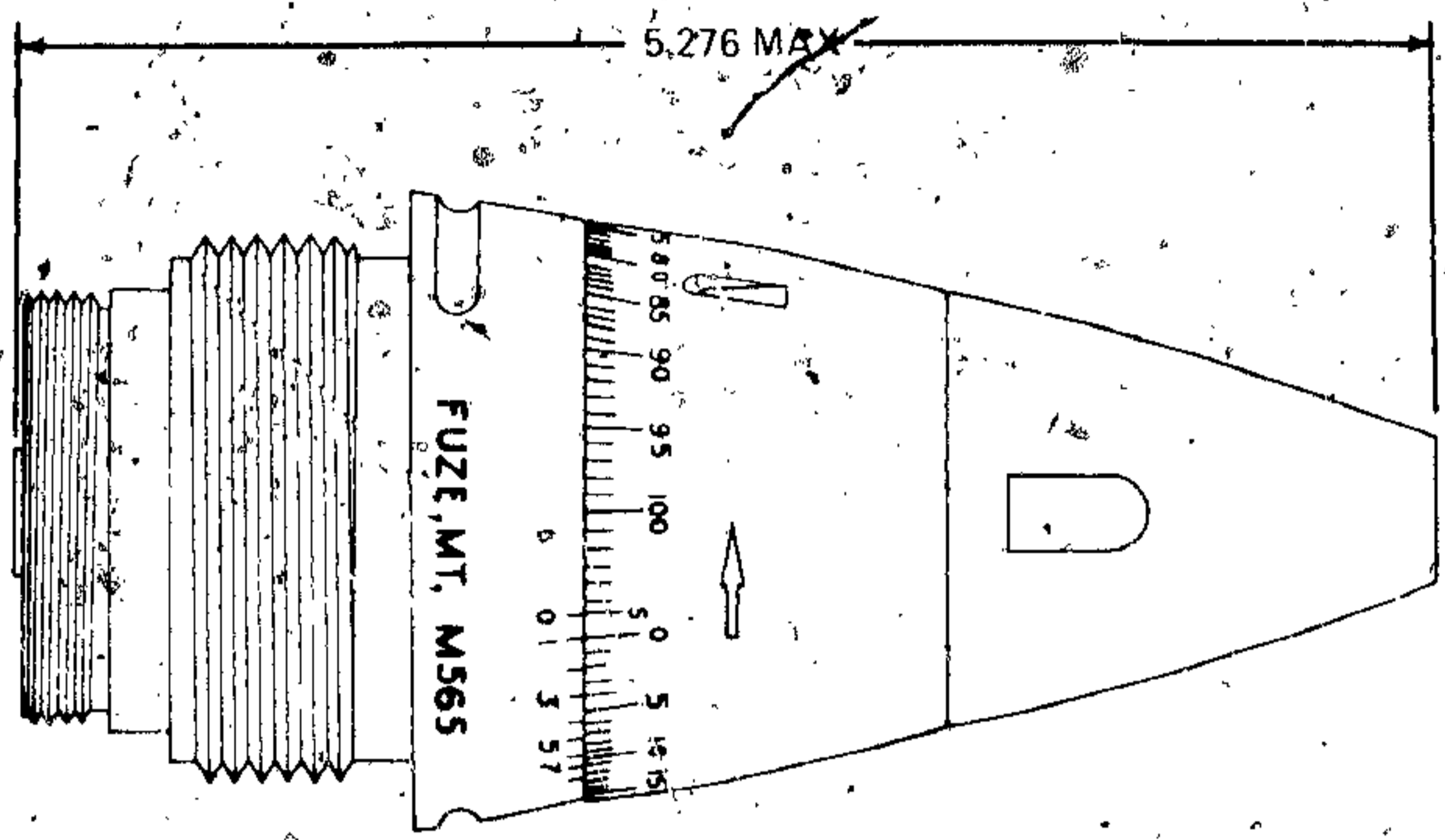
Limitations:

Overhead firing is prohibited.

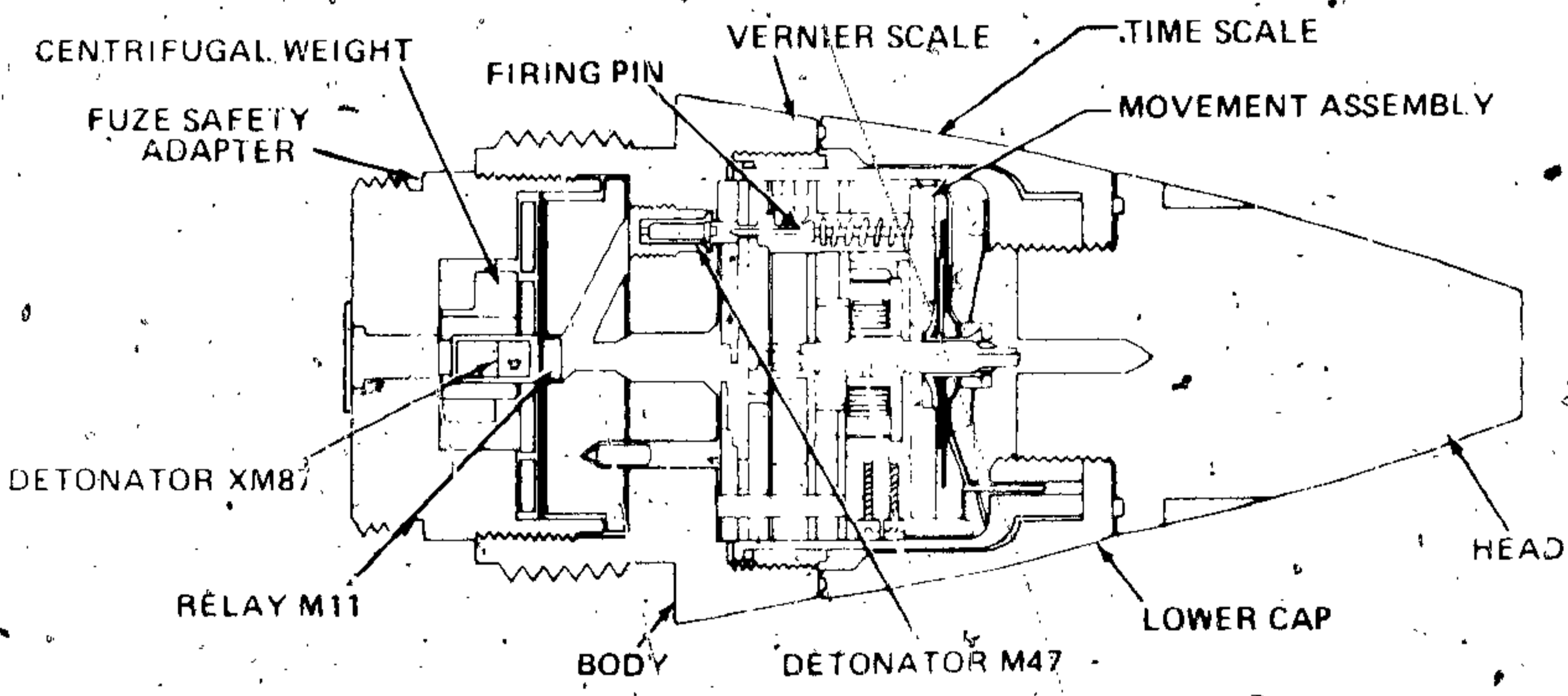
References:

TM 9-2350-215-10 TM 9-1015-203-12
TM 9-1300-251-20 TM 9-1015-234-12
SC 1340/98-IL
SB 700-20

FUZE, MECHANICAL TIME: M565



AR199939



AR199938

Type Classification:

Std AMCTC 1874 dtd 1964

Use:

Mechanical Time Fuze M565 is used to detonate a variety of spin-stabilized projectiles for cannons of 105-mm through 8-inch, except 175-mm, when superquick point detonating capability is not a requirement.

Description:

The fuze consists of a solid steel head threaded into a steel lower cap containing the

timing movement, and a steel body containing a detonator. A safety adapter containing a relay and a detonator in addition to an interrupter assembly is threaded into the base of the fuze body. The timing movement is a spring-driven clockwork mechanism secured in the unarmed position by setback pins and centrifugal detents. A time scale graduated from 0 to 100 seconds is inscribed on the rotatable lower cap, and a vernier scale to permit setting accuracy to 0.1 second appears on the base. The safety adapter interrupter mechanism in the base consists of two centrifugal weights which prevent alignment of the detonator with the relay until a safe arming distance of at least 200 feet from the muzzle is reached.

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Functioning:

Upon firing, setback causes the hammer spring to strike the upraised lug of the timing disk, flattening the lug and releasing the disk from the setting pin. When sufficient centrifugal force has developed, the detents holding the escapement lever of the movement assembly and the rotor of the delayed-arming safety adapter move outward, leaving the escapement components free to run. Simultaneously, centrifugal force actuates the arbor lock, which disengages from the arbor and thus releases the mainspring. As the mainspring drives the movement, the rate of rotation of the arbor and, therefore, of the timing disk is governed by the escapement through the gear train. When the notch in the rotating timing disk reaches the upright of the firing arm, the firing arm turns permitting the firing pin safety plate to swing out from under the firing pin flange, allowing the firing pin to strike the detonator. Detonator M47 initiates the explosive train through the relay and detonator to the projectile.

Tabulated Data:

Type ----- MT
 Weight ----- 2.05 lbs.
 Length:
 Visible ----- 3.77 in.
 Overall ----- 5.276 in.
 Thread size ----- 2.00 in-12NS-1 (R)
 Assembly Dwg. No. --- 10522991

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 hrs/day)

* Packing ----- 8 fuzes in metal container; 2 containers in wire-bound box

* Packing Box:
 Weight ----- 54.6 lbs.
 Dimensions ----- 14-7/8 x 12-13/16 x 9-1/8 in.
 Cube ----- 1.0 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 1
 Storage compatibility group ----- B, E, and N
 DOT shipping class ----- C
 DOT designation --- TIME FUZES

DODAC ----- 1390-N248

Explosive Components:

Detonator M47, Relay M11, and Detonator XM87

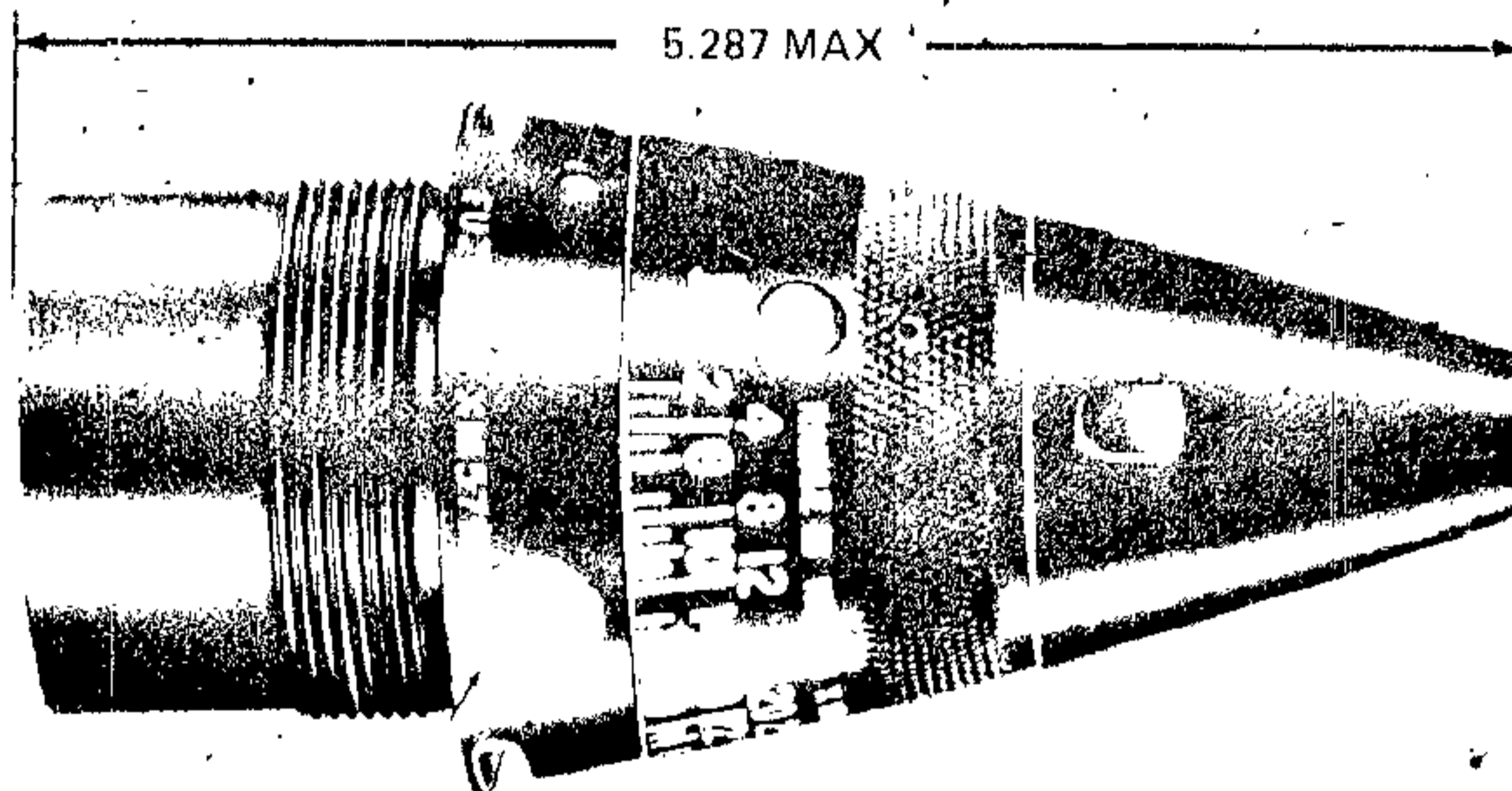
Limitations:

None

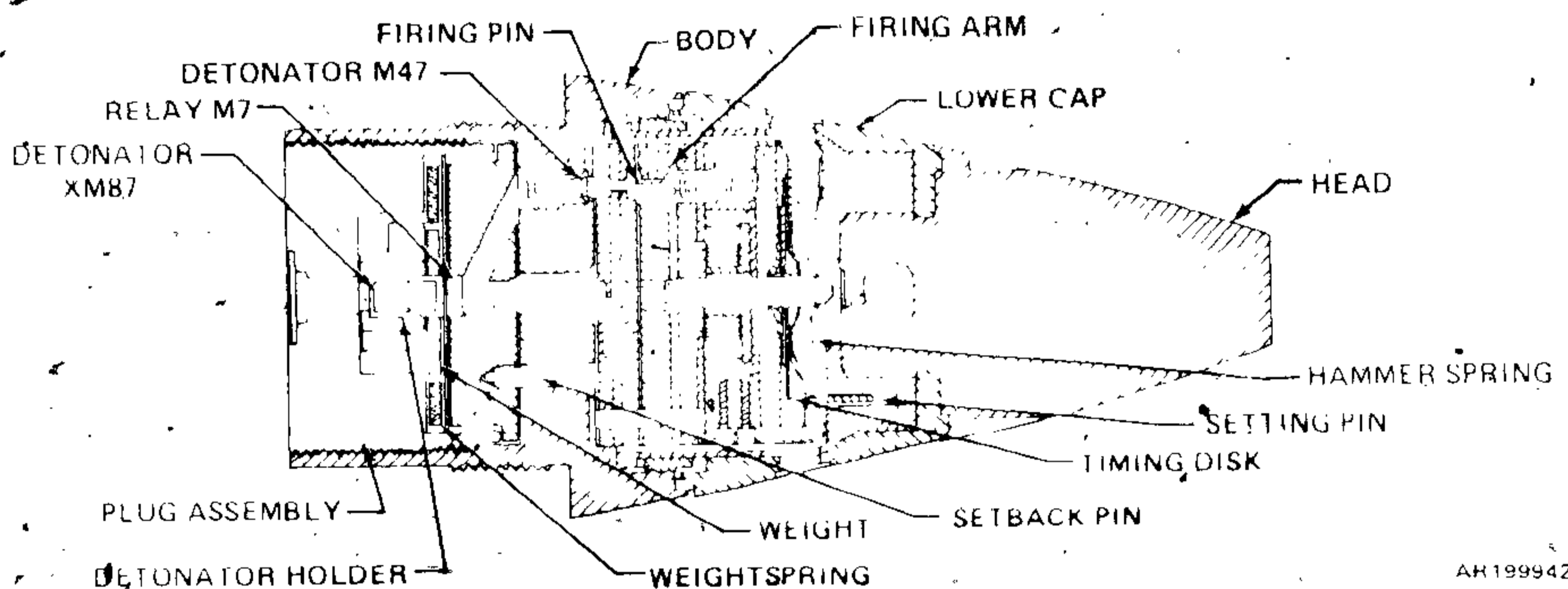
References:

- SC 1340/98-IL
- TM 9-1300-251-20
- TM 9-1300-254-12
- TM 9-1015-203-12
- TM 9-1015-234-12
- TM 9-1025-200-12
- TM 9-2300-216-10
- TM 9-2350-210-12
- TM 9-2350-215-10
- TM 9-2350-217-10
- TM 9-2350-217-10N

FUZE, MECHANICAL TIME: M571



AR199943



AR199942

Type Classification:

Std AMCTC 9575 dtd 1972

Use:

Mechanical Time Fuze M571 is designed especially for use with 105-mm flechette-loaded Cartridge M494.

Description:

The fuze consists of an aluminum head, a lower cap containing the timing movement, a body, and a detonator holder plug assembly. The rotatable lower cap is inscribed with range graduations in meters and a muzzle action mark for alignment as required with a zero mark on the body. The fuze as issued is set

for muzzle action, but any desired range between 200 and 4400 meters can be preset by hand. The movement assembly in the lower cap is a spring-driven clockwork mechanism combined with a muzzle action feature activated by four setback pins and two centrifugal weights (not shown in illustration), utilizing the same firing pin as the time mechanism. The detonator holder located in the fuze body above the closing plug contains Detonator XM87. An interrupter between Relay M7 at the upper end of the body and Detonator XM87 consists of two overlapping centrifugal weights.

Functioning:

Muzzle Action: Setback upon weapon firing causes the setback pins to move downward and

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allow centrifugal force to move the weight above the timer, uncovering a notch in the timing disk. At the same time, centrifugal force moves aside the weights between Relay M7 and Detonator XM87 in the base. With the notch in the timing disk uncovered, the firing arm slides inward and turns, permitting the spring-loaded pin to strike Detonator M47 and initiate the explosive train. Detonation occurs immediately when the projectile leaves the muzzle.

Range Action: Turning the lower cap to set the timing, simultaneously rotates the timing disk by means of a setting pin lodged in an upraised lug on the disk. Setback permits a hammer spring to strike the upraised lug, thus releasing the disk from the setting pin. Centrifugal force releases the timing movement. When the disk has turned the preset time, the disk notch engages the firing arm. The firing arm turns to allow the firing pin to strike the detonator as above. The fuze is designed to function for optimum payload dispersion for the range set. If preset for 200 to 500 meters, the fuze will function 100 meters short of the preset range; between a set range of 600 to 4400 meters, the fuze will function 75 meters short of the preset range.

Tabulated Data:

Type-----	MT
Weight-----	1.5 lbs.
Length:	
Visible-----	3.787 in.
Overall-----	5.287 in.
Thread size-----	1.9-16UNS-1A
Assembly Dwg. No.-----	10551670

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 hrs. /day)
Packing-----	Shipped assembled to round

Explosive Components:

Detonator M47, Relay M7 and Detonator XM87.

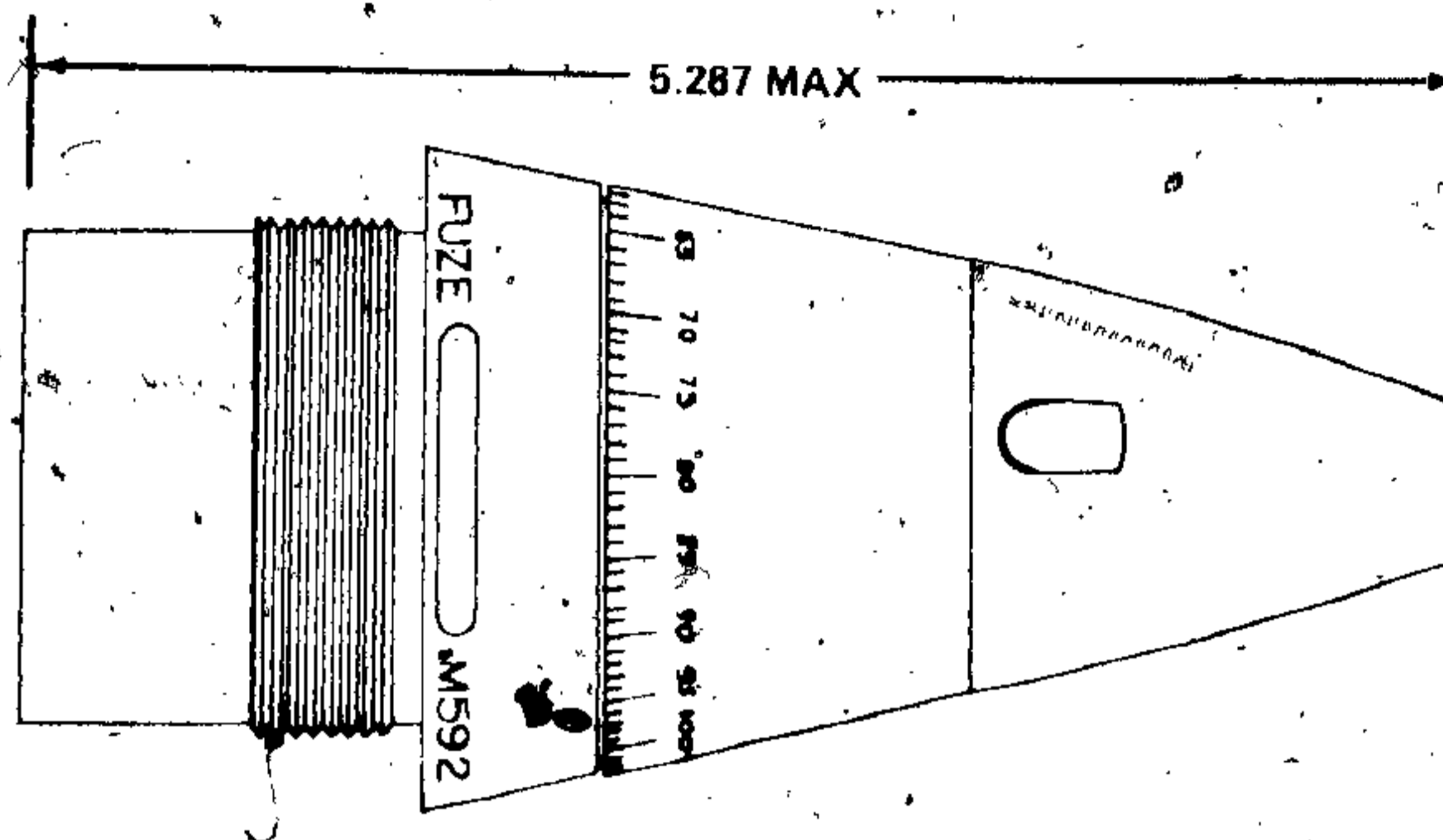
Limitations:

Firing overhead of exposed friendly troops is prohibited. When firing muzzle action, assure that friendly troops clear area immediately in front of and to sides of weapon and take cover.

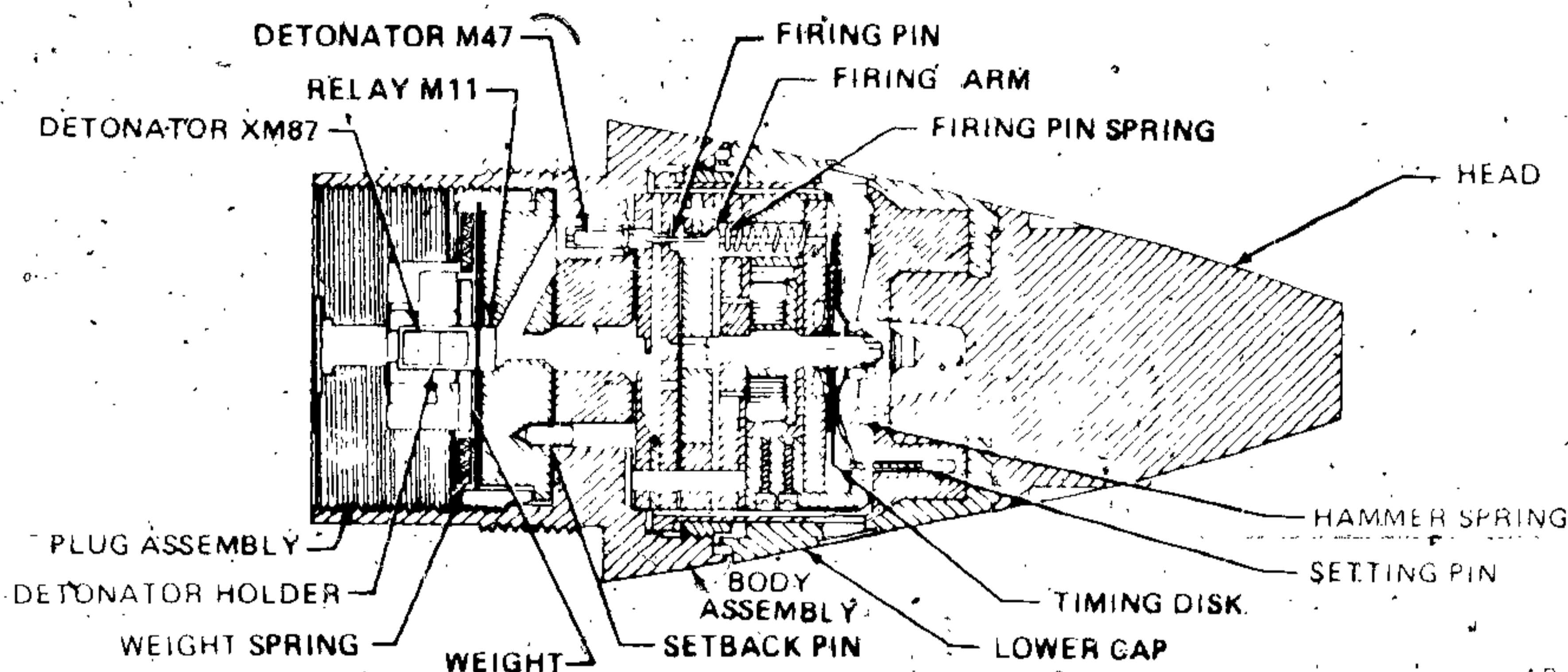
References:

TM 9-1300-251-20
 TM 9-2350-215-10
 SB 700-20

FUZE, MECHANICAL TIME: M592 SERIES



AR199913



AR199912

Type Classification:

Use:

Mechanical Time Fuzes M592 series are designed especially for use with flechette-loaded 106-mm Cartridge M581.

Description:

The fuze consists of an aluminum head, a lower cap containing the timing movement, and a steel body containing a detonator holder and plug assembly. The rotatable lower cap is inscribed with range graduations from 200 to 3300 meters and an MA mark for muzzle action. The movement in the lower cap is a

spring-driven clockwork mechanism combined with a muzzle-action feature activated by setback and centrifugal force, and uses the same firing pin as the time mechanism. The detonator holder located in the fuze body above the closing plug contains Detonator XM87. Two overlapping weights between Relay M11 at the upper end of the body and Detonator XM87 are moved by centrifugal force and constitute an interrupter-type safety provision.

Functioning:

Muzzle Action: Setback upon weapon firing causes the alpha weights (XM592) or the setback pins (M592) to move downward and allow centrifugal force to move the weight above the timer, uncovering a notch in the timing disk.

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At the same time, centrifugal force moves aside the weights between Relay M11 and Detonator XM87 in the base. With the notch in the timing disk uncovered, the firing arm slides inward and turns permitting the spring-loaded firing pin to strike Detonator M47 and initiate the explosive train. Detonation will occur immediately when the projectile leaves the muzzle.

Timed Action: Turning the lower cap to set the fuze, simultaneously rotates the timing disk by means of a setting pin lodged in an up-raised lug on the disk. Setback allows a hammer spring to strike the upraised lug, thus releasing the timing disk from the setting pin. Centrifugal force releases the timing movement. When the timing disk has turned the pre-set time, the disk notch engages the firing arm. The firing arm turns to allow the firing pin to strike the detonator as above. If set for range, the fuze will function approximately 125 meters prior to range setting (optimum stand-off for payload dispersion).

Difference Between Models:

Fuze XM592 uses four alpha weights to provide arming for the muzzle action feature. In Model M592, the weights are replaced by setback pins.

Tabulated Data:

Type-----	MT
Weight -----	1.41 lbs.
Length	
Visible -----	3.787 in.
Overall-----	5.287 in.
Thread size -----	1.8-16UNS-1A
Assembly Dwg. No. -----	10542850

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 hrs./day)

*Packing ----- 8 fuzes in metal container; 2 containers in wire-bound box

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class-----	1
Storage compatibility group-----	B, E & N
*DOT shipping class-----	C
DOT designation-----	FUZE, TIME HANDLE CAREFULLY

Explosive Components:

Detonator M47, Relay M11 and Detonator XM87.

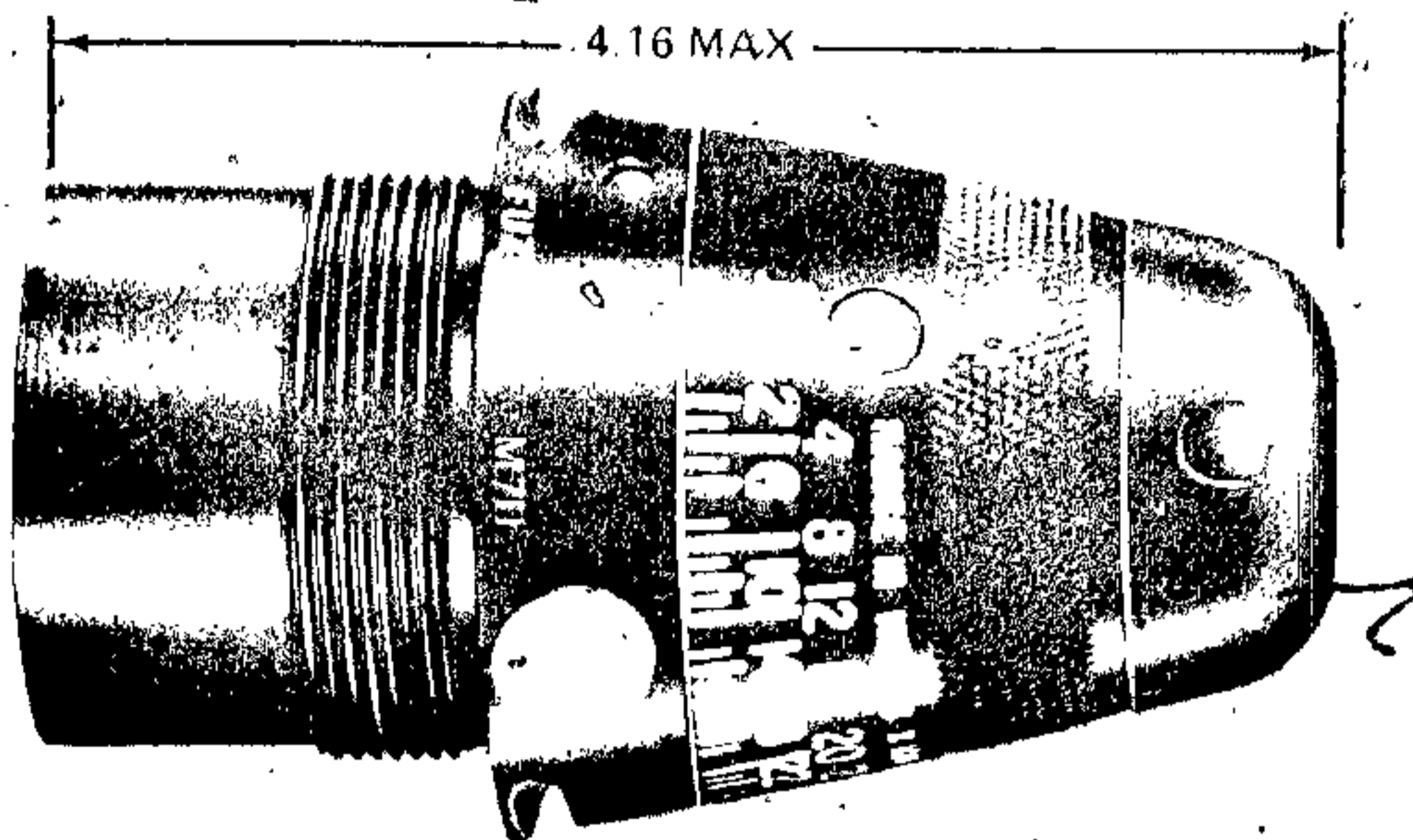
Limitations:

Firing over the heads of exposed friendly troops is prohibited.

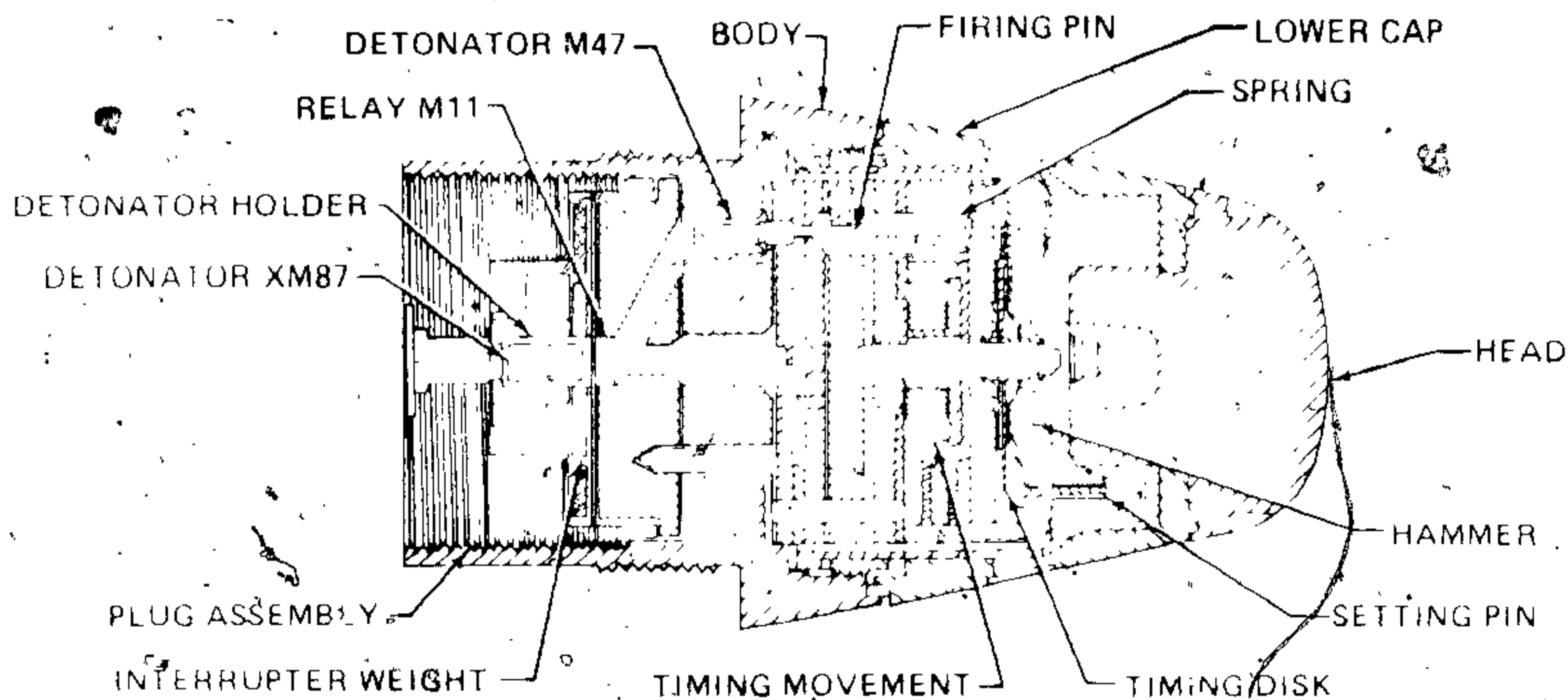
References:

TM 9-1000-205-12
 TM 9-1300-251-20
 SC 1340/98-1L
 SB 700-20

FUZE, MECHANICAL TIME: M711



AR 199915



AR199914

Type Classification:

Use:

Mechanical Time Fuze M711 is designed especially for use with flechette-loaded 90-mm Cartridge M580.

Description:

The fuze consists of an aluminum head, a lower cap containing a timing movement, and a body containing a detonator holder and plug assembly. The rotatable lower cap is inscribed with range graduations from 200 to 4400 meters

and an MA mark for muzzle action. The movement in the lower cap is a spring-driven clockwork mechanism combined with a muzzle action feature activated by setback and centrifugal force, and utilizing the same firing pin as the time mechanism. The detonator holder located in the fuze body above the closing plug contains Detonator XM87. Two overlapping weights between Relay M11 at the upper end of the body, and Detonator XM87 are moved by centrifugal force and constitute an interrupter-type safety provision.

Functioning:

Muzzle Action: Setback upon weapon firing causes the setback pins to move downward and

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allow centrifugal force to move the weight above the timer, uncovering a notch in the timing disk. At the same time, centrifugal force moves aside the weights between Relay M11 and Detonator XM87 in the base. With the notch in the timing disk uncovered, the firing arm slides inward and turns, permitting the spring-loaded firing pin to strike Detonator M47 and initiate the explosive train. Detonation will occur immediately when the projectile leaves the muzzle.

Timed Action: Turning the lower cap to set the timing, simultaneously rotates the timing disk by means of a setting pin lodged in an upraised lug on the disk. Setback permits a hammer spring to strike the upraised lug, thus releasing the timing disk from the setting pin. Centrifugal force releases the timing movement. When the disk has turned the preset time, the disk notch engages the firing arm. The firing arm turns to allow the firing pin to strike the detonator as above. The fuze is designed to function for optimum payload dispersion for the range set. If preset for 200 to 500 meters, the fuze will function 100 meters short of the range set; if preset for 600 to 4400 meters, the fuze will function 75 meters short.

Tabulated Data:

Type-----	MT
Weight-----	1.32 lbs.
Length:	
Visible-----	2.666 in.
Overall-----	4.166 in.
Fuze minimum setback to function (g's)-----	15,000
Fuze maximum setback withstood (g's)-----	22,000
Fuze minimum spin for satisfactory functioning (rpm)-----	19,000

Assembly Dwg. No.-----10542845
Thread size-----1.9-16UNS-2A

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 hrs /day)

Packing-----Fuze is shipped in assembly with complete round

Explosive Components:

Detonator M47, Relay M11, Detonator XM87.

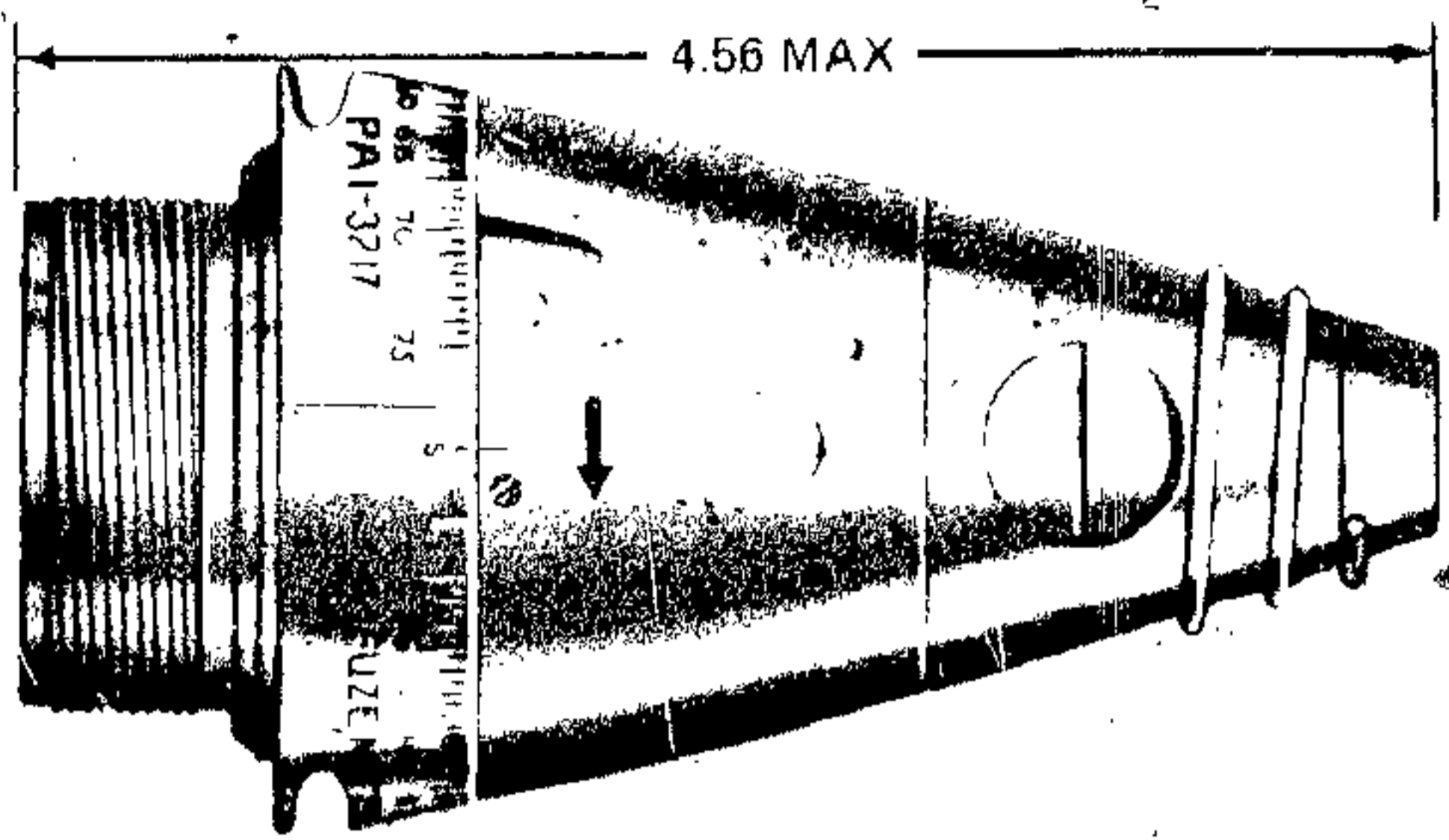
Limitations:

Firing overhead of friendly exposed troops is prohibited. When firing muzzle action, assure that all personnel clear area in front of and immediately to sides of the weapon, and take cover.

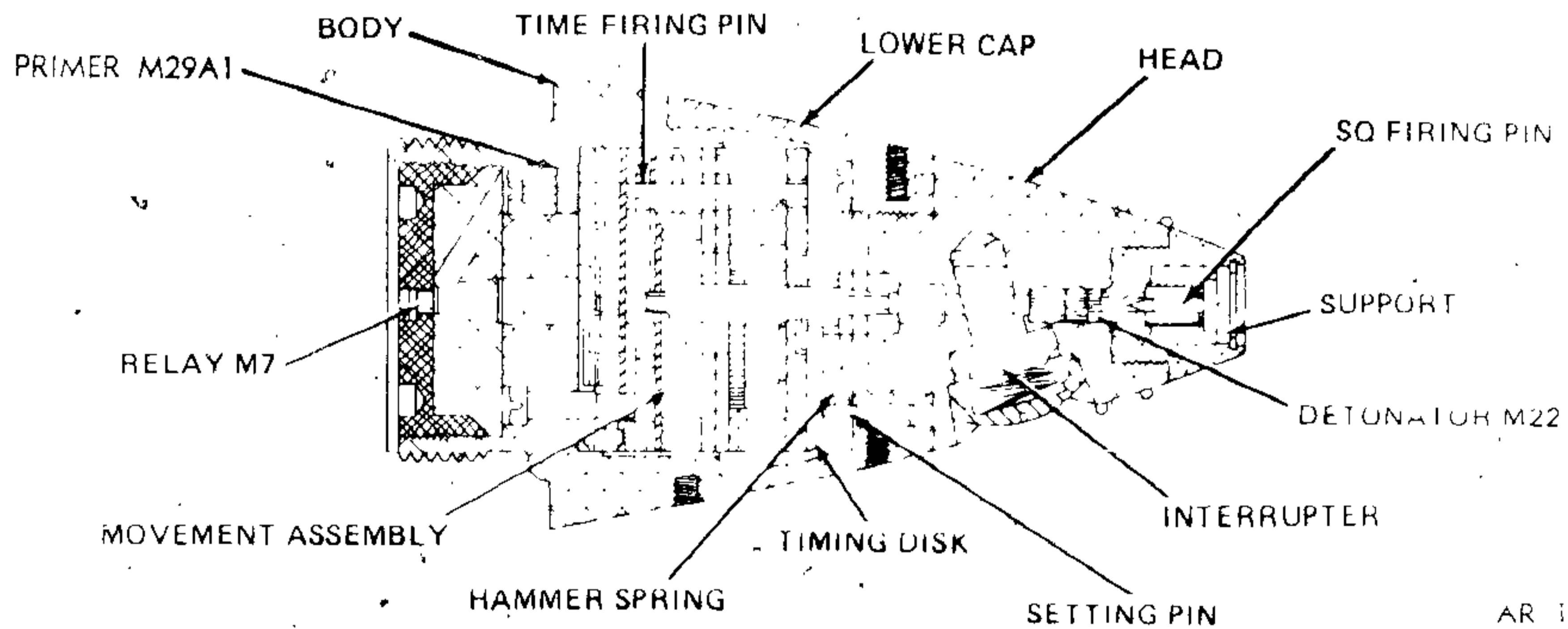
References:

- TM 9-1300-251-20
- TM 9-2350-224-10
- TM 9-7012
- SB 700-20

FUZE, MECHANICAL TIME AND SUPERQUICK: M501A1 (OR M501)



AR199937



AR 199936

Type Classification:

STO OTCM 36841 dtd 1958

Mechanical Time and Superquick Fuzes M501A1 and M501 are a dual purpose type used to detonate spin-stabilized projectiles fired from 105-mm and 155-mm howitzers and from 4.2-inch mortars when a choice of timed or superquick action is required.

Description:

The aluminum head of the fuze houses the superquick point detonating assembly consisting of timing pin and support, a detonator, and a lead charge. An interrupter activated by

centrifugal force from projectile rotation provides bore safety. The major portion of the movement assembly, providing the timing and firing functions of the fuze is contained in the brass lower cap. The aluminum fuze body contains the explosive elements consisting of a primer and a relay, and carries the time setting scale graduated from 2 to 75 seconds inscribed on the exterior. The threaded fuze base is assembled directly into the projectile without a booster. A pull wire extending through the body and the setback pin provide safety for shipping and handling.

Functioning:

When the fuze is set, turning the lower cap rotates the timing disk by means of the setting

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pin, engaged in an upraised lug on the disk. Upon firing, setback permits the hammer spring to strike the upraised lug and release the timing disk from the setting pin. Centrifugal force from projectile spin withdraws the interrupter and releases the detents securing the timing mechanism. When the timing disk has rotated for the time set, a notch turns the firing arm and permits the firing pin to strike the primer. The primer initiates the explosive train through a relay to the projectile. If superquick action was preselected, the superquick firing pin strikes the detonator upon impact to initiate the explosive train.

Difference Between Models:

The time scale graduations on the M501 fuze are from 3 to 75 seconds.

Tabulated Data:

Type ----- MTSQ
Weight ----- 1.41 lbs.
Length:
 Visible ----- 3.75 in.
 Overall ----- 4.56 in.
Thread size ----- 1.70 in. -14NS-1
Assembly Dwg. No. -- 73-7-136

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 hrs/day)

* Packing ----- 8 fuzes in metal container; 2 containers in a wire-bound box

*Packing Box:

Weight ----- 43.8 lbs
Dimensions ----- 14-5/8 x 12-13/16 x 9-1/8 in.
Cube ----- 1.0 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance ----- 1 class
Storage compati- ----- B, E, N bility group
DOT shipping ----- C class
DOT designation --- COMBINATION FUZES

DODAC ----- 1390-N276

Explosive Components:

Detonator M22, tetryl lead charge, and Relay M7.

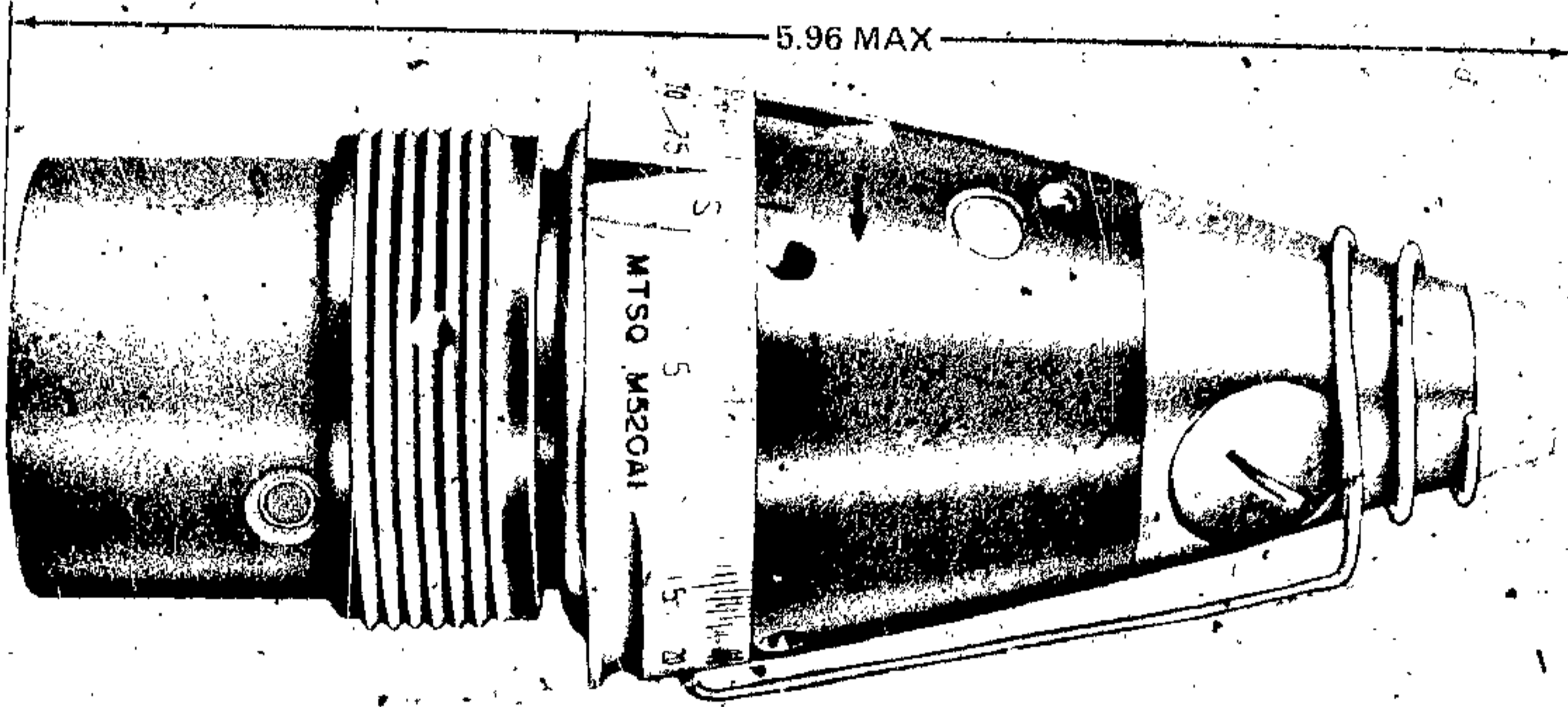
Limitations:

Do not use a fuze with a loose or cocked lower cap. Firing during heavy rainfall may result in premature functioning. When firing for airburst from 155-mm Howitzer's M1, M1A1, or M45, failures may occur with charges 1 or 2, because of insufficient setback force to release the timing mechanism. However, the fuze will then function on impact.

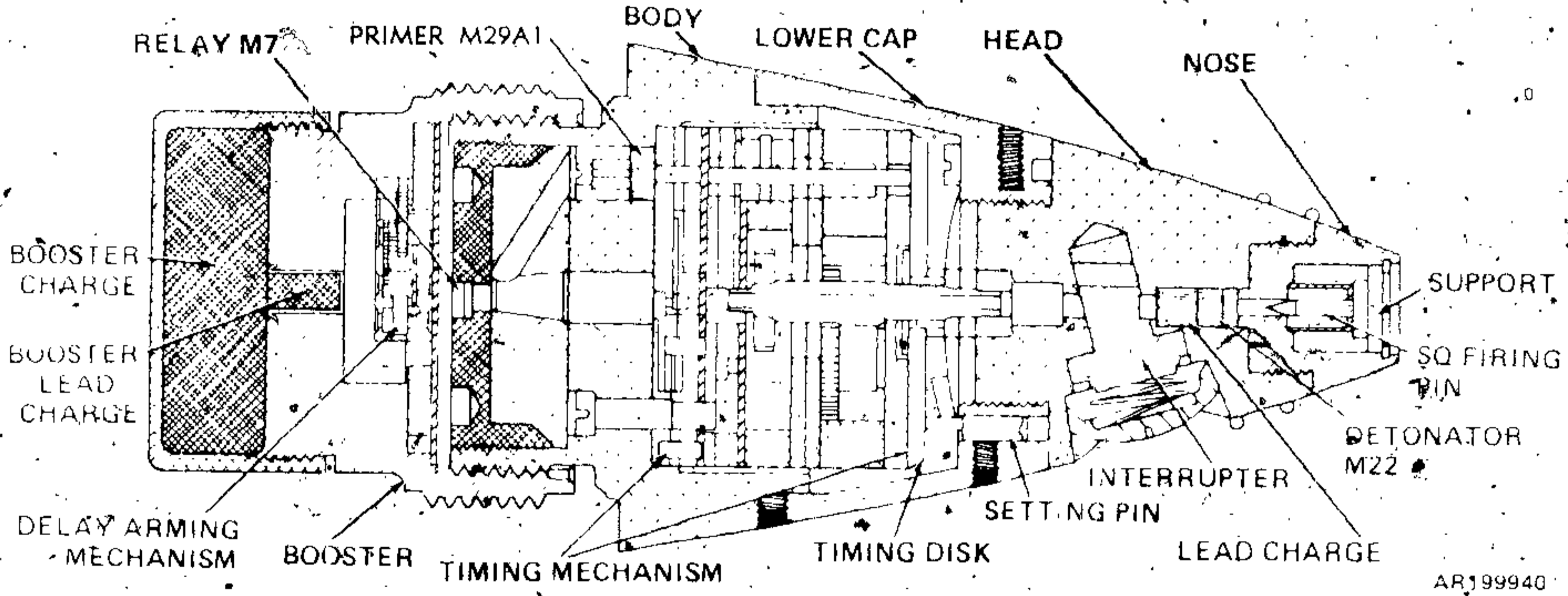
References:

- TM 9-1015-234-12
- TM 9-1025-200-F2
- TM 9-1015-215-12
- TM 9-1300-251-20
- TM 9-2350-217-10
- TM 9-2350-217-10N

FUZE, MECHANICAL TIME AND SUPERQUICK: M520A1 and M520



AR199941



AR199940

Type Classification:

Std. AMCTC 6697 dtd 1969.

Use:

These dual purpose, mechanical time and superquick fuzes are used with ammunition, calibers 90-mm through 280-mm, except 175-mm. The fuze can be used to achieve either airburst or superquick impact detonation of the projectile.

Description:

The fuzes consist of a movement assembly, a point detonator assembly, a lower cap, a body and a booster. The movement assembly contains a clockwork mechanism operated by centrifugal force acting on two gear segment

weights. Springs assist in overcoming the inertia of the weights to assure functioning of the fuze at low projectile spin rates. The point detonator assembly housing the superquick element consists of the nose of the fuze containing firing pin and support, and the lead of the fuze containing an interrupter, a detonator, and booster-lead charge. The brass lower cap contains provisions for releasing and setting the timing disk of the arming mechanism, and the cap is rotatable by a setting slot to provide for fuze time setting. The aluminum body houses a percussion primer and a relay. Graduations from S (for SAFE) to 0.5 through 75 seconds appear around the exterior. Fuzes are shipped with the SAFE mark aligned with the setting index on the lower cap, and with a pull wire attached to prevent inadvertent movement.

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Functioning:

Turning the lower cap to set desired time in seconds prior to detonation simultaneously rotates the timing disk of the internal clock-work mechanism to correspond. Upon weapon firing, setback and centrifugal force release the mechanism until the timing disk has rotated to the preset time for detonation. Also upon weapon firing, centrifugal force withdraws the interrupter to arm the superquick detonation train, and actuates the delay arming of the booster. The purpose of the booster delay is to provide safe arming distance from the muzzle after weapon firing. When superquick impact action is desired, the fuze can be used as shipped, i.e. set in the S position, or may be set to a time greater than the projectile flight time.

Difference Between Models:

Fuze M520A1 is assembled with Booster M125A1 which provides a delay arming distance of 200 ft. Fuze M520 uses Booster M125 which provides 150 ft.

Tabulated Data:

Type	-----	MTSQ
Weight	-----	2.06 lbs.
Length		
Visible	-----	3.75 in.
Overall	-----	5.96 in.
Thread size	-----	2 in. - 12NS-1.
Assembly Dwg. Nos.:		
M520A1	-----	8594044 Rev A
M520	-----	8594044 Rev O

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 hrs/day)

*Packing ----- 8 fuzes in metal container; 2 metal containers in wire-bound box

*NOTE: Fuze may be shipped attached to a cartridge.

*Packing Box:

Weight	-----	55.8 lbs.*
Dimensions	-----	14-7/8 x 12-13/16 x 9-1/8 in.
Cube	-----	1.04 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	-----	7
Storage compatibility group	-----	B
DOT Shipping class	-----	A
DOT designation	----	DETONATING FUZES - CLASS A EXPLOSIVES

DODAC ----- 1390-N280

Explosive Components:

Time Action	-----	Primer M29A1, Relay M7, Detonator M17, and tetryl booster charge.
SQ Action	-----	Detonator M22, detonator lead charge, Relay M7, Detonator M17, and tetryl booster charge

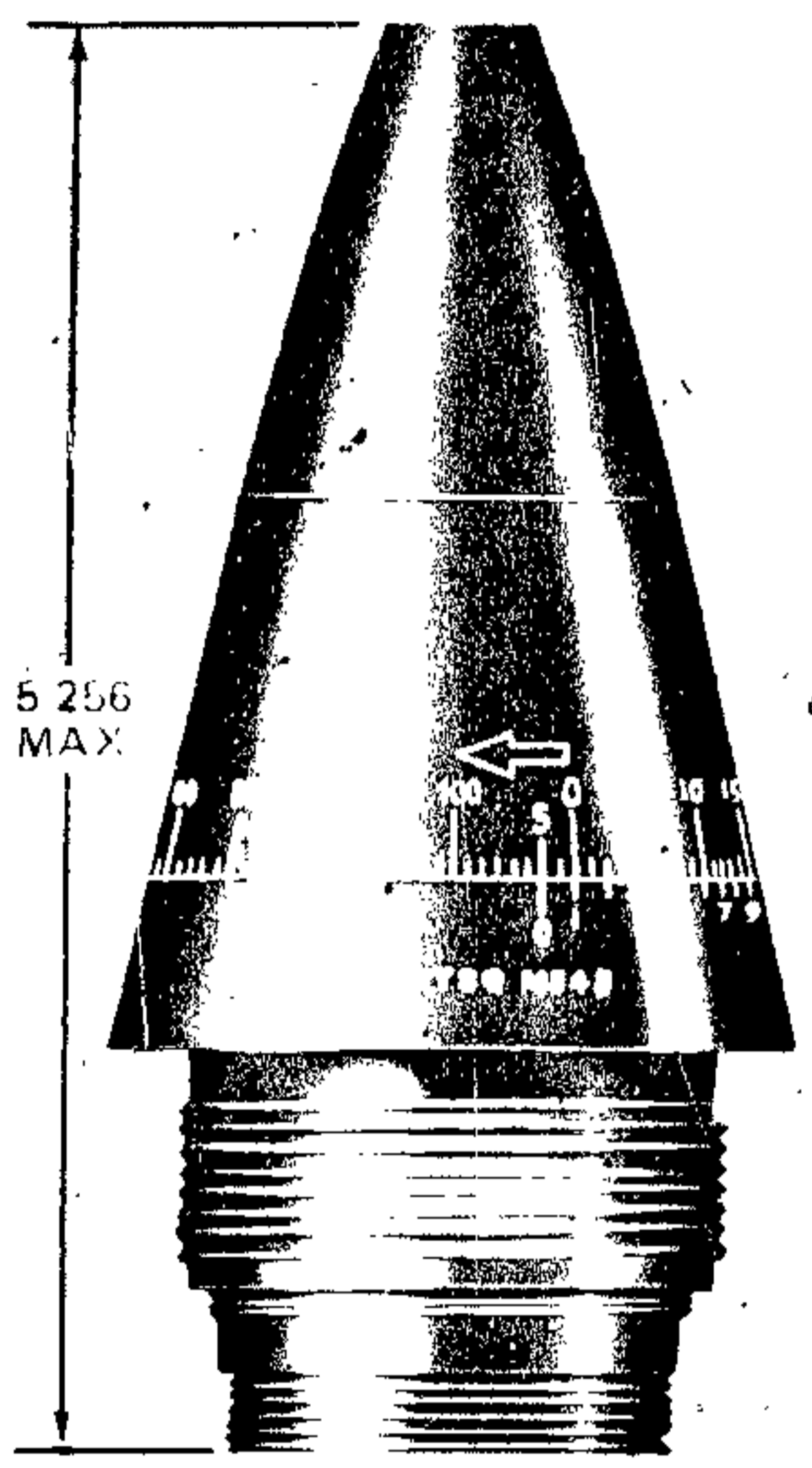
Limitations:

Firing during heavy rain may cause premature functioning of the fuze. Failure may occur when fuzes are set for airburst firing from 155-mm Howitzers M1, M1A1, or M45 with firing charges 1 or 2, because setback may not be sufficient to release the timing mechanism. Such projectiles will detonate on impact through the superquick element.

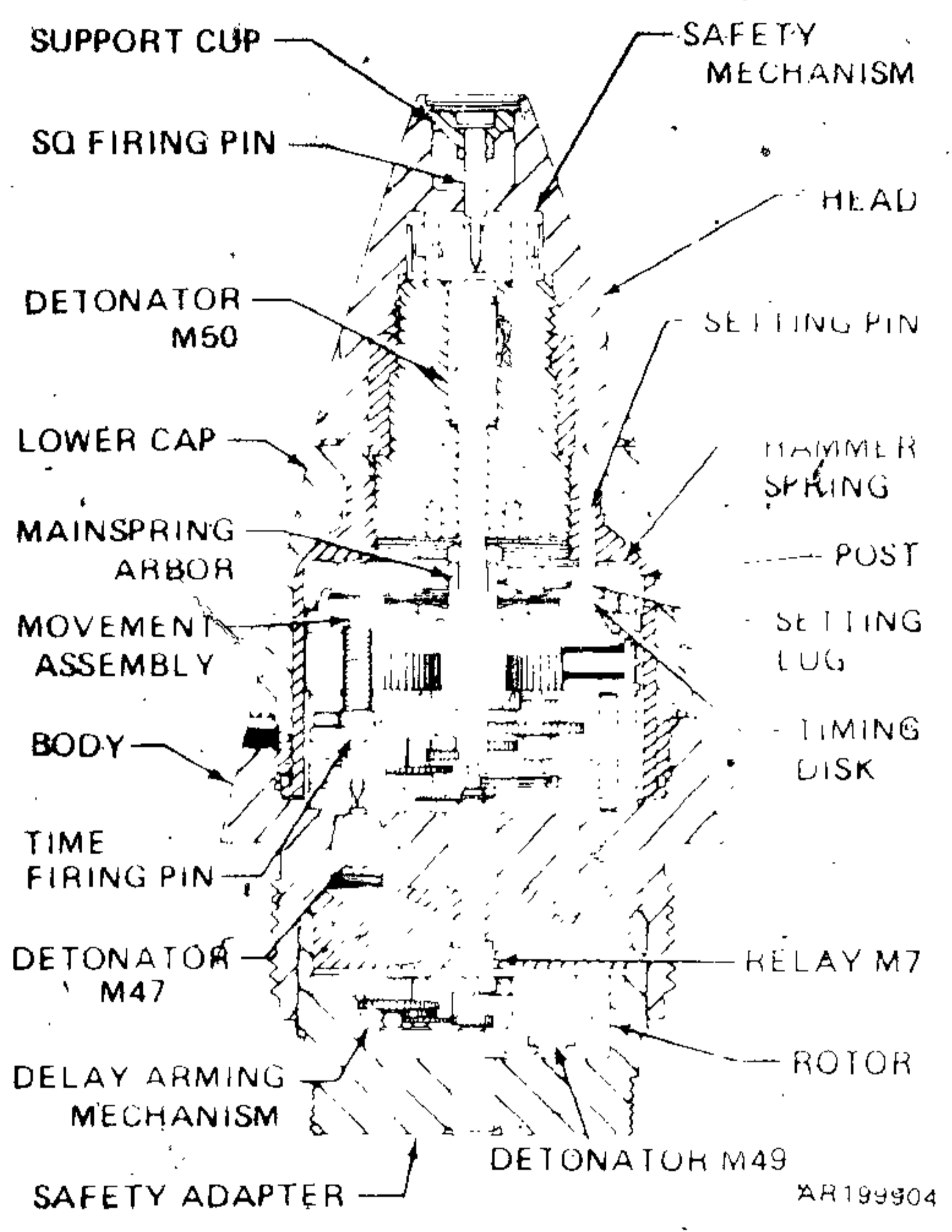
References:

TM 9-1300-251-20
 TM 9-1300-254-12
 TM 9-2300-216-10
 TM 9-2350-215-10
 TM 9-2350-217-10
 TM 9-2350-224-10

FUZE, MECHANICAL TIME AND SUPERQUICK: M548



AR199905



AR199904

Type Classification:

CON MSR 11756003

Use:

Mechanical Time and Superquick Fuze M548 is a dual purpose type used with projectiles when a choice between timed and superquick action is desired.

Description:

The fuze housing is a steel ogive composed of the head, lower cap, fuze body, and safety adapter. A point detonator assembly contained in the head consists of firing pin with support cup, a detent safety mechanism with adapter assembly, and a (SQ) detonator. The rotatable lower cap has a scale graduated from 0 to 100 seconds and contains a hammer spring and housing. The fuze body contains a detonator and a relay. The body is inscribed on the exterior with a zero line and vernier

scale for time settings. The movement assembly contained in the fuze body and lower cap is a spring-driven clockwork mechanism, with a gear train to regulate the fuze timing. The safety adapter is threaded into the base of the fuze body and contains a delayed arming mechanism with a rotor. A detonator is situated in the rotor which holds the detonator out of alignment prior to arming.

Functioning:

Setback upon weapon firing causes the hammer spring to strike an upraised lug on the timing disk and release the disk from the setting pin. When projectile rotation develops enough centrifugal force, the detents holding the escapement lever of the movement assembly, and the detents holding the rotor of the safety adapter move outward, releasing both movements. Centrifugal force also disengages the arbor stop lever (not shown) to release the mainspring and the timing mechanism is started. The time required

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for the delayed arming mechanism to complete rotor movement and arm the detonator provides at least 66 meters (200 feet) safety arming distance from the muzzle. When the timing disk has rotated to the preset number of seconds, a notch in the disk engages a post on the firing arm. The arm turns to remove the firing pin safety plate and to permit the firing pin to strike the detonator which initiates the detonation train through the relay and detonator to the projectile. If the timing mechanism does not function properly, or if superquick action was preselected, the detonation train is initiated by the detonator in the point detonator assembly.

Tabulated Data:

Type ----- MTSQ
Weight ----- 2.05 lbs.
Length:
Visible ----- 3.761 in.
Overall ----- 5.256 in.
Thread size ----- 2-12NS-1
Assembly Dwg. No. --- 8596001

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 4hrs/day)
Packing ----- 1 fuze in fiberboard container; 8 containers in metal can; 2 metal cans in wire-bound box

*Packing Box:

Weight ----- 54.6 lbs.
Dimensions ----- 14-5/8 x 12-13/16
x 9-1/8 in.
Cube ----- 1.0 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance --- 1
class
Storage compati---- B, E & N
bility group
DOT shipping class- A
DOT designation --- TIME FUZES

DODAC ----- 1390-N282

Explosive Components:

Timed Action ----- Detonator M47,
Detonator M50,
Relay M7 and
Detonator M49.

Limitations:

Premature functioning downrange may occur if fuze is fired in rainfall.

To avoid accidental functioning of PD element, do not drop, roll, or strike fuzes under any circumstances, packaged, unpackaged, or assembled to projectiles; and do not strike fuzed round against breech of weapon.

References:

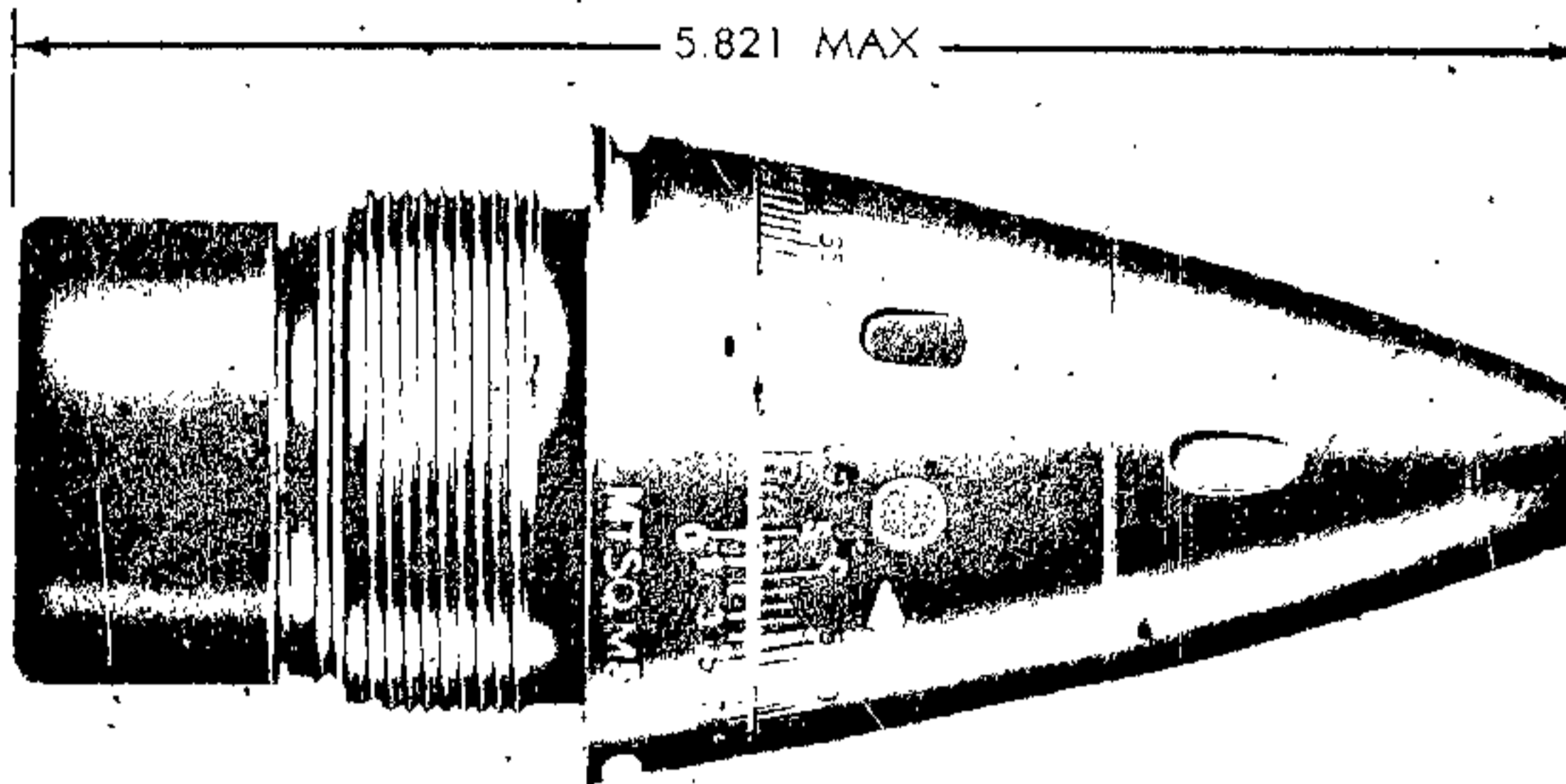
SC 1340/98-IL

TM 9-2350-217-10
TM 9-1015-203-12
TM 9-1015-234-12
TM 9-2300-216-10
TM 9-1015-215-12

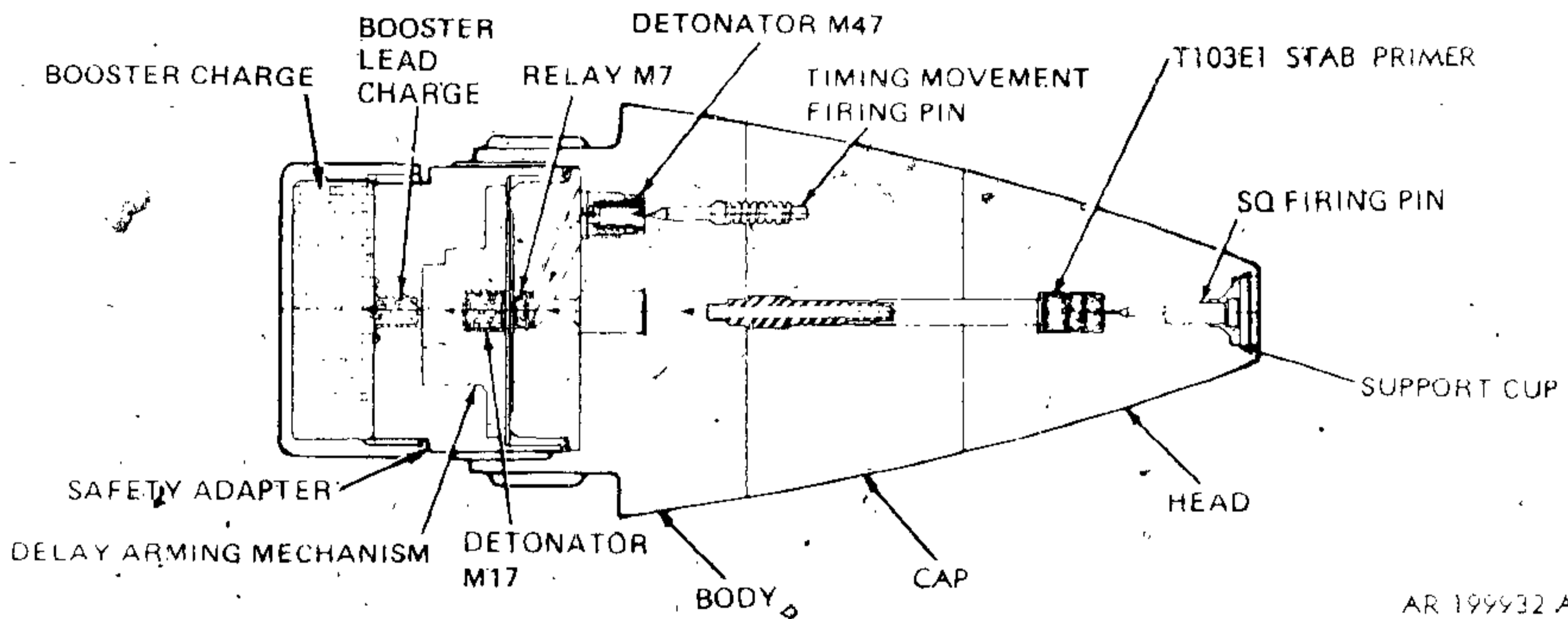


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FUZE MECHANICAL TIME AND SUPERQUICK: M564



AR 199933-A



AR 199932 A

Type Classification:

Std AMCTC 268 dtd 1962.

Use:

Mechanical Time and Superquick Fuze M564 is used with 105mm, 155mm, and 8-inch projectiles when a choice between time and superquick action is desired.

Description:

The M564 fuze consists of a head, cap, body

and delay arming mechanism (D. A. M.). The head contains the point detonating assembly consisting of the firing pin, support plate and two (2) spin detents. The rotatable cap that has an engraved time scale graduated from 0 to 100 seconds (functional time range is from 2.0 to 100 seconds) contains the T103E1 Stab Primer, setting pin and hammer spring assembly. The cap and the forward portion of the body (that is engraved with a vernier scale and zero line for time settings) contain the timing movement that is basically a clock type mechanism for controlling the time of function



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The movement assembly contains a trigger mechanism, firing pin and M47 Detonator. The rear portion of the body houses the M7 Relay and the D. A. M. Assembly with an RDX (Comp A5) booster pellet. The D. A. M. contains an M17 detonator (out-of-line) and tetryl lead charge.

Functioning:

The fuze is set by turning the cap clockwise that turns the movement timing disc proportionately by means of the setting pin engaged in a tab on the timing disc. Upon firing setback deflects the hammer spring to strike the tab thus releasing the timing disc from the setting pin. As projectile spin rate increases, centrifugal force moves the detents securing the movement, and the timing mechanism begins to run. At the same time centrifugal force starts the delay arming mechanism. The time required for arming will take the projectile at least 66 meters (200 feet) from the muzzle of the cannon. When the timing disc has rotated to the preset time, a slot in the timing disc aligns with the firing arm. The firing arm enters the slot, releasing the firing pin safety plate which releases the firing pin permitting the firing pin to strike the M47 detonator and initiate the explosive train through the relay, detonator, booster lead charge and booster charge to the projectile. In the event superquick action (fired as shipped, set on "S") is desired or if the timing mechanism malfunctions, detonation will be initiated by the SQ firing pin striking the T103E1 stab primer on impact.

Tabulated Data:

Type ----- MTSQ
 Weight ----- 2.10 lbs
 Length:
 Visible ----- 3.75
 Overall ----- 5.966
 Thread size ----- 2-12UNF-1A
 Assembly Dwg. No. ----- 10534285

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 hrs/day)

*Packing ----- 8 fuzes in metal containers, 2 containers in wirebound box

*Packing Box:

Weight ----- 63.0 lbs
 Dimensions ----- 14 5/8 x 12-13/16 x 9-1/8 in.
 Cube ----- 1 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class - 7
 Storage compatibility group ----- B
 DOT shipping class ----- A
 DOT designation ----- DETONATING FUZES CLASS A EXPLOSIVES
 DODAC ----- 1390-N278

Explosive Components:

Detonator M47 T103, Relay M7, Detonator M17, tetryl booster lead charge, and RDX Comp A5 booster charge.

Limitations:

Fuzes manufactured prior to 1969 are to be set for 90 seconds if superquick (impact) action only is desired. Year of manufacture is stamped on fuze body preceding lot number.

Fuzes are not to be set for times less than 2 seconds.

Premature functioning may occur down range when the fuzes are fired in rainfall.

To avoid accidental functioning of PD element, do not drop, roll, or strike fuzes under any circumstances, packaged, unpackaged, or assembled projectile, and do not strike round against breech of weapon.

References:

SB 700-20 TM 9-2300-216-10
 SC 1305/30-1L TM 9-1025-200-12
 TM 9-1300-251-20 TM 9-1015-203-12

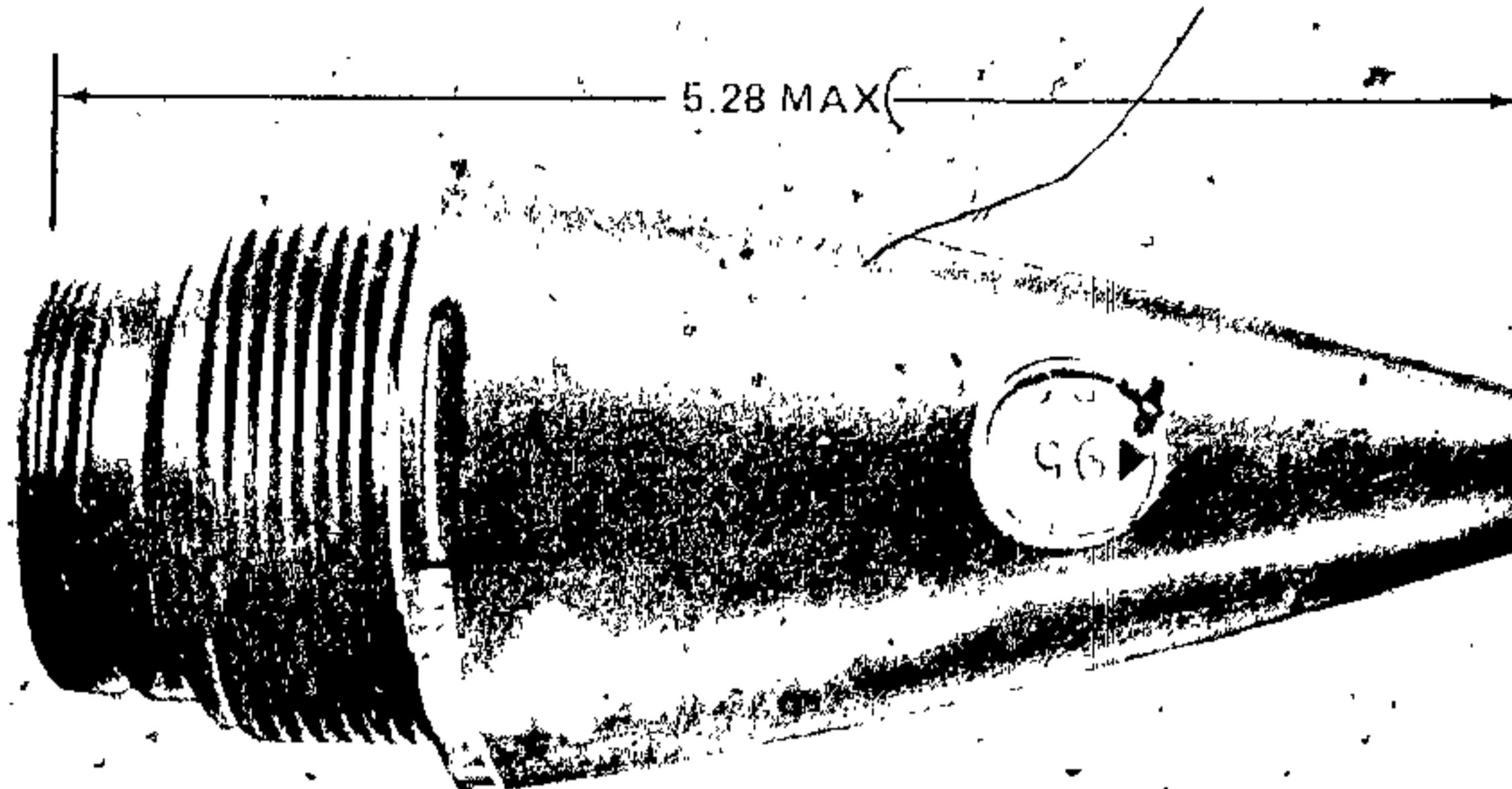
TM 43-0001-28

References: — Continued

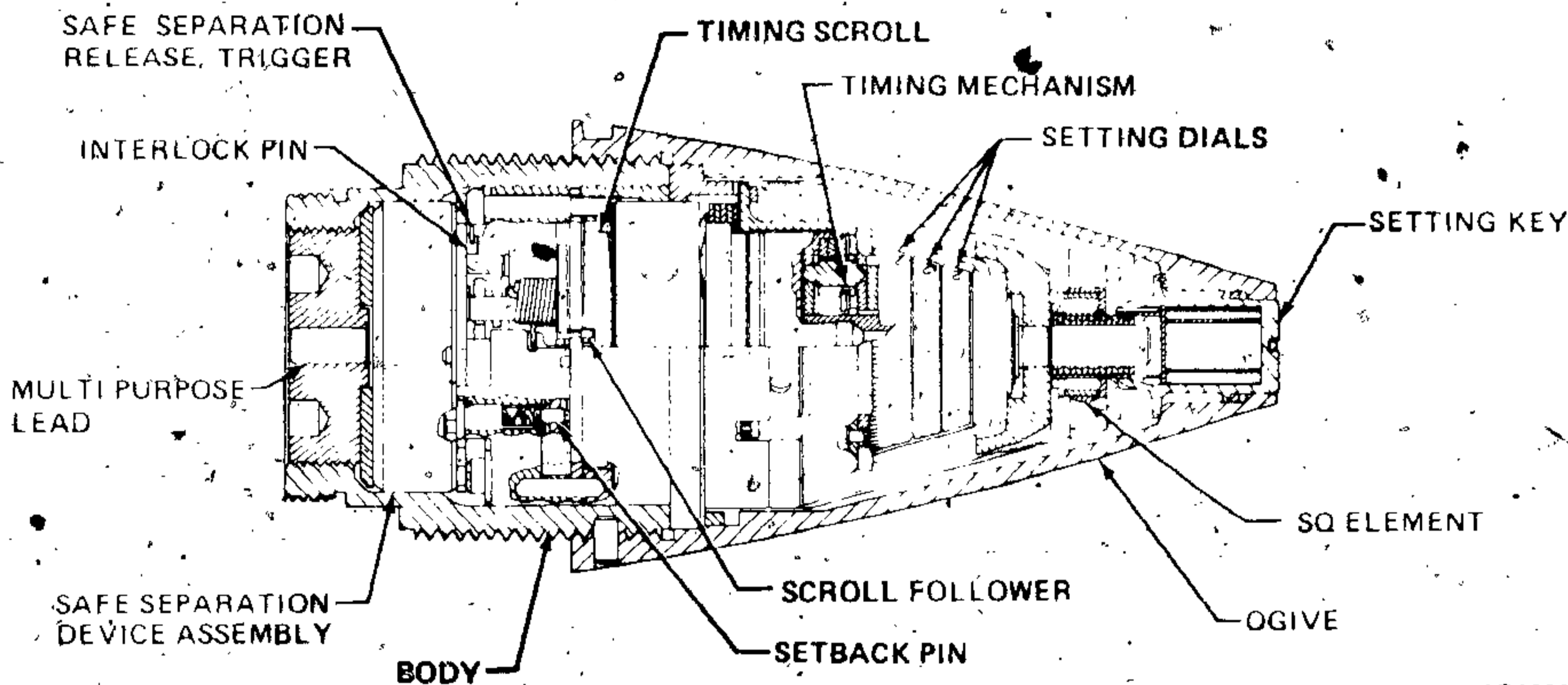
- TM 9-1015-234-12
- TM 9-2350-217-10
- TM 9-2350-217-10N

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FUZE, MECHANICAL TIME AND SUPERQUICK: M577



AR199931



AR199930

Type Classification:

Std

Use:

Mechanical, Time and Superquick (MTSQ)
Fuze M577 is used with 105mm, 155mm, and 8-inch projectiles. It is used with projectiles carrying payloads that are expelled during projectile flight (airburst). See cartridge/projectile-fuze combination charts in Appendix A for current usage.

Description:

The fuze contains a timing mechanism that may be set to function from 2 to 200 seconds in increments of tenths of a second. Three digital rotating dials indicating the time setting (viewed through a window on the fuze) enables accurate time setting without the use of a vernier scale. The fuze may also be set to function on impact with the target (superquick setting). Overhead safety to friendly troops and their equipment is provided for all but the most unlikely time settings.

Functioning:

Setback and centrifugal forces from weapon firing acting on spring, lock, and spin detents allow the fuze to arm and function at its pre-set time or if the setting is superquick, on impact with the target. The Safe Separation Device is designed to provide the safety and arming features of the fuze: A rotor, which carries a detonator, is held out of line with respect to the firing pin by two spin detents, and further restrained by the interlock in the trigger. A properly sequenced firing environment (set back and spin) will actuate the interlock and detents allowing the rotor to rotate to the in-line (armed) position. When the setting is point detonating (PD) or for a time less than 4 seconds, the rotor is released almost immediately. However, when set for a longer time the rotor is not released by the interlock until approximately 3 seconds before the set time, thus providing overhead safety (because of this delay, when the fuze is set for airburst and the projectile impacts before the time setting, the fuze may not function). Motion of the rotor is controlled by a runaway escapement with its arming distance dependent on the subjected spin rate. Spin rate is a function of the characteristics of the weapon/propelling charge combination.

Tabulated Data:

NSN ----- 1390-00-805-0692
 Type ----- MTSQ
 Weight ----- 1.41 lbs
 Length:
 Visible ----- 3.77 in.
 Overall ----- 5.28 in.
 Assembly Dwg. No. ----- 9236500

Temperature Limits:

Firing:
 Lower limit ----- +35°F
 Upper limit ----- +145°F
 Storage:
 Lower limit ----- -65°F
 Upper limit ----- +165°F

Arming Data:

Method ----- Setback and spin
 Fully armed ----- 2-4 secs. before set time

Rotation:

Non-arm ----- 16.7 rps
 Arm ----- 30 rps

Setback:

Non-arm ----- 300 G
 Arm ----- 600 G

*Packing ----- 8 fuzes in metal container; 2 containers in wirebound box

*Packing Box:

Weight ----- 43.8 lbs
 Dimensions ----- 14-5/8 x 12-13/16 x 9-1/8 in.
 Cube ----- 1.0 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 1.4
 Storage compatibility group ----- B
 DOT shipping class ----- Class C Explosive
 DOT designation ----- COMBINATION FUZES HANDLE CAREFULLY
 DODAC ----- 1390-N285

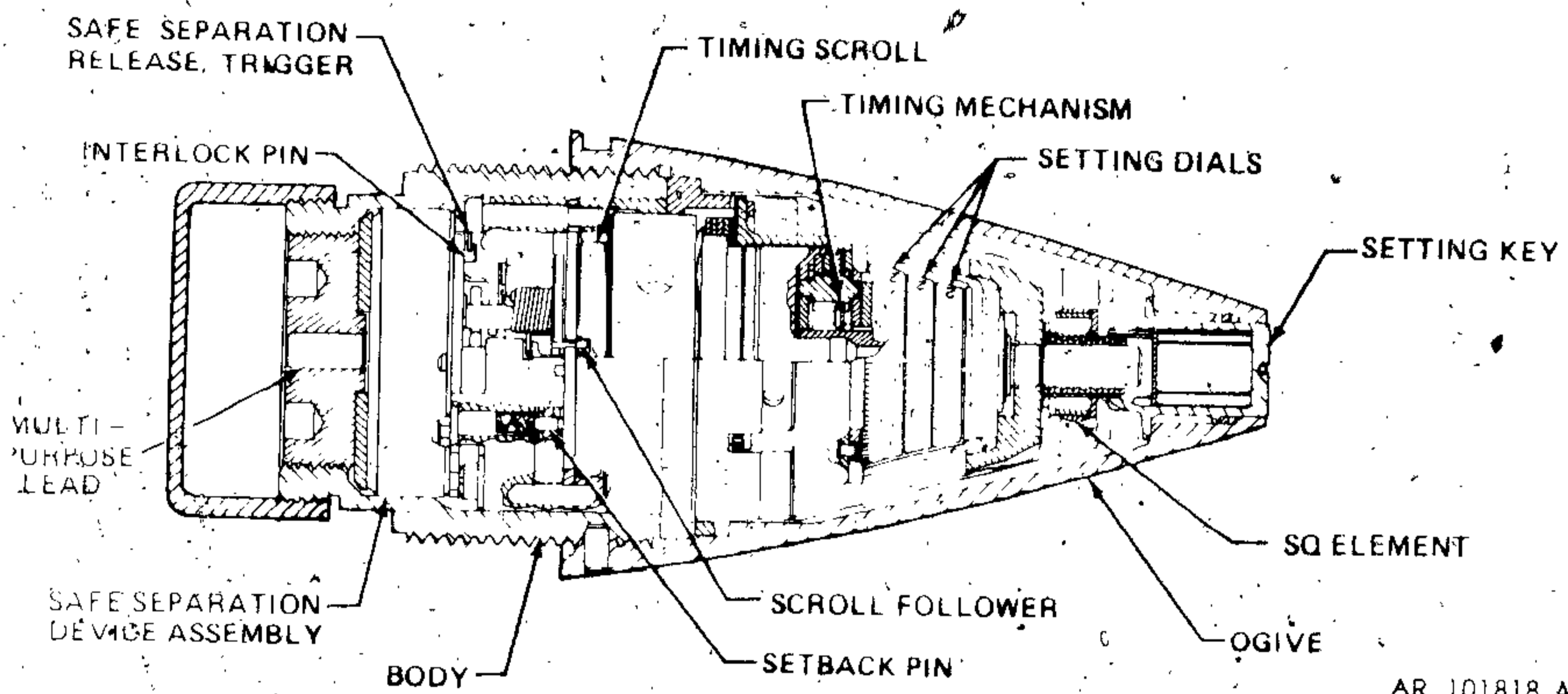
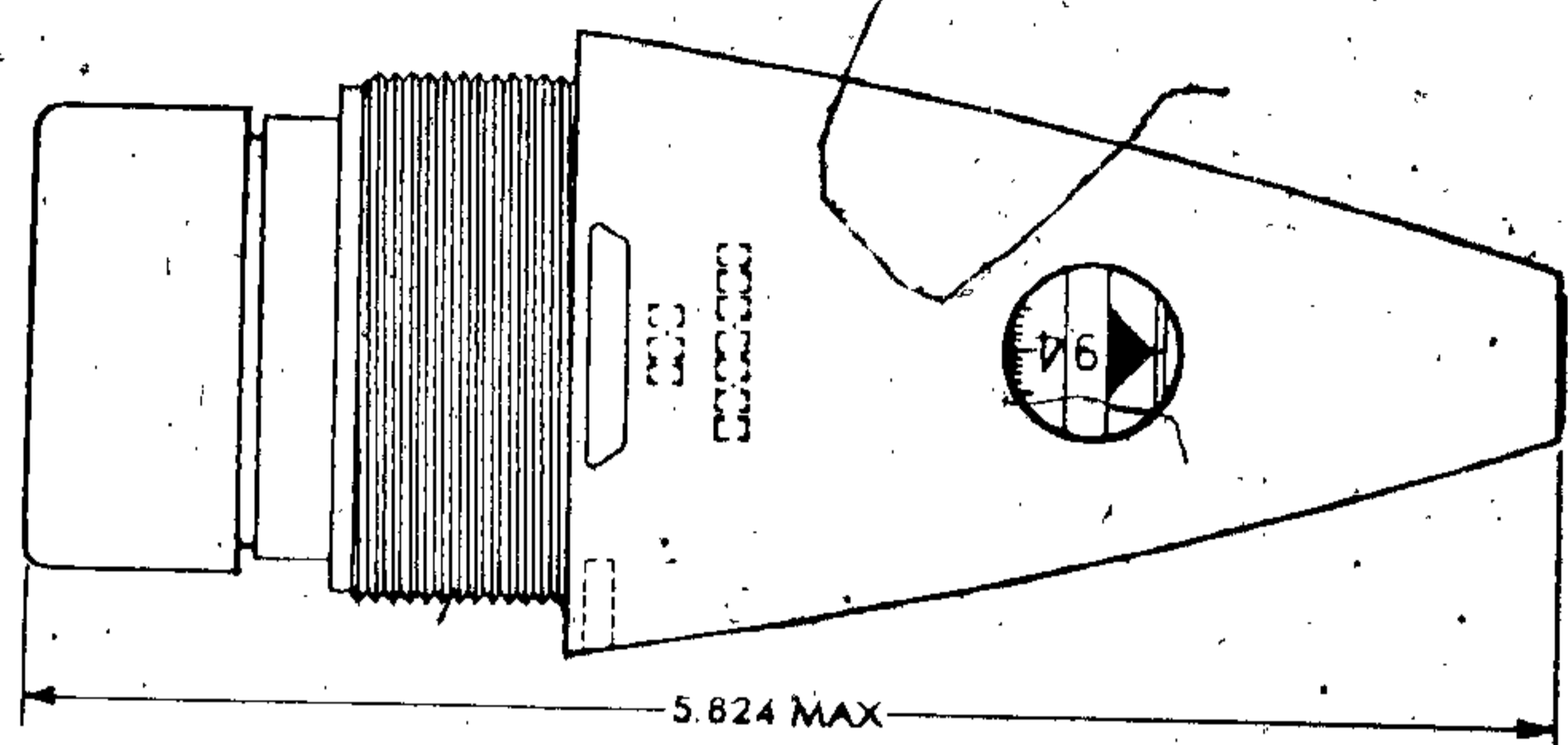
Explosive Components:

Primer M55 and Detonator M94, multi-purpose lead, mild detonating fuze.

References:

- SC 1340/98-IL
- SB 700-20
- TM 9-1015-203-12
- TM 9-1015-234-12
- TM 9-1025-200-12
- TM 9-1300-254-12
- TM 9-2300-216-10
- TM 9-2350-210-12
- TM 9-2350-217-10
- TM 9-2350-217-10N

FUZE, MECHANICAL TIME AND SUPERQUICK: M582



AR 101818 A

Type Classification:

Std MSR 05736060.

Use:

This fuze is used with the 105mm howitzer conventional cartridges HE, M1; HERA, M548; and WP Smoke M60 series. It is used with the 155mm howitzer projectiles HE, M107; HERA M549; M549A, and both the M110 Agent and WP Smoke. It is also used with the 8-Inch projectile HE M106 and the 4.2 inch HE, M329 series.

Description:

The fuze contains a mechanical clockwork timing mechanism that may be set to function at any time from 2 to 200 seconds. The fuze is

set with M35 fuze setter or flat screwdriver. The setting key is at the nose of the fuze, and the time to be set is viewed on three dials through a window in the side of the ogive. The dial closest to the nose indicates hundreds of seconds, or a triangle for a non-time setting. The second dial indicates tens of seconds, and the third dial indicates seconds and tenths of seconds. All settings are made by reference to a hairline visible through the window. The timing mechanism and superquick element are contained in the ogival nose section, threaded to a steel fuze body containing a safe-separation arming assembly and detonator. The timing mechanism and safe-separation assembly are restricted from moving before adequate projectile spin is attained by centrifugally operated lock pins, and the centrifugal detents are further restrained by setback pins. The safety and arming mechanism includes a spin-activated rotor

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to block the detonation train prior to arming. Movement of the arming mechanism is interlocked by a scroll follower in the timing mechanism which also restrains the firing pin. The M582 MTQ fuze is the same as the M577 fuze except that it contains a comp A5 booster pellet and cap.

Functioning:

Setback from weapon firing withdraws the lock pins from the centrifugal detents restraining the timing mechanism and the safety arming mechanism. The timing mechanism starts when a projectile spin rate of at least 1800 RPM withdraws the centrifugal pins. The safety arming rotor does not start to arm until approximately 3 seconds prior to the set time, when the rotor is released by the scroll follower and unblocks the detonation train. The fuze functions at the set time when the scroll follower releases the firing pin. Superquick action on impact is achieved by a one-quarter turn (counterclockwise) to change from the shipping and storage setting to a setting of "98".

Tabulated Data:

Type ----- MTSQ
Weight ----- 1.51 lbs
Length (Overall) ----- 5.819 in
Assembly Dwg. No. ----- 9236700

Temperature Limits:

Firing:
Lower limit ----- -35° F
Upper limit ----- +145° F
Storage:
Lower limit ----- -65°
Upper limit ----- +165° F

Arming Data:

Method ----- Setback and Spin
Fully Armed ----- 2-4 seconds before set time

Setback:

Non Arm ----- 300 G
Arm ----- 600 G

*Packing Box ----- 8 Fuzes in metal containers; 2 containers in wire bound box

*Packing Box
Weight ----- 43.8 lbs
Dimensions ----- 14-5/8" x 12-13/16" x 9-1/8"
Cube ----- 1.0 cu ft.

*See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 1.2
Storage compatibility group -- B
DOT shipping class ----- A
DOT designation ----- DETONATING FUZES CLASS A EXPLOSIVES
DODAC ----- 1390-N286

Explosive Components:

Primer M55, Detonator M94,
Booster Standard Comp A-5
Mild Detonating Fuze
Lead, Multi-purpose.

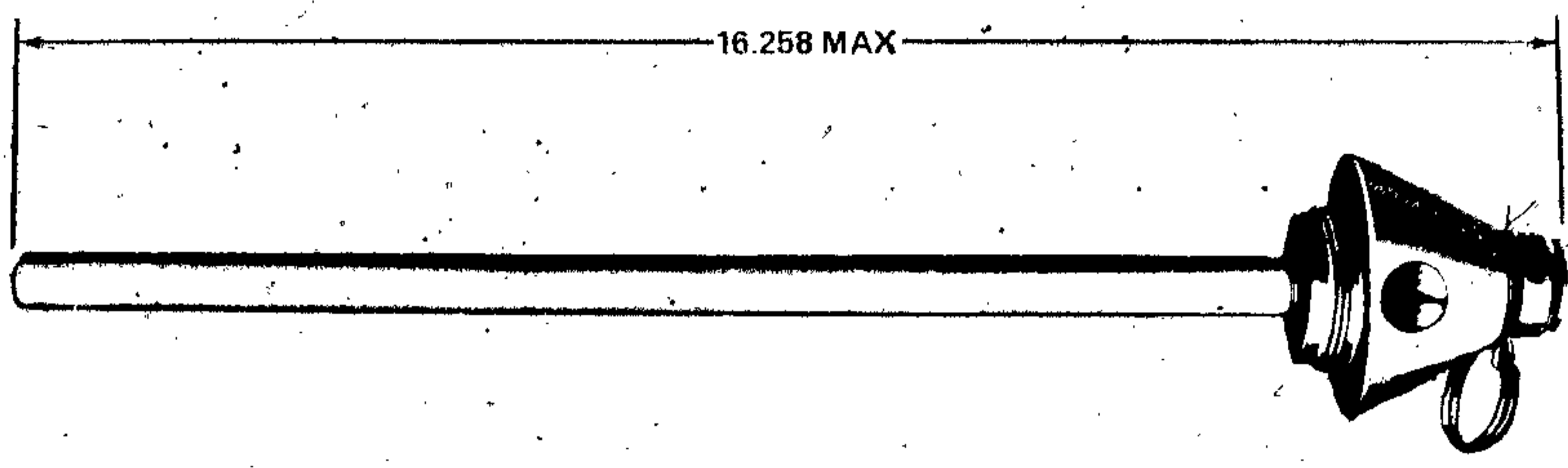
Limitations:

For superquick function, a minimum impact velocity equivalent to 450 fps against 1/8-inch steel plate is required. The fuze may not function or may function on impact if set for a time-to-airburst shorter than required for arming.

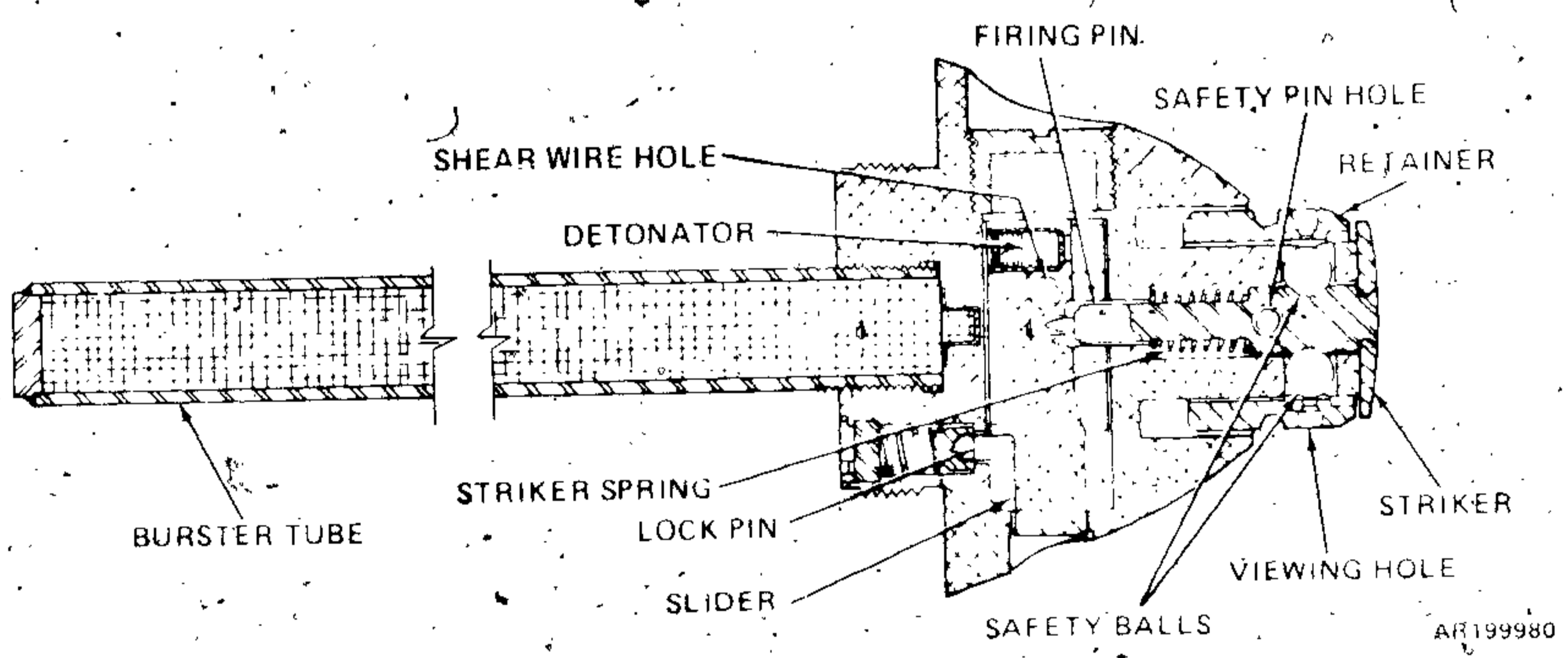
References:

- SC 1340/98-IL
SB 700-20
TM 9-1015-203-12
TM 9-1015-234-12
TM 9-1025-200-12
TM 9-1300-254-12

FUZE, POINT DETONATING: M8



AR199811



AR199980

Type Classification:

Std OTCM 36841 dtd 1958.

Use:

Point-Detonating Fuze M8 is a superquick action impact fuze used with 4.2-inch mortar gas and smoke cartridges.

Description:

The aluminum body of the fuze contains a spring-loaded striker at the nose mounted within a movable circular retainer. The striker and integral firing pin are retained in the unfired position by a shear wire (not shown in illustration) and a removable safety pin.

Two safety balls are positioned by detents between the striker and the retainer. A slider containing the detonator and designed to position the detonator in line with the firing pin is mounted transversely in the fuze body and is secured by a setback pin. A hole or slot is present in the retainer of some fuzes for viewing position of the safety balls. A 14-inch long burster tube is threaded into the base of the fuze.

Functioning:

The safety pin is pulled from the fuze just prior to firing. Upon firing, as the cartridge moves up the barrel, the retainer, acted upon by setback, breaks the shear wire positioning a slot in the retainer wall to accept the safety

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balls. Centrifugal force moves the safety balls into this detent, and this movement assists the striker spring in forcing the striker forward about 1/4-inch to armed position. The firing pin on the lower end of the striker is withdrawn from a hole in the slider. At the same time, setback from firing withdraws the setback pin from the slider. Centrifugal force causes the slider to move outward until a shoulder contacts a stop on the fuze body, and another setback pin, also activated by centrifugal force, locks the slider in armed position. The detonator is now aligned with the firing pin, and detonation of the projectile will be superquick action at impact.

Tabulated Data:

Type	-----	PD
Weight	-----	1.90 lbs.
Length:		
Visible	-----	2.15 in.
Overall	-----	16.25 in.
Thread size	-----	1.7-14NS-2A
Assembly Dwg. No.	----	73-2-311

Temperature Limits:

Refer to complete round upper and lower limits.

Explosive Components:

Detonator and tetryl burster tube.

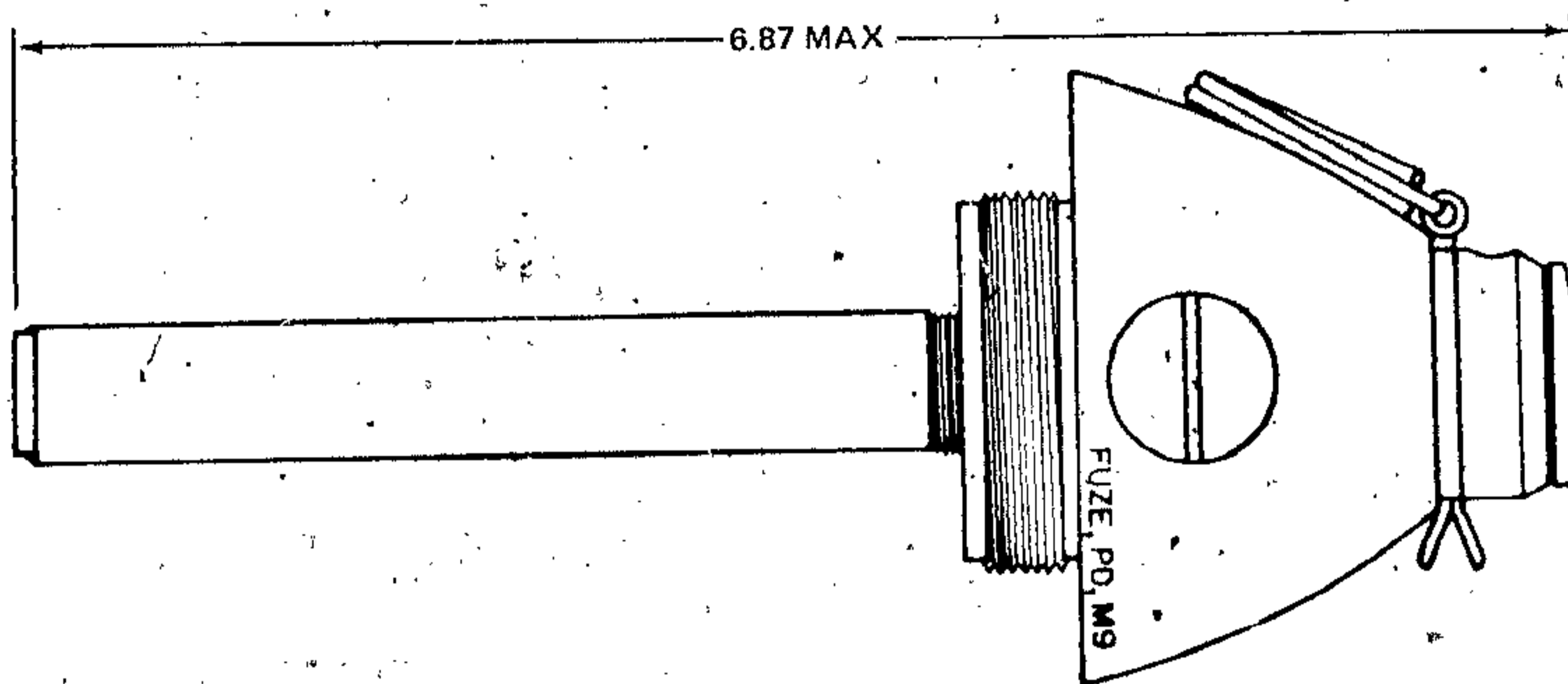
Limitations:

None.

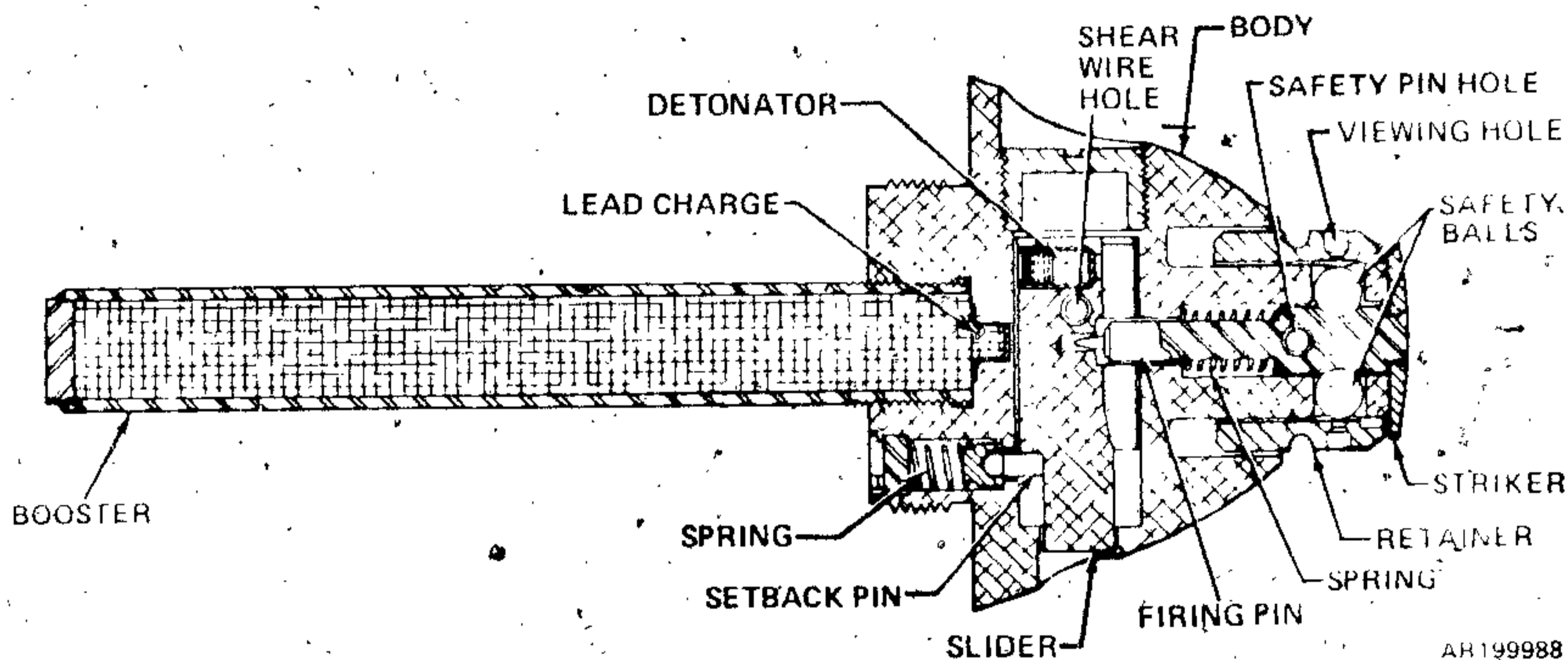
References:

TM 9-1015-215-12
TM 9-1300-251-20

FUZE, POINT DETONATING: M9



AR199989



AR199988

Type Classification:

Std OTCM 36841 dtd 1958.

Use:

Point Detonating Fuze M9 is a superquick action impact fuze used with 4.2-inch mortar HE cartridges.

Description:

The aluminum body of the fuze contains a spring-loaded striker at the nose mounted within a movable circular retainer. The striker and integral firing pin are retained in the unarmed position by a shear wire (not shown in illustration) and a removable safety pin. Two safety balls are positioned by detents (not

shown) between the striker and the retainer. A slider containing the detonator and designed to position the detonator in line with the firing pin is mounted transversely in the fuze body and is secured by a setback pin. A hole or slot is present in the retainer of some fuzes for viewing position of the safety balls. A 4-inch long tetryl booster is threaded into the base of the fuze.

Functioning:

The safety pin is pulled from the fuze just prior to firing. Upon firing and as the cartridge moves up the barrel, the retainer, acted upon by setback, breaks the shear wire and positions a slot in the retainer wall to accept the safety balls. Centrifugal force moves the safety balls into this detent, and this movement

assists the striker spring in forcing the striker forward about 1/4 inch into armed position. The firing pin on the lower end of the striker is withdrawn from a hole on the slider. At the same time, setback from firing withdraws the setback pin from the slider. Centrifugal force causes the slider to move outward until a shoulder contacts a stop on the fuze body, and another pin, also activated by centrifugal force locks the slider in armed position. The detonator is now aligned with the firing pin, and detonation of the projectile will be on super-quick action at impact.

Tabulated Data:

Type ----- PD
 Weight ----- 0.98 lbs.
 Length:
 Visible ----- 2.16 in. max.
 Overall ----- 6.87 in.
 Thread size ----- 1.7-14NS-2A RH
 Assembly Dwg. No. ----- 73-2-312

Temperature Limits:

Refer to complete round for upper and lower limits.

Packing:

See SC for complete packing data including NSN's.

Explosive Components:

Detonator and tetryl booster.

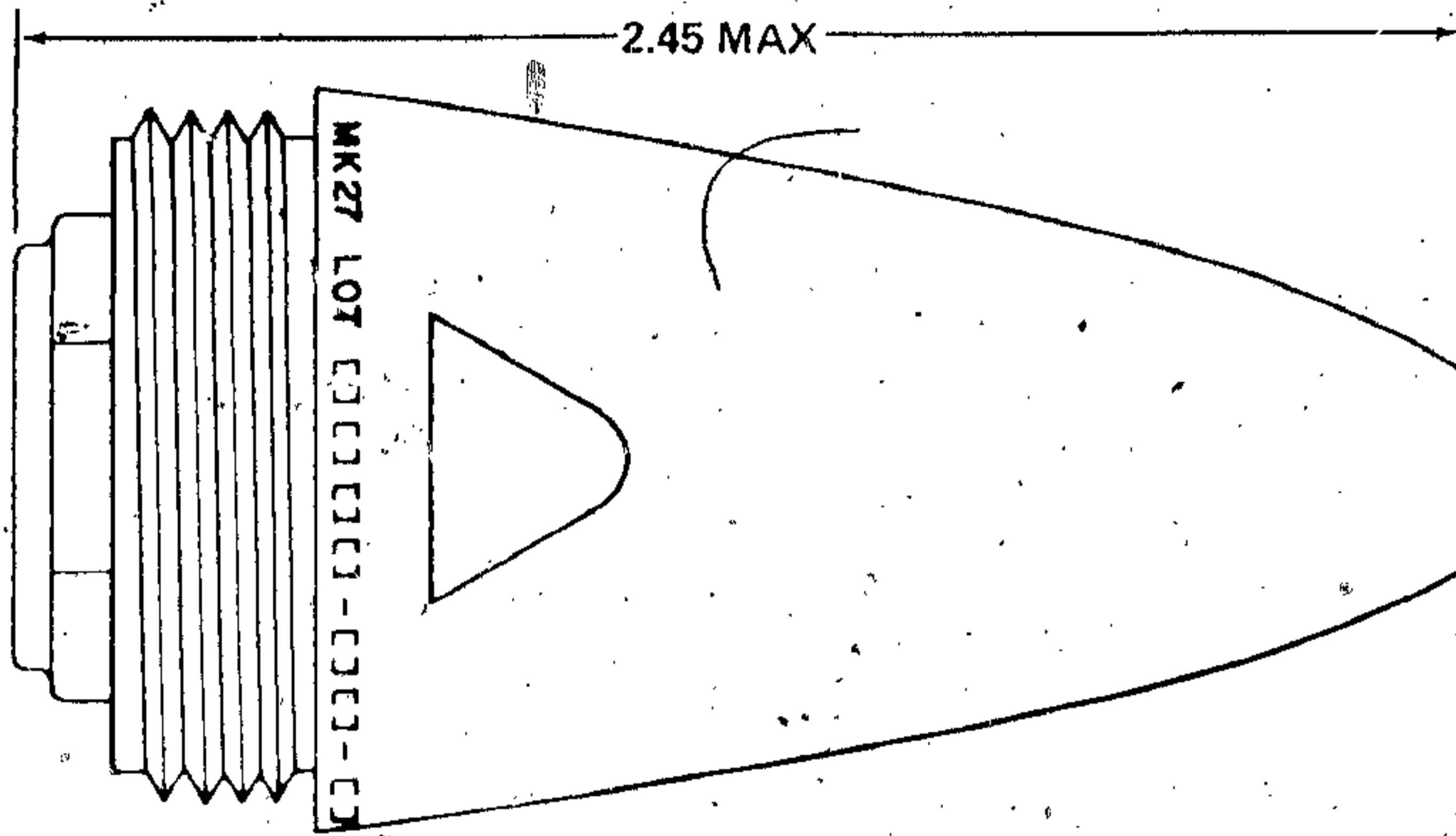
Limitations:

None

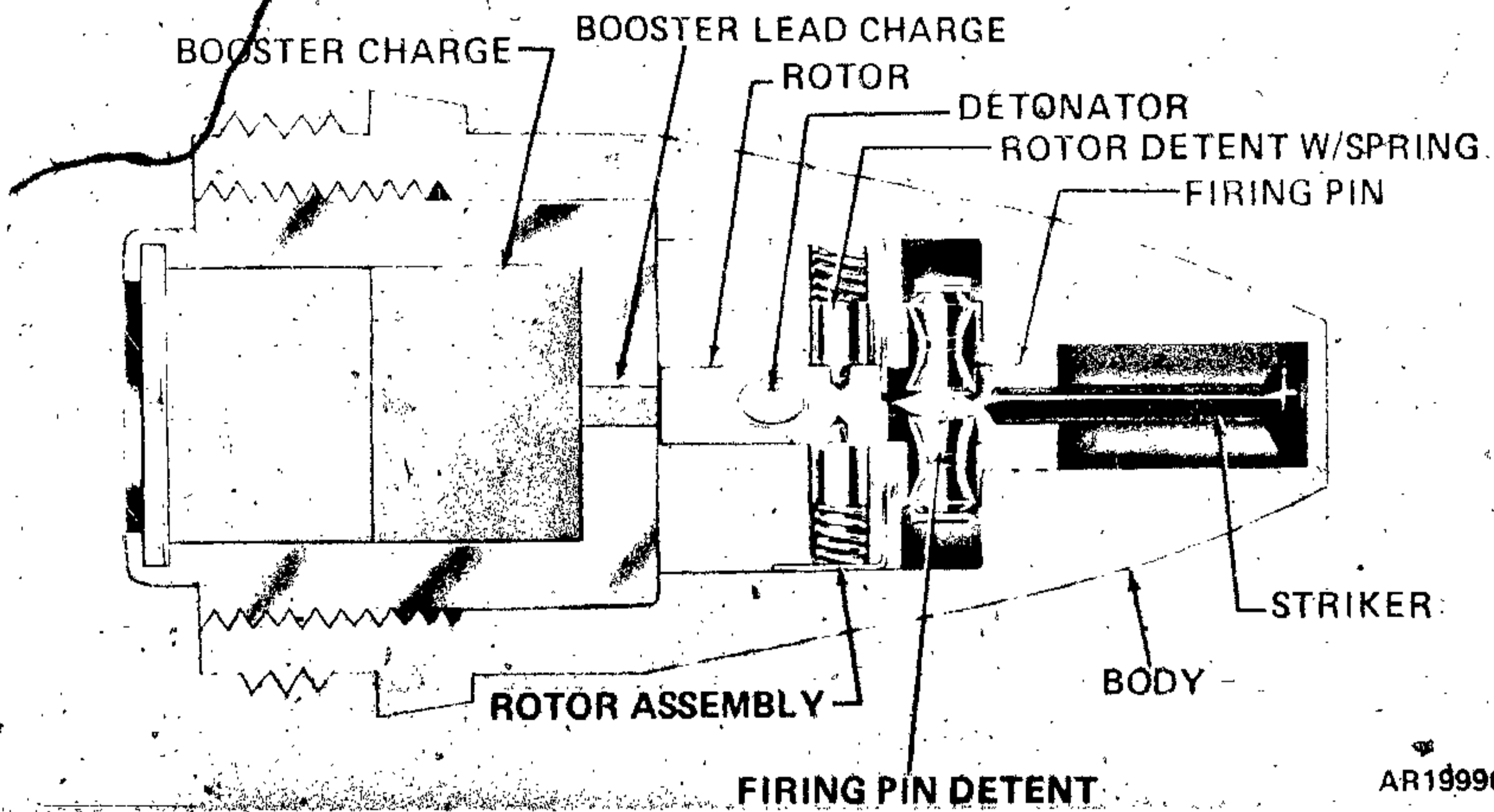
References:

TM 9-1015-215-12
 TM 9-1300-251-20

FUZE, POINT DETONATING: MK27



AR199963



AR199962

Type Classification:

Std OTCM 37119 dtd 1959

Use:

Point Detonating Fuze MK27 is of the super-quick type designed to function on light impact. The fuze is used with 40-mm gun HE ammunition.

Description:

The fuze has a one-piece aluminum body containing a striker in the nose to drive a firing pin. The firing pin is held by two spring-loaded detent pins. A disk-shaped rotor containing the detonator is axially in line with the firing pin. The rotor housing restricts rotor movement to the transverse axis of the fuze.

The detonator is held out of line until arming by two spring-loaded pins which lock the rotor in position. A base plug containing the booster lead charge and booster charge is threaded into the base of the fuze.

Functioning:

Upon firing, as the speed of rotation becomes sufficient, centrifugal force withdraws the detent pins from the firing pin and from the rotor against the resistance of the pin springs. Upon release from the detent pins, the rotor revolves to align the detonator with the firing pin and with the booster lead charge. Upon impact, the striker drives the firing pin into the detonator. Detonator action is transmitted through the booster lead charge and booster charge to explode the projectile.

Tabulated Data:

Type -----	PD
Weight -----	0.22 lb.
Length:	
Visible -----	1.9 in.
Overall -----	2.45 in.
Thread size -----	1.18-14NS-2
Assembly Dwg. No. ----	300423 (Navy)

Temperature Limits:

See complete round for upper and lower limits.

Packing:

See SC for complete round, for complete packing data including NSN's.

Explosive Components:

Detonator MK 18 MOD O, tetryl booster lead charge and tetryl booster charge.

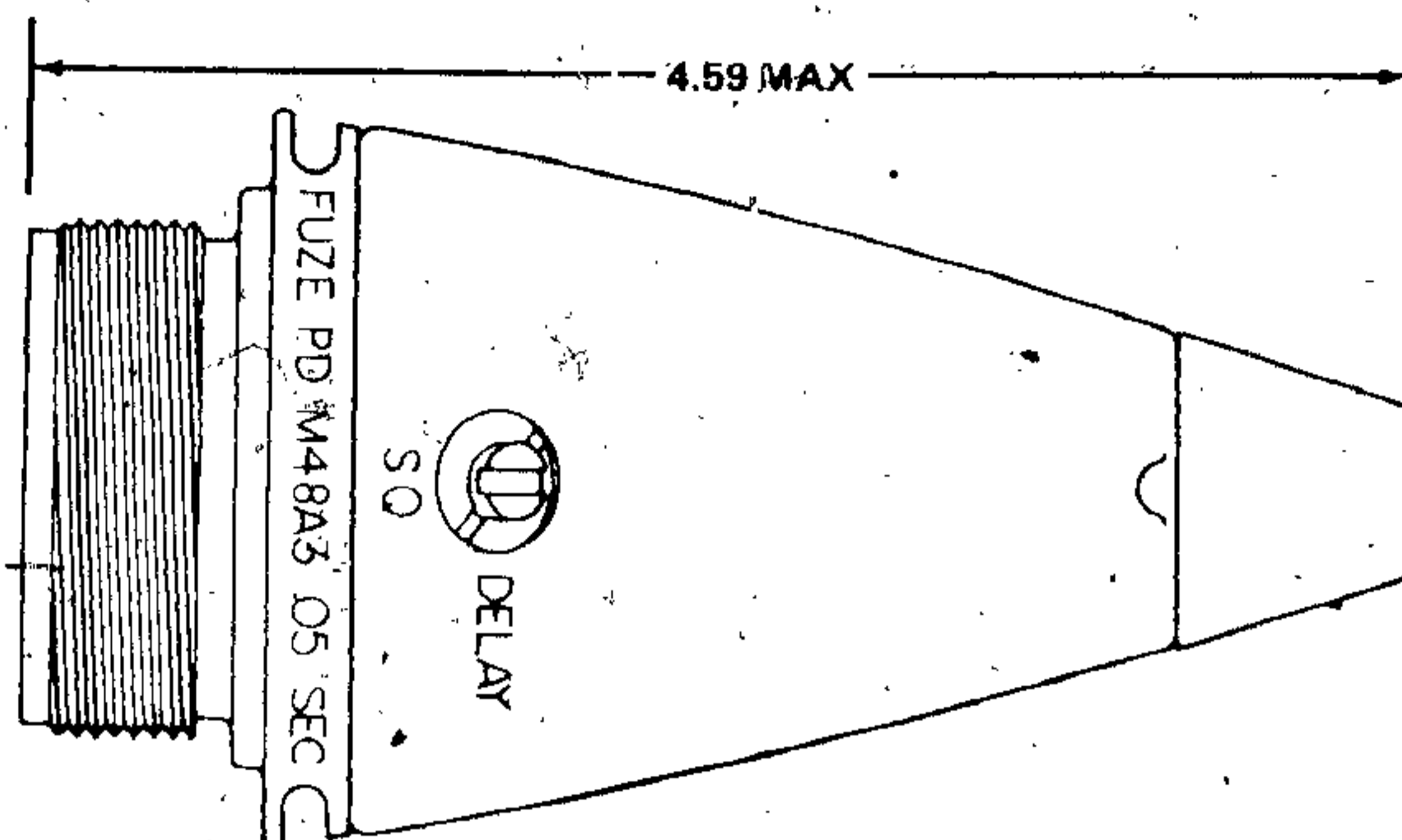
Limitations:

None.

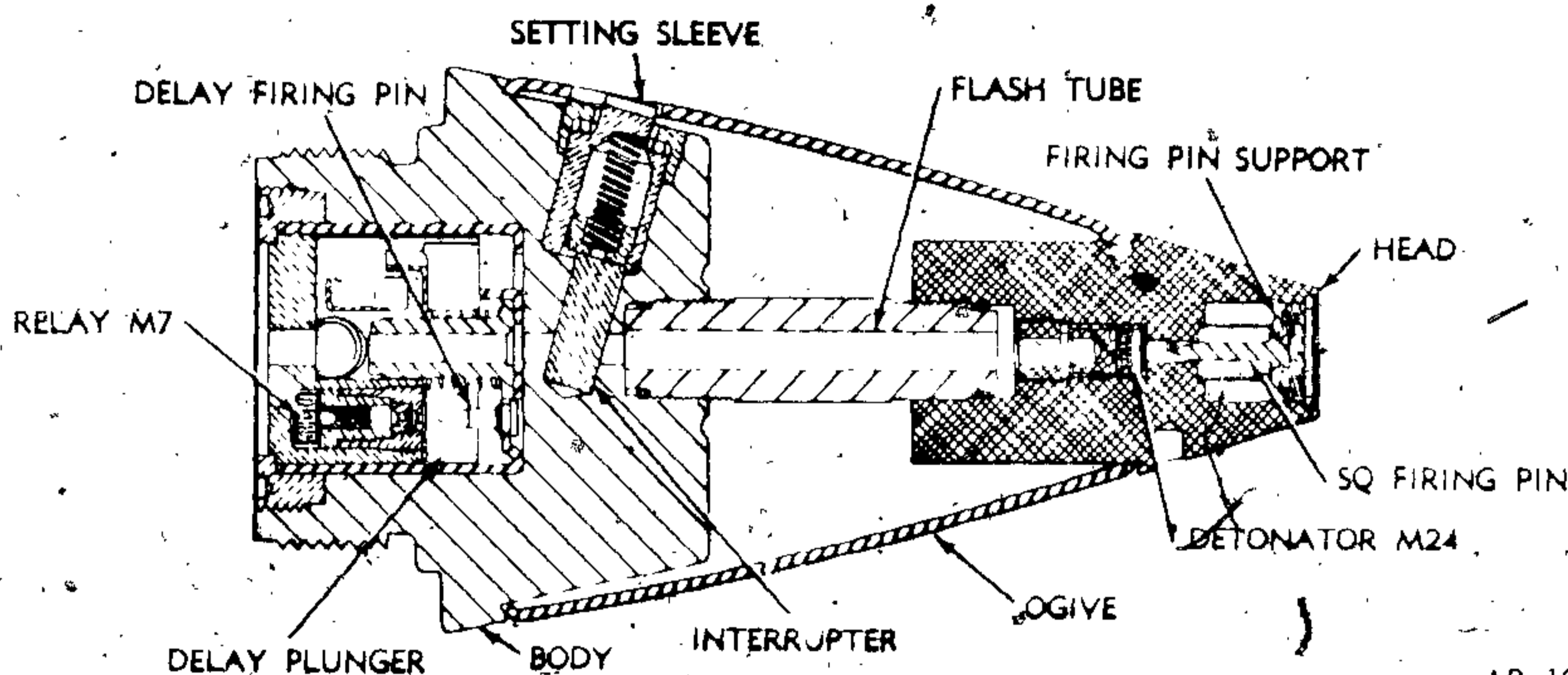
References:

TM 9-1300-251-20
 TM 9-1310-202-12
 TM 9-2350-202-20P

FUZE, POINT DETONATING: M48 SERIES



AR199987



AR 199986

Type Classification:

Std OTCM 36841 dtd 1958
OBS MSR 1F756003 (M48A3)

Use:

The M48 series point detonating fuzes offer selection between superquick or 0.05-second delay action, and are used primarily to detonate Smoke, WP ammunition in calibers 75-mm, 90-mm and 4.2-inch.

Description:

The M48 series fuzes have a PD head assembly containing a firing-pin held in position by a firing pin support which prevents initiation

of Detonator M24 until impact. The fuze body contains an MI 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 delay plunger assembly of the M48A2 fuze comes with delay times of 0.05 seconds or 0.15 seconds, the time delay being stamped on the fuze body. 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.

Functioning:

No action occurs until after the projectile has left the muzzle of the cannon, when centrifugal force withdraws the flash tube interrupter. If SQ action has been selected, thus opening the flash tube. At the same time, the delay plunger is armed in preparation for impact by centrifugal withdrawal of the plunger lock pins. Upon impact, the superquick firing pin is driven against Detonator M24, exploding the projectile if the SQ mode has been selected. Should the superquick element fail, the delay train is also armed and will serve to detonate the projectile, thus avoiding a dud. When the fuze has been preset for delay, the superquick firing pin and detonator still function but have no effect, because the flash tube interrupter is prevented from moving and functioning is solely the result of the delay element.

Difference Between Models:

M48A2 -----	Mfg w/separate delay settings; either 0.05 or 0.15 second
M48A3 -----	One delay setting; 0.05 second

Tabulated Data:

Type -----	PD
Weight -----	1.41 lbs.
(M48A3E2 -----)	1.63 lbs.)
Length -----	
Visible -----	7.74 in.
Overall -----	15.59 in.
(M48A3E2 -----)	4.55 in.)
Assembly Dwg. Nos.:	
M48A2 -----	
M48A3 -----	8798219
M48A3E2 -----	9231837

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 hrs./day)
* Packing -----	8 fuzes in metal container; 2 containers in wire-bound box
* Packing Box:	
Weight -----	66 lbs.
Dimensions -----	14-5/8 x 12-13/16 x 9-1/8 in.
Cube -----	1.04 cu. ft.

*NOTE: See SC for complete packing data including NSN's. Fuzes may be supplied in assembly with ammunition.

Shipping and Storage Data:

Quantity-distance class -----	3
Storage compatibility group -----	B
DOT shipping class -----	C
DOT designation -----	PERCUSSION FUZES
DODAC -----	1390-N318

Explosive Components:

SQ Action -----	Detonator M24
Delay Action -----	Primer, black powder delay charge, Relay M7

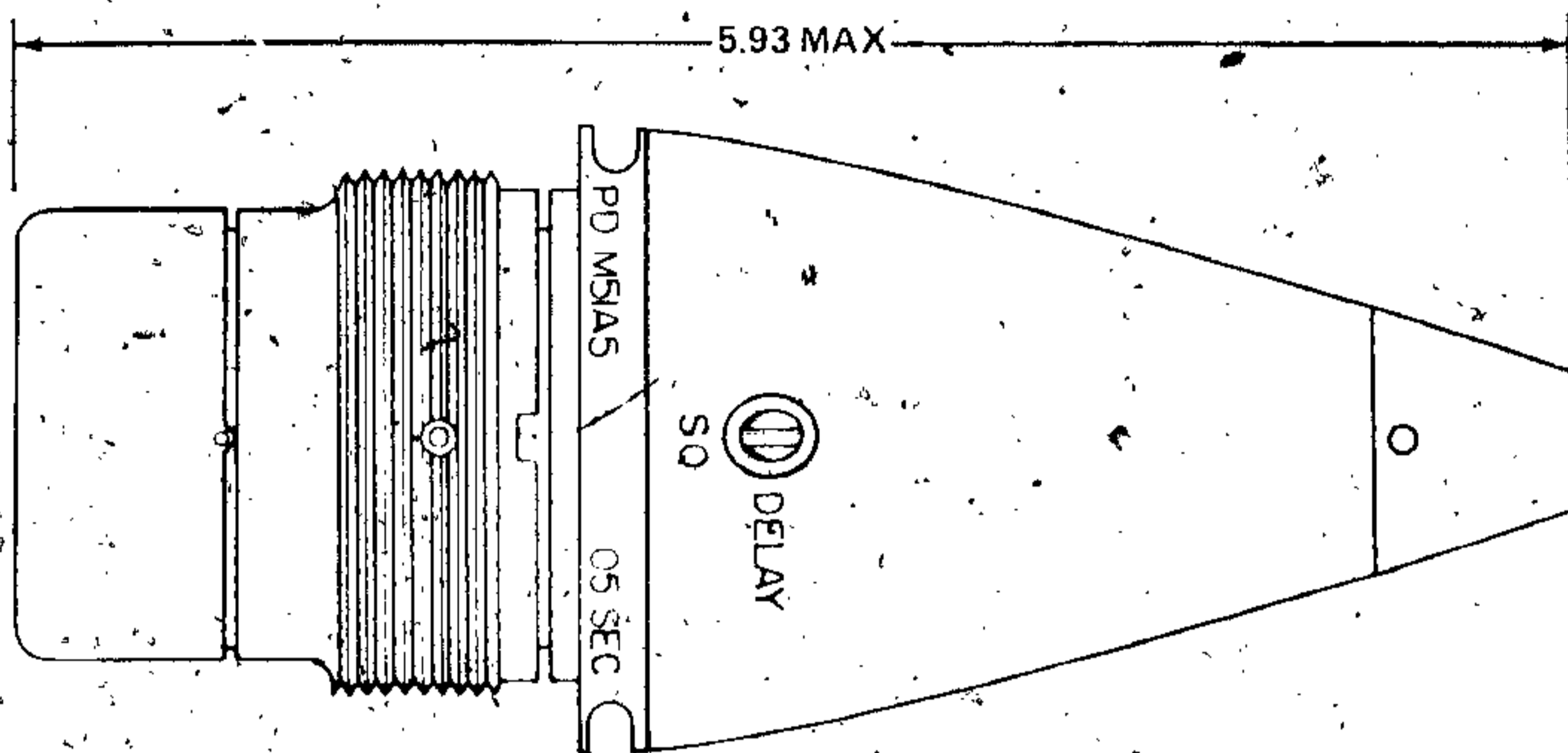
Limitations:

None.

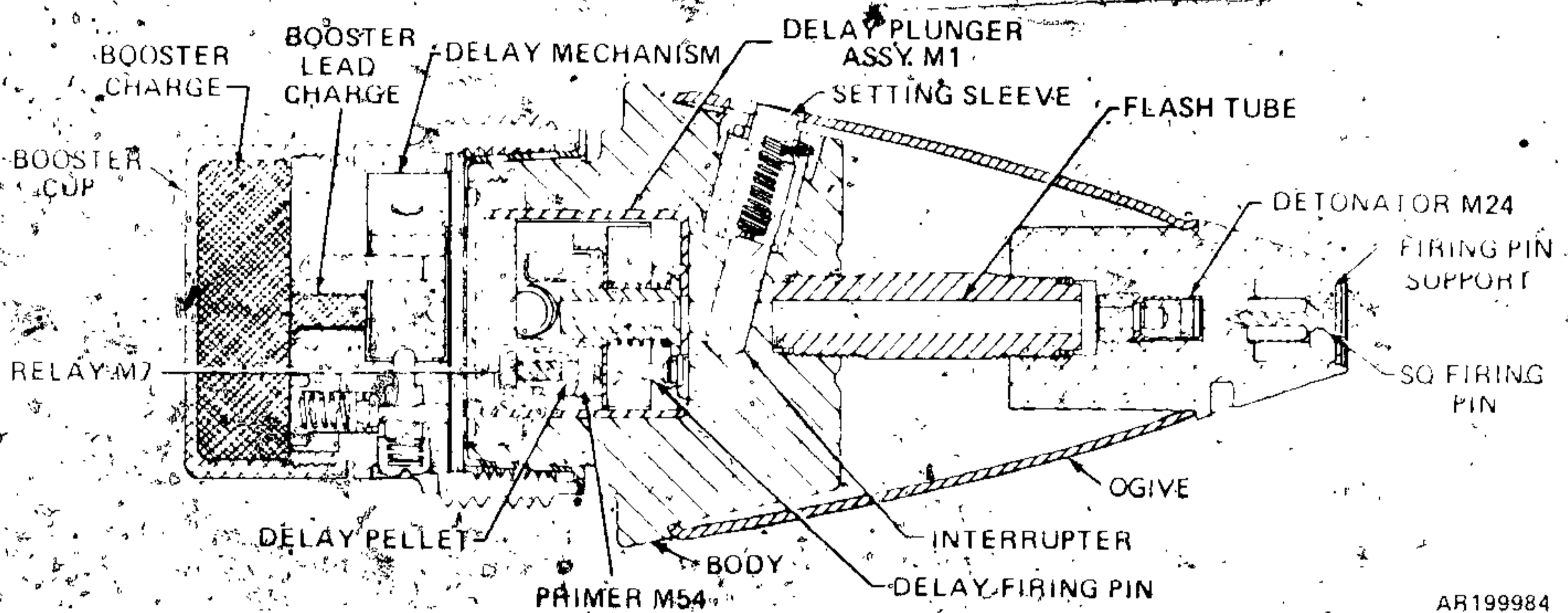
References:

TM 9-1300-251-20
 SC 1340/95-IL
 SB 700-20

FUZE, POINT DETONATING: M51A5



AR199985



AR199984

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 75-mm through 105-mm.

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 pins. 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 most 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 of 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 Among Models:

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

Tabulated Data:

Type ----- PD
 Weight ----- 2.12 lbs.
 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 hrs /day)

* Packing ----- 8 fuzes in metal container; 2 containers in wooden box

* Packing Box:

Weight ----- 55.8 lbs
 Dimensions ----- 14-5/8 x 12-13/16 x 9-1/8 in.
 Cube ----- 1.04 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 7
 Storage compatibility group ----- B
 DOT shipping class ----- A
 DOT designation ----- DETONATING FUZES CLASS A EXPLOSIVES

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.

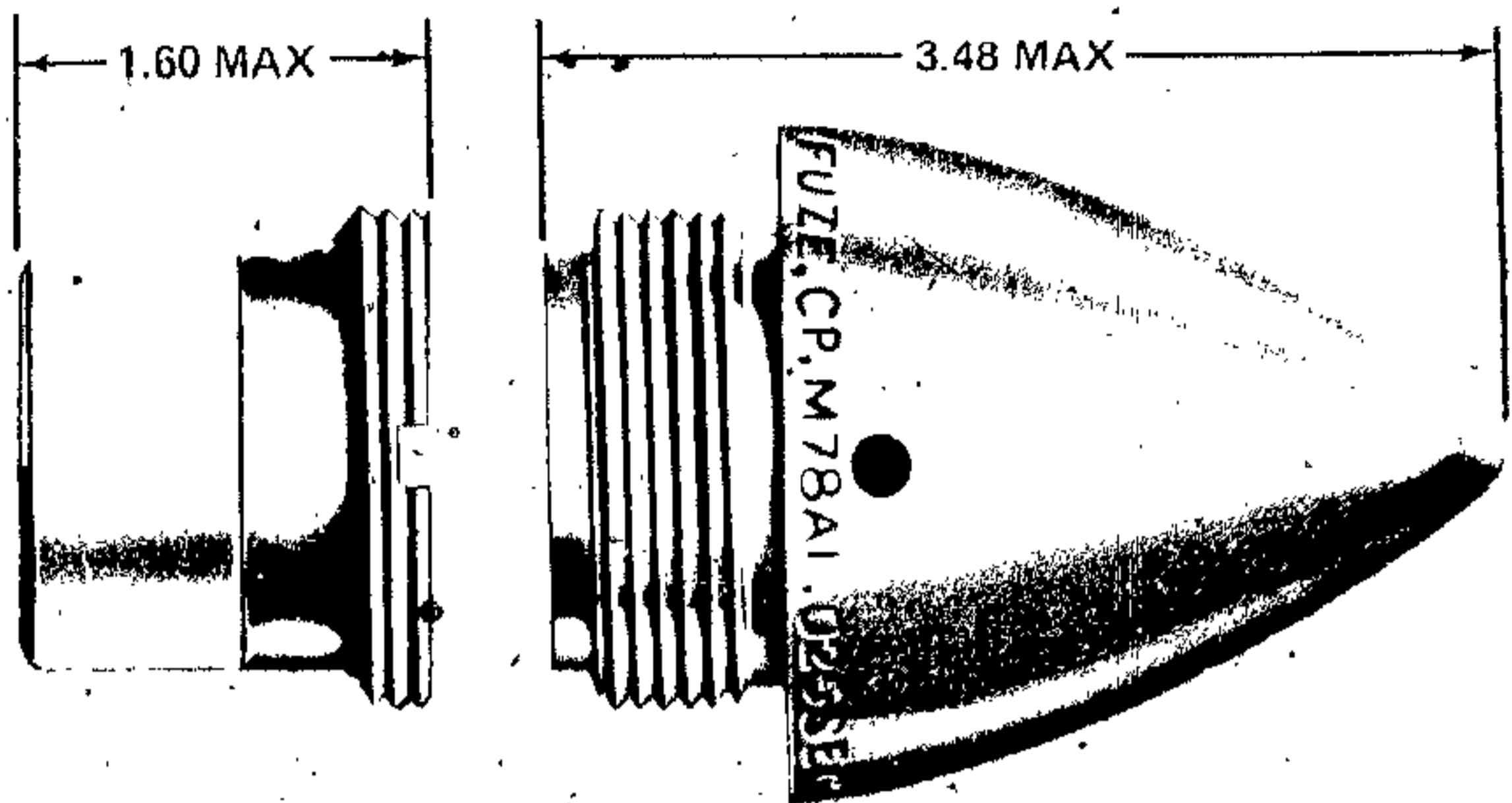
Limitations:

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

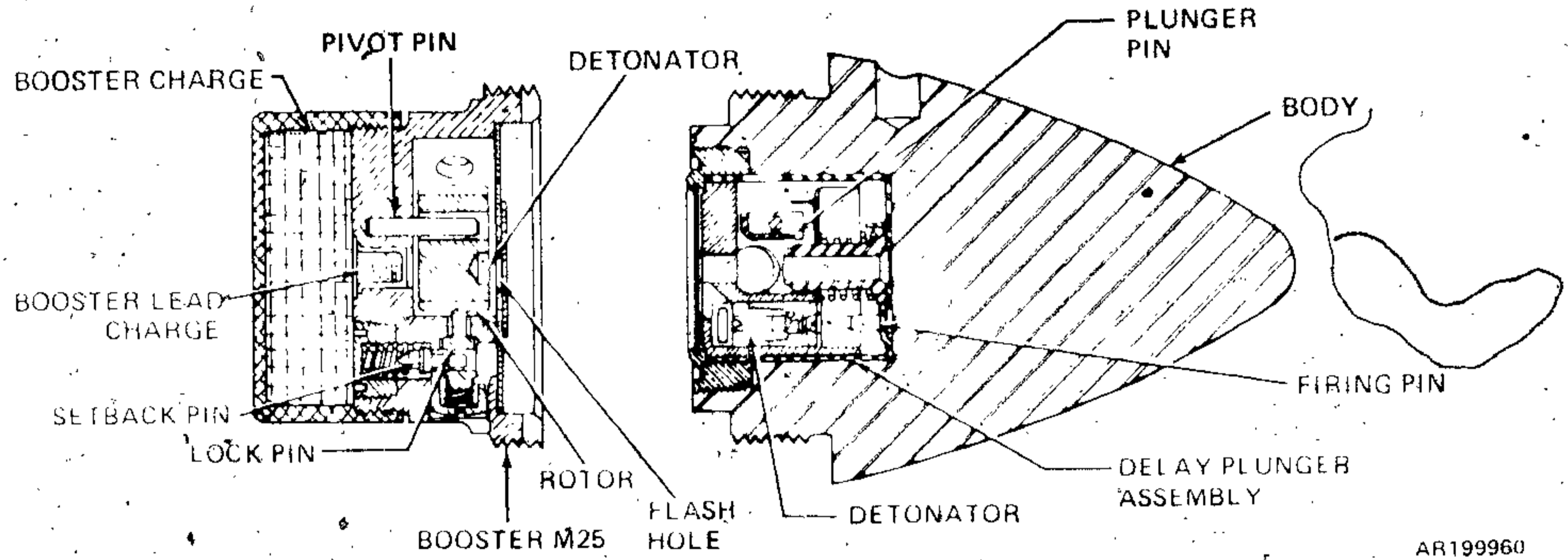
References:

TM 9-1300-251-20
 SC 1340/95-IL
 SB 700-20

FUZE, POINT DETONATING: M78 SERIES



AR199961



AR199960

Type Classification:

Std OTCM 36841, dtd 1958

Use:

Point detonating fuzes of the M78 series are constructed especially for use in spotting and destruction of concrete targets. The fuzes are used with HE projectiles fired from guns and howitzers in calibers 75-mm through 8-inch, except 175-mm.

Description:

The fuze has a solid hardened steel body with an ogival nose. A well in the base houses a firing pin and an inertial-type delay plunger

mechanism containing a detonator. The delay plunger in each type is locked by two spin-activated, spring-loaded plunger pins. All M78 series fuzes are equipped with Booster M25, designed solely for this fuze. The booster has an externally threaded body containing a delayed arming mechanism, Detonator M17, and tetryl booster lead charge. The delayed arming mechanism is an eccentric, spin-activated rotor containing the detonator. In the unarmed position, the detonator is out of line with the flash hole and the rotor is locked by a spring-loaded centrifugal lock pin, which is in turn locked by a setback pin. The base of the booster is an aluminum cup threaded onto the body and containing a 340-gram tetryl booster charge. As issued, Booster M25 is packed and shipped with, but not attached to, the fuze.

TM 43-0001-28

Functioning:

Upon weapon firing, setback force withdraws the setback pin from the lock pin. As the spin rate of the projectile increases, centrifugal force withdraws the two plunger pins from delay plunger Assembly M1 in the head of the fuze, thus arming the delay plunger. Simultaneously, centrifugal force withdraws the lock pin, permitting the rotor to turn on the pivot pin until Detonator M17 is aligned with the flash hole in the booster top cover. The rotor is locked in the armed position by the centrifugal lock pin for the remainder of the flight. This delayed arming of the booster mechanism provides more safety. Upon impact, Delay Plunger M1 is driven forward by inertia into the firing pin to initiate the explosive train.

Difference Between Models:

Fuze M78 has a delay plunger with a single 0.025 second delay. Fuze M78A1 is supplied with a non-delay Plunger Assembly M1, or a 0.025 second delay Plunger M1. Fuzes preset for non-delay are intended primarily for spotting, and are identified by a white-painted nose.

Tabulated Data:

Type -----	PD
Weight -----	2.09 lbs.
Length:	
Visible -----	2.68 in.
Overall -----	3.48 in.
Thread size -----	2-12NS-1
Assembly Dwg. No. ---	73-2-214

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 hrs/day)

*Packing ----- 8 fuzes and 8 boosters in metal container, 2 containers in wirebound box.

*Packing Box:

Weight ----- 60 lbs.
Dimensions ----- 14-7/8 x 13 x 9-1/4 in.
Cube ----- 1.04 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class - 7
Storage compatibility --- B group
DOT shipping class ----- A
DOT designation -- DETONATING FUZES - CLASS A EXPLOSIVES

DODAC ----- 1390-N330 (Non-delay)
1390-N331 (0.025 delay)

Explosive Components:

Detonator M24, Detonator M17, tetryl booster, lead charge, tetryl booster charge, and delay Plunger Assembly M1.

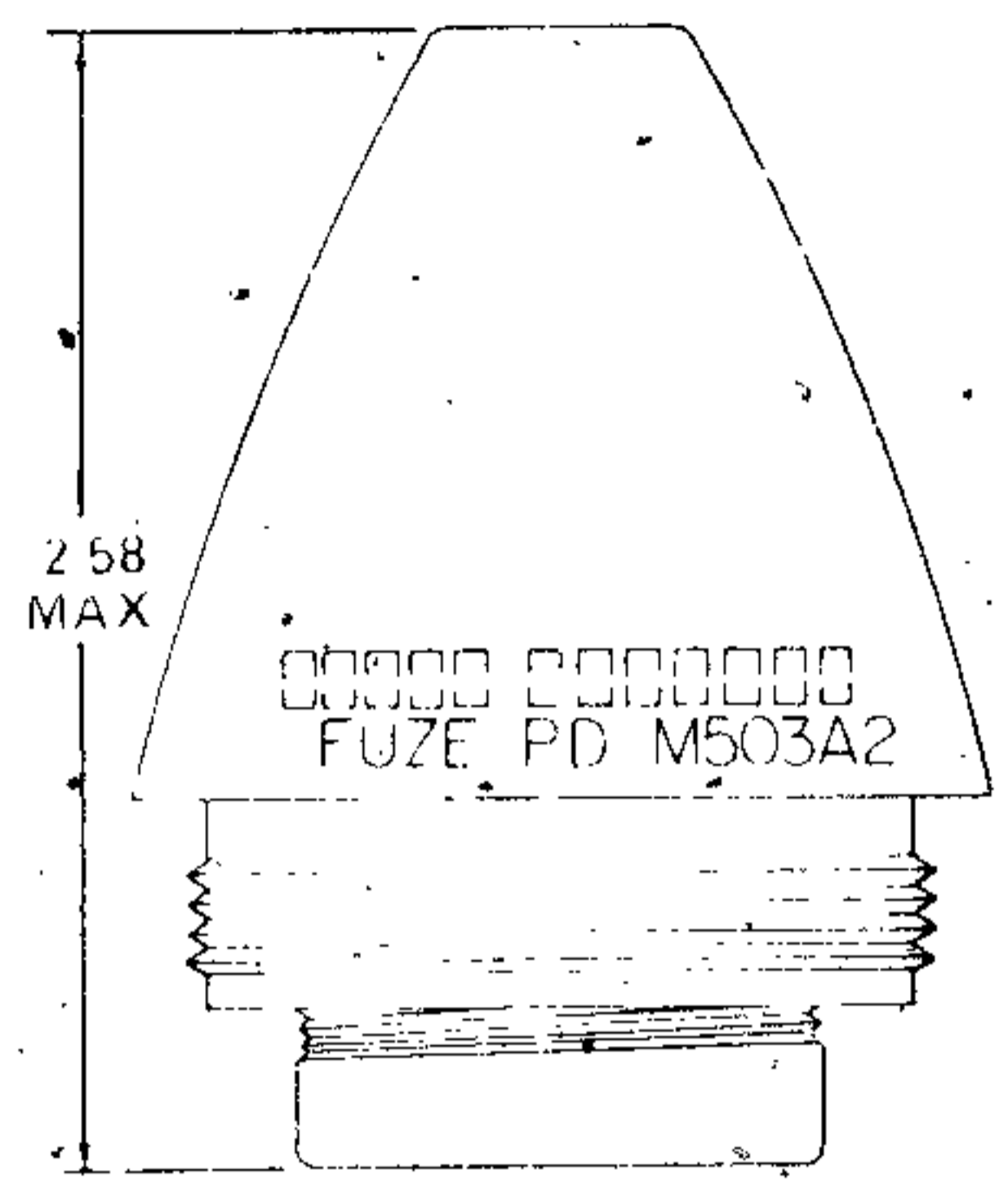
Limitations:

None

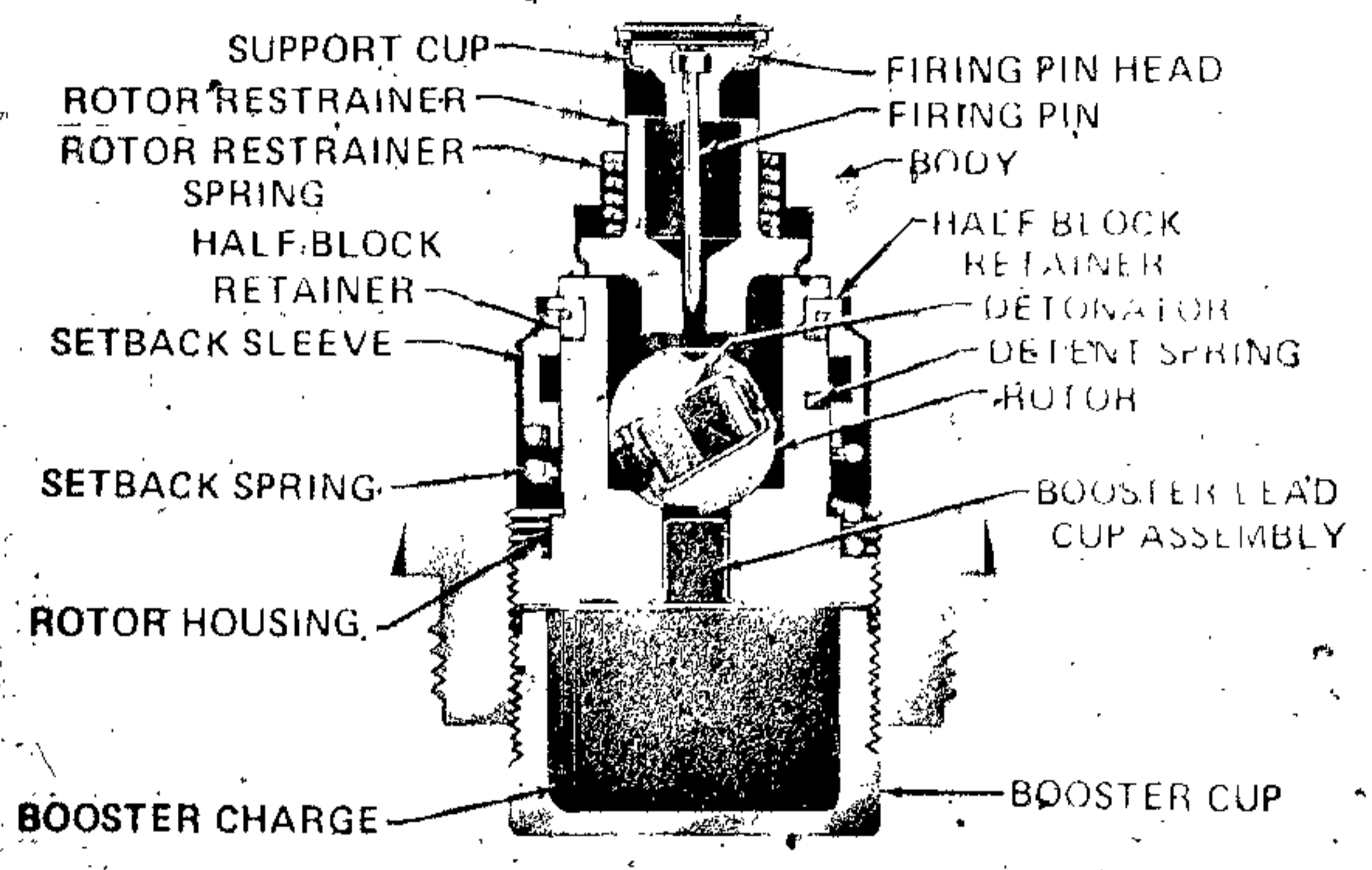
References:

- TM 9-1300-251-20
- TM 9-1015-203-12
- TM 9-1025-200-12
- TM 9-2350-210-12
- TM 9-2350-217-10
- TM 9-1015-234-12
- TM 9-1300-216-10
- TM 9-2350-217-10N

FUZE, POINT DETONATING: M503A2



AR199979



AR199978

Type Classification:

Std. OTCM 32814 dtd 1949

Use:

Point Detonating Fuze M503A2 is of the single-action superquick type, functioning on impact or graze. The fuze is designed for use with 57-mm rifle ammunition.

Description:

The aluminum body of the fuze is recessed at the nose to hold the firing pin head, support cup, and firing pin. The firing pin projects through a spring-loaded rotor restrainer. The brass rotor containing the detonator is restrained in the unarmed condition by four spring-loaded detents in the rotor housing. The rotor housing also contains a booster lead cup assembly. A mechanical safety feature, consisting of a setback sleeve, setback spring, and halfblock retainers mounted externally on the rotor housing, assists the detent springs in securing the rotor before firing. A booster cup containing a booster charge is threaded into the base of the fuze.

Functioning:

Setback from weapon firing displaces the setback sleeve to the rear against the setback

spring. In this position the sleeve continues to hold the rotor detents (not shown in illustration) locked, thus providing a minimum of 60 feet safe distance from the muzzle before arming. When rotation achieves approximately 9000 RPM, centrifugal force moves the halfblock retainers outward. Thus, when the setback sleeve moves forward again with deceleration, it moves to a new position with the groove of the sleeve opposite the rotor detents. The detents move forward into the groove due to centrifugal force, thus freeing the rotor. The rotor turns due to imbalance, to align the detonator with the firing pin. At this point, the rotor is in contact with the rotor restrainer, and the restrainer spring prevents contact between firing pin and detonator. When impact is made on the nose of the fuze, the firing pin is driven into the detonator to initiate the explosive train. If grazing impact is made, the inertia of the rotor overcomes the restrainer spring, and the detonator is driven into the firing pin.

Tabulated Data:

Type	----- PD
Weight	----- 0.34 lb.
Length:	
Visible	----- 1.755 in.
Overall	----- 2.58 in.
Thread size	----- 1.7-14NS-1
Assembly Dwg. No.	----- 9215031

TM 43-0001-28

Temperature Limits:

Firing:

Refer to complete round for upper and lower limits.

Explosive Components:

Detonator M42, tetryl booster lead charge and tetryl booster charge.

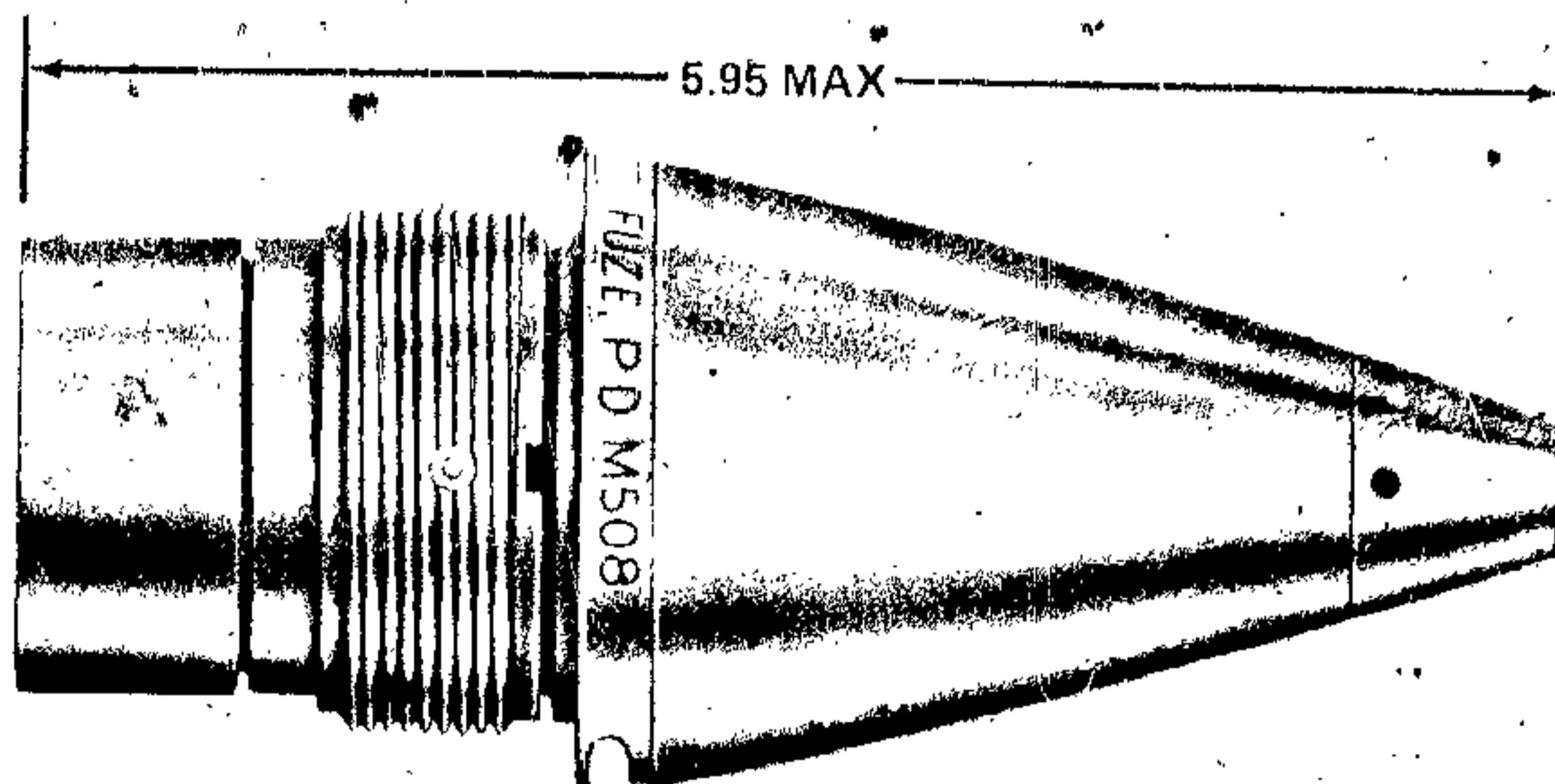
Limitations:

Refer to complete round.

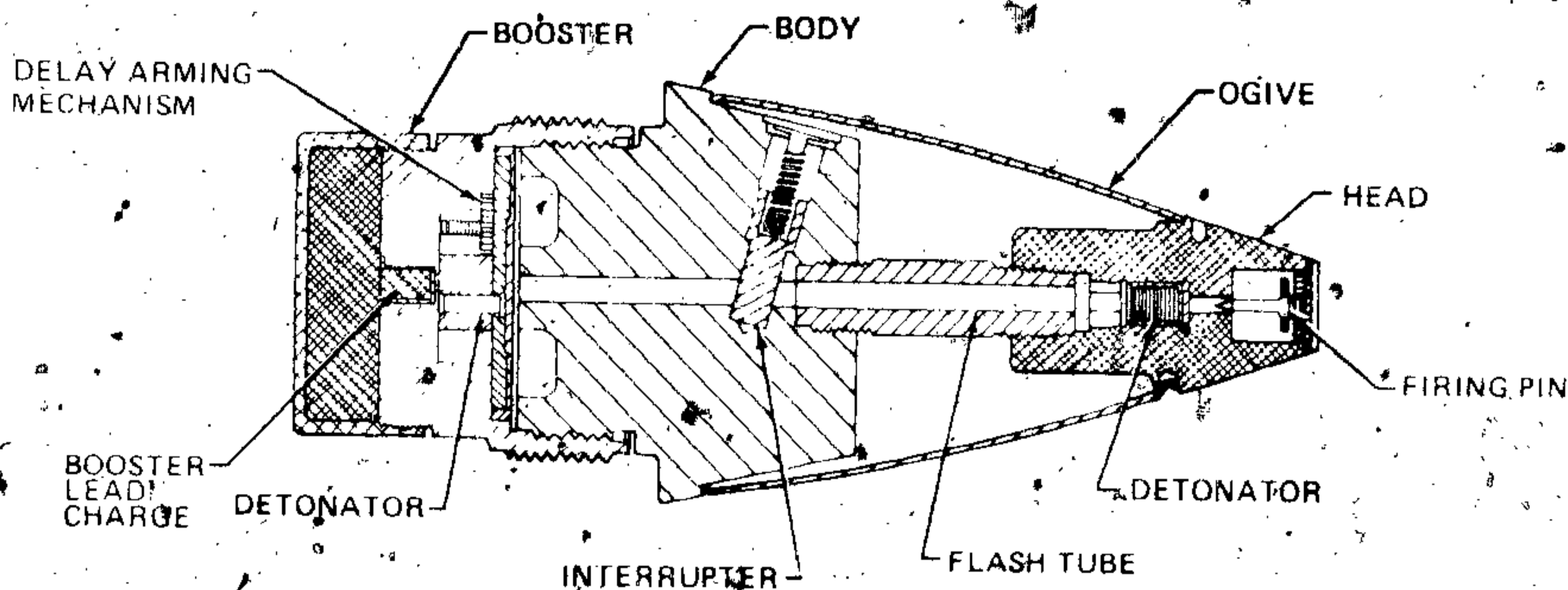
References:

TM 9-1300-251-20

FUZE, POINT DETONATING: M508A1 and M508 SERIES



AR199959



AR199958

Type Classification:

Use:

Point Detonating Fuzes M508A1 and M508 are single-action, delayed arming impact fuzes used to detonate 105-mm, 155-mm, and 8-inch gas or smoke WP projectiles.

Description:

The M508 series fuzes consist of a PD head assembly containing a firing pin held in position by a firing pin support which prevents initiation of Detonator M18 until impact; a stamped steel

windshield to provide an aerodynamic shape to the fuze; a fuze body containing an interrupter assembly to provide bore-safe firing; and an M125A1 or M125 booster assembly. The boosters are physically similar. Booster M125A requires 200 feet of projectile travel before arming, and Booster M125 requires 150 feet. The threaded brass body of the booster contains a delayed arming mechanism, Detonator M17, and a tetryl lead charge. The delayed arming mechanism is operated by centrifugal force acting through a gear train to turn a rotor carrying Detonator M17. In the unarmed position, the detonator is held out of line with the flash hole in the booster cover by rotor detents. An aluminum cup containing a 340-grain tetryl charge is threaded onto the base of the booster.

Functioning:

No action occurs until the spin of the projectile, after firing, causes centrifugal force to withdraw the interrupter from the flash tube against the interrupter spring. At the same time, centrifugal force moves the rotor detents in the booster outward and starts the delayed arming gear train. The timing of the mechanism is such that when the rotor has aligned Detonator M17 with the flash hole to complete arming of the fuze, the projectile will be at least 150 feet from the muzzle. On impact, the firing pins driven into the detonator in the fuze head to initiate projectile detonation.

Difference Between Models:

M508A1 has Booster M125A1 which requires 200 feet of travel to arm. M508 has booster M125 which requires 150 feet of travel to arm.

Tabulated Data:

Type----- PD
 Weight----- 2.15 lbs.
 Length:
 Visible----- 3.74 in.
 Overall----- 5.95 in.
 Assembly Dwg. No.----- 7549041

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 hrs.
 /day)

* Packing ----- 8 fuzes in metal
 container; 2 con-
 tainers in wooden
 box

* Packing Box:

Weight----- 55.8 lbs.
 Dimensions----- 14-5/8 x 12-13/16
 x 9-1/8 in.
 Cube----- 1.04 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
 class----- 7
 Storage compatibility
 group----- B
 DOT shipping class----- A
 DOT designation----- DETONATING
 FUZES-CLASS A
 EXPLOSIVES

DODAC ----- 1390-N326

Explosive Components:

Fuze Detonator M18, Booster Detonator M17, tetryl booster lead charge, and tetryl booster charge.

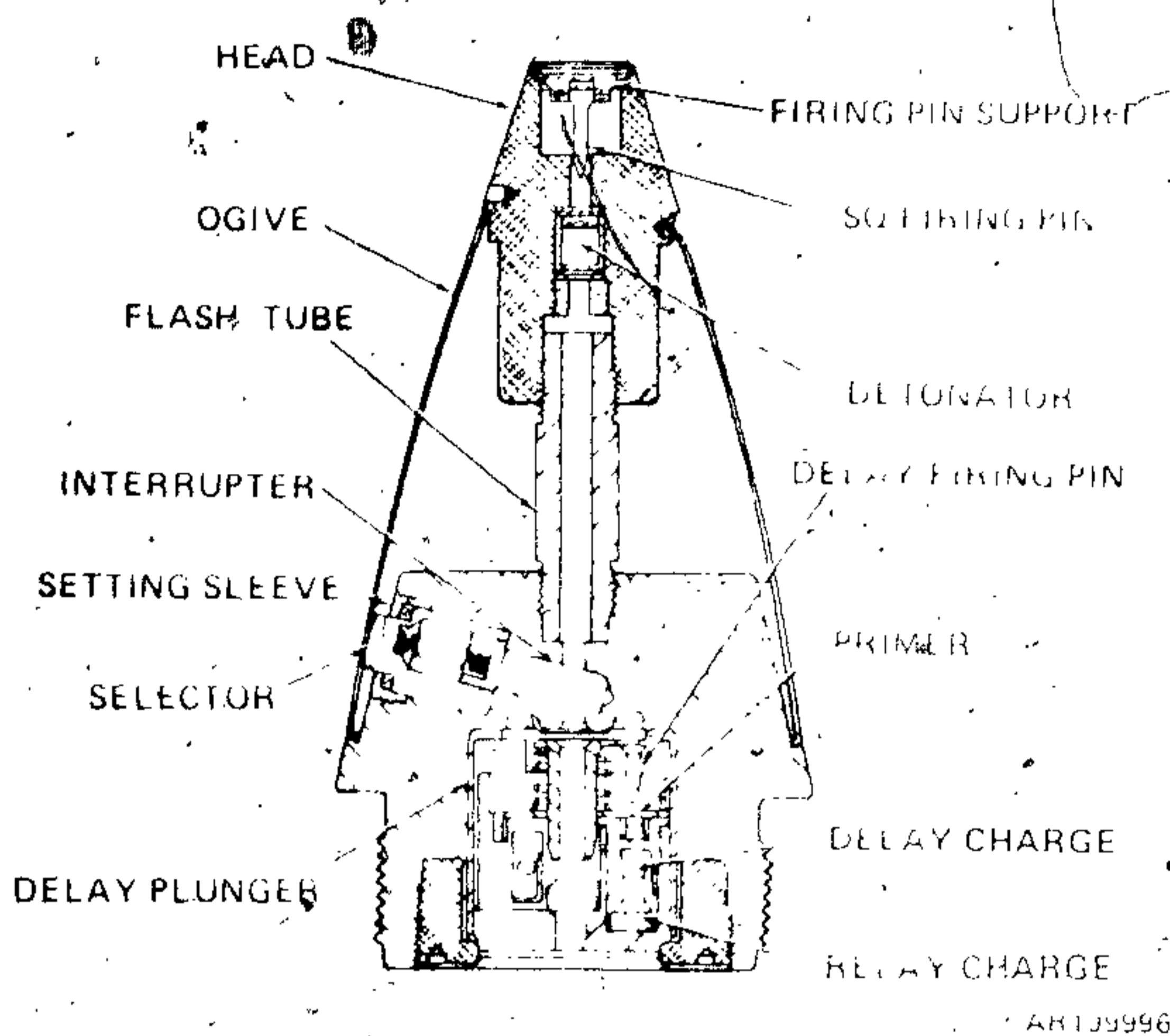
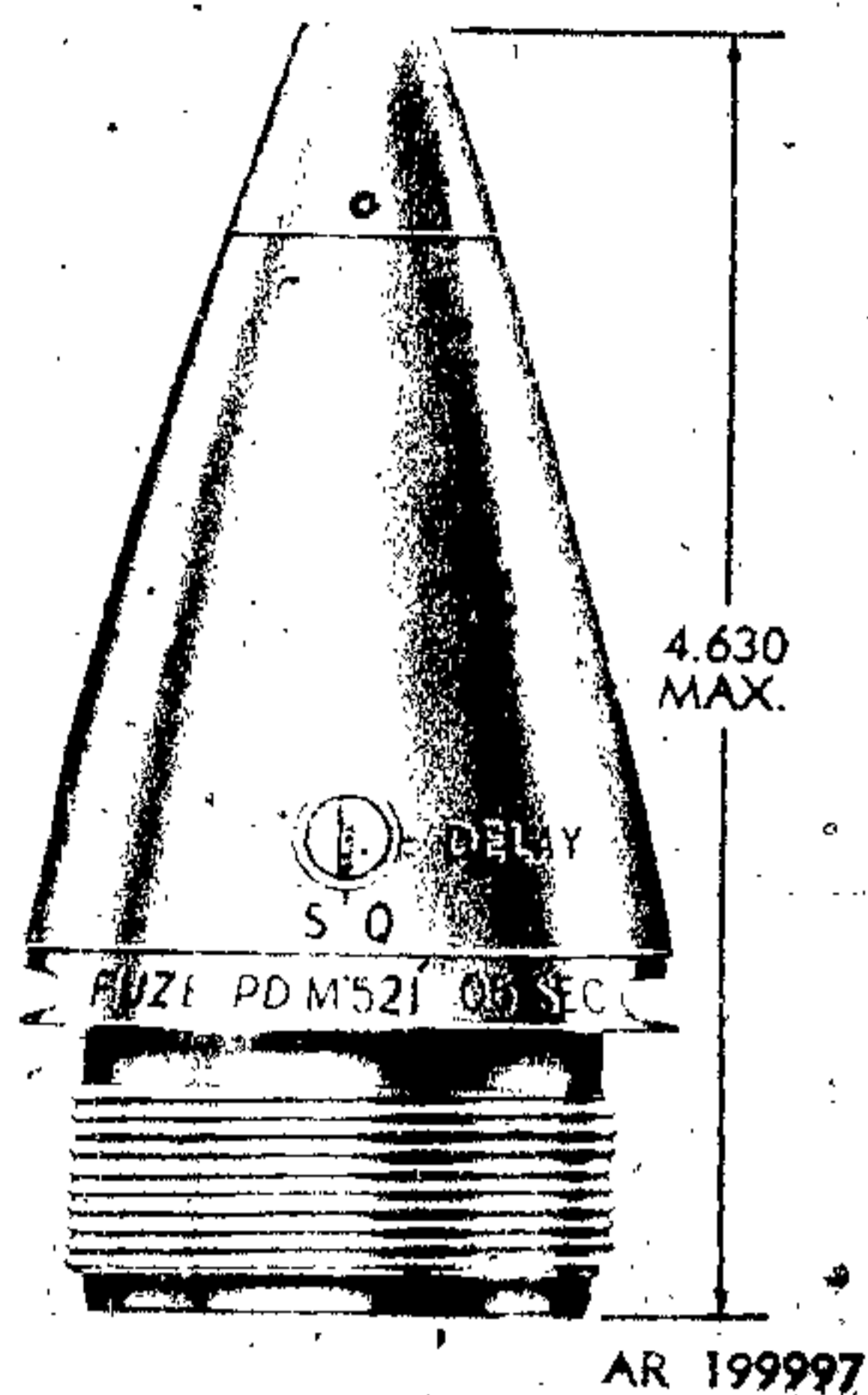
Limitations:

Overhead firing with HE projectiles for practice is not authorized. To avoid premature functioning, do not use this fuze when firing during rain or snow.

References:

- TM 9-1300-251-20
- SC 1340/98-IL
- SB 700-20
- TM 9-1015-203-12
- TM 9-1015-234-12
- TM 9-1025-200-12
- TM 9-2300-216-10
- TM 9-2350-217-10
- TM 9-2350-217-10N

FUZE, POINT DETONATING: M521



Type Classification:

Std OTCM 37119 dtd 1959

Use:

Point Detonating Fuze M521 is of the super-quick, delayed arming type used with WP Smoke cartridges, fired from 4.2-inch mortars. The fuze can be set for a 0.05 second delay or superquick action.

Description:

The head contains a superquick (SQ) element consisting of firing pin, firing pin support and detonator. An ogive exterior shell supports the SQ element and the flash tube to the fuze body. The body contains a setting sleeve with flash tube interrupter, and delay assembly M1 consisting of plunger, firing pin, primer, black powder delay charge, and relay charge.

Functioning:

No action takes place upon firing until sufficient rotational speed has been established to overcome the resistance of springs and setback force on the several safety devices. When set

for superquick action, after the projectile leaves the muzzle of the weapon, centrifugal force causes the interrupter to move outward, opening the passage. At the same time, the plunger pins locking the delay plunger assembly in unarmed position also move outward, releasing that assembly in preparation for impact. The plunger pin lock then swings on its pivot under centrifugal force, placing an arm against the inner end of each plunger pin, thereby preventing the return of the pins to the unarmed position. Upon impact, the firing pin of the superquick element is driven against the detonator, initiating the superquick action. Inertia causes the delay plunger to move forward, driving the primer against the delay firing pin and initiating the delay action. In normal functioning with superquick action, the delay action has no effect since the superquick train will have caused the projectile to explode before the delay train can burn for its prescribed time. However, should the superquick action fail, the projectile will function with delay action rather than become a dud. When set for delay action, the interrupter which interrupts the superquick passage is restrained from moving. Upon impact, the superquick firing pin and detonator function, but the effect is prevented from being transmitted to the projectile.

Tabulated Data:

Type ----- PD
Weight ----- 1.60 lbs.
Length:
 Visible ----- 3.74 in.
 Overall ----- 4.63 in.
Thread size ----- 2 in. -12NS-1
Assembly Dwg. No. - 7549112

Temperature Limits:

Refer to complete round for upper and lower limits.

Explosive Components:

Detonator, primer, black powder delay charge, and relay charge (delay plunger assembly).

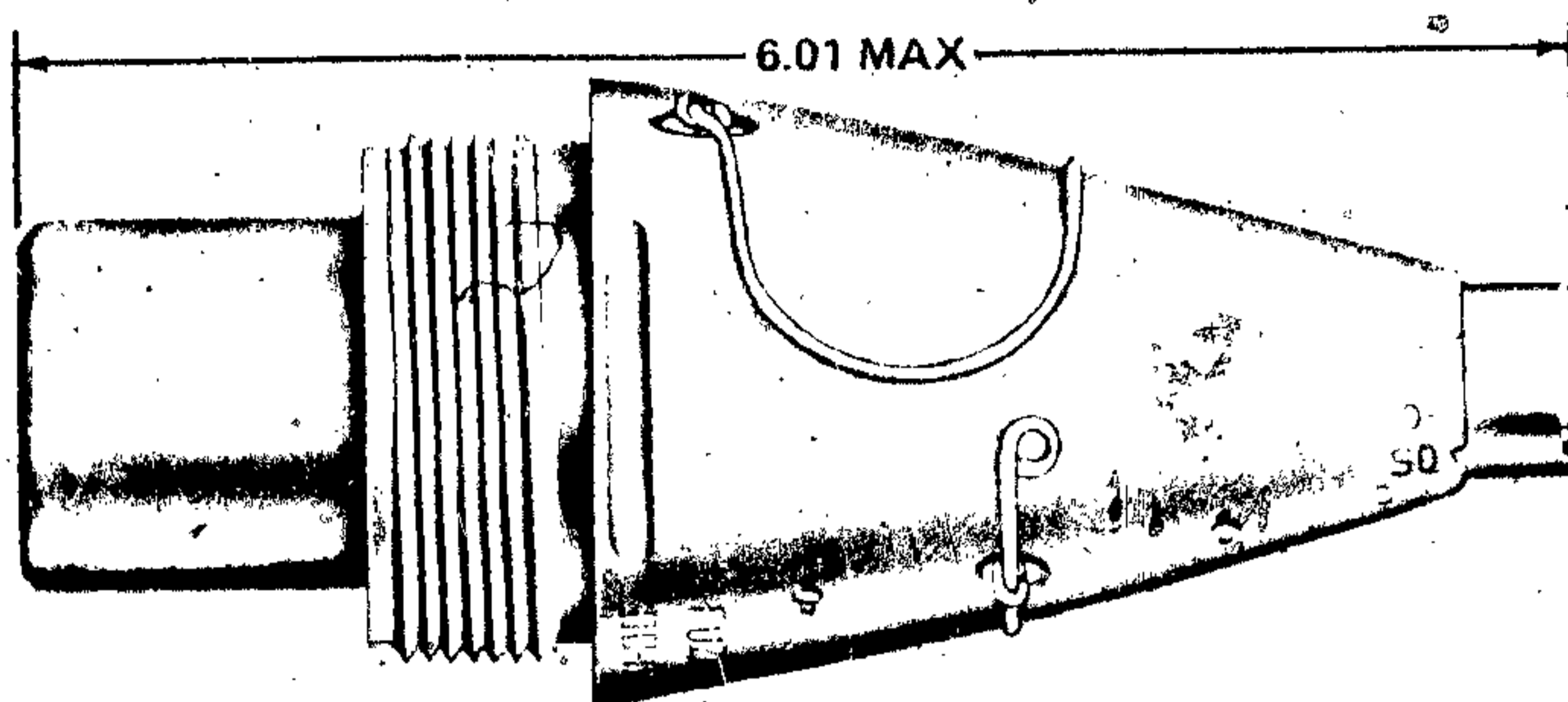
Limitations:

None.

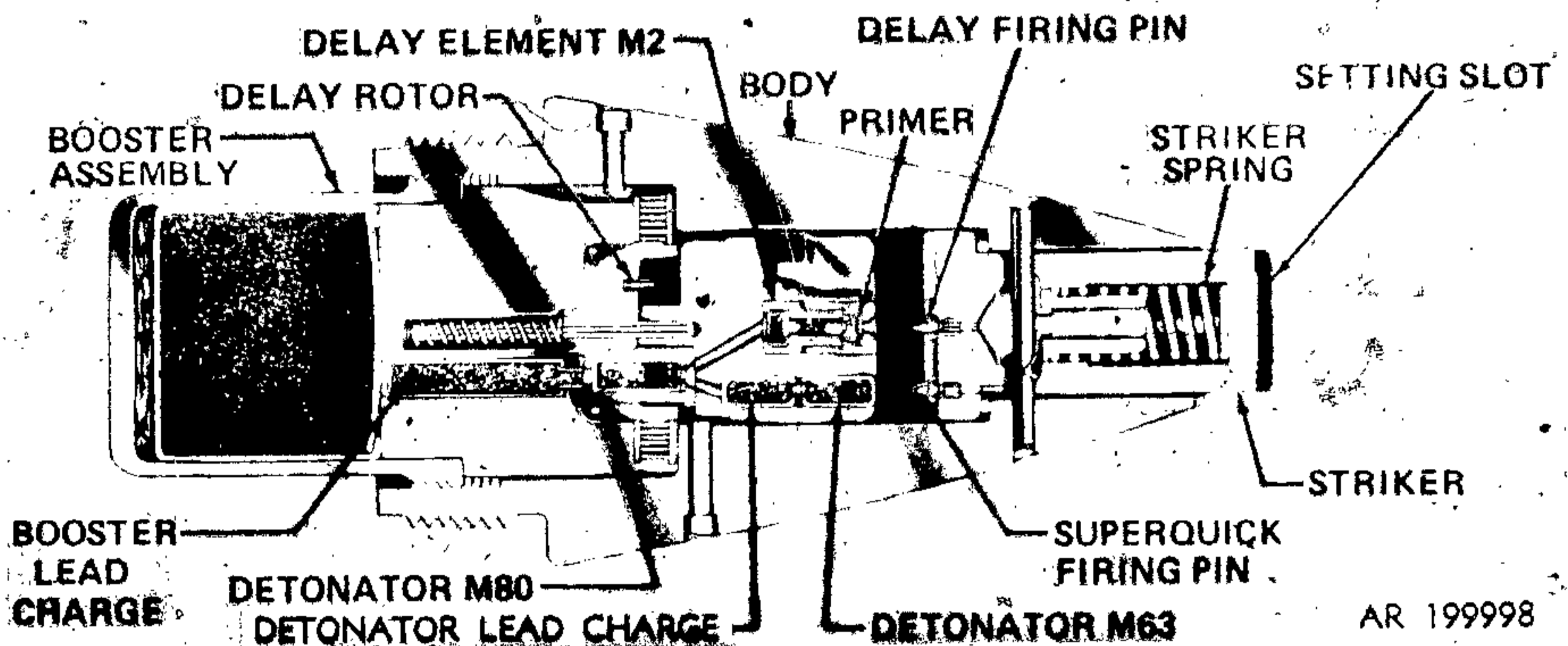
References:

TM 9-1300-251-20
TM 9-1015-215-12

FUZE, POINT DETONATING: M524 SERIES.



AR199999



AR 199998

Type Classification:

Std A AMCTC 3402 dtd 1965 (M524A1, A2, A3, and A4)

Std A AMCTC 7075 dtd 1969

Use:

The M524 series point detonating fuze is used to detonate HE, M362 or Smoke WP, M374 or M375 ammunition fired from 81-mm mortars. The fuze is dual purpose, designed to function on impact or graze with superquick action or 0.05 second delay.

Description:

The fuze has an aluminum body threaded externally to fit the round and internally to accept a tetryl booster. The nose of the fuze is

a spring-loaded striker with a slot for selection of superquick or delay action. Depending on that selection, either detonation train within the fuze body is initiated by independent firing pins. The SQ train consists of Detonator M63 and has a detonator lead charge. The delay train includes primer and Delay Charge M2. Either train fires Detonator M80 and a booster lead charge to detonate the tetryl booster in the base. The fuze is bore-safe by means of a delayed arming mechanism consisting of a spring-loaded rotor released by setback upon weapon firing and a timing device. Two safety pins are provided, one to secure the internal plunger and one to secure the setback arming device. A pull wire connects the pins for removal before firing.

Functioning:

Setback upon weapon firing trips the arming mechanism release, permitting the arming delay rotor to turn toward the armed position. The mechanism assures that arming will occur in not less than 1.25 seconds or more than 2.50 seconds after the round has left the muzzle of the mortar. If SQ action has been preselected explosion of the projectile will occur on impact by the SQ firing pin striking Detonator M63. If delay action was selected, the firing pin is not aligned with Detonator M63 and projectile charge detonation occurs 0.05 second after the delay firing pin operates on the delay train through Delay Charge M2. Each mode operates by separate flash tubes upon Detonator M80, the booster lead charge and the booster.

Difference Among Models:

Army Models M524A5 and M524A6 incorporate the second safety pin retaining the plunger and provide that the pin cannot be removed if the arming mechanism starts inadvertently. The models are similar except that Fuze M524A6 requires greater setback force to arm. Models M524A1, M524A2, M524A3 and M524A4 are for USN and USMC use only and have only one safety pin (arming). Fuzes M524A1 and M524A4 incorporate design differences but function similarly. The delay charge in Fuze M524A2 is replaced by a non-delay element. Fuze M524A3 is capable only of superquick action.

Tabulated Data:

Type----- PD
 Weight----- 1.27 lbs.
 Length:
 Visible----- 3.80 in.
 Overall----- 6.01 in.
 Thread size----- 2-12NS-1
 Assembly Dwg.
 No. (M524A6)----- 9205729

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 hrs./day)

* Packing----- 8 fuzes in metal container
 2 containers in wirebound box

Packing box:

Weight----- 41.8 lb
 Dimensions----- 14-7/8 x 12-13/16 x 9-1/8 in.
 Cube----- 1.0 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class----- 3
 Storage compatibility group----- B
 DOT shipping class----- 1.4A
 DOT designation----- DETONATING FUZES CLASS A EXPLOSIVES
 DODAC----- 1390-N308

Explosive Components:

SQ action----- Detonator M63, tetryl plunger lead charge, Detonator M80, and tetryl booster.
 Delay action----- Primer, black powder Delay Element, M2, Detonator M80, and tetryl booster.

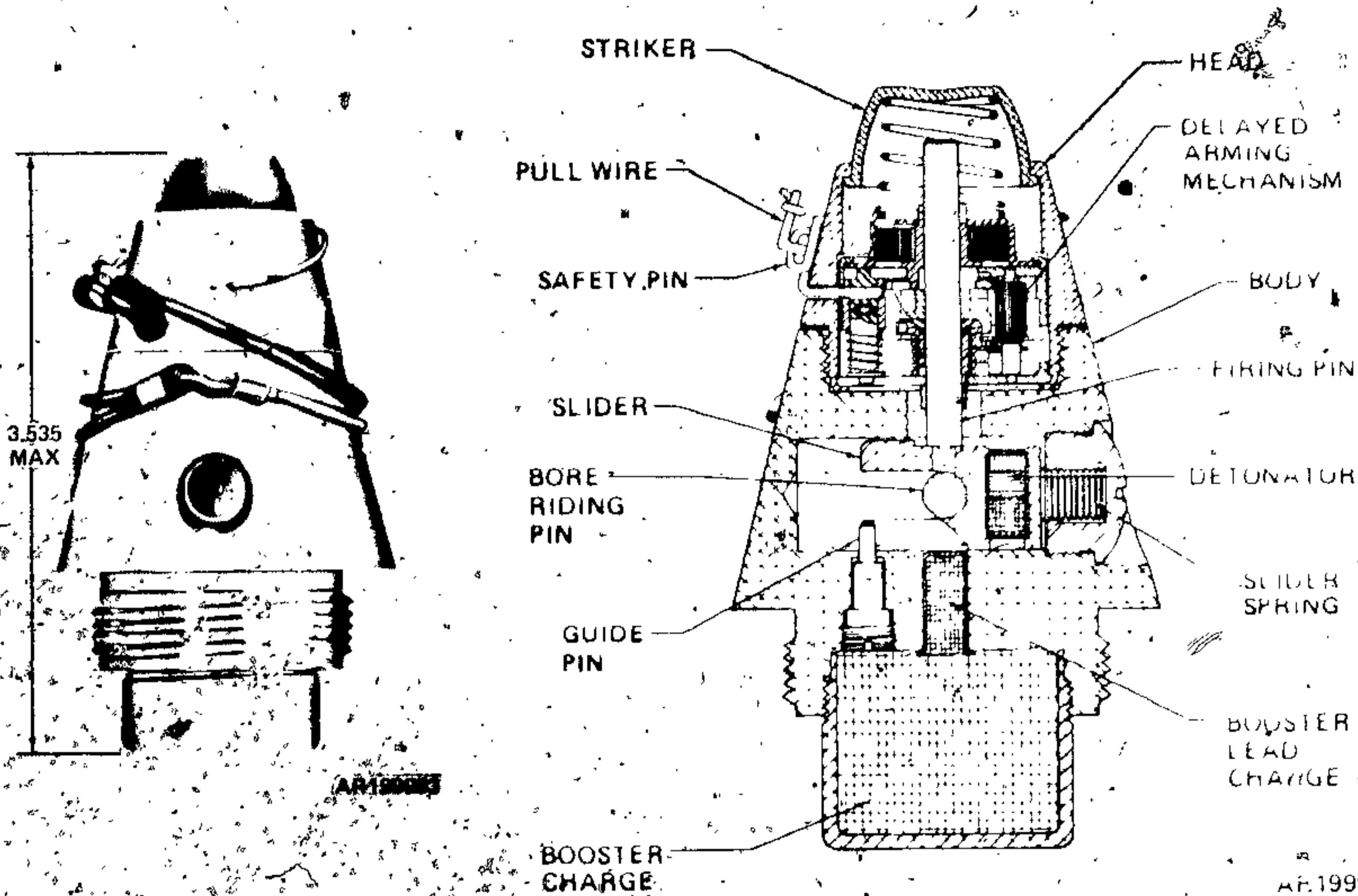
Limitations:

None

References:

TM 9-1015-200-12
 TM 9-1300-251-20
 TM 9-2300-257-10
 SC 1340/98-IL

FUZES. POINT DETONATING: M525 SERIES



AR 199982

Type Classification:

M525 Std B AMCTC 3403 dtd 1965.

Use:

Point-detonating M525 Series fuzes are of the superquick, delayed arming, impact type used with 60-mm and 81-mm HE cartridges and 81-mm WP Smoke cartridges.

Description:

The head of the fuze contains a spring-loaded striker, direct-acting firing pin, and a clockwork mechanism to delay arming for a safe distance from the muzzle of the mortar. The head is threaded into an aluminum body containing a cylindrical slider to position the detonator, and a booster lead charge. Positive safety is provided by a safety pin to be removed just prior to firing.

Functioning:

After removal of the pull ring and safety pin, setback from weapon firing causes the setback pin (not shown in illustration) to release a bore-riding pin. The bore-riding pin then contacts

the bore of the mortar and is ejected as the projectile leaves the muzzle. Setback also releases the pallet and escape pinion wheel (not shown) to begin movement of the delayed arming mechanism. This movement withdraws the firing pin from a detent in the slider. The slider is then moved transversely in the fuze body by a compression slider spring, to align the detonator with the firing pin. The delayed arming occurs approximately 3 seconds after the round has left the muzzle. Upon impact superquick action occurs from detonator through booster lead charge and booster charge to explode the projectile.

Difference Between Models:

M525 and M525A1 differ in the design of the fuze nose, and in the pull and safety wires.

Tabulated Data:

Type	----- PD
Weight	----- 0.44 lb.
Length:	
Visible	----- 2.42 in.
Overall	----- 3.535 in.
Thread size	----- 1-1/2-12NF
Assembly Dwg. No.	----- 8800197

TM 43-0001-28

Temperature Limits:

Refer to complete round for upper and lower limits.

Packing:

Refer to SC for complete packing data including NSN's.

Explosive Components:

Detonator, tetryl, lead charge, and tetryl booster charge or black powder charge.

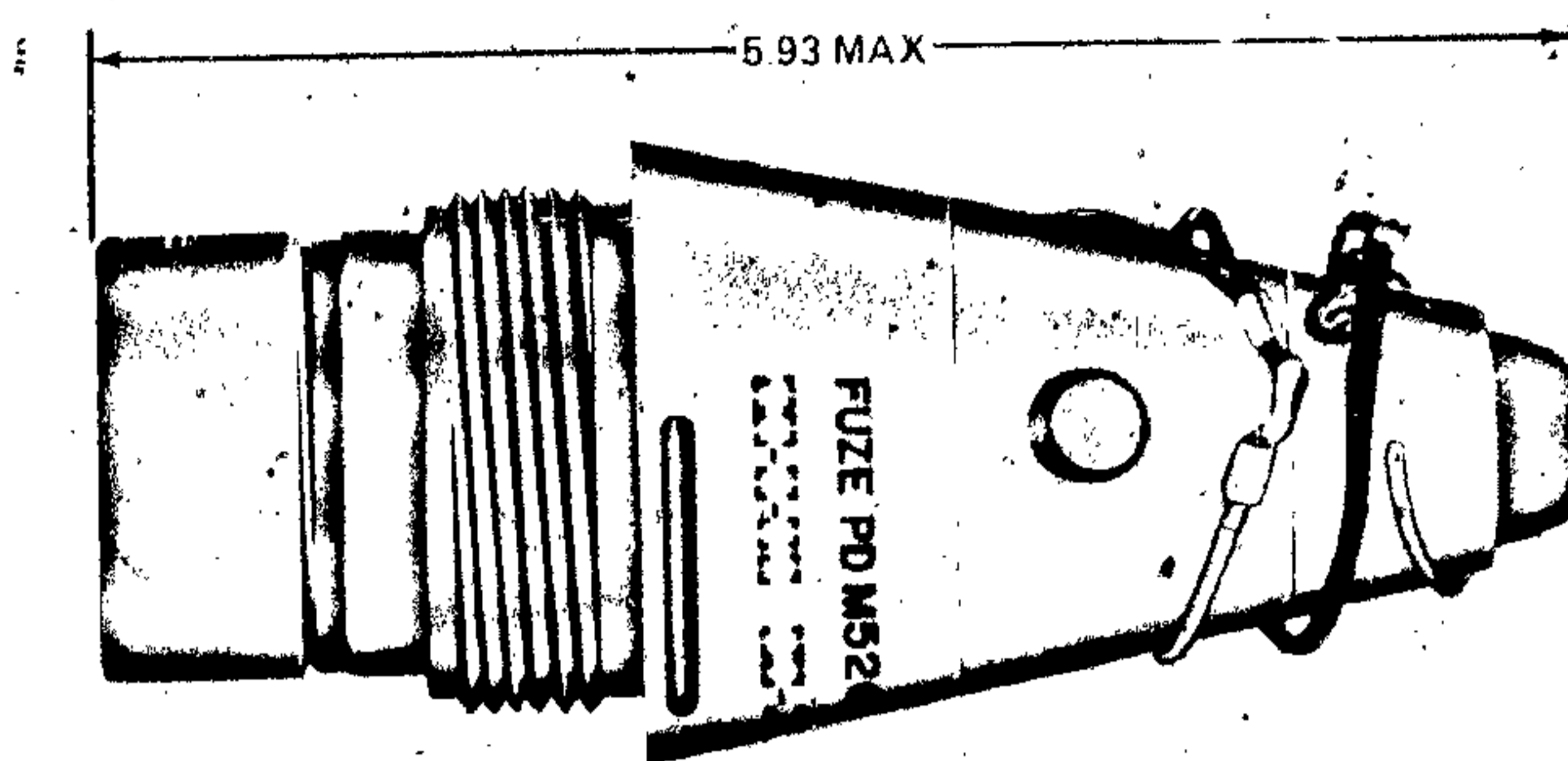
Limitations:

1. Do not fire in the immediate vicinity of any object which might deflect, obstruct, or damage the cartridge.
2. M525A1 is authorized for training only.

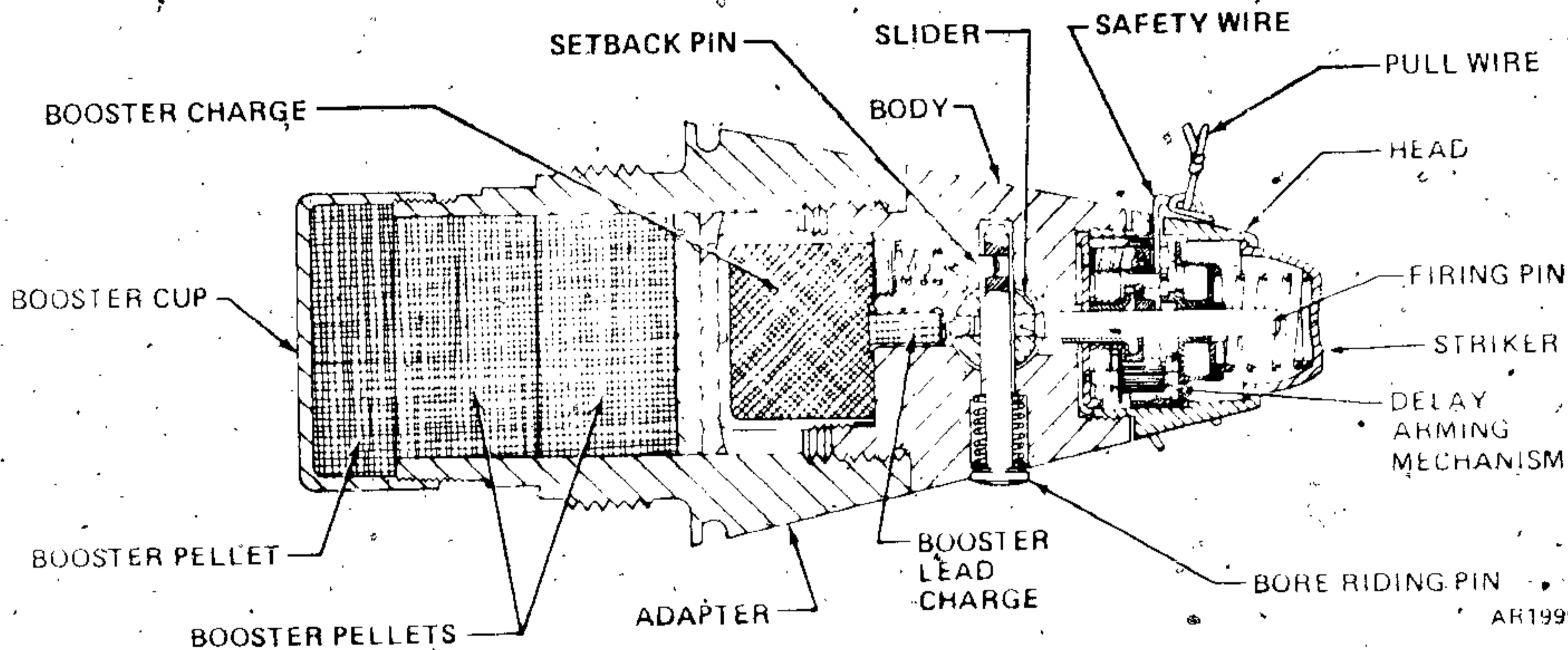
References:

TM 9-1300-251-20

FUZE, POINT DETONATING: M526 SERIES



AR199977



AR199976

Type Classification:

Std AMCTC 3403 dtd 1965

Use:

Point detonating fuzes of M526 series are of the superquick, delayed arming impact type used with 81-mm HE and WP Smoke cartridges.

Description:

The head of the fuze contains a spring-loaded striker, direct-acting firing pin, and a clockwork mechanism to delay arming for a safe distance from the muzzle of the mortar. The head is threaded into an aluminum body containing a cylindrical slider to position the

detonator, and a booster lead charge. A tetryl booster is threaded into the base, and is covered by an adapter containing additional tetryl booster pellets. The adapter is fitted to the external fuze threads formerly intended for attachment to the projectile, and the exterior of the adapter is threaded to fit the ammunition. Positive safety for shipment and handling is provided by a safety wire and pull wire.

Functioning:

After removal of the pull wire and safety wire, setback from weapon firing causes the setback pin to release a bore-riding pin. The bore-riding pin then contacts the bore of the mortar and is ejected as the projectile leaves the muzzle. Setback also releases a primer and escape pinion wheel (not shown in illustration)

to begin movement of the delayed arming mechanism. This movement withdraws the firing pin from a detent in the slider. The slider is then moved transversely in the fuze body by a compression spring, to align the detonator with the firing pin. The delayed arming occurs approximately 3 seconds after the round has left the muzzle. Upon impact, superquick action occurs from detonator through booster lead charge and booster charge to explode the projectile.

Difference Between Models:

Fuzes M526 and M526A1 differ in the design of the safety and pull wires and fuze nose.

Tabulated Data:

Type -----	PD
Weight -----	1.15 lb.
Length:	
Visible -----	3.72 in.
Overall -----	5.93 in.
Thread size -----	2.00 in. -12UNS-1
Assembly Dwg. No. -----	8800254

Temperature Limits:

Refer to complete round for upper and lower limits.

*Packing -----	8 fuzes in metal container, 2 containers in wire-bound box
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*Packing Box:

Weight -----	39.3 lbs.
Dimensions -----	14-5/8 x 12-13/16 x 9-1/8 in.
Cube -----	1.0 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class -	7
Storage compatibility ---	B group
DOT shipping class -----	A
DOT designation -----	DETONATING FUZES- CLASS A EXPLOSIVES

DODAC ----- 1390-N309

Explosive Components:

Detonator, tetryl lead charge, and tetryl booster charge.

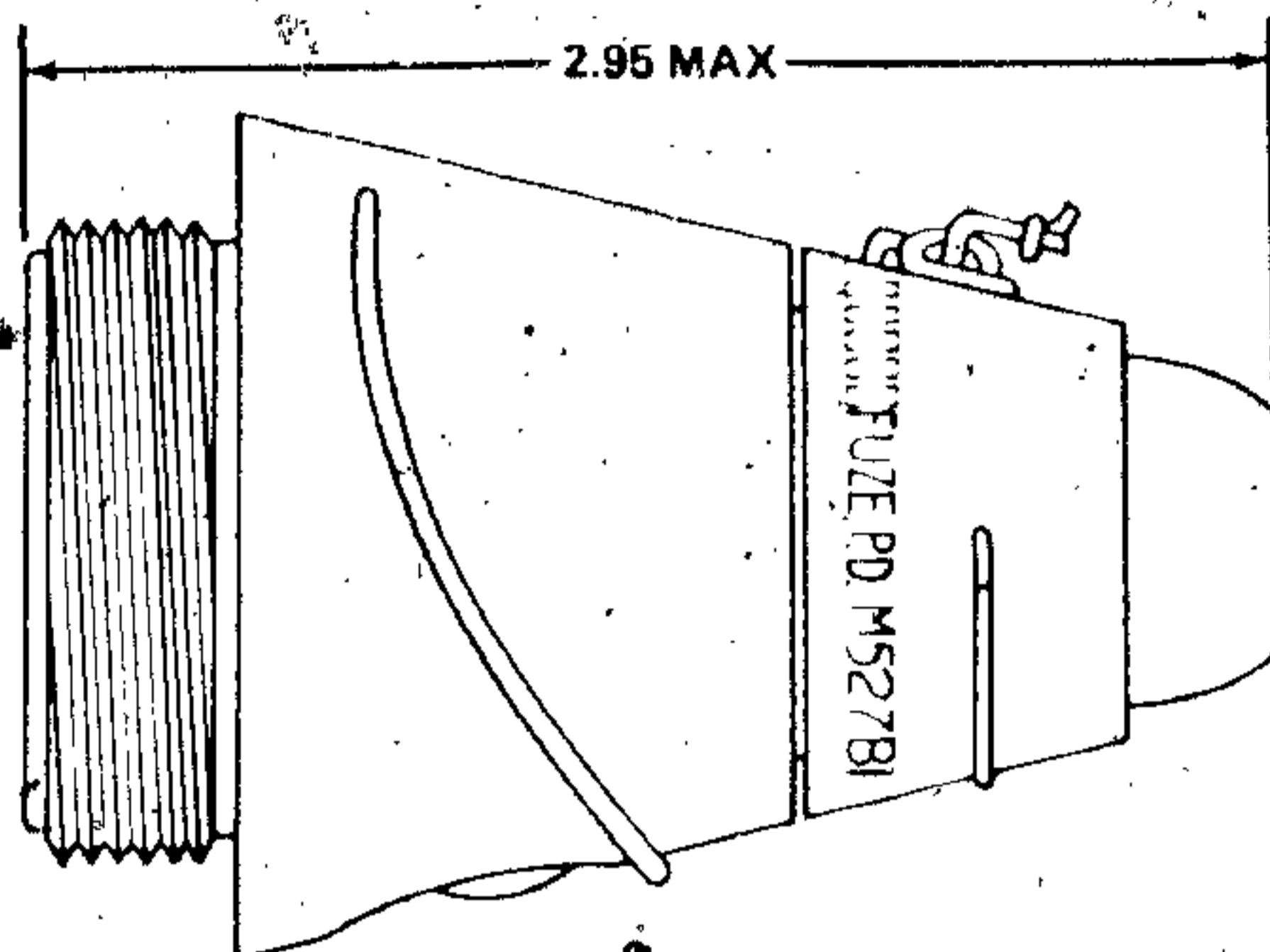
Limitations:

1. Do not fire in the immediate vicinity of any object which might deflect, obstruct, or damage the cartridge.
2. M526A1 is authorized for training only.

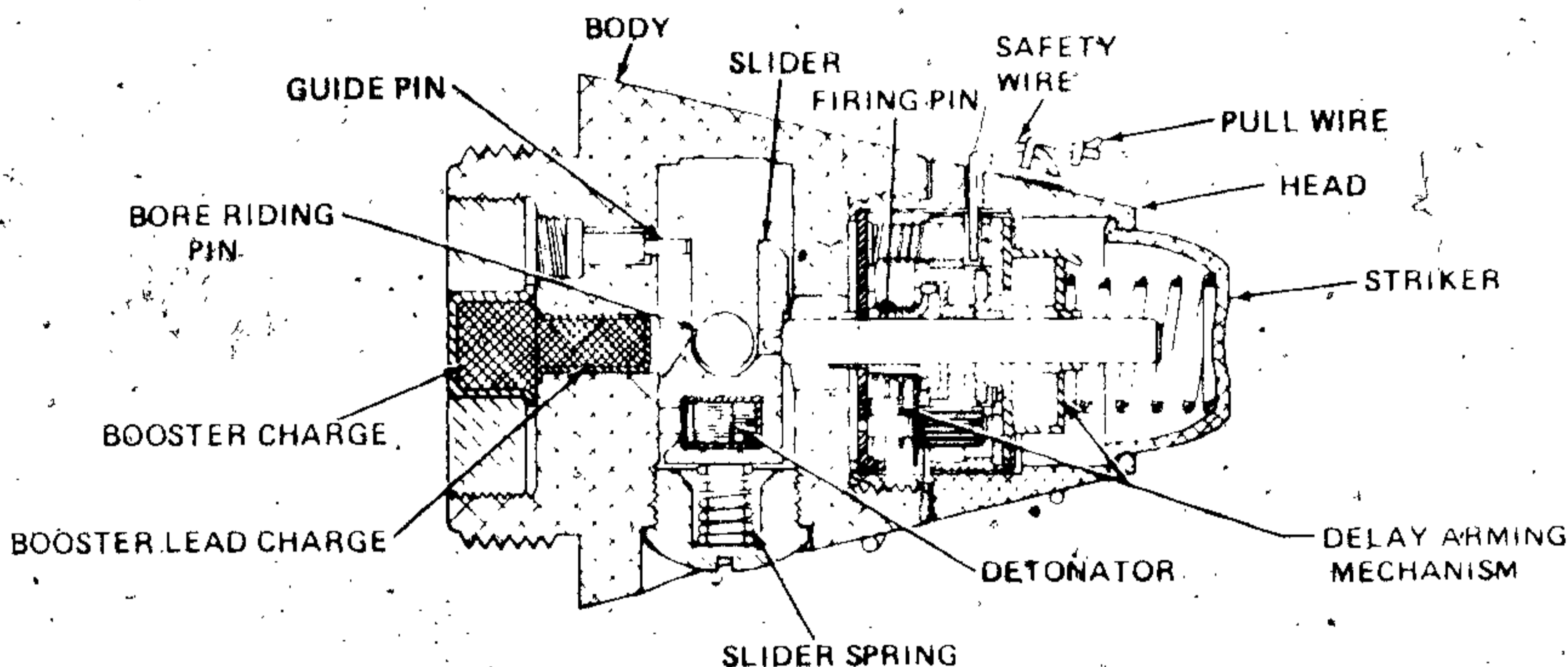
References:

TM 9-1015-200-12
TM 9-3071-1

FUZE, POINT DETONATING: M527 SERIES



AR199975



AR199974

Type Classification:

Std C AMCTC 3403 dtd 1965

Use:

Point Detonating M527 series fuzes are of the superquick, delayed arming type for use with 60-mm mortar WP Smoke cartridges.

Description:

The heads of these fuzes contain a spring-loaded striker, direct-acting firing pin, and a clockwork mechanism to delay arming to a safe distance from the muzzle of the mortar. The head is threaded into a body of plastic or aluminum (see Difference Among Models). The body contains a cylindrical slider to position

the detonator, a booster lead charge, and a small tetryl booster charge carried in an intrusion within the base of the fuze. Positive safety for shipment and handling is provided by a safety wire and pull wire.

Functioning:

After removal of the pull wire and safety wire, setback from weapon firing causes the setback pin to release a bore-riding pin. The bore-riding pin then contacts the bore of the mortar and is ejected as the projectile leaves the muzzle. Setback also releases a pallet and escape pinion wheel to begin movement of the delayed arming mechanism. This movement withdraws the firing pin from a detent in the slider. The slider is then moved transversely in the fuze body by a compression spring, to

align the detonator with the firing pin. Arming occurs approximately 3 seconds after the round has left the muzzle. Upon impact, superquick action occurs from detonator through lead charge and booster charge to Burster M19 in the projectile.

Differences Among Models:

M527 and M527A1 have plastic bodies. M527B1 and M527A1B1 have aluminum bodies. Nose design, and safety and pull wire also differ.

Tabulated Data:

Type -----	PD
Weight -----	0.24 lb.
Length:	
Visible -----	2.65 in.
Overall -----	2.95 in.
Thread size -----	1-1/2-12NF-1
Assembly Dwg. No. ----	8800461

Temperature Limits:

Refer to complete round for upper and lower limits:

Packing:

Refer to complete round. See SC for complete packing data including NSN's.

Explosive Components:

Detonator, tetryl booster lead charge, and tetryl booster charge.

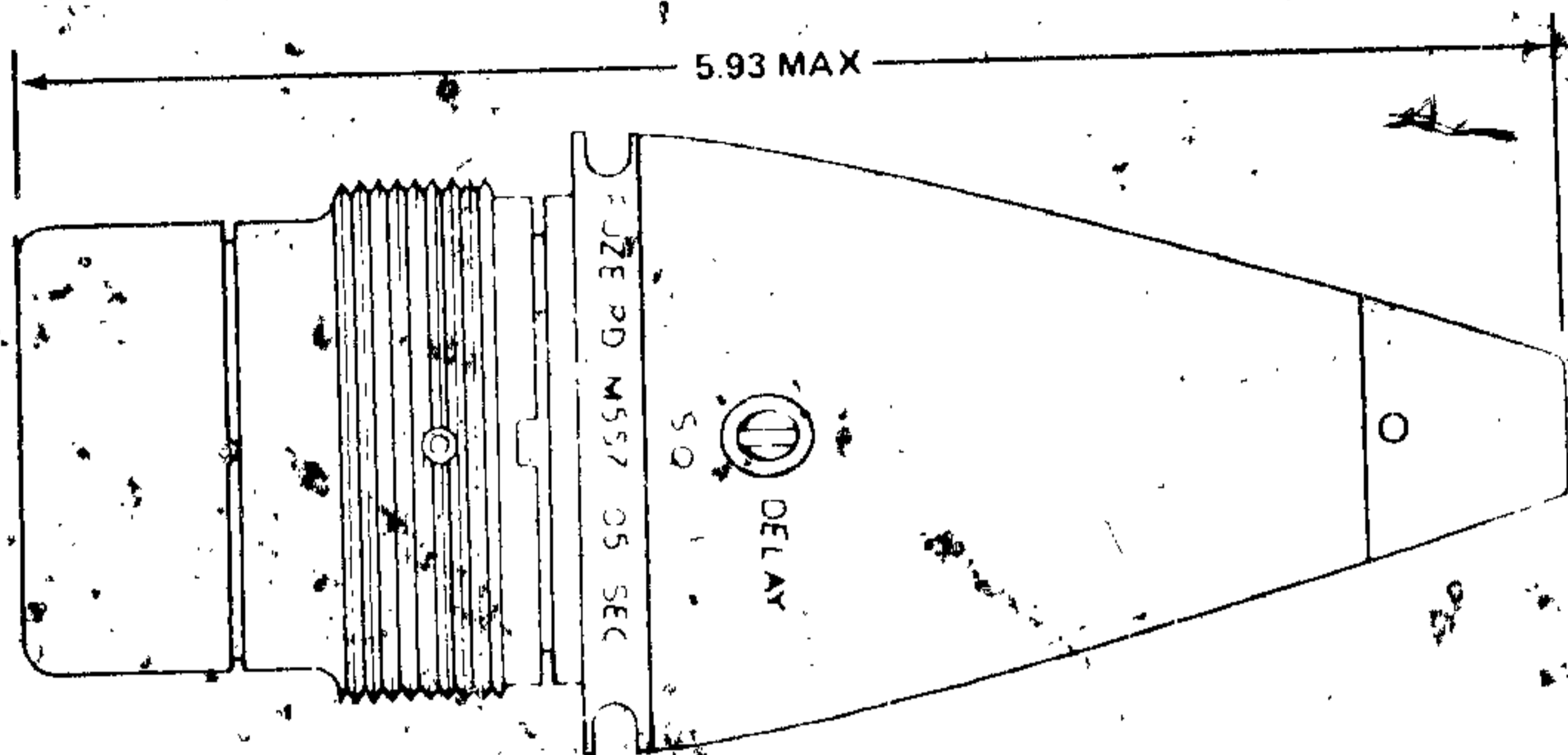
Limitations:

Cartridges utilizing these fuzes will not be fired in the vicinity of any object which might deflect, obstruct, or damage the projectile.

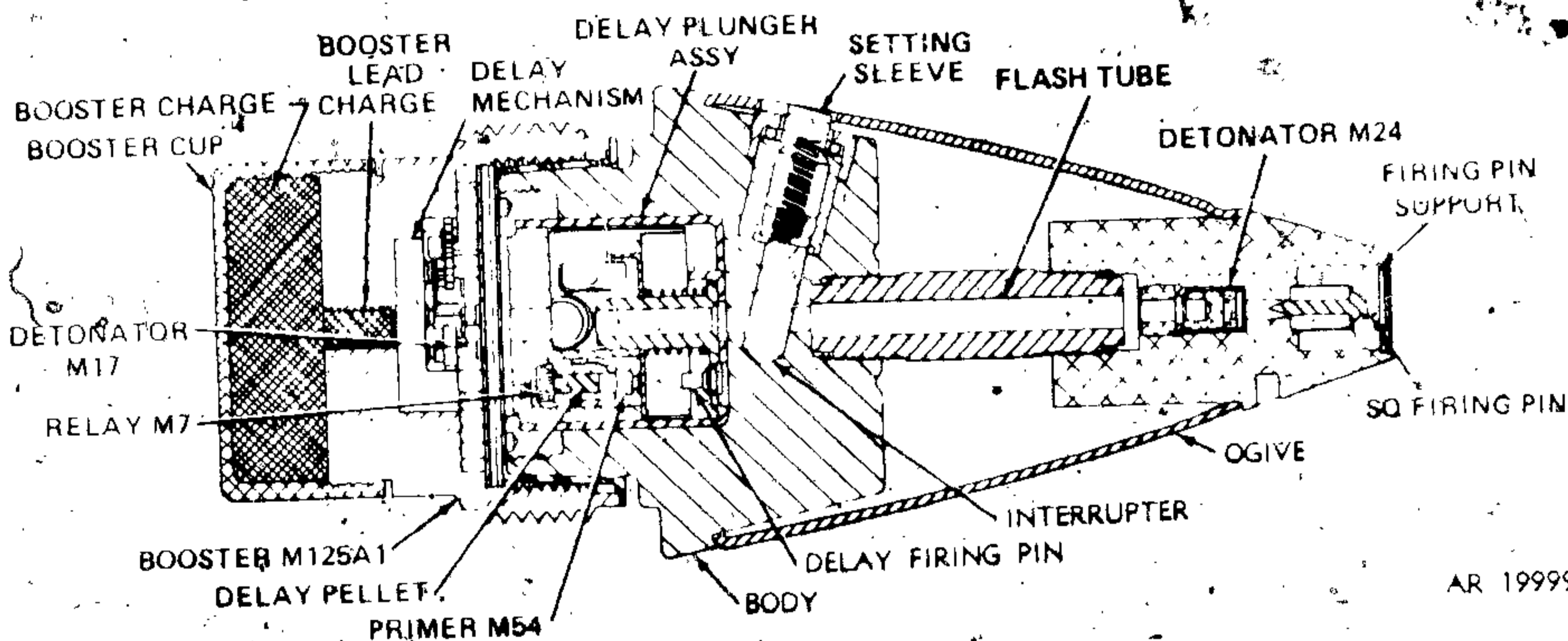
References:

- TM 9-1015-215-12
- TM 9-1300-251-20

FUZE, POINT DETONATING: M557



AR19999E



AR 199994

Type Classification:

Std AMCTC 5726 dtd 1967.

Use:

Point Detonating Fuze M557 is a selective superquick or 0.05 second delay impact fuze designed for use in ammunition for guns of 75-mm through 155-mm, for rifles of 75-mm and 105-mm, for howitzers of 75-mm through 8-inch, and for 4.2-inch mortars.

Description:

The M557 fuze consists of Fuze M48A3 assembled with the M125A1 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 M125A1 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 grains tetryl booster pellet is threaded to the booster body. The M125A1 booster internal configuration is that of an eccentric rotor containing an M17 detonator held in an unarmed (out of line) position by centrifugal detents and a gear train mechanism which provides for delayed arming of the booster assembly for approximately 200 ft. depending upon the weapon and charge being fired.

Functioning:

Upon firing, centrifugal force is utilized to arm the fuze. Centrifugal force retracts the detents holding the rotor in the unarmed position allowing it to turn against the gear train mechanism which controls the turning speed of the rotor until the rotor is in the armed position. Once in the armed position the rotor is locked in position by a spring loaded pin and the rotor M17 detonator is aligned 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 of 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. The delay mechanism of the booster provides an arming distance of approximately 200 feet, depending upon the weapon employed.

Tabulated Data:

Type----- PD
 Weight----- 2.15 lbs.
 Length
 Overall----- 5.93 in.
 Visible----- 3.72 in.
 Assembly Dwg. No.----- 8863535

Temperature Limits:

Firing
 Lower limit----- - 65° F
 Upper limit----- + 160° F

Storage:

Lower limit----- - 80° F (for not more than 3 days)
 Upper limit----- + 160° F (for not more than 4 hrs. /day)

* Packing ----- 8 fuzes in metal container; 2 containers in wooden box

* Packing Box:

Weight ----- 55.8 lbs.
 Dimensions ----- 14-5/8 x 12-13/16 x 9-1/8 in
 Cube ----- 1.04 cu. ft.

* NOTE: See SC for complete packing data, including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 7
 Storage compatibility group ----- B
 DOT shipping class ----- A
 DOT designation ----- DETONATING FUZES-CLASS A EXPLOSIVES

DODAC ----- 1390-N335

Explosive Components:

SQ Action ----- Detonator M24, Detonator M17, tetryl booster lead charge, and tetryl booster charge.

Delay Action----- Delay Plunger Assembly M1 (M54 primer, black powder delay charge, and Relay M7), Detonator M17, tetryl booster lead charge, and tetryl booster charge.

Limitations:

Premature functioning can occur when fuzes are fired in heavy rainfall. Duds may occur when set for delay in low zones of fire (155-mm and 8-inch Zones 1 and 2). When set SQ normal functioning can be expected. To prevent duds

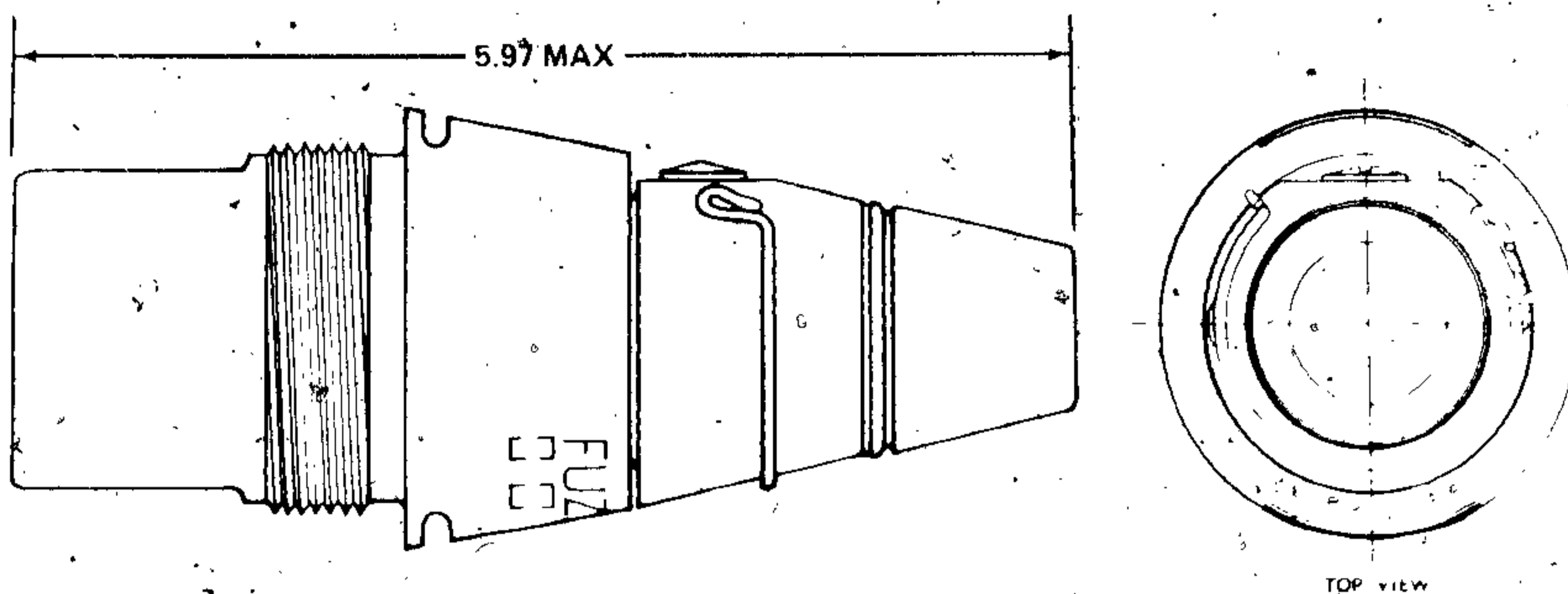
in 4.2-inch cartridges, fire zones (increments) should not be fewer than seven.

References:

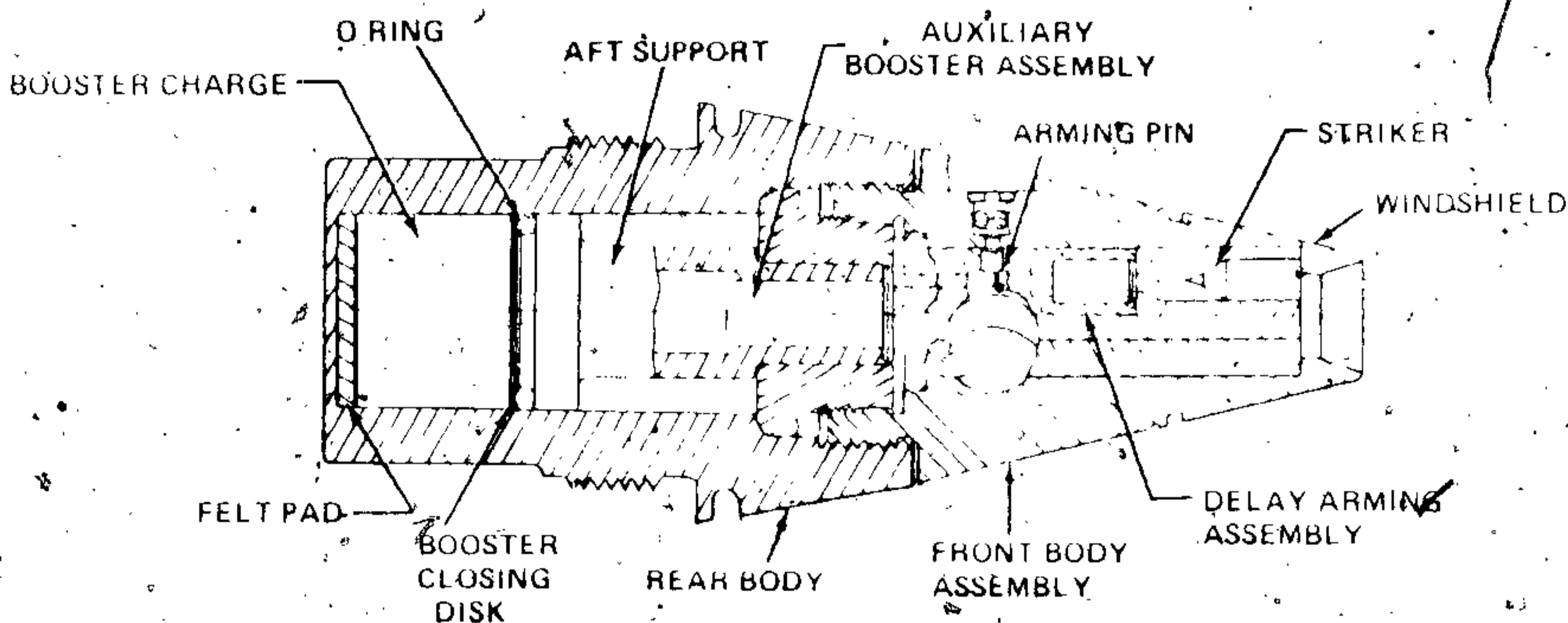
TM 9-1300-251-20
SC 1340/95-IL
SB 700-20
TM 9-1015-203-12
TM 9-1015-234-12
TM 9-1025-200-12
TM 9-2300-216-10
TM 9-2300-217-10
TM 9-2300-217-10N

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FUZE, POINT DETONATING: M567



AR199973



AR199972

Type Classification:

Std AMCTC 8748 dtd 1971.

Use:

Point Detonating Fuze M567 is a selective, superquick or 0.05 delay action, impact type for use with HE or smoke 81-mm mortar cartridges.

Description:

The front body assembly contains an arming mechanism and a firing mechanism which include two spring-loaded setback pins, a slider with inner and outer compression springs (not shown in illustration), an arming pin, and two balls which restrain the superquick firing pin

and the pyrotechnic delayed arming, striker sequence. The explosive train consists of a delay detonator and a superquick detonator housed 90° apart in the cylindrical slider, a lead assembly, an auxiliary booster assembly, and a booster charge.

Functioning:

Fuze, as issued, is set to superquick; for delay action, the selector must be adjusted. Removal of the pull wire permits arming pin to move rearward upon action by the delay arming mechanism. Setback forces upon weapon firing cause rearward motion of the setback pins to allow the balls to recede and the striker to move rearward. This initiates the primer in the pyrotechnic delay arming assembly. Slider springs move the slider assembly axially to

Align the detonator with the firing pin thus arming the fuze. Upon impact, detonation occurs and initiates the explosive train.

Tabulated Data:

Type ----- PD
 Weight ----- 1.3 lbs.
 Length:
 Visible ----- 3.77 in.
 Overall ----- 5.97 in.
 Thread size ----- 2.00-12UNS-1A
 Assembly Dwg. No. ----- 9246242

Temperature Limits:

Firing:
 Lower limit ----- -65°F
 Upper limit ----- +165°F
 Storage:
 Lower limit ----- -65°F
 Upper limit ----- +165°F

*Packing ----- 8 fuzes in metal box, 2 boxes in wirebound box
 *Packing Box:
 Weight ----- 42.1 lbs.
 Dimensions ----- 14-7/8 x 13 x 9-1/4 in.
 Cube ----- 1.04 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class - 7
 Storage compatibility -- B group
 DOT shipping class ---- A
 DOT designation ---- DETONATING FUZES, CLASS A EXPLOSIVES

DODAC ----- 1390-N334

Explosive Components:

Detonator, tetryl booster lead charge, tetryl booster charge, primer, black powder delay charge, and relay.

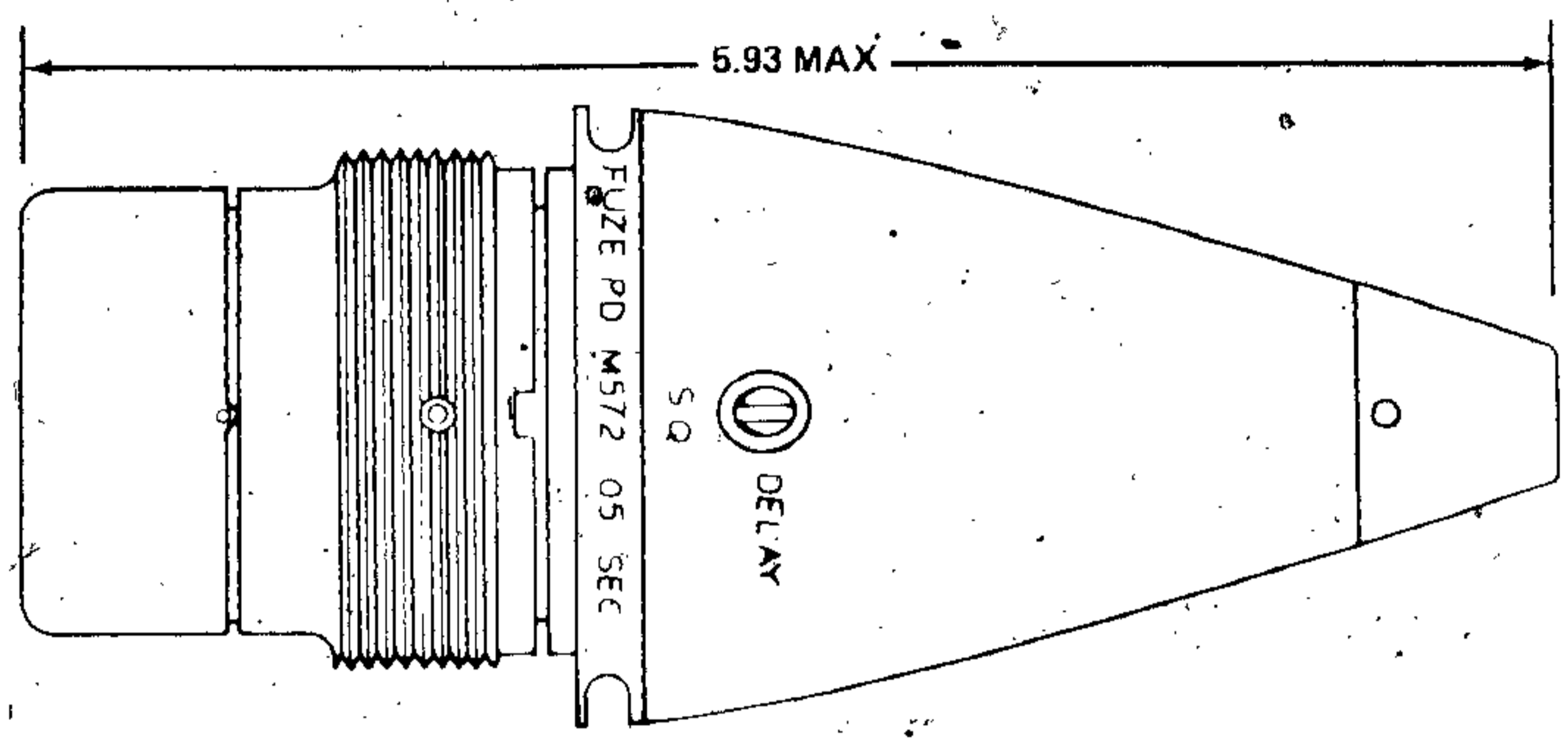
Limitations:

None

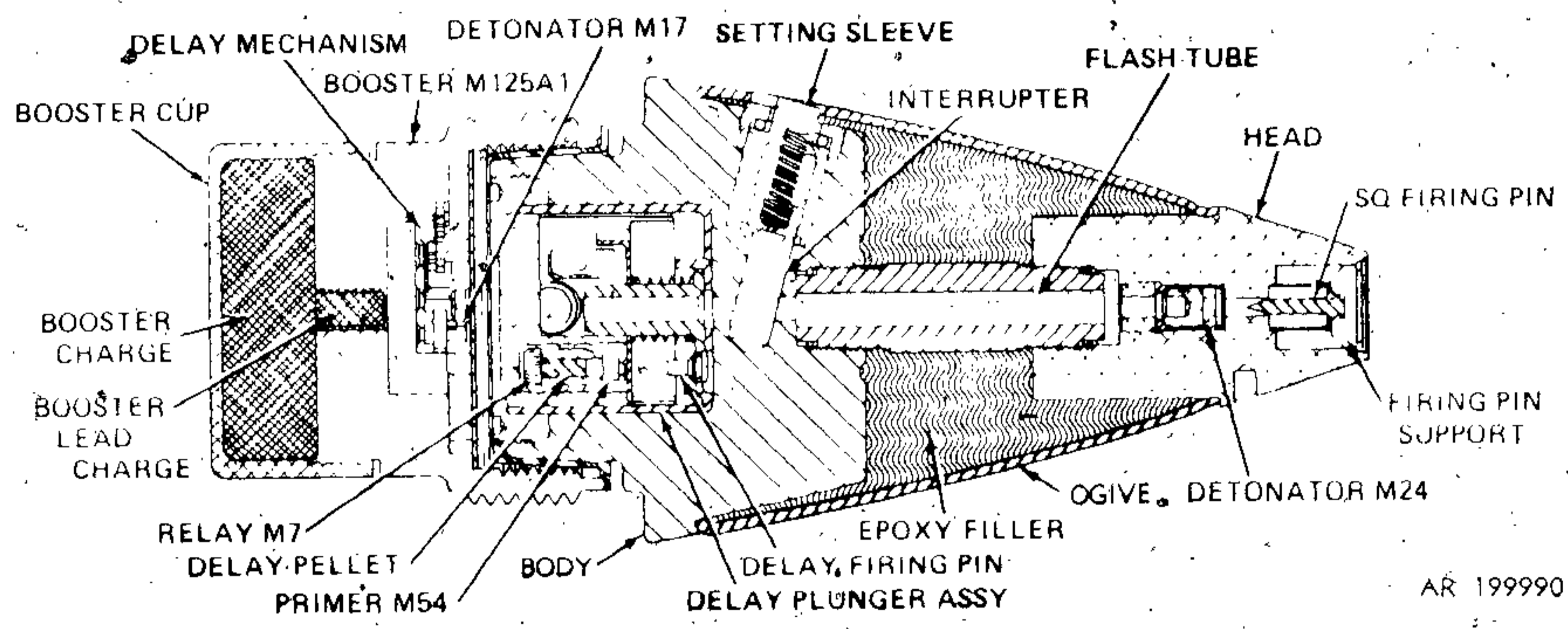
References:

TM 9-1015-200-12
 SC 1340/98-IL
 TM 9-1300-251-20

FUZE, POINT DETONATING: M572



AR199991



AR 199990

Type Classification:

Std AMCTC 3326 dtd 1965.

Use:

Point Detonating Fuze M572 is intended for use only with 175-mm, HE projectiles at all charges, and is designed to withstand structurally the acceleration forces involved.

Description:

The fuze is similar to, but structurally superior to Fuze M557. Fuze M572 consists essentially of Fuze M48A3 modified with an epoxy filler in the ogive cavity for reinforcement, and assembled with Booster M125A1 as an integral component. A superquick element

in the head consists of a firing pin, firing pin support and Detonator M24. The body of the fuze is epoxy filled within the thin-walled ogive. The fuze body contains a delay plunger assembly, and a selective setting device for superquick or delay action. The delay plunger assembly includes a firing pin and Delay Element M2, consisting of primer M54, black powder delay charge, and Relay M7. The M125A1 booster consists of a brass booster body having external threads to fit projectiles having 2-inch diameter, 12 threads per inch cavities, and internal threads to receive fuzes having 1.7-inch diameter, 14 threads per inch. An aluminum booster cup containing a 340-grains tetryl booster pellet is threaded to the booster body. The M125A1 booster internal configuration is that of an eccentric rotor containing an M17 detonator held in an unarmed

(out of line) position by centrifugal detents and a gear train mechanism which provides for delayed arming of the booster assembly until the projectile is approximately 200 feet from the muzzle, depending upon the weapon and charge being fired.

Functioning:

No action occurs until after the projectile has left the muzzle of the gun, when centrifugal force releases the flash tube interrupter, thus opening the flash tube. At the same time, the delay plunger is armed in preparation for impact by withdrawal of the plunger pins, also by centrifugal force. The delay mechanism of the booster provides an arming distance of 200 feet. Upon impact, the superquick firing pin is driven against Detonator M24, exploding the projectile. Should the superquick element fail, the delay train will still function, thus avoiding a dud. When the fuze has been preset for delay, the superquick element will still function but will have no effect because the interrupter blocks the flash tube. Projectile detonation will occur through Delay Element M2.

Tabulated Data:

Type ----- PD
 Weight ----- 2.3 lbs.
 Length:
 Visible ----- 3.72 in.
 Overall ----- 5.93 in.
 Assembly Dwg. No. ----- 8880696

Temperature Limits:

Firing:
 Lower limit ----- - 65°F
 Upper limit ----- + 160°F
 Storage:
 Lower limit ----- + 80°F (for not more than 3 days)
 Upper limit ----- + 160°F (for not more than 4 hrs./day)

* Packing ----- 8 fuzes in metal container; 2 containers in wooden box

* Packing Box:

Weight ----- 55.8 lbs.
 Dimensions ----- 14-5/8 x 12-13/16 x 9-1/8 in.
 Cube ----- 1.04 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 7
 Storage compatibility group ----- B
 DOT shipping class ----- A
 DOT designation ----- DETONATING FUZES-CLASS A EXPLOSIVES

DODAC ----- 1390-N311

Explosive Components:

SQ Action ----- Detonator M24, Detonator M17, tetryl booster lead charge, and tetryl booster charge.
 Delay Action ----- Delay Plunger Assembly M1 (M54 primer, black powder delay charge, and Relay M7), Detonator M17, tetryl booster lead charge, and tetryl booster charge.

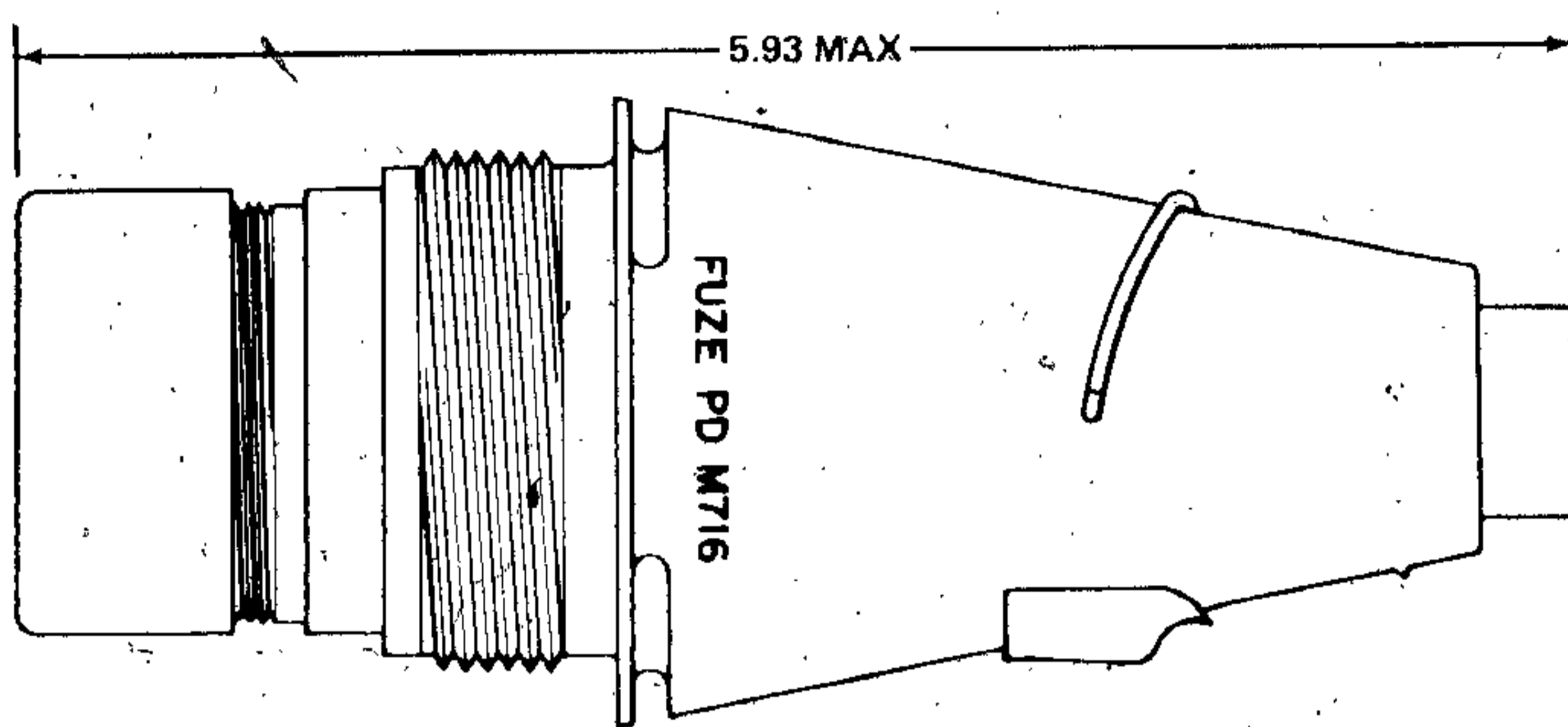
Limitations:

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

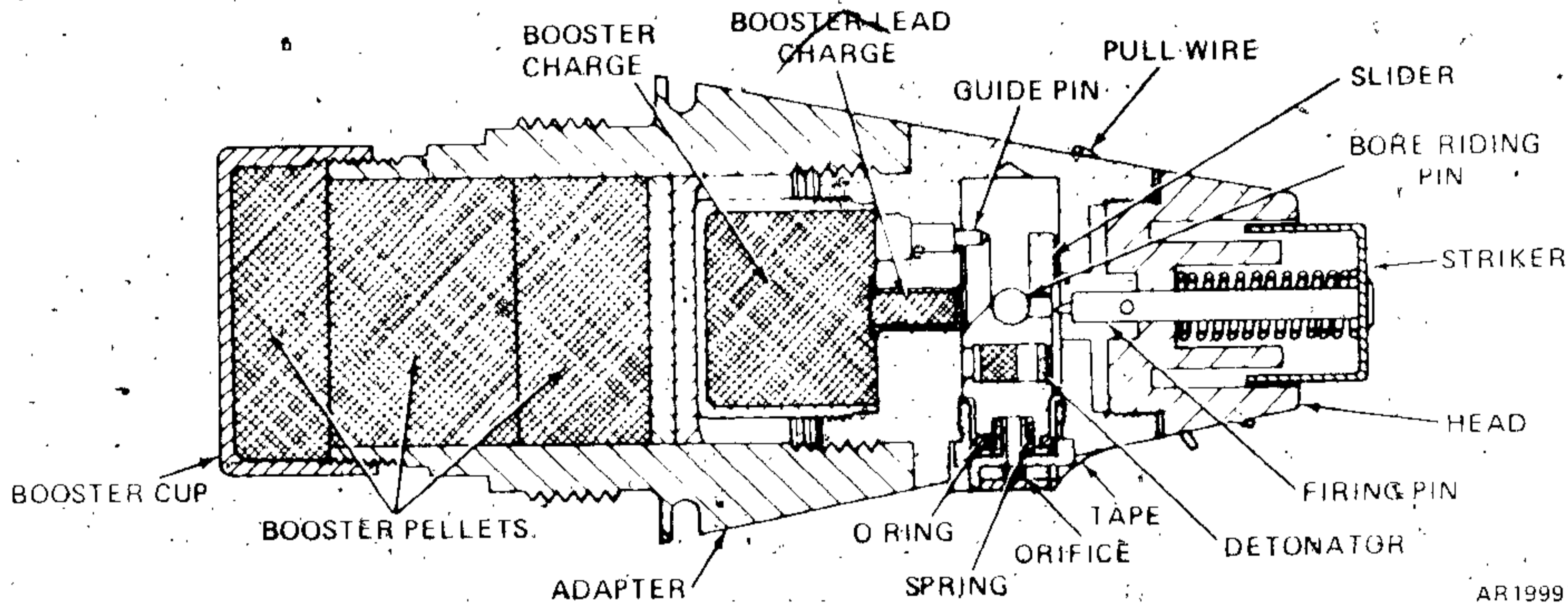
References:

TM 9-1300-251-20
 TM 9-2300-216-10
 SC 1340/98-IL
 SB 700-20

FUZE, POINT DETONATING; M716



AR199971



Type Classification:

Std AMCTC 7874 dtd 1970.

Use:

Point Detonating Fuze M716 (XM716) is a superquick, delay arming impact fuze used with 81-mm mortar cartridges HE, and WP Smoke.

Description:

The aluminum fuze head contains a spring-loaded striker and firing pin. A spring-loaded cylindrical slider, mounted transversely in the aluminum fuze body, contains the detonator and is equipped with an O-ring pressure seal. In-bore safety is provided by a spring-loaded bore

riding pin which locks the slider. A pull wire restrains the setback pin (not shown in illustration) which locks the bore riding pin. Tape and a plastic disk protect the metering orifices. The fuze base contains a booster lead charge, and a booster charge. An adapter assembly with two tetryl booster pellets and a cup with one pellet are threaded to the base.

Functioning:

Setback force from weapon firing forces the setback pin rearward against the pin spring and releases the bore-riding pin. The bore-riding pin then contacts the bore of the mortar and is ejected when the cartridge leaves the muzzle. Ejection of the bore-riding pin unlocks the slider. The slider is moved by a compression

TM43-0001-28

spring, and because of the O-ring seal, a vacuum is created behind the slider. The vacuum is relieved gradually by the bleed air orifice. The metered pressure relief through the orifice provides 1.5 to 6 seconds delay before the slider completes the movement necessary to align the detonator with the firing pin, and arm the fuze. On impact, the striker and firing pin are depressed, and inertia throws the slider with detonator forward into the firing pin. Detonation is on superquick action through the booster lead charge and tetryl booster charge.

Labeled Data:

Type ----- PD
Weight ----- 1.25 lbs.
Length:
Visible ----- 3.72 in.
Overall ----- 5.93 in.
Thread size ----- 2.0 in. - 12UNS-1A
Assembly Dwg., Nos. ----- 9220859
P-9220860

Temperature Limits:

Firing:
Lower limit ----- 0°F
Upper limit ----- +145°F
Storage:
Lower limit ----- -80°F (for not more than 3 days)
Upper limit ----- +160 °F (for not more than 4 hrs/day)

*Packing----- 1 fuze in metal container; 2 containers in wirebound box.

*Packing Box:

Weight ----- 17.4 lbs
Dimensions ----- 14-5/8 x 12-13/16 x 9-1/8 in.
Cube ----- 2.07 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class - 7
Storage compatibility --- B group
DOT shipping class ----- A
DOT designation --- DETONATING FUZES-CLASS A EXPLOSIVES

DODAC ----- 1390-N310

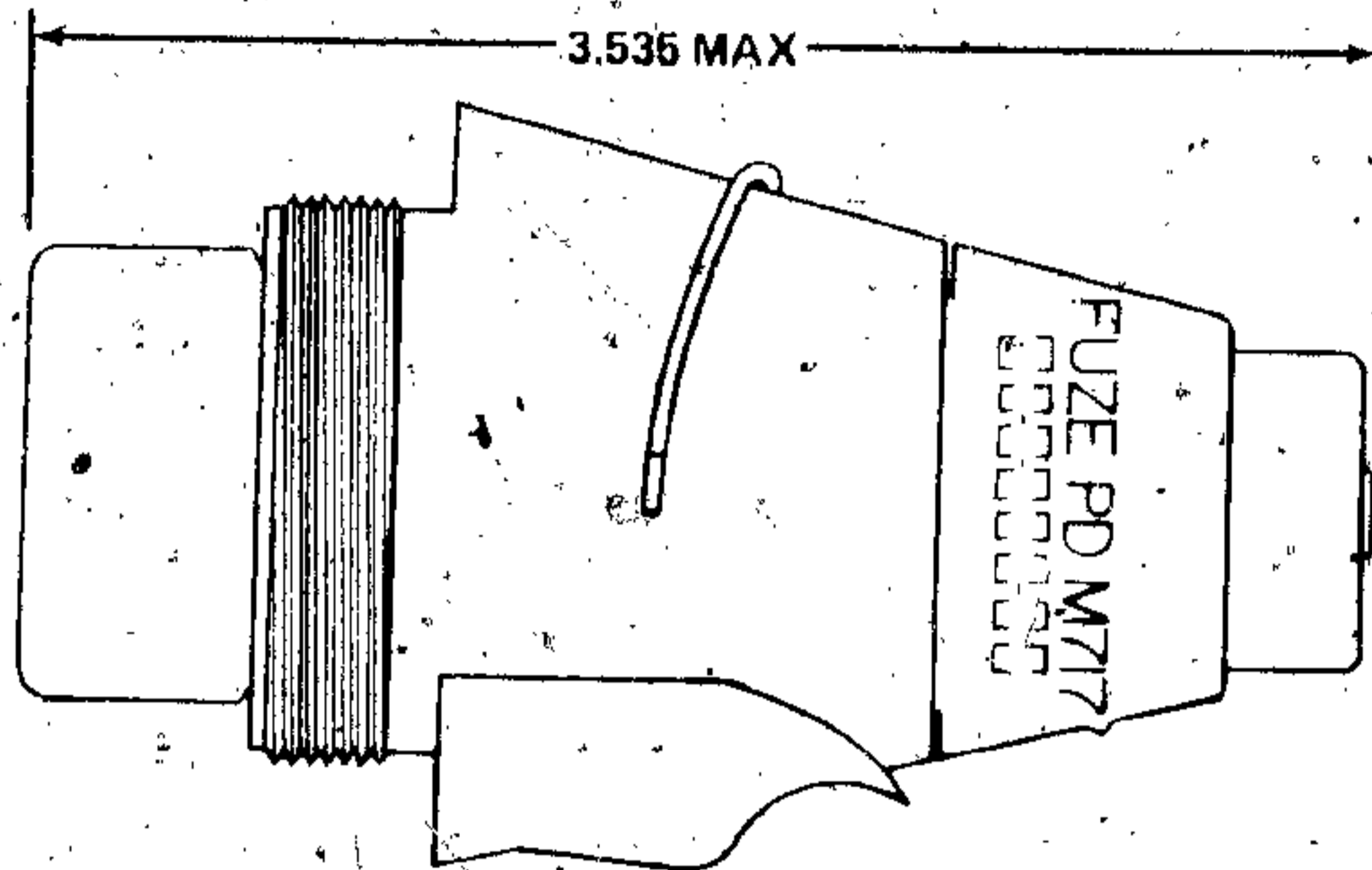
Explosive Component:

Detonator, tetryl booster lead charge, and tetryl booster charge

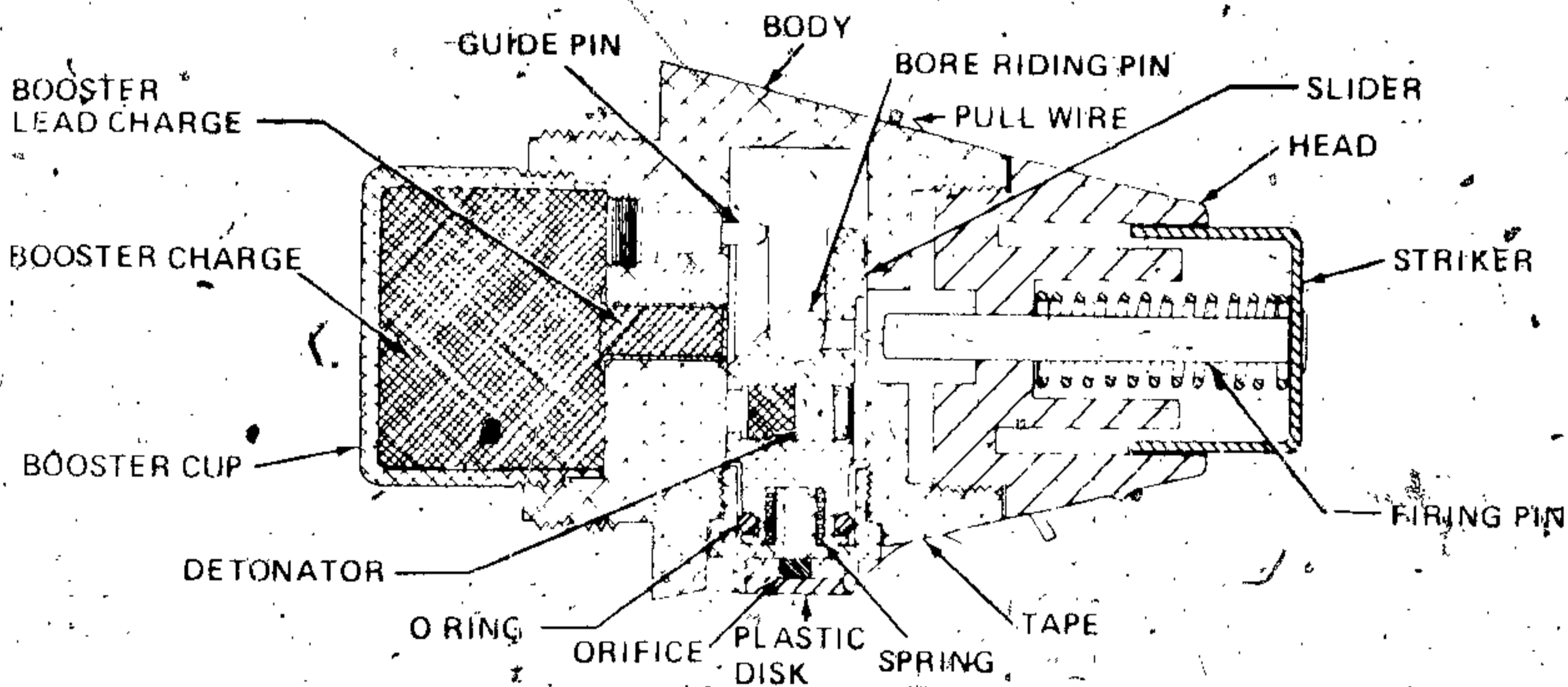
References:

TM 9-1015-200-12
TM 9-1300-251-20
SC 1340/98-IL

FUZE, POINT DETONATING: M717



AR199969



AR199968

Type Classification:

Std - USMC use - AMCTC 7198 dtd 1969.

Use:

Point Detonating Fuze M717 is a superquick, delayed arming impact fuze used with 60-mm mortar HE cartridges.

Description:

The aluminum fuze head contains a spring-loaded striker and firing pin. A spring-loaded cylindrical slider, mounted transversely in the aluminum fuze body, contains the detonator and is equipped with an O-ring pressure-seal. In-bore safety is provided by a spring-loaded bore-riding pin which locks the slider. A pull wire

restrains the setback pin (not shown in illustration) which locks the bore-riding pin. (Tape and a plastic disk protect the metering orifice. The fuze base contains a tetryl booster lead charge. A cup containing a tetryl booster pellet is threaded to the base.

Functioning:

Setback force from weapon firing forces the setback pin rearward against the pin spring and releases the bore-riding pin. The bore-riding pin then contacts the bore of the mortar and is ejected when the cartridge leaves the muzzle. Ejection of the bore-riding pin unlocks the slider. The slider is moved by a compression spring, and because of the O-ring seal, a vacuum is created behind the slider. The vacuum

is relieved gradually by the bleed air orifice. The metered pressure relief through the orifice provides 1.5 to 6 seconds delay before the slider completes the movement necessary to align the detonator with the firing pin and arm the fuze. On impact, the striker and firing pin are depressed, and inertia throws the slider with detonator forward into the firing pin. Detonation is on superquick action through the booster lead charge and tetryl booster charge.

Tabulated Data:

Type ----- PD
 Weight ----- 0.25 lb.
 Length:
 Visible ----- 2.415 in.
 Overall ----- 3.535 in.
 Thread size ----- 1.5 in. 12NF-1
 Assembly Dwg. No. ----- P-9220860

Temperature Limits:

Firing:
 Lower limit ----- 0°F
 Upper limit ----- +145°F
 Storage:
 Lower limit ----- -80°F (for not more than 3 days)
 Upper limit ----- +160°F (for not more than 4 hrs/day)

*Packing ----- 16 fuzes in fiber-board container;
 6 containers in wooden box

*Packing Box:

Weight ----- 70 lbs.
 Dimensions ----- 22-1/2 x 15-3/8 x 12-3/8 in.
 Cube ----- 2.5 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class - 7
 Storage compatibility --- B group
 DOT shipping class ---- A
 DOT designation ---- DETONATING FUZES - CLASS C EXPLOSIVES

DODAC ----- 1390-N314

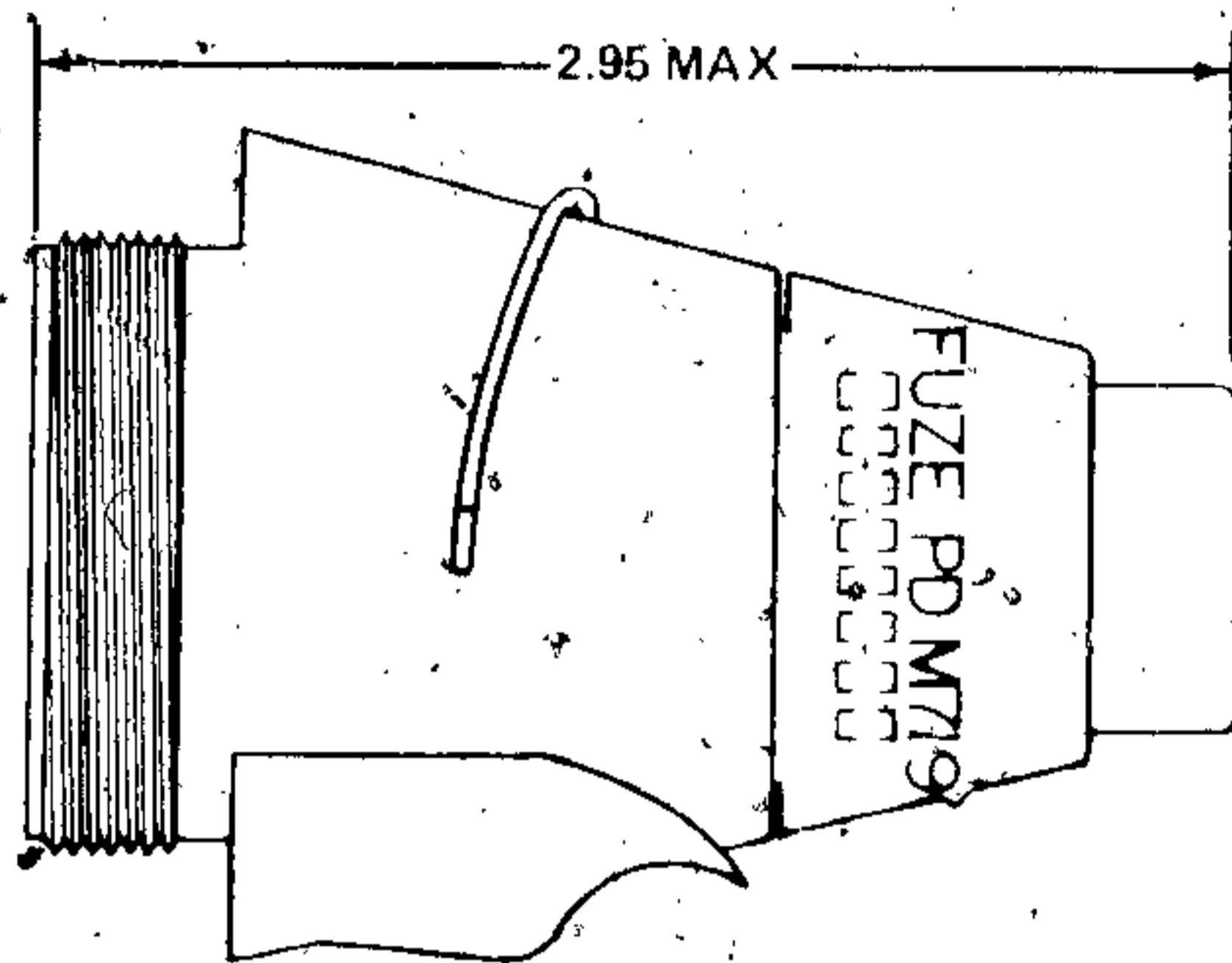
Explosive Components:

Detonator, tetryl booster lead charge, and tetryl booster charge.

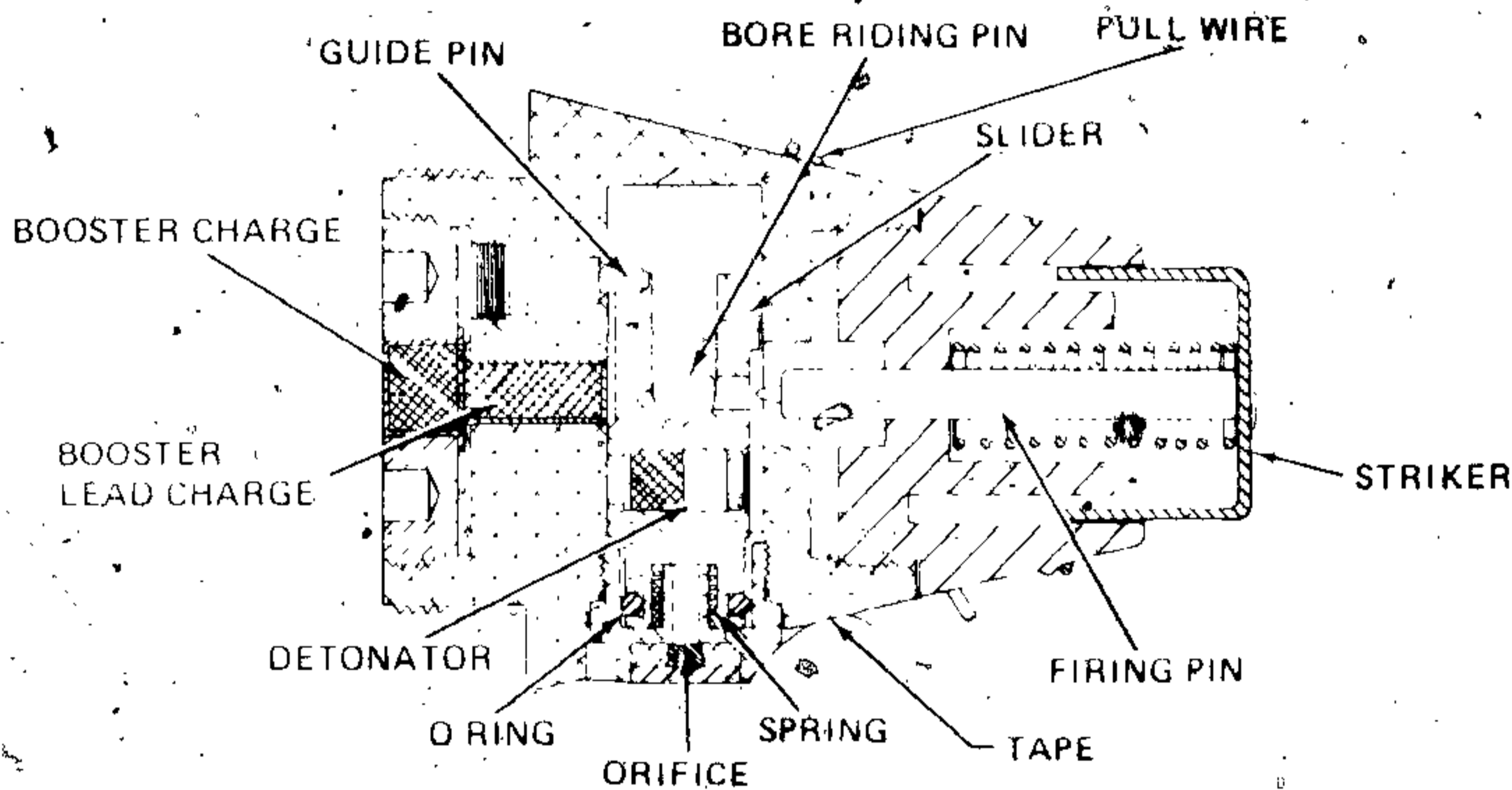
References:

TM 9-1015-215-12
 TM 9-1300-251-20
 SC 1340/98-IL

FUZE, POINT DETONATING: XM719



AR199967



AR199966

Type Classification:

Development

Use:

Point Detonating Fuze XM719 is a super-quick delayed arming impact fuze, used with 60-mm mortar WP Smoke cartridges.

Description:

The aluminum fuze head contains a spring-loaded striker and firing pin. A spring-loaded cylindrical slider, mounted transversely in the aluminum fuze body, contains the detonator and is equipped with an O-ring pressure seal. In-bore safety is provided by a spring-loaded bore riding pin which locks the slider. A pull wire

restrains the setback pin (not shown in illustration) which locks the bore riding pin. Tape and a plastic disk protect the metering orifice. The fuze base contains a tetryl booster lead charge and a small tetryl booster charge.

Functioning:

Setback force from weapon firing forces the setback pin rearward against the pin spring and releases the bore-riding pin. The bore-riding pin then contacts the bore of the mortar and is ejected when the cartridge leaves the muzzle. Ejection of the bore-riding pin unlocks the slider. The slider is moved by a compression spring, and because of the O-ring seal, a vacuum is formed behind the slider. The vacuum is relieved gradually by the bleed air orifice. The metered pressure relief through

the orifice provides 1.5 to 6 seconds delay before the slider completes the movement necessary to align the detonator with the firing pin and arm the fuze. On impact, the striker and firing pin are depressed, and inertia throws the slider with detonator forward into the firing pin. Detonation is on superquick action through the booster lead charge and tetryl booster charge.

Tabulated Data:

Type -----	PD
Weight -----	0.25 lb.
Length:	
Visible -----	2.45 in.
Overall -----	2.95 in.
Thread size -----	1.5 in. -12NF-1
Assembly Dwg. No. ---	73-1-161

Temperature Limits:

Refer to complete round for upper and lower limits.

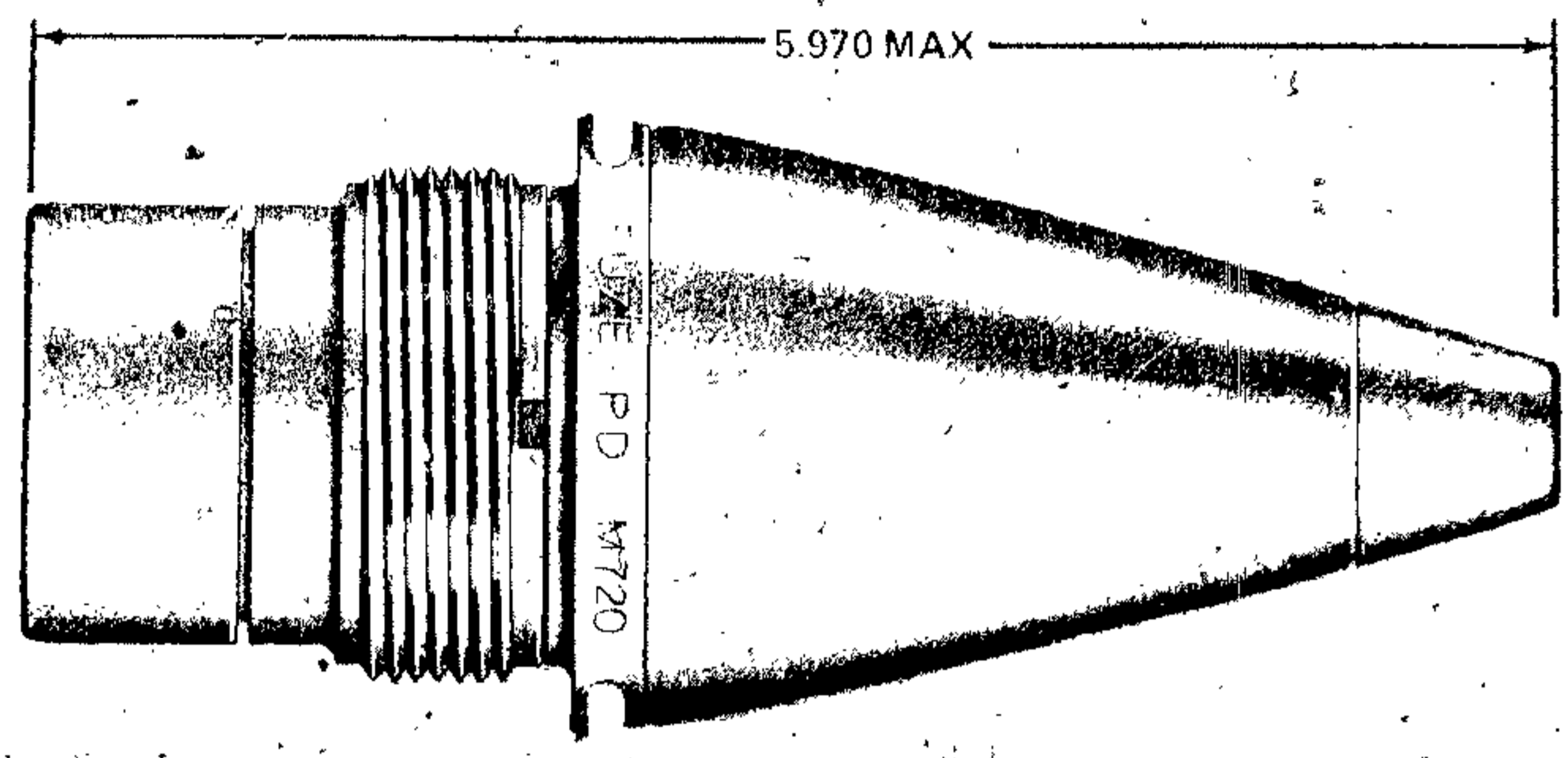
Explosive Components:

Detonator, tetryl booster lead charge, and tetryl booster charge.

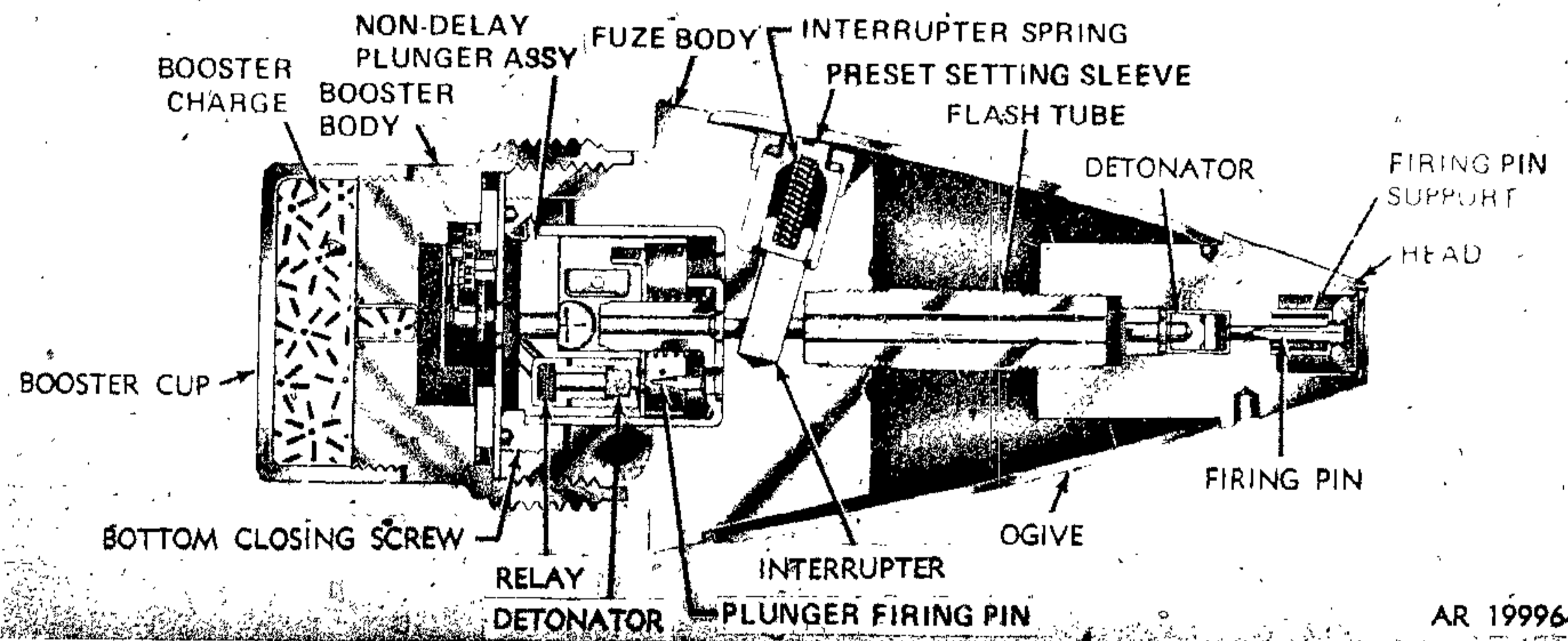
References:

TM 9-1015-215-12
 TM 9-1300-251-20
 SC 1340/98-IL

FUZE, POINT DETONATING, M720



AR199965



AR 199964

Type Classification:

C & I AMCTC 9193 dtd 1972

Use:

Point Detonating Fuze M720 is of the superquick type used with 152-mm gun Cartridge M657 and functions on impact or graze.

Description:

The fuze is essentially Fuze M557 modified to provide arming at closer than normal range and to assure superquick or non-delay detonation upon impact or graze. A superquick element in the head consists of a firing pin, firing

pin support, and Detonator M24. The body of the fuze is a thin-wall ogive containing non-delay inertial type Plunger Assembly M11. An optional delay setting is provided; the fuze as issued is preset on superquick. Booster M125A1 has been modified for use with fuze M720 to reduce the normal arming distance to not less than 25 feet. The booster has a brass body internally threaded to accept the fuze body and externally threaded to fit cartridge M657. A 340-grain trinitro toluene charge is contained by an annular cup welded onto the base of the booster. The fuze body contains Detonator M17 and a superquick mechanism to provide the delayed arming safety.

Functioning:

No action occurs until the projectile has left the muzzle of the gun, when the centrifugal force of rotation is high enough to move the interrupter outward and open the flash tube. At the same time, non-delay Plunger Assembly M1 is armed in preparation for impact by withdrawal of the plunger pins, also by centrifugal force. The rotation also starts movement of the rotor in the booster safety arming mechanism. The movement is so timed that Detonator M17 will be aligned with the flash holes when the projectile is not less than 25 feet from the muzzle. On impact, the superquick action will detonate the projectile. On graze, or in event of failure of the superquick element, detonation will be initiated by non-delay Plunger Assembly M1.

Tabulated Data:

Type -----	PD
Weight -----	2.10 lbs.
Length:	
Visible -----	3.79 in.
Overall -----	5.97 in.
Thread size -----	2-12NS-1
Assembly Dwg. No. ---	9229636

Temperature Limits:

Refer to complete round for upper and lower limits.

Explosive Components:

Detonator M24, Detonator M17, tetryl lead charge, tetryl booster charge, non-delay Element M1.

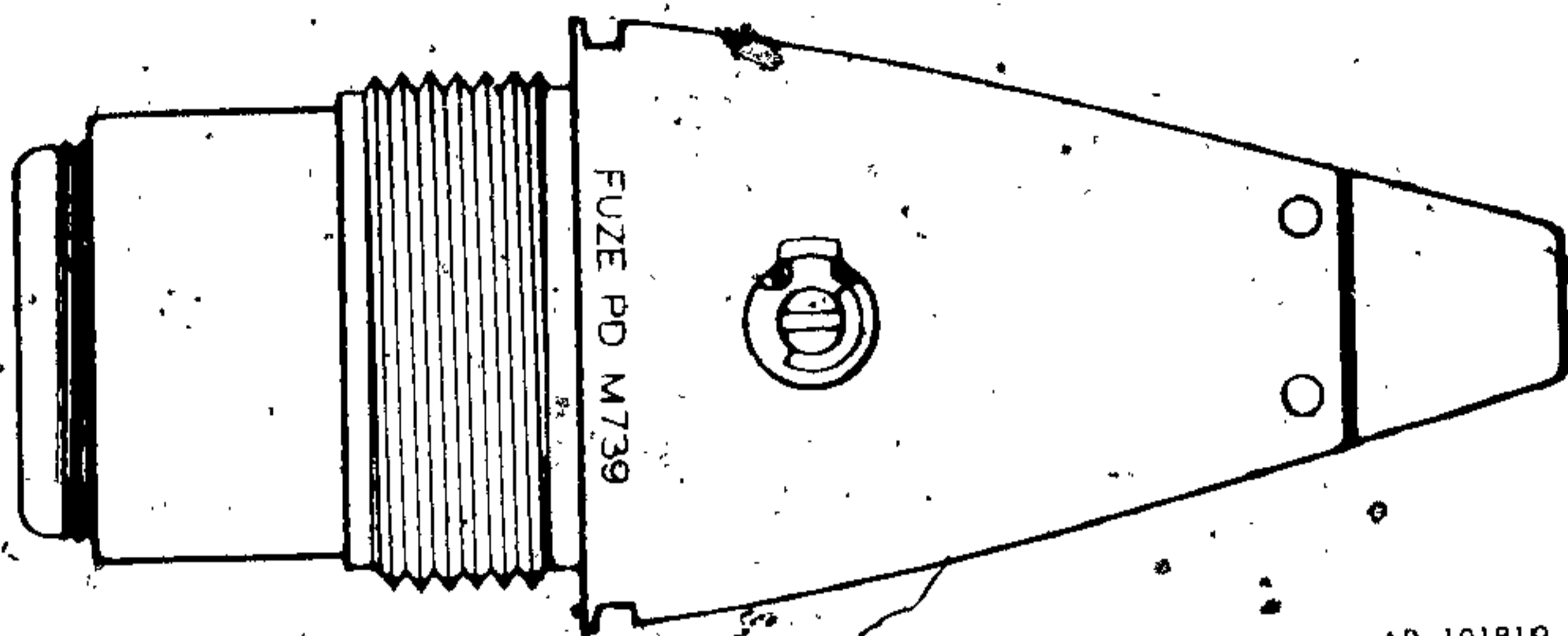
Limitations:

Premature functioning may occur if the fuzes are fired in extremely heavy rainfall.

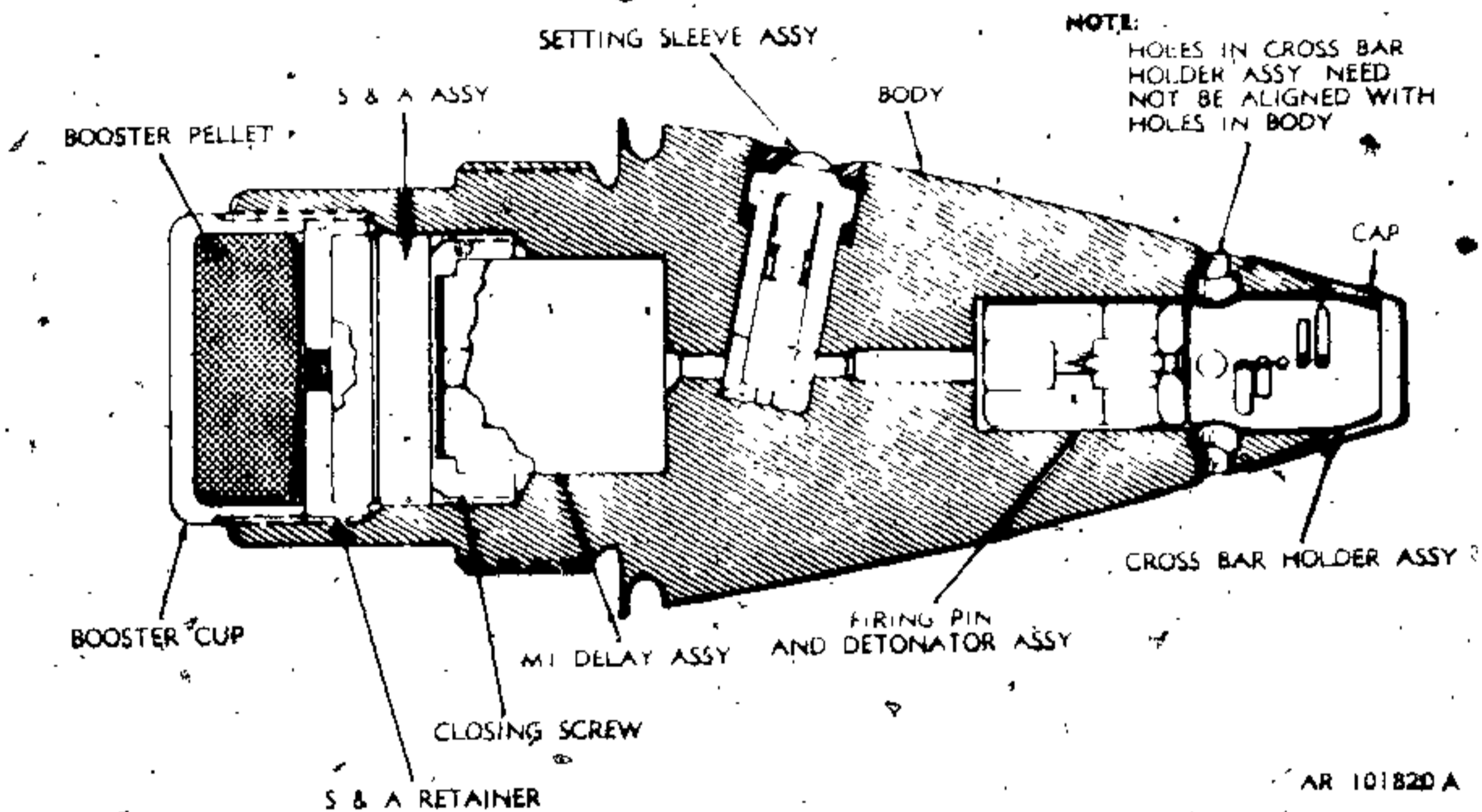
References:

- TM 9-1300-251-20
- TM 9-2350-230-10/2/1
- TM 9-2350-230-12

FUZE, POINT DETONATING; M739



AR 101819 A



AR 101820 A

Type Classification:

Std MSR 02756077 23 December 1974.

Use:

Fuze point detonating M739 is a selective PD (superquick) or 0.05 second delay impact fuze designed for use in all standard HE artillery, 4.2 inch Mortar, 105mm through 8 inch Howitzers and 155mm through 175mm Guns.

Description:

The M739 fuze is the latest improved version of the selective impact fuze. The fuze body is a one-piece design of solid aluminum and has a standard 2-inch threaded base to match projectile nose and fuze cavity. The M739 consists primarily of five (5) modular subassemblies:

- (1) crossbar and holder assembly, (2) firing pin and detonator assembly, (3) setting sleeve assembly, (4) M1 Delay Plunger, and (5) the safe and arming assembly.

The crossbar and holder assembly is a rain insensitive sleeve that allows firing in heavy rain with reduced probability of downrange premature functioning. The assembly is in the nose section of the fuze and consists of five (5) cross bars which break up raindrops and foliage and thus reduce fuze initiation sensitivity without affecting ground or target impact sensitivity.

The firing pin and detonator assembly is located below the rain insensitive sleeve and provides the superquick action on impact. The firing pin is held in position by a firing pin support which prevents initiation of the M99 Stab Detonator until impact.

The setting sleeve assembly (interrupter) is located in the side of the fuze body extending through the flash path of the M99 Detonator and thus provides selection of a PD mode which does not interrupt the flash from the detonator; or a delay mode which prevents the detonation flash from initiating the explosive train.

The M1 Delay Plunger is located in the rear portion of the fuze and provides a .050 second fuze initiation delay for target penetration when the setting sleeve is set "delay". When not set delay the M1 provides a back up and graze action function for the superquick setting.

The safety and arming (S & A) module is located below the Delay Plunger. It contains a rotor with a M55 detonator, an escapement to prevent the detonator from aligning into the explosive firing train until safe arming distance is achieved, both setback and spin locks to prevent accidental arming prior to firing, and an explosive lead. The explosive lead when initiated will detonate the booster pellet made of 22 grams of Comp A5 which is held by an aluminum booster cup assembled into the base of the fuze.

Functioning:

a. Condition as Issued.

(1) In the firing pin and detonator assembly, the firing pin is held over the SQ M99 detonator by a collapsible support. The setting sleeve assembly interrupter blocks the flashhole between detonator and S & A assembly.

(2) The S & A assembly is not armed: since the setback pin engages the rotor bottom, while the spinlock detents engage the side slots of the rotor. This keeps the detonator M55 out of axial alignment with the SQ and the delay flash, explosive element.

(3) The delay assembly M1 is not armed because the detents hold the plunger from moving forward to impact the firing pin held by the housing.

b. Prior to Firing:

(1) For delay action the setting sleeve must be turned clockwise so that the slot is

pointed toward "DELAY". This keeps the flash hole blocked regardless of the interrupter position. The setting sleeve may be returned counterclockwise to the "SQ" setting at will.

(2) For superquick (SQ) action, the selector normally requires only inspection to assure that the slot of the selector sleeve is pointed toward the "SQ" mark. A coin, screwdriver or tip of the fuze wrench M18 may be used to turn the slot to the desired setting.

c. Action Caused by Setback and Spin in Firing the Projectile.

(1) In the interrupter assembly, centrifugal force moves the interrupter outward. When the setting sleeve is set for "SQ" the interrupter unblocks the flashhole in its move outward.

(2) In the delay assembly M1, centrifugal force moves each detent outward and locks each detent in the outward position by means of the centrifugal plunger pin lock.

(3) In the S & A assembly, the setback pin is disengaged from the rotor and the spinlocks move outward under centrifugal force. The rotor is then free and carries the detonator M55 into alignment with the flash hole. This arming action is briefly delayed by a runaway escapement. The arming fuze distance for associated cannon and mortar systems are given in the tabulated data. The rotor is held in its aligned position by the rotor lock pin.

d. Action in Flight.

(1) The plunger restraining spring in the delay assembly M1 holds the plunger rearward.

(2) When fired in the rain, the crossbars, after erosion of the nose cap serve to break up raindrops and prevent functioning of the superquick firing detonator. Excess water is expelled through the holes in the cross bar holder assembly due to centrifugal force created by the spin of the round.

e. Action Upon Impact.

(1) When the projectile hits a soft impact surface, the material ruptures the nose cap and then flows between the crossbars to strike the

firing pin. If the projectile hits masonry or rock, the entire crossbar holder assembly will drive the firing pin into the SQ detonator.

(2) Upon impact the solid structure of the body protects the M1 delay assembly plunger so that it will function after penetrating the target. Within the delay assembly the plunger travels forward upon impact against the firing pin held by the housing, which initiates the explosive delay element. The S & A rotor, which is now held in the armed position is ready to receive the flash from the SQ detonator or from the delay element of the M1 delay assembly or both.

(3) In normal functioning with superquick action, the delay action has no effect, and the superquick primer will have fired the detonator M55 in the rotor of the S & A assembly before the explosive delay element can complete its action. However, should the SQ action fail, the projectile will function with delay action rather than become a dud.

Tabulated Data:

Type -----	PD
Assembly Drawing No. -----	9258605
Length	
Visible -----	3.76 in. Ref
Intrusion into projectile -----	2.21 in. (max)
Overall -----	5.97 in. (max)
Weight -----	1.5 lb
Thread -----	2.00-12 UNS-1A
Arming Speeds (RPM)	

	Inter-rupter	Delay Assy M1	S&A Assy.
Non-arming speed (RPM)	1,100	1,500	1,100
All-arming speed (RPM)	1,700	2,125	1,700

Arming Distance

	Feet		Meters	
	Min	Max	Min	Max
105mm Howitzer M103	143	156	43	48
105mm Howitzer M2	158	172	48	52

4.2 Inch Mortar M30	162	176	49	54
155mm Howitzer M126	236	256	73	78
175mm Gun M113	265	288	82	88
155mm Howitzer M1	283	306	86	93
8 Inch Howitzer M2	382	415	113	126

Explosive Components:

SQ element:

Detonator stab M99	
Primer mix NOL #130 -----	65 mg
Lead Azide -----	180 mg

The delay assembly, M1:

Delay Element, M2	
Primer Mixture No. 70 ---	11 mg
Lead Azide, type I -----	93 mg
Delay Composition -----	32 mg

S and A Assembly:

Detonator M55	
Primer mix NOL #130 -----	15 mg
Lead Azide RD 1300 -----	51 mg
RDX -----	19 mg
Lead explosive -----	PA508
Comp A5, type VI, (a or b) -----	172 mg
Booster pellet	
Comp A5, type VI (a or b) -----	21 grams

Temperature Limits:

Firing:

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

Storage:

Lower limit -----	-80° F) for not more than 3 days
Upper limit -----	+160° (for not more than 4 hrs/day)

Shipping and Storage Data:

Quantity-distance class -----	1.2
Storage compatibility group -----	B
DOT shipping class -----	A

TM 43-0001-28

DOT designation ----- DETONATING
FUZES - CLASS
A EXPLOSIVES
National Stock Number ----- NSN 1390-00-574-
7705
DODAC ----- 1390 - N340
*Packing ----- 8 fuzes in metal
container; 2 con-
tainers in wooden
box
*Packing Box:
Weight ----- 55.8 lbs
Dimensions ----- 14-5/8 x 12-12/16
x 9-1/8 in.

Cube ----- 1.04 cu ft

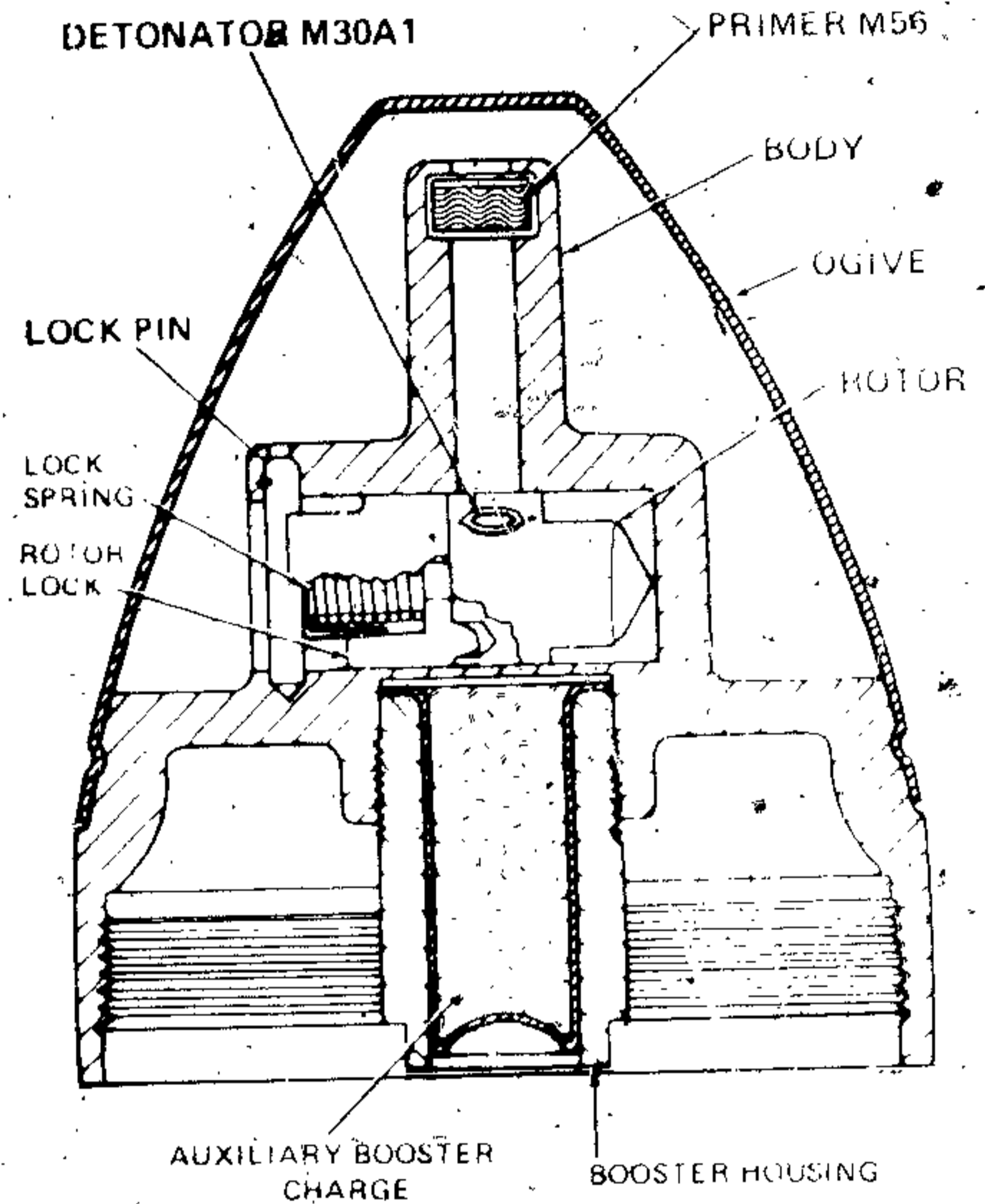
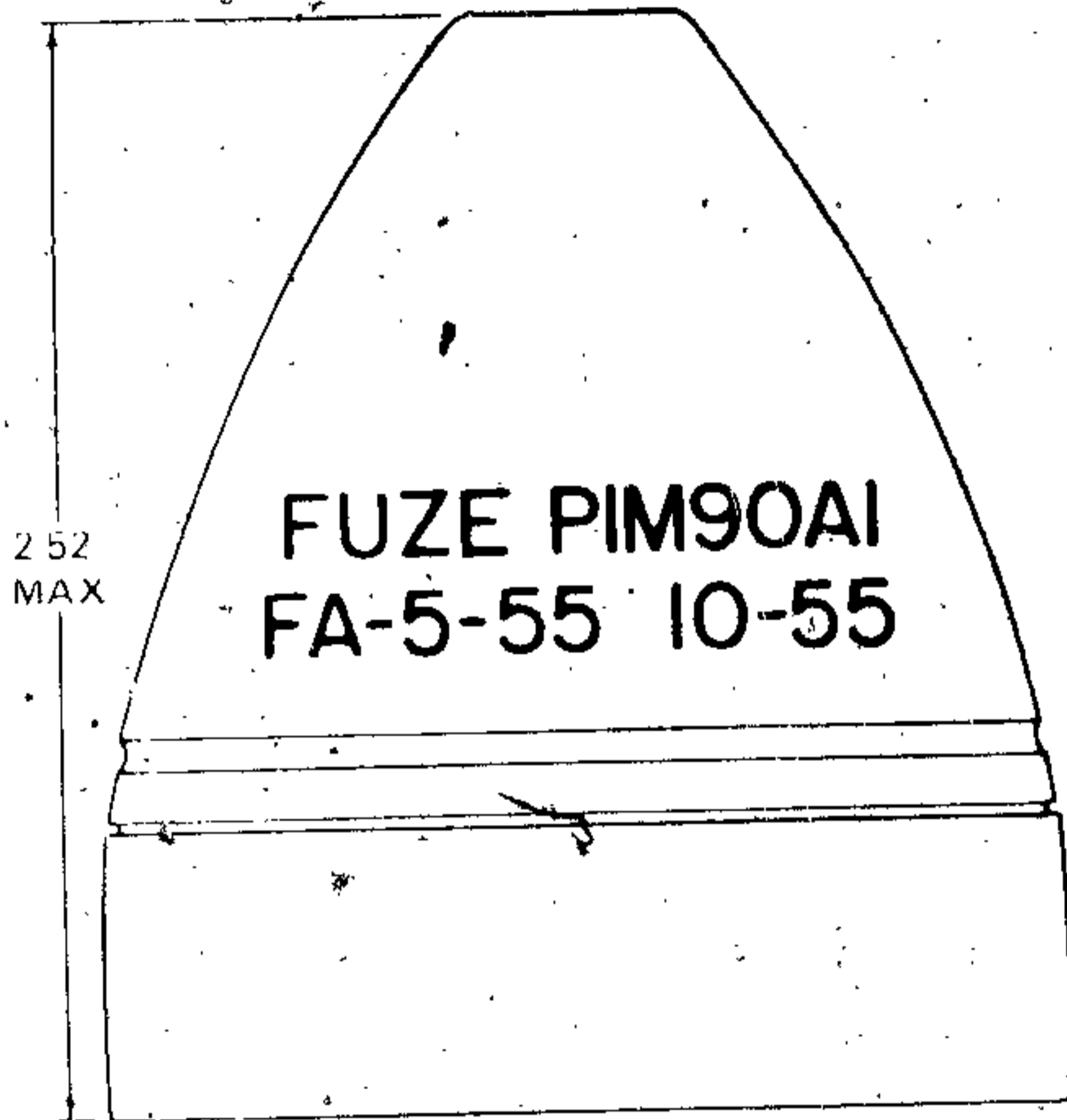
*See SC for complete packing data including
NSN's

Limitations: ----- None

References:

SC 1340/981L
TM 9-1300-251-20
TM 9-1300-251-34
TM 9-2350-217-10N
TM 9-2300-216-10

FUZE, POINT INITIATING: M90A1 or M90



AR199927

AR199926

Type Classification:

C & T OTCM 37119 dtd 1959.

Use:

Fuze M90A1 or M90 is a single-action, superquick, point-initiating fuze designed for use with 57-mm HEAT projectile.

Description:

The fuze has a diecast aluminum body with a neck extending forward to house a primer. A rotor with a lock and lock spring is mounted transversely in the fuze body, and carries a detonator. An auxiliary booster housing threaded into the base of the fuze body carries a booster charge. The base of the fuze body is threaded internally for assembly over the nose of the projectile, and the entire forward end with mechanical parts is covered with a thin steel ogive.

Functioning:

After firing, centrifugal force from projectile rotation withdraws the rotor lock against the lock spring. The rotor cannot move while affected by the setback force of firing, but after setback the rotor turns to align the detonator with the primer and with the auxiliary booster charge. On impact, crushing of the ogive fires the primer which initiates the detonation train to the projectile.

Tabulated Data:

Type	-----	P1
Weight	-----	0.256 lb.
Length:		
Visible	-----	2.52 in.
Overall	-----	2.52 in.
Thread size	-----	2.095-18NS-1
Assembly Dwg. No.	-----	7352-236

TM 43-0001-28

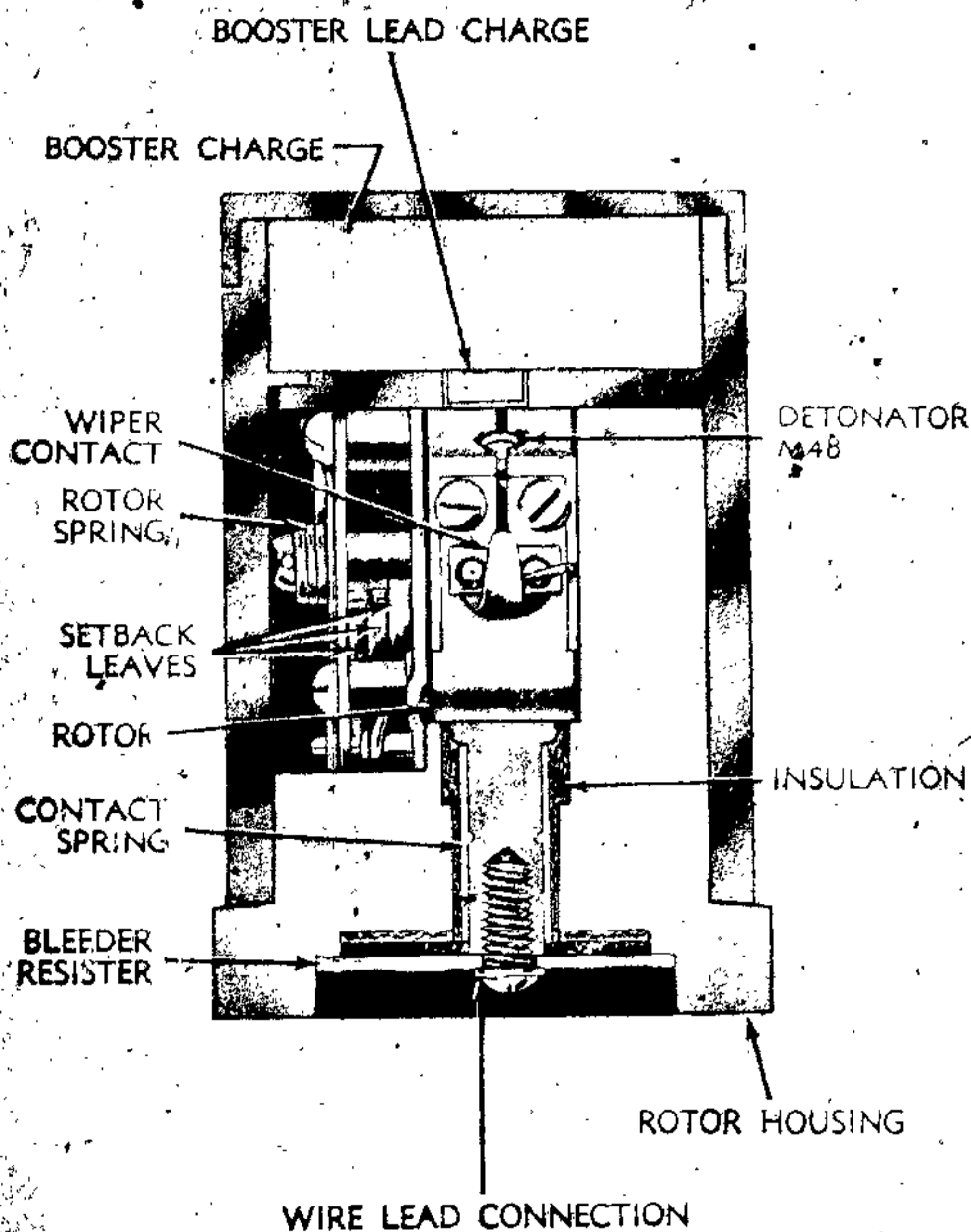
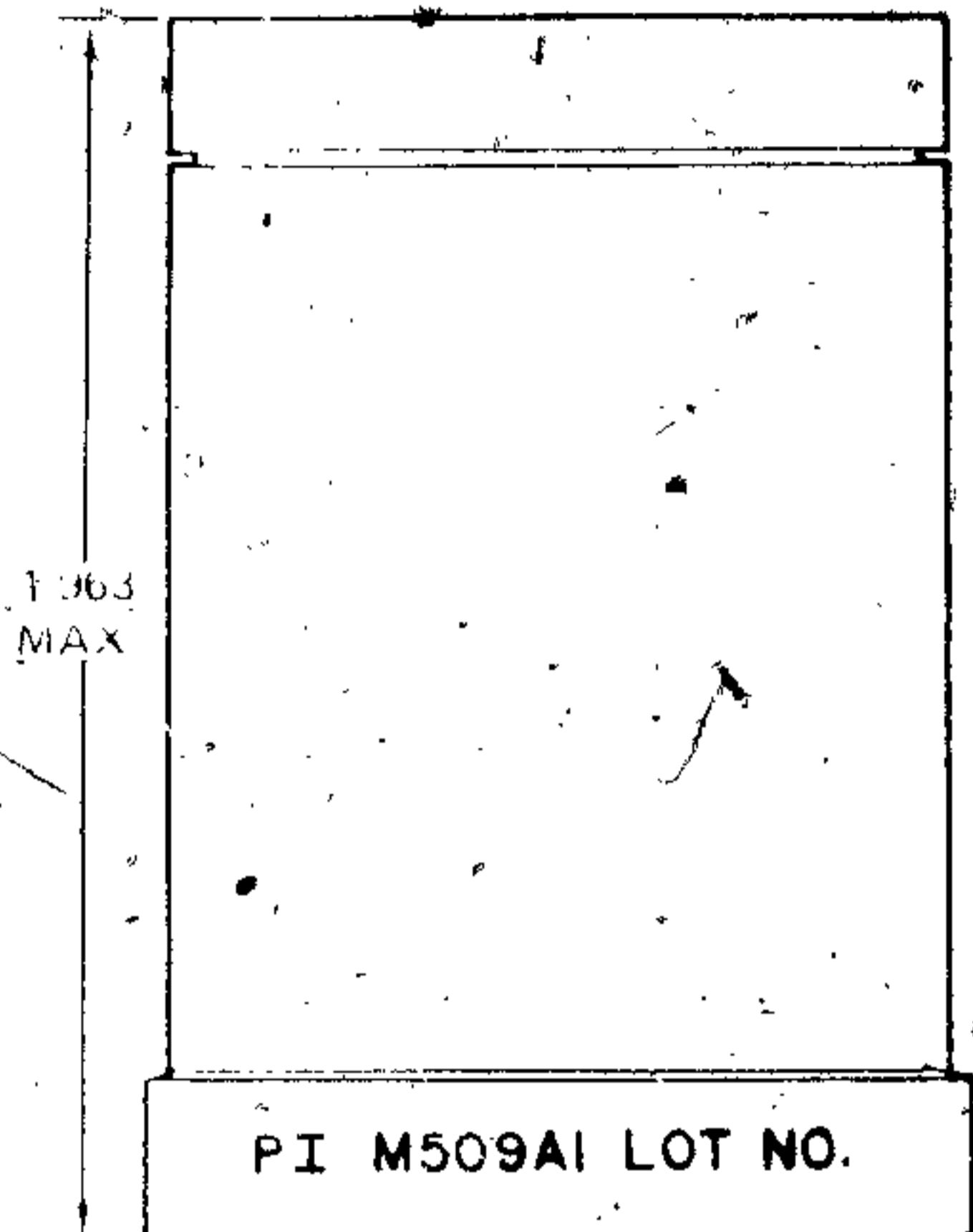
Explosive Components:

Primer M56, Detonator M30A1, and auxiliary Booster M122.

References:

TM 9-1300-251-20

FUZE, POINT INITIATING, BASE DETONATING: M509A1



AR199929

AR 199928

Type Classification:

Std AMCTC 4677 dtd 1966

Use:

Point-initiating, base detonating type Fuze M509A1 is used with fin-stabilized HEAT projectiles in calibers from 76-mm to 120-mm.

Description:

The fuze is essentially an aluminum housing containing a spring-loaded rotor and an electrically-fired Detonator M48. The rotor is the arming mechanism and houses the detonator. In the unarmed position, the rotor is restrained by three metal leaves, so arranged as to be displaced sequentially by setback. The power source is a polarized piezoelectric ceramic

disk (not shown) in the nose of the projectile connected by a wire lead to the fuze. When the rotor is in the armed position, the detonator is aligned with a booster lead charge and booster charge in the nose end of the fuze.

Functioning:

When the weapon is fired, setback force acts sequentially on the leaf arming assembly. When the third leaf has been displaced to the rear, the rotor is released and can rotate, powered by a preloaded spring. Electrical contact between the housing and the rotor is made by a contact spring and a wiper contact when the rotor has moved the detonator into the armed position. When impact is made on the target, deformation of the piezoelectric element (ceramic disk) in the nose generates

TM 43-0001-28

an electric impulse to fire the detonator. The detonator initiates the explosive train through the lead charge and booster charge to the projectile.

Tabulated Data:

Type -----	PIBD
Weight -----	0.31 lb.
Length Overall -----	1.963 in.
Assembly Dwg. No. -----	8799735

Temperature Limits:

Refer to complete round for upper and lower limits.

Explosive Components:

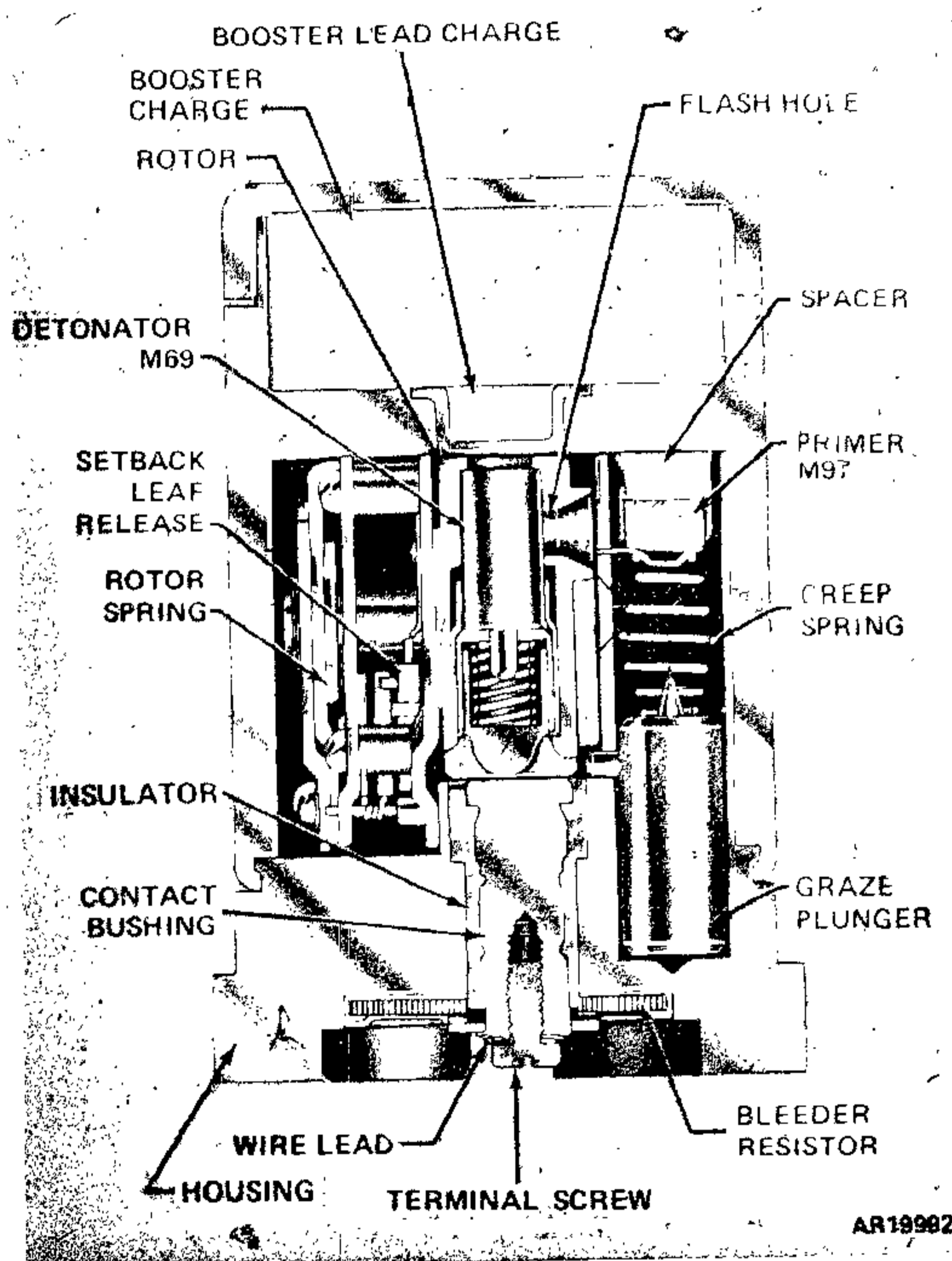
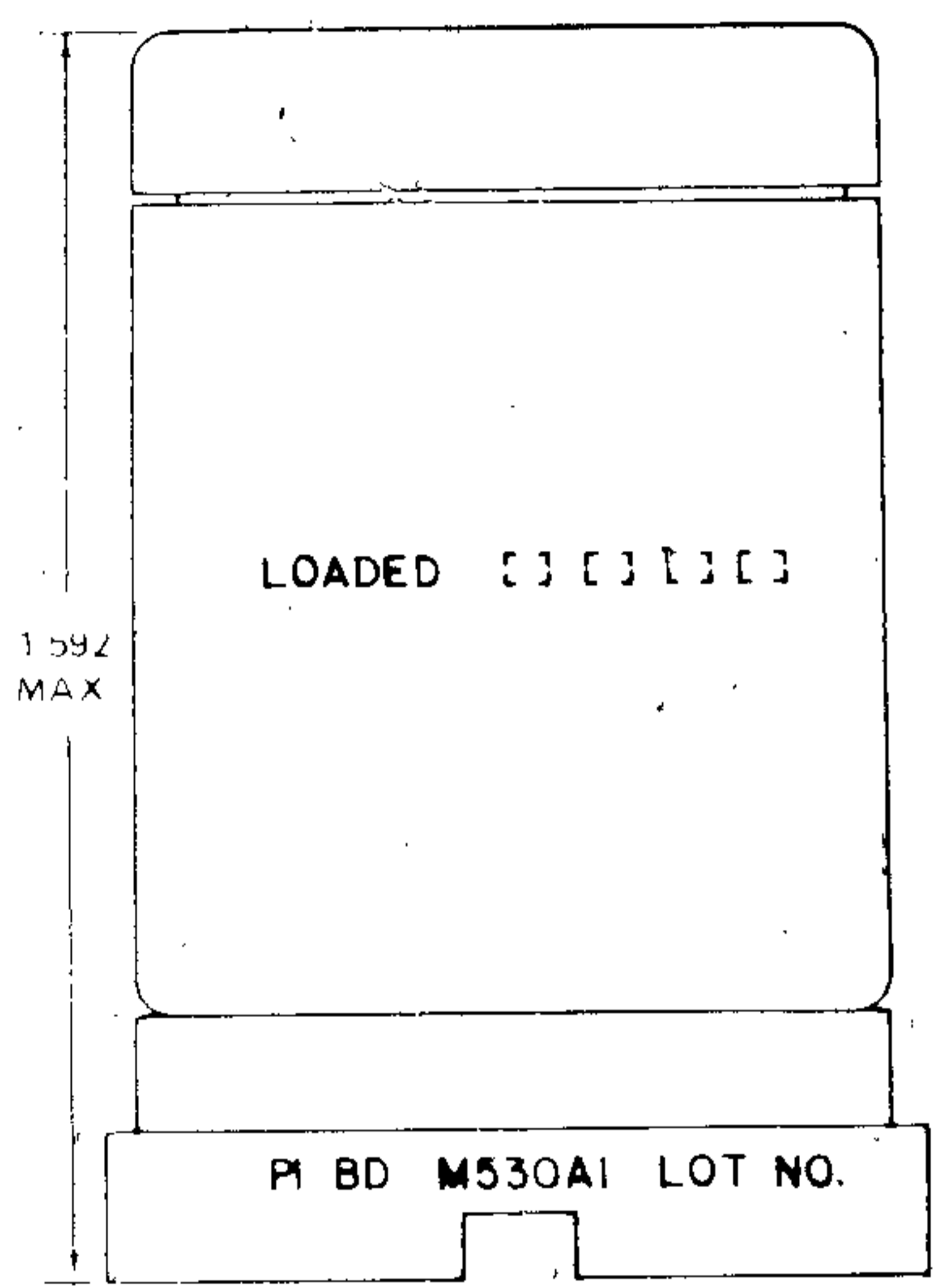
Detonator M48, tetryl booster lead charge, and tetryl booster charge.

Limitations:

References:

TM 9-1300-251-20
TM 9-2350-215-10
TM 9-2350-224-10
TM 9-7012

FUZES, POINT INITIATING, BASE DETONATING: M530A1 AND M530



AR199923

AR199822

Type Classification:

Std AMCTC 4265 dtd 1966

Use:

Point initiating, base detonating type Fuzes M530A1 and M530 are designed for use in low-velocity HEAT projectiles.

Description:

The fuze is essentially an aluminum housing containing a spring-loaded brass rotor and an electrically fired detonator. In the unarmed position, the rotor is restrained by three metal leaves, so arranged as to be displaced sequentially by inertia from setback. The power source is a polarized piezoelectric ceramic disk (not

shown) in the nose of the projectile connected by a wire lead to the fuze. A separate inertial plunger with firing pin is provided to act on the primer for graze impact.

Functioning:

When the weapon is fired, setback force acts sequentially on the individual leaves of the leaf arming assembly. When the third leaf has been displaced to the rear, the rotor is released and can rotate, powered by a pre-loaded spring, retarded by an escapement mechanism. Electrical contact between the housing and the rotor is made by a contact spring and a wiper contact which the rotor has moved 270° to place the detonator in the armed position. When impact is made on the target, deformation of the piezoelectric ceramic (ceramic disk) in the projectile nose generates

an electrical impulse to fire the detonator. The detonator initiates the explosive train through the lead charge and booster charge to the projectile. In event of graze impact, the inertial plunger forces the firing pin into the primer to initiate detonation.

Difference Among Models:

Model M530A1 includes an escapement mechanism not present in Model M530 to retard the rotor and extend arming time.

Tabulated Data:

Type ----- PIBD
Weight -----
Overall length ----- 1.592 in.
Assembly Dwg. No. ----- 10980600

Explosive Components:

Primer M97, Detonator M69, tetryl booster lead charge, and tetryl booster charge.

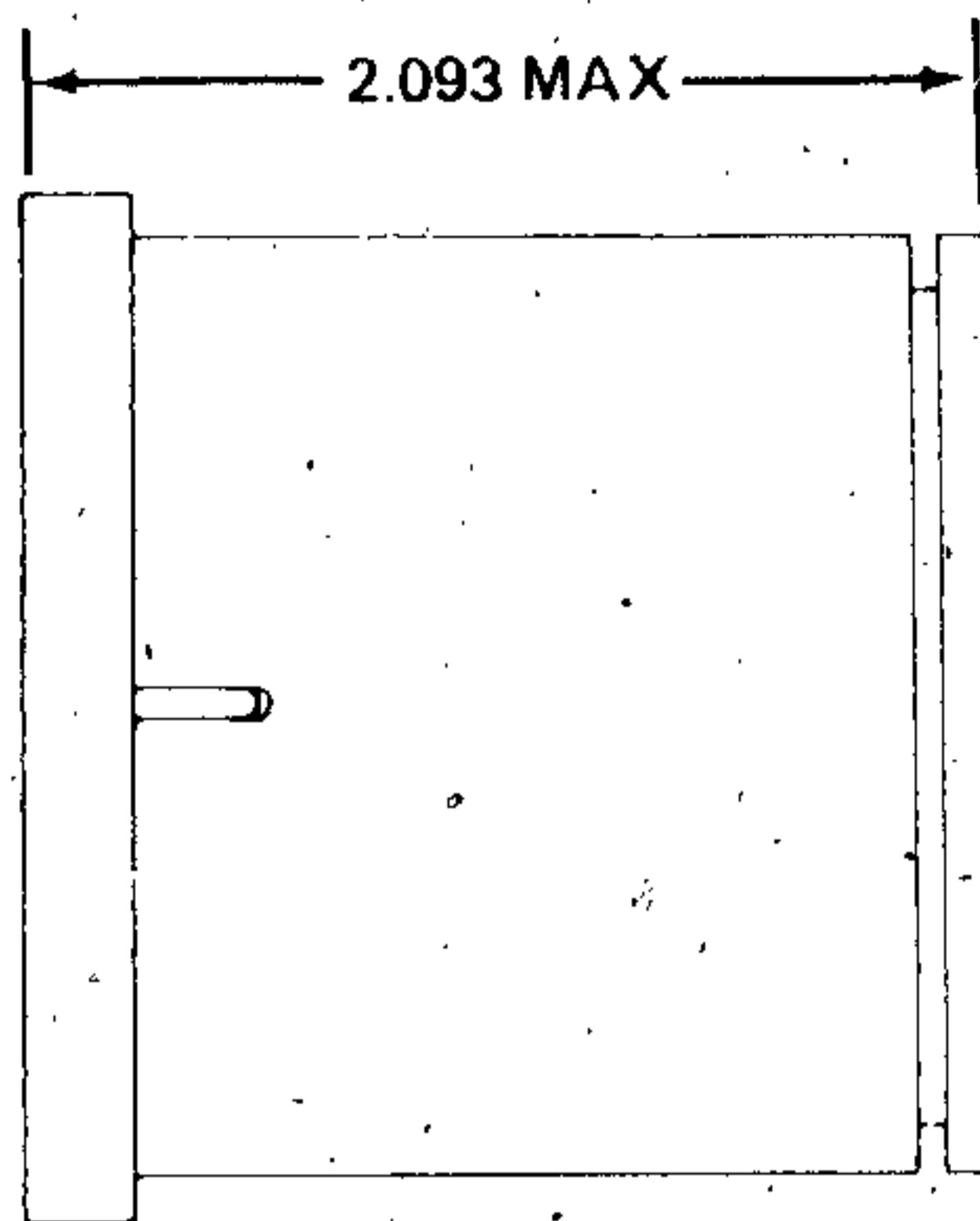
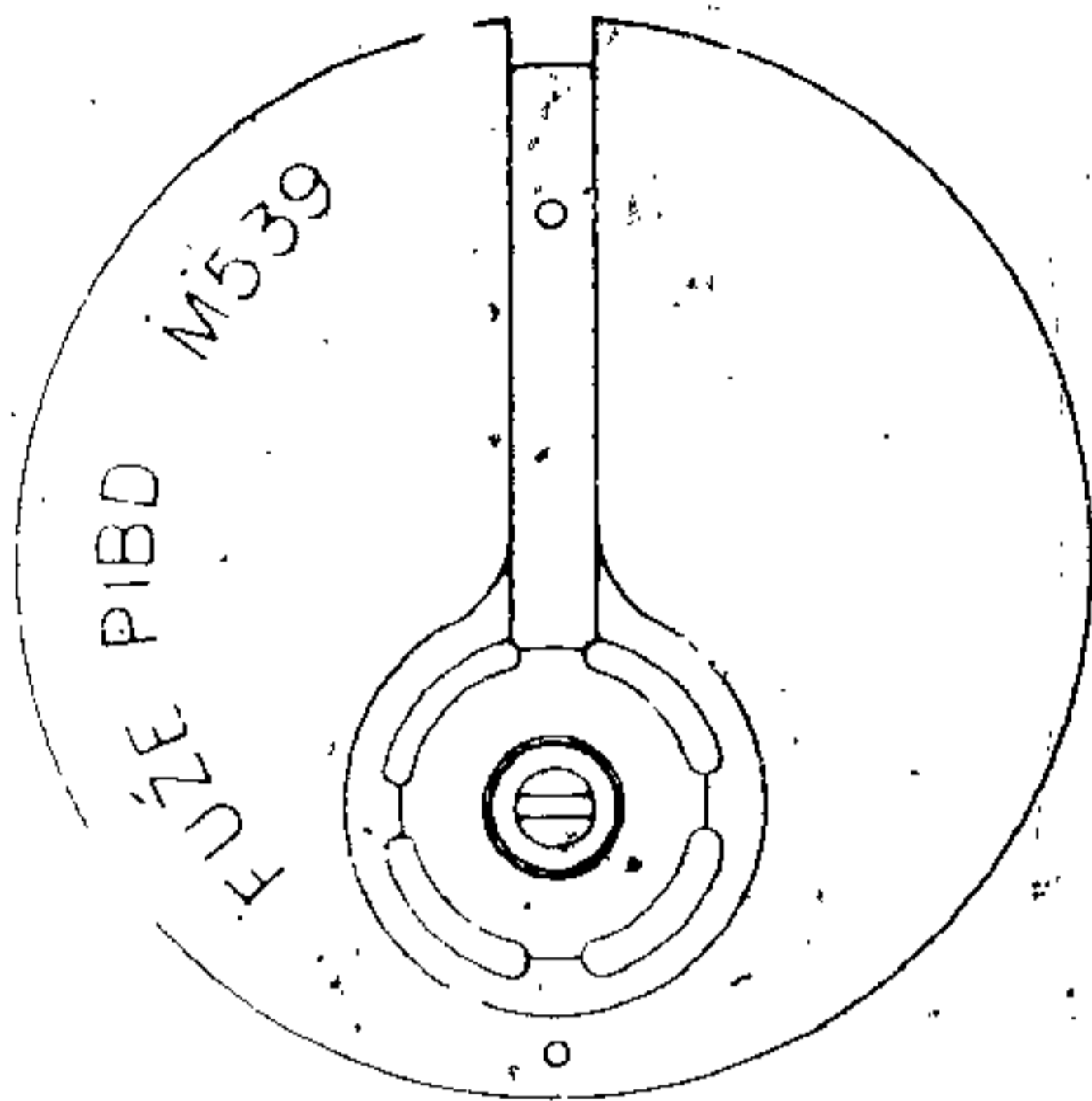
Limitations:

None

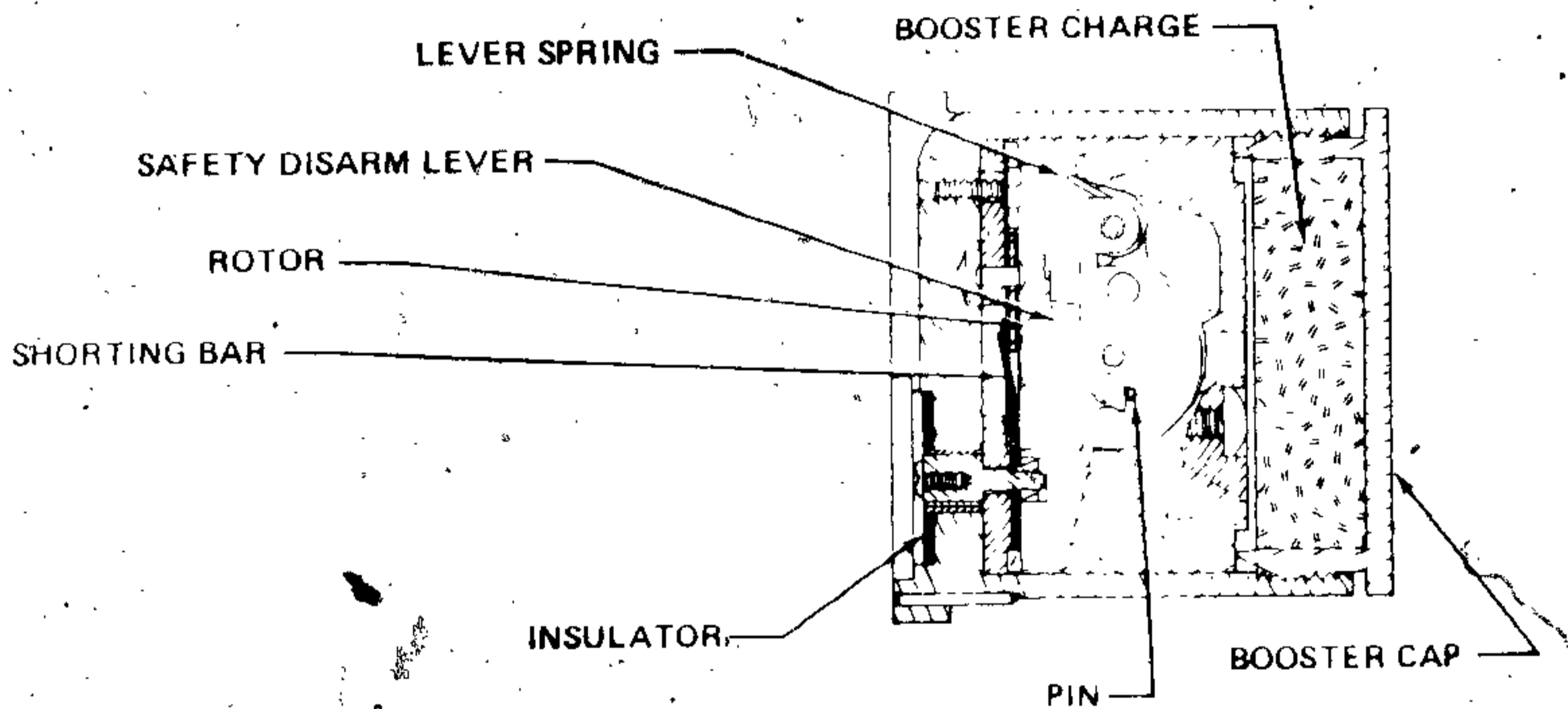
References:

TM 9-1015-223-12
TM 9-1300-251-20

FUZE, POINT INITIATING, BASE DETONATING: M539



AR199925



AR199924

Type Classification:

Std AMCTC 8965 dtd 1972

Use:

Base Detonating Fuze M539 is of the super-quick action, point initiating type used with 152-mm HEAT-T-MP cartridges.

Description:

The fuze is based upon the principle of a piezoelectric element accumulating a charge and firing an electrical detonator housed in an arming rotor. Control-power supply M22 of the fuze includes a polarized piezoelectric element. The rotor is mounted transversely to

the axis of rotation of the fuze, and is locked in the unarmed position by centrifugal detents. The rotor features a safety mechanism to return to the unarmed position in the absence of spin or decay in spin rate, as would be sensed in case of any accidental partial arming. The switch provided in the fuze for delivering the stored charge to the detonator is the impact ball type.

Functioning:

The piezoelectric element immediately accumulates an electrical charge as a result of deformation during setback. The charge is bled off during peak setback by the closing of a shorting bar, and the short circuit results in an opposite charge accumulating on the element.

As setback force decays, the shorting bar opens, leaving the charge stored on the piezo-electric element, as in a capacitor. Meanwhile, centrifugal force from projectile spin withdraws the rotor detents, and the rotor turns to the armed position, with the detonator in the discharge path of the static charge. Either impact on the target or deceleration from grazing will cause the impact ball switch to close and deliver the electrical charge to the detonator, thus initiating the explosive train to the projectile. If the electrical charge is lost during flight, crushing of the nose at impact will also cause the control-power supply to fire the detonator.

Tabulated Data:

Type -----	PIBD
Weight -----	2.0 lbs.
Length overall -----	2.093 in.
Assembly Dwg. No. ----	9204364

Temperature Limits:

Refer to complete round for upper and lower limits.

Explosive Components:

Detonator M65 and RDX booster charge.

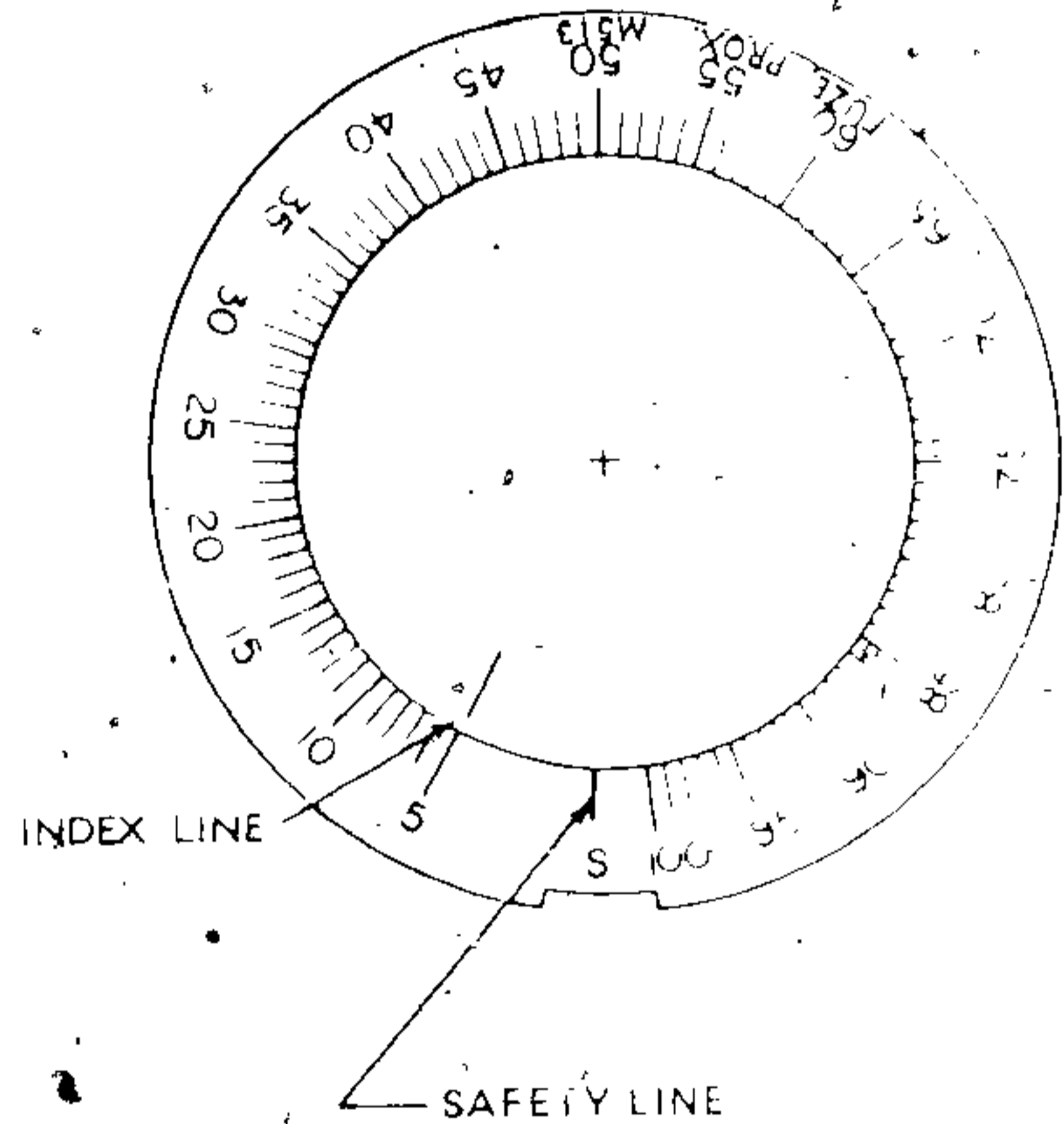
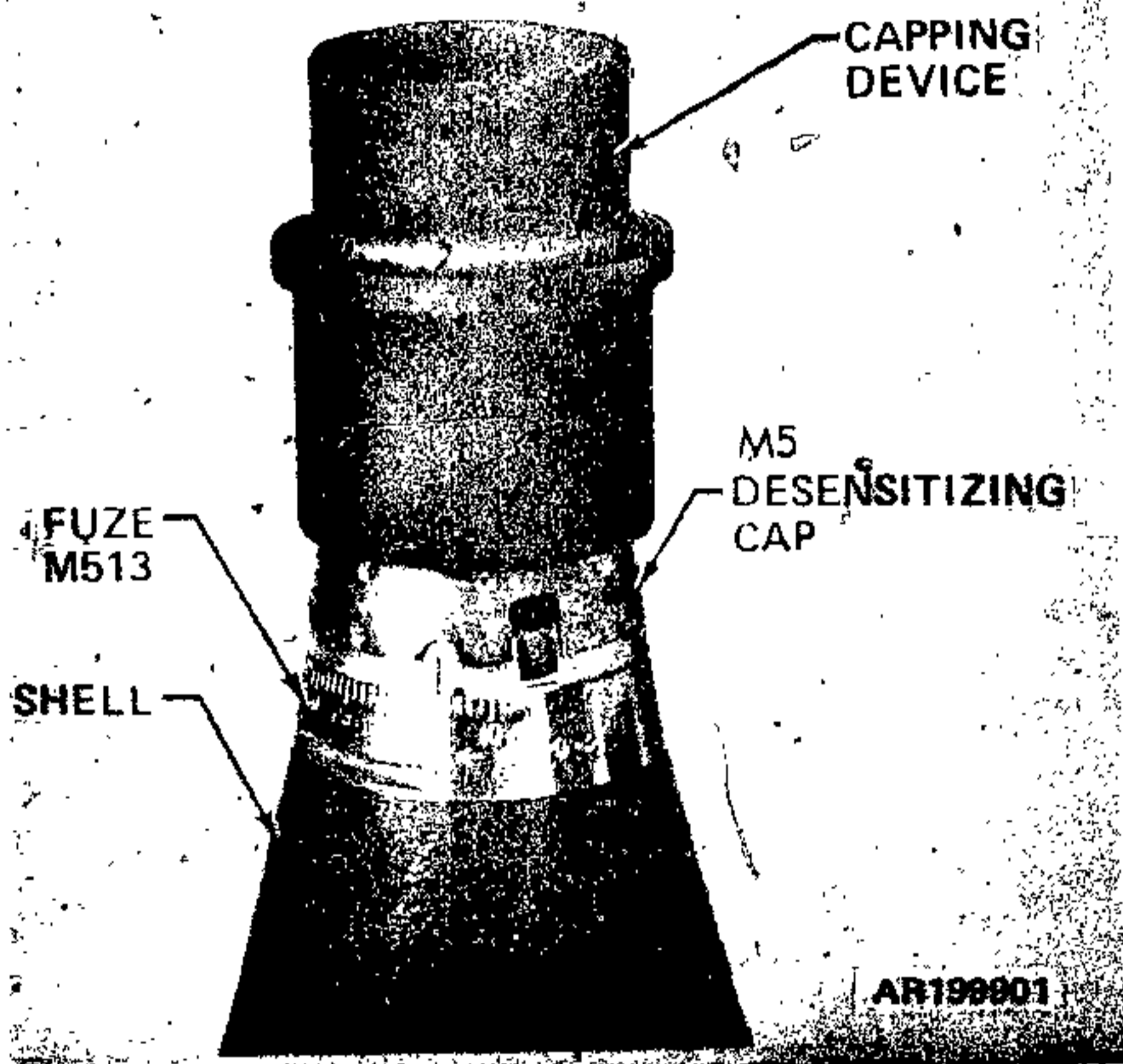
Limitations:

None.

References:

TM 9-1300-251-20
TM 9-6920-465-12

FUZE, PROXIMITY: M513 AND M513B1



METAL SLEEVE TIME GRADUATIONS FOR FUZE M513 AND M513B1

AR 199900

Type Classification:

C & T AMCTC 8558 dtd 1969

Use:

These adjustable, delayed-arming fuzes are used in 75-mm, 105-mm, and 4.2-inch deep-cavity projectiles fired against surface targets.

Description:

The fuze contains a radio continuous wave transmitter/detector with antennas and a power supply which performs the target detection function. A plastic nose cone is fixed to a rotatable setting ring with a single index line. The setting ring is connected to a clock-work timing mechanism within the fuze sleeve

which energizes the proximity element upon approach to the target. The safety line, S, and graduations from 5 to 100, representing seconds to target, are inscribed around the shoulder of the sleeve. The setting ring and sleeve are metal. The slot in the setting ring is for time setting only. Slots in the fuze sleeve are for the fuze wrench when assembling the fuze to the projectile. The fuze is shipped with the index mark set at S. A fuze desensitizing metal cap, M5, may be pressed on the nose cone when the fuze is used with 105-mm, HE cartridges, if burst heights are expected or observed to exceed 30 feet. The M5 cap reduces the burst height by a factor of about 4.

Functioning.

Fuzes are set to the calculated time of flight of the projectile to target. Setback from weapon firing starts the arming cycle by releasing the timing mechanism and initiating the power supply. Approximately 3 seconds prior to set time, the proximity and PD element are armed simultaneously and radio wave transmission is initiated. When any part of the radio wave front is reflected to the fuze from the target, an interaction or doppler signal occurs between the reflected and transmitted wave. When the doppler signal reaches a predetermined amplitude an electronic switch activates the explosive train at an optimum distance from the target. If the proximity mode does not function, the projectile will be detonated on impact by the PD element.

Difference Between Models:

- * Fuze M513 has a steel sleeve.
- * Fuze M513.B1 has an aluminum sleeve.

Tabulated Data:

Type -----	Proximity
Weight:	
M513 -----	2.96 lbs.
M513B1 -----	2.35 lbs.
Length:	
Visible -----	3.74 in.
Overall -----	8.60 in.
Thread size -----	2.00 in. 12NS-1
Temperature Limits:	
Firing:	
Lower limit -----	0°F
Upper limit -----	+120°F
Storage:	
* Lower limit -----	-20°F
Upper limit -----	+130°F
* Packing -----	8 fuzes in metal container; 2 containers in wire-bound box
* Packing Box:	
Weight -----	63.0 lbs.
Dimensions -----	14-5/8 x 12-13/16 x 11-15/16 in.
Cube -----	1.3 cu. ft.
*NOTE: See SC for complete packing data including NSN's	

Shipping and Storage Data:

Quantity-distance class- 7°
 Storage compatibility -- B group
 DOT shipping class ---- A
 DOT designation ---DETONATING FUZES-
 CLASS A EXPLOSIVES

DODAC ----- 1390-N412
 Drawing number ----- GA795240

Limitations:

Use of less than Charge 12 in 4.2-inch mortars and less than Charge 2 in 105-mm howitzers will decrease reliability because of insufficient setback for arming. Use highest charge commensurate with range in any weapon.

Fuze may not be fired at Charge 7 in 105-mm howitzers, except under combat emergency conditions.

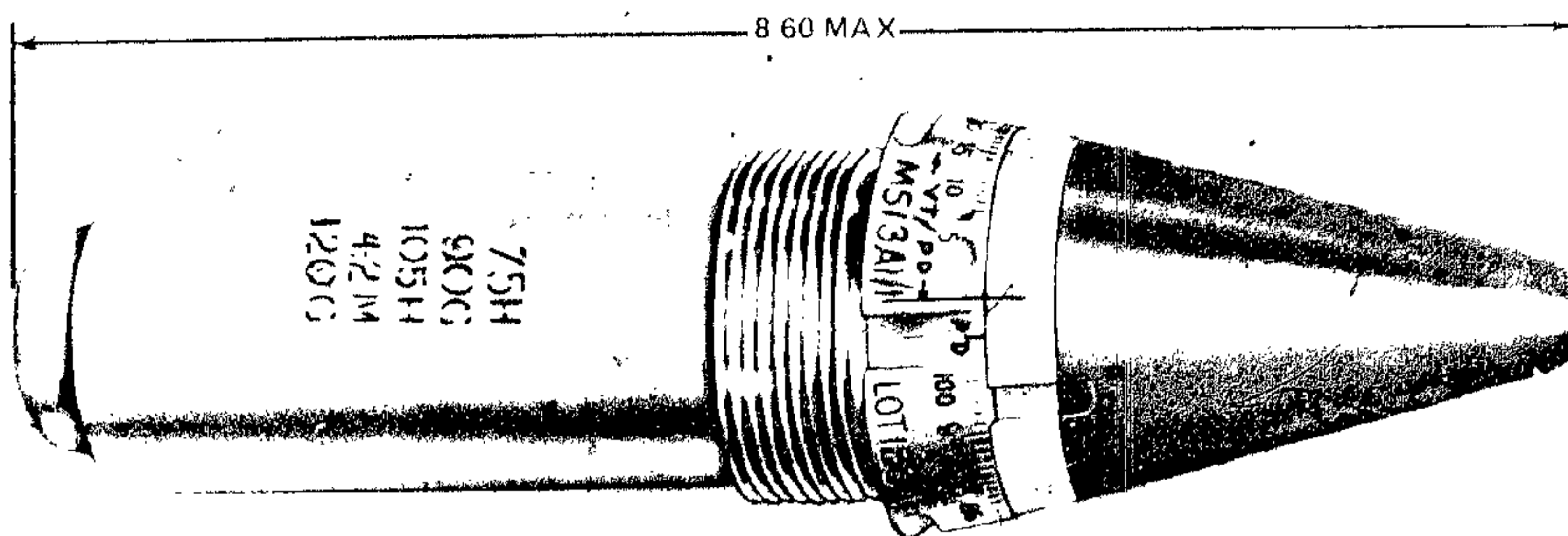
Proximity of other masses to the target area, such as crests or ridges, air observation posts, nearby bursts or fragments experienced when firing volley, salvo, or rapid fire from adjacent weapons, may cause early fuze initiation.

These fuzes cannot be set for impact action only, as fuze will not be armed.

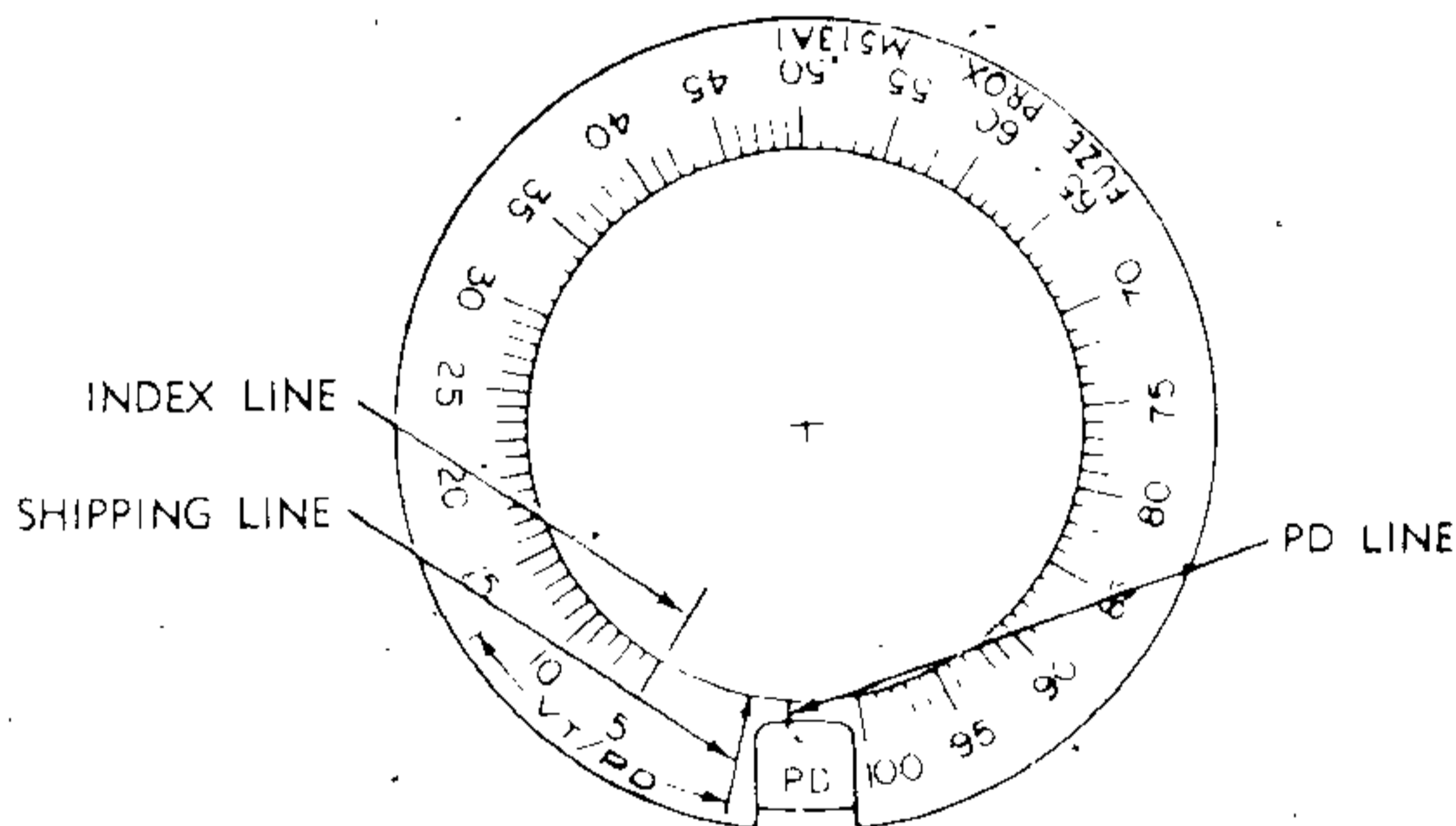
References:

- TM 9-1015-203-12
- TM 9-1015-215-12
- TM 9-2350-217-10
- TM 9-1300-251-20
- SC 1340/95-IL

FUZES, PROXIMITY: M513A1 AND M513A2



AR199899



AR 199898

Type classification:

C & T AMCTC 6558 dtd 1969.

Use:

These adjustable, delayed-arming fuzes are used in deep cavity projectiles fired in 90-mm and 120-mm guns, 105-mm howitzers, and 4.2-inch mortars against surface targets.

which energizes the proximity element upon approach to the target. The safety ring, S, and graduations from 5 to 100, representing seconds to target, are inscribed around the shoulder of the sleeve. The setting ring and sleeve are metal. The slot in the setting ring is for time setting only. Slots in the fuze sleeve are for the fuze wrench when assembling the fuze to the projectile. The fuze is shipped with the index mark set at 5. A burst desensitizing metal cap, M5, may be placed on the nose cone when the fuze is used with 105-mm, HE cartridges, if burst heights are expected or observed to exceed 50 feet. The M5 cap reduces the burst height by a factor of about 4.

Functioning:

Fuzes are set to the calculated time of flight of the projectile to target unless point detonation is desired. Setback from weapon firing starts the arming cycle by releasing the timing mechanism and initiating the power supply and point detonation arming. The fuze is armed for point detonation after 3 seconds of flight. Approximately 3 seconds prior to set time radio wave transmission is initiated. When any part of the radio wave front is reflected to the fuze from the target, an interaction or doppler signal occurs between the reflected and transmitted wave. When the doppler signal reaches a predetermined amplitude an electronic switch activates the explosive train at an optimum distance from the target. If the proximity mode does not function, the projectile will be detonated on impact by the PD element. The function of the desensitizing cap when employed is to inhibit the transmission and reception of radio waves, thus decreasing the sensitivity of the fuze.

Difference Between Models:

Models are similar in appearance but Fuze M513A2 has greater extreme temperature tolerance than Fuze M513A1.

Tabulated Data:

Type -----	Proximity
Weight -----	2.35 lbs.
Length:	
Visible -----	3.795 in.
Overall -----	8.60 in.
Thread size -----	2.00 in. -12NS-1
Assembly Dwg. No. ---	1310371

Temperature Limits:

Firing:	M513A2	M513A1
Lower limit ----	-40°F	-20°F
Upper limit ----	+160°F	+130°F
Storage:		
Lower limit ----	-60°F	-40°F
Upper limit ----	+160°F	+130°F

* Packing ----- 1 fuze per metal container; 12 containers per metal box; 2 metal boxes per wirebound box

* Packing Box:

Weight -----	63 lbs.
Dimensions -----	14-5/8 x 12-13/16 x 11-15/16 in.
Cube -----	1.3 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance - 7 class
 Storage compatibility group - B
 DOT shipping class ---- A
 DOT designation -- DETONATING FUZES CLASS A EXPLOSIVES

DODAG ----- 1390-N412

Explosive Components:

Primer, detonator, detonator lead charges, and tetryl booster charge in either detonation mode.

Limitations:

Use of less than Charge 12 in 4.2-inch mortars and less than Charge 2 in 105-mm howitzers will decrease reliability because of insufficient setback for arming. Use highest charge commensurate with range in any weapon.

Fuze may not be fired at Charge 7 in 105-mm howitzers, except under combat emergency conditions.

Proximity of other masses to the target area, such as crests or ridges, air observation posts, nearby bursts or fragments experienced when firing volley, salvo, or rapid fire from adjacent weapons, may cause early fuze initiation.

These fuzes cannot be set for impact action only as fuze will not be armed.

(1) The following weapon/propelling charge combinations are authorized for use with proximity fuzes M513A1 and M513A2:

In 4.2-inch mortars, Charge 12 and above, with or without extension must be used with this fuze. In 105-mm howitzers use Charges 2-6. (Charge 7 for combat emergency only). With fuze set at 90 seconds (PD mode), use 105H Charges 4-6. For maximum reliability in weapon, use the highest authorized charge commensurate with range.

WARNING

Do not fire this fuze at Charge 7 in 105-mm howitzer, except under combat emergency conditions.

(2) There is little hazard in firing these fuzes over friendly territory; however, in the case of personnel or installations close to, or in the target area, proper consideration should be given to the following:

(a) Avoid firing 105-mm or smaller projectiles at targets closer than 320 meters (350 yards) to friendly positions.

(b) If firing over crests or ridges, arming should be set to be delayed until the projectile has passed the irregularity, clearing it by 64 meters (70 yards) or more.

(c) When projectiles are approaching the target area at small angles of approach, the area between the point of full arming of the proximity element and the target may be sprayed by fragments from occasional bursts. At larger angles of approach, because such fragments decelerate and usually reach a state of free fall, they do not constitute a serious hazard.

(d) When the fuze is set for proximity arming, air observation posts may safely be used to direct fire but should not be set up between the weapon and target. The area close to the target should particularly be avoided. To avoid danger from normal or early bursts, aircraft should approach the trajectory or target area not closer than 320 meters (350 yards) for 105-mm or smaller projectiles.

(e) After proximity arming, fuzes may function under influence of nearby bursts or fragments. An abnormal number of such air

bursts may be experienced from volley, salvo, or rapid fire from adjacent weapons. These functionings may be reduced by increasing the spacing of weapons or increasing the time between the rounds fired. These functionings are not related to downrange premature failures which may occur anywhere along the trajectory.

(3) To assure maximum reliability, these fuzes should be expended at the highest charge authorized commensurate with the desired range.

References:

TM 9-1015-203-12

TM 9-1015-215-12

TM 9-1300-251-20

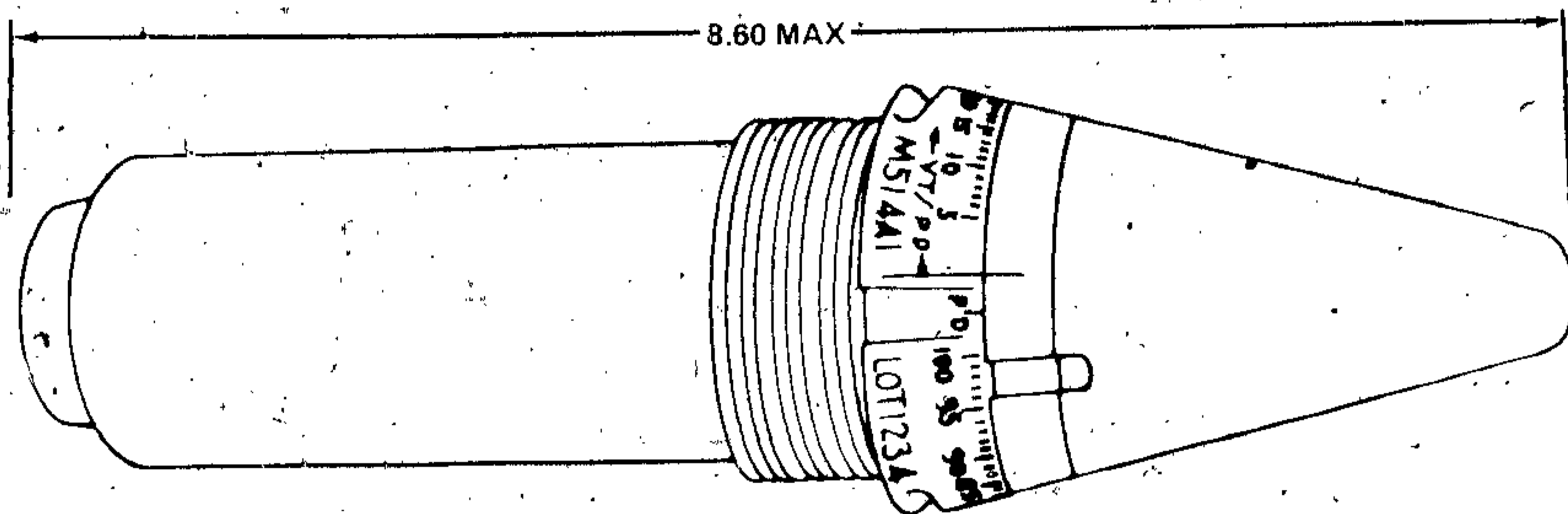
TM 9-2350-217-10

SC 1340/95-IL

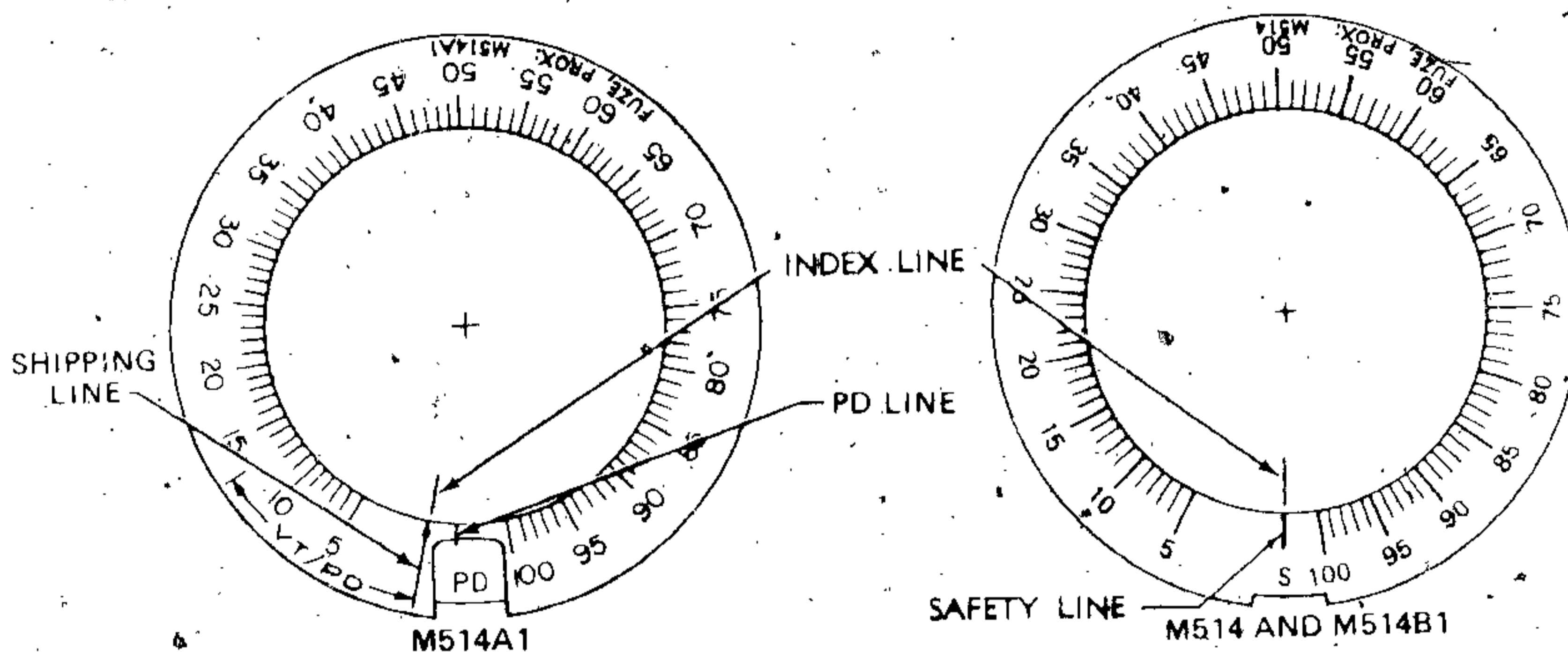
TM 43-0001-28

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FUZE, PROXIMITY: M514 SERIES



AR199895



AR199894

Type Classification:

Obsolete MSR 017560-8 dtd 1975
For training use only

Description:

These fuzes are of the adjustable delayed-arming type which are activated by the receipt of reflected radio transmissions emitted from the fuze upon target approach. The fuzes contain radio transmitters, antennas and receivers and are energized by a battery power source which is activated upon firing. Certain models of this fuze provide for impact functioning (PD action) or the option for a PD setting, but this characteristic is not common to all models. The fuzes have a windshield/nose cone of plastic attached to a metal setting ring. The ring and

fuze sleeve are made of steel or aluminum. The shoulder of the sleeve is marked with a PD setting where applicable and time graduations from 5 to 100 seconds representing the time of flight to the target. The setting index mark is located on the plastic nose cone. The M514A1 series nose cones identified as KEL-F are authorized for use in the 175-mm gun system at all charges (refer to Difference Among Models).

Functioning:

Fuzes are normally set to the calculated time of flight in seconds of the projectile, unless point detonation is desired. Setback from weapon firing starts the arming cycle by releasing the timing mechanism and initiating the power supply. The fuze is armed for point detonation after

3 seconds of flight. The proximity element becomes armed within 3 seconds of settime. When any part of the radio wave front is reflected to the fuze from the target, an interaction or doppler signal occurs between the reflected and transmitted wave. When the doppler signal reaches a predetermined amplitude an electronic switch activates the explosive train at an optimum distance from the target. If for any reason the proximity mode does not function, the projectile will detonate on impact, with the exception of Model M514A1.

Difference Among Models: *

Feature	M514	M514B1	M514A1
PD setting	No	No	Yes
PD impact action	Yes	Yes	No
Sleeve material	Steel	Alum.	Alum.
Use of desensit cap XM5	Yes	Yes	Yes
Weapon/Prop. Chg. combinations:			
155-mm	Chg 3 & above GB Chg 5 & above WB	Chg 3 & above GB Chg 5 & above WB	PD mode Chg 4 & above GB Chg 6 & above WB
175-mm	-----	-----	Chgs. 1 & 2 (KEL-F) All chgs.
8-inch	Chg 3 & above GB All chgs. WB	Chg 3 & above GB All chgs. WB	Chg 3 & above GB All chgs. WB (PD mode: Chg 4 & above GB Chg 6 & above WB)

*NOTE: Model M514A3 (M514A1E1) on separate data sheet)

Tabulated Data:

Type-----Proximity
 Weight -----2.35 lbs.
 Length:
 Visible -----3.74 in.
 Overall-----8.60 in.
 Assembly Dwg. No. -----795245

Temperature Limits:

Firing:
 Lower limit-----0°F
 Upper limit-----+ 120°F
 Storage:
 Lower limit----- - 20°F
 Upper limit----- + 130°F

* Packing ----- 8 fuzes in metal container; 2 containers in wire-bound box

* Packing Box:
 Weight -----63.0 lbs.
 Dimensions -----14-5/8 x 12-13/16 x 11-15/16 in.
 Cube-----1.3 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class -----7
 Storage compatibility group -----B
 DOT shipping class -----A
 DOT designation-----DETONATING FUZES CLASS A EXPLOSIVES
 HANDLE CAREFULLY
 DO NOT STORE OR LOAD WITH ANY HIGH EXPLOSIVES
 DODAC -----1390-N411

Explosive Components:

Primer, detonator, detonator lead charge, and tetryl booster charge in either detonation mode.

Limitations:

Do not use these fuzes for firing at targets closer than 731 meters (800 yards) to friendly

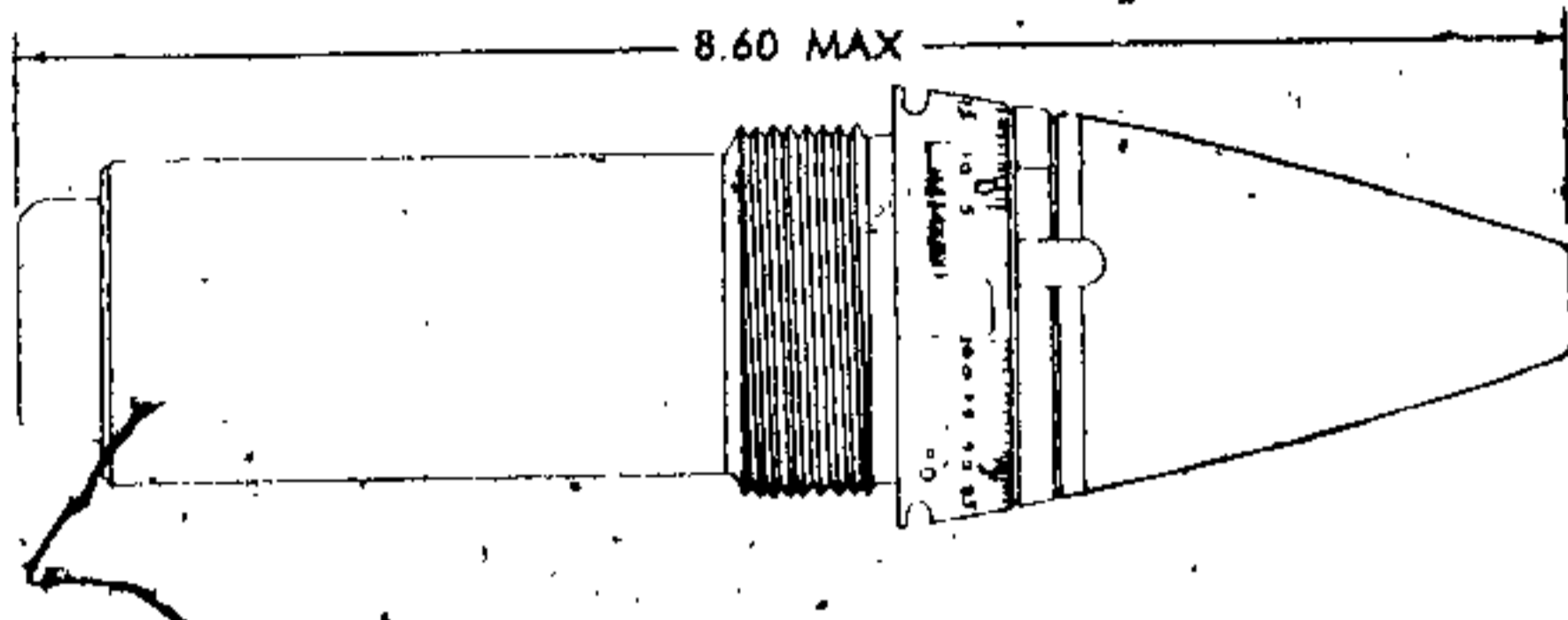
positions. Use the highest charge commensurate with range for maximum fuze reliability. Fuzes are not fully effective against airborne targets. After proximity arming, fuzes may function under influence of nearby bursts or fragments. Firing on overcast days can result in increased frequency of downrange premature. Not all models are interchangeable for use in all weapon systems. (See Difference Among Models.)

References:

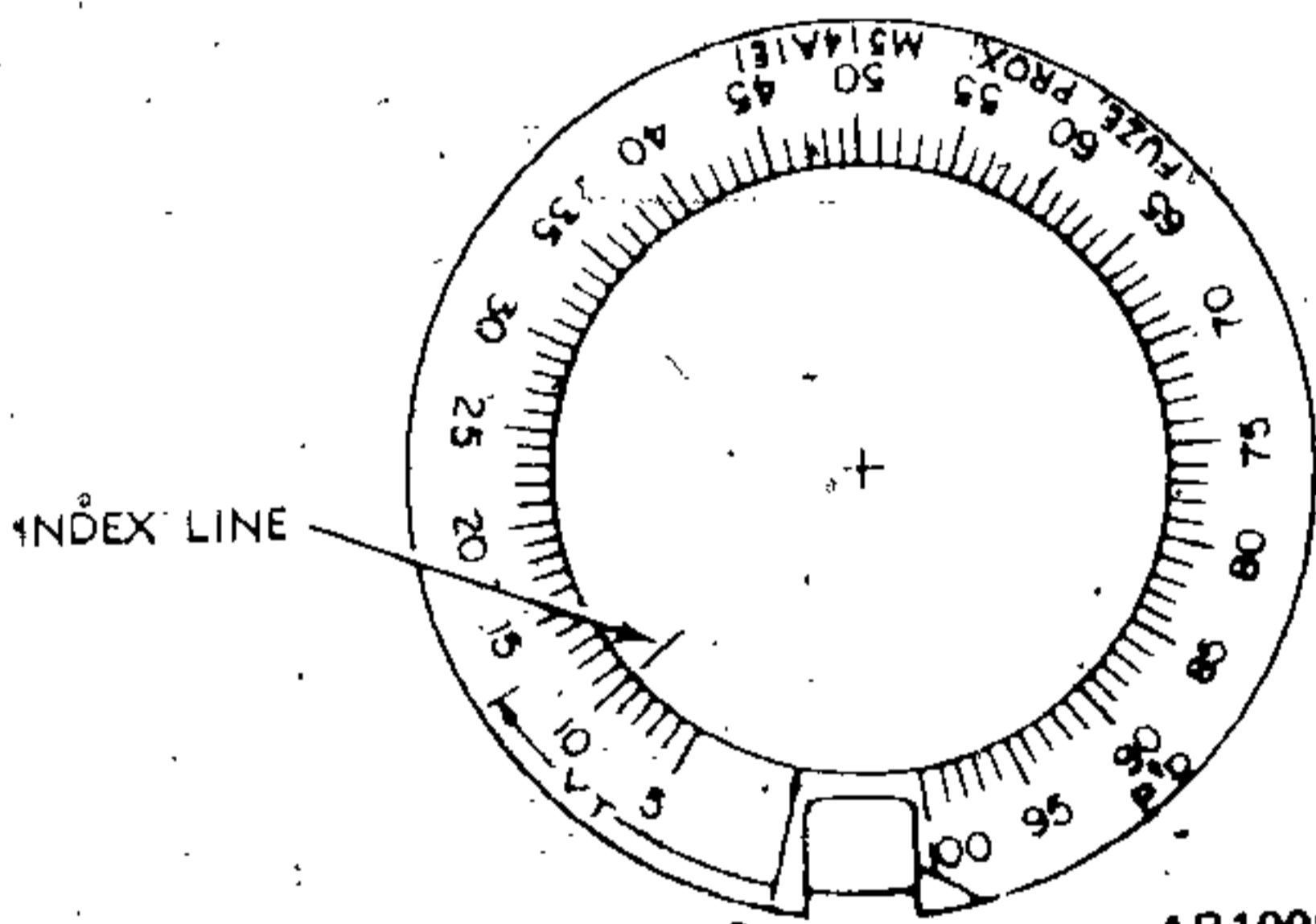
SC 1340/98 IL
SB 700-20
TM 9-1015-234-12
TM 9-1025-200-12
TM 9-1300-251-20
TM 9-2300-216-10
TM 9-2350-210-12
TM 9-2350-217-10
TM 9-2350-217-10N

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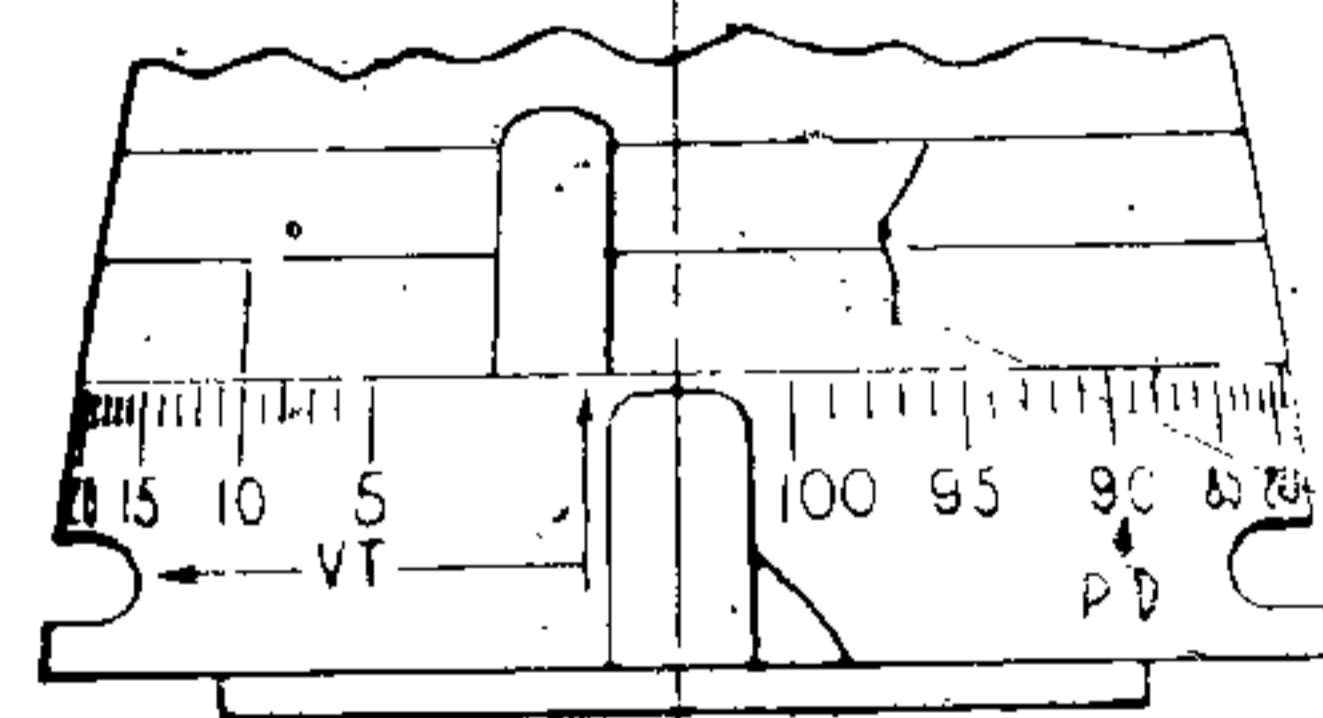
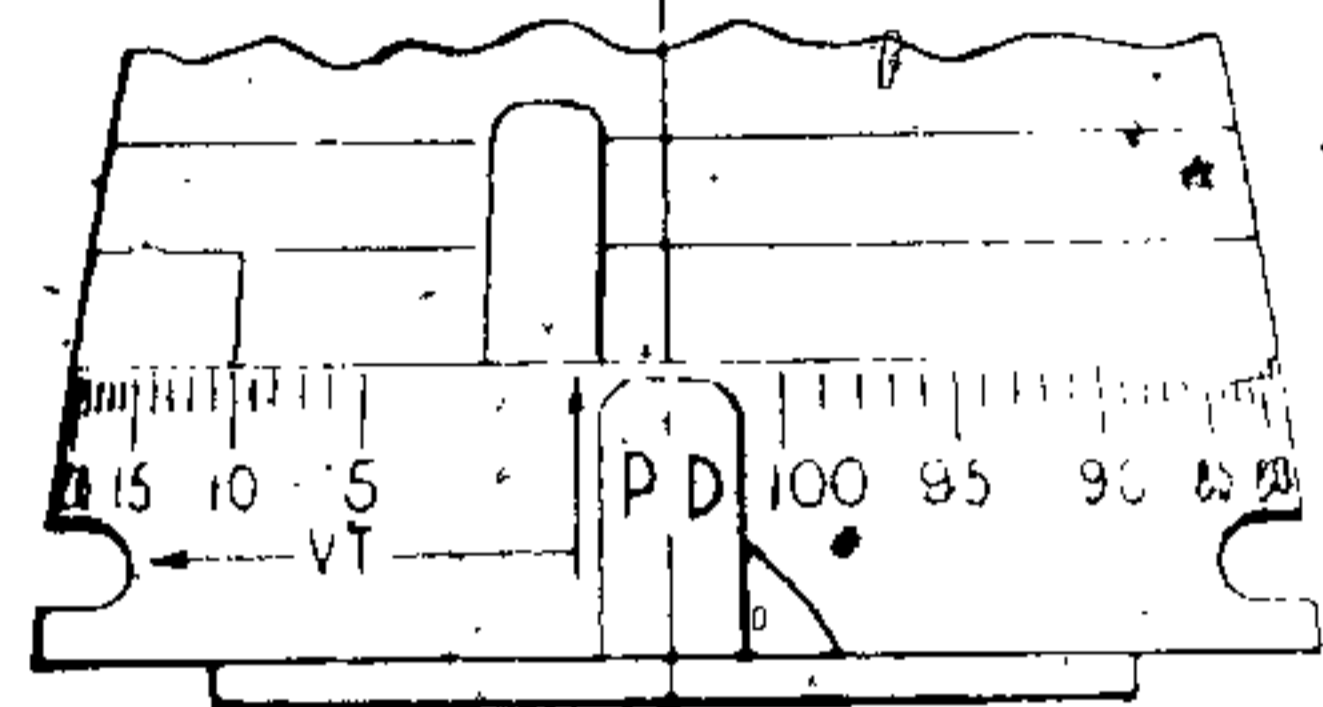
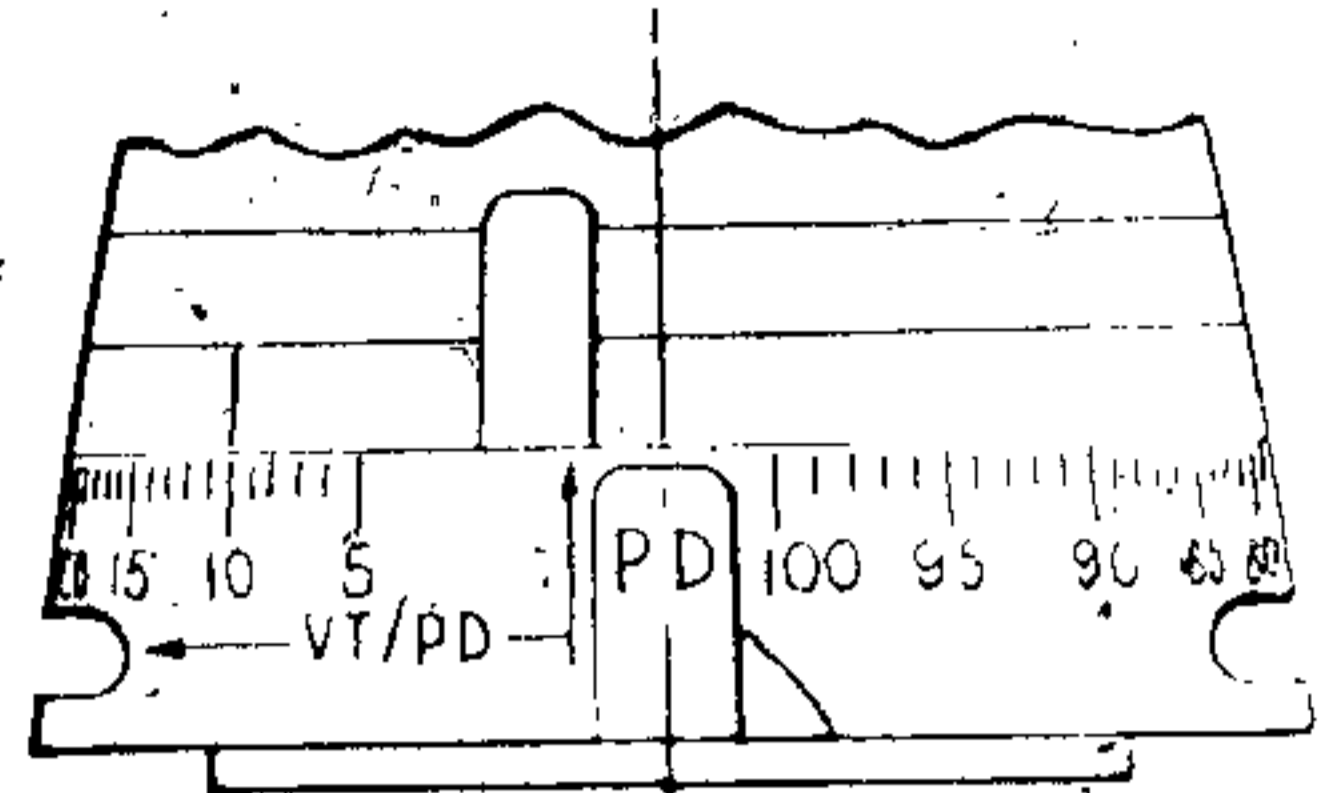
FUZE, PROXIMITY M514A3 (M514A1E1)



AR 199881



AR199880



AR 101339

Type Classification:

Std AMCTC 9514 dtd 1972

Use:

This fuze is an adjustable delayed-arming type designed for use with projectiles fired from 4.2-inch mortars, 105-mm and 155-mm howitzers, 175-mm gun and 8-inch howitzers against surface targets.

Description:

The fuze contains a radio continuous wave transmitter detector with antennas and a power supply which performs the target detection function. A plastic nose cone is fixed to a rotatable metal setting ring which has a single index line. The setting ring is connected to a clockwork timing

mechanism within the fuze sleeve which energizes the proximity element upon approach to the target. In addition, a PD element is included to detonate the projectile on impact, if desired, or if the proximity element fails to operate. Graduations from 5 to 100, representing seconds to target, and a PD set line are inscribed around the shoulder of the sleeve. On this model, the PD mark coincides with the 90 second proximity setting. The slot in the setting ring is for time setting only. Slots in the fuze sleeve are for the fuze wrench when assembling the fuze to the projectile. The fuze is shipped with the index mark aligned with the 10-second mark on the fuze sleeve.

Functioning:

Fuzes are set to the calculated time of flight of the projectile to target unless point detonation

is desired. Setback from weapon firing starts the arming cycle by releasing the timing mechanism and initiating the power supply. The fuze is armed for point detonation after 3 seconds of flight. Approximately 3 seconds prior to set time proximity arming occurs and radio wave transmission is initiated. When any part of the radio wave front is reflected to the fuze from the target, an interaction or doppler signal occurs between the reflected and transmitted wave. When the doppler signal reaches a predetermined amplitude an electronic switch activates the explosive train at an optimum distance from the target. If the proximity mode does not function, the projectile will be detonated on impact by the PD element.

Tabulated Data:

NSN -----1390-00-935-9246
 Type -----Proximity
 Weight -----2.19 lbs.
 Length:
 Vistible -----3.74 in.
 Overall -----8.60 in.
 Thread size -----2.00 IN-12NS-1

Temperature Limits:

Firing:
 Lower limit ----- -40° F
 Upper limit ----- +140° F
 Storage:
 Lower limit ----- -65° F
 Upper limit ----- +145° F
 *Packing ----- 8 fuzes in metal container; 2 containers in wire-bound box
 *Packing Box:
 Weight ----- 63 lbs.
 Dimensions ----- 14-5/8 x 12-13/16 x 11-15/16 in.
 Cube ----- 1.3 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 7
 Storage compatibility group ----- B
 DOT shipping class ----- A
 DOT designation ----- DETONATING FUZES CLASS A EXPLOSIVES
 DODAC ----- 1390-N462
 Drawing number ----- 11707173

Limitations:

The fuze may not be fired at Charge 7 in 105-mm howitzers, except under combat emergency conditions.

Proximity of other masses to the target area, such as crests or ridges, air observation posts, nearby bursts or fragments experienced when firing volley, salvo, or rapid fire from adjacent weapons, may cause early fuze initiation.

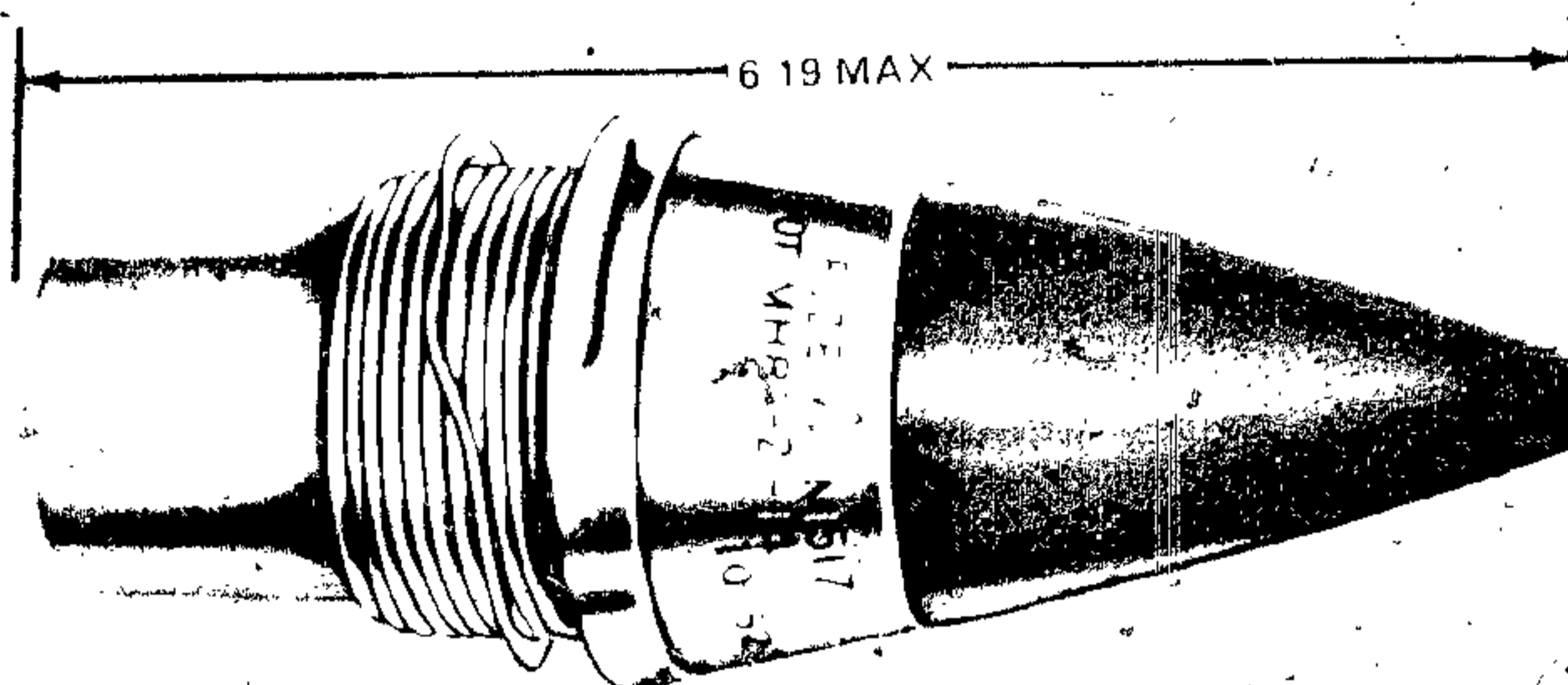
The M514A3 fuze is limited in authorized weapon/propelling charge combinations, as follows:

Weapons	Propelling charge(s)
4.2-inch mortar	10 and above.
105-mm howitzer (all models).	1-6; Charge 7 under emergency conditions for proximity mode only. For PD firings at Charge 7, use Fuze PD M557 or Fuze MTSQ M564.
155-mm howitzer (all models).	All
175-mm gun (all models)	All
8-inch howitzer (all models).	All

References:

- SC 1340/95-IL
- TM 9-1015-203-12
- TM 9-1015-215-12
- TM 9-1015-234-12
- TM 9-1025-200-12
- TM 9-1300-251-20
- TM 9-2300-216-12
- TM 9-2350-210-12
- TM 9-2350-217-10
- TM 9-2350-217-10N

FUZE, PROXIMITY: M517



AR199889

Type Classification:

Std AMCIC 6558 dtd 1969
OBS MSR 01756048

Use:

Proximity Fuze M517 is used with 81-mm M362 HE Cartridge M362 series against surface targets.

Description:

The fuze contains a radio continuous wave transmitter and receiver with antennas in the plastic head and an electrical power source in the steel body as the primary detonation initiator. A safety and arming mechanism is housed in a metal cup in the base. Electrical arming is by setback force activation of the power supply. Mechanical arming is by setback displacement of setback leaves to release a spring-driven rotor with detonator. The rotor holds the detonator out of line in the un-armed condition. The fuze is fitted to the projectile with a wavy spring washer to assure a tight joint and a good electrical ground to the projectile. In addition to the proximity element, the fuze contains a PD element; however, no time setting option is provided.

Functioning:

Setback force upon weapon firing initiates electrical and mechanical arming. electrical arming occurs by a required degree of

setback to activate power generation in the power supply. Mechanical arming occurs through the sequential setback to the rear of 3 setback leaves to release the rotor in the base. The rotor is then turned by centrifugal force to align the detonator. Minimum times for arming are 1.5 seconds for PD action and 4 seconds for proximity action. When the power supply has generated sufficient energy the transmitter is activated. Reflection of any part of the wave pulse back to the fuze results in a ripple of beat interference with the transmitted wave to close an electrical circuit and initiate the explosive train to the projectile. In event the proximity mode does not function, the PD mode will detonate the projectile on impact.

Tabulated Data:

Type -----	Proximity
Weight -----	1.28 lbs
Length:	
Visible-----	3.96 in.
Overfall-----	6.19 in.
Thread size -----	2 00-12NS-1
Assembly Lwg. No.	7542838

Temperature Limits:

Firing:	
Lower limit ----	-40°F
Upper limit ----	+125°F
Storage:	
Lower limit ----	-60°F
Upper limit ----	+160°F

*Packing ----- 1 fuze per metal
container,
20 containers in
wooden box

*Packing Box:

Weight ----- 47.7 lbs.
Dimensions ----- 17-1/2 x 13-1/8 x
9-3/4 in.
Cube ----- 1.29 cu. ft.

NOTE: See SC for complete packing data
including NSN.

Shipping and Storage Data:

Quantity-distance class - 7
Storage compatibility -- B
group
DOT shipping class ---- A
DOT designation --- **DETONATING FUZES -
CLASS A EXPLOSIVES**

DODAC ----- 1390-N417

Limitations:

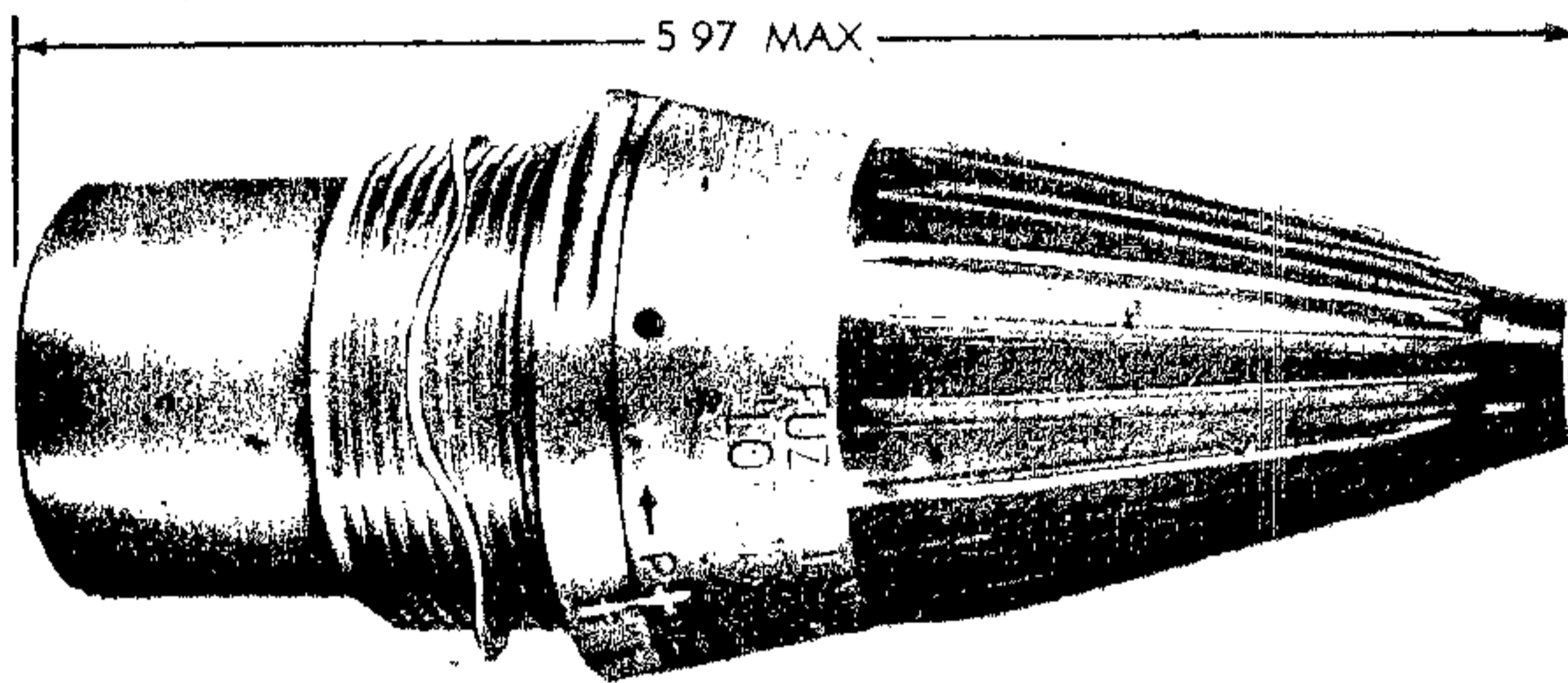
Clearance of at least 100 feet over obstacles
should be allowed for maximum reliability and
effect.

Heavy precipitation, or temperature extremes
may result in premature functioning.

References:

TM9-1015-200-12
TM9-1300-251-20

FUZE, PROXIMITY: M532



AR199888

Type Classification:

Std AMC TC 3404 dtd 1965

Use:

Proximity Fuze M532 is a dual purpose fuze used with 81-mm mortar HE and WP cartridges.

Description:

The fuze consists of a ribbed plastic nose attached to an aluminum ring which is in turn attached through a slip joint to an aluminum base. A steel housing is screwed into the base. Radio transmitter/detector and amplifier/transmitting circuits are contained within the plastic nose. A thermal reserve battery within the base supplies power to the electronic circuits. A setback initiated arming delay clock, detonator, and booster pellet are contained within the steel housing. The nose and attached ring are turned 1/3 turn or more in the direction indicated to change the mode of operation from proximity to point detonating (PD). It cannot be reset. A shear pin prevents accidental turning during normal handling.

Functioning:

Setback of a prescribed minimum force and duration activates the reserve battery and releases the arming delay clock. Approximately nine seconds after firing the clock releases the rotor containing the electric detonator and the arming cycle is completed. As the fuze approaches the ground, the reflected wave interacts with the transmitted signal to cause a frequency shift and initiate the detonator. Initiation occurs in a region of 3 to 30 feet above the ground. The height of burst depends on the mode of fuze, nature of the terrain, and the approach velocity.

Tabulated Data:

Type -----	Proximity
Weight -----	1.30 ± 0.5 lbs
Length:	
Visible -----	3.76 max.
Overall -----	5.97 max.
Thread size -----	2 (0-12) X 1
Assembly Dwg. No. ---	11001026

Temperature Limits:

Firing:

Lower limit----- -40° F

Upper limit----- +125° F

Storage:

Lower limit----- -65° F

Upper limit----- +160° F

*Packing ----- 8 fuzes in metal container; 2 containers in wirebound box

*Packing Box:

Weight ----- 41.8 lbs.

Dimensions ----- 14-5/8 x 12-13/16 x 9 1/8 in.

Cube ----- 1.3 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance

class ----- 7

Storage compati-

bility group ----- B

*DOT shipping class----- A

DOT description --- DETONATING FUZES-
CLASS A EXPLOSIVES

DODAC -----1390-N402

Limitations:

Proximity fuzes may function under the influence of nearby bursts or fragments. An abnormal number of premature air bursts may result from volley, salvo or rapid fire from adjacent weapons. Reduce premature bursts by increasing time between round or the spacing between weapons.

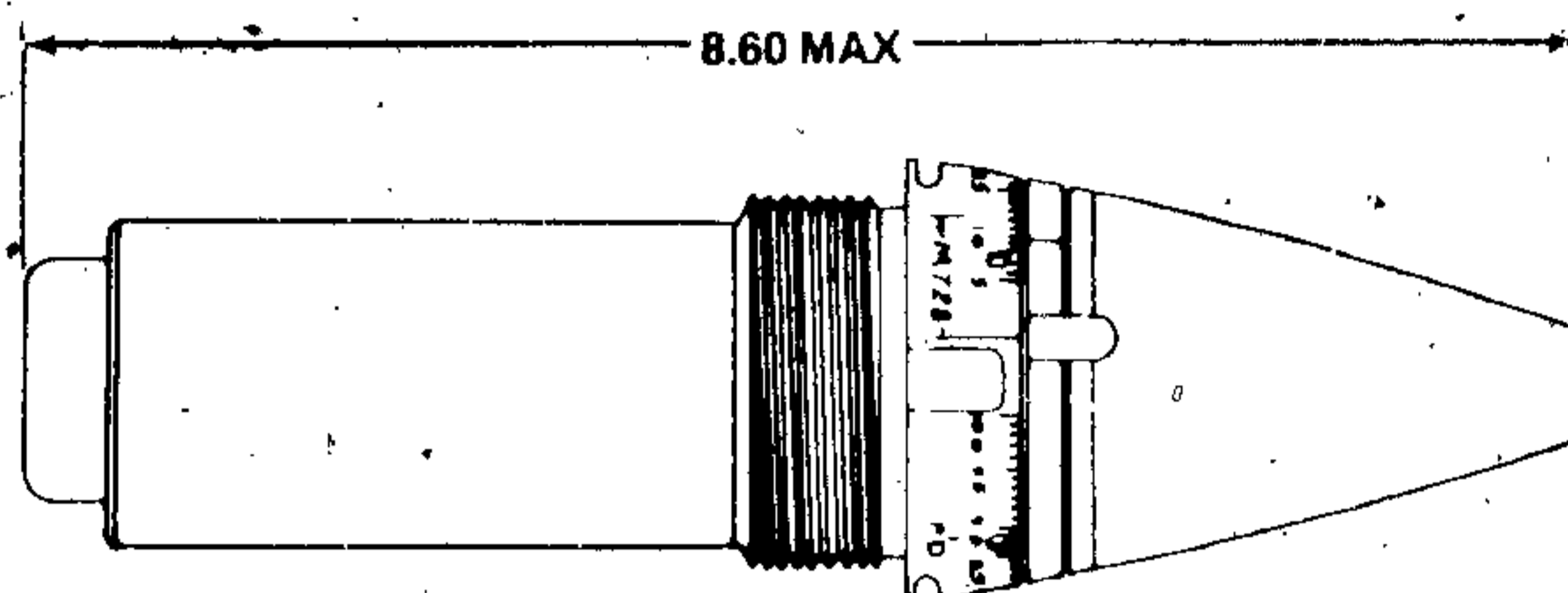
References:

TM 9-1015-200-12

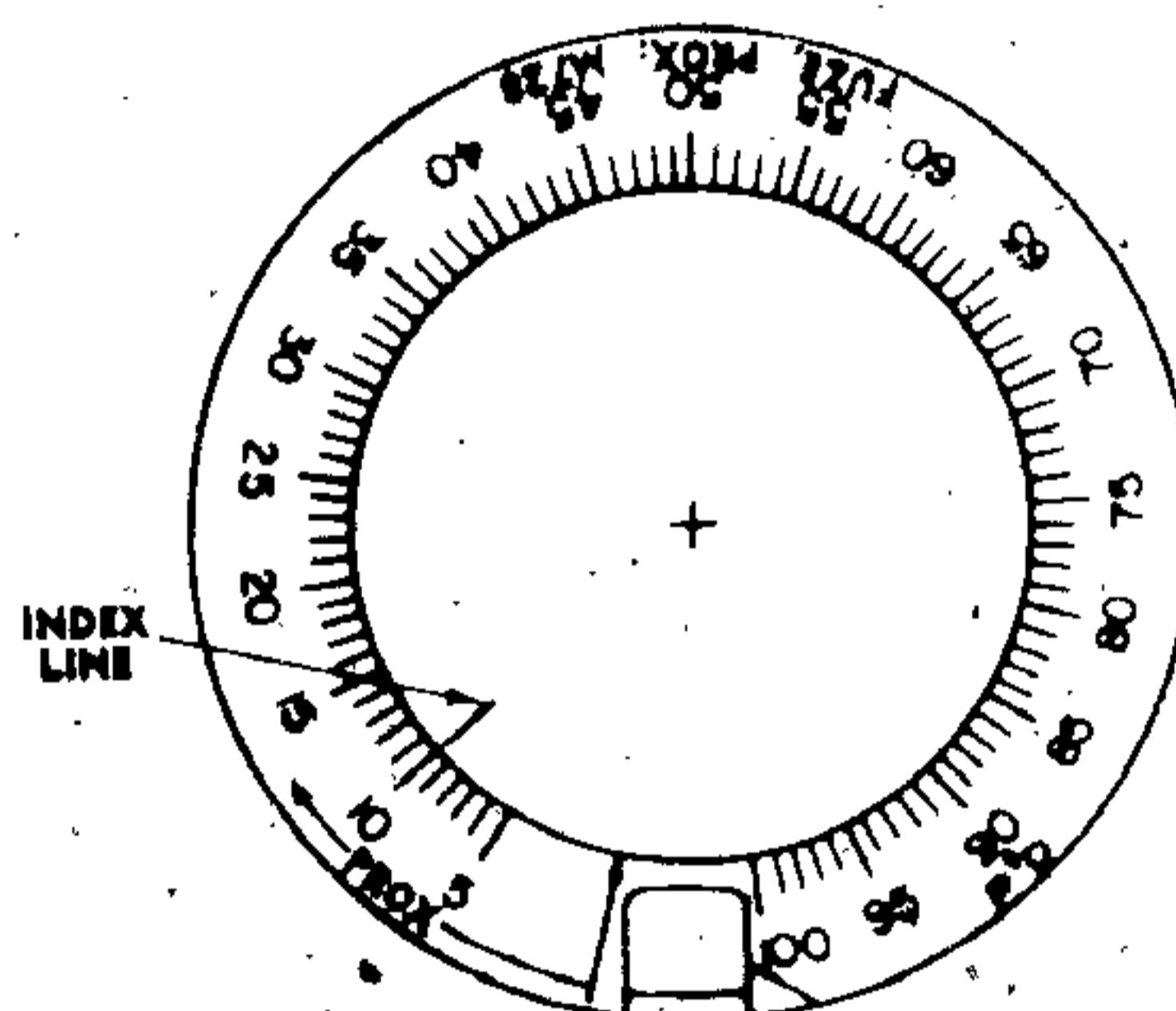
TM 9-1300-251-20

SC 1340/98-IL

FUZE, PROXIMITY: M728



AR199893



AR199892

Type Classification:

Std AMCTC 9514 dtd 1972.

Use:

Proximity Fuze M728 is the latest model of the adjustable delayed-arming type designed for use with projectiles fired from 4.2-inch mortars, 105-mm and 155-mm howitzers, 175-mm gun, and 8-inch howitzers against surface targets.

Description:

The fuze contains a radio continuous wave transmitter/detector with antennas and a power supply which performs the target detection function. A nose cone is fixed to a rotatable setting ring which has a single index line. The

setting ring is connected to a clockwork timing mechanism within the fuze sleeve which energizes the proximity element upon approach to the target. In addition, a PD element is included to detonate the projectile on impact if desired, or if the proximity element fails to operate. Graduations from 0 to 100, representing seconds to target, and a PD set line are inscribed around the shoulder of the sleeve. On this model the PD mark coincides with the 90-second proximity setting. The plastic nose cone of the fuze has an anti-static protective coating. The setting ring and sleeve are metal. The slot in the setting ring is for time setting only. Slots in the fuze sleeve are for the fuze wrench when assembling the fuze to the projectile. The fuze is shipped with the index mark aligned with the 10-second mark on the fuze sleeve. The major difference between the M514A1E1 and the M728 is that the latter has a black anti-static coating which prevents

the fuze from functioning prematurely during some adverse atmospheric conditions.

Functioning:

Fuzes are set to the calculated time of flight of the projectile to target unless point detonation is desired. Setback from weapon firing releases the timing mechanism and initiates the power supply and point detonation arming. The fuze is armed for point detonation after 3 seconds of flight. Approximately 3 seconds prior to set time, proximity arming occurs; also, radio wave transmission is initiated. When any part of the radio wave front is reflected to the fuze from the target, an interaction or doppler signal occurs between the reflected and transmitted wave. When the doppler signal reaches a predetermined amplitude, an electronic switch activates the explosive train at an optimum distance from the target. If the proximity mode does not function, the projectile will be detonated on impact by the PD element.

Tabulated Data:

Type -----	Proximity
Weight -----	2.19 lbs.
Length:	
Visible -----	3.74 in.
Overall -----	8.60 in.
Thread size -----	2.00-12NS-1
Assembly Dwg. No. -----	11718400

Temperature Limits:

Firing:
 Lower limit: ----- -40°F
 Upper limit ----- +140°F

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

*Packing ----- 8 fuzes in metal container; 2 containers in wire-bound box

*Packing Box:
 Weight ----- 63.0 lbs.
 Dimensions ----- 14-5/8 x 12-13/16 x 12 in.
 Cube ----- 1.3 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class - 7:
 Storage compatibility --- B group
 DOT shipping class ---- A
 DOT designation ---- DETONATING FUZES - CLASS A EXPLOSIVES

DODAC ----- 1390-N463

Explosive Components:

Time Mode: Primer, detonator, detonator lead charge, and booster charge.
 PD Mode: Detonator, detonator lead charge, and tetryl booster charge.

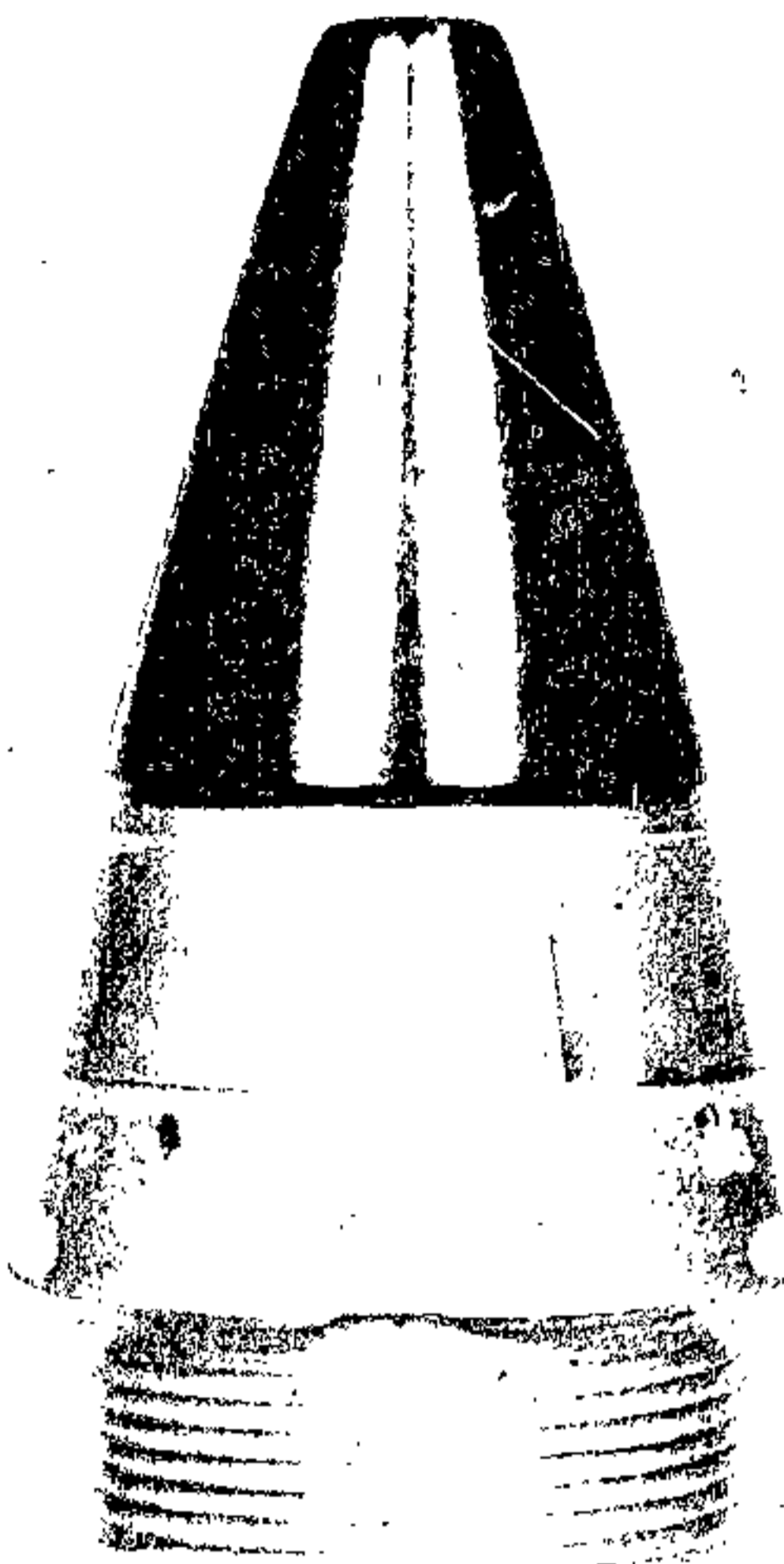
Limitations:

Avoid firing at targets closer than as shown to friendly positions with the following cartridges; when using Fuze M728:
 4.2-inch and 105-mm --- 320 meters (350 yards)
 155-mm, 175-mm, ----- 731 meters (800 and 8-inch yards).
 Premature bursts may occur when firing over ridges with clearance of less than 64 meters

References:

- TM 9-1015-203-12
- TM 9-1015-215-12
- TM 9-1025-200-12
- TM 9-1300-251-20
- TM 9-2350-210-12
- TM 9-2300-216-10
- SC 1340/98-IL

FUZE PROXIMITY: M732



AR 101663

Type Classification:

STD 05766017

Use:

Proximity Fuze M732 is designed for use on conventional, high-explosive ammunition; specifically, 105-mm, 155-mm, 175-mm, and 8-inch artillery ammunition, and 4.2-inch mortar ammunition with a standard 2-inch thread. Action may be either proximity airburst or impact. Arming is initiated by setback and completed by the spinning of the projectile. Fuze M732 has the same intrusion (2.2 inches) as standard point detonating and mechanical time fuzes, and unlike other proximity fuzes, it does not require a deep-intrusion shell cavity.

Description:

Fuze M732 has a plastic nose cone fitted to a movable steel ring which rotates on a steel sleeve. The movable ring has an index mark for setting time. The fuze is shipped with the index mark aligned with the PD line on the sleeve. The sleeve also has graduations from 5 to 15 which represent seconds of flight time to target.

Functioning:

Fuzes are set for the anticipated time of flight (in seconds) to the target. When set at any value between 5 seconds and 15 seconds, proximity arming occurs approximately 3 seconds prior to the set time. If the fuze fails to function in the proximity mode, it will function on ground impact. The impact element

becomes armed after 400 calibers of air travel and remains armed throughout flight. The burst height is essentially optimum, regardless of projectile size or angle of fall.

NOTE

Do not assemble Desensitizing Cap XM5 to this fuze. This cap was authorized for Proximity Fuzes M513 Series only.

a. Condition as Issued. The fuze is issued set on PD. The battery is not energized. The safety and arming (S&A) mechanism holds the explosive train out of line.

b. Prior to Firing. Set fuze on desired time setting.

c. Action Caused by Setback and Spin on Firing. On firing, setback causes a safety pin to be released in the S&A mechanism and the battery ampule to open, releasing the electrolyte. Projectile spin releases safety detents in the S&A mechanism and drives the rotor from the safe to the armed position. Spin also drives the battery electrolyte into position in the cells, causing the battery to activate.

d. Action in Flight. In flight, spin drives the S&A to the armed position after at least 400 calibers of air travel. The electronic timer runs and arms the fuze in the proximity mode at the set time minus 3 seconds. The proximity element detonates the round at approximately 7 meters above the target.

e. Action Upon Impact. If the proximity element fails to function, the mechanical backup element will detonate the round on impact. This mechanical element arms with the rotor and is active throughout flight.

Tabulated Data:

<u>Length:</u>		
Visible	-----	3.76 in. max.
Intrusion	-----	2.21 in.
Overall	-----	5.97 in.
Weight	-----	1.75 ± .05 lb
Body material	-----	Steel
Thread size	-----	2-12 UNS-1A
<u>Arming</u>		
	<u>Min.</u>	<u>Max.</u>
Setting time	-----	5 sec. 150 sec.
Spin	-----	2,700 18,000
	rpm	rpm
Setback	-----	1,100 g 18,000 g
<u>Distance (400 calibers minimum):</u>		
105-mm howitzer	-----	42.6 m
4.2-in. mortar	-----	42.7 m
155-mm howitzer	-----	62.0 m
175-mm gun	-----	70.0 m
8-in. howitzer	-----	81.3 m

Temperature Limits:

Operational	-----	-35° to +145° F
Transportation and storage	-----	-50° to +160° F
Packing	-----	One fuze per barrier bag; 8 barrier bags per metal container; 2 containers per wire-bound box

Packing box:

Weight w contents	-----	49.8 lb
Outside dimensions	-----	14-5/8 in. x 12-13 1/2 in. x 9-1/8 in.
Cube	-----	1 cu ft

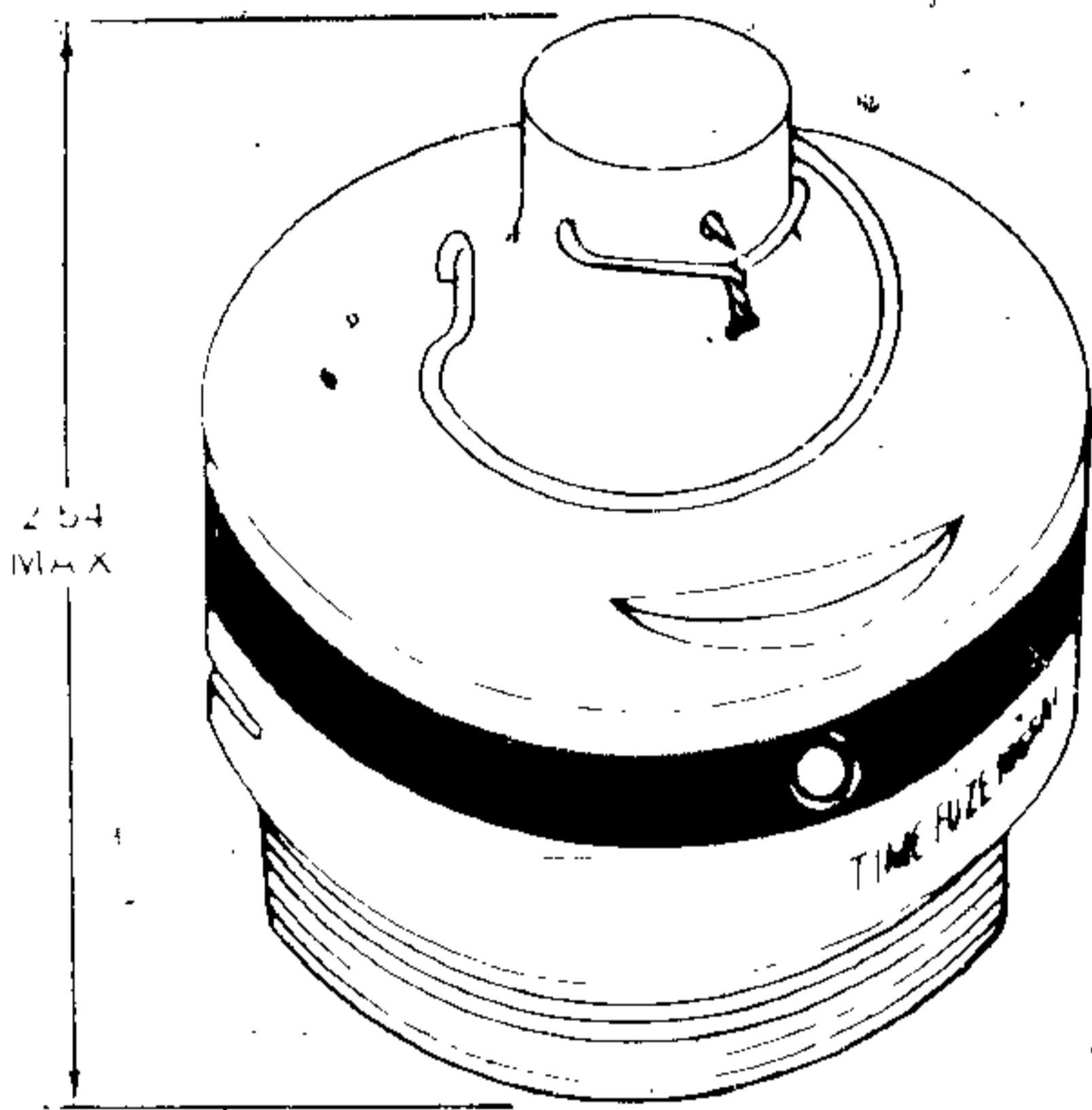
Shipping and Storage Data:

Quantity-distance class	-----	1.1
Storage compatibility group	-----	B
DOT shipping class	-----	A
DOT designation	-----	Detonating Fuzes, Class A Explosives -- Handle Carefully

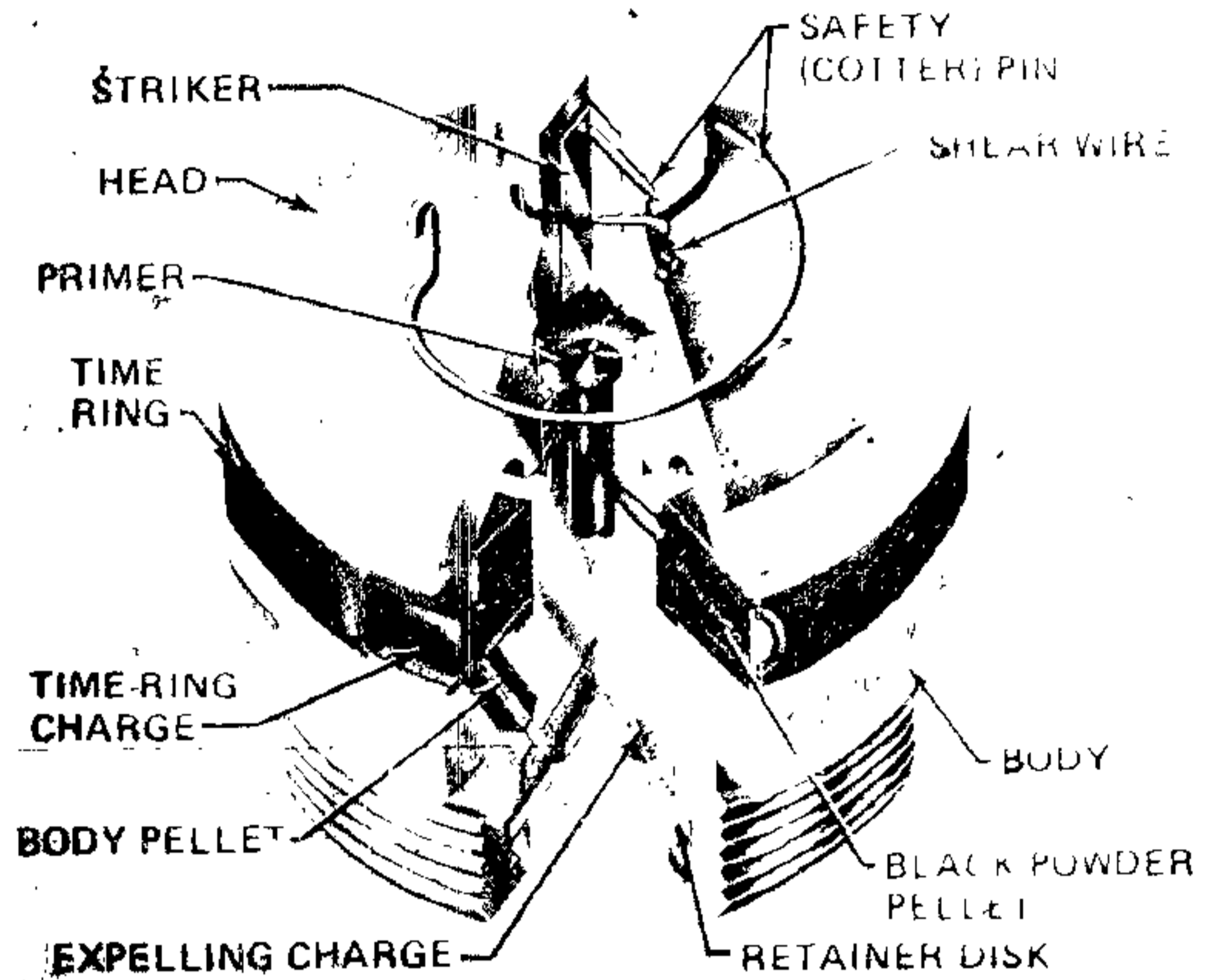
References:

- FM 6-40
- FM 23-92
- TM 9-1015-203-12
- TM 9-1025-200-12
- TM 9-1300-251-20
- TM 9-2350-217-10

FUZE, TIME: M65A1 OR M65



AR199907



AR199906

Type Classification:

Std AMCTC 8346 dtd 1971.

Use

Time Fuze M65A1 is a powder-train fixed delay type used with 60-mm Illuminating Cartridge M83A3. The M65 fuze is used with Cartridges M83A1 and M83A2.

Description:

The fixed time-train is a powder type consisting of a primer, a black powder pellet, a time ring charge loaded for 15-second burning, a body pellet and a black powder expelling charge. An inertial striker restrained by a shear wire is housed in the nose of the fuze, and the burning components are within the body. There is no setting ring or other provision for varying function time.

Functioning:

Upon firing setback causes the striker to move rearward with sufficient force to shear the shear wire and strike the primer. The flame from the primer ignites the black powder pellet, which in turn ignites the time-ring

charge. After the flame from the time-ring charge has completed about the time ring it ignites the body pellet. The body pellet then ignites the expelling charge. Flame from the expelling charge passes through the apertures in the expelling charge retainer disk, ejecting the parachute and illuminant charge assemblies from the base of the projectile.

Differences Between Models:

Fuze M65A1 differs from Fuze M65 in the following respects: the striker is longer; the body is recessed beneath the time train; to protect the felt pads which separate the body and ring the fuze wrench holes in the felt are replaced with two fuze wrench slots cut in the lower flange of the body; the time-train ring is slightly heavier and the quickmatch is replaced by a black powder pellet.

Tabulated Data:

Type-----	T
Weight:	
M65A1-----	0.74 lb.
M65-----	0.77 lb.
Length:	
Visible-----	2.06 in.
Overall-----	2.54 in.

Thread size ----- 2-20NS-1
Assembly Dwg. Nos.:
M65A1 ----- 9207568
M65 ----- 73-3-163

Packing ----- Fuze is assembled
with cartridge and
is not a separate
item of issue.

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 hrs.
/day)

Shipping and Storage Data:

Not Applicable. >

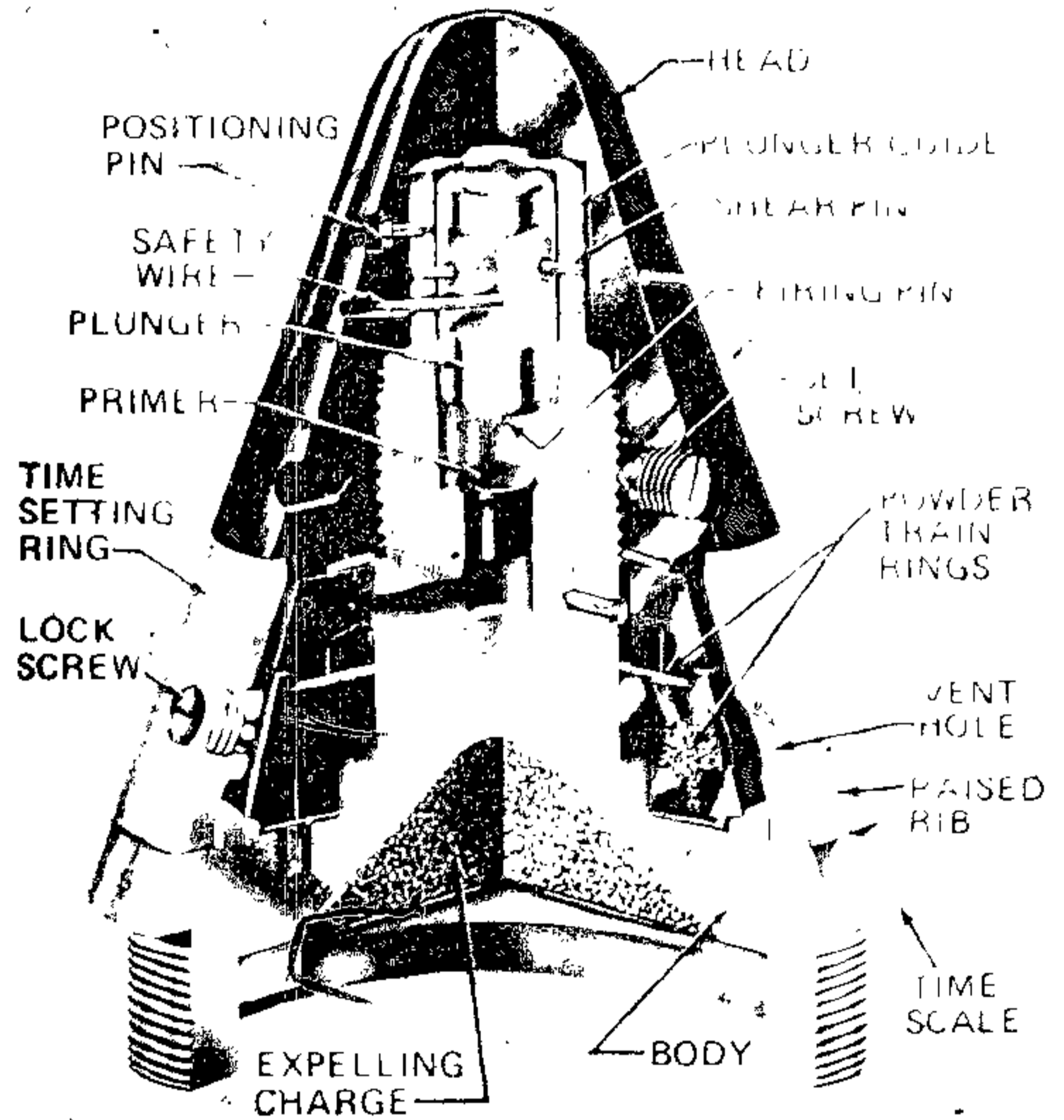
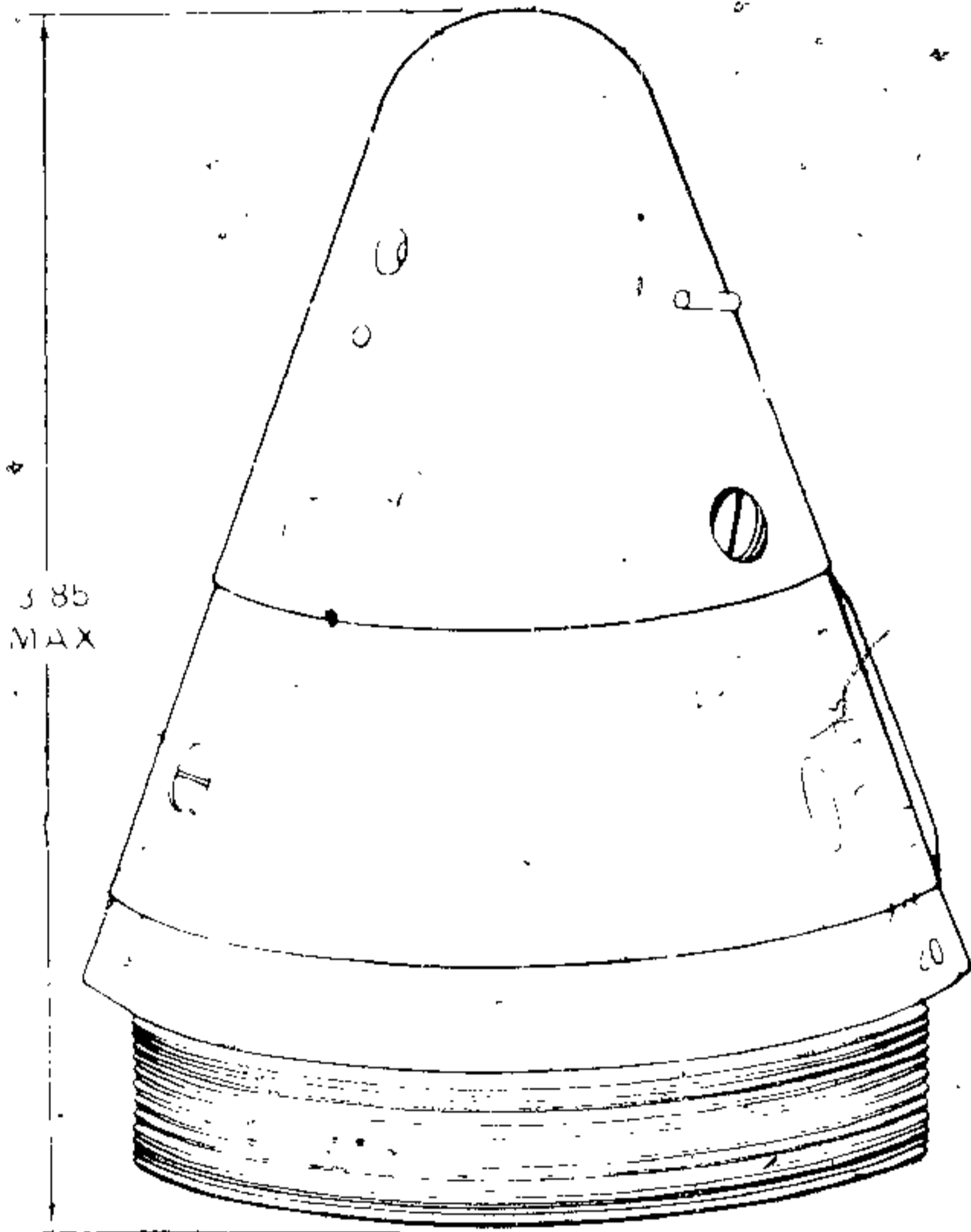
Explosive Components:

Primer, black powder time-ring charge,
black powder pellet, and black powder ex-
pelling charge.

Reference:

FM 23-85

FUZES, TIME: M84 AND M84A1



AR199911

AR199910

Type Classification:

Std AMCTC 6390 dtd 1965.

Use:

Time Fuzes M84 and M84A1 are the single-purpose powder train, selective time type and are used with 81-mm illuminating cartridges.

Description:

The fuze has a brass head containing an inert primer acting from setback and a brass body containing a primer, variable-time powder, train rings and a black powder expelling charge. A time setting ring on the body has six notches and six raised ribs to adapt to fuze M25 and a setting rib for alignment with the desired time setting as chosen from the 0

to 25 second scale on the base. The time scale is in 1 second increments, and 5 second increments are indicated by bosses. The raised setting rib and the body bosses enable the fuze to be set in the dark. As issued, the fuze is equipped with a safety wire to be removed before firing.

Functioning:

After removal of the safety wire, the inertial plunger is held by two shear pins passing through the plunger guide. Setback from firing causes the plunger to shear these pins and strike the percussive primer at the base of the plunger guide. Ignition of the primer causes burning of the variable time powder train selected according to the time setting. The burning powder train then ignites a black powder pellet and the expelling charge. The expelling charge ejects the parachute and time train assemblies through the base of the projectile.

TM 43-0001-28

Difference Between Models:

Fuze M84A1 has a tungsten compound delay train and a graduated scale of 50 seconds in two-second intervals. Otherwise, models M84 and M84A1 are identical.

Fabulated Data:

Type -----	T
Weight -----	1.82 lbs.
Length	
Visible -----	3.25 in.
Overall -----	3.85 in.
Thread size -----	2.4-18NS-1
Assembly Dwg. Nos.:	
M84A1 -----	9232784
M84 -----	9205598

Temperature Limits:

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

Storage:

Lower limit -----	- 65° F
Upper limit -----	+ 145° F
Packing -----	Fuze is assembled with the cartridge and is not a separate item of issue.

Shipping and Storage Data:

Not Applicable.

Explosive Components:

M84: Primer M39A1, black powder time-train rings, black powder pellet, and black powder expelling charge.

M84A1: Primer M39A1, tungsten compound time-train rings, black powder pellet and black powder expelling charge.

Reference:

TM 9-1015-200-12

FUZES, INERT AND DUMMY.

Type Classification:

Use:

Inert and dummy fuzes are provided for ammunition such as target practice, test, and drill to simulate fuze assembly.

Description:

Dummy fuzes are manufactured especially for the purpose, and inert fuzes are assembled from burned-out or rejected parts of service fuzes; consequently, the substitute fuzes resemble in each case the service fuze for which training is conducted, and have the same dimensional and material characteristics. In general, each inert or dummy fuze is designed for use with a specific dummy cartridge according to the following table:

Fuze, PD Inert, M51 series	Inert or dummy nose-fuzed rounds from 75-mm to 8-inch
Fuze, PD Inert, M52 series	60-mm Cartridge M49 series 81-mm Cartridge M45 series
Fuze, PD Inert, M89	57-mm TP Cartridge M306
Fuze, PD Dummy M59	75-mm Dummy Cartridge M19, 76-mm Dummy Cartridge M20; 105-mm Dummy Cartridge M14
Fuze, PD Dummy M69	40-mm TP-T. Cartridge M91 & Dummy Cartridge M25
Fuze, PD Dummy M73	175-mm Dummy Cartridge M458

Fuze, PD Dummy M80	90-mm Dummy Cartridge M12 series
Fuze, PD Dummy M553	105-mm TP-T Cartridge M393 series

Functioning:

Not applicable.

Tabulated Data:

Fuze, Inert or Dummy	Weight lbs.	Length, inches		Service Fuzes Simulated
		Visible	Overall	
I, PD, M51 series	2.15	3.74	5.93	PD, M51 series
I, PD, M52 series	1.06	2.40	3.52	PD, M52 series
I, PD, M89	0.37	1.72	2.52	PD, M89
D, PD, M59	1.4	3.75	4.55	PD, M48 series, M51 series, M535, M557, M572
D, PD, M69	0.225	1.9	2.375	PD, M69
D, PD, M73	2.15	3.77	5.71	M51 series, M535, M557, M572
D, PD, M80	3.37	4.75	6.825	MI, M43 series
D, BD, M533	1.007	N.A.	4.87	BD, M534 series

References:

TM 9-1300-251-20
Refer to operator's manuals

TM 43-0001-28

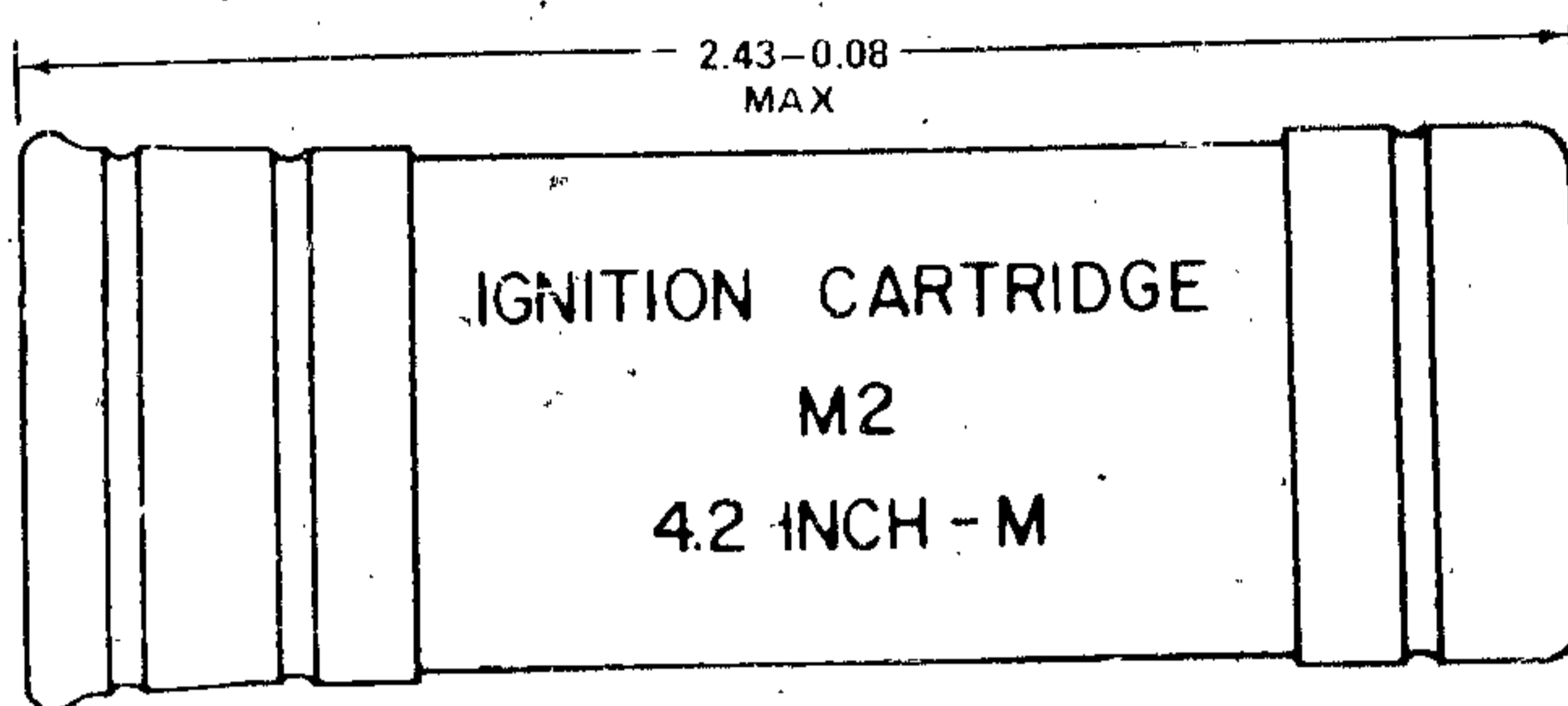
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CHAPTER 8

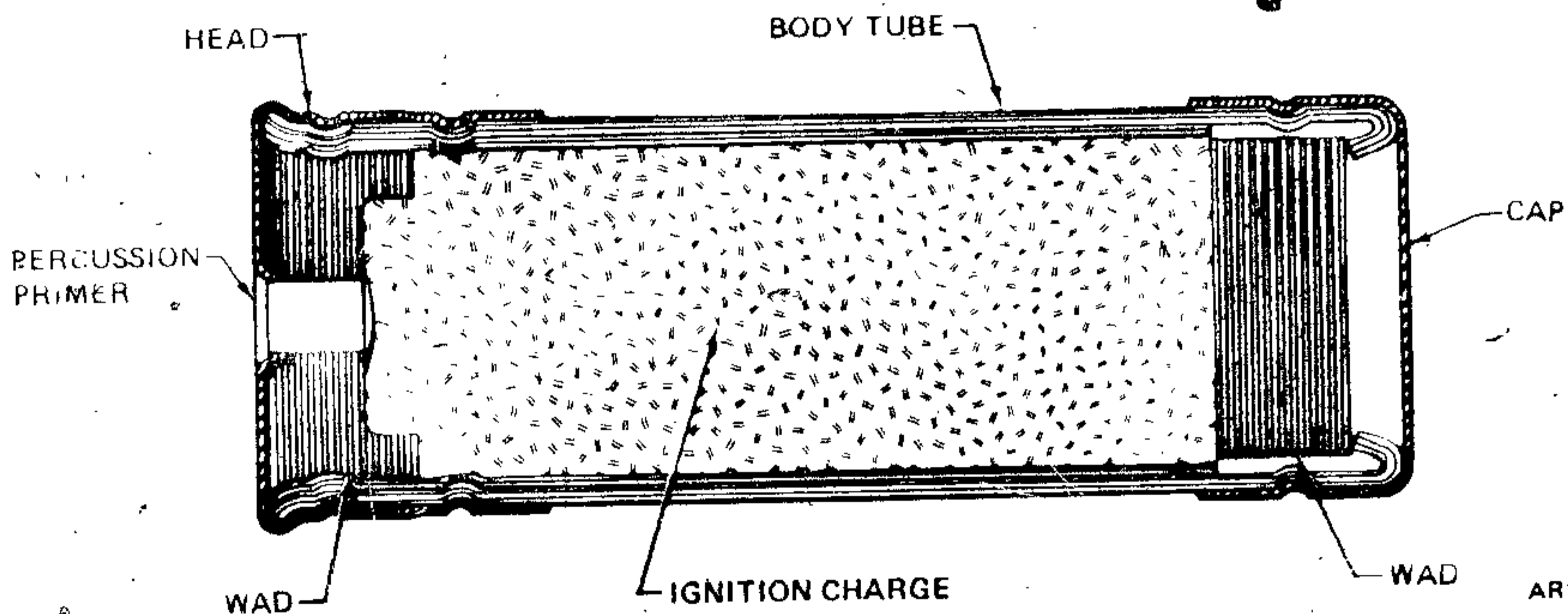
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CARTRIDGE, IGNITION: M2, M2A1, & M2A2



AR199470



AR199469

Type Classification:Use

These cartridges are components of all 4.2 inch mortar cartridges. Ignition Cartridge M2 is used with Propelling Charges M6 and M36. Ignition Cartridge M2A1 is used with Propelling Charge M36A1. Ignition Cartridge M2A2, which has greater resistance to moisture and longer shelf life than M2A1, is used with Propelling Charge M36A1 and M36A2. Illuminating Cartridge M36A2 uses M2A2 only.

Description:

These cartridges are similar in external appearance to a commercial 12-gauge shotgun

cartridge. Each cartridge consists of an outer body tube of red cartridge paper construction, an inner body tube of green cartridge paper construction, a brass cap crimped over the front end, a brass head with a tin-plate liner crimped over the rear end, and a percussion primer inserted into the head at the cartridge base. The cylindrical cavity in the body tube contains one of two different types of ignition charges, depending on the cartridge model. Three layers of hard-pressed paper wadding in the front end of the body tube act to seal and hold the ignition charge in position. A hard-pressed convolute wound paper wad in the base of the body tube serves as a receptacle for the percussion primer and seals and holds the ignition charge in position.

Functioning:

The firing pin in the mortar tube base strikes the percussion primer in the base of the ignition cartridge, igniting the ignition charge. The flash from the burning ignition charge incinerates the body tube and ignites the propelling charge through the flash holes in the cartridge container.

Difference Between Models:

See Tabulated Data.

Tabulated Data:

Complete round:

Type ----- Ignition cartridge

Weight:

M2 -----

M2A1, M2A2 -----

Length:

M2 ----- 2.45-.05 in.

M2A1, M2A2 ----- 2.43-.08 in.

Color ----- Red w/black markings

Ignition charge:

M2 ----- Propellant, M9,
Type II, 120.0
± 2.5 grains

Class and div
dwg. No. --- 75-19-81

M2A1, M2A2 ----- Black powder,
Class 3, 170.0
± 5 grains

Drawing No. -- 8863425 (M2A1)
-- 9252205 (M2A2)

M2A2 ----- Black powder,
Class 3, 133.0
± 5 grains

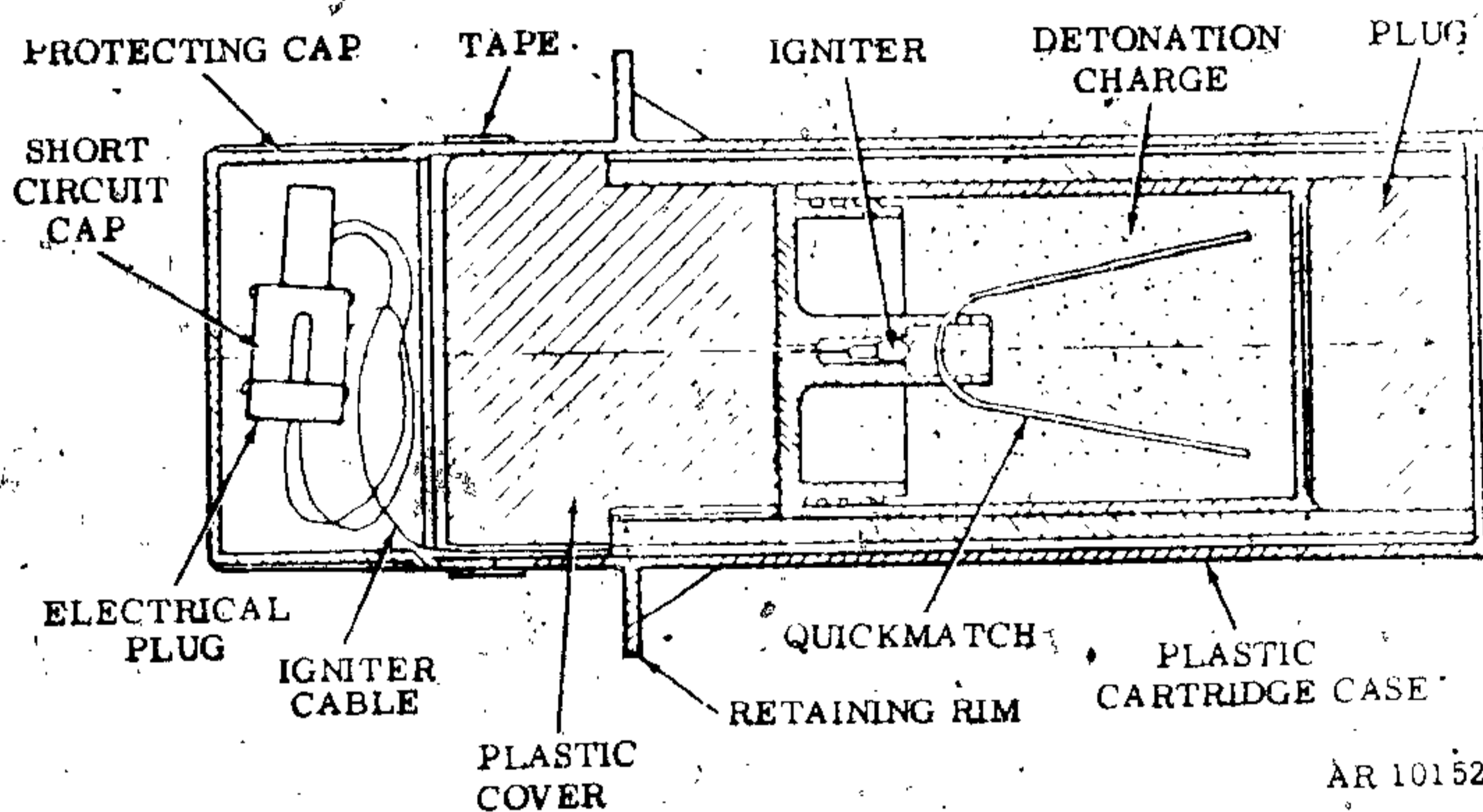
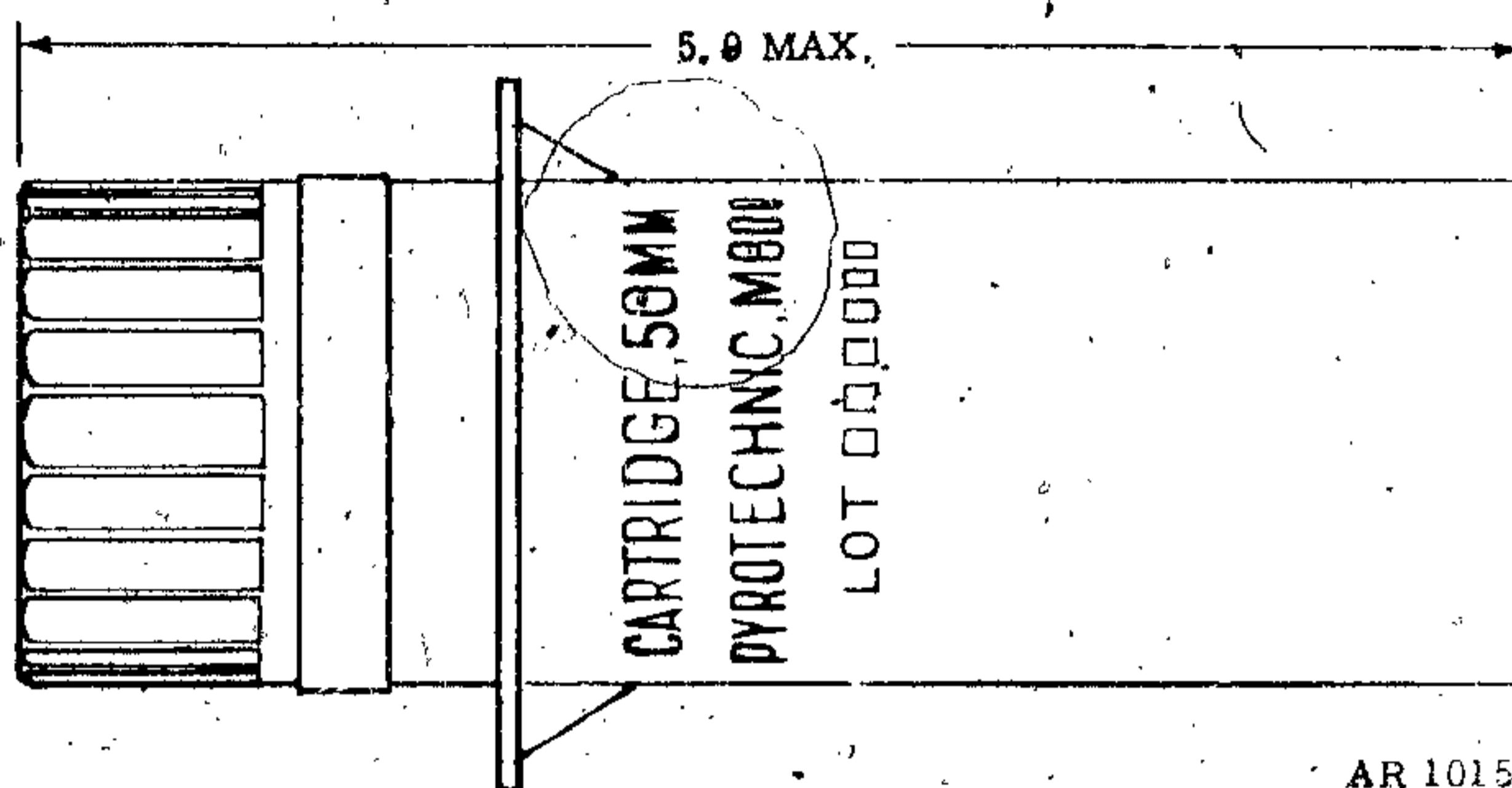
Drawing No. -- 8882287

Primer ----- Percussion

References:

SC 1305/30-IL
TM 9-1300-251-20
TM 9-1015-215-12

CARTRIDGE, 50-MM: PYROTECHNIC, M800



Type Classification:

STD 31 March 1977 (MSR Pending).

Use:

To simulate the acoustic (bang) and optical (flash and smoke) signature of tank main gun. Firing is from the Simulator Tank Gunfire: Main Gun Weapons Effect Signature.

Description:

The cartridge consists of an outer, plastic case encompassing two sections which are taped together. The upper section is a protective cap and is removed prior to loading and firing. The hollow space within the cap

houses the ignition leads and plug used to electrically initiate the cartridge. The lower section is loaded into the firing drums of the simulator and contains the pyrotechnic charge and electrical igniter assembly. The plastic case is provided with a retaining rim which presses against the inner wall of the drum to prevent the cartridge from falling out.

Functioning:

Nine cartridges are inserted singly into the nine firing drums of the Simulator Tank Gunfire: Main Gun Weapons Effect Signature and electrically connected by their plugs to the corresponding sockets of the firing drums. The simulator is mounted on the tank's main gun tube and each cartridge is activated electrically

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upon depressing the main gun trigger. The cartridges function in place to produce the audible and visual simulation of the tank gun. After each round is expended, a firing device automatically prepares the next round for firing. The simulator is adaptable to the following US combat vehicles: M60, M60A1, M60A2, M60A3, M48, M48A3, M48A5, M551, and the XM1.

Tabulated Data:

NSN -----1310-01-034-1397
Weight loaded -----0.31 lbs (140 gms)
Length -----5.9 in. (150mm)
Diameter -----1.87 in. (50mm)
Diameter (overall) -----2.85 in. (72.5mm)
Method of actuation ---Electrical
Body material -----Polyethylene
Color -----Yellow Olive w/
White markings

Pyrotechnic Charge:

Type -----Flash powder
Weight -----1.5 oz (42 gms)
Igniter -----Electrical

Performance:

Burning time -----Instantaneous

Packing: -----162 per box; 9 per inner pack

Packing Box:

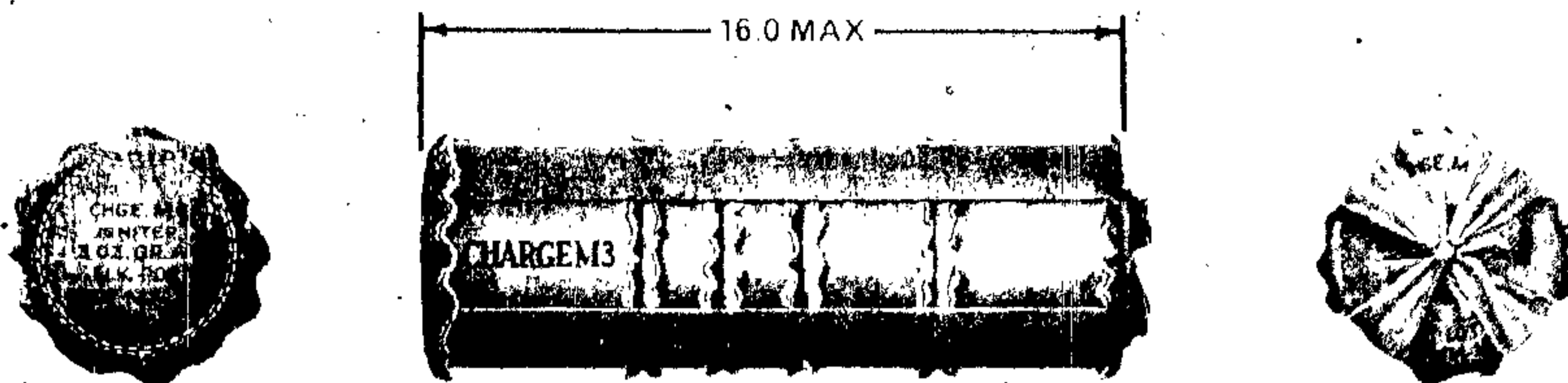
Weight -----94.6 lbs (43 kgms) Approx.
Dimensions -----22-1/2 x 16 x 20-2/5 in. (572mm x 406mm x 520mm)
Cube -----4.34 cu ft (0.12 cu meters)

Shipping and Storage Data:

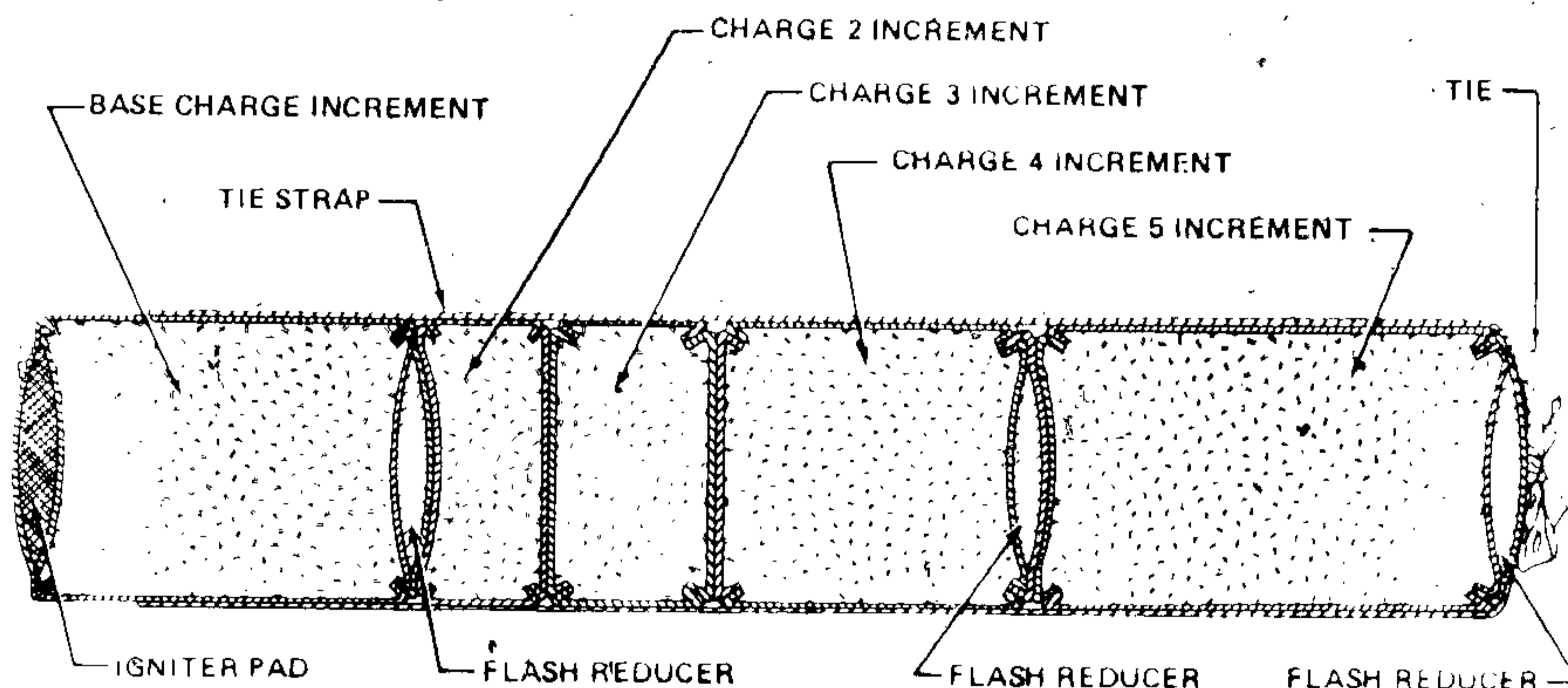
Quantity-Distance
Class -----1.1*
Storage compatibility group -----G*
DOT shipping class -----Explosive B*
DOT designation -----Special Fireworks*
Handle Carefully
Keep Fire Away
DODAC -----1310-B-870
Drawing Number -----9322059

*Interim pending further evaluation.

CHARGE, PROPELLING, 155-MILLIMETER: M3 SERIES



AR199661



AR199660

Type Classification:

M3A1: Std AMCTC 4633 dtd 1966
 M3: Std AMCTC 4633 dtd 1966

Use:

The M3 series propelling charges are green bag type designed for use in 155-mm howitzers for firing in Zones 1 through 5.

Description:

The full charge consists of approximately 5.50 pounds of propellant including a base charge and four unequal increments loaded in cloth bags. The bags are fastened together with four cloth straps sewn to the base and tied on top of Increment 5. Charge M3 is assembled

without flash reducer pads. Charge M3A1 includes 3 flash reducer pads containing potassium nitrate or potassium sulphate. A 2 ounce pad is assembled forward of the base charge and there are two 1-ounce pads forward of increments 4 and 5. The igniter charge of the M3A1 is 3.5 ounces of clean burning igniter (CBI) in a red cloth bag sewn to the rear of the base section. The igniter charge of the M3 is 3 ounces of black powder. The seams of the base charge section are inverted on the M3A1 only so that the edges of the cloth are inside to reduce residue after firing.

Functioning:

The primer ignites the igniter pad, and the igniter charge, in turn, ignites the propellant

charge. The burning propellant generates rapidly expanding gases to propel the projectile through the barrel and to the velocity required to reach the target or function point. The flash reducer pads serve to limit breech flare-back as well as muzzle flash and blast overpressure.

Difference Between Models:

Model M3 does not include flash reducers. The igniter charge is 3 ounces of black powder instead of CBI, and the base seams are not inverted.

Tabulated Data:

Type ----- Green bag, separate loading
 Weight ----- 6.2 lbs.
 Length ----- 16 in.
 Color ----- Green w/black markings
 Propellant ----- M1 (5.6 lbs. explosive)
 Cannon used with ----- M1, M1A1, M45, M126, M126A1, M185, M199

Temperature Limits:

Firing:
 Lower limit ----- - 40°F
 Upper limit ----- + 125°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 ----- 2 propelling charges in container MI4
 *Container:
 Weight ----- 29.0 lbs.
 Dimensions ----- 33-3/4 x 6-3/8 x 6-3/8 in.

Cube ----- 0.89 cu. ft.
 Explosive per container ----- 11.5 lbs.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 2
 Storage compatibility group ----- J
 DOT shipping class ----- B
 DOT designation ----- PROPELLANT, EXPLOSIVE SOLID CLASS B WITH CANNON PRIMERS AND IGNITERS
 DODAC ----- 1320-D540
 Assembly Dwg. Nos.:
 M3A1 ----- 8887277
 M3 ----- 8864405

Preparation for Firing:

No preparation is required other than adjusting the charge according to the firing zone.

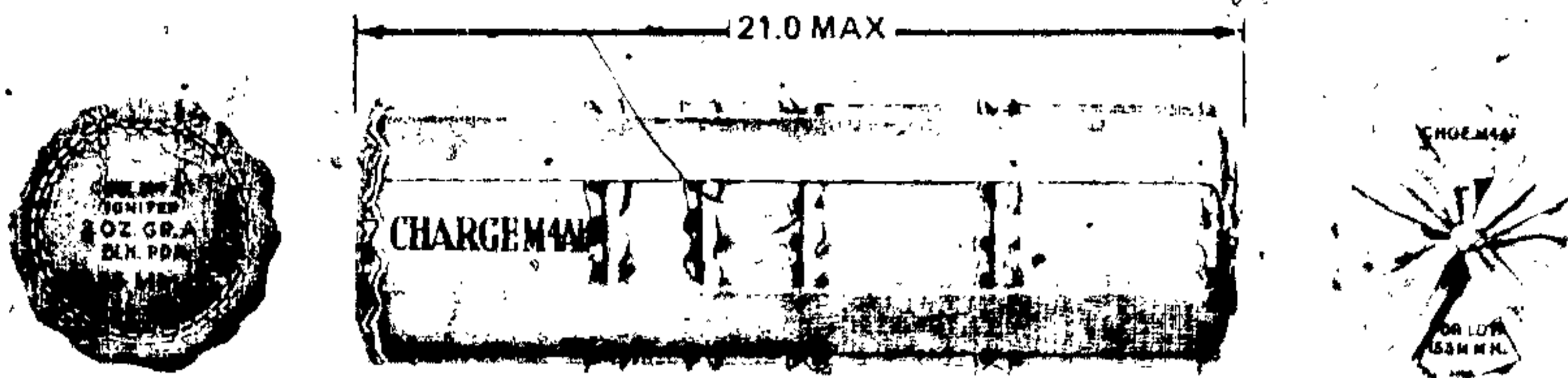
Limitations:

Increments of green bag charges may not be mixed with white bag increments.

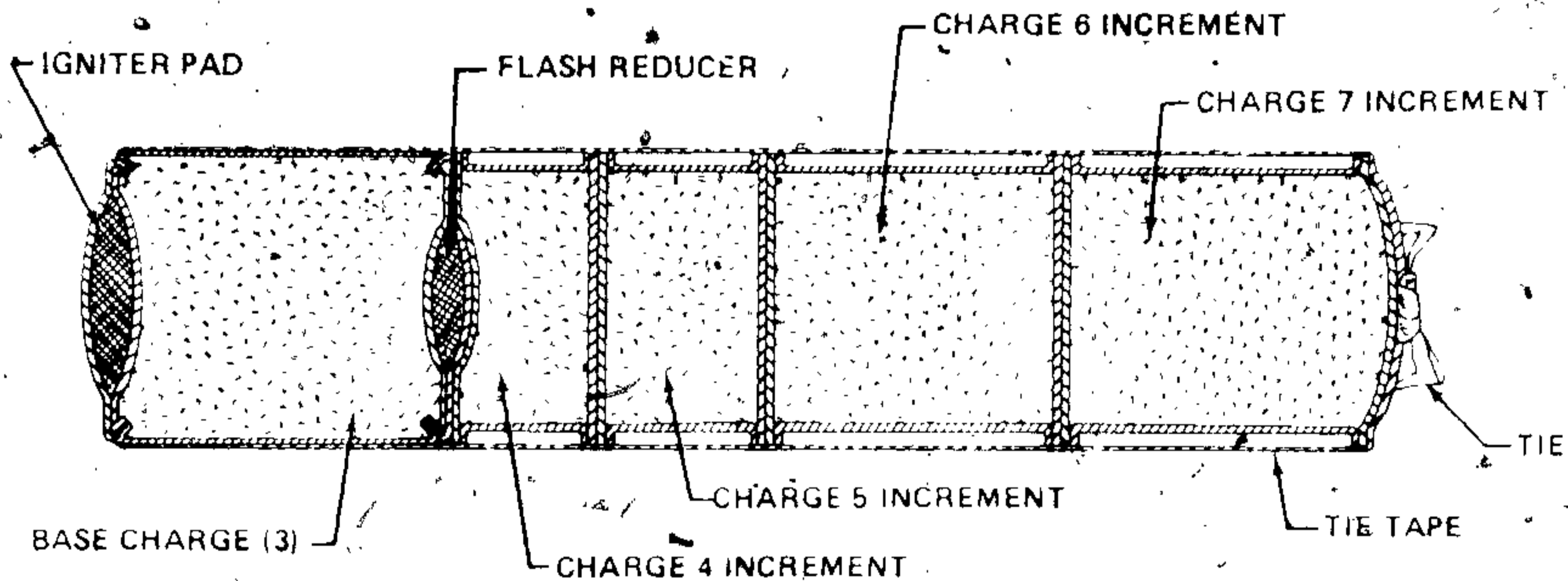
References:

SC 1305/30-IL
 SB 700-20
 DARCOM P 700-3-3
 TM 9-1300-251-20
 TM 9-1025-200-12
 TM 9-2350-217-10
 TM 9-2350-217-10N

CHARGE, PROPELLING, 155-MILLIMETER: M4 SERIES



AR199659



AR199658

Type Classification:

M4A2: Std AMCTC 4633 dtd 1966

M4A1: Std AMCTC 4633 dtd 1966

Use:

This white bag propelling charge is used in 155-mm howitzers for firing in Zones 3, 4, 5, 6 and 7.

Description:

The total charge (M4A2 Prop. Charge) consists of 13 pounds of propellant and is divided between a base charge and four unequal increments loaded in white cloth bags. The increments are connected by four cloth tapes sewn to the base and tied on top of Increment 7. The

igniter for Charge M4A2 is 3.5 ounces of clean burning igniter (CBI) in a red cloth pad sewn to the bottom of the base charge. A flash reducer pad containing one ounce of potassium nitrate or potassium sulphate is assembled at the front end of the base increment (Increment 3). The seams in the base pad are inverted so that the edges of the cloth are inward to reduce residue after firing.

Functioning:

When the weapon is fired, the primer ignites the igniter charge, and the igniter charge ignites the propelling charge. The burning propellant generates rapidly expanding gases to propel the projectile through the barrel and to the velocity required to reach the target. The flash-reducer pads serve to limit breech

flareback as well as muzzle flash and blast overpressure.

Difference Between Models:

Model M4A1 is similar to Model M4A2 except that the igniter charge is 3.0 ounces of black powder instead of CBI, the base charge seams are not inverted, and the charge does not include a flash reducer. Flash Reducer M2 may be used with Charge M4A1 when required, but is a separate item of issue.

Tabulated Data:

Complete round:

Type -----	Separate loading, white bag
Weight -----	14.0 lbs.
Length -----	21.0 in. max.
Color -----	White w/ black markings
Cannon used with -----	M1, M1A1, M45, M126, M126A1, M185, M199
Propellant -----	M1 (13.4 lbs. explosive)

Temperature Limits:

Firing:

Lower limit -----	- 40° F
Upper limit -----	+ 125° F

Storage:

Lower limit -----	- / 80° F for periods not more than 3 days
Upper limit -----	+ 140° F for periods not more than 4 hrs. /day

*Packing ----- 1 charge in metal container M13

*Container:

Weight -----	30.5 lbs.
Dimensions -----	27-3/4 x 7-3/8 x 7-3/8 in.

Cube -----	0.87 cu. ft.
Explosive per container -----	13.7 lbs.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class -----	2
Storage compatibility group -----	J
DOT shipping class:	
M4A2 -----	B
M4A1 -----	B
DOT designation:	
M4A2 -----	PROPELLANT EXPLOSIVES SOLID CLASS B
M4A1 -----	PROPELLANT EXPLOSIVES SOLID CLASS B
DODAC -----	1320-D541
Assembly Dwg. Nos.:	
M4A2 -----	9207624
M4A1 -----	71-9-180

Preparation for Firing:

No preparation is required except adjustment of the charge according to the firing zone intended.

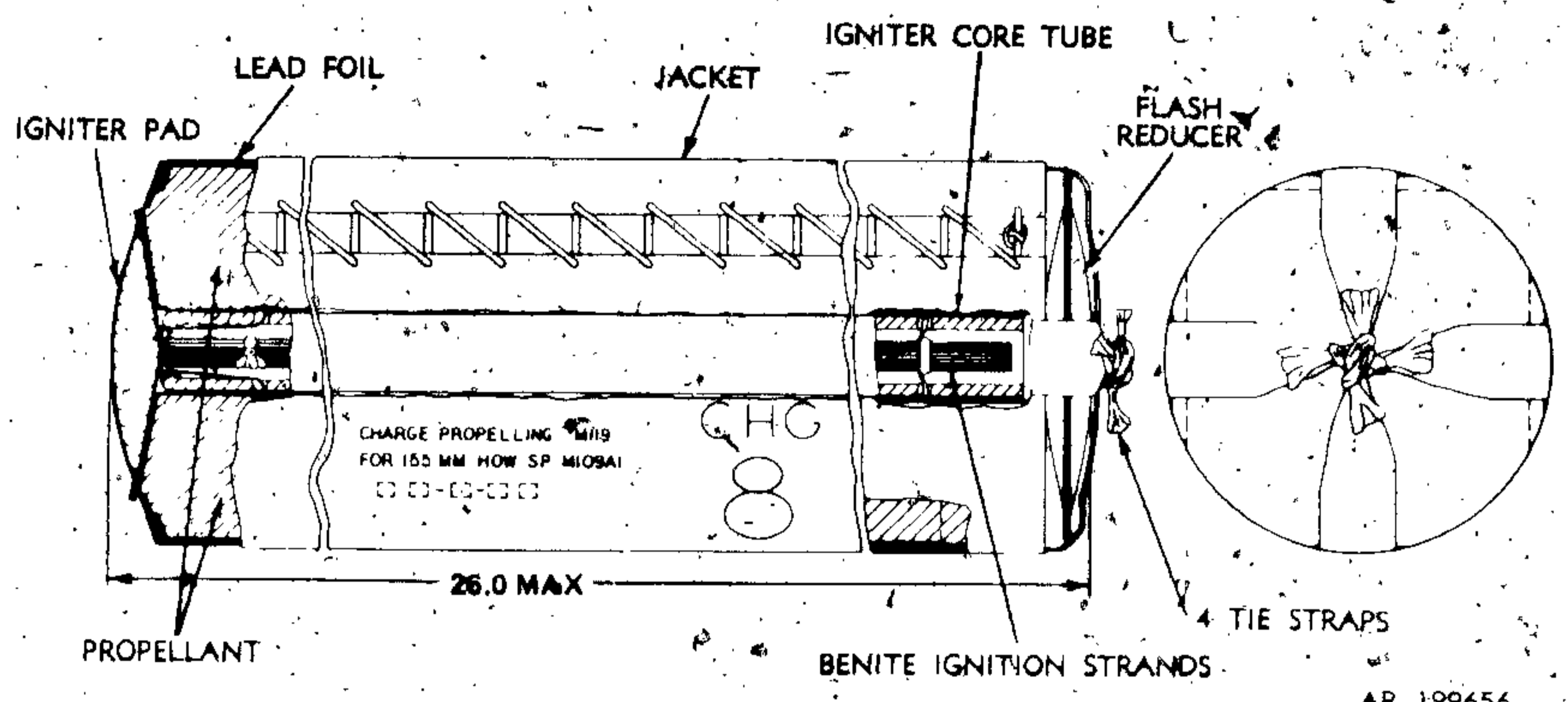
Limitations:

Erratic range results may be expected when firing M4 series charge in Zones 3 and 4, so Green Bag M3 series charge should be used for those zones when available.

References:

- SC 1305/30-IL
- SB 700-20
- DARCOM P 700-3,3
- TM 9-1300-251-20
- TM 9-1025-200-12
- TM 9-2350-217-10
- TM 9-2350-217-10N

CHARGE, PROPELLING, 155-MILLIMETER: M119 (M119A1)



AR 199656

Type Classification:

(M119) Std AMQTC 8204 dtd 1971
(M119A1) Std MSR 12776011

Use:

This propelling charge is designated Zone 8 and extends the range of 155-mm Howitzer M109A1, M109A2 and M198.

Description:

Propelling Charge M119/M119A1 is a single-increment white bag charge. A perforated igniter core tube extends through the center of the propellant. The 26-inch length of the charge precludes use in any other weapon than the long tube howitzer. The forward end is sheathed in lead foil and also carries a one pound flash

reducer pad of potassium sulphate. A circular igniter pad of red cloth containing two ounces of clean burning igniter (CBI) is sewn to the base of the rayon propellant bag.

Functioning:

When the weapon is fired, the primer ignites the CBI in the igniter pad at the base of the propelling charge. The igniter flashes through the perforations in the igniter core tube to ignite the propellant. The burning propellant generates rapidly expanding gases to propel the projectile through the barrel and to the velocity required to reach the target. Blast overpressure and muzzle flash of the firing are reduced by the flash reducer included in the charge. The lead foil sheath serves to prevent copper build-up (coppering) in the weapon.

Differences Between Models:

The basic difference between the M119 and M119A1 models is that the M119A1 has a shaped flash reducer that precludes non-ignition of the Rocket Motor of the M549/M549A1 Projectile. The M119A1 has a new molded center core igniter tube; a 360° basic igniter seam lacing jacket. A pull strap has also been added to the M119A1 charge that provides easier removal from the metal container. This pull strap must be removed from the charge before loading into the weapon tube.

Tabulated Data:

Type -----	White bag, separate loading
Weight -----	23 lbs
Length -----	26 in.
Color -----	White w/black markings
Cannon used with -----	M185 (M109A1) M199 (M198)
Propellant -----	M8, 20.5-lbs
Primer -----	M82

Performance (complete round):

Maximum range -----	(18,692 yd)
Muzzle velocity -----	2245 fps (681 m)

Temperature Limits:

<u>Firing:</u>	
Lower limit -----	-40° F
Upper limit -----	+125° F
<u>Storage:</u>	
Lower limit -----	-65° F for periods not more than 3 days
Upper limit -----	+160° F for periods not more than 4 hrs/day

*Packing ----- 1 propelling charge in palletized metal container PA37A1

*Prop. chg, container:
 Weight ----- 70 lbs
 Dimensions ----- 29-1/4 x 8-1/4 x 8-1/4
 Cube ----- 1.2 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class --	2
Storage compatibility group -----	J
DOT shipping class -----	B
DOT designation -----	PROPELLANT EXPLOSIVE SOLID-CLASS B
DODAC -----	1320-D533
Assembly Dwg. No. -----	9226436 (M119) 9325852 (M119A1)
Container Dwg. No. -----	9234357

Preparation for Firing:

No preparation is required.

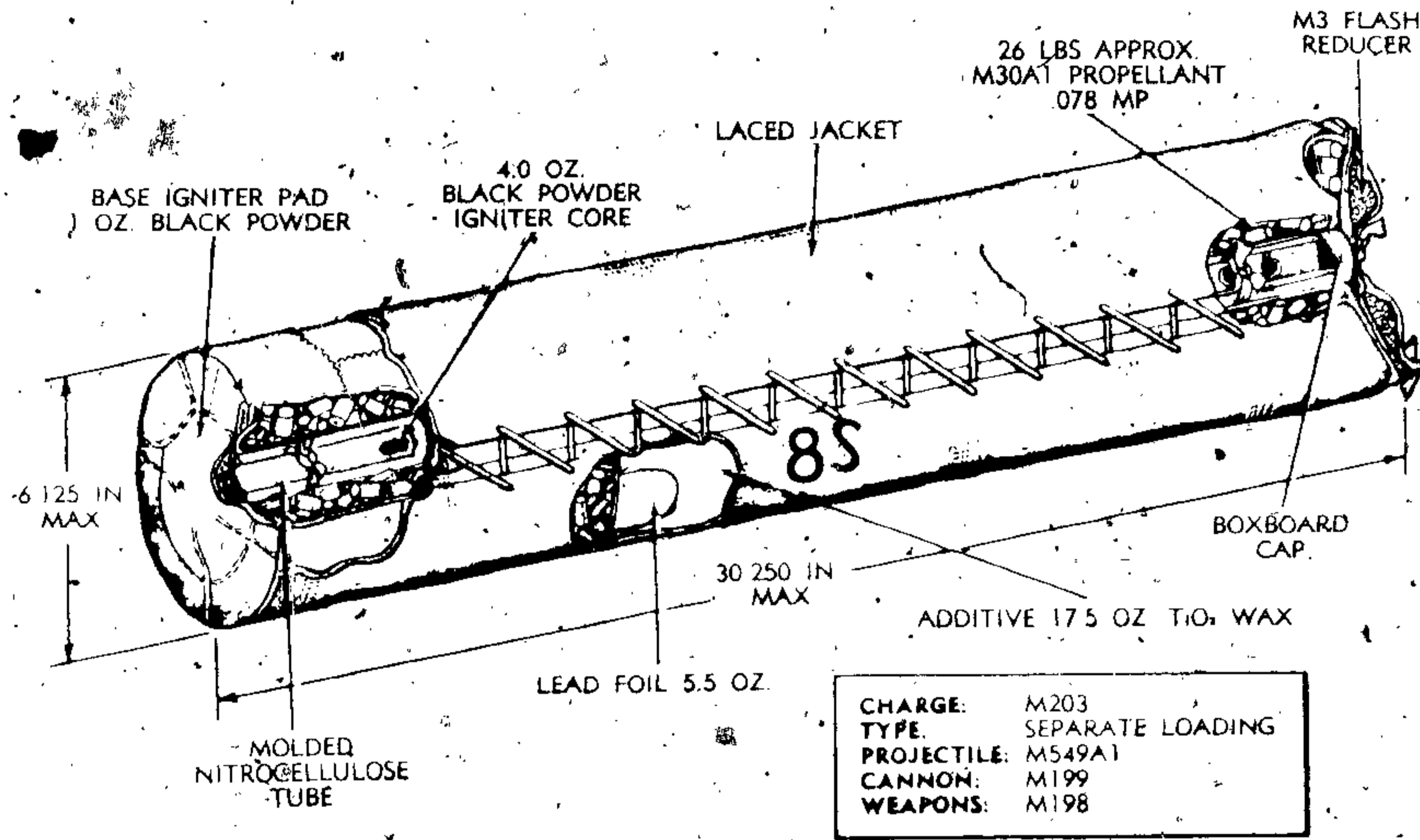
Limitations:

None.

References:

TM 9-1300-251-20
 TM 9-2350-217-10
 TM 9-2350-217-10N

CHARGE, PROPELLING, 155 MILLIMETER: M203



AR 101714 A

Type Classification:

Std MSR 01776003.

Use:

The M203 is a zone 8S charge designed to supplement the standard M3, M4 series and M119, M119A1 charges and to provide extended range for the 155mm Howitzer M198.

Description:

The M203 Propelling Charge is a single increment, red bag charge, approximately 30 1/4 inches long. The charge contains approximately 26 pounds of the high energy M30A1 propellant in a cloth bag. A red cloth igniter pad containing 1 ounce of black powder is sewn to the base of the charge. A central ignition core extends through the center of the charge for almost its entire length. This ignition core consists of a nitrocellulose paper tube containing a bag of black powder which is sewn to the

base igniter. A liner consisting of a cloth side impregnated with titanium dioxide and paraffin wax, and a lead side lines the forward end of the charge. Four tie straps sewn to the base of the charge run the length of the charge and are tied at the forward end of the charge. A donut shaped flash reducer is inserted under the tie straps at the forward end of the charge. A cylindrical jacket is placed over the charge length and tightly laced. This scarlet lacing jacket serves to provide necessary rigidity and structural stability of the assembled charge, and serves to differentiate the 8S from the M119/M119A1 zone 8 charge.

Functioning:

The flash from the black powder in percussion primer M82 ignites the igniter pad at the base of the charge. The burning igniter pad in turn ignites the black powder in the igniter core to spread ignition to the propelling charge. Rapidly expanding gases from the burning charge propel the projectile through the barrel of the

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weapon with enough velocity to reach the target. The flash reducer functions to reduce blast over-pressure and flash at the muzzle of the weapon.

Tabulated Data:

Type ----- Red bag, separate loading
 Weight ----- 26 lbs
 Length ----- 30 1/4
 Color ----- Red w/black markings
 Cannon used with ----- M199 (M198) system
 Propellant M30A1 ----- 26 lbs
 Primer ----- M82 (only)
 Performance ----- Zone 8S

Temperature Limits:

Firing:
 Lower limit ----- -50° F
 Upper limit ----- +125° 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

----- 1 propelling charge in metal container PA68

Propelling charge containers:

Weight -----

Dimensions ----- 38 x 8-13/32 x 8-13/32 in.
 Cube ----- 1.55 cu ft

Shipping and Storage Data:

Quantity-distance class --- 2
 Storage compatibility group ----- J
 DOT shipping class ----- B
 DOT designation ----- Propellant Explosive Solid-Class B
 DODAC ----- 1320-D532
 Assembly Dwg. No. ----- 9281897 (M203)
 Container Dwg. No. ----- 9293303 (M203)

No preparation is required.

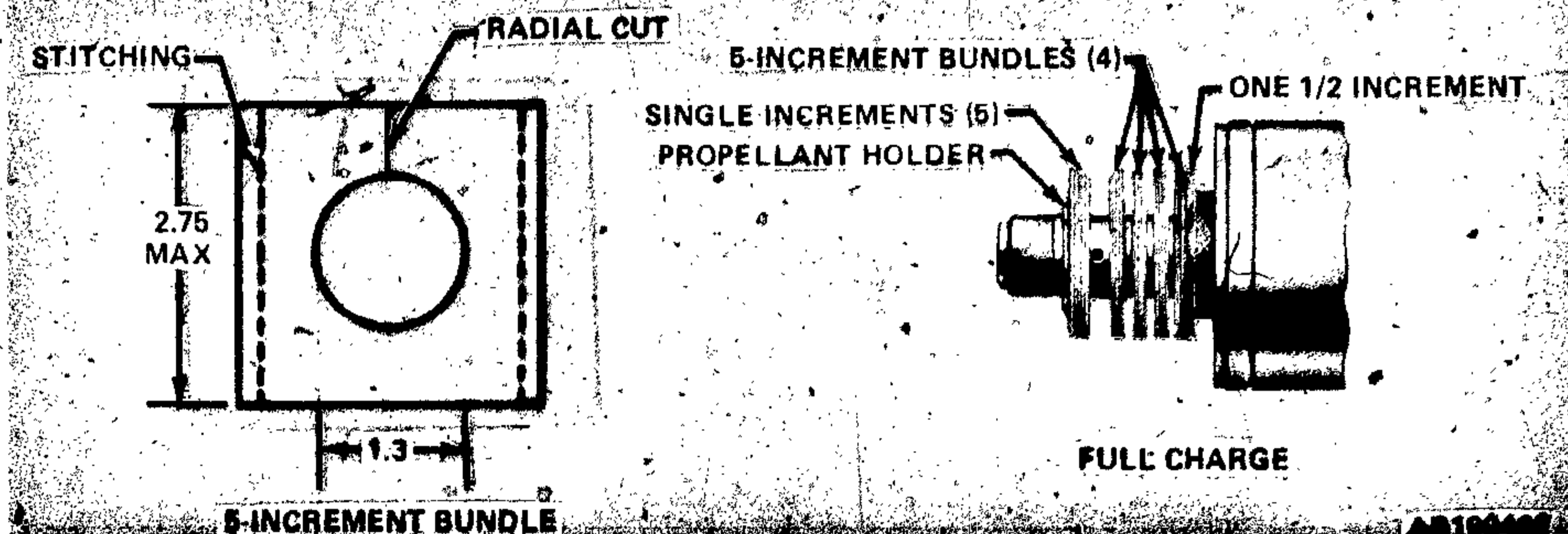
Limitations:

It is used only with the M549A1 (TNT loaded) 155mm RAP Projectile, and the M483A1 155mm Projectile, and in the M198 Howitzer, and for firing in Zone 8S.

References:

- TM 9-1025-211-10
- TM 9-1300-251-20

CHARGE, PROPELLING, 4.2-INCH: M6



Use:

This charge is a component of Smoke Cartridges M2 and M2A1, Gas Cartridges M2 and M2A1, and High Explosive Cartridges M3 and M3A1.

Description:

A full charge consists of 25-1/2 increments of M8 sheet propellant arranged in the following order: one 1/2 increment, four 5 increment bundles, and five single increments. This full charge is assembled on the cartridge as issued. Individual increments or bundles may be removed as required for fire adjustment as indicated in the appropriate firing tables. The method of securing the increments to the cartridge container varies among the cartridges, but each method involves the use of a wire propellant holder in front of or behind the increments.

Functioning:

The flash from the detonation of Ignition Cartridge M2 passes through the vents in the cartridge container, providing direct ignition of the propelling charge.

Tabulated Data:

Type propellant ----- M8
 Weight (full charge) --- 0.60 lb.
 Used with ignition
 cartridge ----- M2
 Drawing number ----- 71-12-27

Limitations:

To avoid excessive pressure which could result in damage to materiel and injury to personnel, charges must be fired at or above the following temperatures:

23-25-1/2 increments --- +60°F
 20-22-1/2 increments --- +20°F
 17-19-1/2 increments --- 0°F
 5-16-1/2 increments --- -40°F
 when using Cartridges M2, M2A1, M3, M3A1, M328, M329B1 and M333 assembled without cartridge container extensions.

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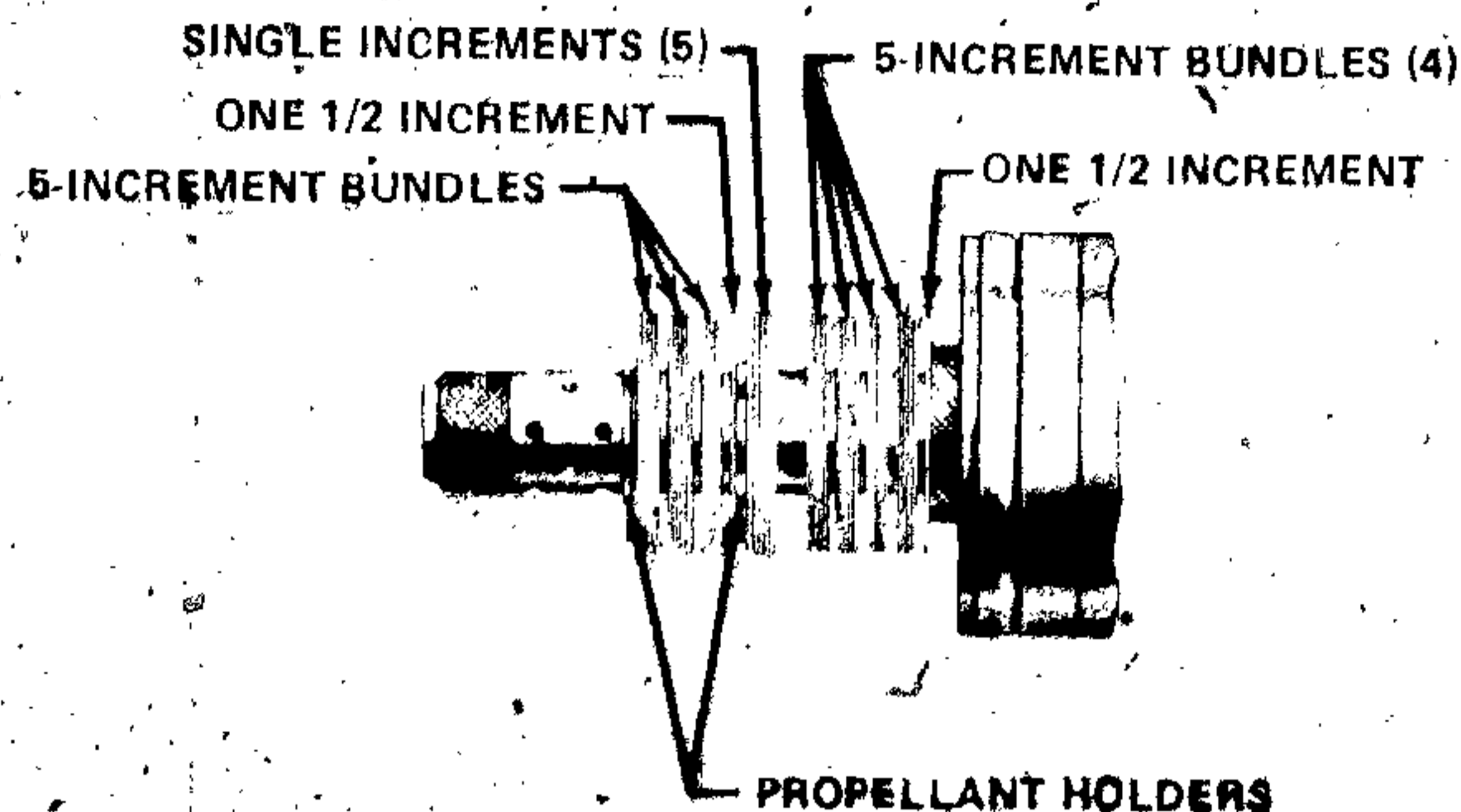
References:

TM 9-1015-215-12

TM 9-1300-251-20

TM 9-1320-241-12

CHARGE, PROPELLING, 4.2-INCH: M36



AR199400

Use:

This charge is a component of Smoke Cartridge M328, High Explosive Cartridge M329, and Illuminating Cartridge M335.

Description:

A full charge consists of 41 increments of M8 sheet propellant arranged in the following order: one 1/2 increment, four 5 increment bundles, five single increments, one 1/2 increment, and three 5 increment bundles. This full charge is assembled on the cartridge as issued. Individual increments or bundles may be removed as required for fire adjustment as indicated in the appropriate firing charts. Two wire holders are used to secure the increments to the cartridge container and extension. The extension must be used with more than 25-1/2 increments, and must be removed when firing with less than 25-1/2 increments. Removal of the extension requires relocation of the ignition cartridge in the cartridge container.

Functioning:

When used at any charge from 25-1/2 increments to full charge, the flash from the detonation of the Ignition Cartridge M2 passes through the vents in the cartridge container extension providing indirect ignition of the propelling charge. At charges below 25-1/2 increments, the extension is not used, and the flash from the ignition cartridge passes through the vents in the

cartridge container providing direct ignition of the propelling charge.

Tabulated Data:

Type propellant -----M8
 Weight (full charge)----0.60 lb.
 Used with ignition
 cartridge ----- M2
 Drawing number -----8797836

When firing cartridges M2, M2A1, M3, M3A1, M328, M329B1, M335 at a charge below 25-1/2 increments the cartridge container extension must be removed, and the ignition cartridge relocated in the cartridge container. When the following charges are assembled without the cartridge container extension, they will be fired at or above the temperatures listed.

23-25-1/2 increments. --- +60°F
 20-22-1/2 increments. --- +20°F
 17-19-1/2 increments. --- 0°F
 5-16-1/2 increments. --- -40°F

Failure to observe these limitations may result in excessive pressure causing damage to material and injury to personnel.

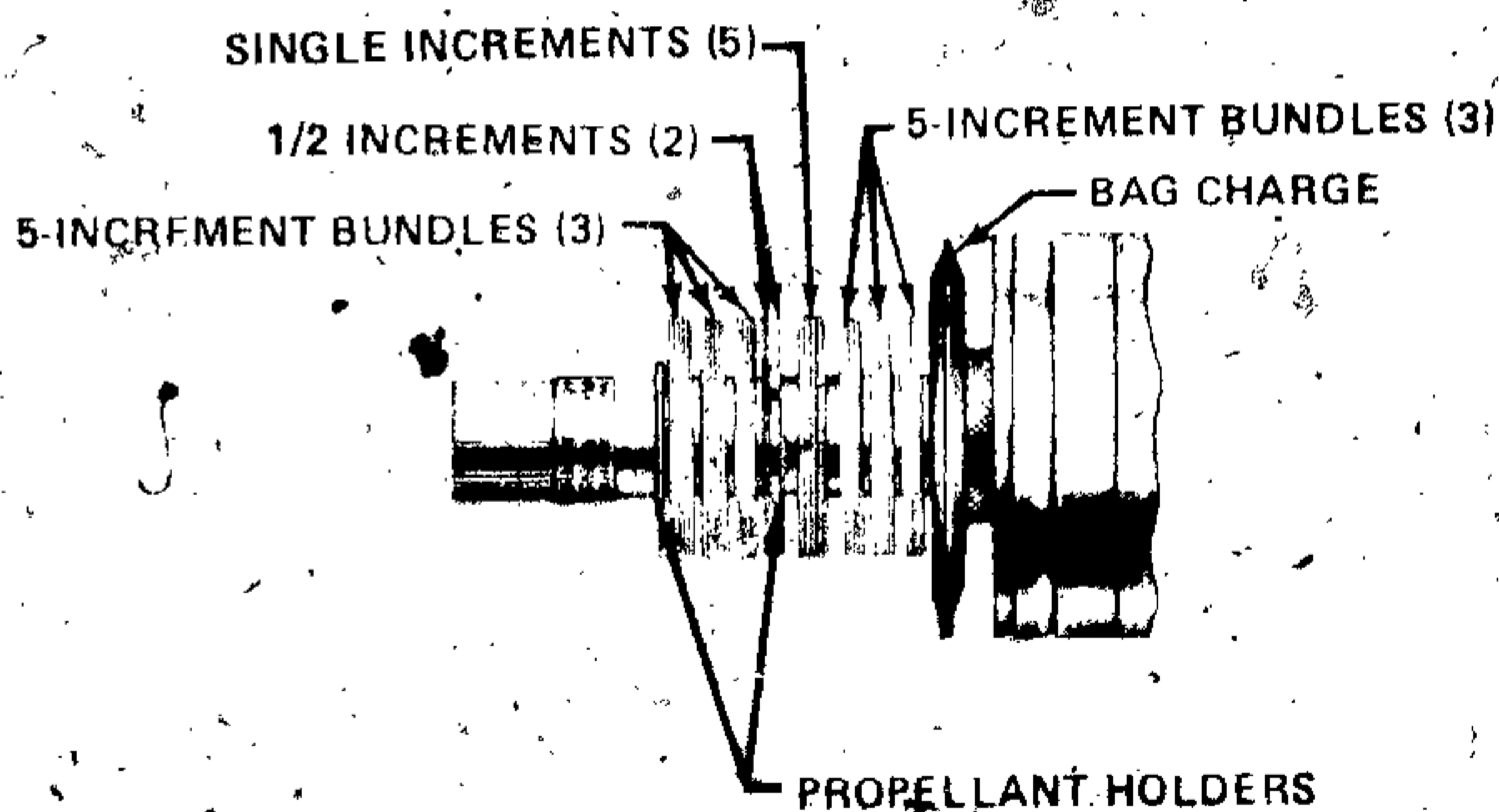
References:

TM 9-1015-215-12
 TM 9-1300-251-20
 TM 9-1320-241-12

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CHARGE, PROPELLING, 4.2-INCH: M36A1



AR199458

Use:

This charge is a component of Smoke Cartridge M328A1, High Explosive Cartridge M329A1, Illuminating Cartridges M335A1 and M335A2 and Tactical CS Cartridge M630.

Description:

A full charge consists of 36 increments of M8 sheet propellant and a doughnut-shaped bag of M9 flake propellant arranged in the following order: one bag charge, three 5 increment bundles, five single increments, two 1/2 increments, and three 5 increment bundles. This full charge is assembled on the cartridge as issued. Individual increments or bundles may be removed as required for fire adjustment as indicated in the appropriate firing charts, but the bag charge will not be removed at any time. Two wire holders are used to secure the increments to the cartridge container and extension. Removal of the extension when firing at reduced charge does not require relocation of the ignition cartridge.

Functioning:

The flash from the detonation of the Ignition Cartridge M2A1 or M2A2 passes through the vents in the cartridge container, providing direct ignition of the propelling charge.

Tabulated Data:

Type propellant ----- M8 and M9
 Weight (full charge) ---- 0.60 lb.
 Used with ignition
 cartridge ----- M2A1, M2A2
 Drawing number ----- 8863617

Limitations:

The bag charge of M9 propellant will not be removed at any time. When firing at a charge below 25-1/2 increments, remove the cartridge container extension. The ignition cartridge does not require repositioning.

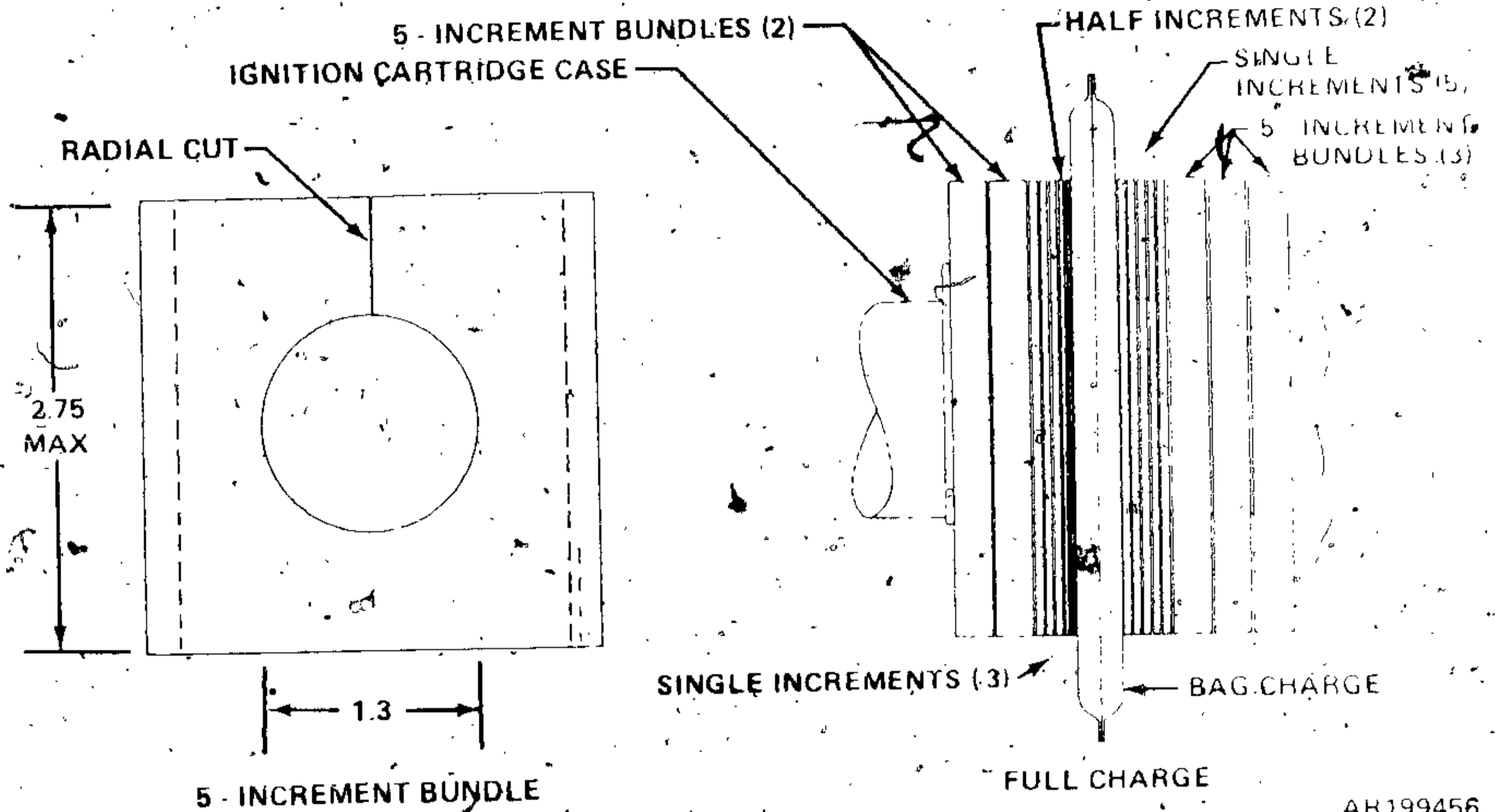
References:

FM 9-1015-215-12
 TM 9-1300-251-20
 TM 9-1320-241-12

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CHARGE, PROPELLING, 4.2-INCH: M36A2.



AR199456

Use:

This charge is a component of High Explosive Cartridge M329A2.

Description:

A full charge consists of 34 increments of M8 sheet propellant and a doughnut shaped bag of M9 flake propellant arranged in the following manner: three 5 increment bundles, five single increments, one bag charge, two 1/2 increments, three single increments, and two 5 increment bundles. This full charge is assembled on the cartridge as issued. Individual increments or bundles may be removed as required for fire adjustment as indicated in the appropriate firing charts, but the bag charge will not be removed at any time.

Functioning:

The flash from the detonation of the Ignition Cartridge M2A2 passes through the vents

in the cartridge container, providing direct ignition to the propelling charge.

Tabulated Data:

Type propellant	-----	M8 and M9
Weight (full charge)	-----	0.60 lb.
Used with cartridge	-----	M2A2
Drawing number	-----	9244177

Limitations:

The bag charge of M9 propellant will not be removed at any time.

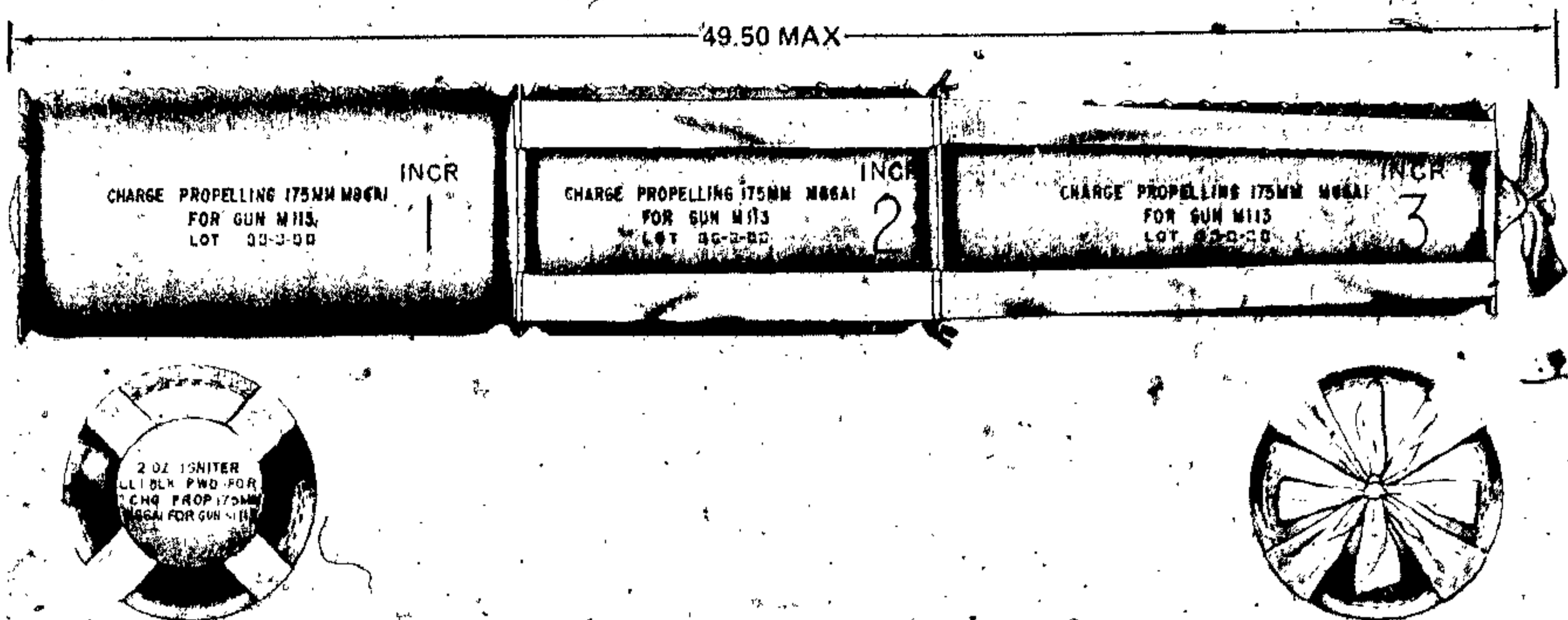
References:

TM 9-1015-215-12
 TM 9-1300-251-20
 TM 9-1320-241-12

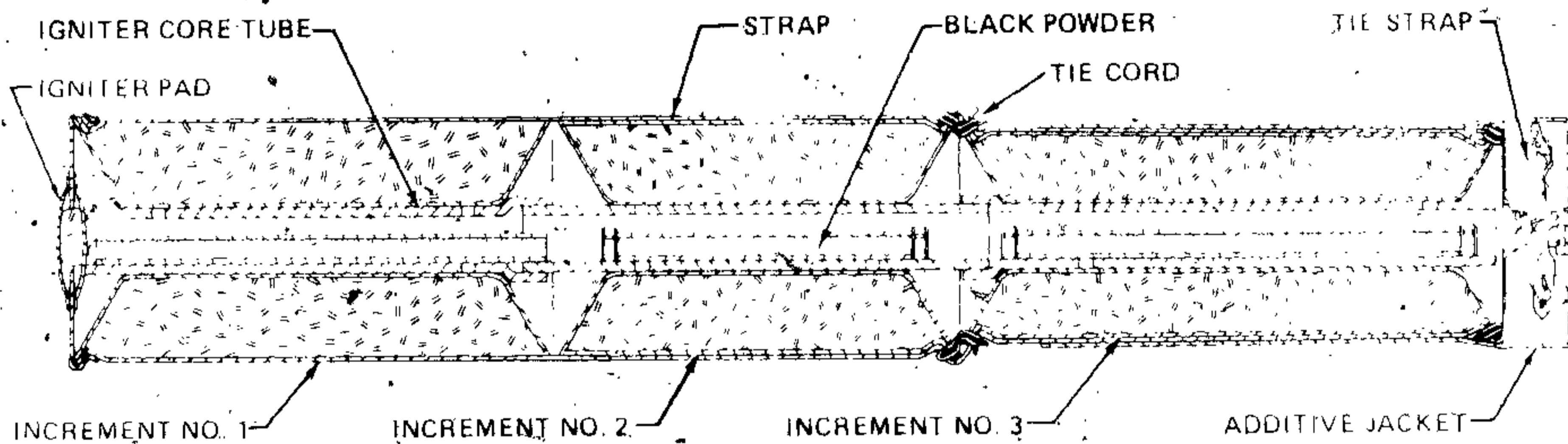
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CHARGE PROPELLING, 175-MILLIMETER: M86 SERIES



AR192492



AR199688

Type Classification:

Std AMCTC 5851 dtd 1968.

Use:

M86 series propelling charges are used in the 175MM M107 Self-Propelled Weapon System.

Description:

(Ancillary items used only with these charges are the M1 additive jacket and the M5 flash reducer-described below.)

The charge is an adjustable three-increment white bag type. It is approximately 49-1/2 inches long and contains a total of 55 pounds of multiperforated Propellant M6 in acrylic viscose-rayon bags. The bags are tied together by

four tying straps attached to the top of Increment 1 and knotted on top of Increment No. 3. The tying straps are reinforced by cord tied tightly around the junction of Increments No. 2 and 3. Each propelling charge has an igniter core assembly extending through the center of the charge. The core assembly consists of three rigid polyurethane tubes containing bagged igniter cores of black powder. The igniter tubes for Zones 1 and 3 contain bell shaped ends which assemble over the ends of the igniter tube in increment two. A red cloth igniter pad, filled with black powder, is sewn to the base of increment 1. The igniter core for Increment 1 is sewn to the igniter base pad and is loose in the increment 1 igniter tube. The cores for Increments 2 and 3 are tied inside the igniter tubes for those increments. An igniter protective cap is placed

over the igniter base pad for protection in shipment and storage. An additive jacket is issued separately for assembly over Increment 3 when firing full charge. (The majority of M86A2 charges are shipped with the additive jacket already assembled over Increment 3.) All charges are packed with an M82 percussion primer. An M5 flash reducer is also issued separately to be assembled around the junction of Increments 2 & 3 on certain M86A1 charges. It is designed to reduce excessive blast and flash effects associated with certain lots of Propelling Charge M86A1. The flash reducer, which contains 16 ounces of potassium sulphate, is an apron-type cloth bag designed to be tied around the forward end of Increment No. 2 with its leading edge at the junction of Increment Nos. 2 and 3.

NOTE

Use Flash Reducer XM5 with Lots IND 1-19 through IND 1-77 of Propelling Charge M86A1 when fired at Zone 3 only.

Bore-wear-reducing Additive Jacket M1 is used with Increment No. 3 when firing M86 Series Propelling Charges at full charge. It consists of two 10-1/2 x 18 x 1/8-inch cloth-backed sheets of additive mixture stitched together. The additive mixture is composed of 47 percent titanium dioxide and 53 percent wax. The cloth backing, which is bonded to and overlaps the sheets of additive mixture, is stitched to an unbonded tough plastic film casing which serves as a jacket liner. When compressed along the seams, the jacket arches to form a cylinder with a diameter of approximately 7-1/2 inches.

NOTE

If the additive mixture is cracked or the plastic sheet is ripped, the additive jacket is still acceptable for use. Use the additive jacket over Increment No. 3 only. Use of the jacket on Increments Nos. 1 and 2 is ineffective.

In a tactical situation, if additive jackets are not available and the mission is in jeopardy, a maximum of 100 rounds per tube may be fired at full charge without affecting current condemnation limits of the tube.

Functioning:

When the primer is initiated in the breech-block of the gun, flash ignites the black powder in the igniter pad. The flame proceeds through the powder in the igniter tubes to accomplish uniform ignition of the propelling charge through all three increments. The burning propellant generates rapidly expanding gases to propel the projectile through the gun tube at the velocity required to reach the target. When the additive jacket is employed for full charge firing, the mixture of titanium dioxide and wax in the cloth backing serves to reduce bore wear at the origin of rifling in the cannon. When the M5 flash reducer is employed for full charge firing, the potassium sulfate serves to reduce the amount of blast and flash which occurs.

Difference Between Models:

The M86 has a 4 ounce igniter pad and all 3 tubes are perforated. The M86A1 has a 2 ounce igniter pad and an unperforated increment No. 1 tube. The M86A2 is identical to the M86A1 except for the igniter tubes, which are reinforced with dacron scrim. Early production M86A2's are packed without additive jackets.

Tabulated Data:

Propelling Charge:

Type -----	White bag, separate loaded propelling charge
Weight -----	58.0 lbs.
Length -----	49.5 in. (max.)
Dia. -----	8.0 in. (max.)
Cannon (Weapon) used with -----	M113, M113A1 (M107)

Propellant:

Composition -----	M6
Grain type -----	7 perforated cylinder, L D = 2.35
Weight -----	55 lbs.
Web -----	0.0776 in.
Primer -----	M82

Temperature Limits:

Firing:

Lower limit -----	- 40° F.
Upper limit -----	+ 125° F.

Storage:

Lower limit----- - 80°F (for periods
of not more than
3 days)
Upper limit ----- + 160°F (for not
more than 4 hrs.
/day)

* Packing ----- 1 charge with add-
(Propelling Charge) itive jacket in
plastic barrier bag
or metal container;
16 metal containers
per pallet
Container ----- M460
Weight ----- 96.0 lbs
Dimensions ----- 9-13/16 in. Dia. x
55 in.
Cube ----- 3.1 cu. ft.

* Pallet:
Weight ----- 2020 lbs.
Dimensions ----- 40 x 55 x
45-1/2 in.
Cube ----- 57.9 cu. ft.

Shipping and Storage Data:

Quantity-distance
class ----- 2
Storage
compatibility ----- J
DOT shipping class ----- B
DOT designation ----- PROPELLANT EX-
PLOSIVES SOLID
CLASS B
DODAC ----- 1320-D361
Drawing numbers: ----- M86-8837005
M86A1
M86A2-8837905

* Packing ----- 10 per carton; 1
(M15 Flash Reducer) carton per barrier
bag; 4 barrier bags
per wooden box
Weight ----- 66 lbs.
Dimensions ----- 19-1/8 x 10-5/8 x
14-7/8 in.
Cube ----- 1.74 cu. ft.

Shipping and Storage Data:

Quantity-distance
class ----- 7

Storage

compatibility ----- O
DOT shipping class ----- A
DOT designation ----- BLACK POWDER
DODAC ----- 1320-D493
Drawing number ----- 9212660

* Packing ----- 10 per carton; 1
(M1 Additive Jacket) carton per barrier
bag; 4 barrier bags
per wooden box
Weight ----- 80 lbs.
Dimensions ----- 23-3/8 x 15-3/16 x
15-9/32 in.
Cube ----- 2.72 cu. ft.

Shipping and Storage Data:

Quantity-distance
class ----- N/A
Storage
compatibility ----- N/A
DOT shipping class ----- N/A
DOT designation ----- AMMUNITION
NONE EXPLOSIVE
DODAC ----- 1320-D1170
Drawing number ----- 9207962

*NOTE: See SC for complete packing data including NSN's.

Limitations:

Zone 3 firing of Charges M86 and M86A1 is restricted to combat use only. The restriction does not apply to M86A2. In addition, all M86 and M86A1 charges require a special inspection of the central ignition core prior to firing. M86A2 charges suspected of rough handling must also undergo this inspection.

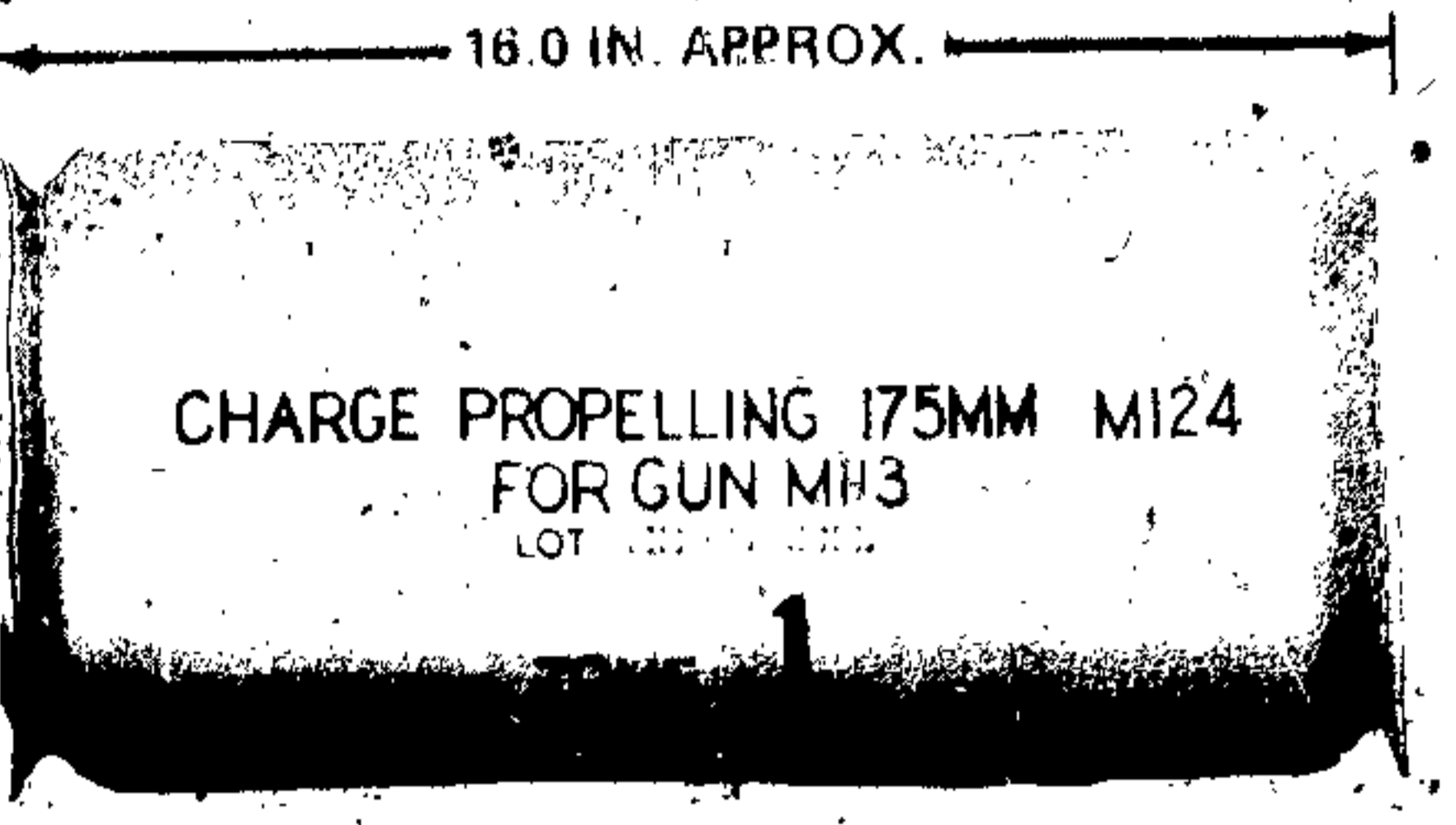
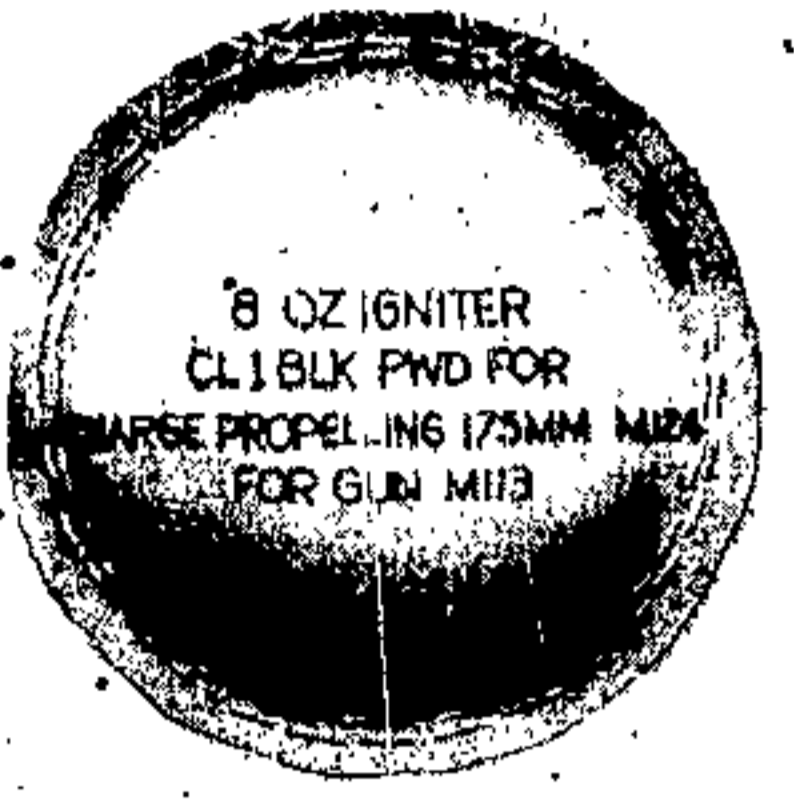
References:

- AMCP 700-3-3
- SB 700-20
- SC 1305/30-IL
- TM 9-1300-251-20
- TM 9-1300-251-34
- TM 9-2300-216-10

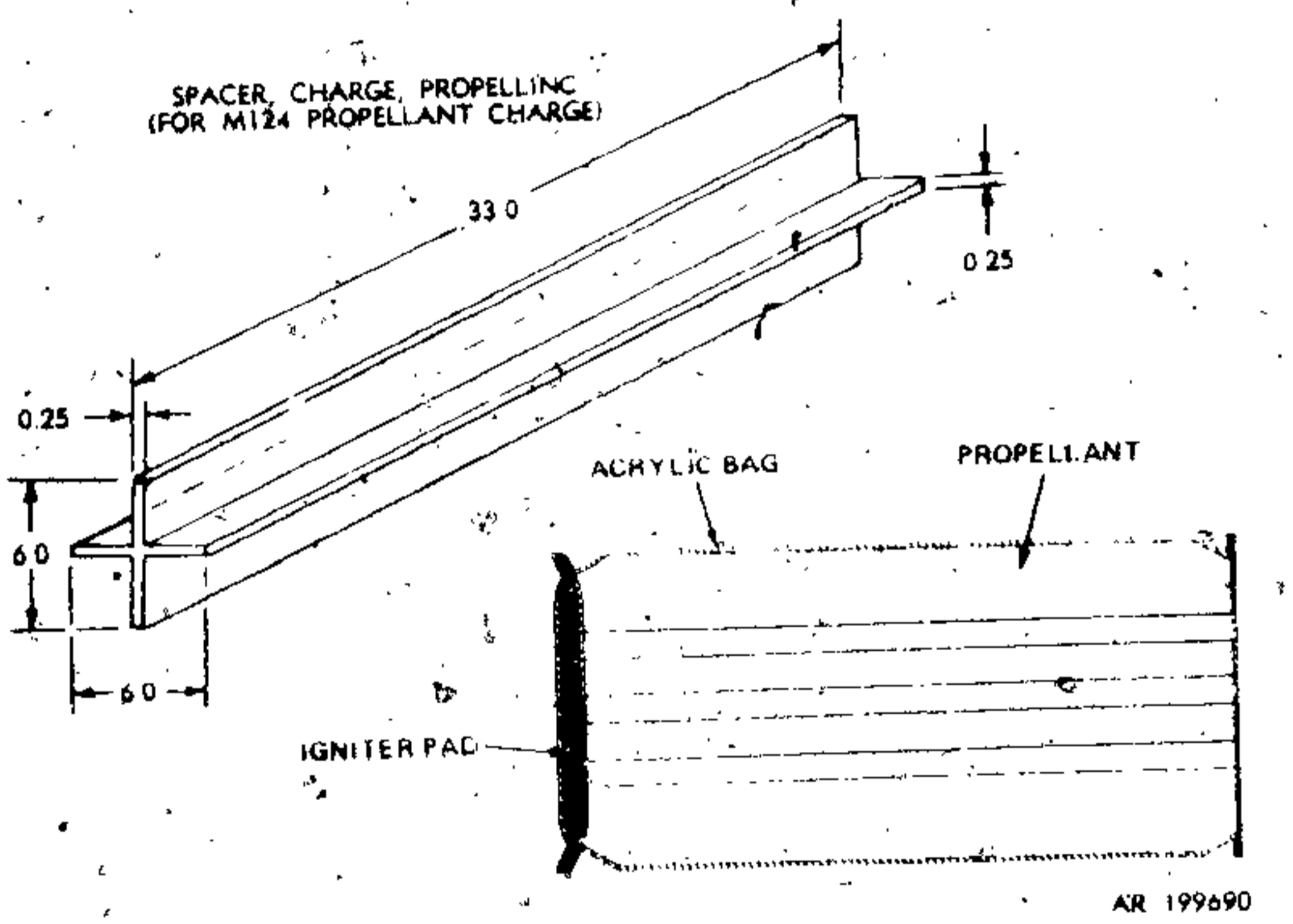
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Handwritten: 06.04.84 Unterschrift: V. Stahl

CHARGE, PROPELLING, 175-MILLIMETER: M124



AR199706



Type Classification:

Standard AMGTC 7622 dtd 1970

Use:

Propelling charge M124 is used with gun cannons M113 and M113A1 for firing in zone 1 only.

Description:

Charge M124 is a single increment, green bag charge, approximately 16-inches long. The charge contains approximately 17-pounds of Propellant M6 in an acrylic viscose-rayon bag. An igniter pad containing 8-ounces of black powder is attached to the base of the charge. An igniter protector cap covers the igniter

pad during shipment and storage. Percussion primer M82 is used to ignite the charge. The charge must be used with a non-integral, separately issued spacer. The spacer is a cruciform fabricated from polyurethane and approximately 33 inches long.

Functioning:

The flash of the black powder charge from percussion primer M82 ignites the igniter pad and the black powder core to ignite in turn the M6 propellant charge. The burning propellant generates rapidly expanding gases to propel the projectile through the barrel with the velocity required to reach the target. The cloth material is essentially consumed by the burning. (The spacer is inserted into the weapon chamber prior to the charge and serves

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to prevent fallback of the projectile on top of the propelling charge.)

Tabulated Data:

Charge, Propelling M124:

Type ----- Green bag
 Weight ----- 17.5 lbs
 Length ----- 16 in.
 Propellant:
 Composition ----- M6
 Grain type ----- 7 perforated;
 L/O= 2.35
 Weight ----- 17 lbs
 Web ----- 0.37 in.
 Igniter ----- 8 oz black powder
 base pad
 Primer ----- M82
 Cannon used with ----- M113, M113A1
 Assembly Dwg No. --- 9223106
 Color ----- Green w/black

*Packing ----- 3 charges and 3
 primers in metal
 container

*Packing Box:

Weight ----- 95 lbs
 Dimensions ----- 55-3/8 x 10-15/32
 x 10-15/32
 Cube ----- 3.5 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 2
 Storage compatibility
 group ----- J
 DOT shipping class -- B
 DOT designation ----- PROPELLANT EX-
 PLOSIVE SOLID B-
 CLASS B
 DODAC ----- 1320-D536

Limitations:

The charge must be used with a spacer which is a separate item of issue.

Cruciform Spacer:

NSN ----- 1320-01-010-0145
 Weight ----- 1 lb (approx)
 Length ----- 33 in.
 Drawing No. ----- 9298769
 Cannon used with -- M113, M113A1
 Dimensions ----- 33 x 6 x 6 (1/4 in.
 thick flange)

Packing ----- 48 spacers in wire-
 bound box

Packing Box:

Weight ----- 11 1/2 lbs
 Dimensions ----- 32-7/8 x 24-3/4 x
 35-3/8 in.
 Cube ----- 16.2 cu ft

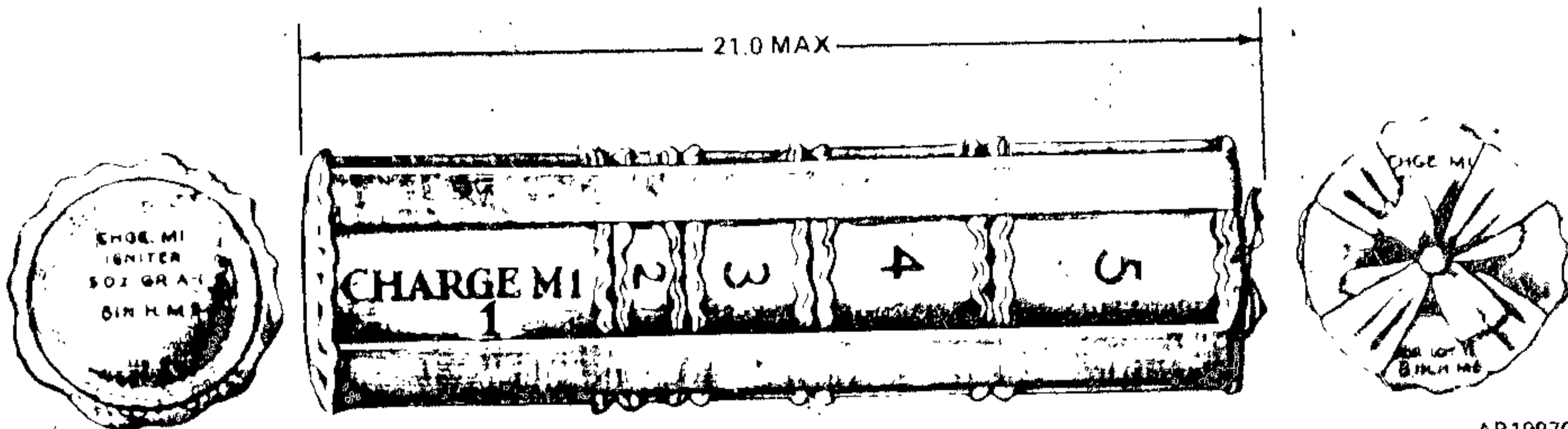
Shipping and Storage Data:

Quantity-distance
 class ----- Not applicable
 Storage compati-
 bility group ----- Not applicable
 DOT shipping
 class ----- Not applicable
 DOT shipping
 class ----- Not applicable
 DODAC ----- Not applicable

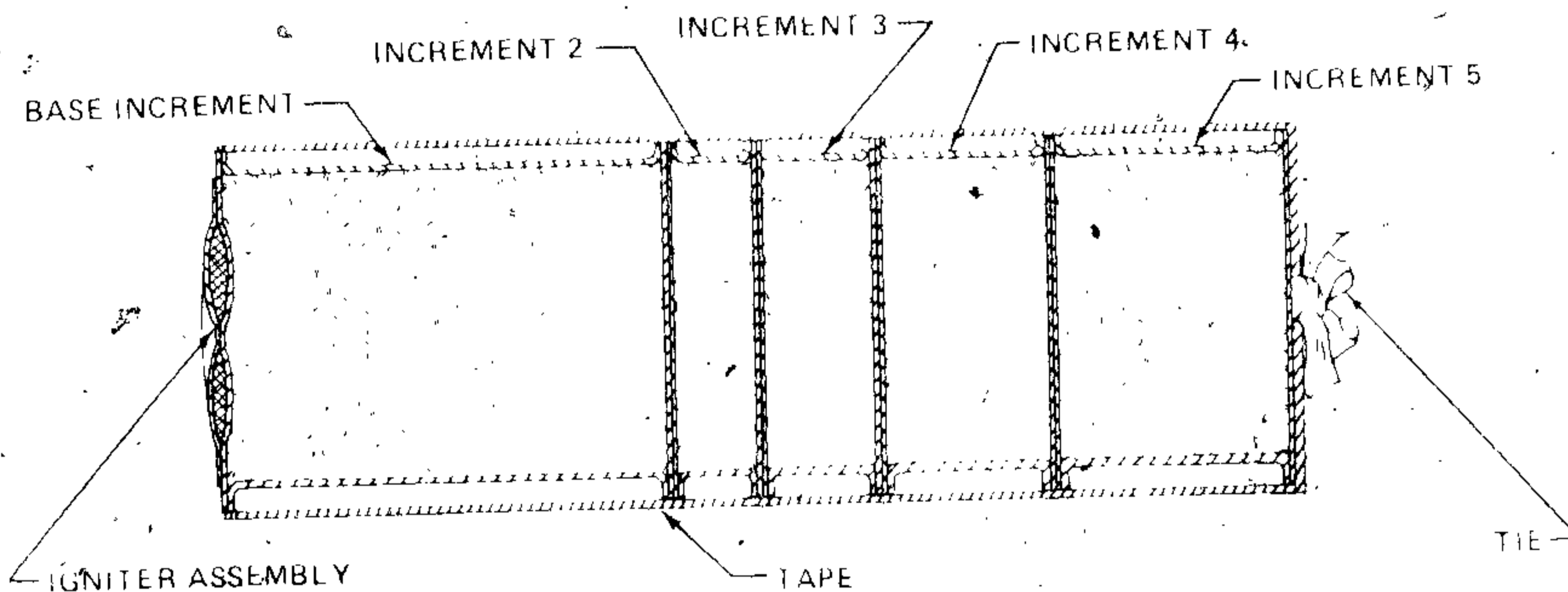
References:

SB 700-20
 SC 1305/30-IL
 TM 9-1300-206
 TM 9-1300-251-20
 TM 9-1300-251-34
 TM 9-2300-216-10

CHARGE, PROPELLING, 8-INCH M1



AR199701



AR199700

Type Classification:

Std OTCM 36841 dtd 1958

Use:

8-inch Green Bag Propelling Charge M1 is used for zone firing with Charges 1 to 5 in 8-inch howitzer cannons.

Description:

The charge consists of a base section (Charge 1) and four unequal increments (2 through 5) of propellant M1 in green cloth bags. The increments are assembled end to end in

sequence, and held in place by four tying straps sewn to the base of Increment 1 and the top of the top of Increment 5. A red igniter pad containing 5 ounces of black powder is secured to the base of Increment 1. Each increment of the charge and the igniter pad is identified by black stencil markings.

Functioning:

The flash from the primer ignites the black powder igniter pad, which in turn ignites the propellant in the charge. The burning propellant generates gases which force the projectile out of the gun tube at a velocity required to reach the target.

Tabulated Data:

Type ----- Green Bag, separate loaded propelling charge
 Weight ----- 15.0 lbs.
 Length ----- 21.0 in. (max.)
 Dia. ----- 6.50 in. (max.)
 Color ----- Green w/black marking

Propellant:

Composition ----- M1
 Grain type ----- 1 perforated
 L/D ----- 4.6
 Weight ----- 13.6 lbs.
 Web ----- 0.017 in.
 Primer ----- Model Used with Cannon Weapon
 MK2A4 M2, M2A1 (M115)
 M82 M47, (M55); M2A2 (M110)
 MK15 Mods 2 & 3 M47, (M55); M2A2 (M110)
 MK34 M47 (M55),

Assembly Dwg. No. ----- 8860491

Temperature Limits:

Firing:
 Lower limit ----- - 40° F
 Upper limit ----- + 125° F
 Storage:
 Lower limit ----- - 80° F (for periods of not more than 3 days)
 Upper limit ----- + 160° F (for not more than 4 hrs./day)

* Packing ----- 1 charge in metal container; 50 metal containers per pallet

Container ----- M18A2
 Weight ----- 34 lbs.
 Dimensions ----- 8-13/32 dia. x 26-9/32 in.
 Cube ----- 1.1 cu. ft.

Pallet:

Weight ----- 1650 lbs.
 Dimensions ----- 44 x 52 x 50 in.
 Cube ----- 67.2 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 2
 Storage compatibility group ----- J
 DOT shipping class ----- B
 DOT designation ----- PROPELLANT EXPLOSIVES SOLID CLASS B
 DODAC ----- 1320-D675

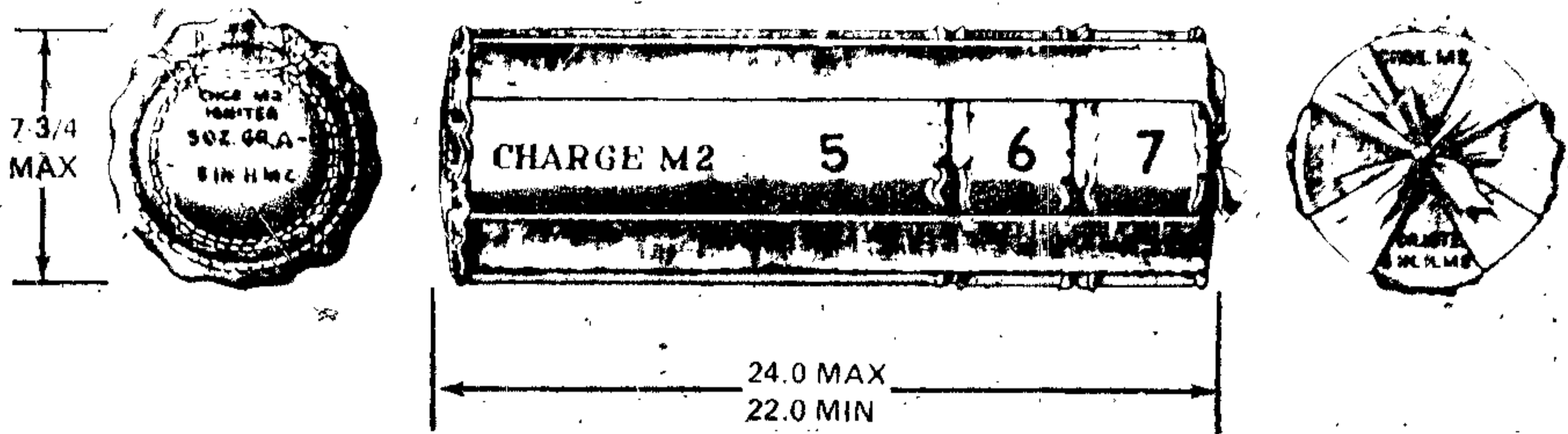
Limitations:

N/A

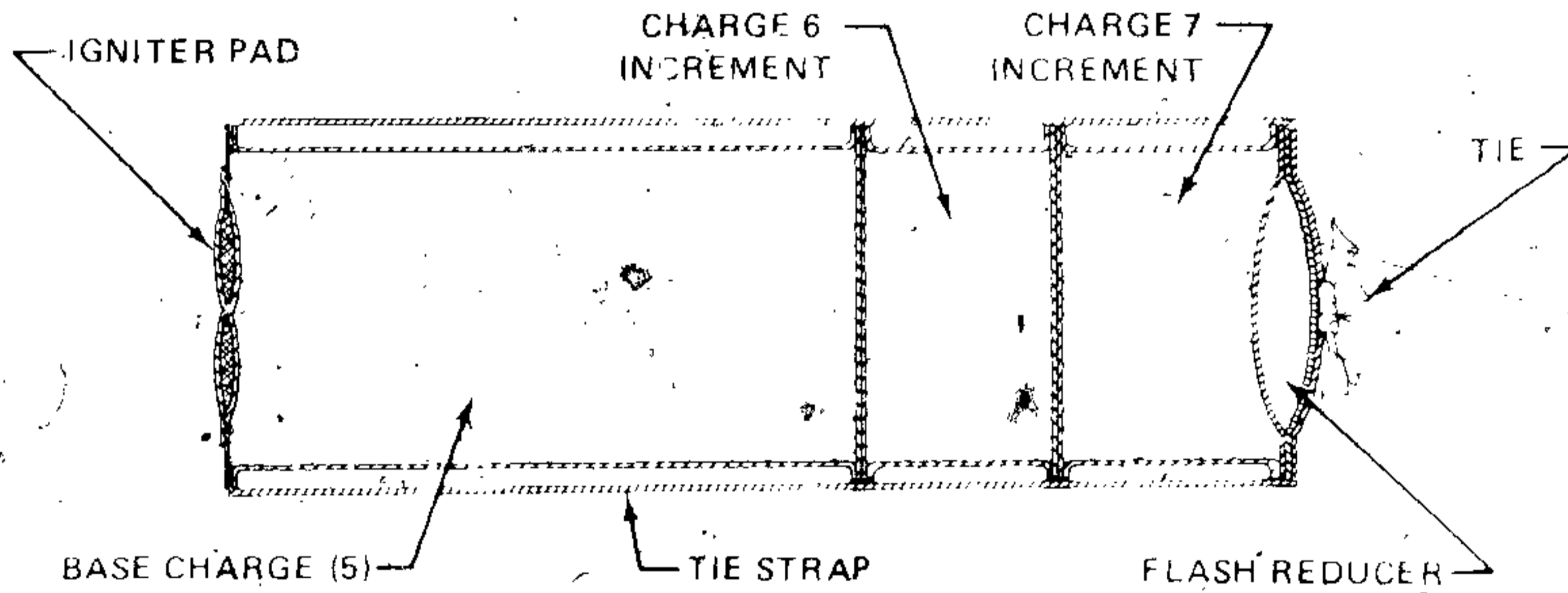
References:

SC 1305/30-II
 AMCP 700-3-3
 SB 700-20
 TM 9-2300-216-10
 TM 9-1300-250
 TM 9-1300-206
 TM 9-1300-251-20
 TM 9-1300-251-34
 TM 9-3004
 TM 9-2350-210-12

CHARGE, PROPELLING, 8-INCH: M2



AR199699



AR199698

Type Classification:

Std. OTCM 36841 dtd 1958

Use:

8-Inch White Bag Propelling Charge M2 is used for zone firing with Charges 5 through 7 in 8-inch howitzer cannons.

Description:

The charge consists of a base section (Charge 5) and two unequal increments (Charges 6 and 7) for zone firing. The increments are assembled end to end in sequence, and held in place by four tying straps sewn to the base of Increment 5 and tied over the top of Increment 7. A red cloth igniter pad containing 5 ounces of black powder is sewn to

the base of Increment 5. Each increment of the charge and the igniter pad is identified by black stencil markings. In use an M3 Flash Reducer is inserted under the tie straps at the forward end of the charge. Flash reducer M3 is a separate item of issue to be used when firing all zones of the M2 Propelling Charge. It consists of a square pad of red cloth containing a 1 pound mixture of potassium sulfate and black powder.

Functioning:

The flash from the primer ignites the black powder igniter pad, which in turn ignites the M2 propellant in the charge. The burning propellant generates gases which force the projectile out of the gun tube at a velocity required to reach the target. The flash reducer serves

reduce the amount of blast overpressure at the muzzle. Although the flash reducer increases the quantity of smoke, it must be used in daylight firing as well as night firing unless it is tactically impossible.

Tabulated Data:

Type----- White Bag, separate loading propelling charge
 Weight----- 30 lbs.
 Length----- 24.0 in. (max.)
 Dia----- 7-3/4 in. (max.)
 Color----- White w/black markings
 Propellant:
 Composition----- M1
 Grain Type----- 7 perforated cylinder
 Weight----- 28.5 lbs.
 Web----- 0.043 in.
 Primer----- Model Used with Cannon (Weapon)
 MK2A4 M2, M2A1 (M115)
 M82 M47 (M55); M2A2 (M110)
 MK15 M47 (M55); M2A2 Mods 2 (M110) & 3
 MK34 M47, (M55)
 Assembly Drawing No.----- 8861374

Temperature Limits:

Firing:
 Lower limit----- - 40° F
 Upper limit----- + 125° F
 Storage
 Lower limit----- - 80° F (for periods of not more than 3 days)
 Upper limit----- + 160° F (for not more than 4 hrs./day)

* Packing----- 1 charge in metal container; 32 metal containers per pallet
 Container----- M19A2
 Weight----- 54 lbs.
 Dimensions----- 9-13/16 in. dia. x 29-9/32 in.
 Cube----- 1.6 cu. ft.
 Pallet:
 Weight----- 1732 lbs.

Dimensions----- 44 x 58-1/2 x 47 in.

Cube----- 64 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class----- 2
 Storage compatibility group----- J
 DOT shipping class----- B
 DOT designation----- PROPELLANT EXPLOSIVE SOLED CLASS B
 DODAC----- 1320-D676
 Packing, M3 Flash Reducer----- 10 per carton; 1 carton per barrier bag; 4 barrier bags per wooden box
 Weight----- 80 lbs.
 Dimensions----- 17-1/8 x 14-3/8 x 9-1/2 in.
 Cube----- 1.35 cu. ft.

Shipping and Storage Data:

Quantity-distance class----- 7
 Storage compatibility group----- O
 DOT shipping class----- A
 DOT designation----- BLACK POWDER
 DODAC----- 1320-D681
 Drawing number----- 8861374

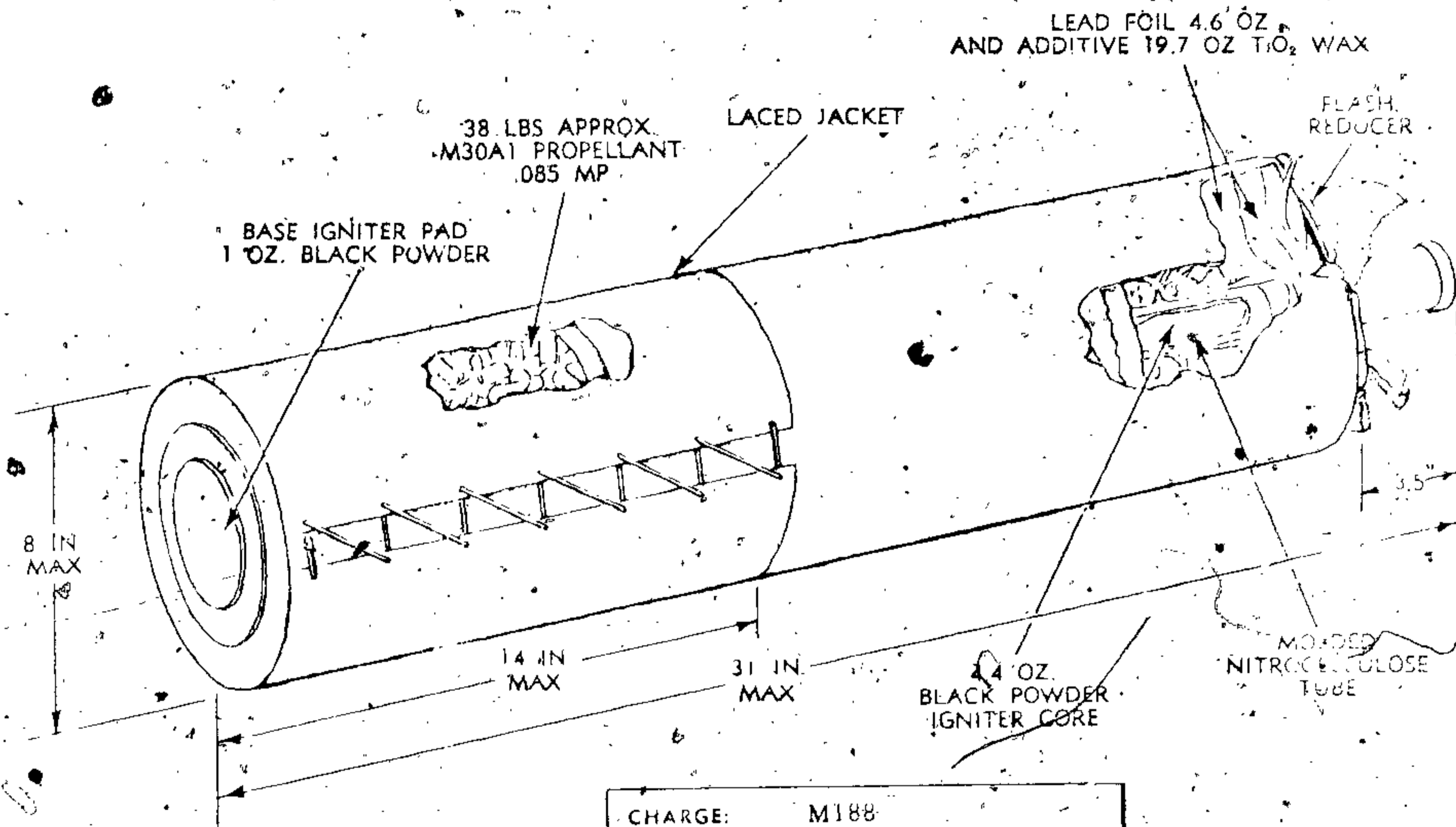
Limitations:

The M2 propelling charge must be used with an M3 flash reducer. If flash reducers are not available, occasional blast overpressure and excessive flash may be experienced.

References:

- SC 1305/30-IL
- SB 700-20
- AMCP 700-3-3
- TM 9-1300-251-20
- TM 9-1300-251-34
- TM 9-1300-206
- TM 9-1300-250
- TM 9-2300-216-10
- TM 9-3004
- TM 9-2350-210-12

CHARGE, PROPELLING, 8-INCH: M188



CHARGE:	M188
TYPE:	SEPARATE LOADING
PROJECTILE:	M106, HE
CANNON:	M201
WEAPONS:	M110A1 HSP

AR 100892-B

Type Classification:

Std

Use:

The M188 is a zone 8 charge designed to supplement the standard M1 and M2 charges and provide extended range for 8-inch howitzer M110A1.

Description:

The M188 Propelling Charge is a single increment, white bag charge, approximately 31 inches long and 8 inches in diameter. The charge contains approximately 38 pounds of high-energy M30A1 propellant in a cloth bag. A red cloth igniter pad containing 1 ounce of

black-powder is sewn to the base of the charge. A central ignition core extends through the center of the charge for almost its entire length. This ignition core consists of a nitrocellulose paper tube, containing a bag of black powder, which is sewn to the base igniter. A liner consisting of a cloth side, impregnated with titanium dioxide and paraffin wax, and a lead side lines the forward end of the charge. Four tie straps sewed to the base of the charge run the length of the charge and are tied at the forward end of the charge. A flash reducer is inserted under the tie straps at the forward end of the charge. A cylindrical jacket is placed over the charge length and tightly laced. This lacing jacket serves to provide necessary rigidity and structural stability of the assembled charge.

Functioning:

The flash from the black powder in percussion primer M82 ignites the igniter pad at the base of the charge. The burning igniter pad in turn ignites the black powder in the igniter core to spread ignition to the propelling charge. Rapidly expanding gases from the burning charge propel the projectile through the barrel of the weapon with enough velocity to reach the target. The flash reducer functions to reduce blast over-pressure and flash at the muzzle of the weapon.

Tabulated Data:

Type	-----	Separate loaded Propelling charge, white bag
Weight	-----	40 lbs
Length	-----	31.0 in.
Color	-----	White w/black markings
Primer used	-----	M82
Cannon used with	-----	8-inch SP Howitzer M110A1
Assembly Dwg. No.	-----	9277173
Propellant:		
Grain type	-----	7 perforated cylinder, L/D=2.35
Composition	-----	M30A1
Weight	-----	38 lbs
Web	-----	0.085 in.
Igniter:		
Base pad	-----	1 oz Black Powder
Central core	-----	4.4 oz black powder

Temperature Limits:

Firing:		
Lower limit	-----	-40°F
Upper limit	-----	+125°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	-----	1 propelling charge in metal container

*Container:

Weight	-----	75 lbs
Dimensions	-----	29 1/4 in. x 10 15/32 dia
Cube	-----	2.4 cu ft

NOTE

See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	-----	2
Storage compatibility group	-----	J
DOT shipping class	-----	B
DOT designation	-----	PROPELLANT EXPLOSIVES CLASS B SOLID
DODAC	-----	1320-D661

Limitations:

N/A

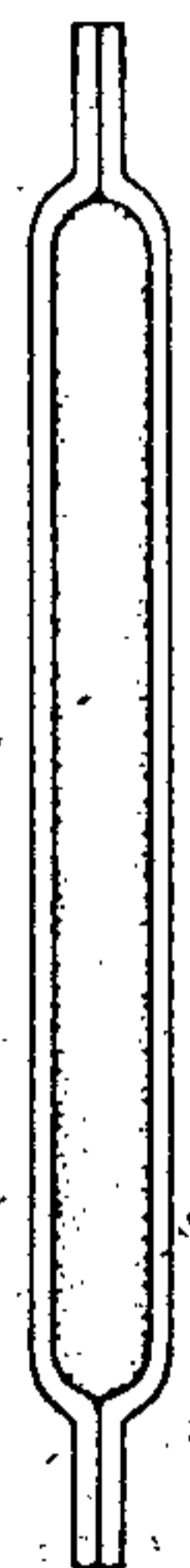
References:

- SC 1305/30-IL
- SB 700-20
- AMCP 700-3-3
- TM 9-1300-206
- TM 9-1300-251-20
- TM 9-1300-251-34
- TM 9-2300-216-10



FLASH REDUCER M2 (T2)

<p>FLASH REDUCER M2 (T2)</p> <p>FOR 155 MM HOW M1, M45, & M126</p>
--



AR 199645A

Type Classification:

STD OTCM 31154 dtd 1946.

Use:

Flash Reducer M2 (T2) is used with White Bag Propelling Charges M4 and M4A1 in 155-mm howitzer cannons, ordinarily on an optional basis. However, TB 9-1300-385 requires use of this flash reducer with certain specific lots of Propelling Charge M4. The primary purpose is the reduction of muzzle flash to make accurate weapon location more difficult for the enemy. A secondary effect is reduction of blast pressure at the muzzle. When used, one flash reducer is inserted at the forward end of each increment used, including the base charge. Even though Propelling Charge M4A2 has an integral flash reducer assembled at

Increment No. 3, the M2 (T2) may be used as a supplement with that charge also, if additional flash reduction is desired. No flash reducers are required when using Green Bag Propelling Charge M3.

Description:

Flash Reducer M2 (T2) consists of 1-1/2 ounces of black powder and potassium sulphate or potassium nitrate mixture in a 4-inch square bag of red cotton cloth. The edges are sewn together to prevent leakage of the chemical mixture.

Functioning:

The flash reducer is ignited by the burning propellant. When the black powder and potassium nitrate or potassium sulphate mixture



TM 43-0001-28

burns in combination with the propelling charge, the chemical reaction causes a reduction in muzzle flash of the weapon. The likelihood of blast overpressure from the muzzle is also reduced. There is some increase in smoke at the weapon muzzle when the M2 (T2) is used.

Tabulated Data:

Weight ----- 0.06 lb.
Dimensions ----- 4 x 4 in.
Cannon (Weapons)
used with ----- M1, M1A1 (M114,
M114A1); M45
(M44, M44A1);
M120, M126A1
(M109); M185
(M109A1); M199 (M198)

Propelling charges
used with ----- M4, M4A1, M4A2

Temperature Limits:

Firing:
Lower limit ----- -40°F
Upper limit ----- +125°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 ----- 200 flash reducers
in metal container
4 containers in
wooden box

*Packing Box:
Weight ----- 68.2 lbs.
Dimensions ----- 26-7/16 x 13 1/2
11-15/16 in.
Cube ----- 2.37 cu. ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
class ----- 7
Storage compatibility
group ----- O
DOT shipping class -- A
DOT designation ---- BLACK POWDER
DODAC ----- 1320-D552
Assembly Dwg.
No. ----- 9229177

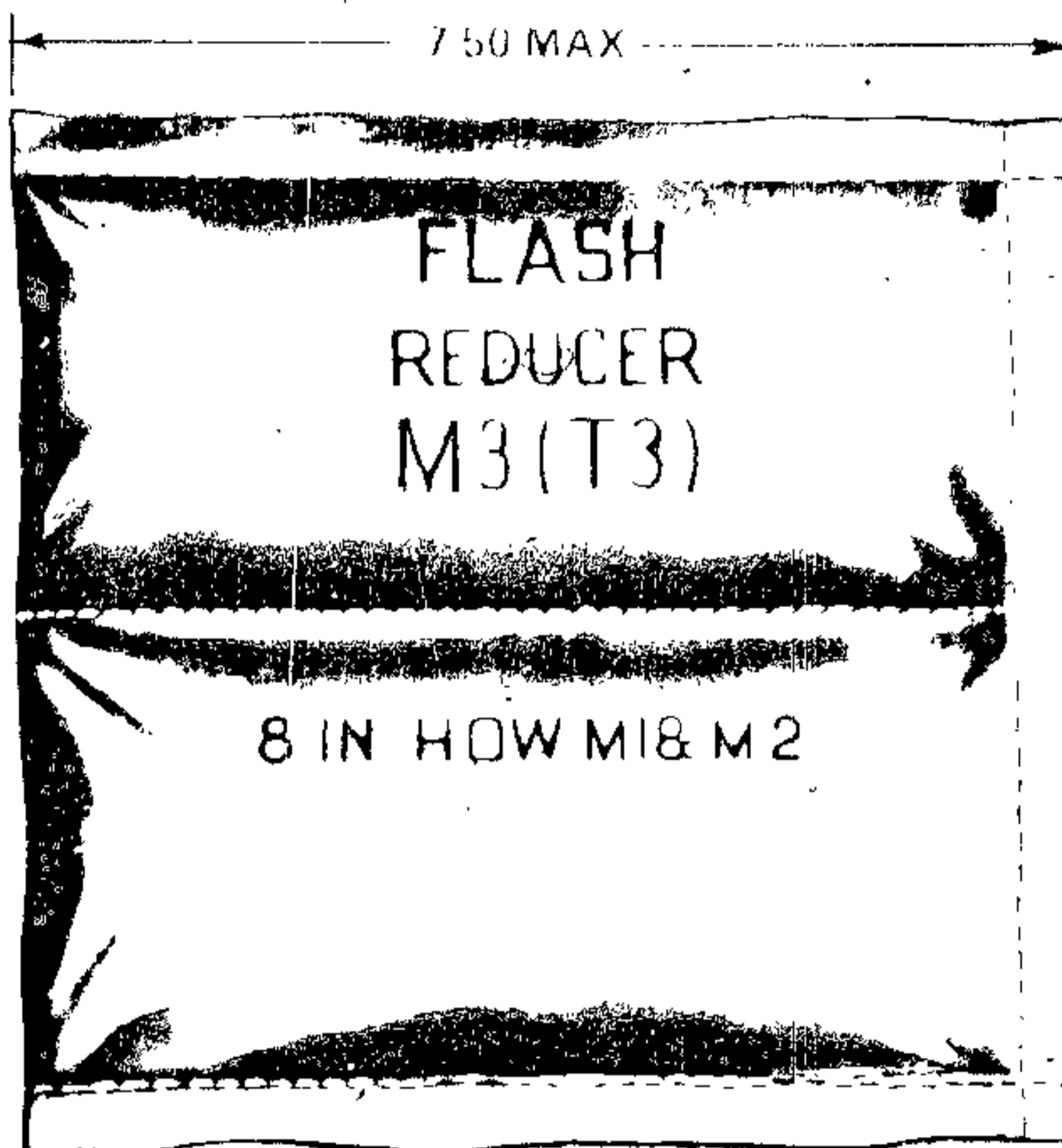
Preparation for Firing:

None

References:

TM 9-1300-251-20
SC 1305/30-1L
SB 700 20
AMCP 700-3-3

REDUCER, FLASH: M3 (T3)



AR 199693-A

Type Classification:

Std AMCTC 8020 dtd 1970

Use

Flash Reducer M3 is used when firing 8-inch White Bag Propelling Charge M2 (all zones). It is not used with Green Bag Propelling Charges M1 which are flashless. The primary purpose is the reduction in muzzle flash to make accurate weapon location more difficult for the enemy. It is used in both night and day-light firings. A secondary effect is reduction of blast pressure at the muzzle.

Description:

The flash reducer is a square red cloth pad containing a one-pound mixture of black powder and potassium sulphate or potassium nitrate. The assembly is sewn around each edge to prevent leakage of the contents, and through the center to increase tear resistance. Thus, the appearance is of two equal increments. The flash reducer is inserted under the tie/straps at the forward end of the propelling charge at time of firing.

Functioning:

The flash reducer is ignited by the burning propellant. The chemical combination of burning potassium and propellant serves to modify the flashing of gases at the muzzle of the weapon. The result is a reduction in brilliance and of the blast overpressure at the muzzle.

Tabulated Data:

Type -----	Chemical modifier
Weight -----	1 lb
Dimensions -----	7-1/2 x 7-1/2 in.
Color -----	Red w/ black markings
Filler -----	Potassium sulphate or potassium nitrate Black powder
Cannon (Weapon) used with -----	M47 (M55) M2, M2A1 (M11), M2A1F1 (M11F)
Charges used with -----	8-inch Charge Propelling M2
Assembly Dwg. No. -----	8881015



Vahsbeck

FM 43-0001-28

Temperature Limits:

Firing:

Lower limit----- - 40° F
Upper limit----- + 125° F

Storage:

Lower limit----- - 80° F (for periods
not longer than 3
days)
Upper limit----- + 160° F (for periods
not more than 4 hrs.
/day)

* Packing ----- 10 flash reducers in
carton; 1 carton in
barrier bag; 4 bags
in wooden box

* Packing Box:

Weight ----- 80 lbs.
Dimensions----- 17-1/8 x 14-3/8
x 9-1/2 in.
Cube ----- 1.35 cu. ft.

* NOTE: See SC for complete packing data
including NSN's.

Shipping and Storage Data:

Quantity-distance
class ----- 7
Storage compatibility
group ----- O
DOT shipping class ----- A
DOT designation ----- BLACK POWDER
DODAC ----- 1320-D681

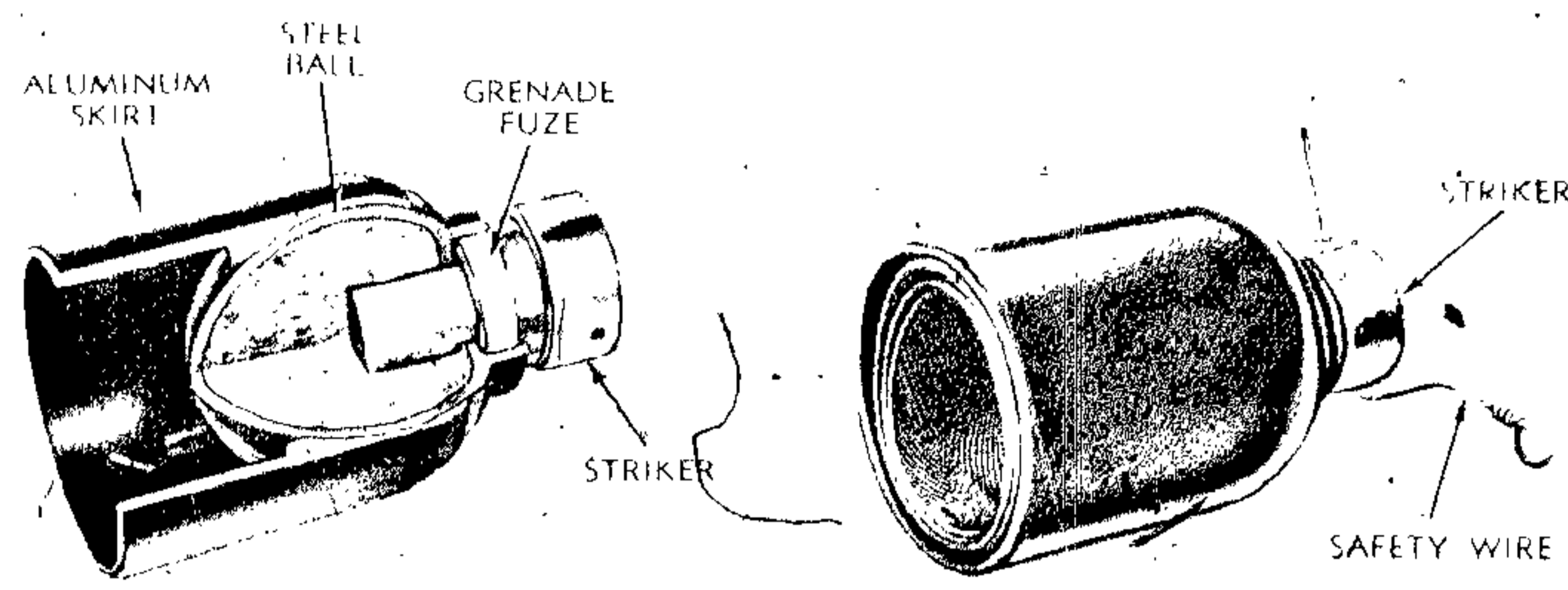
Limitations:

None

References:

TM 9-1300-251-20
TM 9-2300-216-10

GRENADEN: GENERAL PURPOSE, M35



CUTAWAY VIEW WITH RIBBONS REMOVED (ARMED) STRIKER PLATE EXTENDED

GRENADEN WITH RIBBONS FURLED AND SAFETY WIRE IN PLACE (UNARMED)

AR 101392

USE. To provide improved antipersonnel capability when loaded in 105MM cartridge, M413

CLASSIFICATION: STANDARD B

DESCRIPTION:

TABULATED DATA

(1) The grenade M35 is a ground burst munition consisting essentially of a steel ball with an aluminum skirt and a point-detonating grenade fuze and striker in the nose. Two nylon ribbon streamers, attached to the inside of the aluminum skirt, orient and drag-stabilizes the grenade in flight. The steel ball is filled with 28 grams of Comp B.

Explosive	28 grams	Comp B
Length		2.46 in.
Diameter		1.46 in.

FUNCTIONING:

(2) Three grenades in the layer next to the base plug of the M413 projectile contain a yellow dye which acts as a spotting charge. The dye is in polyethylene bags secured by a polyethylene cup which is located beneath the nylon streamers.

(1) When each grenade M35 is ejected from the projectile body, the 20 lb. force pulls free of the safety wire which is attached to the spacer plate (fig. 1-3).

(2) This starts a mechanical action within the grenade fuze which starts the explosive train.

(3) The fragmenting portion of the grenade body consists of a steel sphere filled with Comp B, a booster retainer, felt pad and booster pellet. The inner surfaces of the sphere have been embossed in such a manner that upon detonation, it bursts uniformly into fragments of optimum effectiveness.

(3) The aluminum skirt of the grenade contains two streamer ribbons which unfurl when the grenade is in free flight. These ribbons drag-stabilize and orient the grenade with the point-detonating grenade fuze and striker downward.

(4) When the striker impacts, the grenades detonate. The yellow dye, which was contained in three grenades, is visible for two miles on a clear day.

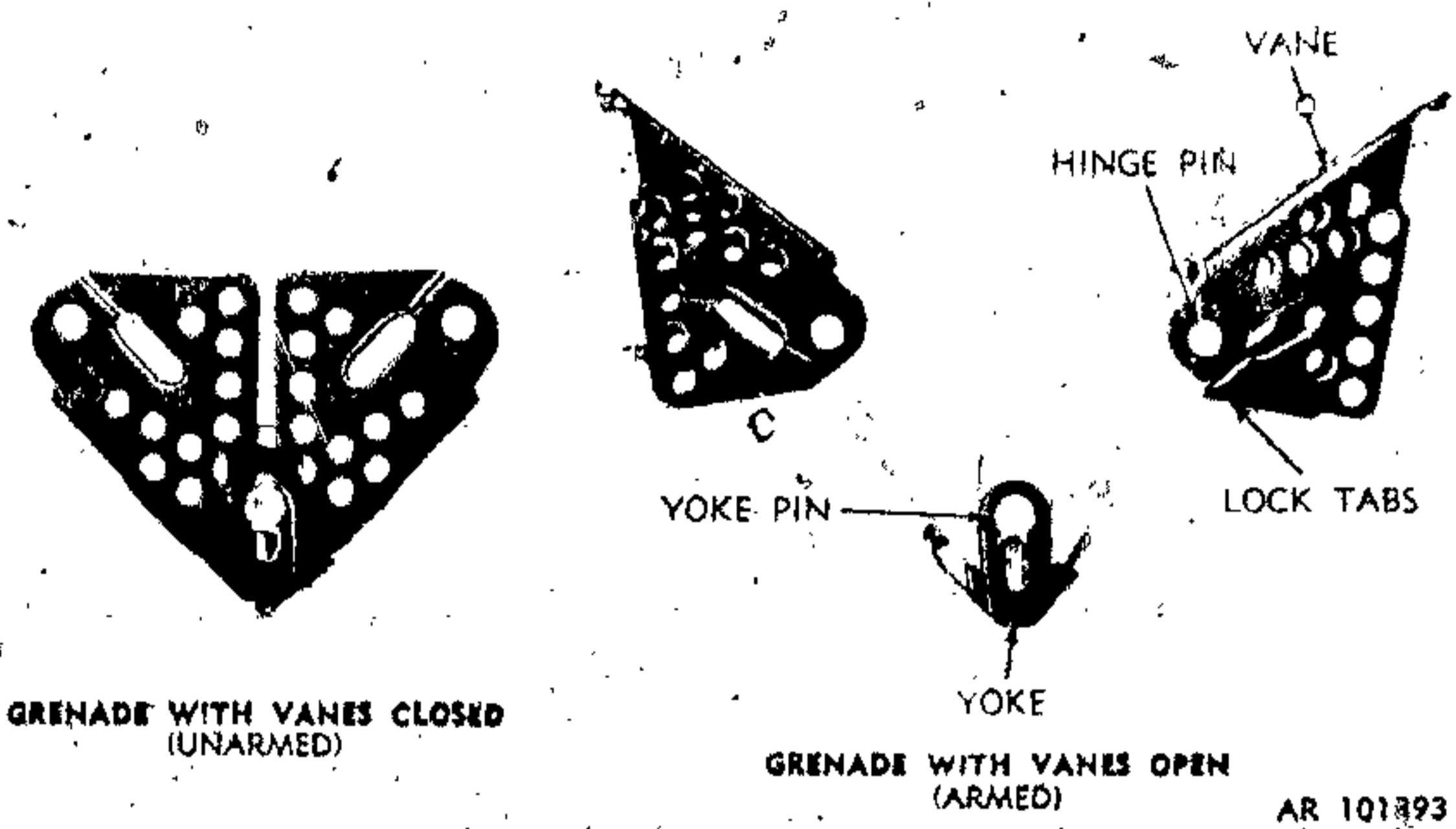
REFERENCES:

TM 9-1300-254-12

DRAWING: Grenade - XP94930

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GRENADE: GENERAL PURPOSE, M36



USE: To provide improved antipersonnel capability when loaded into 105MM cartridge M444E1 and 107MM cartridge M453.

DESCRIPTION:

(1) The grenade M36 is an airburst munition which is expelled from the projectile body in flight. Upon surface impact, the explosive components are ejected upward for airburst. The grenade consists of a housing assembly, two spring-loaded vanes, a yoke with firing pin, ejection charge, delay detonator, and a two-piece steel ball filled with Comp A5.

(2) After the vanes are extended, a spring moves the yoke to the extended position. The firing pin, attached to the yoke, retracts from the slide assembly, permitting movement of this assembly which locates the detonator in the armed position. A delay in arming of the grenade is provided by restricting movement of the slide assembly. This delay helps prevent premature grenade functioning caused by midair collision immediately after ejection from the projectile.

(3) When the grenade impacts the target surface, the yoke drives the firing pin into the detonator which initiates the ejection charge. The ejection charge forces the steel ball up and away from the housing, ignites the first-life mixture in the delay detonator, and forces the detonator into the in-line position. The delay detonator functions the high explosive at a distance of 4 to 6 feet above the impacted surface, causing the steel ball to fragment.

CLASSIFICATION: STANDARD A

TABULATED DATA

Type of Explosive	-----	Comp A5
Explosive in one grenade	-----	21.25 grams
Total Weight	-----	.44 lb

REFERENCE:

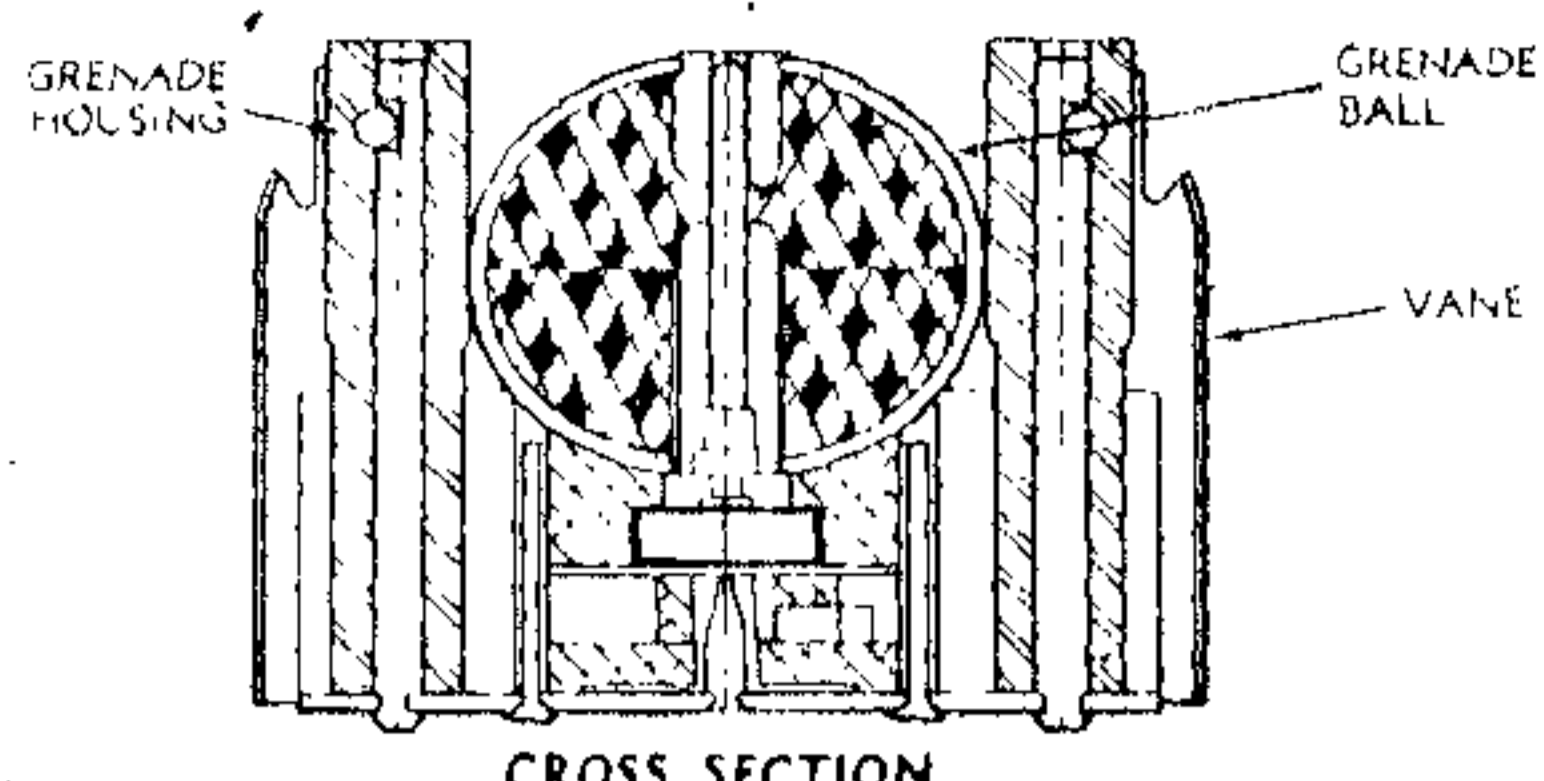
- TM 9 1315-245-12
- Drawings:
- Grenade M36 —C9211946

FUNCTIONING:

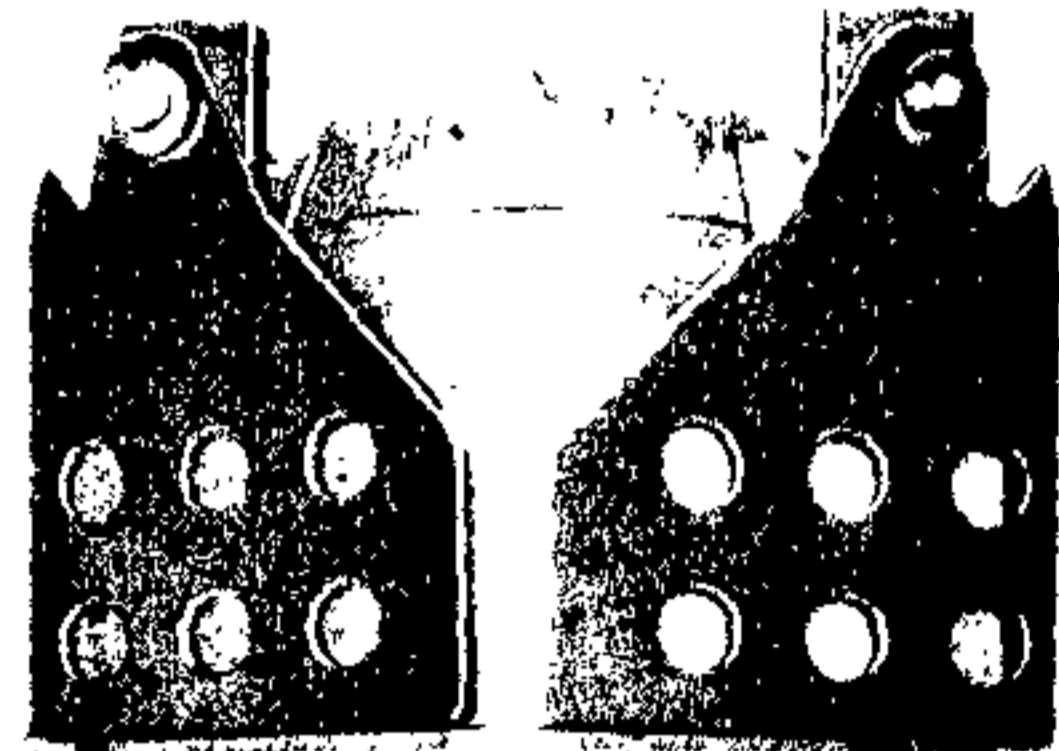
(1) Upon expulsion from the projectile, the vanes open and orient the grenade in a vertical or near-vertical position. The energy of the vane springs and the airstream lock the two vanes in the open position and stabilizes the grenade.

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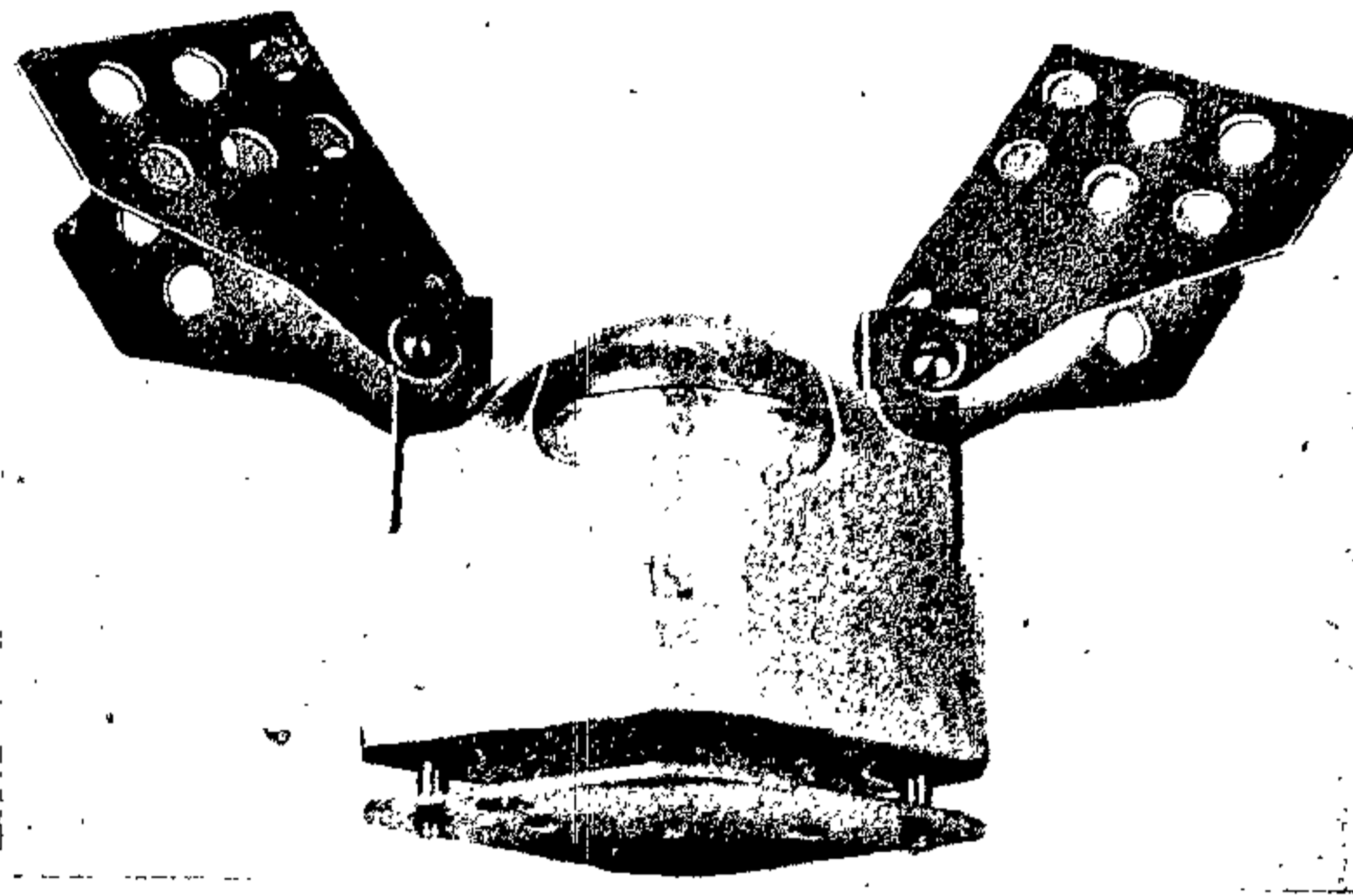
GRENADE, GENERAL PURPOSE, M39



CROSS SECTION



GRENADE WITH VANES CLOSED



GRENADE WITH VANES OPEN

AR 101394

USE: To provide improved antipersonnel capability when loaded in 105MM cartridge M444.

DESCRIPTION:

The grenade M39 is an airburst munition which is expelled from the projectile body in flight. Upon surface impact, the explosive components are ejected upward for airburst. The grenade consists of a housing assembly, two vanes, which extend in flight, pivoted on two D-shaped sear pins, a striker plate with firing pin, two striker plate guide rods which interlock the sear pins, ejection charge, delay detonator, and a two-piece steel ball filled with COMP A5. There are 18 grenades in the M444 cartridge.

CLASSIFICATION: STANDARD A

TABULATED DATA

Explosive 23.55grams COMP A5

FUNCTIONING:

(1) When each grenade M39 is expelled from the projectile body, the vanes open and orient the grenade by interaction of the air stream.

(2) The D-shaped sear pins rotate with the vanes, and free the striker plate guide rods which allow the spring to extend the striker plate.

(3) This action withdraws the firing pin from the rotor and a spring forces the rotor into a position where the primer is aimed with the ejection charge and the delay detonator. The grenade is now armed.

(4) The vanes are held open by the air stream and striker plate guide rods.

(5) When the grenade impacts, the firing pin is driven into the primer which initiates the ejection charge.

(6) The ejection charge initiates the delay detonator and propels the steel ball upward.

(7) The delay detonator is assembled with a delay element designed to detonate the steel ball approximately 4 to 6 feet above impact surface.

REFERENCE:

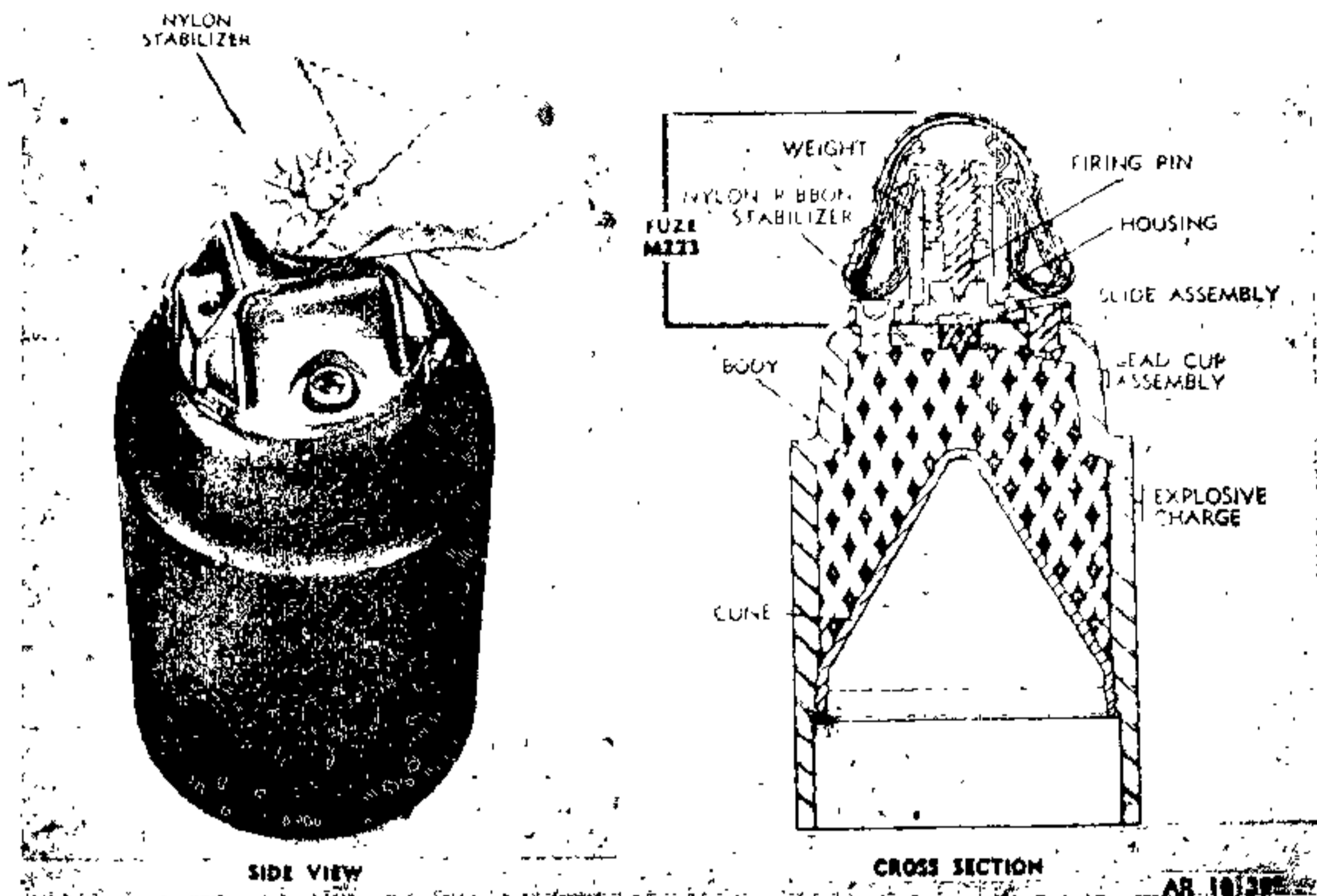
TM 9-1300-254-12

DRAWING - F8864945

TM 43-0001-28

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GRENADE, GENERAL PURPOSE, M42



USE. To provide anti-materiel and anti-personnel capabilities in a submissile delivered by 155MM M483 and 8 inch M509 projectiles for howitzers.

DESCRIPTION

(1) The M42 grenade is a ground burst munition consisting essentially of a 1.5 inch diameter cylindrical shell body loaded with approximately 31 grams of Composition A5 in a shaped charge. A nylon-ribbon loop stabilizer is provided to orient and arm the grenade.

(2) The inertia type fuze has a slide assembly containing an M55 detonator and a coil spring to force the slide into the armed position.

(3) The M42 grenade has embossed inner side wall for optimum fragment size.

CLASSIFICATION: STANDARD A

TABULATED DATA:

Explosive	-----	30.5 grams	Comp A5
Length	-----	3.25 in.	
Weight	-----	0.46 lb.	

FUNCTIONING:

(1) Upon expulsion from the projectile, the nylon ribbon stabilizer extends and orients the grenade and due to rotational forces, unfreeds the threaded firing pin from the weight (semi armed), and pushes the firing pin out of the slide assembly. The slide assembly is then free to move and moves into the armed position by action of the slide spring and centrifugal force. The spring maintains the slide assembly in the fully armed position.

(2) Upon impact, the inertia weight drives the firing pin into the detonator M55, initiating the firing train. A shaped charge jet is expelled downward while the body bursts into a large number of small fragments. The jet is capable of penetrating approximately 2 to 3 inches of homogeneous armor plate. Anti-personnel effects are obtained by fragmentation of the grenade body.

REFERENCES:

TM 9-1320-241-12

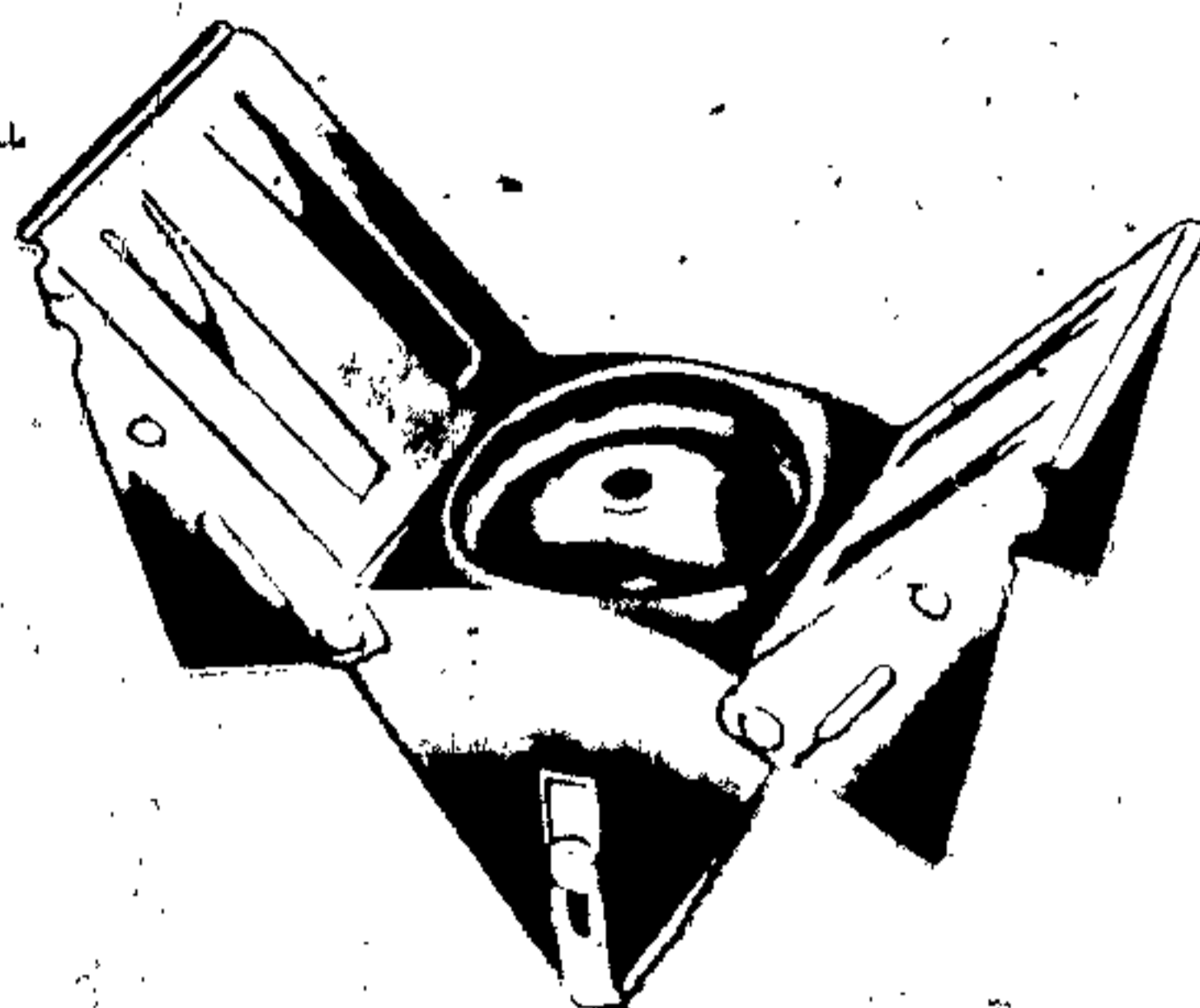
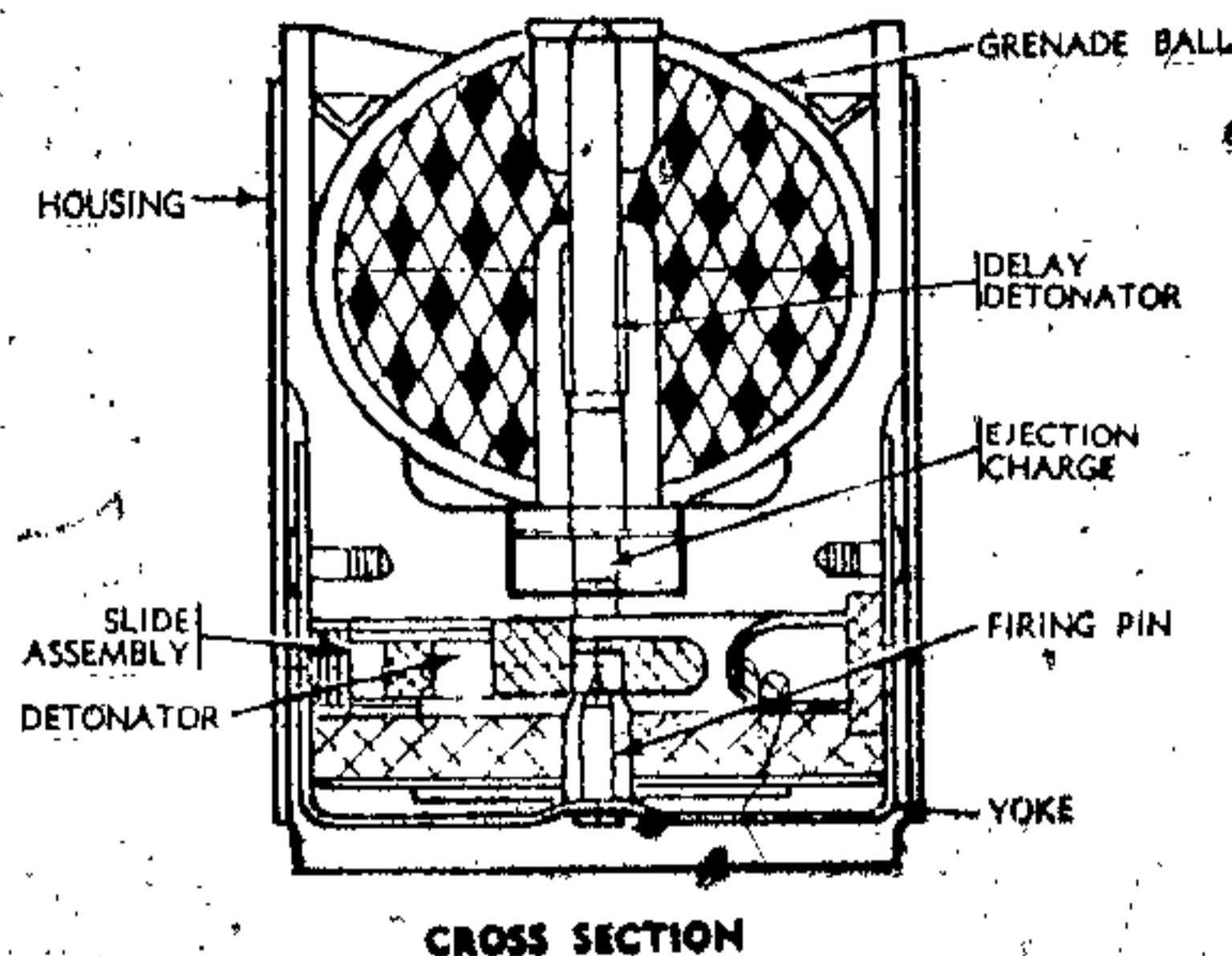
Drawing:

Grenade 9215340

TM 43-0001-28

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GRENAD: GENERAL PURPOSE, M43A1



GRENAD WITH VANES OPEN

AR 101397

USE: To provide improved antipersonnel capability when loaded in 155MM projectile, M449 Series, 8 inch projectile M404 and 16 inch projectile mark 19 Mod 0.

DESCRIPTION:

The grenade, M43A1 is not painted or marked. It is an airburst munition which is expelled from the projectile in flight. Upon surface impact, the explosive components are ejected upward for airburst. The grenade consists of a housing assembly with two spring-loaded vanes and a two-piece steel ball filled with COMPOSITION A5.

CLASSIFICATION: STANDARD A

TABULATED DATA

Explosive ----- 21.25 grams
Comp A5

FUNCTIONING:

(1) Upon expulsion from the projectile, the vanes open and orient the grenade in a vertical or near-vertical position. The energy of the vane springs and the airstream lock the two vanes in the open position and stabilize the grenade.

(2) After the vanes are extended, yoke springs move the yoke to the extended position. The firing pin, attached to the yoke, retracts from the slide assembly, permitting move-

ment of this assembly which locates the detonator in the armed position. A delay in arming of the grenade is provided by restricting movement of the slide assembly. This delay helps prevent premature grenade functioning caused by impact friction immediately after ejection from the projectile. Arming delay is achieved by allowing air to pass through a porous plug in the housing located adjacent to the slider recess.

(3) When the grenade impacts the target surface, the yoke drives the firing pin into the detonator which initiates the ejection charge. The ejection charge forces the steel ball up and away from the housing, ignites the first fire mixture in the delay detonator, and forces the detonator into the in-line position. The delay detonator functions the high explosive Comp A5 at a distance of 4 to 6 feet above the impacted surface, causing the steel ball to fragment.

REFERENCES:

TM 9-1300-254-12

Drawing:

8875900

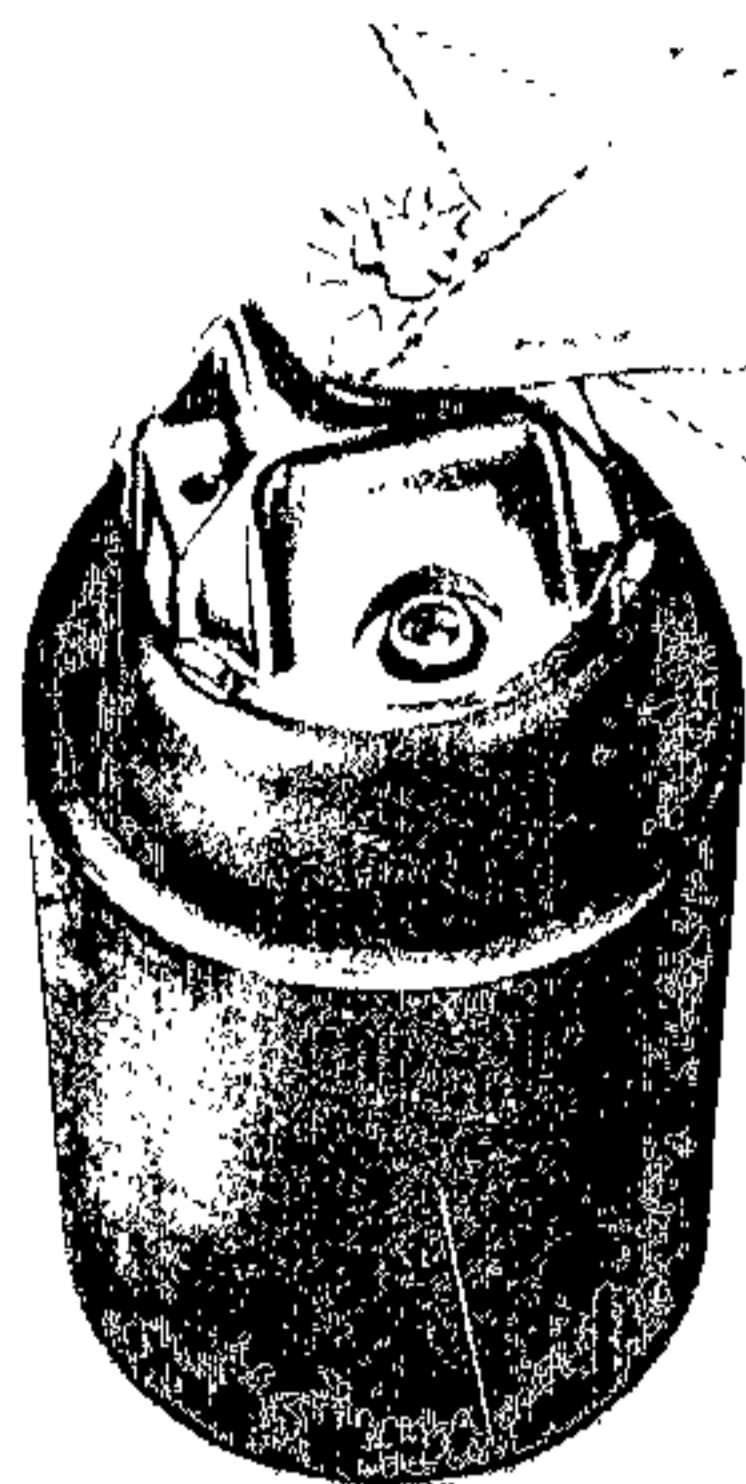
CARRIERS:

M449 Series (f0 grenades)
M404 (104 grenades)

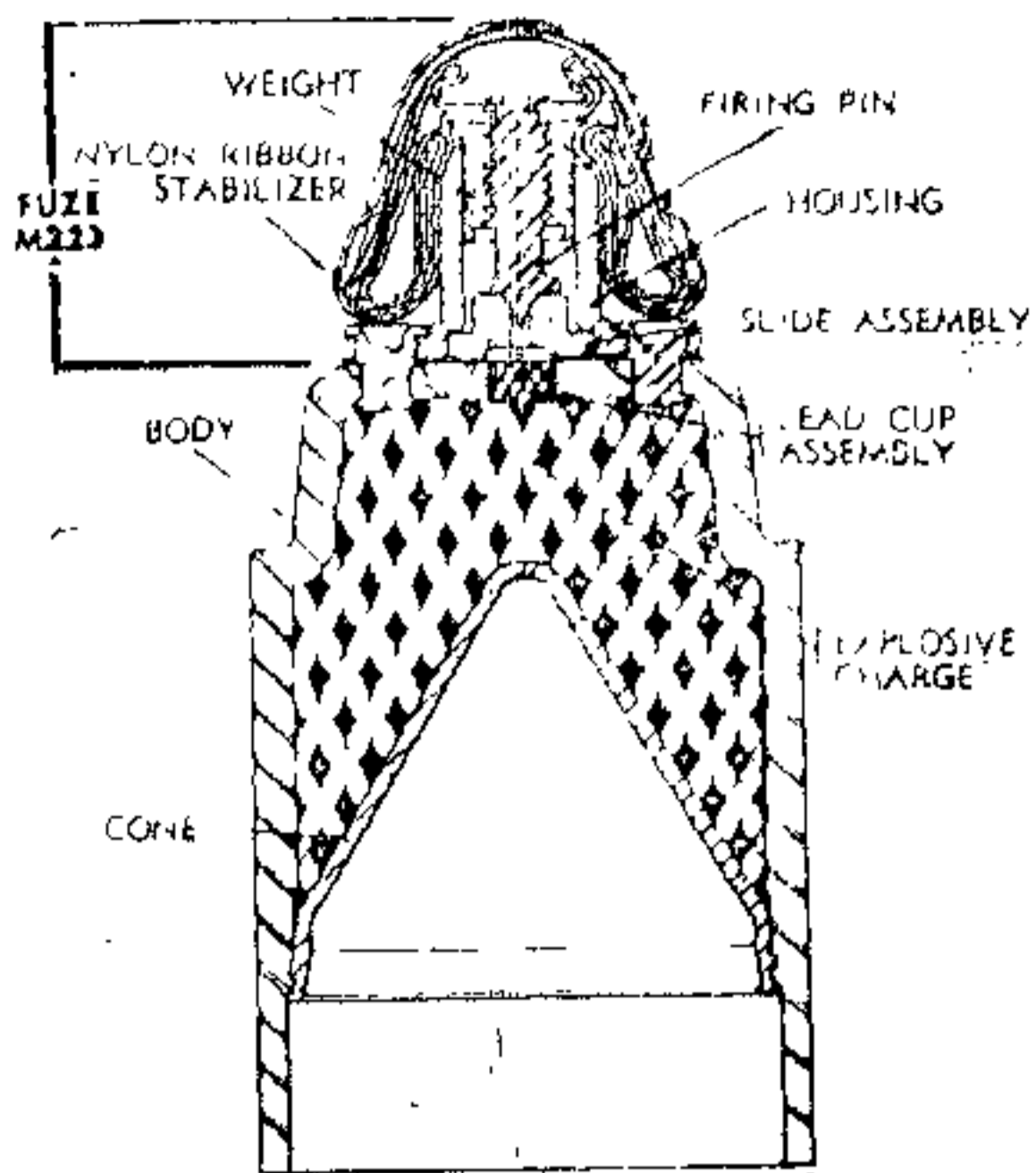
TM 43-0001-28

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GRENADE, GENERAL PURPOSE, M46



SIDE VIEW



CROSS SECTION

AR 101396

USE: To provide antimateriel and antipersonnel capabilities in submissiles carried in the last three aft layers in the 155MM M483 projectile for howitzers.

DESCRIPTION:

The M46 grenade is a ground burst munition consisting essentially of a 1.5 inch diameter cylindrical shell body loaded with approximately 30 grams of COMP A5 in a shaped charge. A nylon ribbon loop stabilizer is provided to orient and arm the grenade.

The inertia type fuze has a slide assembly containing a M55 detonator and a coil spring to force the slide into the armed position.

The M46 grenade has a smooth inner side wall that makes the body wall stronger than the embossed wall of the M42 grenade. The wall does not have optimum fragmentation characteristics of the M42 grenade wall, but has extra strength to prevent compression failure during setback.

CLASSIFICATION: STANDARD A

TABULATED DATA:

Explosive	30 grams Comp A5
Length	3.25 inches
Weight	0.47 lbs.

FUNCTIONING:

1. Upon expulsion from the projectile, the nylon ribbon stabilizer extends and orients the grenade, and due to rotational forces unthreads the (threaded firing pin from the weight (sem. armed), and pulls the firing pin out of the slide assembly. The slide assembly is then free to move, and moves into the armed position by action of the slide spring and centrifugal force. The spring maintains the slide assembly in the fully armed position.

2. Upon impact, the inertia weight drives the firing pin into the M55 detonator, initiating the firing train. A shaped charge jet is expelled downward while the body bursts into a large number of small fragments. The jet is capable of penetrating approximately 2.75 inches of homogeneous armor plate. Antipersonnel effects are obtained by fragmentation of the grenade body.

REFERENCES:

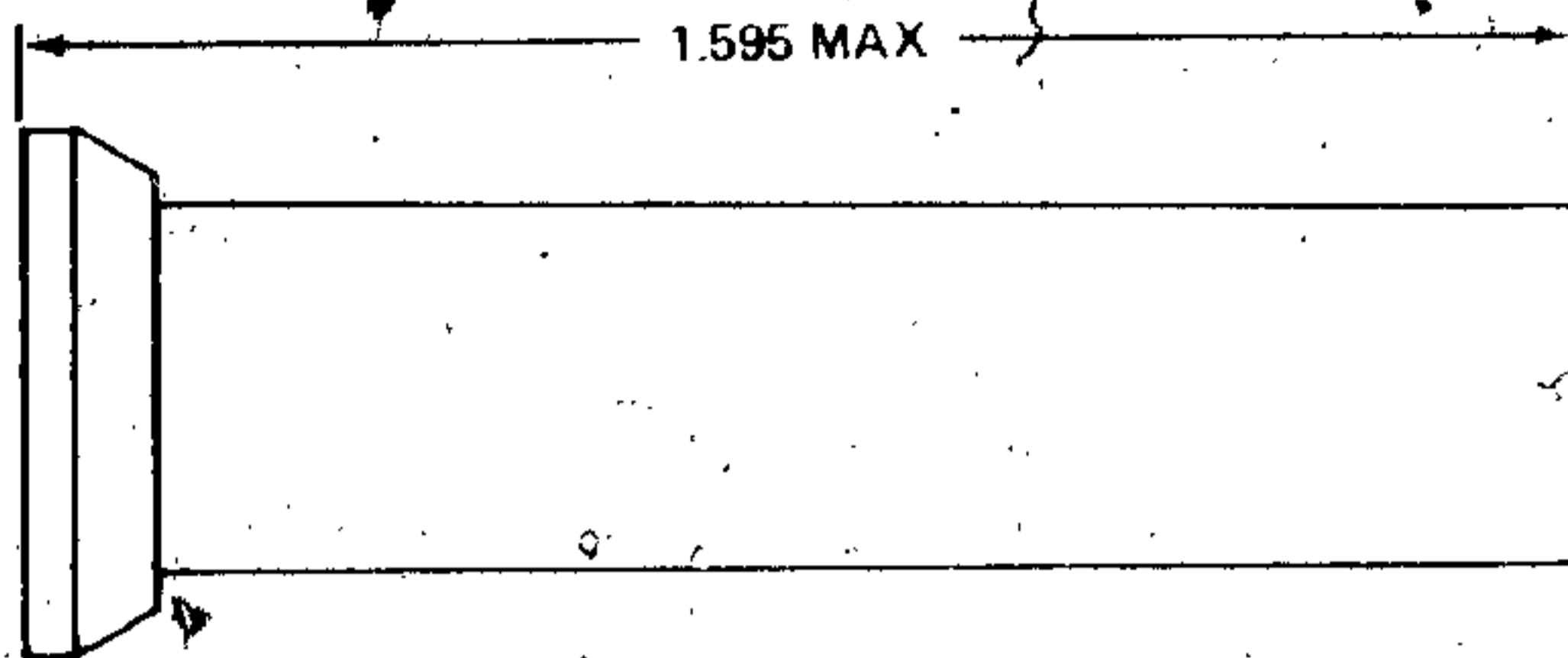
TM 9-1320-241-12

Drawing:

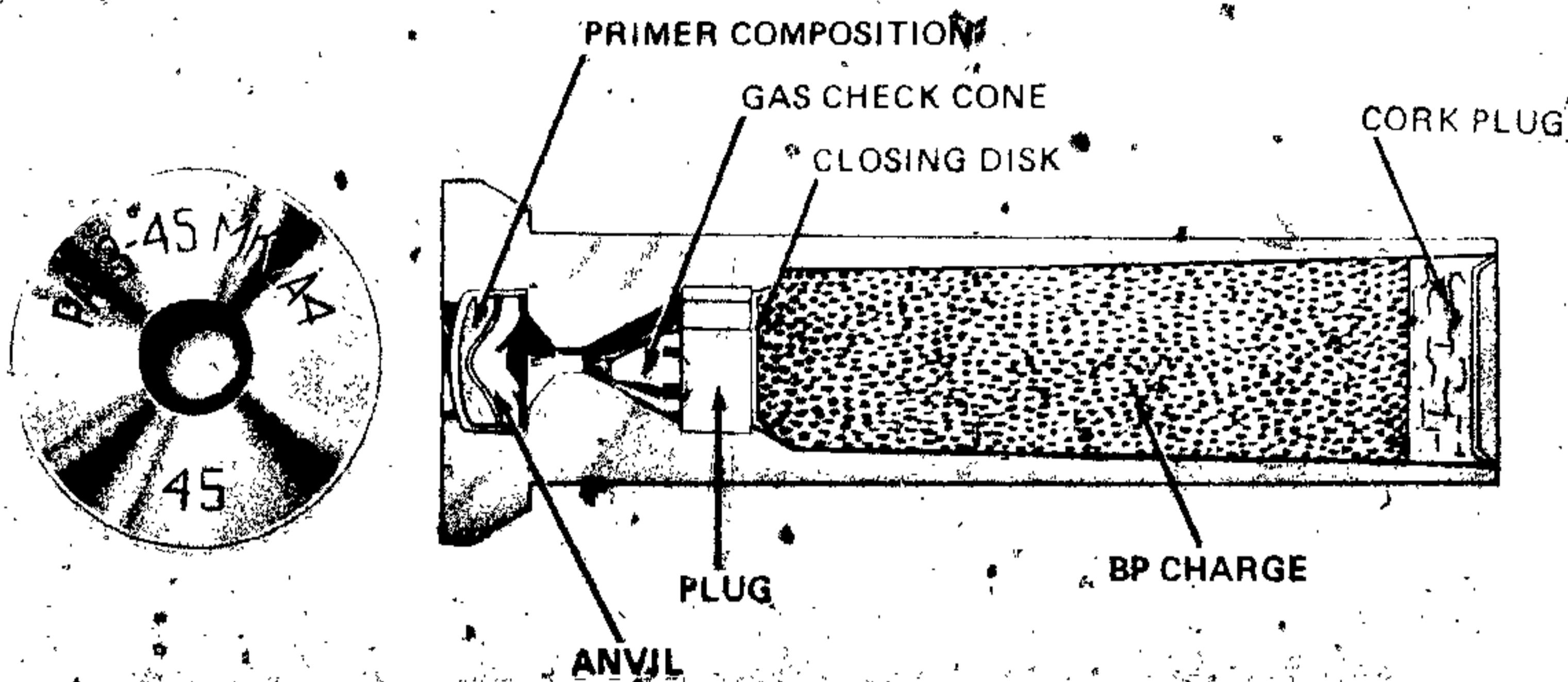
Grenade 9215370

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PRIMER, PERCUSSION: MK2A4



AR199649



AR199649

Type Classification:

Std OTCM 36841 dtd 1958

Use:

This primer is used with a variety of separate-loading ammunition rounds to initiate burning of the propelling charge.

Description:

Percussion Primer, MK2A4 is a brass cylinder with an extraction flange base, containing a charge of 19 grains of black powder. A primer cup in the center of the base contains a small quantity of sensitive primer composition. An anvil, gas check cone, and plug are installed between the primer cup and the black

powder charge. The black powder is sealed in the primer case by a closing disk at the rear and a cork washer at the front end.

Functioning:

The primer is inserted in the firing lock of the weapon. When struck by the firing pin, the primer cup is indented, compressing the sensitive primer composition against the anvil. The primer composition detonates from the impact shock and flashes through a port in the plug to ignite the black powder charge in the primer case. The gas check cone prevents blowback in the event the primer cup is ruptured. The burning black powder charge initiates burning of the propelling charge.

Tabulated Data:

Type ----- Percussion
 Weight ----- 0.06 lb.
 Length ----- 1.595 in.
 Diameter ----- 0.348 in.
 Cannon (Weapon) used
 with ----- 155-mm: M1,
 M1A1 (M114,
 M114A1)
 8-in: M2, M2A1
 (M115)
 Filler and weight ----- Black powder,
 19 grains

Temperature Limits:

Firing:
 Lower limit ----- - 40° F
 Upper limit ----- + 125° F
 Storage:
 Lower limit ----- - 80° F (for periods
 of not more than
 3 days)
 Upper limit ----- + 160° F (for periods
 of not more than 4
 hrs./day)

* Packing ----- 250 primers in
 shipping container;
 2 containers in
 wirebound box

* Packing Box:

Weight ----- 37 lbs.
 Dimensions ----- 14-5/8 x 12-13/16
 x 9-1/8 in.
 Cube ----- 1.0 cu. ft.

Weight ----- 37 lbs.
 Dimensions ----- 14-5/8 x 12-13/16
 x 9-1/8 in.
 Cube ----- 1.0 cu. ft.

*NOTE: See SC for complete packing data
 including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 3
 Storage compatibility
 group ----- B
 DOT shipping class ----- C
 DOT designation ----- CANNON PRIMERS,
 HANDLE CARE-
 FULLY
 DODAC ----- 1390-N525
 Assembly Dwg.
 No. ----- 8840362

Preparation for Firing:

No preparation is required.

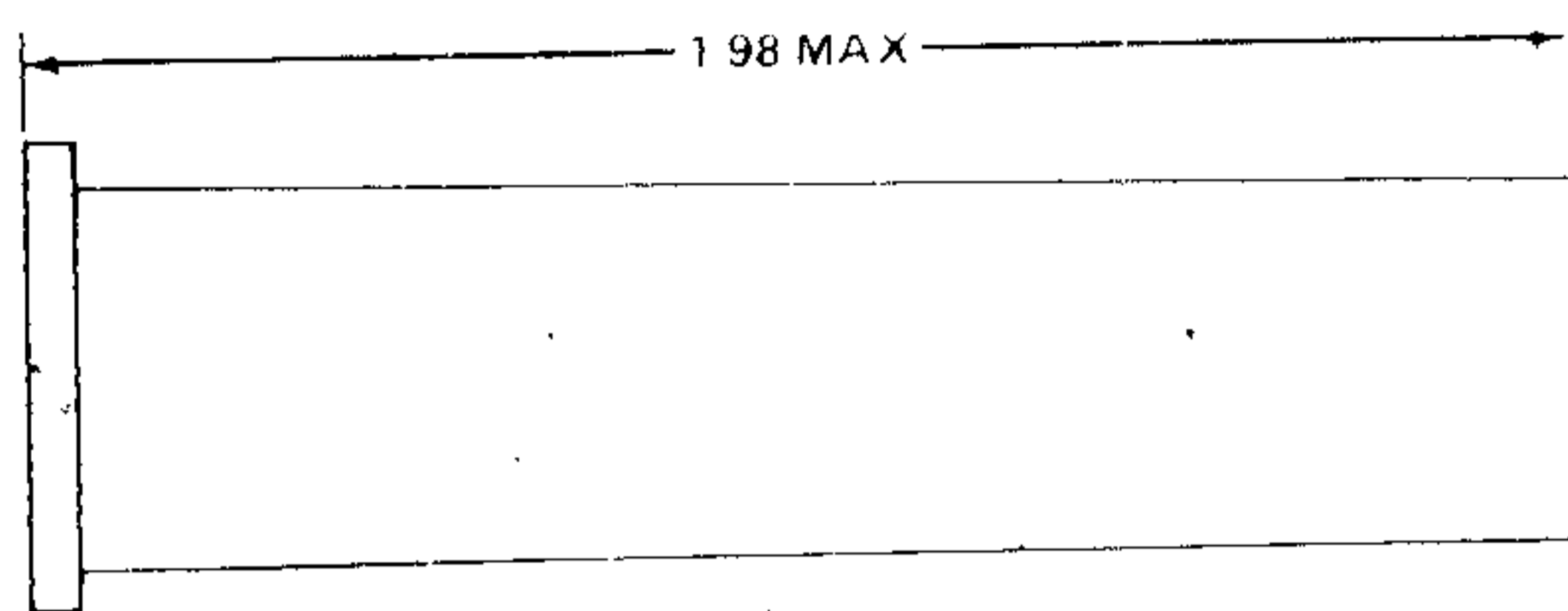
Limitations:

None

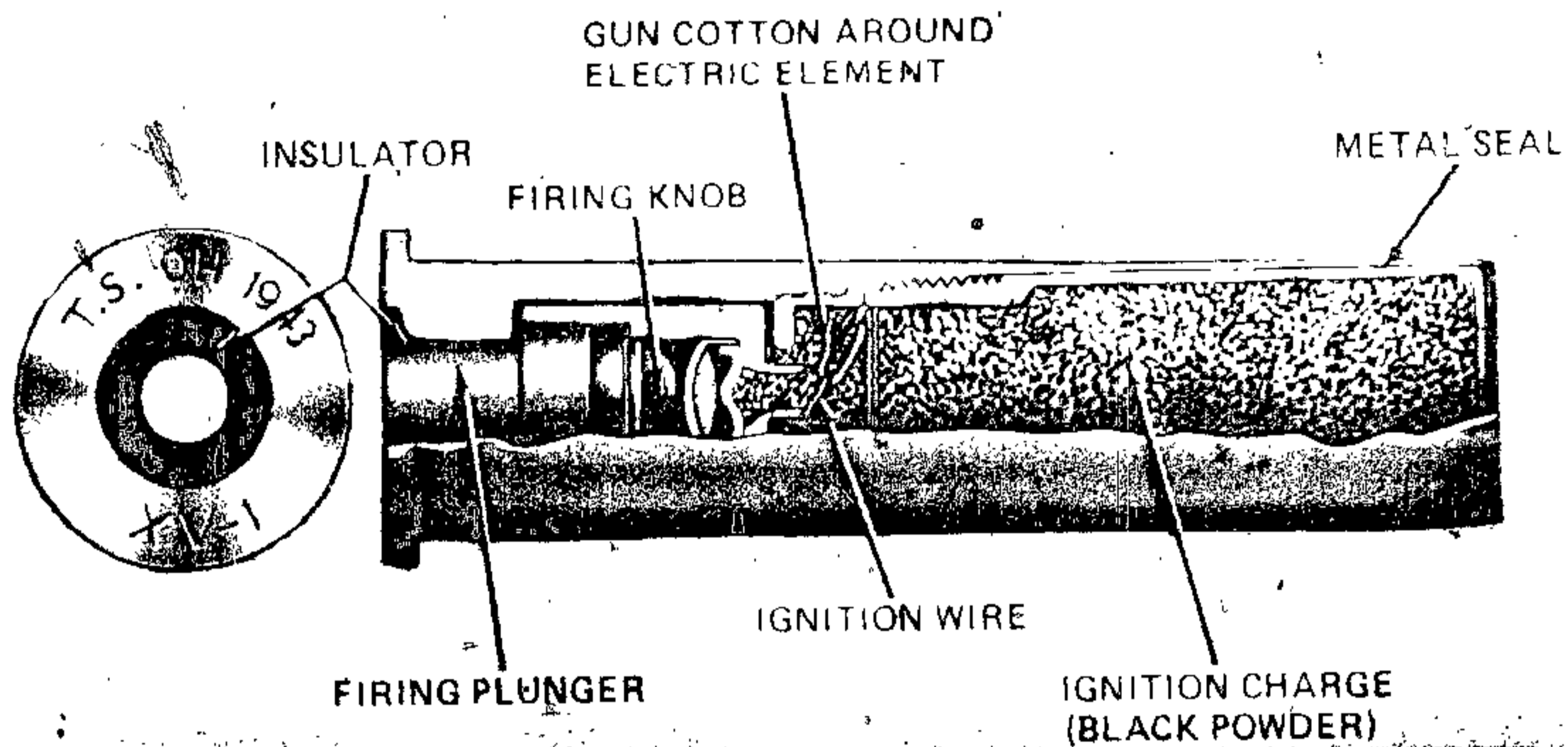
References:

TM 9-1300-251-20
 SC 1305/30-IL
 SB 700-20
 AMCP 700-3-3
 TM 9-1025-200-12

PRIMER, ELECTRIC AND PERCUSSION: MK15, MODS 2 AND 3



AR 199647



AR 199648

Type Classification:

Std OTCM 37119 dtd 1959.

Use:

This primer is used with a variety of separate-loading ammunition rounds to initiate burning of the propelling charge. The primer can be activated either by percussion from a firing pin, or by an electric current.

Description:

Primer MK15, Mods 2 and 3, is a brass cylinder with an extraction flange base. A charge container loaded with 30 grains of black powder is threaded into the case. The base contains a

firing plunger assembly, a primer cap of sensitive primer compound, and an electrical resistance wire embedded in gun cotton. The plunger assembly is insulated electrically from the case, except for the resistance wire connecting the two parts.

Functioning:

The primer is inserted into the firing hole of the weapon. In the percussion mode, the firing plunger is struck by the firing pin and the integral firing knob crushes the primer cap. Flash of the primer compound flashes through the gun cotton and the black powder to initiate burning in the propelling charge. In the electrical mode, a current induced by the electrical firing mechanism of the weapon is introduced into the firing plunger. Since the primer

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is otherwise insulated from the case, the current flows through the resistance wire to the case. The resistance wire heats up to ignite the gun cotton and black powder.

Difference Between Models:

Not applicable. Both Modifications 2 and 3 are incorporated in the same primer.

Tabulated Data:

Type	-----	Electric and percussion
Weight	-----	0.14 lb.
Length	-----	1.98 in.
Cannon used with	-----	Various separate loading
Filler and weight	-----	Black powder, 30 grains

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 hrs/day)

* Packing ----- 38 per metal can; 24 cans (248) per metal box.

* Packing Box:

Weight	-----	84 lbs.
Dimensions	-----	25-1/4 x 16-1/2 x 6-1/4 in.
Cube	-----	1.51 cu. ft.

* NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	-----	3
Storage compatibility group	-----	B
DOT shipping class	-----	C
DOT designation	-----	CANNON PRIMERS HANDLE CAREFULLY
DODAC	-----	1390-N535
Assembly Dwg. No.	-----	74-8-5

Preparation for Firing:

No preparation is required.

Limitations:

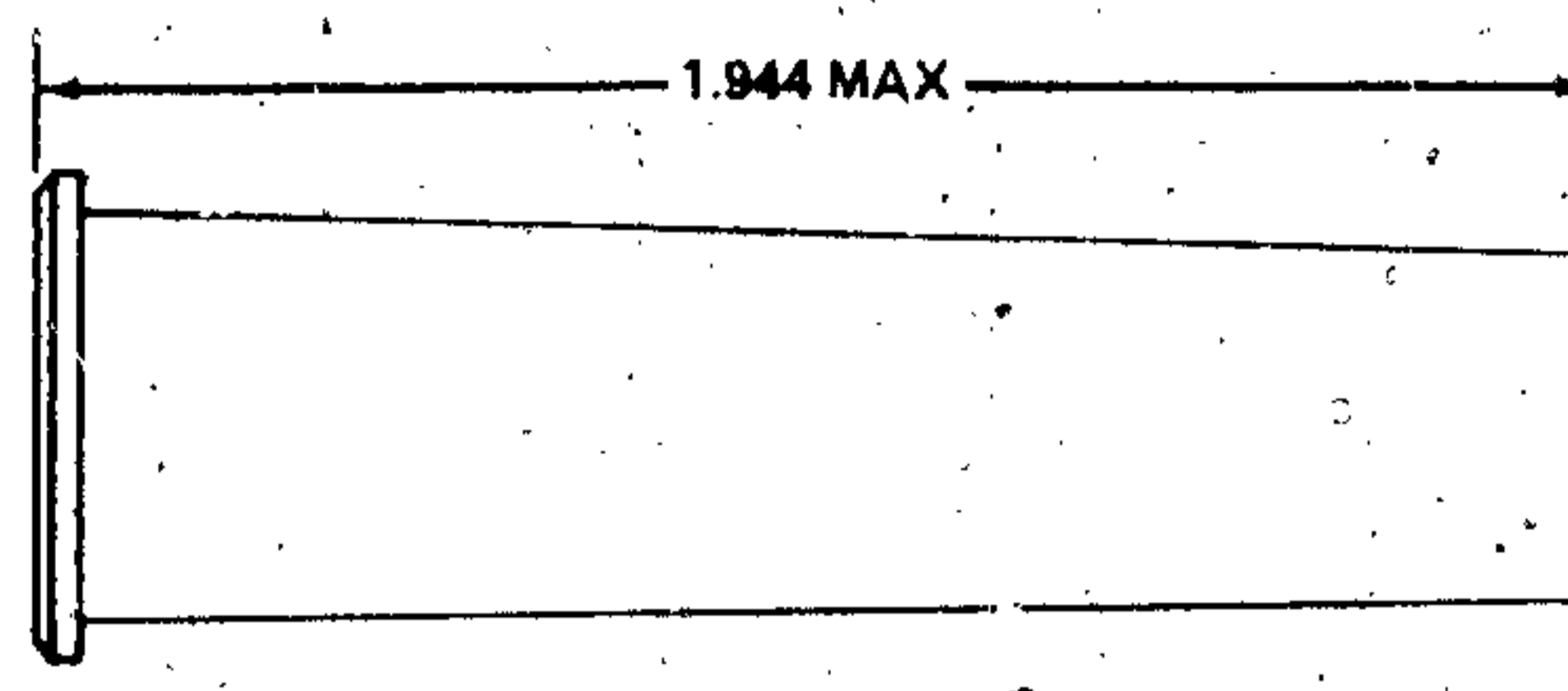
None

References:

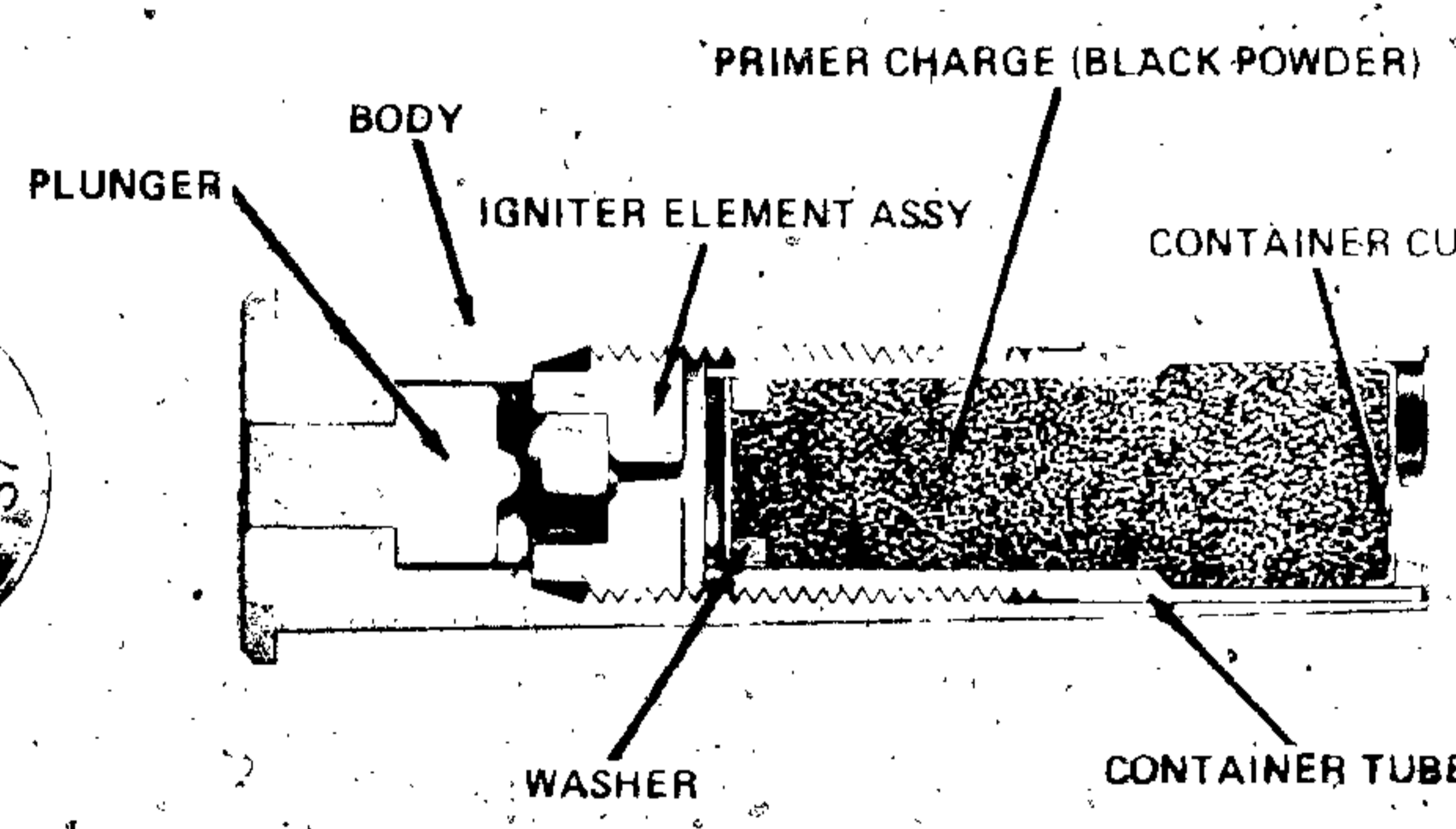
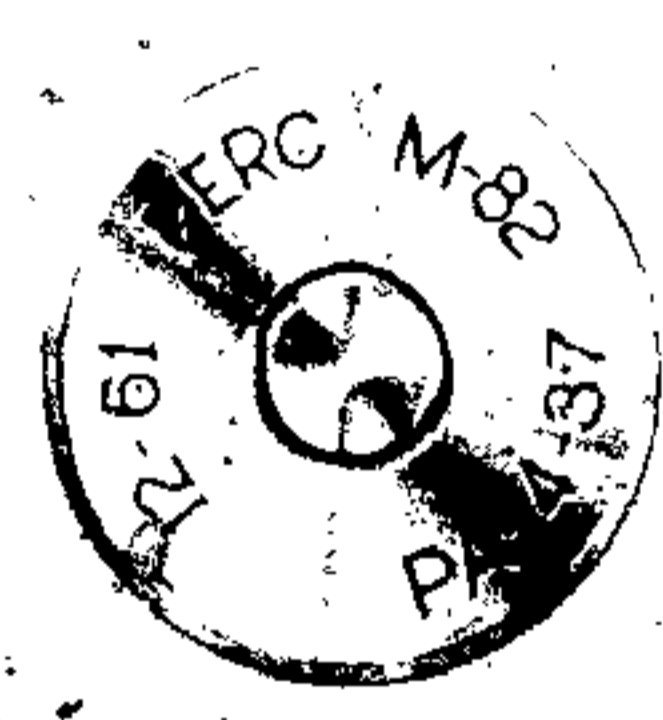
- TM 9-1300-206
- TM 9-1300-251-20
- TM 9-1300-251-34
- TM 9-2300-216-10
- TM 9-2350-210-12
- TM 9-2350-217-10

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PRIMER, PERCUSSION: M82



AR199651



AR199650

Type Classification:

Std OTCM 37807 dtd 1981.

Use:

This primer is used to initiate burning of propellant charges in separate loading weapon systems.

Description:

The primer consists of a cylindrical brass case with an extraction flange which contains a plunger in the base, an ignition element, and a container loaded with 22-grains of black powder. The plunger has an integral striker and is activated by the breech mechanism firing pin. The ignition element is threaded into the primer

case forward of the striker, and contains a percussion primer. The primer contains primer mixture and an anvil, and is sensitive to impact from the plunger. The black powder container is also threaded into the case with the open end toward the ignition element. This end is sealed with a paper disk to prevent seepage of black powder granules.

Functioning:

The primer is inserted into the firing lock of the weapon. When struck in the base by the firing pin, the plunger is driven forward and initiates the primer in the ignition element. The primer flash ignites the black powder charge in the container assembly which flashes through the vent tube to ignite the black powder igniter at the base of the propelling charge.

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Tabulated Data:

Type-----Percussion
 Weight-----0.14 lb.
 Length-----1.94 in. max.
 Cannon used with -----155-mm: M109A1,
 M109
 175-mm: M107
 8-inch: M110,
 M110E2, M55
 Filler and weight-----Black powder,
 22 grains
 Percussion primer
 filler and weight -----Primer mixture,
 0.55 grains
 Temperature Limits:
 Firing:
 Lower limit----- - 40° F
 Upper limit----- + 125° F
 Storage:
 Lower limit----- - 80° F (for periods
 of not more than
 3 days)
 Upper limit----- + 160° F (for not
 more than 4 hrs./
 day)
 * Packing ----- 20 primers in fiber-
 board container;
 25 containers in
 wooden box
 * Packing Box:
 Weight-----49 lbs.
 Dimensions-----24-1/8 x 12 x
 11-3/16 in.
 Cube-----1.8 cu. ft.
 *NOTE: Latest packing data only. See
 SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
 class-----3
 Storage compatibility
 group-----B
 DOT shipping class-----C
 DOT designation -----CANNON PRIMERS
 HANDLE CAREFUL-
 LY
 DOPAC-----1390-N523
 Assembly Dwg. No.-----8861197

Preparation for Firing:

No preparation is required.

References:

- TM 9-1300-206
- TM 9-1300-251-20
- TM 9-1300-251-34
- TM 9-2300-216-10
- TM 9-2350-210-12
- TM 9-2350-217-10
- TM 9-2350-217-10N

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APPENDIX A

CARTRIDGE/PROJECTILE-FUZE COMBINATION CHARTS

CARTRIDGE/PROJECTILE-FUZE COMBINATIONS FOR GUNS

WEAPON	CARTRIDGE-PROJECTILE	HEAD	HEAD	MK	ST	MK	ST	MK	ST	WEAPON
40 MILLIMETER		HE	HE							M728
		HE	HE							M728
76 MILLIMETER		HE	HE							M728
		HE	HE							M728
90 MILLIMETER		HE	HE							M728
		HE	HE							M728
105 MILLIMETER		HE	HE							M728
		HE	HE							M728
120 MILLIMETER		HE	HE							M728
		HE	HE							M728
152 MILLIMETER		HE	HE							M728
		HE	HE							M728
160 MILLIMETER		HE	HE							M728
		HE	HE							M728

LEGEND
 ■ - ASSUES OF COMPATIBLE
 P - REQUIRE REMOVAL OF SUPPLEMENTAL CHARGE IF PRESENT

Figure A - Cartridge/Projectile/Fuze combinations for guns.

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APPENDIX A

CARTRIDGE/PROJECTILE-FUZE COMBINATION CHARTS

TM 43-0001-28

CARTRIDGE/PROJECTILE-FUZE COMBINATIONS FOR HOWITZERS

WEAPON	CARTRIDGE/PROJECTILE	FUZE											
		P D		M T		M SC		M S		M P		M R	
		MST (MO)	MTE SERIES (CP)	MTP SERIES	MST SERIES	MST (M)	MST (S)	MST (M)	MST (S)	MST (M)	MST (S)	MST (M)	MST (S)
75 MILLIMETER M1A1 M1	HE M48 (NORMAL CAVITY) HE M48 (DEEP CAVITY)												
105 MILLIMETER M2A1 M2A2 M49	APERS-T XM546 HE M64 M64B1 105MM M84A1 SMOKE GB M360 HE M1 (NORMAL CAVITY) HE M1 (DEEP CAVITY) HE M41J HE M44J TACTICAL CS M629 HEP-T M127 HE RA M54H 111MM M311A2 M311A2B1 111MM M311A1 GAS H HE M60 SMOKE WP M60 FR-15												
105 MILLIMETER CANNON M1 M1A1 M1A5 M126	AGENT H HE M10 AGENT B M121 M121A1 HE RAP M549 SERIES HE M107 (NORMAL CAVITY) HE M107 (DEEP CAVITY) HE M110 SERIES HE M483A1 HE M692/M73 AT 71B 74 111MM M118 111MM M118 SERIES SMOKE H HE M116A M116B1 SMOKE H COLORED HE M116A1 M116B1 SMOKE WP FR-15												
105 MILLIMETER CANNON M185 M199	AGENT H HE M10 AGENT B M121 M121A1 HE M107 (NORMAL CAVITY) HE M107 (DEEP CAVITY) HE M110 SERIES HE M483A1 HE M692/M731 AT 71B 741 111MM M185 SMOKE H HE M116A1 (M116E1) SMOKE H COLORED HE M116B1 SMOKE WP M110 SERIES												
155 MILLIMETER M2A1 M17	GB OR X M126 HE M106 (NORMAL CAVITY) HE M106 (DEEP CAVITY) HE M101 HE M509E1												

LEGEND

- - AS ISSUED OR COMPATIBLE
- P - REQUIRES REMOVAL OF SUPPLEMENTAL CHARGE IF PRESENT

AR 101382 A

Figure A-2. Cartridge/projectile-fuze combinations for howitzers.

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CARTRIDGE-FUZE COMBINATIONS FOR MORTARS

WEAPON	CARTRIDGE	FUZE																								
		M8	M9	M18A3	M21	M24 SERIES	M25 SERIES	M26 SERIES	M27 SERIES	M57	M567	M716	M717	M562	M565	M520 SERIES	M548	M564	M65	M84	M513 SERIES	M517	M532	M728	M732	
60 MILLIMETER M2, M19	HE, M49 SERIES																									
	ILLUM M65 SERIES																									
	SMOKE WF M30Q SERIES																									
	TI M50A21																									
	HE M47 SERIES																									
81 MILLIMETER M1, M29, M29A1	HE M362 SERIES																									
	HE M374 SERIES																									
	ILLUM M30Q SERIES																									
	SMOKE WF M30Q SERIES																									
	SMOKE WF M30Q SERIES																									
4.2 INCH M2, M30	HE M47 SERIES																									
	GAS OR WF M. SERIES																									
	HE N. (NORMAL) SERIES																									
	HE M30A1 (OFF) SERIES																									
	HE M32 SERIES																									
	ILLUM M37 (A)																									
	ILLUM M335A																									
	SMOKE WF M32R SERIES																									

LEGEND
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 P - REQUIRES REMOVAL OF SUPPLEMENTAL CHARGE IF PRESENT

AR 101383-A

Figure A-3 Cartridge-fuze combinations for mortars.



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CARTRIDGE-FUZE COMBINATIONS FOR RECOILLESS RIFLES

WEAPON	CARTRIDGE	P.D.				
		M48A3	M57 (MOV)	M508 SERIES	M509 SERIES	M510 SERIES
57 MILLIMETER RIFLE M18, M18A1	HE, M306					
	HE, M306A1					
	HEAT, M307 SERIES					
	SMOKE, WP, M308					
	SMOKE, WP, M308A1					
	TP, M306A1					
75 MILLIMETER RIFLE M20	HE, M309 SERIES					
	HEAT, M310					
	HEAT-I, M310A1					
	HEP-T, M349					
	SMOKE, WP, M311					
	SMOKE, WP, M311A1					
	TP, M309A1					
90 MILLIMETER RIFLE M67	HEAT, M371 SERIES					
	PRACTICE, M371					
105 MILLIMETER RIFLE M27, M27A1	HEP, M326					
	HEP-T, M326					
106 MILLIMETER RIFLE M40A6, M40A4	APERS-T, M581					
	HEAT, M344 SERIES					
	HEP-T, M346 SERIES					

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Figure A-4. Cartridge-fuze combinations for recoilless rifles.

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Guided Missile Systems, Semi-
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PAGE NO.	PARA GRAPH	FIGURE NO.	TABLE NO.
2-290		151	
4-5		1	

Item 5 is listed as a Screw but should be listed as a Knob.

In bubble J, callout 8 is depicted as a Washer and in bubble G, callout 8 is depicted as a Terminal Board. Recommend that bubble J callout 8 be changed to callout 2.

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<i>Remove pages</i>	<i>Insert pages</i>
i thru iv	i thru iv
2-83 through 2-86	2-83 through 2-86
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3-105 and 3-106	3-105 and 3-106
3-119 and 3-120	3-119 and 3-120
None	3-128.5 through 3-128.8
3-131 and 3-132	3-131 and 3-132
3-141 and 3-142	3-141 and 3-142
4-51 through 4-70	4-51 through 4-70
7-103 and 7-104	7-103 and 7-104
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TECHNICAL MANUAL

No 43-0001-28

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**ARMY AMMUNITION DATA SHEETS
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GUNS, HOWITZERS, MORTARS, RECOILLESS RIFLES, GRENADE LAUNCHERS AND
ARTILLERY FUZES
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*This manual, together with TM 9-1300-251-20, 21 December 1973; and TM 9-1300-251-34, 30 January 1975, including all changes, superseded TM 9-1300-203, 6 April 1967, including all changes.

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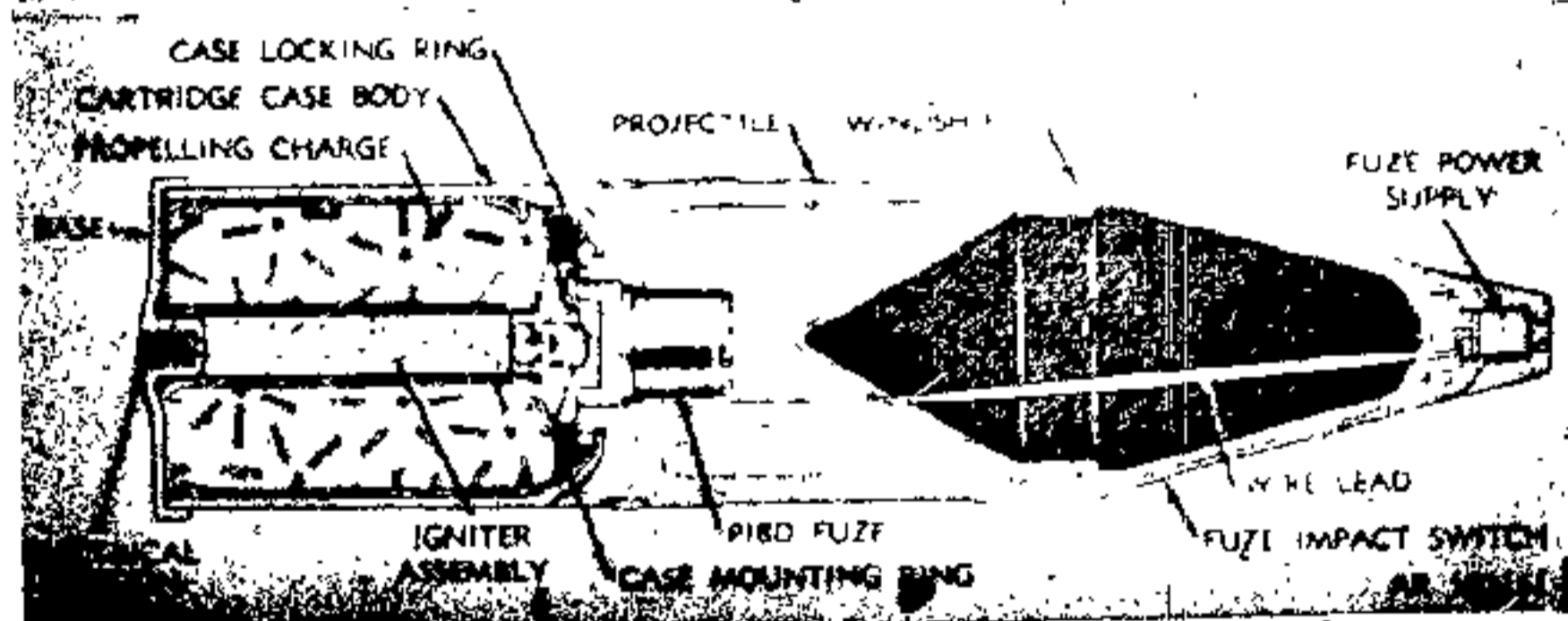
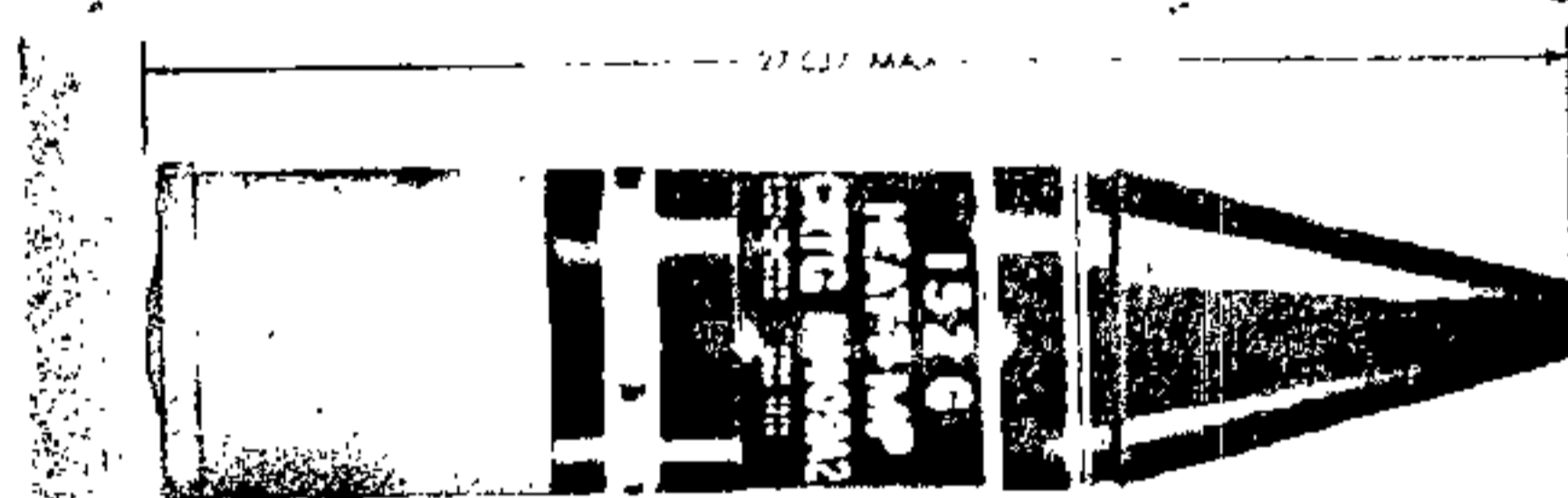
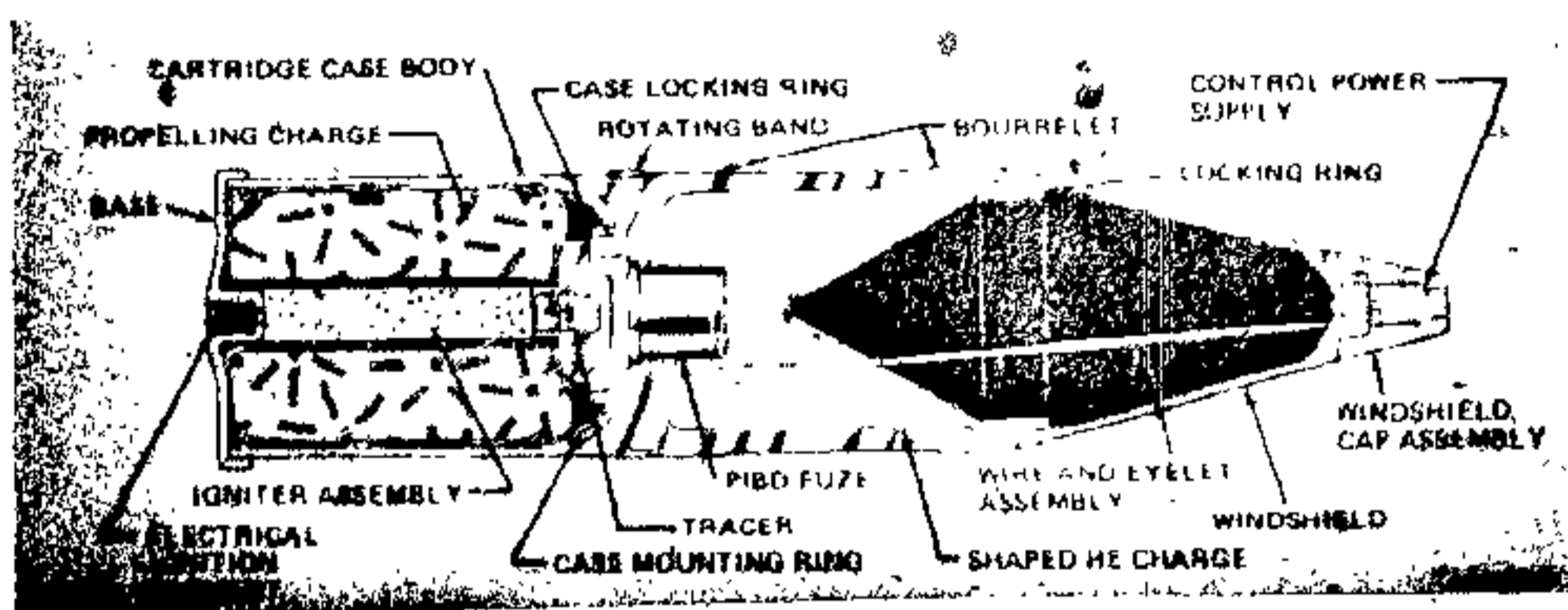
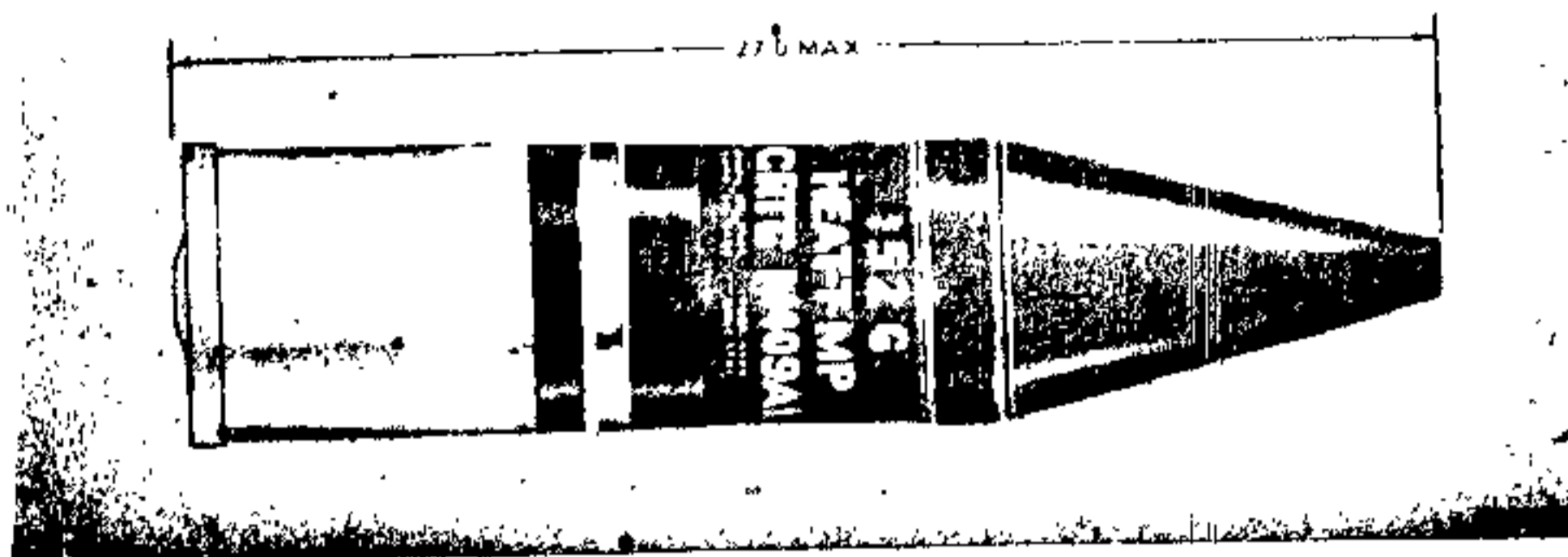
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CARTRIDGE, 152-MILLIMETER: HEAT-T-MP, M409A2, M409A1 AND M409



Type Classification:

M409A2 Std DA Ltr 1976
 M409A1 Std AMCTC 8865
 M409 C & T AMCTC 8965

Use:

This cartridge is fired from 152mm gun-launchers primarily as an armor-defeating round with additional antipersonnel capability.

Description:

The projectile consists of a forged steel body

fitted with a steel windshield and a fluted copper cone liner to shape the high explosive charge. The liner is held in place by a steel locking ring. The windshield is threaded to the locking ring and houses an insulator and wire eyelet connector assembly. The wire connector assembly connects the fuze with the control power supply housed in a insulator in the windshield cap. The control power supply provides the point-initiating, base-detonating fuze with electrical energy. The projectile is loaded with Composition B, and the fuze is fitted in a cavity of the explosive charge. The tracer is contained in the base plug and is assembled to a steel fuze locking cup in the base of the projectile. A slotted iron rotating band, forward of the base,



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provides spin and obturation. Cartridge Case M205 used in M409A2 and M409A1 is a two-piece assembly of base and body made of high-density felted nitrocellulose, inert fibers, and resin. The body, containing a bagged propelling charge, is attached to the projectile by a steel mounting ring and aluminum case locking ring. The base houses the electric ignition system and is cemented to the body with a special nitrocellulose lacquer. Cartridge Case M157 used in Cartridge M409 is similar to the M205 in shape and function, but is of a different non-metallic flammable material. The M157 case is more vulnerable to fracture on impact than the M205, and the igniter primer is of a different design. The body is attached to the projectile by epoxy resin and a case locking ring.

Functioning:

Electric current from the firing mechanism of the weapon initiates the ignition element/initiator. The resulting flash ignites the propellant, and the burning propellant generates gases to force the projectile from the gun tube and concurrently ignite the tracer. When the round is used against armor, electrical energy from the control power supply in the nose of the projectile is fed to the fuze on impact. Functioning of the fuze detonates the shaped explosive charge of Composition B to collapse the copper cone and create a high-velocity focused shock wave. The intensity of the shock wave causes failure of the target armor, and a jet of metal particles penetrates the interior of the target. For antipersonnel use, the round is fired so the fuze will function on graze or direct impact on target. Blast and fragmentation created by detonation of the explosive charge inflicts casualties.

Difference between Models:

The M409A2 model has the improved M509A1 PIBD fuze and has the full frontal area impact switch enabling the projectile to be effective on all areas of the ogive.

Tabulated Data:

Complete round:

Type ----- HEAT-T-MP
 Weight ----- 48.5 lb --- M409A2 ---
 50.5 lb
 Length ----- 27.0 in.
 Cannon used with ----- M81 Series, M162

Projectile:

Body material ----- Forged steel
 Color -----
 (Old) ----- Black w/yellow markings

2-84 Change 8

(New) ----- Black w/white markings and yellow band

Filler and weight ----- Comp. B-6.3 lb

Components:	M409A2	M409A1	M409
Cartridge case -----	M205	M205	M157
Propelling charge -----	M189	M189	M189
Primer -----	M91	Electric	M91
Tracer -----	M13	M13	M13
Fuze -----	M539A1	PIBD-M539	XM539E1

Performance:

Maximum range ----- 9900 yd (9000 mtr)
 Muzzle velocity ----- 2240 fps (683 mps)

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 of not more than 3 days
 Upper limit ----- +160°F (+71.1°C) for period of not more than 4 hr/day

*Packing ----- 1 cartridge in fiber container; 1 container per wooden box

*Packing Box:

Weight ----- 97.5 lb
 Dimensions ----- 42-1/8 x 12-9/16 x 13-11/32 in.
 Cube ----- 4.0 cu ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class-- 1.1
 Storage compatibility --- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
 DODAC ----- 1320-D381
 Drawing number ----- M409 - 9204196
 M409A1 - 9257471
 M409A2 - 9323952

Operational Characteristics:

Do not remove barrier bag until round is being

chambered. Unprotected cartridge cases where barrier bags have been removed are flammable and can be ignited accidentally by burning cigarettes, smoldering residue, embers, and open flames, etc. Neoprene barrier bags may be difficult to remove at -25°F or below.

Limitations:

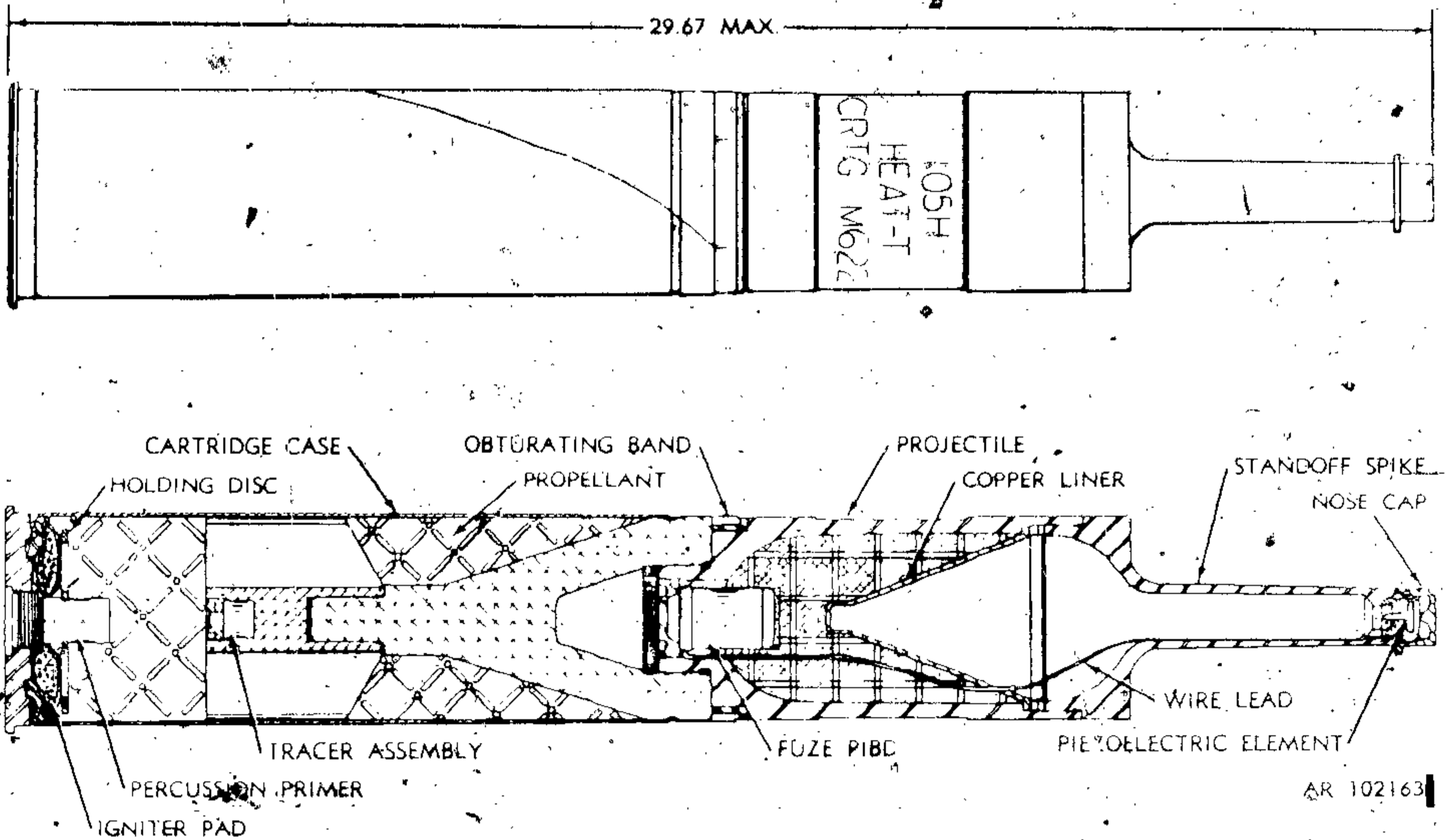
Probe adapter will not be used when firing rounds assembled with Cartridge Case M205.

References:

- SC 1305/30-IL
- SB 700-20
- DARCOM(AMC)-R-700-3-3
- TM 9-2350-230-12
- TM 9-2350-232-10
- TM 9-1300-251-20

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CARTRIDGE, 105-MILLIMETER: HEAT-T, M622



Type Classification:

Std-MSR 06786019

Use:

This cartridge is a fixed high-explosive anti-tank round for utilization with 105mm howitzers for an expanded capability in a direct-fire mode against armor and hard targets.

Description:

The projectile configuration is that of a steel body cylinder having a plastic obturating band and M509A1 point initiating base detonating (PIBD) fuze with a standoff spike assembly threaded to the front and a fin and boom assembly threaded to the rear. The loading of the pro-

jectile consists of a Comp B shaped charge formed by a funnel-shaped copper liner within the body. A piezoelectric element is fitted to the spike assembly and connected to the M509A1 PIBD fuze in the body. The fin assembly is threaded to receive an M13 tracer assembly.

The cartridge is of the fixed type, i.e., the M201 cartridge case is crimped to the projectile and requires a minimum bullet pull of 3,000 pounds. The cartridge case is of the two-piece spiral design and contains an M100 MOD percussion primer, an igniter pad and 57 oz of M30 propellant.

Functioning:

Impact of the weapon firing pin ignites the percussion primer resulting in ignition of the igniter pad and M30 propellant producing a rapid expansion.

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of propellant gas which propels the projectile out of the weapon tube. The projectile is fin stabilized in flight with only a minimal spin imparted to the projectile when the plastic obturator engages the weapon tube rifling. The hot propellant gases also ignite the tracer which burns for a minimum of 2.5 sec and provides visual observance of the projectile trajectory. On impact, fuze functioning detonates the explosive filler, causing collapse and inversion of the copper cone, creating a high velocity focused shock wave and jet of metal particles with which to penetrate the target.

Tabulated Data:

Complete round:

Type ----- HEAT-T
Weight ----- 32.1 lb
Length ----- 29.67 in.
Cannon used with ----- M2A1, M2A2, M137

Projectile:

Body material ----- Steel bar
Color ----- Black w/yellow markings
Filler ----- Comp B
Weight of filler ----- 2.14 lb

Components:

Cartridge case ----- M201
Propellant ----- M30 (57 oz)
Primer ----- M100 Mod
Tracer ----- M13
Fuze ----- PIBD M509A1

Performance:

Maximum range ----- classified
Muzzle velocity ----- classified

Temperature Limits:

Firing:

Lower limit ----- -45°F (-41.8°C)
Upper limit ----- +145°F (+62.8°C)

Storage:

Lower limit ----- -80°F (-62.2°C) (for periods not exceeding 3 days)
Upper -----
Upper limit ----- +160°F (+71.1°C) (for periods not exceeding 4 hr/day)

*Packing

----- 1 round per fiber container 2 fiber containers per wooden box

*Packing Box:

Weight ----- 110 lb
Dimensions ----- 38-1/8 x 12 x 7-21/32 in.
Cube ----- 2.0 cu ft

*Note: See SC for complete packing data including NSN's.

Shipping & Storage Data:

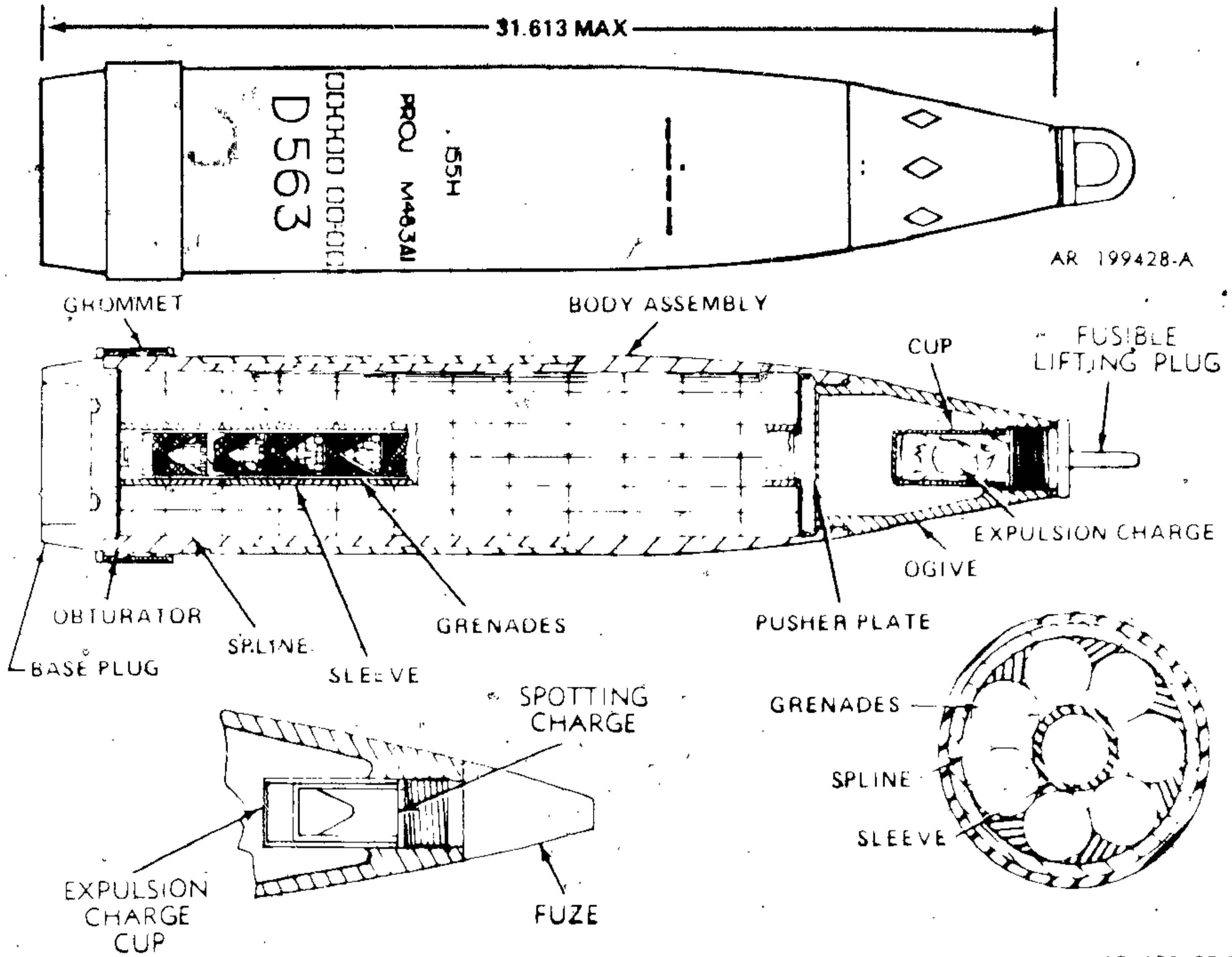
Quantity-distance class ----- (12) 1.2
Storage compatibility ----- E
DOT shipping class ----- A
DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC ----- 1315-6472
Drawing number ----- 9282517

References:

SC 1305/30-1L DARCOM-P 700-3-3

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PROJECTILE, 155 MILLIMETER: HE, M483A1



Type Classification:

Std A 10756043 dtd 1975.

Use:

This projectile is used to deliver submissiles dual purpose armor defeating and anti-personnel grenades.

Description:

This projectile is of the separate loading type. The fuze, propelling charge, and primer are handled and loaded separately. The projectile is provided with a fusible lifting plug in place of a fuze for handling. The plug must be replaced by a fuze before the projectile is loaded. The projectile contains a total of 88 dual-purpose grenades (64 M42 and 24 M46). The grenades are contained by a base plug, with a left-

hand thread which is screwed into the base of the projectile. For normal usage, the expulsion charge is contained in a cavity in the nose of the projectile to eject the grenades. If desired, this expulsion charge may be replaced by a spotting charge designed to detonate the entire projection as if it were a bulk-loaded HE projectile. The metal rotating band near the base of the projectile is protected during storage and handling by a removable plastic grommet. The M46 Grenades have stronger bodies to carry the load at the rear setback when fired.

Functioning:

When the primer is detonated, the flash ignites the propelling charge producing gases which force the spin-stabilized projectile out of the gun and propels it to the target. The fuze, having been set to function at a pre-determined time in flight, initiates the expulsion charge ejecting the entire grenade load from the rear of the projectile.

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Centrifugal force disperses the grenades radially from the projectile line-of-flight. The M42 and M46 grenades are ground-burst submissiles which explode on impact. With the alternate loading of the spotting charge instead of the expulsion charge, the functioning of the fuze detonates the entire projectile over the target, permitting observation of the projectile fuze functioning in relation to the target.

Tabulated Data:

Projectile:
 Type ----- HE
 Weight ----- 102.6 lb
 Length w/fuze ----- 35.4 in.
 Body material ----- Forged steel/aluminum
 Color ----- Olive drab w/yellow diamonds and markings

Filler and weight:
 Number of grenades, M42-- 64
 Number of grenades, M46-- 24
 Explosive, Comp. A5, each grenade ----- 30.5 grams
 Explosive, Comp. A5, each projectile ----- 6.25 lb
 Expulsion charge ----- M10 propellant, 58 grams

Components:
 Propelling charge M3 ---- Propellant M1, 5.0 lb (Zones 1 - 5)
 Propelling charge M4A2 -- Propellant M1, 13.5 lb (Zones 3 - 7)
 Primer ----- M82
 Fuze ----- MTSQ, M577

HOWITZER	CANNON USED WITH
M109	M126A1
M109A1	M185
M109A1B	M185
M109A2	M185
M109A3	M185
M198	M199
M114A2	M1A2

Performance (full charge):
 Maximum range ----- 14,586 mtr (15,951 yd)
 Muzzle velocity ----- 560.2 mps (1837.9 fps)
 Propelling charge M119 ---- Special Single Zone (8) for use with the M109A1 only

Performance:
 Maximum range ----- 17,740 mtr (19400 yd)
 Muzzle velocity ----- 650 mps (2132.5 fps)
 Propelling charge M203 ---- Special Single Zone (8) for use with the M198 howitzer

Performance:
 Maximum range ----- 23,100 mtr (25,262 yd)

Temperature Limits:

Firing:
 Lower limit ----- -40°F (-40°C)
 Upper limit ----- +125°F (+52.0°C)
Storage:
 Lower limit ----- -65°F (-53.8°C)
 Upper limit ----- +165°F (+73.9°C)
 *Packing: ----- Pallet of 8 projectiles

*Pallet:
 Weight (loaded) ----- 874 lb
 Dimensions ----- 39-3/8 x 29 x 14-1/2 in.
 Cube ----- 9.7 cu ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Inhabited bldg dist/DOO ° hazard class/division/storage compatibility group ----- (18) 1.1D
 DOT shipping class ----- A
 DOT designation ----- EXPLOSIVE PROJECTILES
 DODAC ----- 1320-D563
 Drawing number ----- 9215220
 Top packaging drawing number ----- 8837839

WEIGHT ZONES
 Loaded Projectile (w/o fuze, w/o plug)

Zone	Up to & Incl.		Marking
	Over	lb	
2	99.1	100.3	
3	100.3	101.3	
4	101.3	102.6	
5	102.6	103.6	
6	103.6	104.8	

Ballistics:

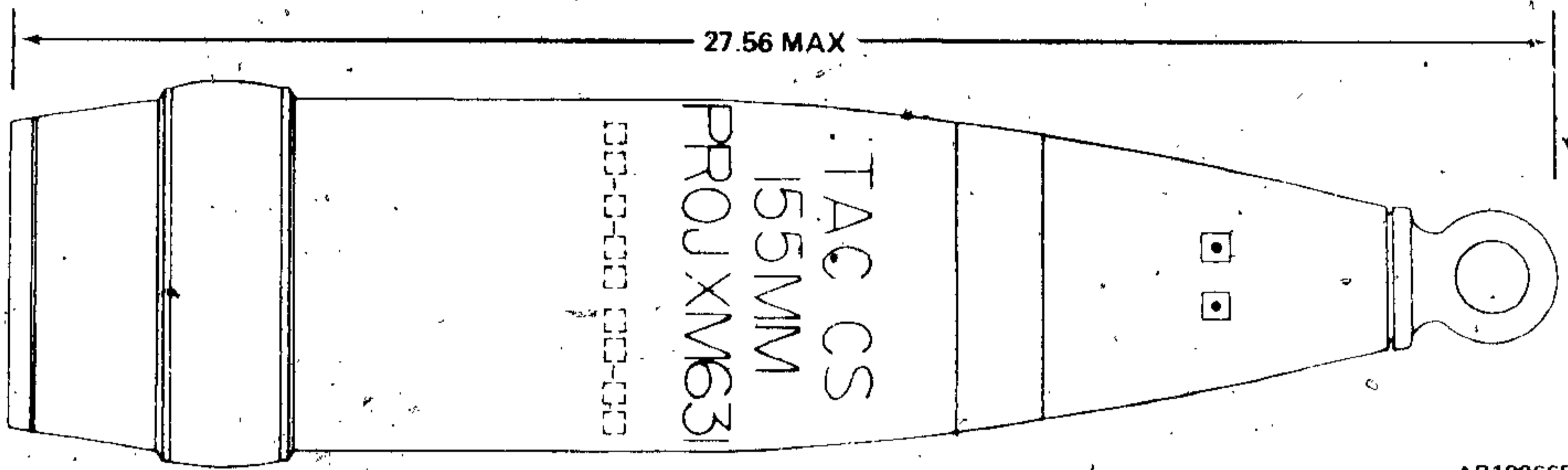
Howitzer, Self-Propelled, M109A1, M198

Charge	Muzzle velocity (mps)	Max Range (mtr)
1, M3A1, green bag	200.0	3640
2, M3A1, green bag	224.5	4570

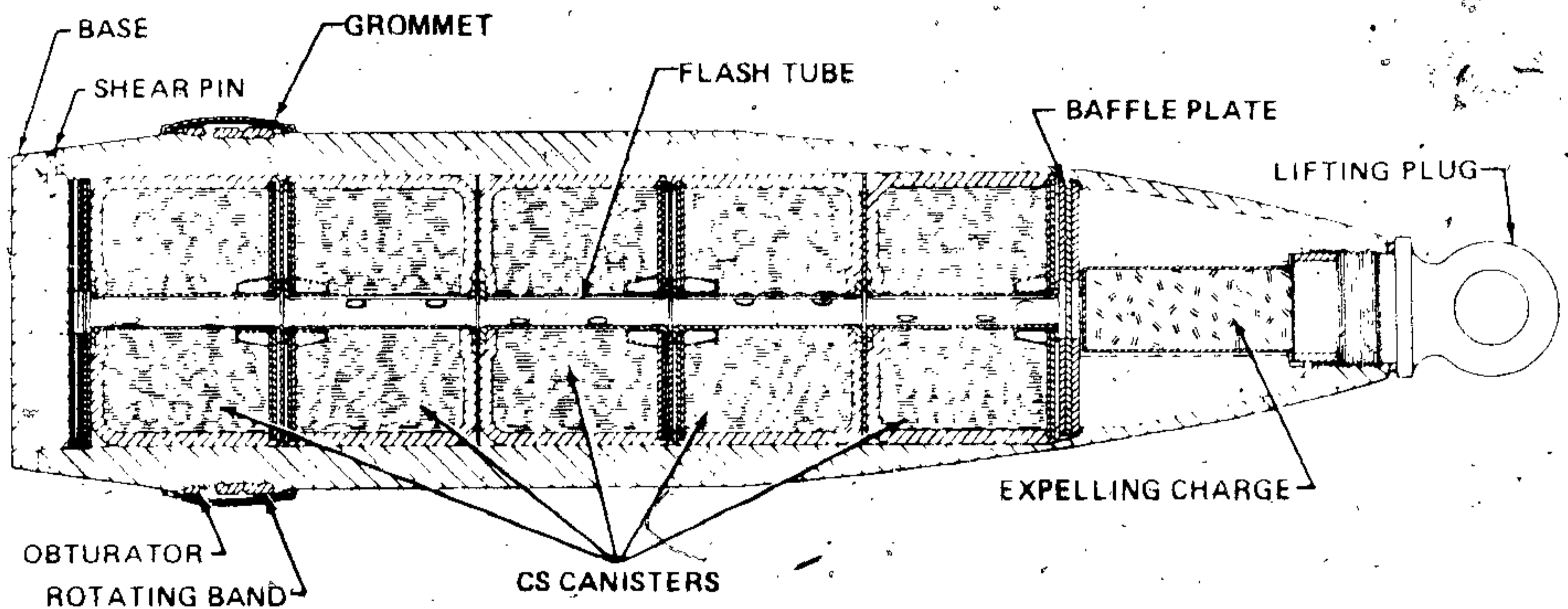


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PROJECTILE, 155 MILLIMETER: TACTICAL CS, XM631



AR199665



AR199664

Type Classification:

Use:

This projectile is fired from 155mm howitzers and is used to harass personnel by emitting CS irritant fumes.

Description:

The base-ejecting type projectile is a hollow steel shell containing five stacked canisters. Each canister is filled with approximately two pounds of CS-Pyrotechnic mix and 0.81 ounce of

starter mix. An expelling charge of 3.36 ounces of black powder in a plastic container is located in the nose of the projectile below the fuze cavity. A baffle plate with a central hole separates the expelling charge from the top canister. A central perforated tube runs through each canister to form a flash tube extending the length of the stack from the expelling charge to the base of the projectile. The base is a steel plug secured by three shear pins. An MTSQ fuze is used with this projectile. For shipment and handling, a lifting plug is installed in the fuze cavity. A gilding metal rotating band and a plastic obturating band encircle the projectile near the base, and are protected by a grommet for shipment and handling.



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Functioning:

When the weapon is fired, the burning propellant charge generates rapidly expanding gases to propel the projectile through the barrel and to the velocity required to reach the target. The rotating band engages the barrel rifling to impart spin to the projectile. The obturating band expands, forming a seal to prevent leakage of gas pressure past the projectile. Functioning of the fuze ignites the expelling charge. The expelling charge flashes through the flash tube to ignite the CS canisters, blow off the base, and expel the burning canisters. The average canister burning time is 90 seconds. The effect of the CS agent on personnel is burning off the eyes, coughing, and difficulty in breathing.

Tabulated Data:

Complete round:

Type-----Tactical CS
Weight with fuze-----96.75 lb (approx)
Length w/o lifting plug---23.79 in.
Cannon used with-----M1, M1A1, M45,
M126, M126A1,
M185

Projectile:

Body material-----Steel
Color-----Gray w/red bands
and red markings.
Filler and weight-----CS, 14.05 lb
Propelling charge-----M3/M4 series
Primers-----M82, Mk2A4
Fuze-----MTSQ M548

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-----8 projectiles on
pallet

*Pallet:

Weight-----782 lb
Dimensions-----27-1/8 x 13-5/8
x 32 in.
Cube-----6.8 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class-----4
Storage compatibility group----A
DOT shipping class-----B
DOT designation-----TACTICAL CS PRO-
JECTILES CLASS
B SPECIAL PER-
MIT NO. 5208
DODAC-----1320-D581
Assembly Dwg. No.-----9220382

Limitations:

Do not fire with fuze set as issued. If impact detonation is intended instead of time functioning, set the fuze for 90 seconds.

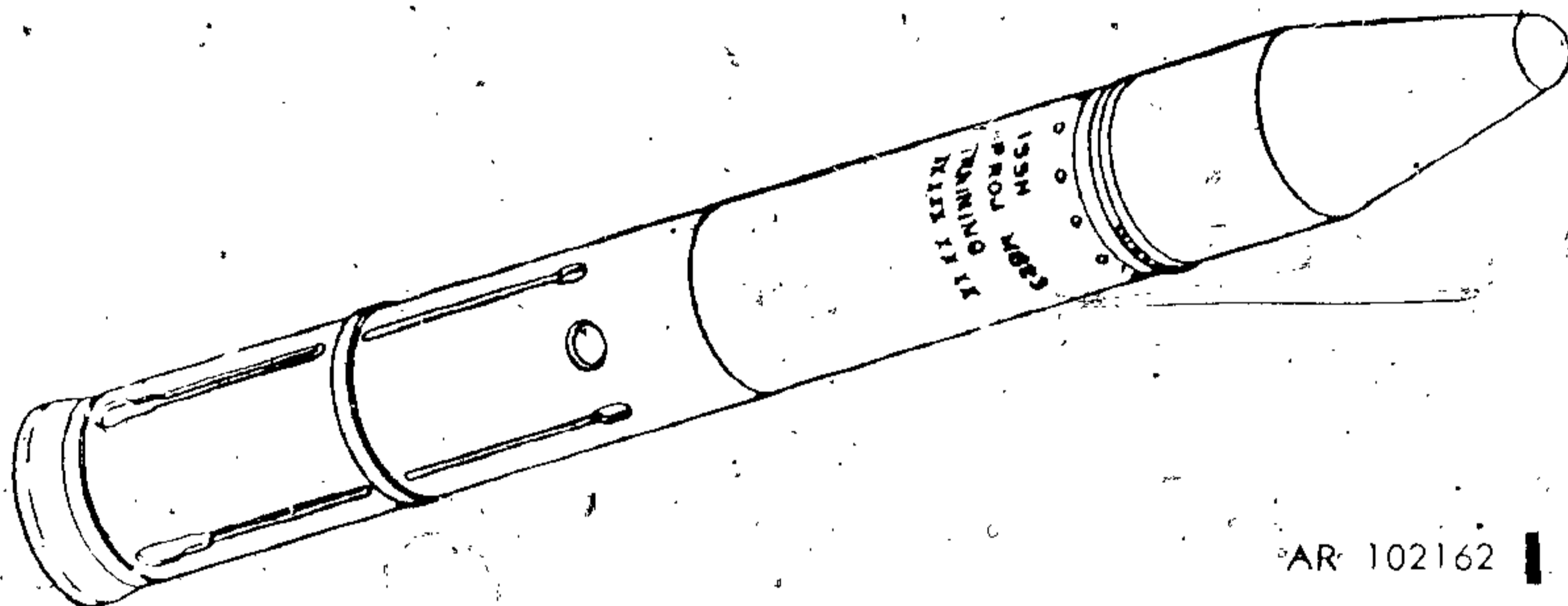
References:

DARCOM-P 700-3-3
SB 700-20
SC 1305/30-IL
TM 9-1025-200-12
TM 9-1300-251-20
TM 9-2350-217-10
TM 9-2350-217-10N



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PROJECTILE, 155MM: TRAINING, M823



AR 102162

Type Classification:

STD MSR 11796005

Use:

The projectile, 155mm: Training, M823 is an inert round which is not to be fired from the howitzer. It is designed to train the 155mm Howitzer weapon crews in handling the Cannon Launched Guided Projectile M712 (Copperhead) at crew level.

Description:

The training projectile M823 simulates the M712 in weight, center of gravity and external appearance. The M823 projectile consists of the following components:

- (1) The M712 dome.
- (2) The M712 closure plug modified for

easy removal and reassembly in connection with obturator replacement.

- (3) The plastic M712 type obturator.

- (4) A one-piece body assembly with five settable M712 type code and time switches mounted in a bracket located in the forward Bourrelet. It also simulates in appearance, the recessed fins and wings of the M712 round.

This projectile provides crew training in unpacking and repacking, setting the required time and code, ramming and extraction of the tactical projectile. The basic design will have a total weight of approximately 137 pounds.

Provisions have been made to replace the obturator should it become damaged from repeated use by removing the projectile aft closure. In addition, the plastic nose dome on the training projectile can be replaced if it becomes damaged or broken. The



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switch bracket with five code and time switches is also easily replaceable.

Functioning:

The training round M823 contains no explosive. It is designed to be reusable with little maintenance and is used for training the 155mm howitzer crew in the operation of the live M712 projectile. The procedures are as follows:

- (1) The projectile is unpackaged and inspected.
- (2) The code and time switches are set.
- (3) The projectile is rammed into the howitzer tube.
- (4) The projectile is extracted from the howitzer tube.
- (5) The projectile is repacked.

This training round simulates the M712 in all artillery unit activity except that no propellant charges or other hazardous materials shall be used in training exercises with this item.

The Extractor:

The extractor tool is used to extract the projectiles M712 and M823 from the cannon tubes in howitzers M109A1/A2/A3 and the M198. These howitzers have the long cannon tubes M185 and M199.

The extractor tool consists of a two-piece adjustable screw driven rod. An expansion ring on one end is designed to snap and lock into the base of an M712 Projectile. A ratchet driven drive nut is located on the opposite end of the rod just to the rear of a T-Bar striker which is designed to fit against the rear face of a 155mm breech. A ratchet is provided to turn the drive nut. In use, the tool is extended and inserted in the open chamber of a 155mm howitzer through the weapon breech until the forward end makes contact with the projectile base. The projectile is engaged and locked by applying forward pressure to the extractor tool. The extractor drive nut is then turned by hand until the striker bar is against the breech ring face. The ratchet tool is then inserted in the drive nut and turned until the projectile is pulled free.

Tabulated Data:

Projectile:
Type ----- Inert (training)
Weight ----- 137 lb

3-128.6 Change 8

Length ----- 54.0 in.
Outside diameter ----- 6.1 in. (155mm)
Body material ----- Aluminum
Color ----- Bronze w/black markings

Weapon System Information:

Weapon Type Cannon Tube
M109A1/A2/A3 — SP — M185
M198 — Towed — M199

Charge propelling ----- N/A
Fuze ----- N/A
Firing temperature ----- N/A

*Packing:

One projectile per container
Six containers per pallet (when delivered in quantity).

Container:

Weight:
W/projectile ----- 189 lb
W/o projectile --- 51.5 lb
Length ----- 60 in.
Width ----- 7.75 in.
Height ----- 7.75 in.
Cube ----- 2.08 cu ft

Pallet (unit load with contained projectiles and dunnage)

----- 1205 lb
Length ----- 60 in.
Width ----- 46.5 in.
Height ----- 13.5 in.
Cube ----- 21.80 cu ft

DOT designation ----- Projectile — non-explosive

Drawing No.

Projectile ----- 9329721
Extractor ----- 9305465
Container ----- 9305335

*Note: Both the M712 and the M823 Projectiles use the same container and pallet. However, the markings on the containers differ as follows:

The container for the M712 projectile is painted olive drab with white markings.

The container for the M823 projectile is painted olive drab with bronze patches and black markings.

Limitations:

The M823 Training Projectile is not to be fired from a weapon. Such firing could be hazardous to personnel forward of the howitzer.

References:

DEP 9-1320-536-14&P
DEP 9-1320-526-14&P

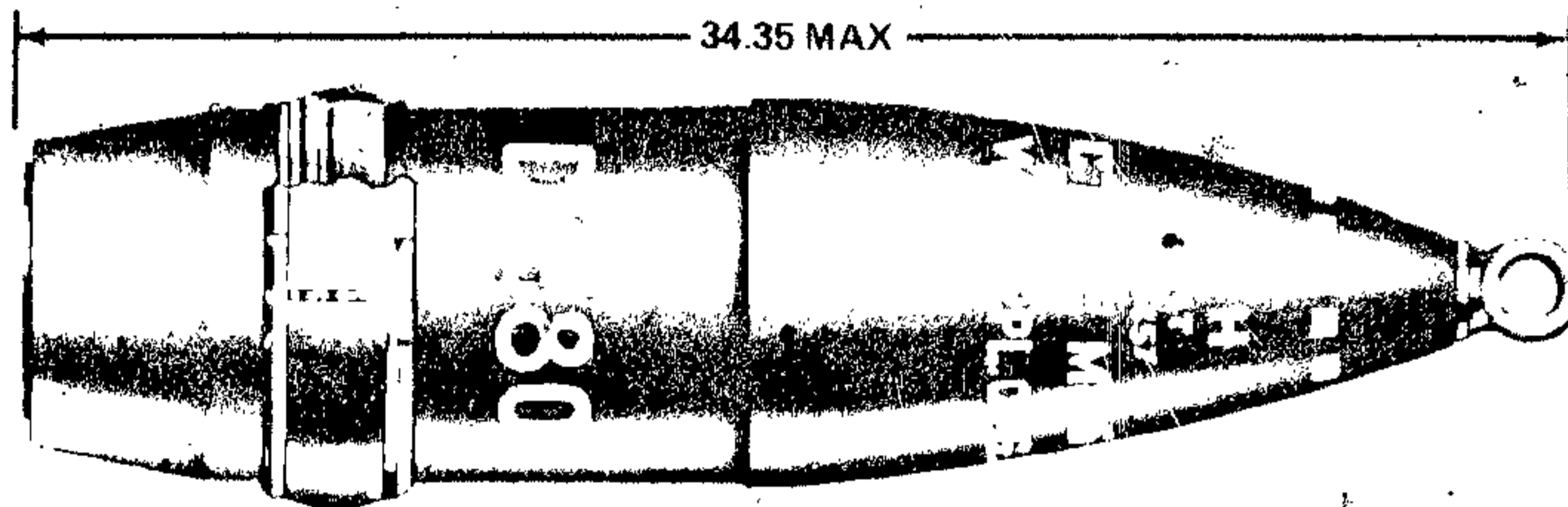
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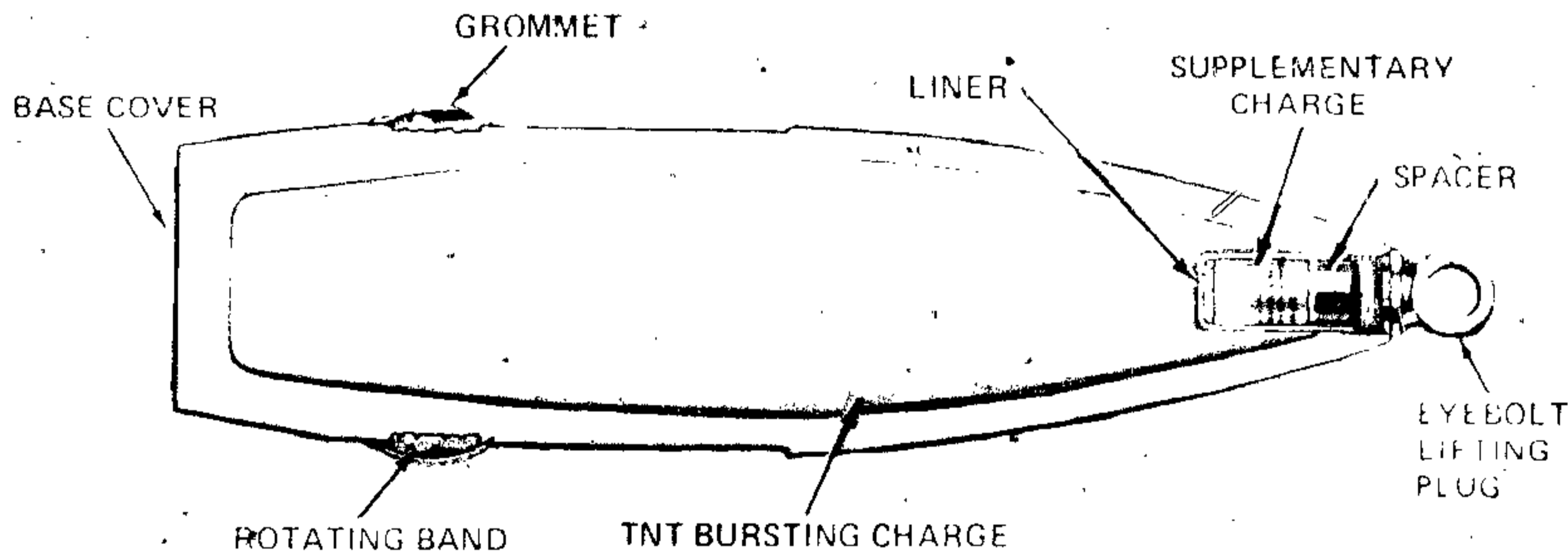


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PROJECTILE, 8 INCH: HE, M106



AR19704



AR199704

Type Classification:

Std UTCM 36841 dtd 1958

Use:

This projectile is used against personnel and materiel, producing blast and fragmentation at the target.

Description:

The projectile consists of a hollow steel forging with a boattailed base, a steamlined ogive, and a gilding metal rotating band. A base cover is welded to the base of the projectile for added protection against the en-

trance of hot gases from the propelling charge during firing. The nose of the propelling is fitted with a thread-eyebolt-lifting plug to facilitate handling and provide a closure for the fuze cavity. The projectile is made with either a shallow or deep fuze cavity and may be loaded with TNT or Composition B. Deep cavity projectiles contain a supplementary charge in the fuze cavity. A cardboard spacer is placed in the fuze cavity between the supplementary charge and the lifting plug to limit movement of the supplementary charge during shipping and handling. The rotating band is protected by a removable grommet. The loaded projectile is zoned into one of five weight zones ranging from 191.4 to 204.3 pounds. The weight zone of the projectile is



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indicated by the number squares and prick punch marks on the ogive of the projectile.

Functioning:

The grommet and lifting plug are removed from the projectile and 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 supplementary charge is removed. Fuze arming occurs after firing, during projectile flight downrange. Depending upon the type of fuze fitted, the fuze functions detonating the projectile on impact, after an elapsed time or on sensing of the target.

Tabulated Data:

Projectile:
 Type ----- HE

WEIGHT-ZONE INFORMATION

LOADED PROJECTILE
 W/O FUZE
 W/O LIFTING PLUG

ZONE	OVER LB	UP TO & INCL	MARKING
2	191.4	194.3	□ □
3	193.9	196.8	□ □ □
4	196.4	199.3	□ □ □ □
5	198.9	201.8	□ □ □ □ □
6	201.4	204.3	□ □ □ □ □ □

Length:
 W/O Lifting Plug----- 31.43 in.
 W/Lifting Plug ----- 34.35 in. (max)

Diameter:
 Rotating Band ----- 8.28 in.
 Bourrelet ----- 7.998. (max)

Body material ----- Steel
 Color ----- Olive drab w/yellow markings

Filler and weight --- TNT 36.3 lb Comp
 B 38.8 lb

Supplementary Charge ----- TNT 0.3 lb

Grommet ----- 3 types, metal w/wire ties, fiberglass or plastic w/metal lever

Weapon system information:

	Weapon M115 towed	Model M110SP M2A2	Type M55SP
Cannon Tube	M2A1, M2	(M2A1E1)	M47
Prop Chg	M1, M2	M1, M2.	M1, M2
Primer	MK2A4	M82, MK15	M82, MK15
Fuze PD	M78, M557, M739	Same	Same
Fuze MTSQ	M564, M582	Same	Same
Fuze Prox			M728, M732

Temperature Limits:

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

Storage:
 Lower limit ----- -80°F for periods of not more than 3 days (63°C)
 Upper limit ----- +160°F for not more than 4 hr/day (+71.1°C)

*Packing ----- 6 projectiles on pallet

*Pallet:
 Weight ----- 1253 lb
 Dimensions ----- 39-1/2 x 28-1/2 x 19-1/4 in.
 Cube ----- 12.4 cu ft

*NOTE: See SC for complete packing data including NSN's.

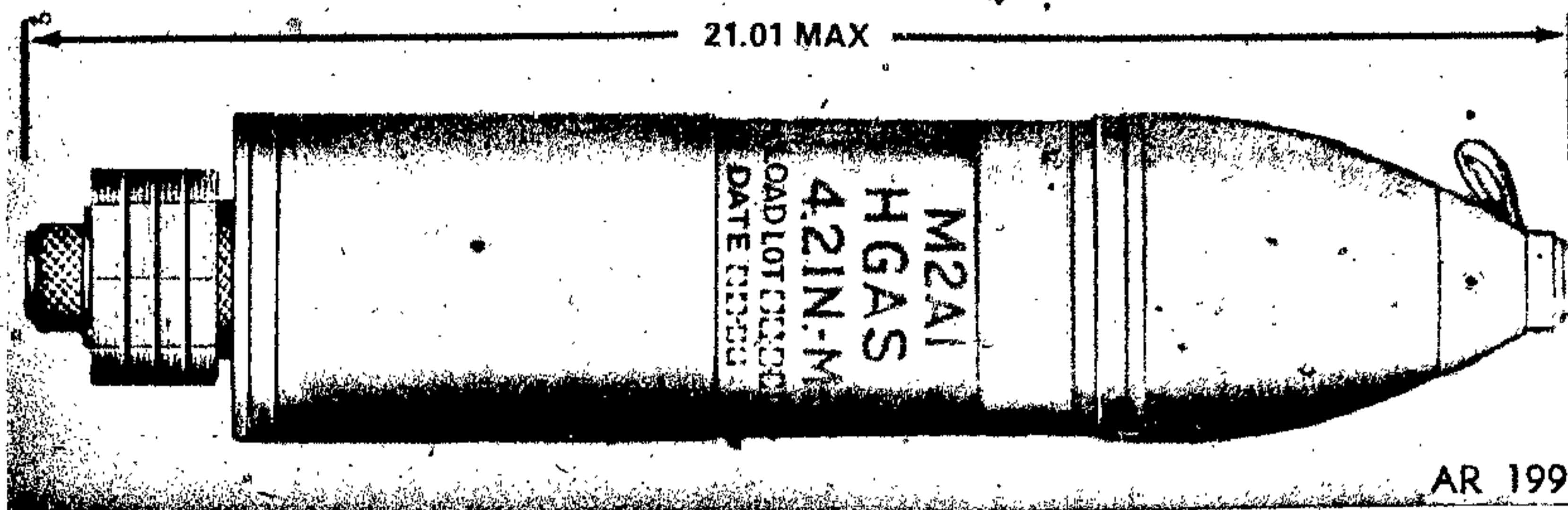
Shipping and Storage Data:

Quantity-distance class ----- 1:1
 Storage compatibility group ----- D
 DOT shipping class ----- A
 DOT designation ----- EXPLOSIVE PROJECTILE
 DODAC ----- 1320-0680
 Drawing number ----- 9207909

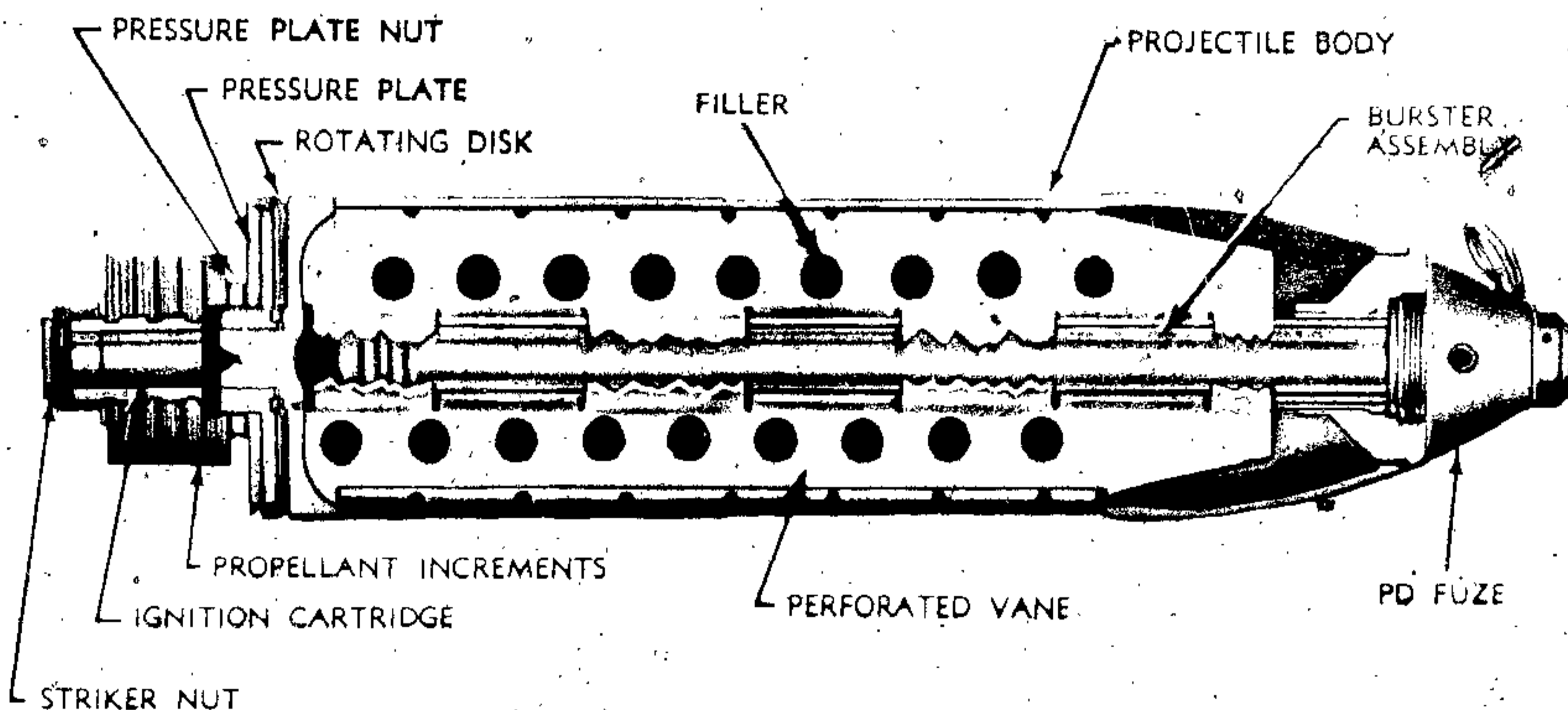


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CARTRIDGE, 4.2-INCH: GAS, M2A1 AND M2



AR 199468-A



AR 199467

Type Classification:

M2A1: Std OTCM 36841 dtd 1958
M2: OBS MSR 05776015

Use:

This cartridge is used for casualty effect and may be filled with either non-persistent gases CNB, CNS, CK or CG, or persistent gases H, HD or HT.

Description:

The complete round consists of a projectile

body, a PD fuze with an integral burster, and a tail assembly. The body contains a perforated vane assembly welded to the inside of the body and is designed to accommodate the burster tube that extends from the fuze. 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.

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

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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. The perforated vane causes the liquid filler to rotate with the projectile to reduce the possibility of erratic flight. The fuze functions on impact, detonating the burster charge which ruptures the projectile and disperses the gas filler.

Difference between Models:

Cartridge M2 differs slightly from Cartridge M2A1 in the design of the obturating mechanism.

Tabulated Data:

Complete round:

Type ----- Agent
Weight ----- 24.67 lb
Length ----- 21.01 in.
Cannon used with ----- M2, M30

Projectile:

Body material ----- Steel
Color:
 Persistent ----- Gray w/2 green bands and green markings
 Non-persistent ----- Gray w/1 green band and green markings
Filler and weight ----- Gas, 5.75 to 8.00 lb
Ignition cartridge ----- M2*
Propelling charge ----- M6*
Fuze ----- PD, M8 (with M14 burster)

Performance (full charge):

Maximum range ----- 4879 yd (4,460 mtr)
Muzzle velocity ----- 839 fps (255.8 mps)

*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°C) (for period not more than 4 hr/day)

*Packing

----- 1 round in fiber container; 2 containers in wooden box

*Packing Box:

Weight ----- 75.0 lb
Dimensions ----- 27-1/16 x 11-1/8 x 7-7/32 in.
Cube ----- 1.3 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- (1?) 1.2
Storage compatibility group ----- K
DOT shipping class ----- A
DOT designation ----- AMMUNITION FOR CANNON WITH GAS PROJECTILES
DODAC ----- CN8, CNS-1315-C701 H, HD, HT-1315-C703
Drawing number ----- 75-1-284

Limitations:

Short rounds may occur when Cartridge M2A1 is fired with fewer than seven increments.

References:

- SC 1305730-1L
- TM 9-1015-215-12
- TM 9-1300-251-20
- TM 9-1320-241-12

Shipping and Storage Data:

Quantity-distance class-----1.2 (12)
 Storage compatibility group----K
 DOT shipping class-----A
 DOT designation-----EXPLOSIVE PRO-
 JECTILE

DODAC:

GB-----1320-D696
 VX-----1320-D695
 Assembly Dwg. No.:
 GB-----8860620-1
 VX-----8860620-2

Ballistics (M2, M2A1, M2A2 & M47 cannons):

	Muzzle Velocity (fps)	Maximum Range (mtr)
Charge 1, M1, green bag	820	5600
Charge 2, M1, green bag	900	6600
Charge 3, M1, green bag	1000	8000
Charge 4, M1, green bag	1150	9700
Charge 5, M1, green bag or M2, white bag	1380	11,600
Charge 6, M2, white bag	1640	13,900
Charge 7, M2, white bag	1950	16,800

Limitations:

None

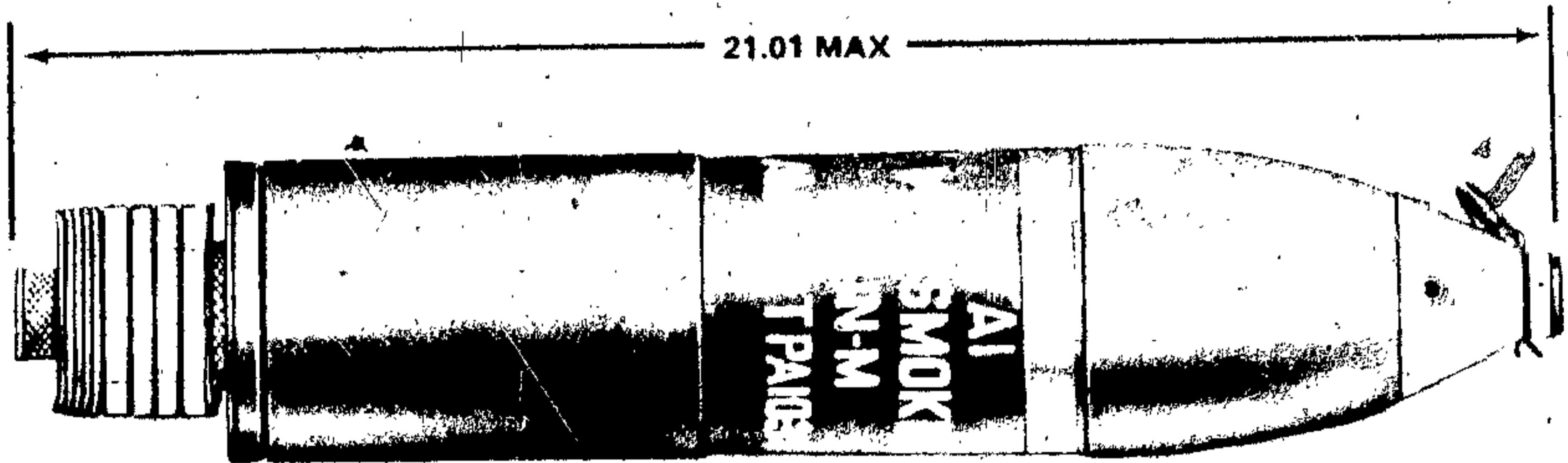
References:

SC 1305/30-1L
 SC 700-20
 DARCOM-P 700-3-3
 TM 9-2300-216-10
 TM 9-1300-250
 TM 9-1300-206
 TM 9-1300-251-20
 TM 9-1300-251-34

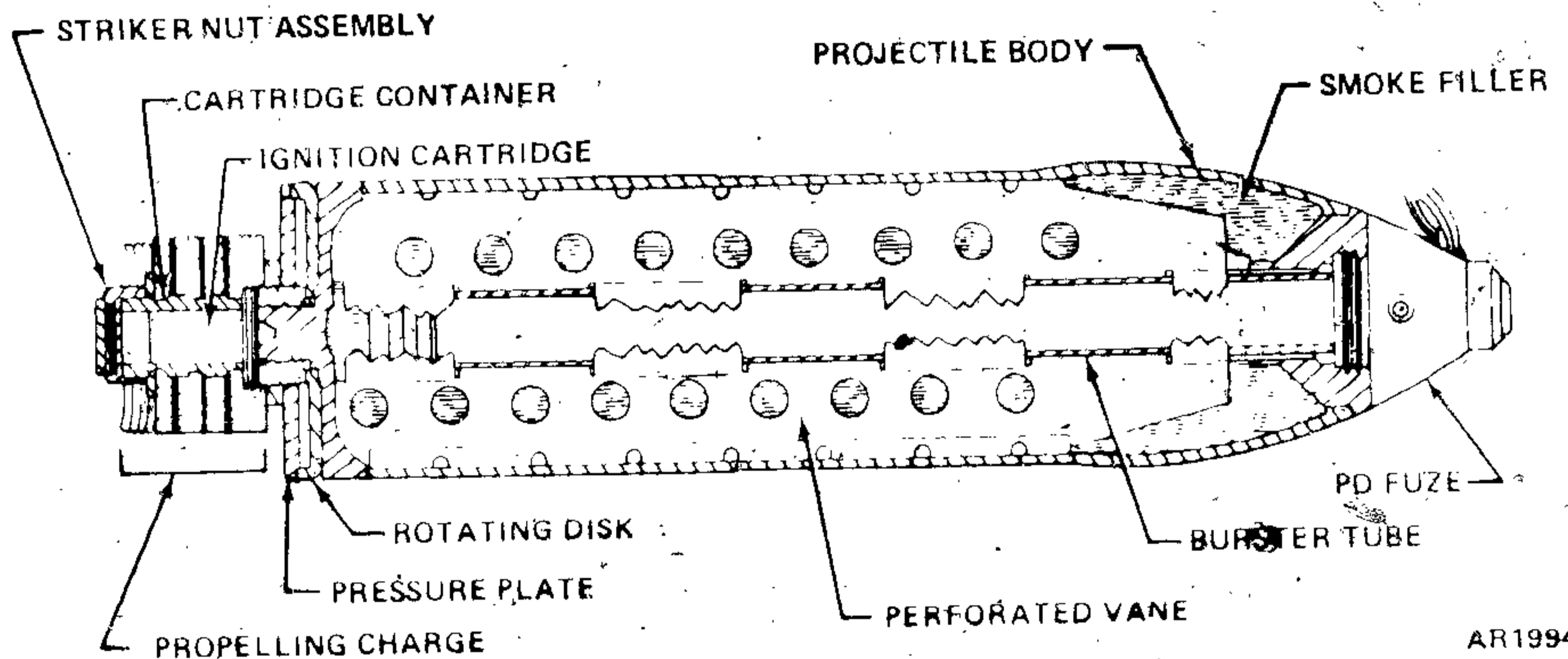


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CARTRIDGE, 4.2 INCH: SMOKE, PWP OR WP, M2A1 & M2



AR199465



AR199465

Type Classification:

OBS 11756003

Use:

This cartridge is used against personnel and materiel as an incendiary device, and to produce a screening smoke.

Description:

The complete round consists of a projectile body, a PD fuze with an integral burster, and a tail assembly. The body contains a perforated

vane assembly welded to the inside of the body and designed to accommodate the burster tube that extends from the fuze. 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.

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

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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. On impact, the functioning of the fuze detonates the burster charge which shatters the projectile casing, dispersing the filler. On contact with the air, the WP (or PWP) filler ignites creating a dense white smoke with some incendiary effect.

Differences between Models:

Cartridge M2 differs slightly from Cartridge M2A1 in the design of the obturating mechanism.

Tabulated data:

Complete round:

Type ----- Smoke
Weight ----- 24.91 lb
Length ----- 21.01 in.
Cannon used with ----- M2, M30

Projectile:

Body material ----- Steel
Color ----- Gray w/yellow band and yellow markings

Filler and weight ----- WP, 7.50 lb

Components:

Ignition cartridge ----- M2*
Propelling charge ----- M6*
Fuze ----- PD, M8 (with M14 burster)

Performance (full charge):

Maximum range ----- 4879 yd (4,460 mtr)
Muzzle velocity ----- 839 fps (255.8 mps)

*NOTE: See separate data sheets.

Temperature Limits:

Firing:

Lower limit ----- -40°F (-40°C)
Upper limit ----- +25°F (+52.0°C)

Storage:

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

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

*Packing Box:

Weight ----- 70.0 lb
Dimensions ----- 27-1/6 x 11-1/8 x 7-7/32 in
Cube ----- 1.3 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- (12) 1.2
Storage compatibility group ----- H
DOT shipping class ----- A
DOT designation ----- AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC ----- 1315-C708
Drawing number ----- 75-1-284

Limitations:

Short rounds may occur when Cartridge M2A1 is fired with fewer than seven increments.

Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

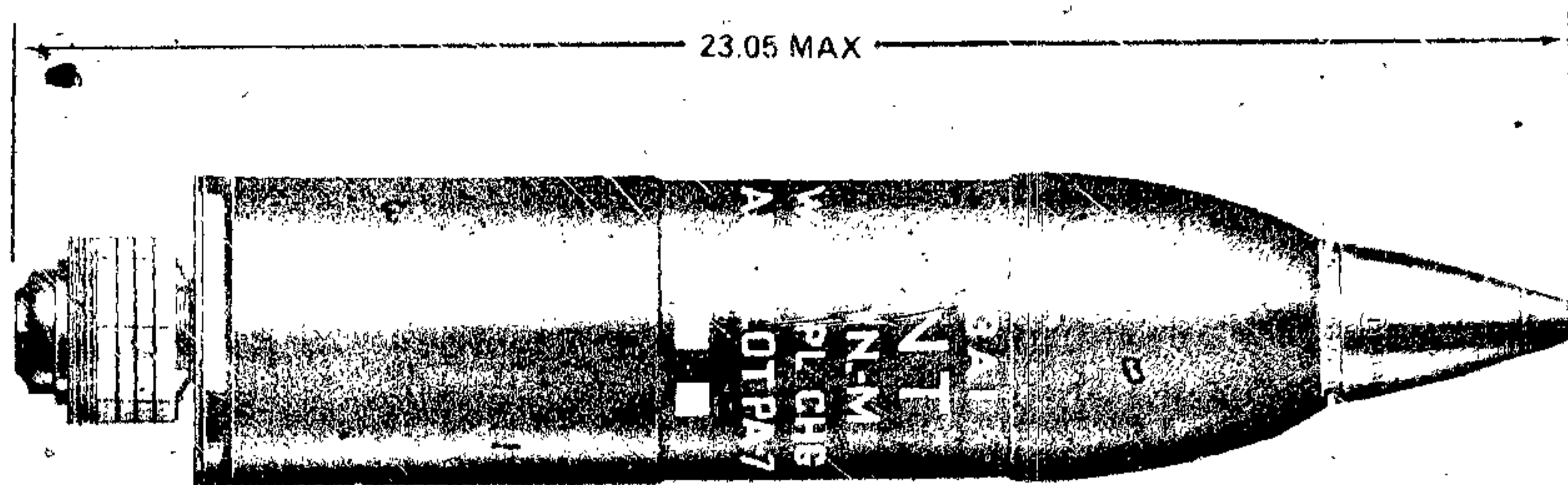
References:

- SC 1305/30-IL
- TM 9-1015-215-12
- TM 9-1300-251-20
- TM 9-1320-241-12

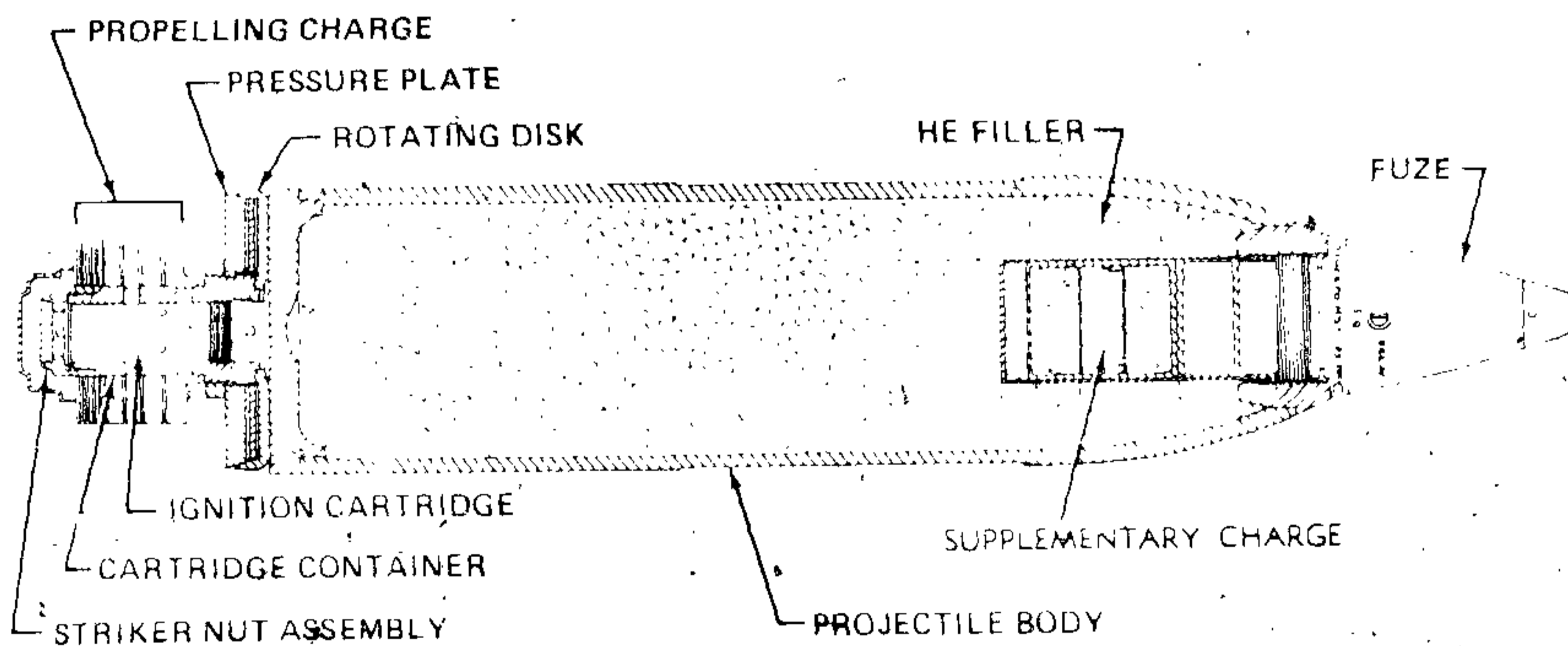


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CARTRIDGE, 4.2-INCH HE, M3A1 & M3



AR199464



AR199463

Type Classification:

OBS 11756003

Use:

This cartridge is used against personnel and materiel, providing both fragmentation and blast effect.

Description:

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 of 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.

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. The functioning of the fuze detonates the supplementary charge (when used) and the high explosive charge. Depending on

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the type of fuze used, the projectile bursts either over or on the target producing near optimum fragmentation and blast effect.

Difference between Models:

The fuze well on the M3 cartridge is designed to accommodate the burster tube of the M9 fuze. In addition, the physical dimensions of the two models are slightly different.

Tabulated Data:

Complete round:
 Type ----- HE
 Weight ----- 26.20 lb
 Length ----- 23.05 in.
 Cannon used with ----- M2, M30

Projectile:
 Body material ----- Steel
 Color ----- Olive drab w/yellow markings
 Filler and weight ----- TNT, 7.80 lb
 Supplementary charge ----- TNT, 0.365 lb

Components:
 Ignition cartridge ----- M2*
 Propelling charge ----- M6*

Fuze:
 M3 ----- PD, M9
 M3A1 ----- PD, M557, MTSQ, M520 series, M564; Prox. M513 series

*NOTE: See separate data sheets.

Performance (full charge):
 Maximum range ----- 5043 yd (4,610 mtr)
 Muzzle velocity ----- 845 fps (258 mps)

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 in fiber container; fiber containers in wooden box

*Packing Box:
 Weight ----- 76 lb
 Dimensions ----- 31-5/16 x 11-13/16 x 7-3/8 in.
 Cube ----- 1.6 cu ft

*NOTE: See SC for complete packing data including MSN's.

Shipping and Storage Data:

Quantity-distance class ----- 1.1
 Storage compatibility group ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
 DODAC ----- 1315-C704
 Drawing number ----- 75-1-285

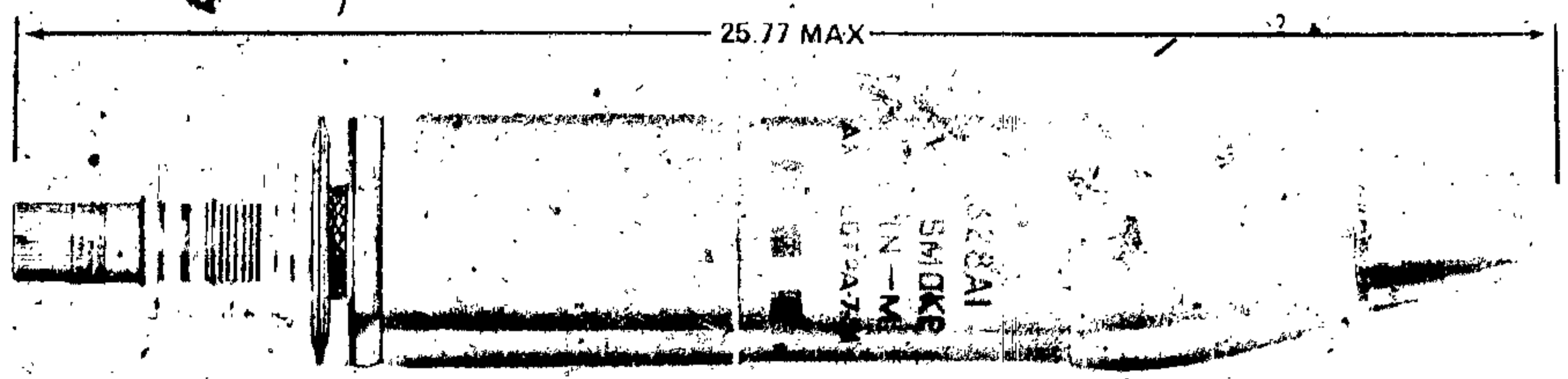
Limitations:

Minimum charge for firing Cartridge M3A1 with a proximity fuze is 10 increments.

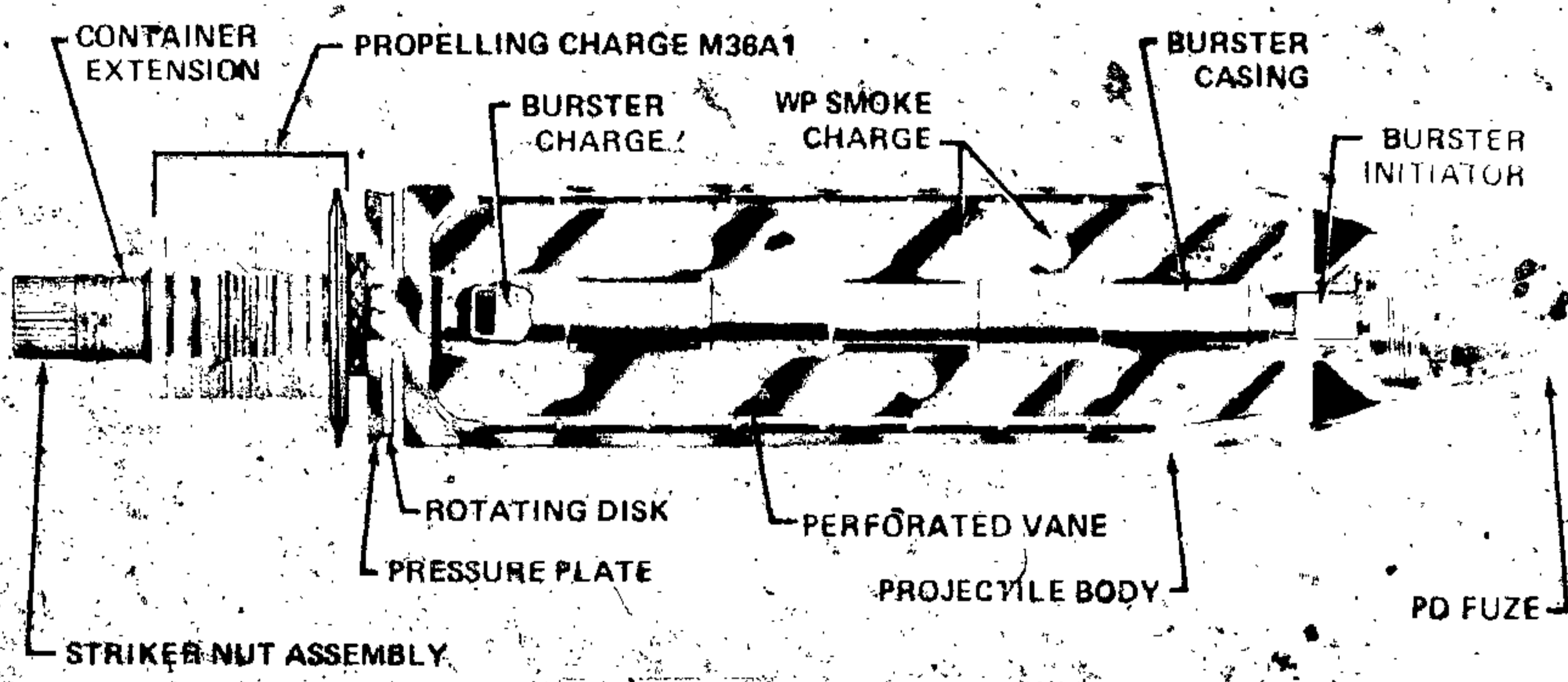
References:

SC 1305/30-IL
 TM 9-1015-215-12
 TM 9-1300-251-20
 TM 9-1320-241-12

CARTRIDGE, 4.2-INCH: SMOKE, WP, M328A1 AND M328



AR128452



AR128452

Type Classification:

Std AMCTC 124 dtd 1962 (M328A1)
CON 11756003 (M328)

Use:

These cartridges are used to produce a screening smoke.

Description:

The complete round consists of a projectile body, a PD fuze, and a tail assembly. The steel body contains a perforated vane assembly, and is designed to accommodate a burster casing containing an initiator charge and a burster charge. Cartridges loaded prior to 1963 have a tetrytol burster charge; those loaded after 1963 use a Composition B burster charge. The tail assembly

consists of a pressure plate and rotating disc, a propelling charge, a striker nut assembly, a cartridge container and extension, and an ignition cartridge.

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. The PD fuze functions on impact, activating the burster initiator which detonates the burster charge. The burster charge shatters the projectile body, dispersing the

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WP filler. White phosphorous ignites on contact with the air, producing a dense white smoke with some incendiary effect.

Differences between Models:

Cartridge M328 is similar to M328A1 as illustrated except that M328 uses Ignition Cartridge M2 and Propelling Charge M36. See separate data sheets for details of Ignition Cartridges M2 and M2A2, and Propelling Charges M36 and M36A1.

Tabulated Data:

Complete round:

Type ----- WP
Weight ----- 28.66 lb
Length ----- 25.77 in.
Cannon used with ----- M2, M30

Projectile:

Body material ----- Steel
Color -----
Old ----- Gray w/yellow band
and yellow markings
New ----- Light green w/yellow
band and light red
markings

Filler and weight ----- WP, 8.4 lb (M328A1)
WP, 7.5 lb (M328)

Components:

	M328A1	M328
Ignition cartridge	M2A2*	M2*
Propelling charge	M36A1*	M36*
Burster assembly	M35	M35
Burster initiator	M13	M13
Fuze	PD, M48A3 (w/adaptor), M521	PD, M48A3 (w/adaptor)

*NOTE: See separate data sheets.

Performance (full charge):

Maximum range ----- 6,180 yds (5,650 mtr)
Muzzle velocity ----- 981 fps (299 mps)

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 in fiber container; 1 container in wooden box.

*Packing Box:

Weight ----- 76 lb
Dimensions ----- 31-15/16 x 11-13/16 x
7-3/8 in.
Cube ----- 1.6 cu

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- (12) 1.2
Storage compatibility group ----- H
DOT shipping class ----- A
DOT designation ----- AMMUNITION FOR CANNON
WITH SMOKE PROJECTILES
DODAC ----- 1315-0708
Drawing number ----- 8797829

Limitations:

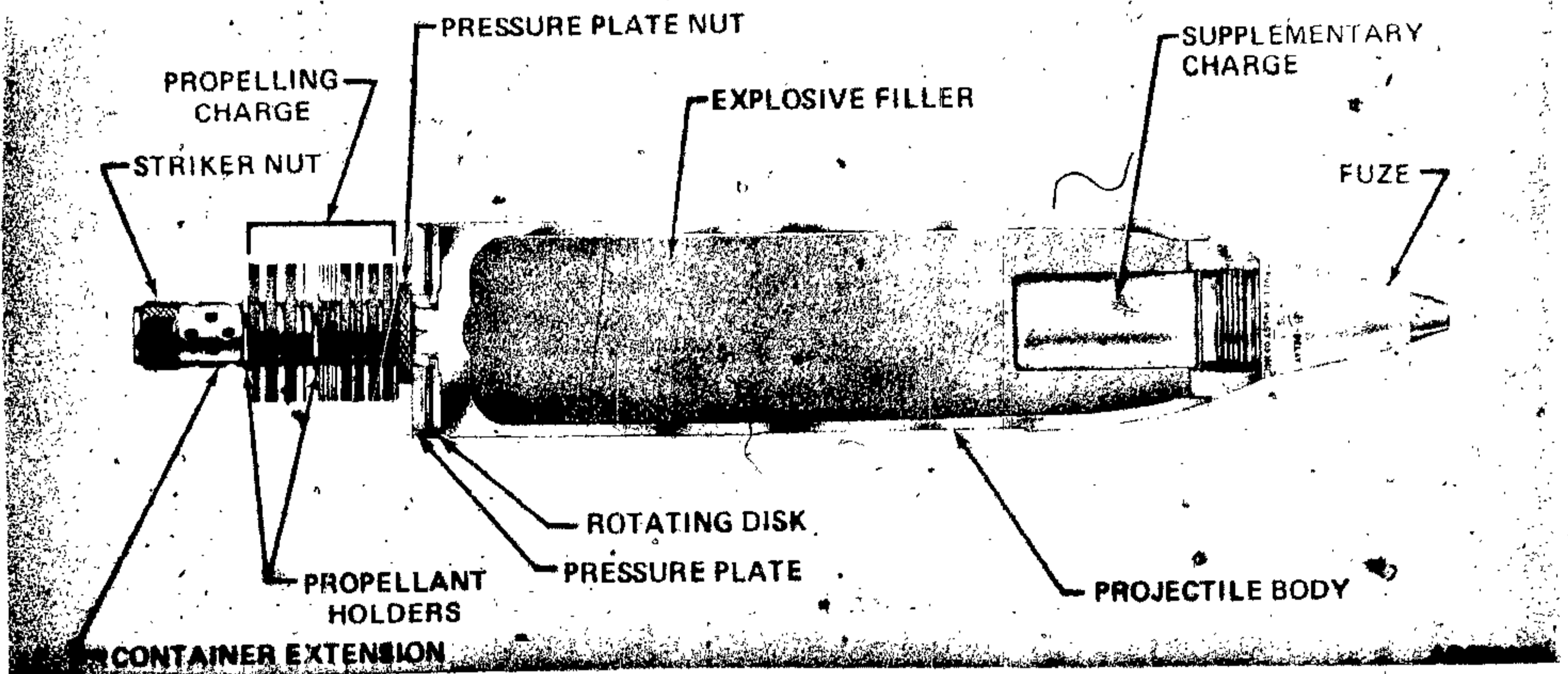
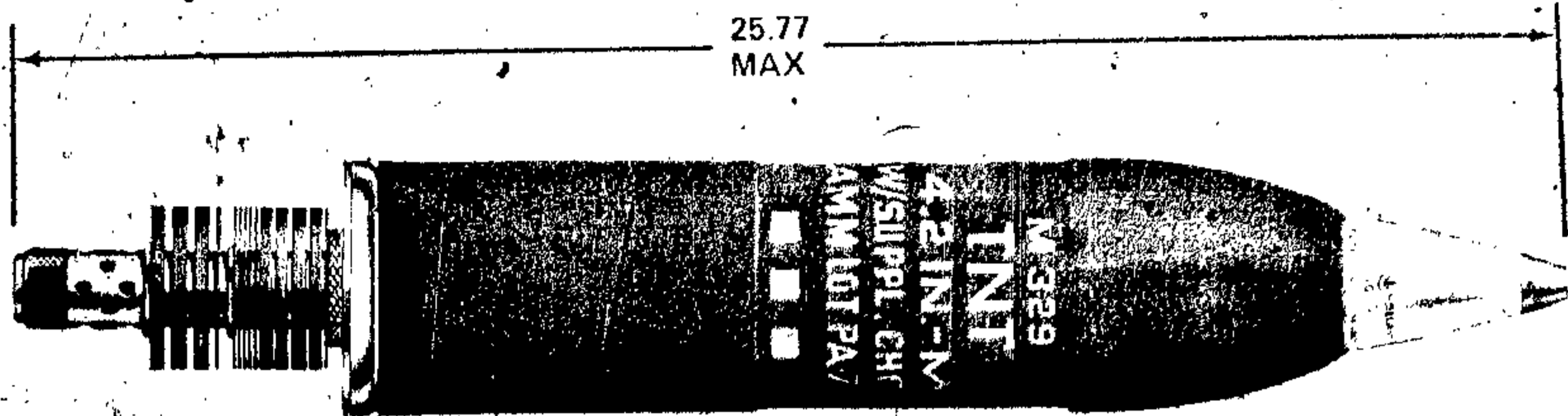
Short rounds may occur when firing with fewer than 10 increments.

Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

References:

SC 1305/30-IL
TM 9-1015-215-12
TM 9-1300-251-20
TM 9-1320-241-12

CARTRIDGE, 4.2-INCH: HE, M329 AND M329B1



Type Classification:

Std AMCTC 124 dtd 1962 (M329B1)
CON 11756003

Use:

These cartridges are used against personnel and materiel, providing both fragmentation and blast effect.

Description:

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 of TNT; this charge is removed to accommodate deep-intrusion proximity fuzes. The tail assembly includes

a pressure plate and rotating disk, 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. Functioning of the fuze detonates the supplementary charge and, in turn, the high explosive charge. Depending upon the type of fuze used, the projectile bursts either over or on the target, producing near optimum fragmentation and

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blast effect.

Difference between Models:

M329B1 has a projectile body made from a forging with an integral base.

Tabulated Data:

Complete round:

Type	HE
Weight	27.07 lb
Length	25.77 in.
Cannon used with	M2, M30

Projectile

Body material	Steel tube
Color	Olive drab w/yellow markings
Filler and weight	TNT, 7.08 lb
Supplementary charge	TNT, 0.365 lb

Components

Ignition cartridge	M2*
Propelling charge	M36*
Fuzes	PD, M557, M739 MTSQ, M520 series M564 Prox., M513 series M728, M732

*NOTE: See separate data sheets.

Performance (full charge):

Maximum range	5929 yd (5,420 mtr)
Muzzle velocity	964 fps (294 mps)

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 in fiber container; 2 containers in wooden box.

*Packing Box:

Weight	76 lb
Dimensions	31-15/16 x 11-13/16 x 7-3/8 in.
Cube	1.6 cu ft

*NOTE: See SC for complete packing data including NSN's:

Storage and Shipping Data:

Quantity-distance class	1.1
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1315-C704
Drawing number	75-1-301 (M329) 8863682 (M329B1)

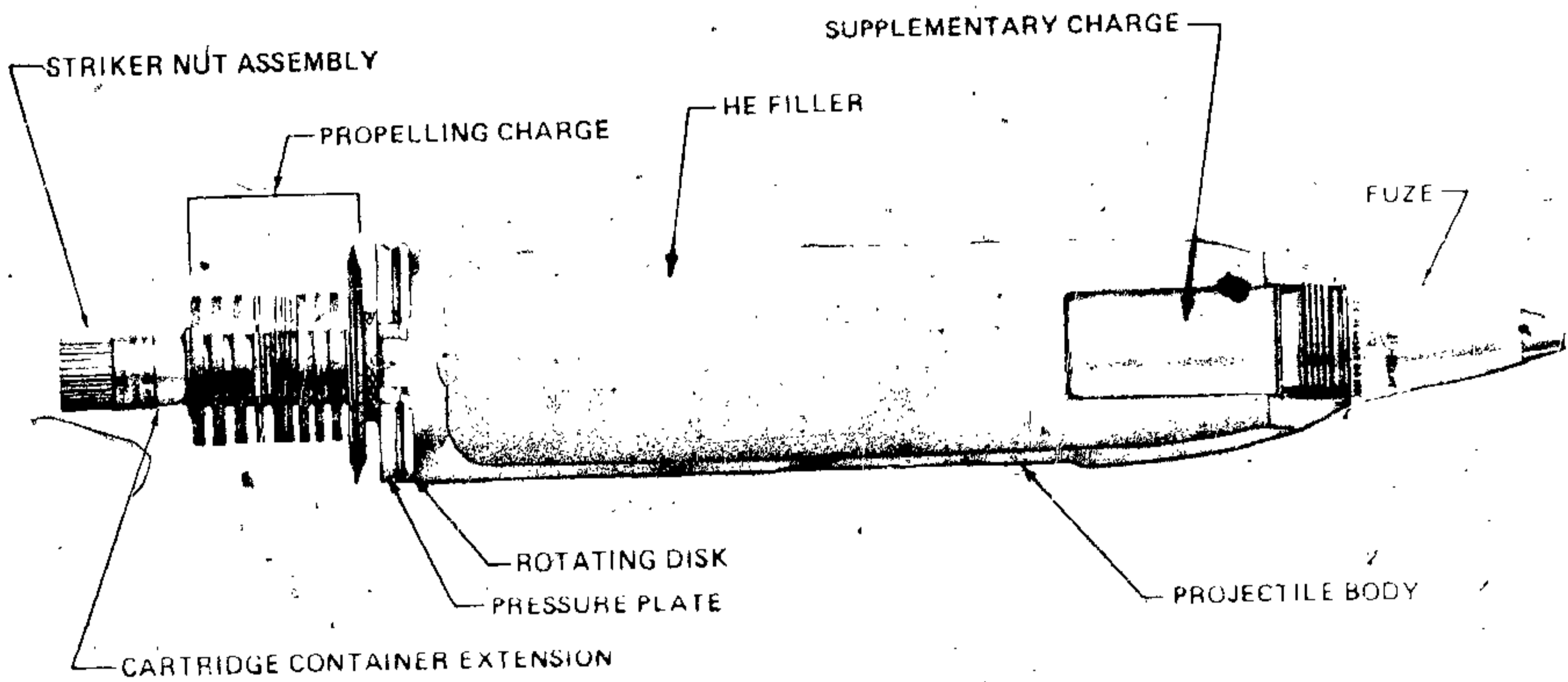
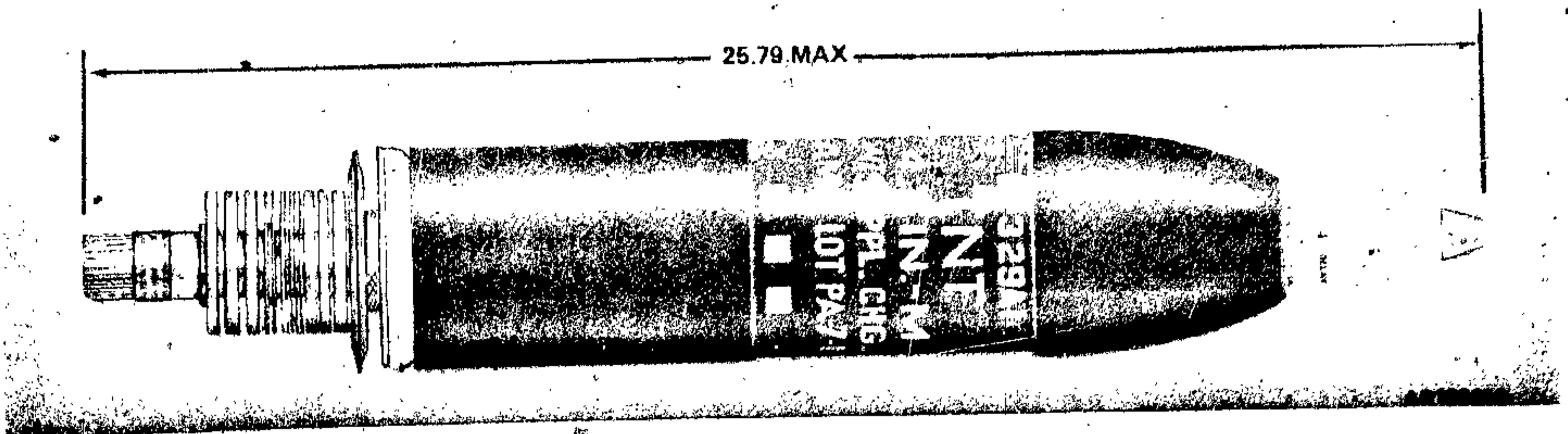
Limitations:

Short rounds may occur when firing with less than seven increments. Minimum charge for firing with a proximity fuze is 10 increments.

References:

- SC 1305/30-1L
- TM 9-1015-215-12
- TM 9-1300-251-20
- TM 9-1320-241-12

CARTRIDGE, 4.2-INCH: HE, M329A1



AR199449

Type Classification:

Std (LCC-B) 01756003

Use:

This cartridge is used against personnel and materiel, providing both fragmentation and blast effect.

Description:

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 of TNT; this charge is removed to accommodate certain proximity fuzes. 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. The functioning of the fuze detonates the supplementary charge and, in turn, the high explosive charge. Depending on the type of fuze used, the projectile bursts either over or on target, producing near optimal fragmentation and blast effect.

Change 2 of 4 of

Tabulated Data:

Complete round:

Type ----- HE
 Weight ----- 27.07 lb
 Length ----- 25.79 in.
 Cannon used with ----- M2, M30

Projectile:

Body material ----- Steel tube
 Color ----- Olive drab w/white markings
 Filler and weight ----- TNT, 7.08 lb

Supplementary

charge ----- TNT, 0.365 lb

Components:

Ignition cartridge ----- M2A2*
 Propelling charge ----- M36A1*
 Fuze ----- PD, M557; M739 MTSQ,
 M520 series or
 M564, Prox.,
 M513 series M728,
 M732

*NOTE: See separate data sheets.

Performance (full charge):

Maximum range ----- 6,180 yd (5,650 mtr)
 Muzzle velocity ----- 981 fps (299 mps)

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 in fiber con-
 tainer; 2 fiber con-
 tainers in wooden
 box

*Packing Box:

Weight ----- 76 lb
 Dimensions ----- 31-5/16 x 11-13/16 x
 7-3/8 in
 Cube ----- 1.6 cu ft

*NOTE: See SC for complete packing data including
 NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 1.1
 Storage compatibility
 group ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON
 WITH EXPLOSIVE PRO-
 JECTILES
 DODAC ----- 1315-C704
 Drawing number ----- 8863685

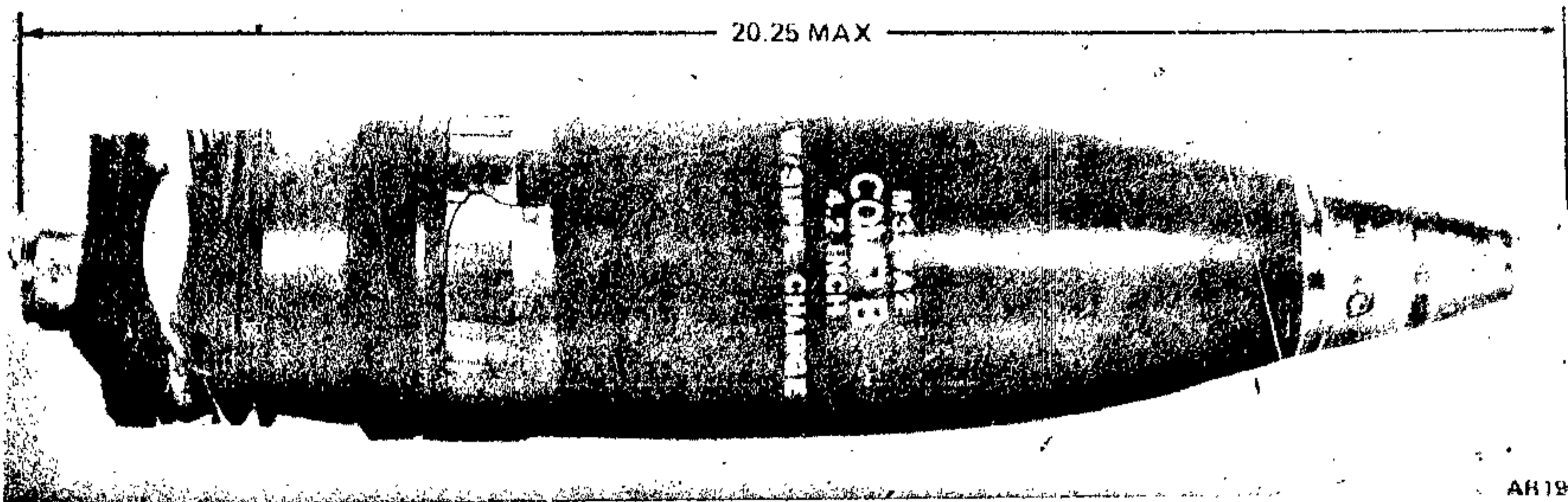
Limitations:

Short rounds may occur when firing with fewer
 than 10 increments. Minimum charge for firing with
 a proximity fuze is 10 increments.

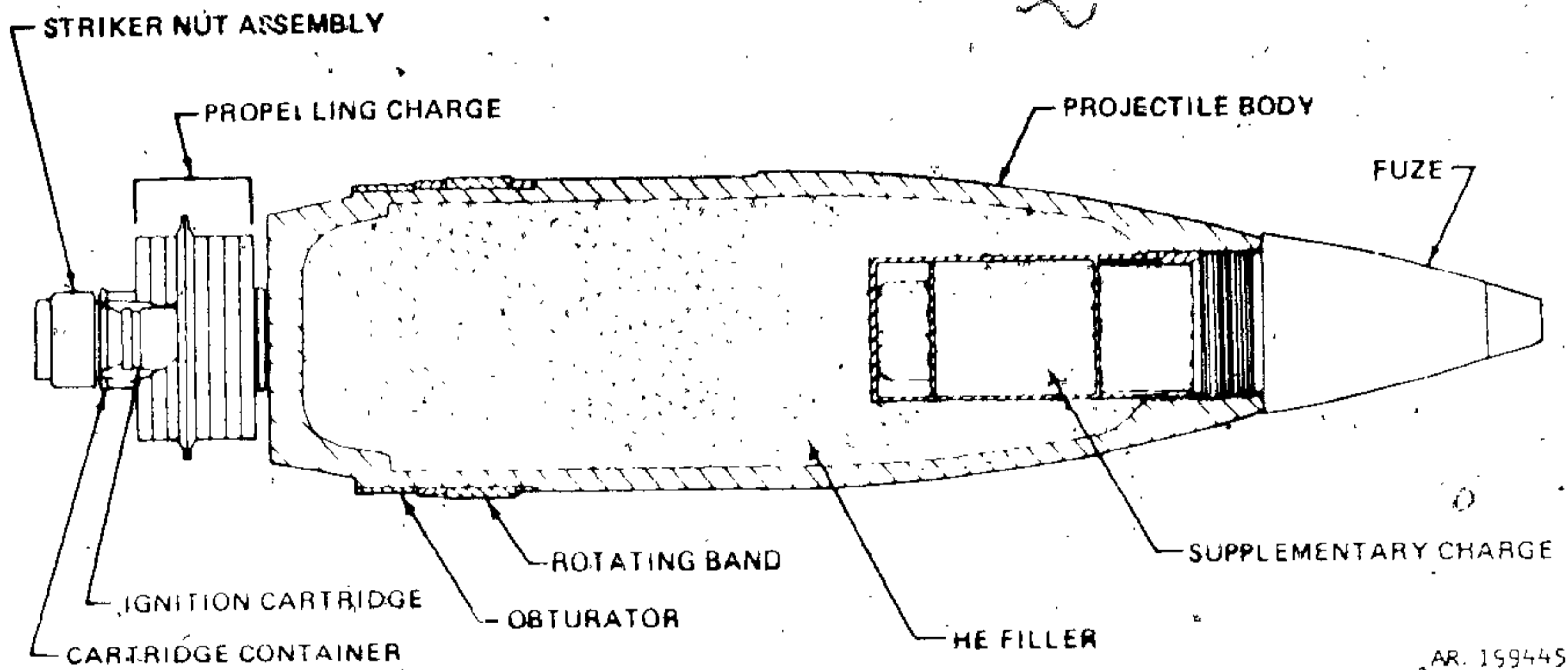
References:

SC 1305/30-1L
 TM 9-1015-215-12
 TM 9-1300-251-20
 TM 9-1320-241-12

CARTRIDGE, 4.2-INCH: HE, M329A2 (M329A1E1)



AR189445



AR 189445-A

Type Classification:

Std LCC-A MSR 01756033

Use:

This cartridge is used against personnel and materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body, a fuze, and a tail assembly. The forged steel body has a pre-engraved rotating band and a neoprene rubber obturating ring near the base, and is designed to accommodate an impact, delay, or proximity fuze. Below the nose is a deep fuze cavity containing a TNT supplementary charge which is removed when using a long-intrusion

proximity fuze. The tail assembly consists of a cartridge container and ignition cartridge, a propelling charge, and a striker nut assembly.

Functioning:

The cartridge is positioned so that the pre-engraved rotating band aligns with the rifling grooves in the bore of the tube. When the cartridge is released, it slides down the mortar tube until the striker point in the striker nut assembly strikes the weapon firing pin. The striker point functions the percussion primer in the ignition cartridge. The flash from the primer ignites the ignition cartridge which, in turn, ignites the propelling charge. The gas from the propelling charge exerts pressure on the base of the projectile, expands the obturator, and forces the projectile back up the tube. The pre-engraved rotating band is engaged in the rifling and imparts spin to the projectile. The spin stabilizes

TM 43-0001-28

the projectile in flight. Functioning of the fuze detonates the supplementary charge and, in turn, the high explosive charge. Depending upon the type of fuze used, the projectile bursts either over or on the target, producing near optimum fragmentation and blast effect.

Tabulated Data:

Complete round:

Type ----- HE
Weight ----- 22.00 lb
Length ----- 20.25 in.
Cannon used with ----- M2, M30

Projectile:

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

Filler and weight ----- Comp B 5.75 lb

Components:

Ignition cartridge ----- M2A2*
Propelling charge ----- M36A2*
Fuzes ----- PD, M557, M739 MTSQ,
M564, Prox., M728,
M732

Performance (full charge):

Maximum range ----- 7220 yd (6,600 mtr)
Muzzle velocity ----- 1010 fps (308 mps)

*NOTE: See separate data sheets.

Temperature Limits:

Firing:

Lower limit ----- -65°F (-53.8°C)
Upper limit ----- +160°F (+71.1°C)

Storage:

Lower limit ----- -65°F (-53.8°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 in fiber con-
tainer; 2 containers
in wooden box

*Packing Box:

Weight ----- 63 lb
Dimensions ----- 25-3/4 x 11-11/16 x
6-3/8 in.
Cube ----- 1.4 cu ft

*NOTE: See SC for complete packing data including
NSN's

Shipping and Storage Data:

Quantity-distance class -- 1.1
Storage compatibility
group ----- E
DOT shipping class ----- A
DOT designation ----- AMMUNITION FOR CAN-
NON WITH EXPLOSIVE
PROJECTILES
DODAC ----- 1315-6704
Drawing number ----- 9235654

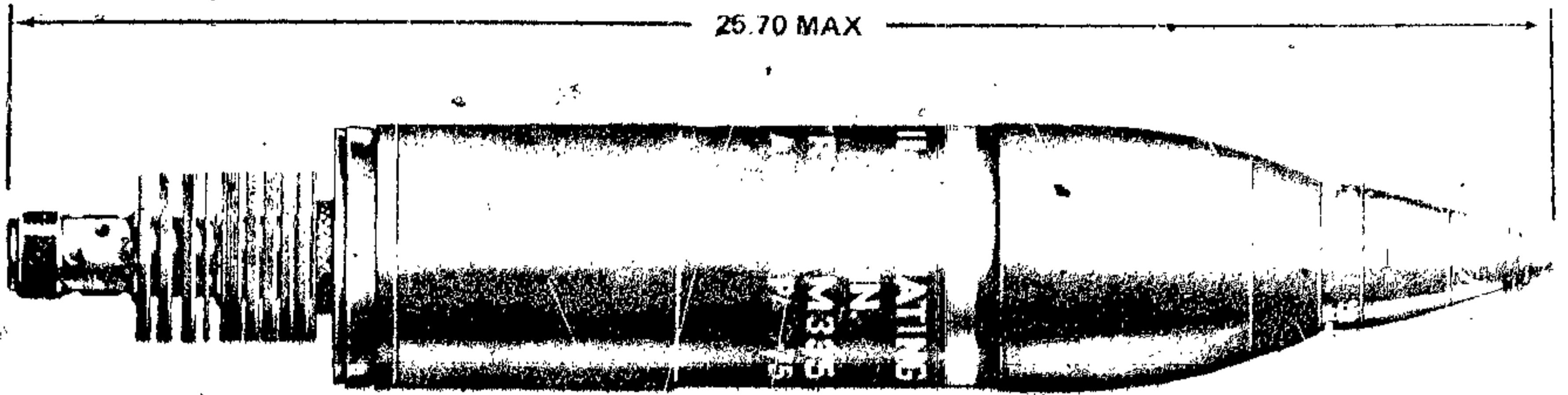
Limitations:

The supplementary charge must be removed from
the nose cavity before attempting to install a
long-intrusion proximity fuze.

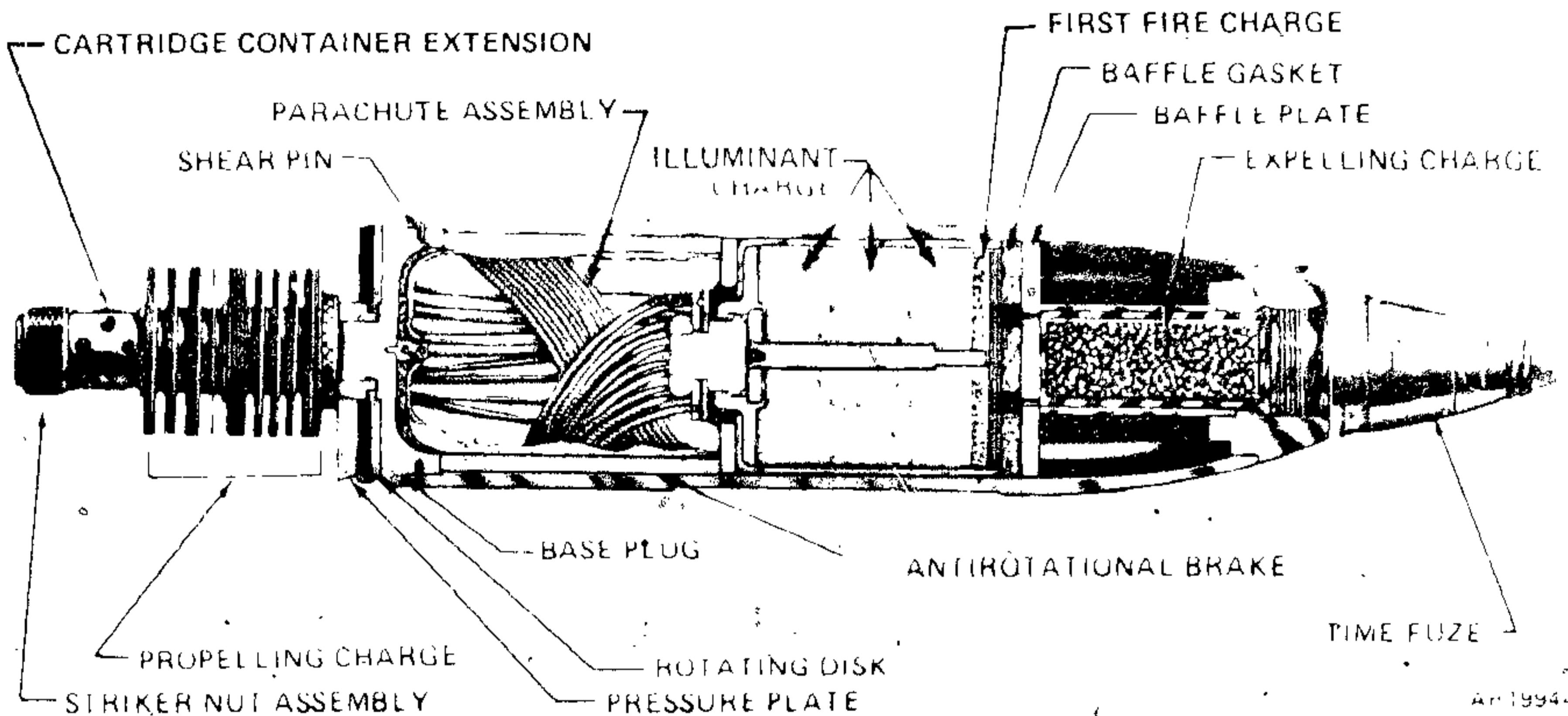
References:

SC 1305/30-1L*
TM 9-1015-215-12
TM 9-1300-251-20
TM 9-1320-241-12

CARTRIDGE, 4.2-INCH: ILLUMINATING, M335A1 AND M335



AR189444



AR189443

Type Classification:

M335A1: Std AMTC 3881 dtd 1965
 M335: Cont AMTC 9546 dtd 1972

Use:

This cartridge is used for target and battle-field 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 fins to reduce canister spin at the time of ejection and prevent twisting of the parachute suspension. The tail assembly includes a pressure plate, a 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 pin 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 approximately 70 sec, at 500,000 candlepower for the M335A1, and 60 sec for the M335.

Differences between Models:

M335A1 and M335 are similar except for ignition cartridges and propelling charges. See separate data sheets for 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 ----- Illum., 3.31 lb
 Expelling charge ----- BP, 0.18 lb

Components.

	<u>M335</u>	<u>M335A1</u>
Ignition cartridge -----	M2*	M2A1*
Propelling charge -----	M36*	M36A1*
Fuze -----	MTSQ, M501	MT, M562

Performance (full charge):

	<u>M335</u>	<u>M335A1</u>
Maximum range -----	5251 yd (4800 mtr)	5787 yd (5290 mtr)
Muzzle velocity -----	952 fps (290 mps)	990 fps (301.7 mps)

*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°C) (for period not more than 4 hr/day)

*Packing ----- 1 round in fiber container; 2 containers in wooden 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 SC for complete packing data including NSN's.

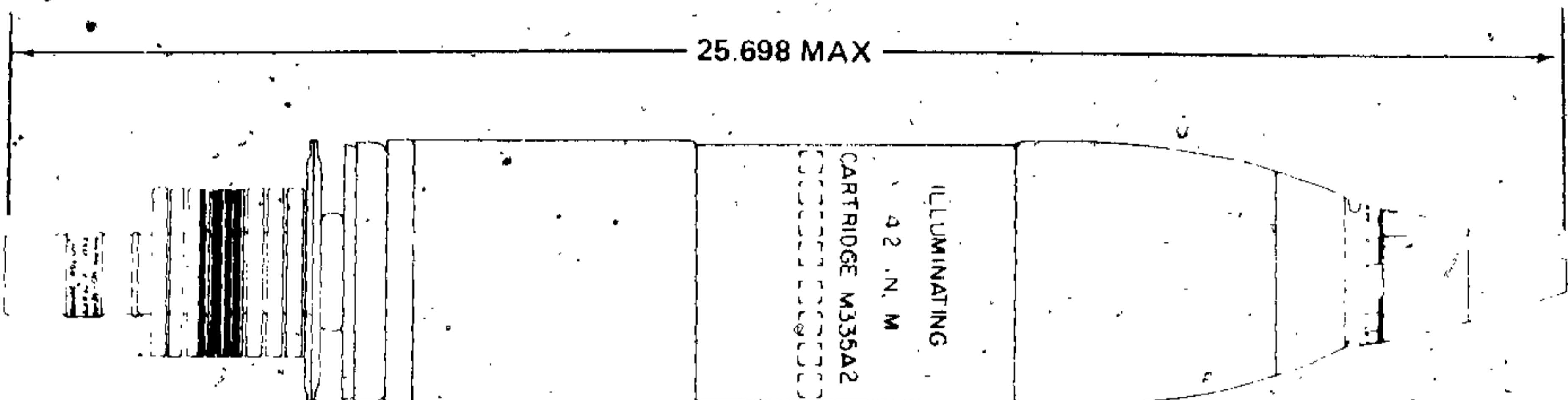
Shipping and Storage Data:

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

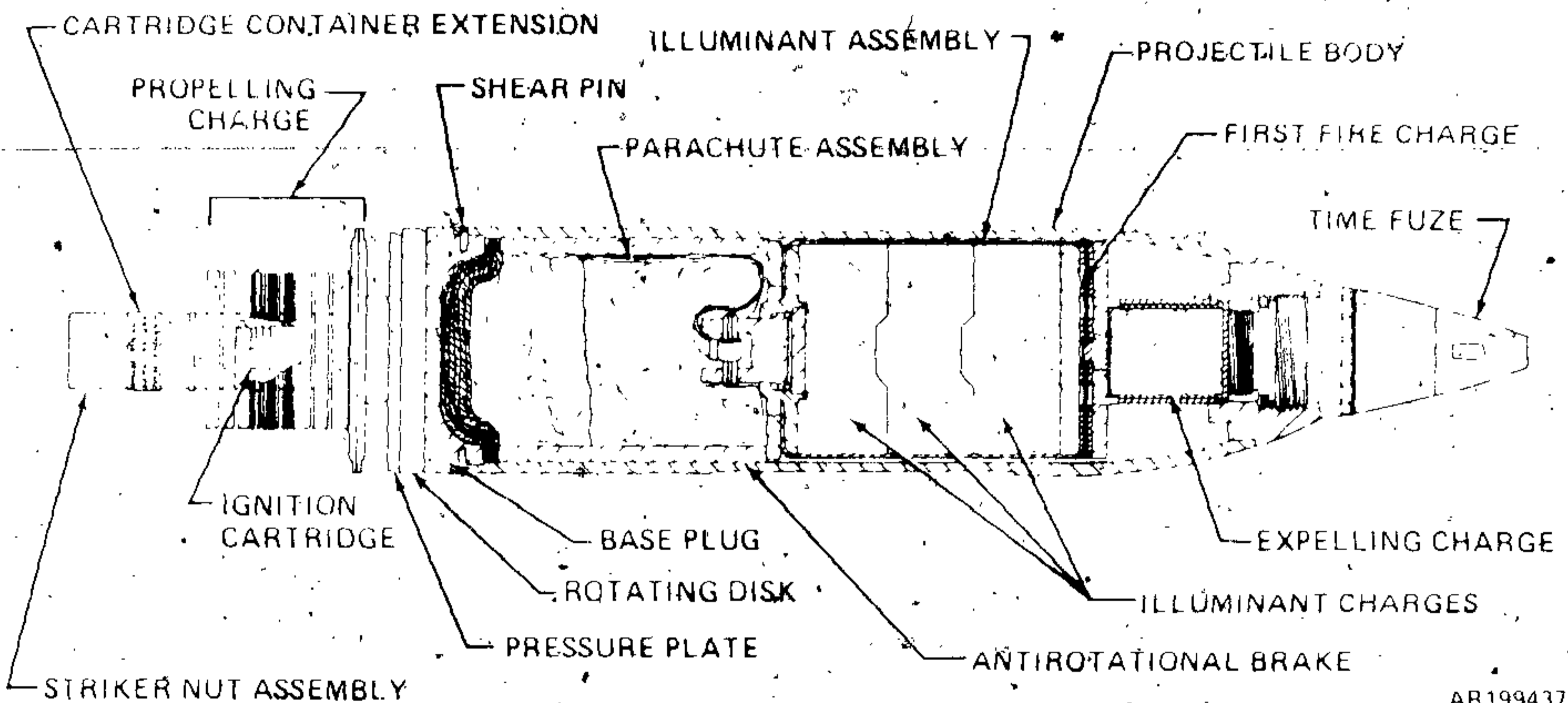
References:

SC 1305/30-1L
 TM 9-1015-215-12
 TM 9-1300-251-20
 TM 9-1320-241-12

CARTRIDGE, 4.2-INCH, ILLUMINATING: M335A2



AR199438



AR199437

Type Classification:

Std AMTC 3881 dtd 1965

Use:

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

Description:

The complete round consists of a projectile body with a detachable base plug, a time 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 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

TM 43-0001-28

the fuze, the expelling charge is ignited, expelling the illuminant and parachute assemblies through the base of the projectile body and igniting the first-fire charge. The first-fire charge ignites the illuminant charge; the spring-loaded brakes extend to stop rotation, and the parachute deploys. Burning time is approximately 90 sec at 850,000 candlepower.

Tabulated Data:

Complete round:

Type ----- Illuminating
 weight ----- 26.00 lb
 Length ----- 25.698 in.
 Cannon used with ----- M2, M30

Projectile:

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

Components:

Ignition cartridge ----- M2A2*
 Propelling charge ----- M36A1*
 Fuze ----- MT, M565

*NOTE: See separate data sheets.

Performance (full charge)

Maximum range ----- 6006 yd (5490 mtr)
 Muzzle velocity ----- 1001 fps (305.1 mps)

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 in fiber container; 2 containers in wooden 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 SC for complete packing data including MSN's.

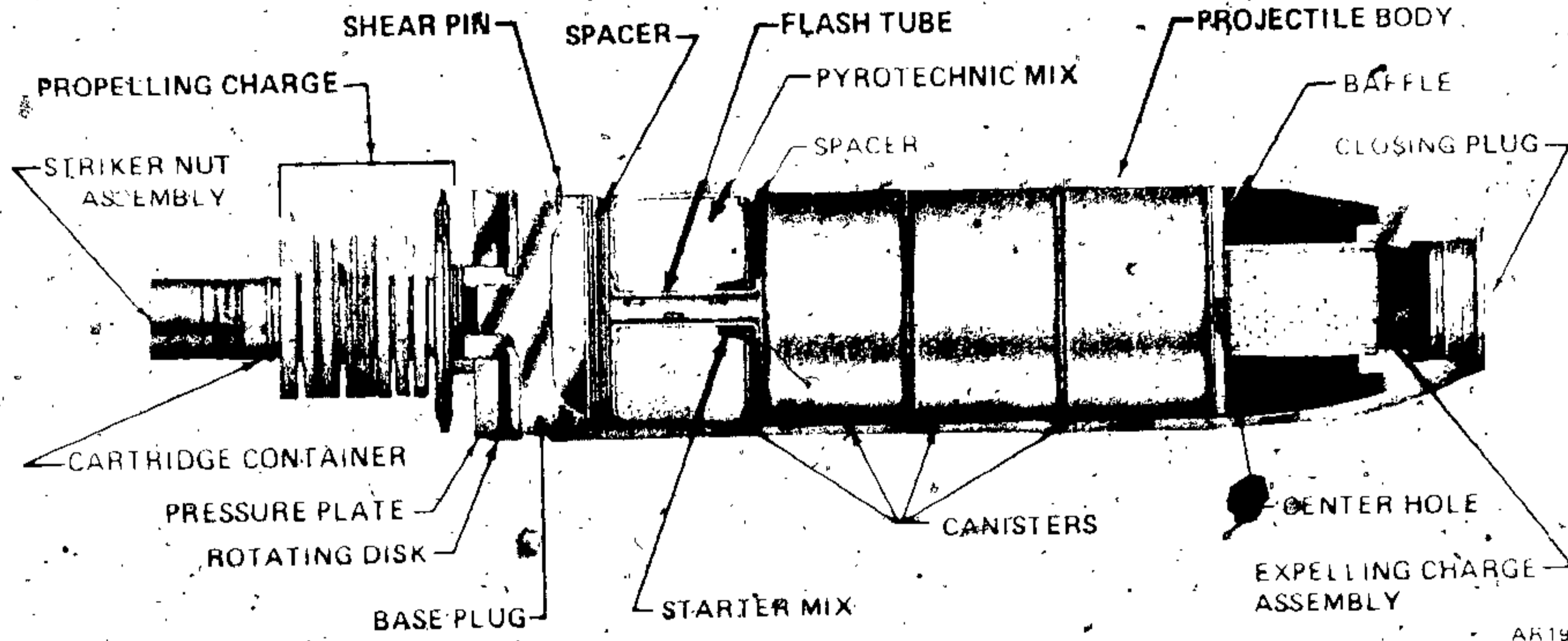
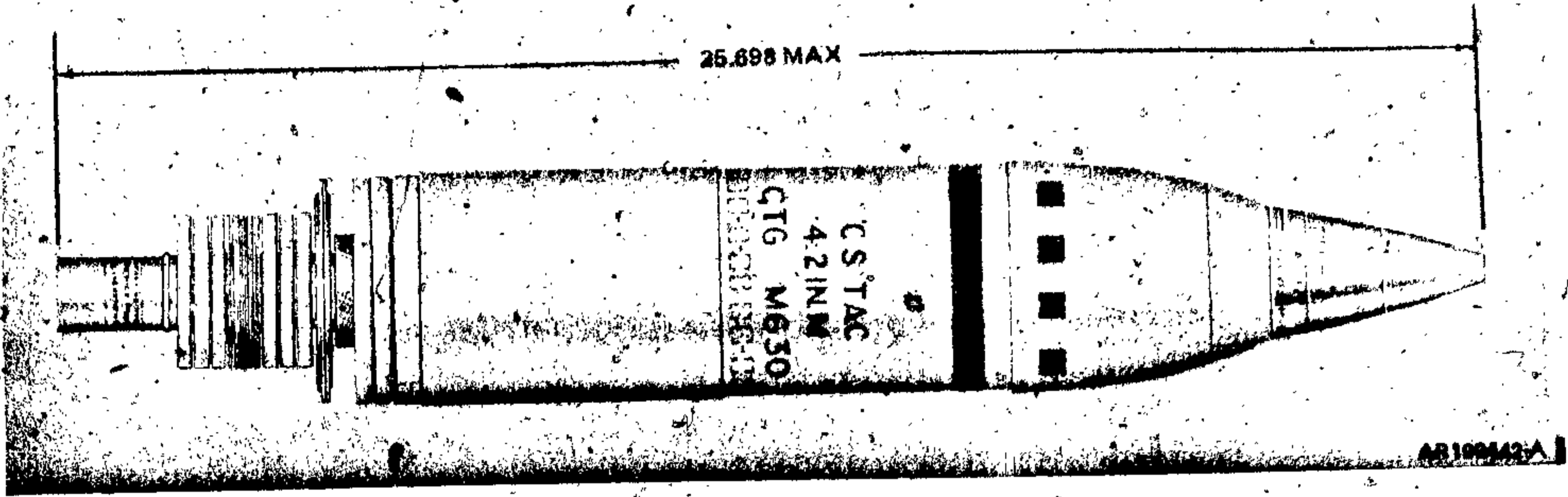
Shipping and Storage Data:

Quantity-distance class ----- (08) 1.2
 Storage compatibility group ----- G
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES
 DODAC ----- 1315-C706
 Drawing number ----- 8886595

References:

SC 1305/30-1L
 TM 9-1015-215-12
 TM 9-1300-251-20
 TM 9-1320-241-12

CARTRIDGE, 4.2-INCH: TACTICAL CS, M630



Type Classification:

Std. AMC, TC 8233 dtd 1971

Use:

This cartridge is used to harass personnel by emitting irritant fumes.

Description:

The complete round consists of a projectile body with a detachable base plug, a time fuze, 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 body contains four canisters of CS pyrotechnic mix, each with a small charge of starter

mix. An aluminum baffle separates the expelling charge from the canisters, and chipboard spacers separate the canisters from each other. The baffle, the spacers, and the canisters have a center hole allowing the flash from the expelling charge to provide ignition. 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

dist, 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 time fuze, the expelling charge is ignited. Flash from the expelling charge ignites each of the canisters, and the burning canisters are expelled from the projectile body. Average burning time of each canister is 60 seconds, producing a gas which causes extreme burning of the eyes, coughing, difficulty in breathing, and chest tightness.

Tabulated Data:

Complete round:

Type ----- Tactical CS
 Weight ----- 27.07 lb
 Length ----- 25.698 in.
 Cannon used with ----- M2, M30

Projectile:

Body material ----- Steel
 Color ----- Gray w/red band
 and red markings
 Filler and weight ----- CS, 4.0 lb
 Expelling charge ----- BP, 0.16 lb

Components:

Ignition cartridge ----- M2A2*
 Propelling charge ----- M36A1*
 Fuze ----- MT, M565; MTSQ
 M548

*NOTE: See separate data sheets.

Performance (full charge):

Maximum range ----- 6180 yd (5,650 mtr)
 Muzzle velocity ----- 981 fps (299 mps)

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 in fiber con-
 tainer; 2 containers
 in wooden box.

*Packing Box:

Weight ----- 76.0 lb
 Dimensions ----- 31-5/16 x 11-13/16 x
 7-3/8 in.
 Cube ----- 1.6 cu ft

*NOTE: See SC for complete packing data including NSNs.

Shipping and Storage Data:

Quantity-distance class - (12) 1.2
 Storage compatibility
 group ----- G
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON
 WITH TACTICAL CS
 PROJECTILES CLASS B,
 DOT SPECIAL PERMIT
 NO. 5208

DODAC ----- 1315-C710
 Drawing number ----- 9220299

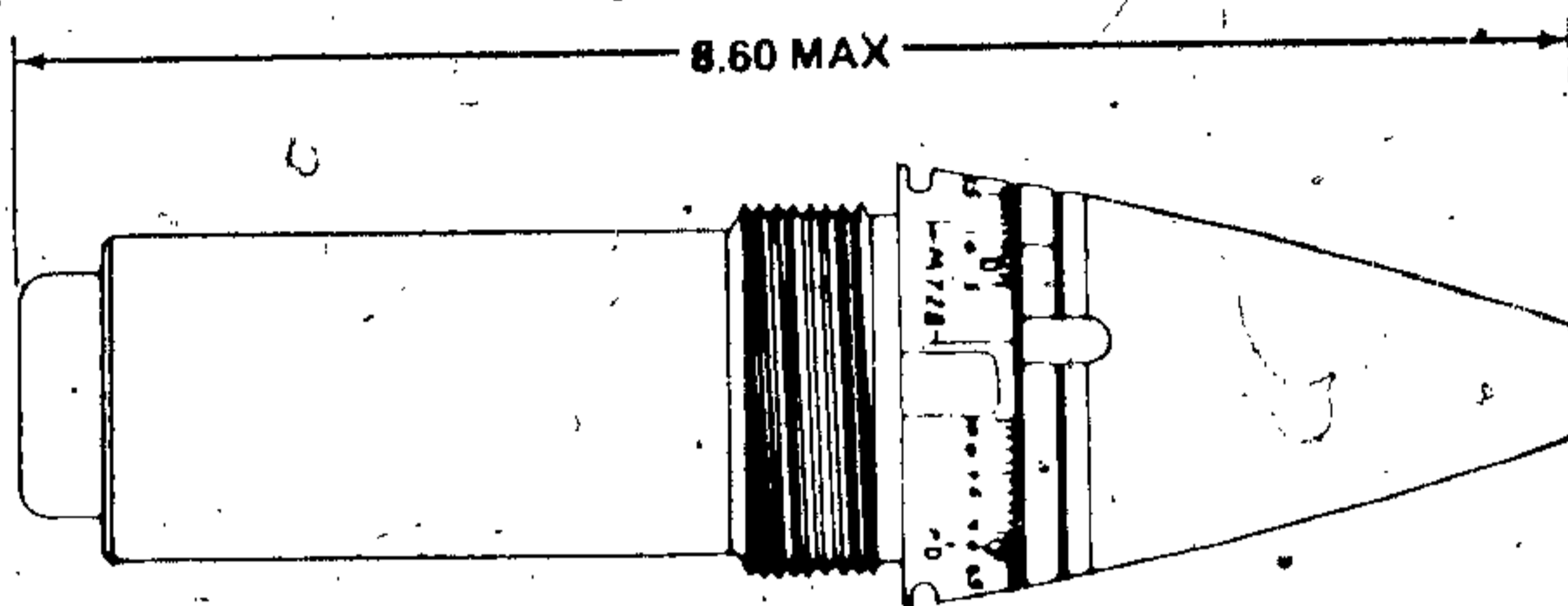
Limitations:

Firing with less than 10 increments of propel-
 lant can result in short rounds.

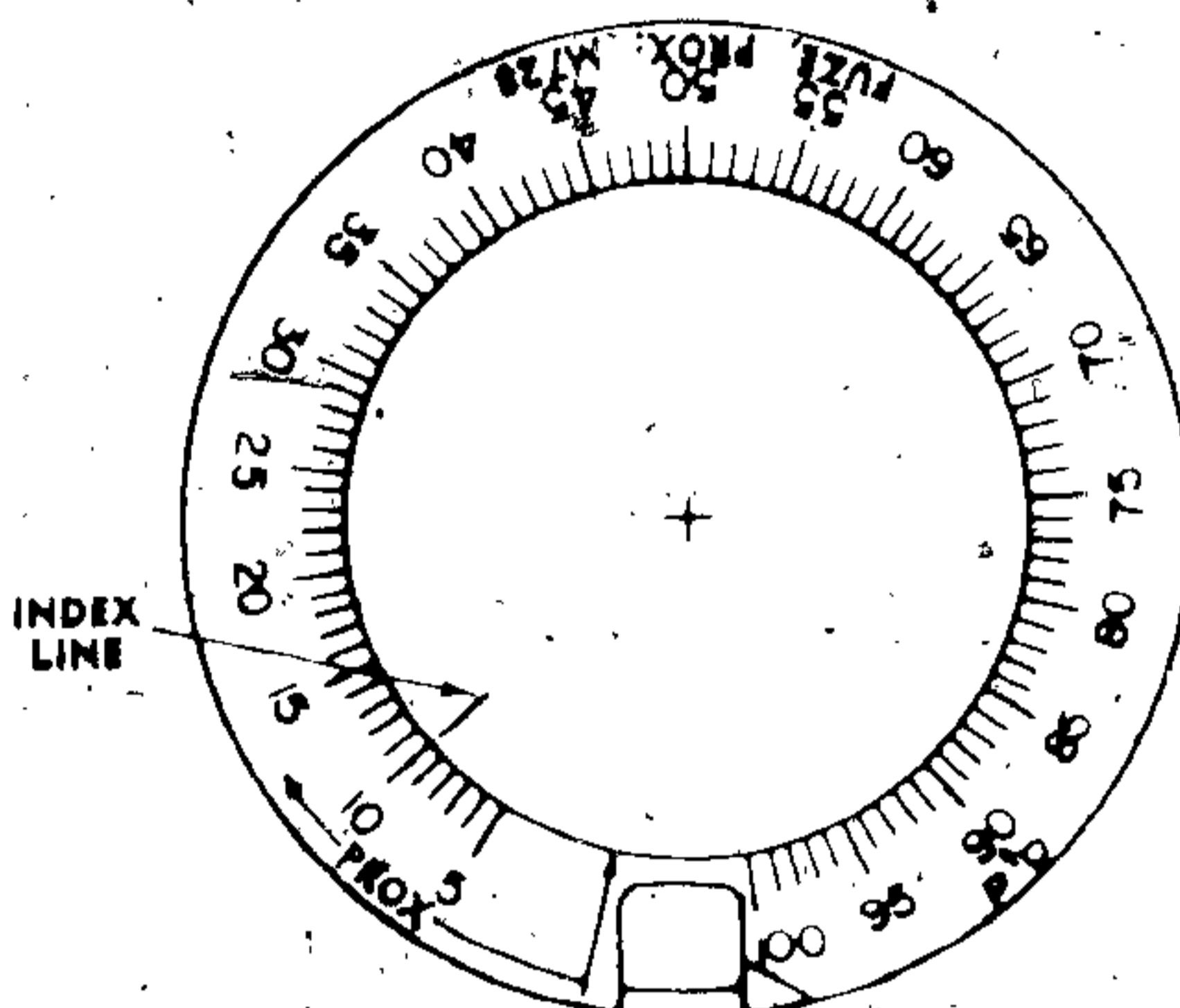
References:

SC 1305/30-11
 TM 9-1015-215-12
 TM 9-1300-251-20
 TM 9-1320-241-12
 TM 9-1320-241-12

FUZE, PROXIMITY: M728



AR199893



AR199892

Type Classification:

Std AMCTC 9514 dtd 1972.

Use:

Proximity Fuze M728 is the latest model of the adjustable delayed-arming type designed for use with projectiles fired from 4.2-inch mortars, 105mm and 155mm howitzers, 175mm gun, and 8-inch howitzers against surface targets.

Description:

The fuze contains a radio continuous wave transmitter/detector with antennas and a power supply which performs the target detection function. A nose cone is fixed to a rotatable setting ring which has a single index line. The setting ring is connected to a clockwork timing mechanism within the fuze sleeve which energizes the proximity element upon approach to the target. In addition, a PD element is included to detonate the projectile on impact,

or if the proximity element fails to operate. Graduations from 5 to 100, representing seconds to target, and a PD set line are inscribed around the shoulder of the sleeve. On this model the PD mark coincides with the 90-second proximity setting. The plastic nose cone of the fuze has an anti-static protective coating. The setting ring and sleeve are metal. The slot in the setting ring is for time setting only. Slots in the fuze sleeve are for the fuze wrench when assembling the fuze to the projectile. The fuze is shipped with the index mark aligned with the 10-second mark on the fuze sleeve. The major difference between the M514A1E1 and the M728 is that the latter has a black anti-static coating which prevents the fuze from functioning prematurely during some adverse atmospheric conditions.

Functioning:

Fuzes are set to the calculated time of flight of the projectile to target unless point detonation is desired. Setback from weapon

firing releases the timing mechanism and initiates the power supply and point detonation arming. The fuze is armed for point detonation after 3 seconds of flight. Approximately 3 seconds prior to set time, proximity arming occurs; also, radio wave transmission is initiated. When any part of the radio wave front is reflected to the fuze from the target, an interaction or doppler signal occurs between the reflected and transmitted wave. When the doppler signal reaches a predetermined amplitude, an electronic switch activates the explosive train at an optimum distance from the target. If the proximity mode does not function, the projectile will be detonated on impact by the PL element.

Tabulated Data:

Type-----Proximity
 Weight-----2.19 lb
 Length:
 Visible-----3.74 in.
 Overall-----8.60 in.
 Thread size-----2.00-12NS-1
 Assembly Dwg No.-----11718400

Temperature Limits:

Firing:
 Lower limit-----40°F (-40°C)
 Upper limit-----140°F (+60°C)

Storage:
 Lower limit-----65°F (-53.8°C)
 Upper limit-----145°F (+63°C)

*Packing-----8 fuzes in metal container; 2 containers in wirebound box

*Packing Box:
 Weight-----63.0 lb
 Dimensions-----4-5/8 x 12-13/16 x 12 in.
 Cube-----3 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class-----1,1
 Storage compatibility group-----B
 DOT shipping class-----A
 DOT designation-----DETONATING FUZES - CLASS A EXPLOSIVES
 DODAC-----1390-N463

Explosive Components:

Time Mode: Primer, detonator, detonator lead charge, and booster charge.

PD Mode: Detonator, detonator lead charge, and tetryl booster charge.

Limitations:

Avoid firing at targets closer than as shown to friendly positions with the following cartridges, when using Fuze M728:

4.2-inch and 105mm--320 mtr (350 yd)
 155mm, 175mm and
 8-inch-----731 mtr (800 yd)

Premature bursts may occur when firing over ridges with clearance of less than 64 meters.

References:

TM 9-1015-203-12
 TM 9-1015-215-12
 TM 9-1025-200-12
 TM 9-1300-251-20
 TM 9-2350-210-12
 TM 9-2300-216-10
 SC 1340/98-11

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS



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SOMETHING WRONG WITH THIS PUBLICATION?

FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)

CDR, Tooele Army Depot
ATTN: AMXTE-MAE
Tooele, UT 84074

DATE SENT

14 January 1975

PUBLICATION NUMBER

TM 9-1430-560-20P-3

PUBLICATION DATE

22 Feb 74

PUBLICATION TITLE Data Processing Station, Guided Missile Systems, Semi-Trailer Mounted, TM 9-1430-560-20P-3

BE EXACT PIN-POINT WHERE IT IS

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT.

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.
2-290		151	
4-5		1	

Item 5 is listed as a Screw but should be listed as a Knob.

In bubble J, callout 8 is depicted as a Washer and in bubble G, callout 8 is depicted as a Terminal Board. Recommend that bubble J callout 8 be changed to callout 2.

NOTE TO READER:

Your comments will go directly to the cataloger responsible for this manual, and he will prepare the reply that is returned to you. To help him in his evaluation of your recommendations, please explain the reason for each of your recommendations, unless the reason is obvious.

All comments will be appreciated, and will be given immediate attention. Handwritten comments are acceptable.

For your convenience, blank "tear out" forms, preprinted, addressed, and ready to mail, are included in this manual.

SAMPLE

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER

JOHN DOE XXX - XXXX

SIGN HERE

John Doe

TEAR ALONG PERFORATED LINE

REVERSE OF DA FORM 2036-2

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DEPARTMENT OF THE ARMY

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DEPARTMENT OF THE ARMY
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Dover, NJ 07801

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FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER TM 43-0001-28	PUBLICATION DATE 30 OCT 80	PUBLICATION TITLE Artillery Ammunition
-------------------------------------	-------------------------------	---

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARA GRAPH	FIGURE NO	TABLE NO

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

(This area is left blank for user input.)

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER

SIGN HERE

TEAR ALONG PERFORATED LINE

REVERSE OF DA FORM 3020-2

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HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 18 March 1980

**ARMY AMMUNITION DATA SHEETS
FOR
ARTILLERY AMMUNITION:
GUNS, HOWITZERS, MORTARS, RECOILLESS RIFLES,
GRENADE LAUNCHERS AND
ARTILLERY FUZES
(Federal Supply Class 1310, 1315, 1320, 1390)**

TM 43-0001-28, 25 April 1977, is changed as follows.

1. Remove old pages and insert new pages as indicated below. New or changed material is indicated by a vertical bar in the margin of the page. Added or revised illustrations are indicated by a letter of the alphabet adjacent to the illustration identification number.

Remove pages

i through vi
None
2-82.1 and 2-82.2
2-99 and 2-100
2-113 and 2-114
3-39 and 3-40
3-59 through 3-62
3-73 through 3-76
3-89 through 3-94
3-105 through 3-108
3-117 and 3-118
3-118.1 and 3-118.2
3-135 through 3-138
3-143 through 3-148
4-23 and 4-24
4-31 through 4-44
None
4-45 through 4-48
4-63 and 4-64
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None
5-25 and 5-26
6-23 and 6-24
7-37 and 7-38
7-51 and 7-52
7-55 and 7-56
7-103 and 7-104
7-109 and 7-110
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8-9 and 8-10
8-10.1 and 8-10.2
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Insert pages

i through vi
2-66.1 and 2-66.2
2-82.1 and 2-82.2
2-99 and 2-100
2-113 and 2-114
3-39 and 3-40
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7-111 through 7-120
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TECHNICAL MANUAL
NO. 43-0001-28.

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 25 April 1977

ARMY AMMUNITION DATA SHEETS
FOR
ARTILLERY AMMUNITION:
GUNS, HOWITZERS, MORTARS, RECOILLESS RIFLES,
GRENADE LAUNCHERS AND ARTILLERY FUZES
(Federal Supply Class 1310, 1315, 1320, 1390)

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You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, US Army Armament Materiel Readiness Command, ATTN: DRSAR-MAS-MA, Dover, New Jersey 07801. A reply will be furnished to you.

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*This manual, together w/TM 9-1300-251-20, dtd Dec 73; and TM 9-1300-251-34, dtd Jan 75, including all changes, supersedes TM 9-1300-203, dtd Apr 67, including all changes.

Change 6.

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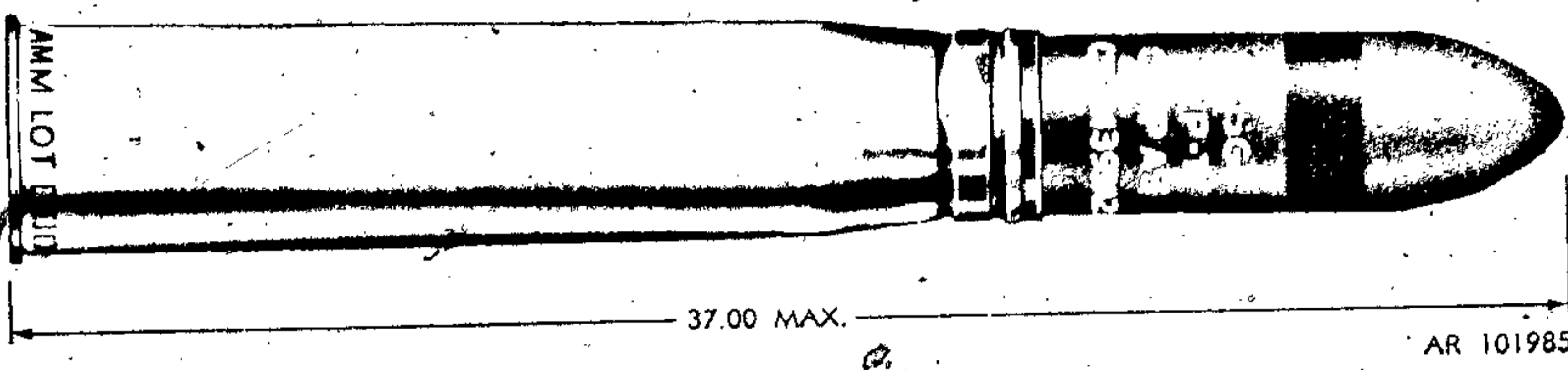
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APPENDIX A. CARTRIDGE/PROJECTILE-FUZE COMBINATION CHARTS -----A-1

TM 43-0001-28

CARTRIDGE, 105 MILLIMETER: HEP-T, M393A2 AND M393A1



Type Classification:

Std AMCTC 3325 dtd 1965

Use:

The M393A2 cartridge is designed for use against armored targets, light materiel, and personnel.

Description:

The cartridge carries a payload of 6.6 pounds of Comp A3, a high explosive, plastic composition. The projectile is a thin walled cylinder with a relatively short ogive and a flat base. The base of the projectile is fitted with a base-detonating fuze and a tracer. The projectile is assembled to a brass (or steel)

cartridge case fitted with an electric primer and containing a bagged propelling charge.

Functioning:

When the weapon is fired, the electrically initiated primer ignites the propelling charge. The burning propellant ignites the tracer and creates gases which force the projectile out of the gun tube and propels it to the target. On impact the fuze functions initiating the explosive filler.

Differences Between Model:

The M393A1 differs from the M393A2 in that it employs a different fuze BD M534 while the M392A2 employs the BD fuze M578. The filler weight on the M393A1 is 0.3 pounds less.

Tabulated Data:

Complete Round:

Type ----- HEP-T
 Weight ----- 45 lb
 Length ----- 37 in.
 Cannon used with
 Projectile -----
 Filler ----- M68
 Explosive (393A2) ----- 6.6 lbs Comp A
 Explosive (393A1) ----- 6.3 lbs Comp A
 Body Material ----- Steel
 Color ----- Olive Drab w/yellow
 Markings and Black
 Blend

Cartridge Case -----

M150B1 (steel)
 M150 (brass)

Propellant -----

M1 (5.9 lb)

Primer (electric) -----

M86

Tracer -----

M12

Ballistics:

Maximum Range -----

9,510 m
 10,400 yds

Muzzle Velocity -----

2400 m
 731.5 mps

Temperature Limits:

Firing:

Lower limits ----- -40°F
 Upper limit ----- +125°F

Storage:

Lower limit ----- -80° (for periods not
 more than 3 days)
 Upper limit ----- +160°F (for period
 not more than 4
 hrs/day)

Packing: -----

One round/fiber con-
 tainer two contain-
 ers/wooden box

Packing Box:

Weight (w/2 ctgs) ----- 137.0 lbs
 Dimensions OD ----- 43-1/2 x 14 x 8-1/2 in.
 Cube ----- 3.0 cu ft

Shipping & Storage Data:

Quantity-distance class -----

1.1

Storage compatibility -----

E

DOT shipping class -----

A⁺

DOT designation -----

AMMUNITION FOR CAN-
 NON WITH EXPLOSIVE
 PROJECTILE

DODAC -----

1315-C429
 1315-C518

Drawing number -----

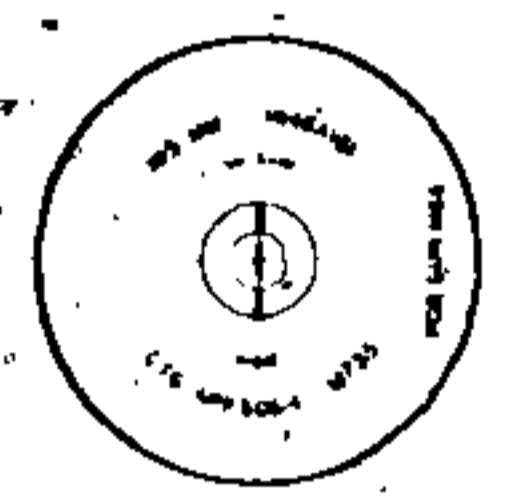
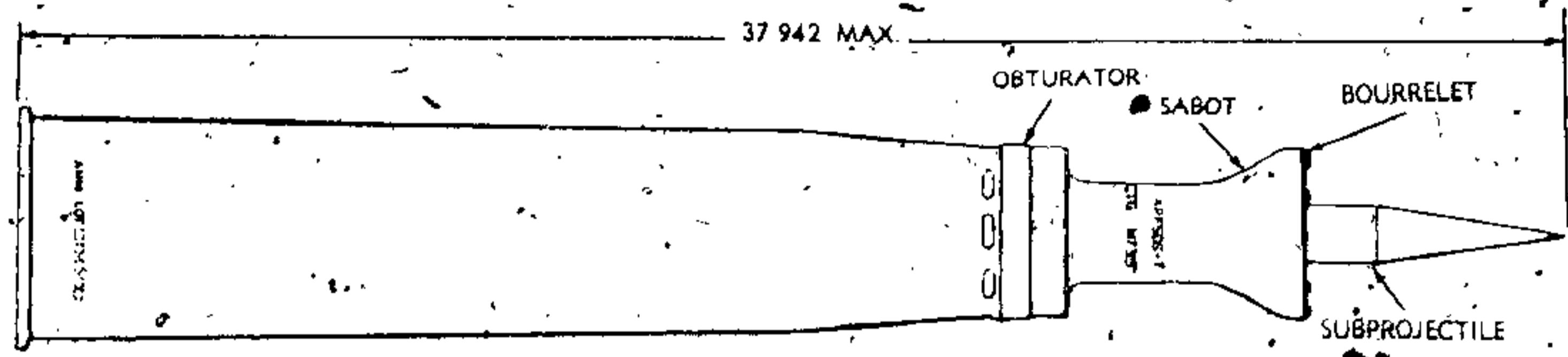
M393A2-8886470
 M393A1-8853735

References:

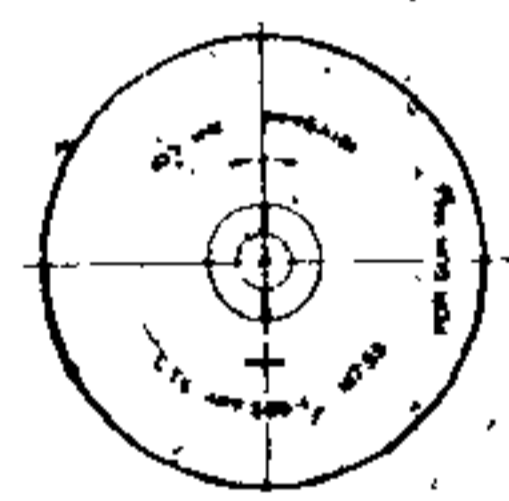
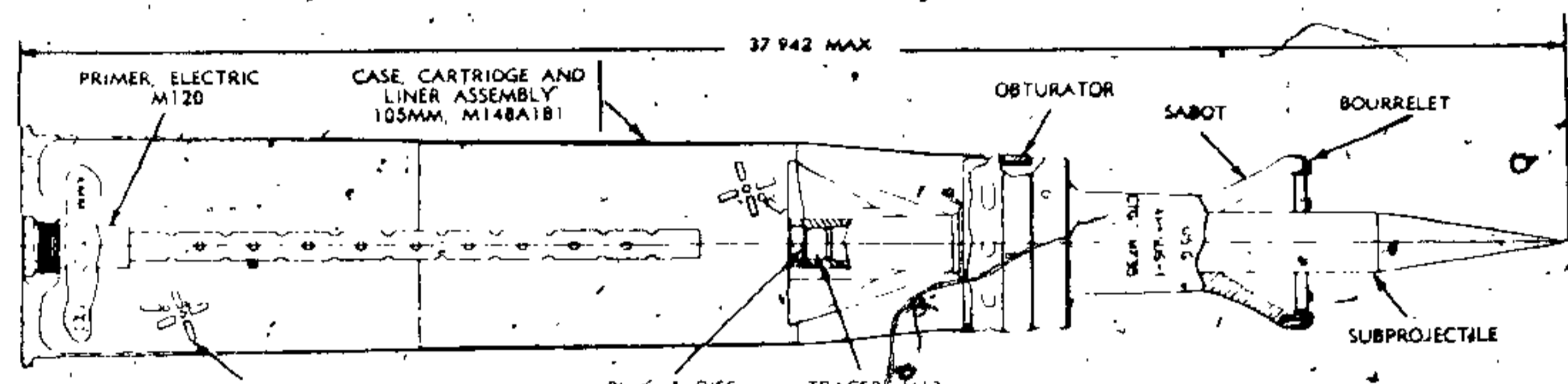
TM 9-1300-203/2
 SC 1305/30-IL
 AMCP-700-3-3
 SB-700-20

TM 43-0001-28

1 CARTRIDGE, 105-MILLIMETER: APFSDS-T, M735



AR 101660A



AR 100995-B

Type Classification:

Cartridge, 105-mm, APFSDS-T, M735.

Use:

This cartridge is a high velocity, flat trajectory, discarding sabot round used in 105-mm gun cannons against armored targets.

Description:

The projectile consists of a sub-projectile and sabot. The sub-projectile consists of a steel-nickel body, which houses a tungsten core and is fitted with an aluminum windshield and fin assembly. The aluminum sabot, composed of three 120° sections, is assembled around the

sub-projectile. A steel bourrelet, containing three shear cuts, is screwed to the sabot forward face. A nylon obturator and polypropylene seat is assembled around the sabot, and a urethane seal is applied over the rear face of the sabot. An M13 Tracer is assembled in the fin and held in place by a threaded plug and disc assembly. The projectile is crimped to an M148A1B1 Cartridge Case, which holds approximately 12.5 pounds of M30 propellant, and is fitted with an M120 electric primer. A gun-tube wear-reducing titanium-dioxide liner is assembled to the interior wall of the cartridge case.

Functioning:

The M735 is loaded and fired in the tank gun in the normal manner. Upon firing, the sabot with

Change 6

2-82:1

its subprojectile is propelled from the gun and the tracer is ignited. The subprojectile is in a low friction bearing surface within the sabot and is free to rotate and so does not pick up the high rotation rate the gun rifling normally imparts to a projectile. Upon leaving the gun, centrifugal and aerodynamic forces cause the sabot to separate from the subprojectile and it quickly falls to earth. The fin stabilized subprojectile continues on a true course to the target at high velocity. Target penetration is effected strictly by the high kinetic energy of subprojectile's high density core when it impacts.

Tabulated Data:

Complete Round:

Type	Fixed
Weight	39.50 lb.
Length	37.94 in.
Assembly Dwg. No.	929607
Color	Black w/white markings

Temperature Limits:

<u>Firing:</u>	
Lower limit	-25°F
Upper limit	+125°F
<u>Storage:</u>	
Lower limit	-65°F
Upper limit	+160°F

Performance:

Chamber pressure	60,000 psi at +70°F
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Packaging:

Inner pack dwg.	9293481
Outer pack dwg.	9293479
Weight (lbs)	132.0
Cube (ft)	3.4

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

*Packing Box:

Weight	124.0 lbs
Dimensions	47-7/16 x 13-5/16 x 7-1/16 in.
Cube	2.5 cu ft

*NOTE: See SC for complete packing data including NSN's.

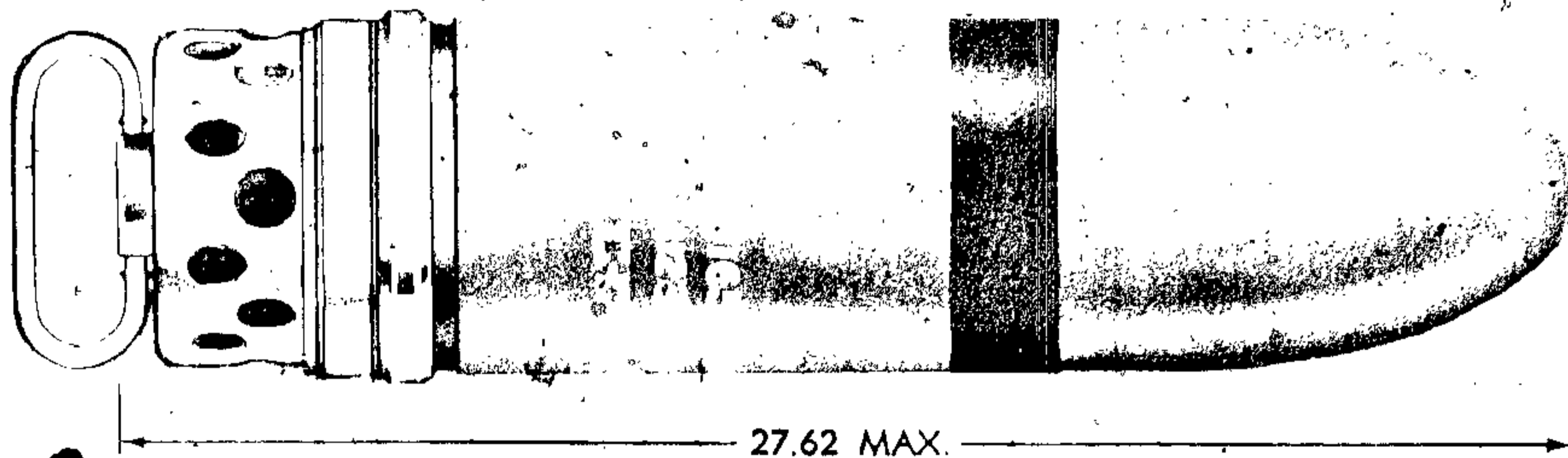
Shipping and Storage Data:

Quantity-distance class	A
Storage compatibility	E
DOT shipping class	B
DOT classification	Ammunition for Cannon w/Solid Projectile
DODAC	Not assigned

References:

TM 9-1300-251-20
TM 9-1300-251-34

CARTRIDGE, 165MM: HEP, M123A1 AND M123



AR 101986

Type Classification:

Std AMCTC 4266 dtd 1966

Use:

This cartridge is a chemical energy round designed for demolition. It is capable of damaging or destroying the type of structures (log walls, concrete bunkers, etc.) and equipment (abandoned vehicles etc.) encountered on a battlefield. It is also effective as an antipersonnel round.

Description:

The M123A1 projectile is made of drawn plate steel with a blunt ogive. A copper rotating band encircles the projectile just forward of the base. The projectile is cast loaded with a filler of approximately 35 pounds of Comp

A3. A pressed felt washer and disk are positioned between the explosive charge and the base of the projectile to buffer the explosive from the shock of the setback. The base of the projectile is fitted with a base-detonating fuze and sealed with a steel plug. It is threaded externally for attachment to the mouth of the cartridge case. The cartridge case contains the propelling charge and a bagged supplementary igniter charge of 220 grains of black powder, heat-sealed in a polyethylene liner, which provides an improved moisture barrier over that in the M123. An electric primer is fitted to the base of the cartridge case. 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:

On firing an electric current transmitted by

TM 43-0001-28

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. On impact, the functioning of the fuze detonates the explosive.

Difference Between Models:

The M123 differs from the M123A1 in the following design aspects. The handle assembly requires 4 or 5 turns to release, in lieu of one quarter turn; the base plug is aluminum instead of steel, and the cartridge case is a three-piece welded design with a plastic liner. The projectile loaded with a filler of Comp A3.

Calculated Data:

Complete round:

Type -----	HEP
Weight -----	67.60 lb
Length -----	27.62 in.
Cannon used with--	M135
<u>Projectile:</u>	
Explosive Filler--	35 lb Comp A3
Body Material ----	Steel
Color -----	Olive drab w/yellow markings and black band.

Cartridge Case ----- M104

This is a 2 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.

Primer -----	M73
Fuze BD -----	M62A2

Ballistics:

Maximum Range -----	1000 yds
	914 mtr
Muzzle Velocity ---	850 fps

Temperature Limit:

Firing:

Lower limits -----	-40°
Upper limit -----	+125°

Storage:

Lower limits -----	-80° (for periods not more than 3 days)
Upper limit -----	+160° (for period not more than 4 hrs/day)

*Packing:

1 round per fiber container
1 container per wooden box

*Packing Box:

Weight w/ctg -----	94.0 lbs
Dimensions O.D.-----	30-1/16 x 7-3/8 x 7-7/16 in.
Cube -----	1.7 cu ft

Shipping & Storage Data:

Quantity-distance class--	1:1
Storage compatibility ---	E
DOT shipping class -----	A
DOT designation, -----	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES

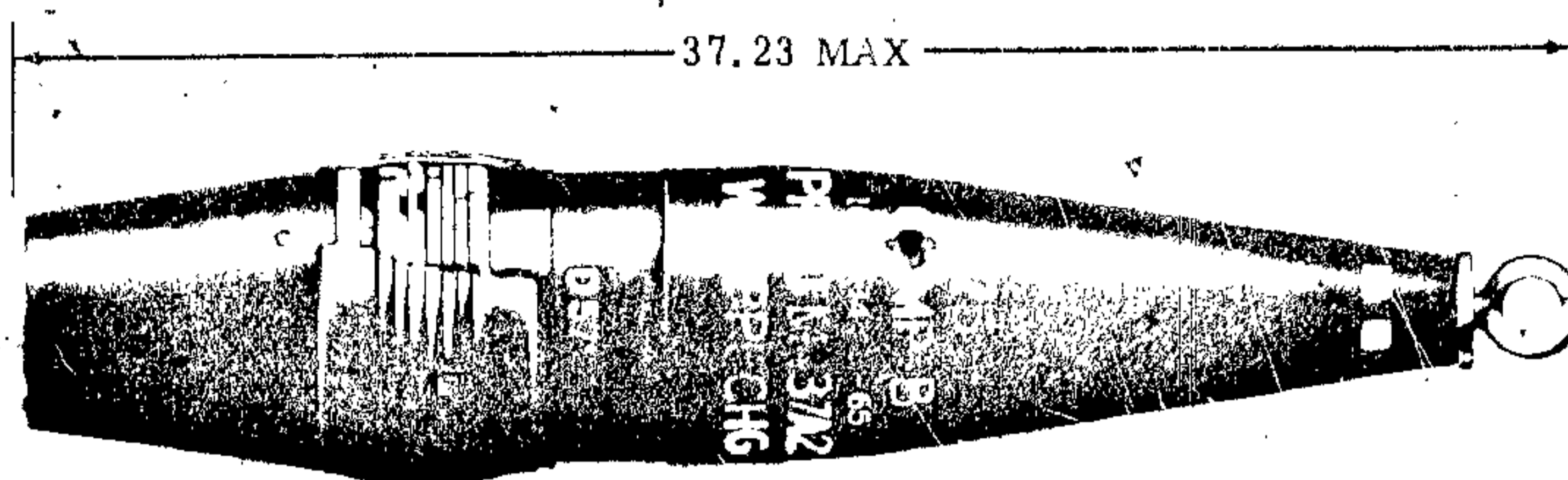
DODAC ----- 1315-D570

Drawing No. ----- 8845043

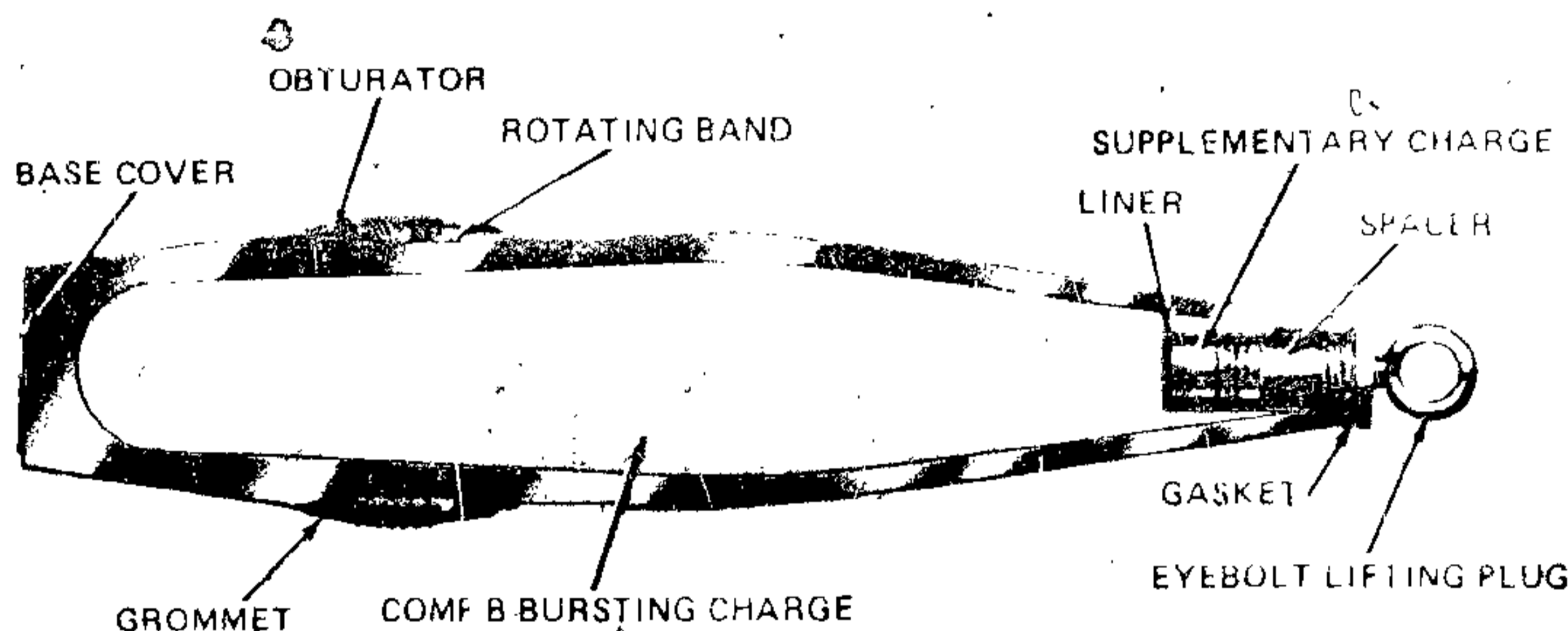
References:

TM 9-1300-203/2	DARCOM-P 700-3-3
SC 1305/30-IL	SB 700-20

PROJECTILE, 175 MILLIMETER: HE, M437A2 AND M437A1



AR199692



AR199691

Type Classification:

- M437A2: Std AMCTC 3089, dtd 1965.
- M437A1: Std AMCTC 3089, dtd 1965.

Use:

175mm HE Projectiles M437A2 and M437A1 are high explosive rounds for the 175mm Gun Cannon M113 used for fragmentation, blast, and mining in support of ground troops and armored columns.

Description:

The projectile consists of a hollow steel forging with a boattailed base, a streamlined ogive, a gilding metal rotating band, and a

nylon obturating 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. The nose of the projectile is fitted with a threaded eyebolt lifting plug to facilitate handling and provide a closure for the fuze cavity. The projectile is made with a deep fuze cavity and may be loaded with TNT or Composition E. Deep cavity projectiles contain a supplementary charge in the fuze cavity. A cardboard spacer is placed in the fuze cavity between the supplementary charge and the lifting plug to limit movement of the supplementary charge during shipping and handling. The rotating band is protected by a removable grommet. The loaded projectile is zoned into one of four weight zones ranging from 142.75 to 147.23 pounds. The weight zone

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of the projectile is indicated by the number of prick punch marks on the ogive of the projectile.

Functioning:

When the weapon is fired, Primer M82 ignites the igniter pad of the propelling charge. The burning pad ignites the black powder in the core assembly. Sparks and flame flash through perforations in the igniter core tubes in a pattern designed to assure uniform ignition of the propellant increments. Bore wear in the gun is reduced by an additive jacket assembled to Increment 3 when firing at full charge. Gases generated by the burning propellant force the projectile through the gun tube with the velocity required to reach the target. The rotating band engages the barrel rifling to impart spin for stabilization in flight. The obturating band expands to prevent leakage of gas pressure past the projectile, and is discarded on leaving the weapon. Depending upon the type fuze employed, the projectile is detonated either on impact or on approach to the target.

Difference Between Models:

Model M437A2 is filled with Comp. B; Model M437A1 is filled with TNT.

Tabulated Data:

Projectile:

Type HE

Weight Zone Information:
WEIGHT ZONE

LOADED PROJECTILE (W/O FUZE)

Zone	Pounds		Marking
	Over	Up to & Incl.	
1	142.75	143.96	□
2	143.84	145.05	□ □
3	144.93	146.14	□ □ □
4	146.02	147.23	□ □ □ □

Length:

W/o lifting plug-----34.14 in.
 W/lifting plug-----37.23 in. (max)
 Cannon (Weapon)
 used with-----M113, M113A1
 Body material-----Forged steel
 Color-----Olive drab w/yellow markings

Filler and Weight:

M437A2-----Comp. B 31 lbs;
 Supp Chg 0.30
 1b TNT
 M437A1-----TNT 30 lbs; Supp
 Chg 0.30 1b TNT

Components:

Propelling charge-----M86 series
 Primer-----M82
 Fuzes-----PD, M572; Prox,
 M514A1, M728,
 MTSQ, M582

Temperature Limits:

Firing:

Lower limit----- -40°F
 Upper limit----- +125°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-----6 projectiles per
 pallet

*Pallet:

Weight-----948 lbs
 Dimensions-----42-3/16 x 25-5/8
 x 17-1/8 in.
 Cube-----10.6 cu ft

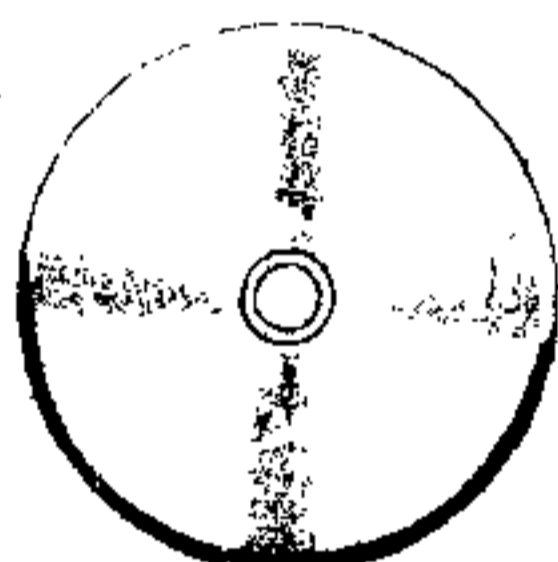
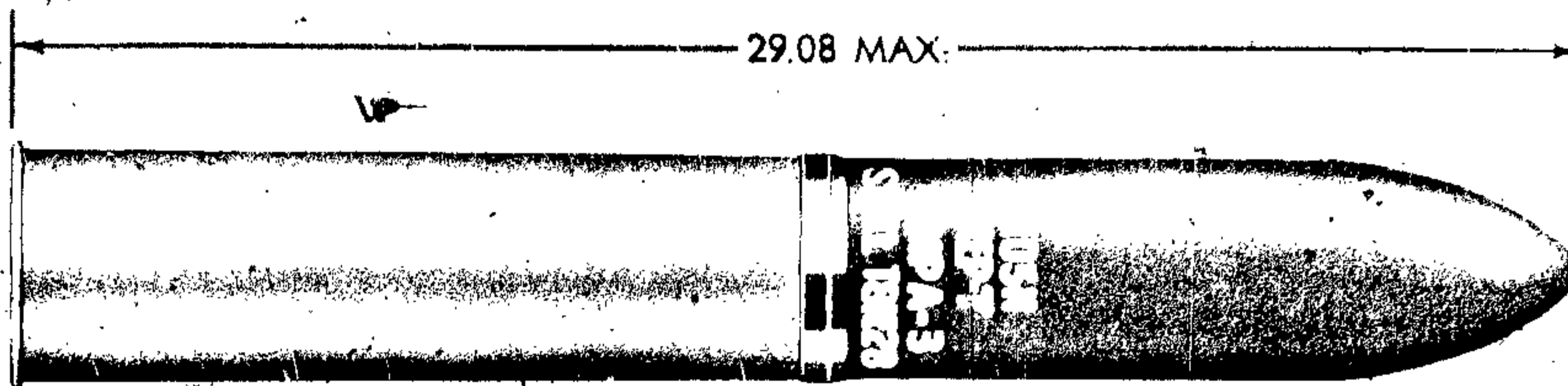
*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance classes----(21) 1.1
 Storage compatibility group---D
 DOT shipping class-----A
 DOT designation-----EXPLOSIVE PROJ-
 ECTILE
 DODAC-----1320-0572 (M437A2,
 M437A1) w/Supple-
 mentary Charge
 1320-0591 (M437A1,
 M437A2 without
 supplementary
 charge)
 Assembly Dwg. No.-----8837902

TM 43-0001-28

CARTRIDGE, 105 MILLIMETER: HEP, HEP-T, M327 (TR1E2B)



AR 101988

Type Classification:

Std OTCM 36841, dtd 1958.

Use:

This cartridge is used for both anti-tank and anti-personnel purposes.

Description:

The projectile is a thin walled steel cylinder with a relatively short ogive and a flat base. A gilding metal rotating band encircles the projectile slightly forward of the base. The base is fitted with a threaded adapter which accommodates a base detonating fuze which may or may not have an integral tracer, depending on the model. Rounds with tracers are classified as HEP-T. The projectile is

loaded with 7.6 pounds of Composition A3.

An M14 series cartridge case, containing a non-adjustable bagged charge of single granulation propellant, is loose-fitted over the base of the projectile. A percussion primer is press fitted into the base of the cartridge case.

Functioning:

When the weapon is fired, the primer (a percussion type initiated by the firing pin) ignites the propelling charge. The burning propellant creates gasses which force the spin stabilized projectile out of the gun tube and propel it to the target. (If the round is fitted with the M91 fuze, the tracer is also ignited by the burning propellant and burns during the early stages of flight). On impact, the functioning of the fuze detonates the explosive.

Tabulated Data:

Complete round:

Type -----HEP
 Weight-----33.45 lb
 Length-----29.08 in.
 Cannon used with-----M2A1, M2A2, M49,
 M103, M137

Projectile:

Explosive filler-----7.6 lb Comp A3
 Body material-----Steel
 Color-----Olive drab w/yel-
 low markings and
 black bands
 Cartridge case-----M14 (brass)
 M14B1 (steel)

Propellant:

Type-----M6
 Weight-----3.9 lb
 Primer-----M28A2, M28B2
 Tracer (when used)-----Integral w/fuze
 Fuze BD-----M91

Ballistics

Maximum range-----9,500 yds;
 8,685 mtrs
 Muzzle velocity-----2050 fps

Temperature Limits:

Firing:

Lower limits----- -40°F
 Upper limits----- +125°F

Storage:

Lower limits----- -80°F (for
 periods not
 more than
 3 days)
 Upper limits----- +160°F (for
 periods not
 more than
 4 hrs/day)

Packing:

-----1 round per fiber
 container, 2
 containers per
 wooden box

Packing box:

Weight w/2 cartridges-----120 lb
 Dimensions OD-----37-1/4 x 11-15/16
 x 7-19/32 in.
 Cube-----2.0 cu ft

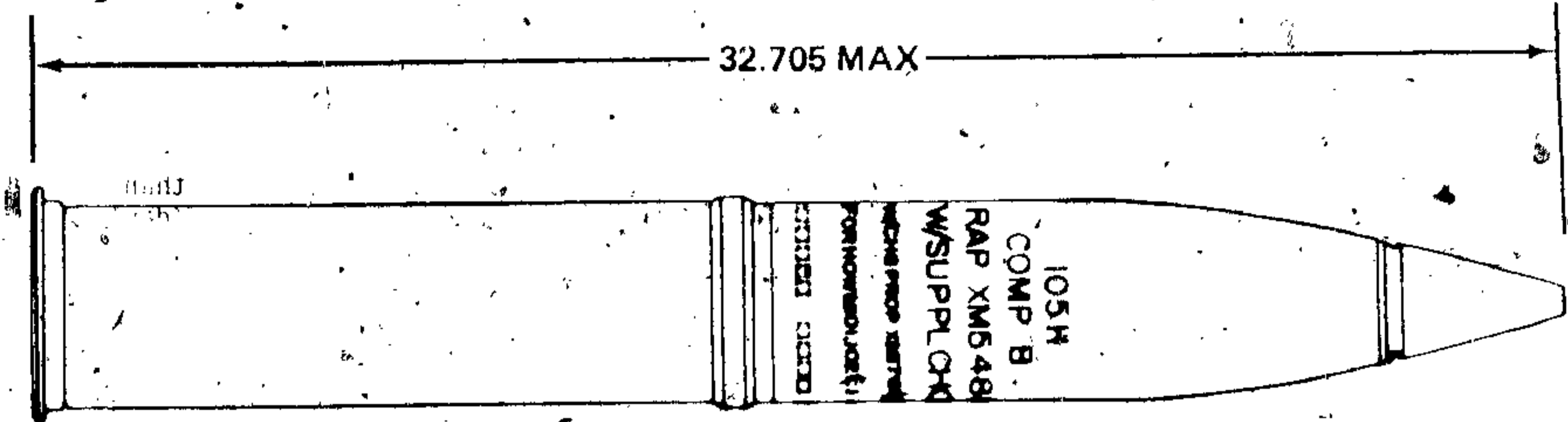
Shipping and Storage Data:

Quantity-distance class-----1.1
 Storage compatibility group---E
 DOT shipping class-----A
 DOT designation-----Ammunition for
 cannon with
 explosive pro-
 jectiles
 DODAC-----1315-0448
 Drawing number-----75-1-362

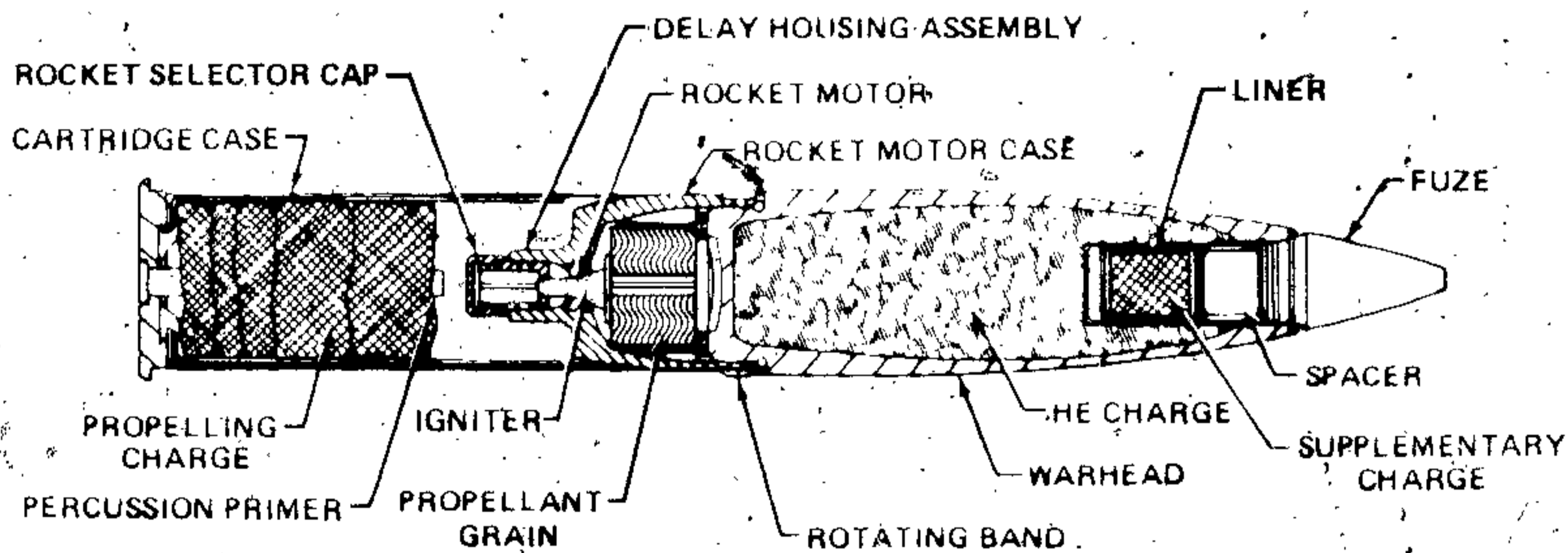
References:

TM 9-1300-203/? DARCOM-P 700-3-3
 SC 1305/30-IL SB 700-20

CARTRIDGE, 105 MILLIMETER: HERA, M548



AR199733



AR199732

Type Classification:

Std AMCTC 8414, dtd 1971.

Use:

This cartridge is a high explosive, rocket-assisted round with extended range capability used for fragmentation, blast and mining in support of ground troops and armored columns.

Description:

The projectile consists of two pieces, a streamlined warhead and rocket motor body of boat-tail design. The nose of the warhead is threaded for a fuze and the warhead is filled

with cast Composition B having a deep cavity and supplementary charge. The rocket motor body contains the rocket grain and rocket ignition system, contained in a spike at the rear of the body. The spike housing ignition system is fitted with a cap. A sintered iron rotating band is swaged to the rocket motor body and the body threaded to the warhead to complete the projectile assembly. The cartridge case contains a primer and five individually bagged and numbered propelling charge increments. The base of the cartridge case is drilled and a percussion primer assembly is pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing benite. The five numbered increment bags are tied together,

in numerical order, 3, 4, 5, 6 and 7 with acrylic cord. These are assembled into the cartridge case, around the primer flash tube, with Increment 3 at the base of the cartridge case and Increment 7 toward the mouth of the cartridge case.

Functioning:

Rocket "OFF-MODE" -- If the projectile is unfuzed, the closing plug is removed and a fuze assembled to the projectile, and if required, is set. The cartridge is loaded into the weapon. Upon firing, impact of the weapon firing pin results in the initiation of the percussion primer which, in turn, ignites the benite 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 tube imparts spin to the projectile providing in-flight stability. Projectile functioning is dependent upon the fuze used and may function on impact (instantaneous or delay), function above ground either at a predetermined height based upon time of flight, or function in proximity with target area. Fuze function detonates the H.E. projectile filler resulting in projectile fragmentation and blast.

Rocket "ON-MODE" -- The fuze is assembled to the projectile as in the Rocket "OFF MODE." The rocket cap, on the spike of the projectile, is removed and the cartridge case with propellant is slipped over the projectile and the cartridge loaded into the weapon. After firing, the burning propellant gases initiate the ignition composition which, in turn, ignites the delay composition. Approximately 16 seconds later (the projectile has left the tube and is traveling down-range), the balance of the rocket motor ignition system ignites the rocket motor. The rocket motor burns for 2 seconds boosting the projectile velocity resulting in a greater projectile range. Fuze initiation, as described for Rocket "OFF-MODE," detonates the projectile HE filler resulting in projectile fragmentation and blast.

Tabulated Data:

Complete round:

Type-----HERA
 Weight-----38.5 lb
 Length-----32.7 in.
 Cannon (weapon) used with--M49 (M52, M52A1),
 M2A1, M2A2
 (M101, M101A),
 M103 (M108),
 M137 (M102)

Projectile:

Body material-----High carbon steel forging
 Color-----Olive drab w/yellow markings
 Filler and weight-----Comp B, 5.2 lb
 Fuzes-----Prox. M728, PD
 M557, 96, M130
 M564

Propelling charge:

Cartridge case:
 M14-----Brass, 5.9 lb (approx)
 M14B1-----Steel, down, 5.4 lb (approx)
 M14B4-----Steel, 3 pc spiral wrap, 4.7 lb (approx)
 Propelling charge-----M176, 2.84 lb.
 Percussion primer assembly-----M108
 Primer-----Dwg. No. 9212386
 Benite (BP)-----210 grains
 Motor body-----Steel alloy forging
 Rocket propellant grain--XM33 propellant Nitrocellulose base 1.06 lb.

Delay assembly:

No. increments	Weight	Composition
1	250 mg	Flash
6	950 mg (ea)	Delay
1	200 mg	Igniter

Flash composition:

Constituent	Parts by wt.
Zirconium-----	58 ± 1.0
Chromium oxide-----	16 ± 1.0
Molybdenum trioxide-----	25 ± 1.0
Vinyl alcohol	
Acetate resin (solids)---	1.0 ± 0.1

Igniter composition:

Constituent	Parts by wt.
Zirconium-----	65 ± 1.0
Iron oxide-----	25 ± 1.0
Diatomaceous earth-----	10 ± 1.0
Vinyl alcohol	
Acetate resin (solids)---	1 ± 0.1

Delay composition:

Constituent	Parts by wt.
Tungsten-----	42.5 ± 5
Barium chromate-----	45 ± 5
Potassium perchlorate-----	12.5 ± 0.25
Vinyl alcohol	
Acetate resin (solids)---	1 ± 0.1

Rocket propellant grain igniter:

Type 1 Class 3 boron potassium nitrate pellets 5.0 grains (approx.)

Performance:

Maximum range-----15,000 meters
 Muzzle velocity-----1,800 fps

Temperature Limits:

Firing:

Lower limit----- -40°F
 Upper limit----- +145°F

Storage:

Lower limit----- -65°F
 Upper limit----- +150°F

*Packing:

-----1 round in fiber
 container; 2
 containers in
 wooden box

*Packing Box:

Weight-----122 lb
 Dimensions-----45-19/32 x 11-13/
 16 x 7-11/16 in.
 Cube-----2.4 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class----- (12) 1.2
 Storage compatibility group----- E
 DOT shipping class----- A

DOT designation-----

AMMUNITION FOR
 CANNON WITH EX-
 PLOSIVE PRO-
 JECTILE

DODAC-----

1315-C463

Drawing number-----

9212376

Limitations:

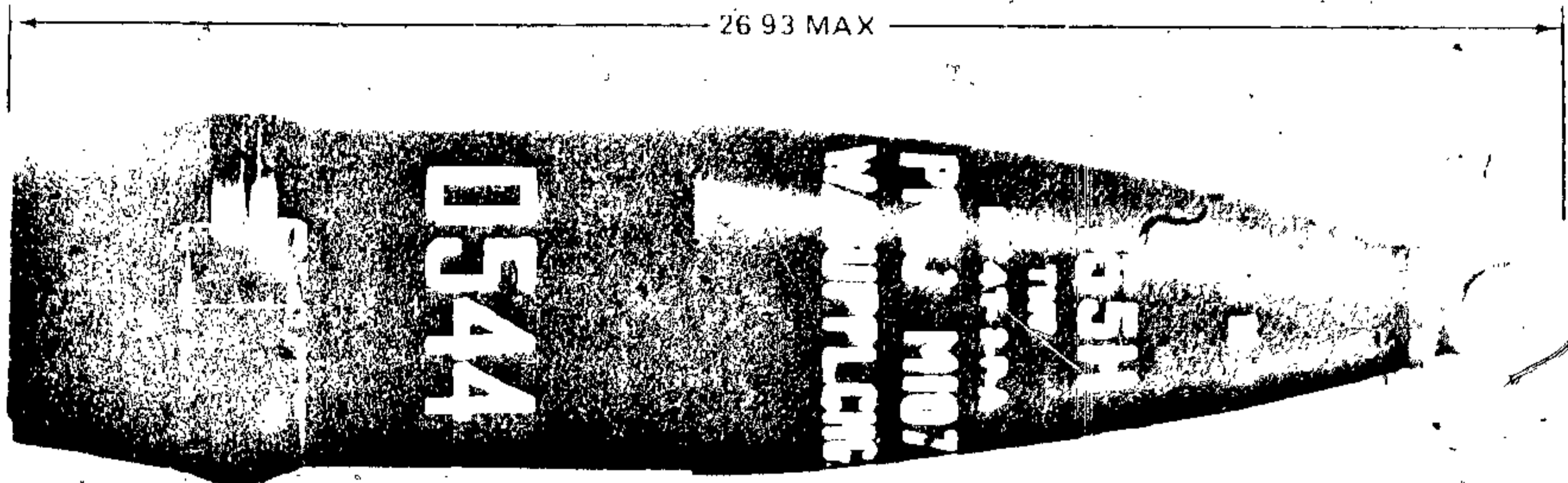
Charge 7 is authorized for firing in both Rocket-On and Rocket-Off modes. Charges 3, 4, 5, and 6 are authorized for Rocket-Off Mode firing only under emergency combat conditions.

References:

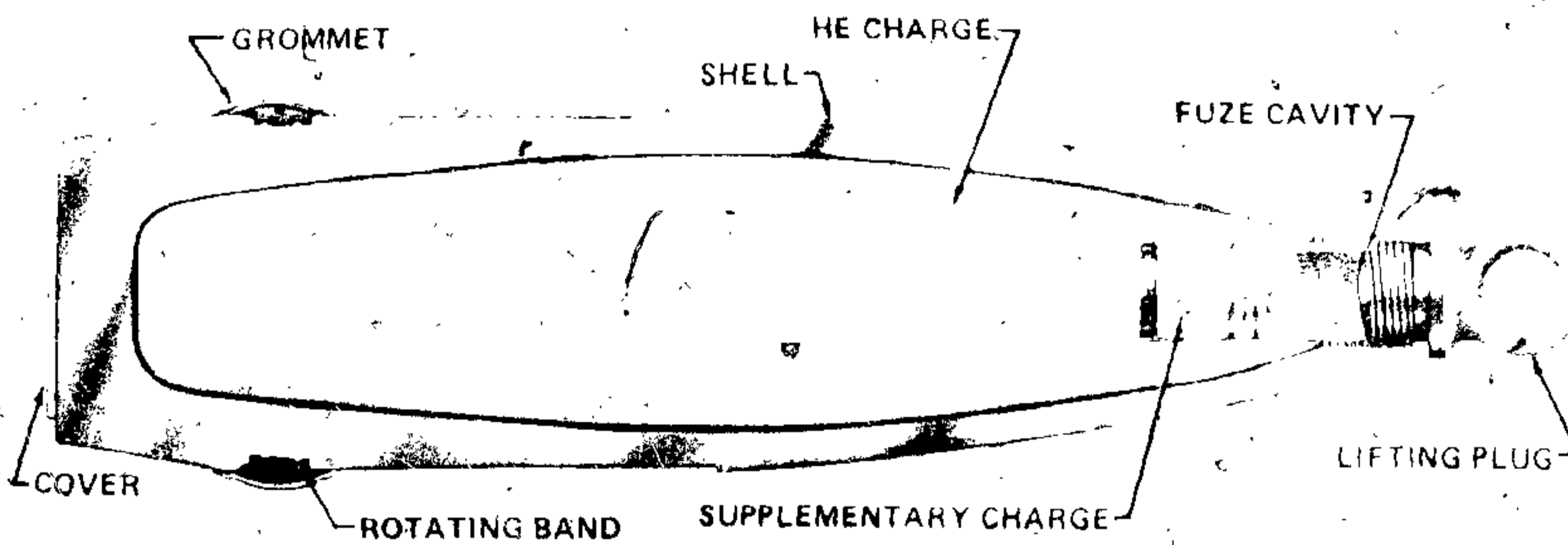
SC 1305/30-1L
 SB 700-20
 DAPCOM-P 700-3-3
 TM 9-1015-203-12
 TM 9-1015-234-12
 TM 9-1300-251-20
 TM 9-2350-217-10

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



AR199685



AR199684

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 boat-tail 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.

Differences 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 charge of 15.4 lbs is slightly greater than in the deep cavity projectile.

Tabulated Data:

WEIGHT ZONES
LOADED PROJ. (W/O FUZE; W/O PLUG)

Zone	Over	Up to & Incl	Marking
2	90.0	91.3	□ □
3	91.1	92.4	□ □ □
	92.0	93.7	□ □ □ □
	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
 MTSQ: M504,
 M582
 Prox: M728
 M732

Temperature Limits:

Firing:
 Lower limit-----65°F
 Upper limit-----+145°F
 Storage:
 Lower limit-----80°F (for per-
 iods not more
 than 3 days)
 Upper limit-----160°F (for
 periods not
 more than 4
 hrs/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 SC for complete packing data includ-
 ing NSN's

Shipping and Storage Data:

Quantity-distance class----- (18) 1,1
 Storage compatibility group-----D
 DOT shipping class-----A
 DOT designation-----EXPLOSIVE PRO-
 JECTILES

DODAC:
 Deep cavity-----1320-0544
 Normal cavity-----1320-0571
 Assembly Dwg No.
 Deep cavity-----9216352

Ballistics:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
1, M3, green bag	207.3	3900	774.4
2, M3, green bag	234.7	4800	698.6

Cannon M1, M1A1, M45. Continued

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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

Cannon M126/M126A1

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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
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 (mtrs)	Elevation (mils)
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:

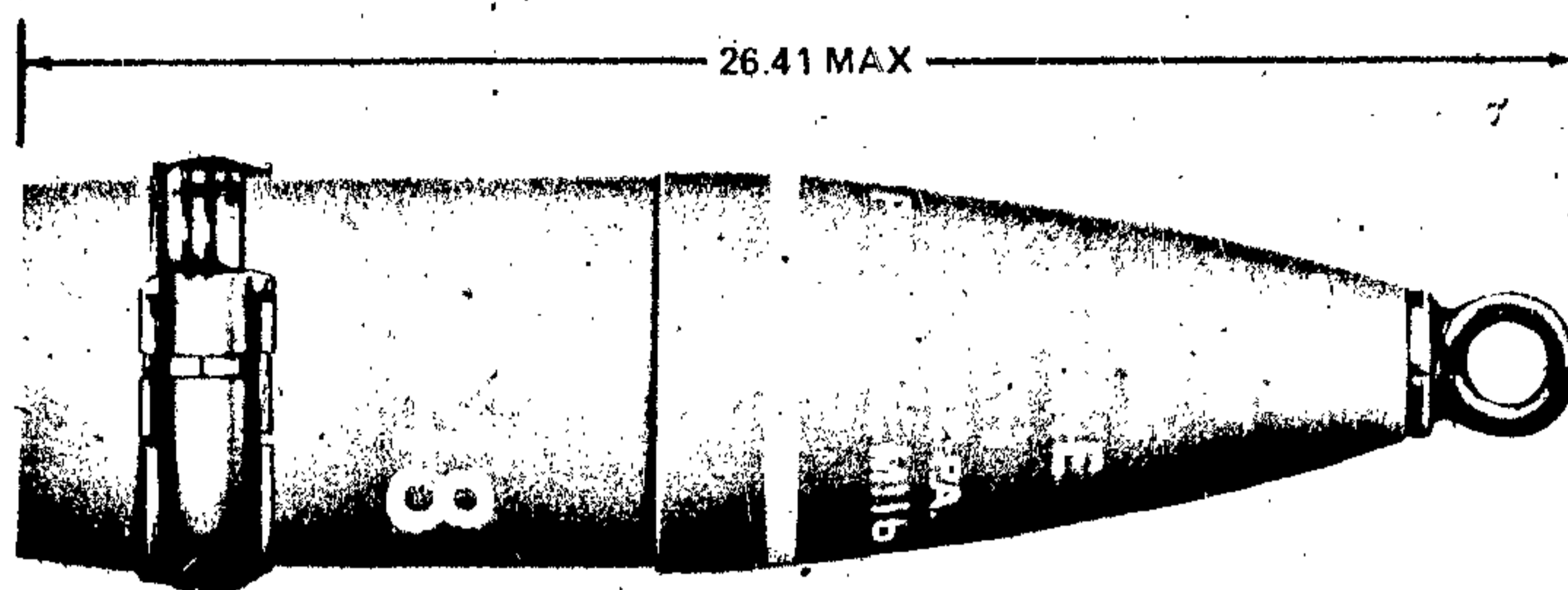
Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
1, M3A1, green bag	212.8	4000	673.6
2, M3A1, green bag	239.8	5000	722.4
3, M3A1, green bag	280.8	6500	690.4
4, M3A1, green bag	322.9	8300	760.9
5, M3A1, green bag	380.1	9800	717.2
3, M4A2, white bag	296.5	7200	734.9
4, M4A2, white bag	340.9	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

TM 43-0001-28

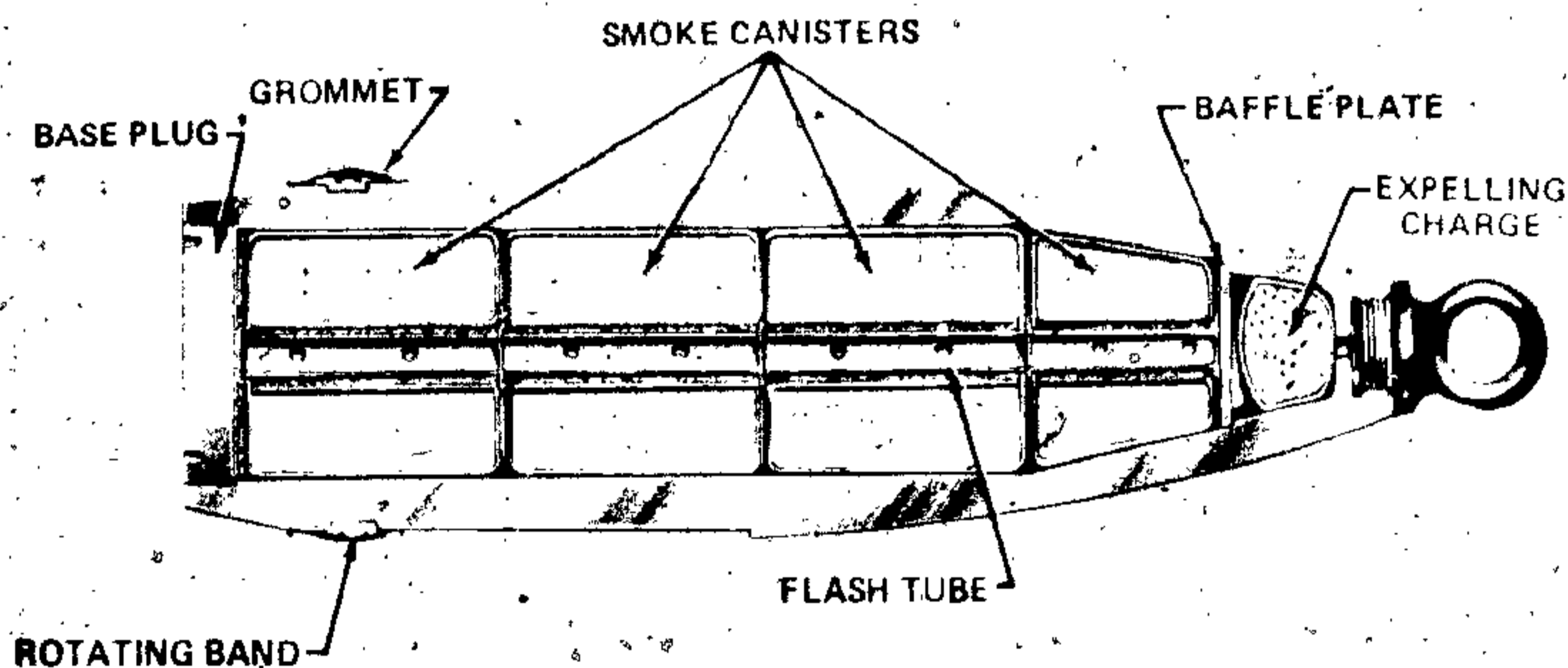
References:

- I DARCOM-P 700-3-3
- SC 1305/30-1L
- SB 700-20
- TM 9-1025-200-12
- TM 9-1300-251-20
- TM 9-2350-217-10
- TM 9-2350-217-10N

PROJECTILE, 155 MILLIMETER: SMOKE, BE, M116 AND M116B1, HC AND COLORED



AR199677



AR199676

Type Classification:

Std OTCM 36841, dtd 1958 (M116B1).
OBS MSR 11756003 (M116).

Use:

The projectile is fired from 155mm howitzers and is used for screening, spotting, or signaling.

Description:

This base-ejection type projectile is a hollow steel shell containing four canisters of chemical smoke compound. The canister filler may be either hexachloroethane-zinc (HC) or a smoke mixture in colors of green, red or yellow. The canisters are stacked within the projectile and each has a perforated central tube so that

in the stack, a flash tube is continuous through the contents. The front canister is cone-shaped to conform to the curvature of the projectile case. An expelling charge of black powder is contained in the nose of the projectile under the fuze cavity. The fuze cavity is fitted with a lifting ring lug for shipment and handling. A baffle plate with a central hole near the flash tube separates the expelling charge from the first smoke canister. A rotating band with a protective grommet for shipment and handling encircles the projectile near the base. The base is closed with a metal closure disk and threaded plug.

Functioning:

When the weapon is fired, the burning propelling charge generates rapidly expanding gases to propel the projectile through the barrel with

the velocity required to reach the target. The rotating band engages the barrel rifling to impart spin to the projectile. The rotating band also forms a seal to prevent leakage of gas pressure past the projectile. Functioning of the fuze ignites the expelling charge. The expelling charge flashes through the central tube to ignite the smoke canisters, blow off the base, and expel the canisters. An effective smoke cloud is produced within 30 seconds, and maximum smoke emission occurs in about one minute.

Difference Among Models:

The expelling charge in Model M116B1 (.34 lb of black powder) is contained in a polyethylene cup instead of in a cloth bag as in M116 (.29 lb of black powder). Also, the copper closure disk used in Model M116 has been replaced with a steel disk in the newer model.

Tabulated Data:

WEIGHT ZONES			
Zone	Pounds		Marking (Zone squares)
	Over	Up to & Incl	
2	90.7	92.0	□ □
3	91.8	93.1	□ □ □
4	92.7	94.4	□ □ □ □
5	94.0	95.3	□ □ □ □ □

Weight Zone applies to HC canister loaded projectiles without fuze, lifting plug, gasket and grommet.

Complete round:

Type-----Smoke HC or colored

Weight as fired:
 HC-----94.80 lb
 Colored-----86.23 lb
 Length w/lifting plug-----26.41 in. nominal
 Cannon used with-----M1, M1A1, M45, M126, M126A1, M185, M199

Projectile:

Body material-----Forged steel
 Color-----Newer - Light green w/black markings (Colored smoke - Color indicated by a series of 3 C's)
 Older - Gray w/ yellow markings
 Filler and weight-----HC: 25.84 lb
 Colored smoke: 17.19 lb

Propelling charge-----M3/M4 series
 Primers-----MK2A4 (M1, M1A1, M45 cannon)
 M82 (M126, M126A1, M185, M199 cannon)

Fuzes-----MTSQ, M501 series

Temperature limits, firing:

Lower limit----- -40°F
 Upper limit----- +125°F

Temperature limits, 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:

	Colored Smoke	HC Loaded
Weight-----	727 lb	802 lb
Dimensions-----	27-1/8 x 13-5/8 x 32 in.	27-1/8 x 13-5/8 x 32 in.
Cube-----	6.7 cu ft	6.7 cu ft.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class-----2
 Storage compatibility group-----A
 DOT shipping class-----B
 DOT designation-----SPECIAL FIREWORKS, HANDLE CAREFULLY, KEEP FIRE AWAY

DODAC:

HC-----1320-0548
 Red-----1320-0549
 Yellow-----1320-0551
 Green-----1320-0547
 Violet-----1320-0554
 Assembly Dwg. No-----9227998

Ballistics:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
1, M3, green bag	207.3	3900	774.4
2, M3, green bag	234.7	4800	698.6

Cannon M1, M1A1, M45: --Continued

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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

Cannon M126/M126A1:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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
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

Cannon M185:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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

Cannon M185: --Continued

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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

Cannon M199:

Charge	Muzzle Velocity (m/s)	Max Range (mtrs)	Elevation (mils)
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
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

Limitations:

The M116 and M116B1 projectiles can only be fired at zones 1 thru 6, as these projectiles do not have groove pins in the base.

References:

- DARCOM-P 700-3-3
- SC 1305/30-1L
- SB 700-20
- TM 9-1025-200-12
- TM 9-1300-251-20
- TM 9-2350-217-10
- TM 9-2350-217-10N

TM 9-43-0001-28

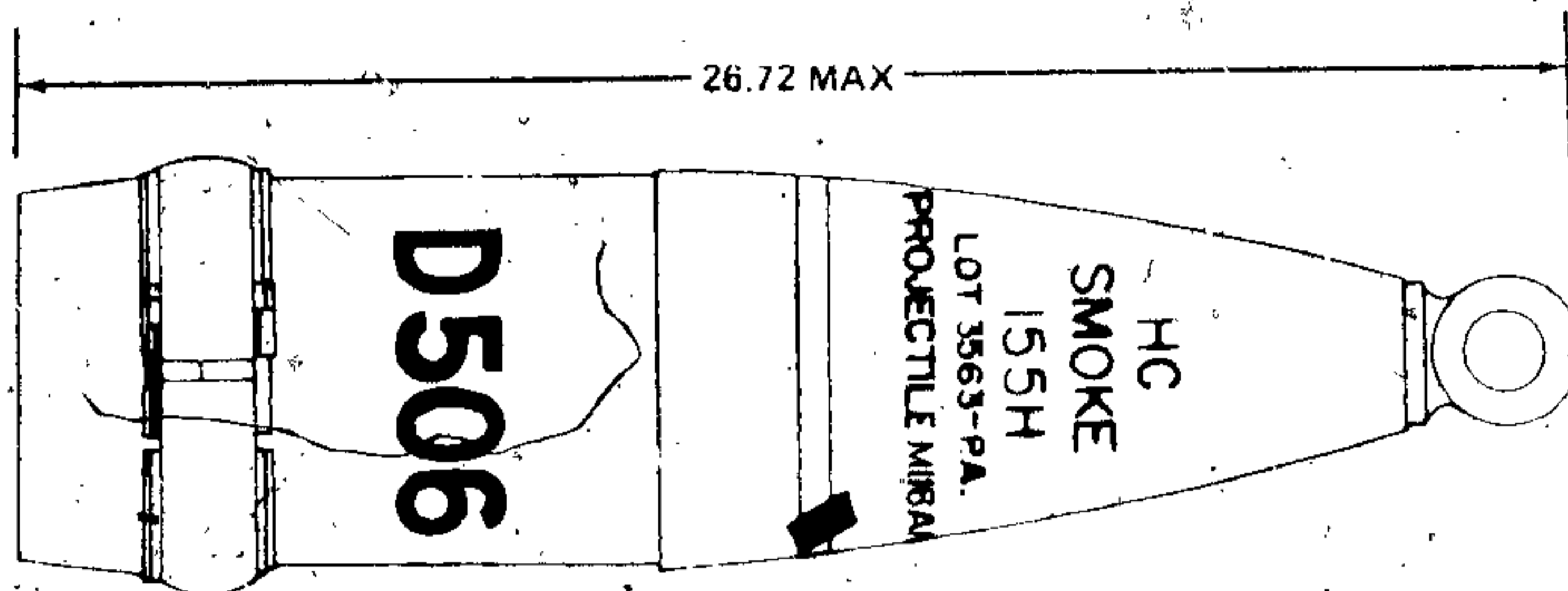
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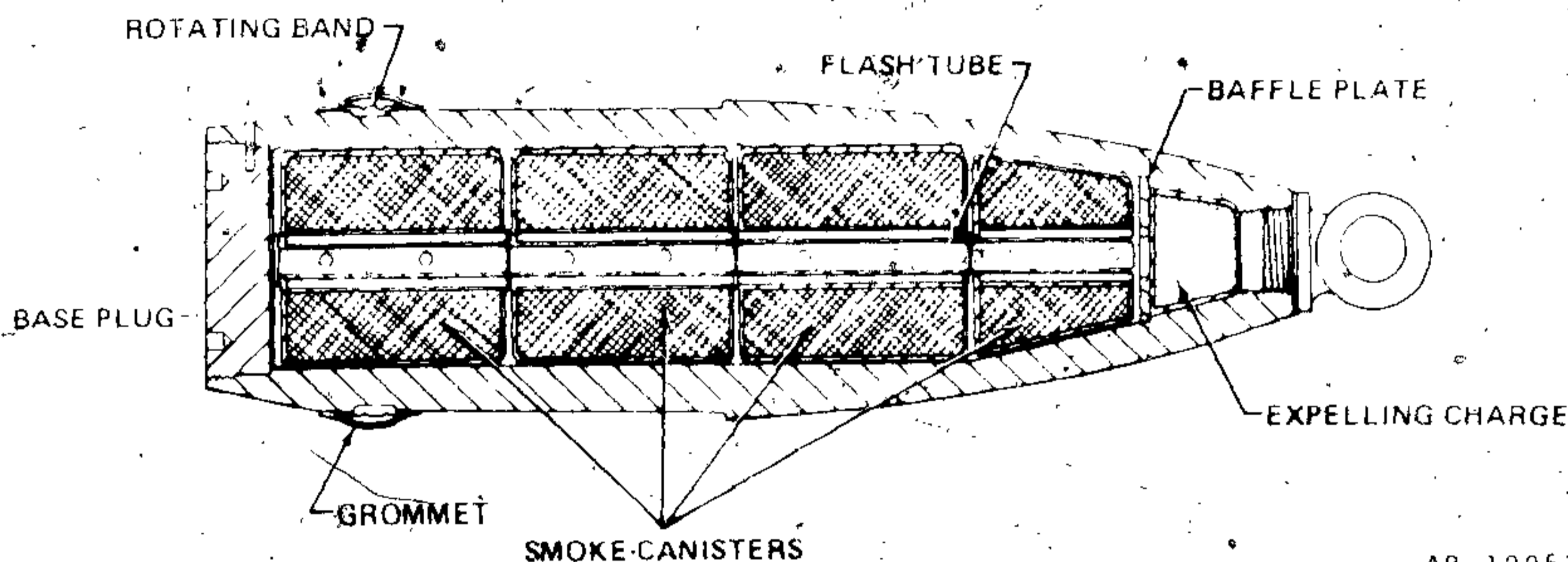
Change 6

25d-97-11

PROJECTILE, 155 MILLIMETER: SMOKE, HC, M116A1



AR 199675-B



AR 199674-A

Type Classification:

Std MSR 04786002.

Use:

This projectile is fired from 155mm howitzers and is used for screening, spotting, and signalling.

Description:

This base-ejection type projectile is basically similar to Models M116 and M116B1, but with some design changes to improve reliability. The projectile is a hollow steel casing containing four canisters of chemical smoke compound. The canister filler is HC (white smoke). The canisters are stacked within the projectile and separated by aluminum spacers. A metal ring

supports the expelling charge of 0.34 lb of black powder in the nose of the projectile under the fuze cavity. Each canister has a perforated tube through the center. A baffle plate, between the top canister, and the expelling charge, has a central hole. A flash tube is thus formed from the expelling charge through the length of the stacked canister. The fuze cavity will accommodate MT or MTSQ fuzes. For shipment and handling, the cavity has a lifting ring lug installed. A rotating band with a protective grommet, for shipment and handling encircles the projectile near the base. The base is closed with a metal closure disk and a threaded base plug.

Functioning:

When the weapon is fired, the rotating band engages the barrel rifling to impart spin to the

projectile. The rotating band also forms a seal to prevent leakage of gas pressure past the projectile. The burning propellant charge generates rapidly expanding gases to propel the projectile through the barrel with the velocity required to reach the target. Functioning of the fuze ignites the expelling charge which flashes through the central tube to ignite the smoke canisters. The expelling charge also blows off the base and expels the canisters. An effective smoke cloud is produced within 30 seconds, and maximum smoke emission occurs in about one minute.

Difference Among Models:

Models M116 and M116B1 have cardboard canister separators and a smaller fuze cavity. The size of the cavity limits choice of fuzes.

Tabulated Data:

WEIGHT ZONES			Marking
Zone	Over Pounds	Up to Pounds	
2	90.1	91.4	
3	91.2	92.5	
4	92.1	93.8	
5	93.4	94.7	

Complete round:

Type-----Smoke, HC or colored
 Weight with lifting plug-----94.7 lb
 Length with lifting plug-----26.72 in. nominal
 Cannon used with-----M1, M1A1, M1A2, M45, M126, M126A1, M185, M199

Projectile:

Body material-----Steel
 Color-----Light green w/ black markings (Color indicated by a series of 3 C's in color of smoke)

Filler and weight:

HC-----5.45 lb

Propelling charge-----M3/M4 series, M119, M119A1
 Primers-----MK2A4 (M1, M1A1, M1A2 cannon), M82 (M126, M126A1, M185, M199 cannon)

Fuzes-----MT, M565

Temperature Limits:

Firing:
 Lower limit-----40°F
 Upper limit-----125°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-----727 lb
 Dimensions-----27-1/8 x 13-5/8 x 32 in.
 Cube-----6.7 cu ft

*NOTE:

See SC for complete packing data including NSN's.

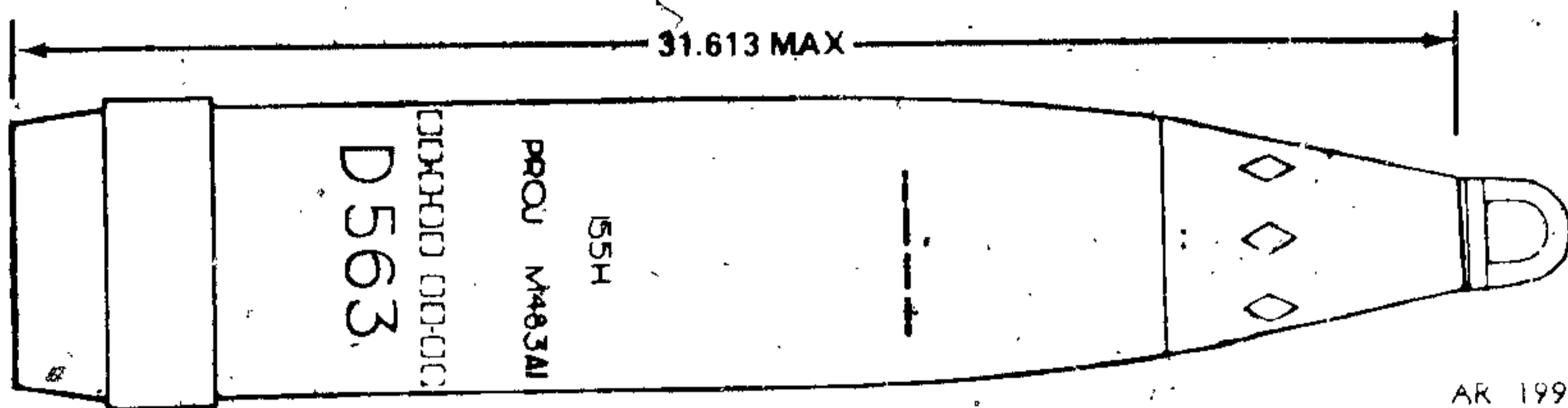
Shipping and Storage Data:

Quantity-distance class-----1.3
 Storage compatibility group-----G
 DOT shipping class-----B
 DOT designation-----SPECIAL FIREWORKS, HANDLE CAREFULLY, KEEP FIRE AWAY

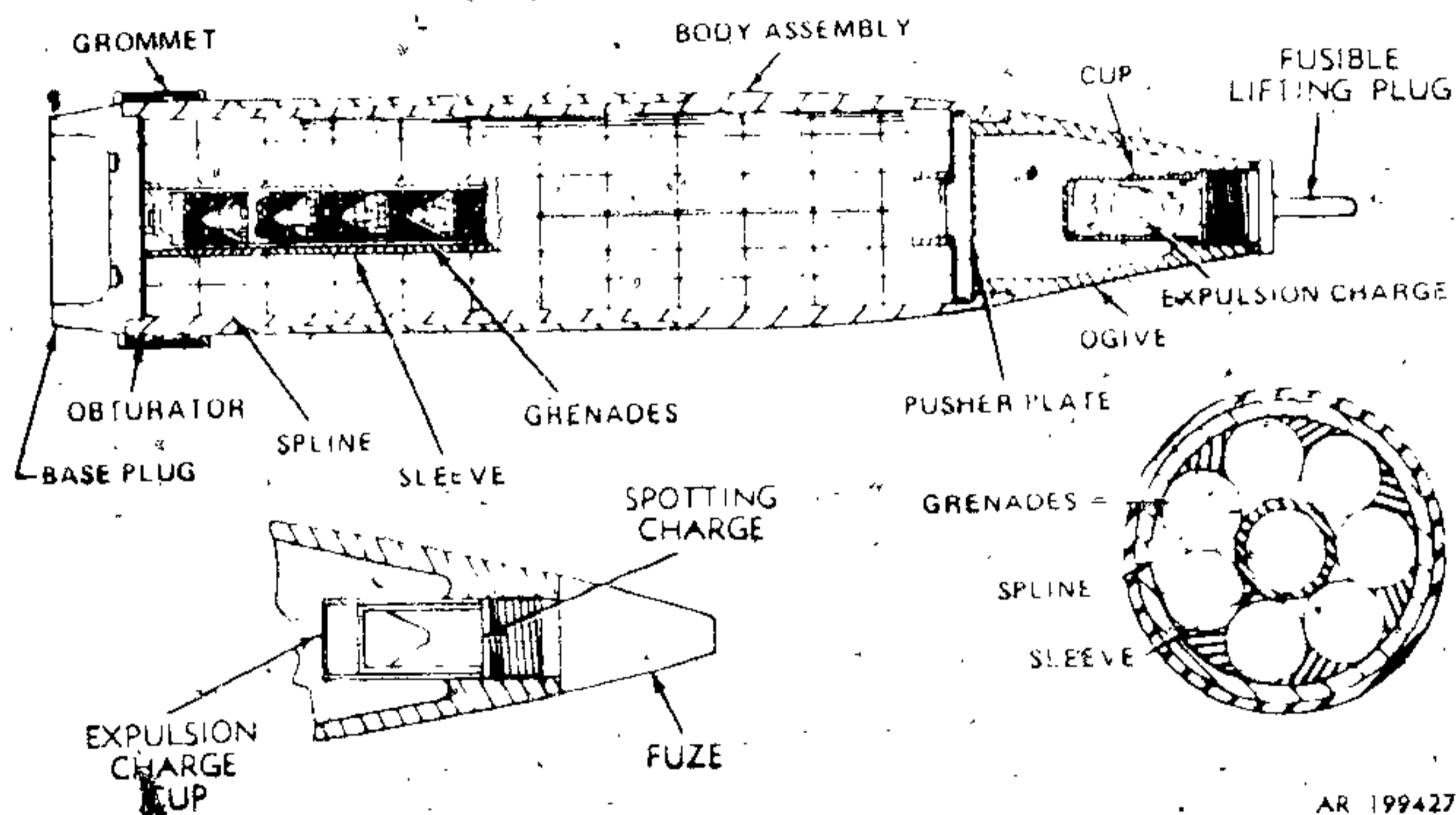
DODAC:

HC M116A1-----1320-0506
 HC M116, M116B1-----1320-0548
 Assembly Dwg. No-----8885162

PROJECTILE, 155 MILLIMETER: HE, M483A1



AR 199428-A



AR 199427-B

Type Classification:

Std A 10756043 dtd 1975.

Use:

This projectile is used to deliver submissiles, dual purpose armor defeating and anti-personnel grenades.

Description:

This projectile is of the separate loading type. The fuze, propelling charge, and primer are handled and loaded separately. The projectile is provided with a fusible lifting plug in place of a fuze for handling. The plug must be replaced by a fuze before the projectile is loaded. The projectile contains a total of 88 dual-purpose grenades (64 M42 and 24 M46). The grenades

are contained by a base plug, with a lefthand thread which is screwed into the base of the projectile. For normal usage, an expulsion charge is contained in a cavity in the nose of the projectile to eject the grenades. If desired, this expulsion charge may be replaced by a spotting charge designed to detonate the entire projectile as if it were a bulk-loaded HE projectile. The metal rotating band near the base of the projectile is protected during storage and handling by a removable plastic grommet. The M46 Grenades have stronger bodies to carry the load at the rear on setback when fired.

Functioning:

When the primer is detonated, the flash ignites the propelling charge producing gases which force the spin-stabilized projectile out of the gun and propels it to the target. The fuze,

IM 43-0001-28

having been set to function at a pre-determined time in flight, initiates the expulsion charge ejecting the entire grenade load from the rear of the projectile. Centrifugal force disperses the grenades radially from the projectile line-of-flight. The M42 and M46 grenades are ground-burst submissiles which explode on impact. With the alternate loading of the spotting charge instead of the expulsion charge, the functioning of the fuze detonates the entire projectile over the target, permitting observation of the projectile fuze functioning in relation to the target.

Identified Data:

Projectile:

Type-----HE
 Weight-----102.6 lb
 Length w/ fuze-----35.4 in.
 Body material-----Forged steel/
 aluminum
 Color-----Olive drab w/yel-
 low diamonds and
 markings

Filler and weight:

Number of grenades, M42-----64
 Number of grenades, M46-----24
 Explosive, Comp A5, each
 grenade-----30.5 grams
 Explosive, Comp A5, each
 projectile-----6.25 lb
 Expulsion charge-----M10 propellant,
 51 grams

Components:

Propelling charge M3-----Propellant M1, 5.0
 lbs (Zones 1 - 5)
 Propelling charge M4A2-----Propellant M1,
 13.5 lb (Zones
 3-7)
 Primer-----M82
 Fuze-----MTSQ, M577
 Cannon used with-----M109, M109A1, M185,
 M199

Performance (full charge):

Maximum range-----14,586 meters
 Muzzle velocity-----560.2 meters/sec
 Propelling charge M119-----Special Single
 Zone (8) for use
 with the M109A1
 only

Performance:

Maximum range-----17,740 meters
 Muzzle velocity-----650 meters/sec
 Propelling charge M203-----Special Single
 Zone (8) for use
 with the M198
 howitzer

Performance:

Maximum range-----23,100 meters

Temperature Limits:

Firing:

Lower limit-----40°F (-40°C)
 Upper limit-----125°F (51.7°C)

Storage:

Lower limit-----65°F (-53.8°C)
 Upper limit-----165°F (73.9°C)

*Packing:-----Pallet of 8 projec-
 tiles

*Pallet:

Weight (loaded)-----874 lb
 Dimensions-----39-3/8 x 29 x 14-
 1/2 in.
 Cube-----9.7 cu ft

*NOTE: See SC for complete packing data includ-
 ing NSN's.

Shipping and Storage Data:

Inhabited bldg dist/DOD
 hazard class/division/
 storage compatibility
 group----- (18) 1.1D
 DOT shipping class-----A
 DOT designation-----EXPLOSIVE PROJEC-
 TILES
 DODAC-----1320-0563
 Drawing number-----9215220
 Top packaging drawing
 number-----8837839

WEIGHT ZONES

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

Zone	Up to & Incl		Marking
	Over	lbs	
2	99.1	100.3	□ □
3	100.3	101.3	□ □ □
4	101.3	102.6	□ □ □ □
5	102.6	103.6	□ □ □ □ □
6	103.6	104.8	□ □ □ □ □ □

Ballistics:

Howitzer, Self-Propelled, M109A1, M198

Charge	Muzzle velocity (m/s)	Max Range (mtrs)
**1, M3A1, green bag	200.0	3640
**2, M3A1, green bag	224.5	4570

TM 43-0001-28

Ballistics - Continued

Howitzer, Self-Propelled, M109A1, M198 - Continued

Charge	Muzzle velocity (m/s)	Max Range (mtrs)
3, M3A1 green bag	253.9	5590
4, M3A1 green bag	293.5	7080
5, M3A1 green bag	349.5	9050
3, M4A2 white bag	334.2	8400
4, M4A2 white bag	310.1	7720
5, M4A2 white bag	363.5	9420
6, M4A2 white bag	445.0	11730
7, M4A2 white bag	535.2	14320

Howitzer, Self-Propelled, M109A1

Charge	Muzzle velocity (m/s)	Max Range (mtrs)
**1, M3A1, green bag	180.9	2980
**2, M3A1, green bag	216.0	4220
3, M3A1, green bag	263.0	5940
4, M3A1, green bag	304.1	7500
5, M3A1, green bag	358.3	9330
3, M4A2, white bag	297.5	7230
4, M4A2, white bag	337.0	8630
5, M4A2, white bag	386.0	10080
6, M4A2, white bag	460.0	12150
7, M4A2, white bag	546.5	14650
8, M119/M119A1 white bag	650.0	17740

Howitzer - M198 (199 Cannon)

Charge	Muzzle velocity (m/s)	Max Range (mtrs)
--------	-----------------------	------------------

Propelling Charge - Green bag

	M3A1	M3	
3G	261.9	257.9	2980
4G	303.6	301.6	4220
5G	358.1	356.1	5940

Propelling Charge - White bag

	M4A2	M4A1	
3W	285.2	285.2	7230
4W	326.5	324.5	8630
5W	381.3	378.3	10080
6W	460.7	455.7	12150
7W	546.2	543.2	14650

Charge	Muzzle velocity (m/s)	Max Range (mtrs)
--------	-----------------------	------------------

Propelling Charge - M119

8	655.8	17740
---	-------	-------

Propelling Charge - M203

8S	797.0	22400
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**Firing below charge 3 may result in stickers when fired in M185 and M199 Cannons.

References:

TM 9-1340-241-12

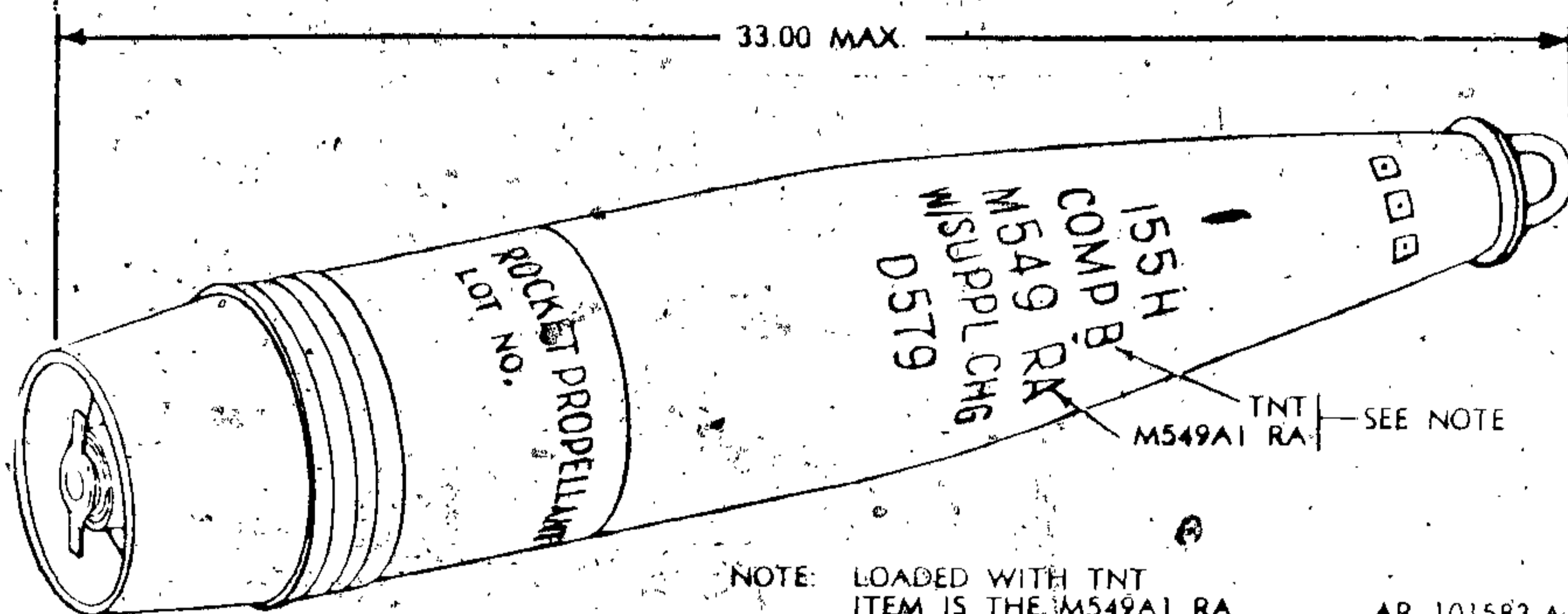
TM 9-1300-251-20

TM 9-1300-251-34

TM 9-2350-217-10N

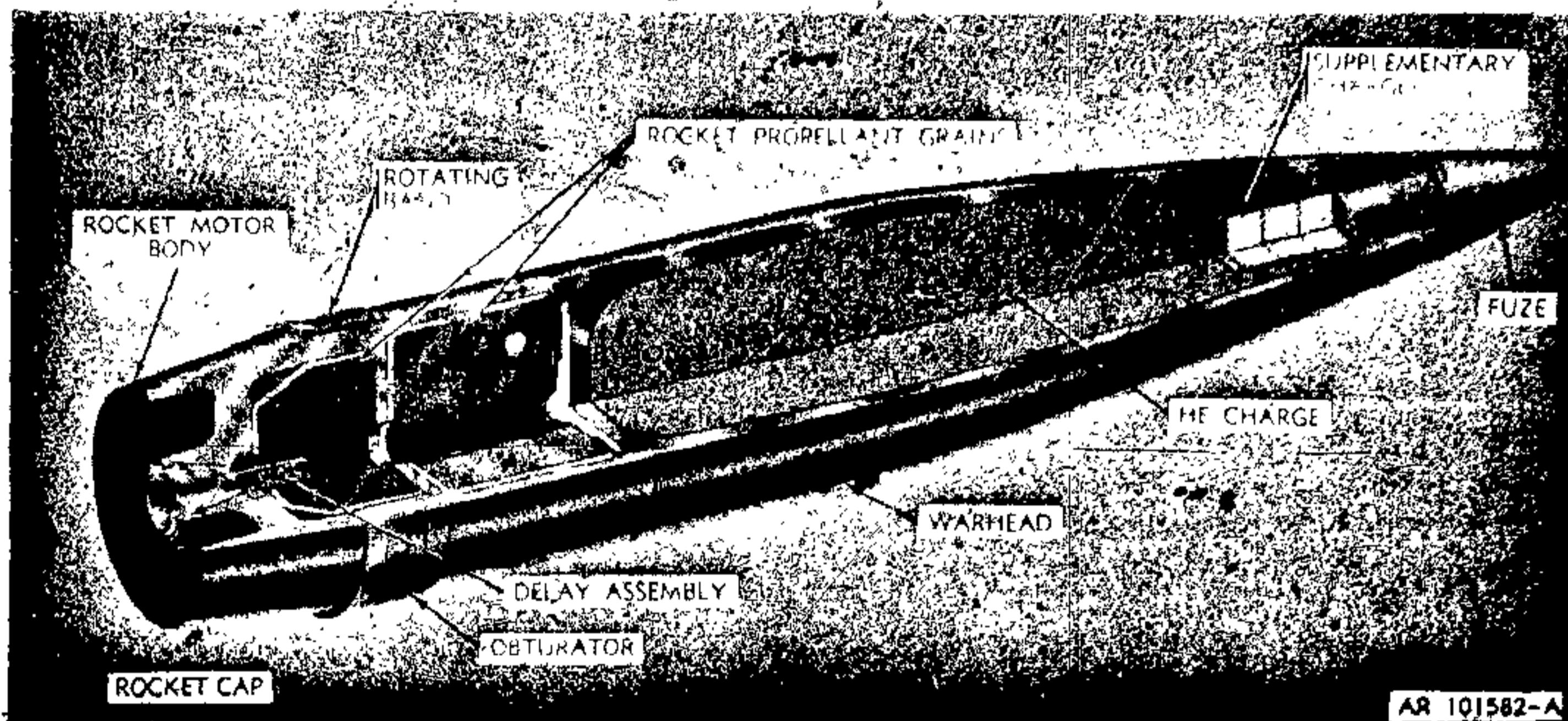
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PROJECTILES, 155 MILLIMETER: HERA, M549 AND M549A1



NOTE: LOADED WITH TNT ITEM IS THE M549A1 RA

AR 101583-A



AR 101582-A

Type Classification:

M549: Std AMCTC 8753, dtd 1971.
M549A1: Std.

Use:

Fragmentation and blast effect against personnel and materiel. Also extends the range and improves effectiveness of 155mm M109 and M109A1 self propelled and M114A2 and M198 Towed howitzers.

Description:

These projectiles consist of two major components, a warhead filled with 16 pounds of Composition B high explosive (M549) or 15 pounds

of TNT high explosive (M549A1), and a solid propellant rocket motor. These components are threaded together so that the outer steel shells of both form a streamlined ogive. A supplementary charge is installed in the deep cavity of the nose for PD and time fuzeing. Both the M732 and the M728 Proximity fuzes may be used. A rotating band encircles the assembled projectile near the base. A rocket cap is threaded into the base. The cap is removed prior to firing to allow ignition of the rocket motor for extended range. The rocket motor body contains seven pounds of solid rocket propellant arranged in two segmented grains. Each of the three segments of the forward grain contains an ignition pellet. The motor nozzle is recessed in the center of the boat tail rocket motor base of the projectile, and thrust is along the longitudinal axis.

The M549/M549A1 projectiles have a lifting plug designed to protect the projectile fuze area against accidental damage. The new plug has an oversized (3-3/4 in.) flange. If this protective lifting plug is broken at the neck area, the threaded portion of the plug will remain in the projectile and the projectile cannot be fuze. No attempt should be made to extract any portion of a broken plug from a projectile, the projectile is not to be used and should be returned to supply point.

The Projectile M549/M549A1 also has a new type of obturator designed especially to fit the configuration of this projectile. It is of polycarbonate composition.

Functioning:

When the weapon is fired, the rotating band engages the barrel rifling to impart spin to the projectile for stability in flight. The obturator of the rotating band forms a seal to prevent leakage of gas pressure past the projectile. Rapidly expanding gases from the burning propellant charge propel the projectile through the barrel with the velocity necessary to reach the target. Extended range is obtained through rocket assist, the rocket cap is removed prior to weapon chambering exposing the pyrotechnic delay assembly in the base of the rocket motor. When the projectile is fired, the propellant gases ignite the delay which burns for approximately 7 seconds and then sets off the rocket igniter to initiate the rocket motor propellant. The rocket motor fires for approximately three seconds. This additional thrust augments the velocity and consequently, the range of the projectile. If a PD or MTSQ or short intrusion proximity fuze is used, the fuze detonates the supplementary charge and the supplementary charge detonates the warhead filler either on impact or at the preset time. Both proximity fuzes, the M728 (long intrusion which requires removal of the supplementary charge) or the M732 (short intrusion) are restricted from overhead fire. Using the M728 may result in down-range prematures. Tests for the M732 have not yet been completed. Detonation on the warhead is on approach to the target.

Difference Between Models:

Model M549 is filled with Comp B; Model M549A1 is filled with TNT.

Tabulated Data:

Complete round:
 Type-----HE, rocket assist
 Weight with fuze-----96 lb (approx)

Length with fuze-----34.39 in. max
 Length w/o fuze-----33.78 in. max
 Cannon used with-----M126, M126A1,
 M185, M1A2,
 M199

Weight zone information:

Zone	WEIGHT ZONE LOADED PROJECTILE (W/O FUZE)		Marking
	Over	Up to & including	
3	91.8	93.6	☐ ☐ ☐
4	93.2	95.0	☐ ☐ ☐ ☐
5	94.6	96.4	☐ ☐ ☐ ☐ ☐

Projectile:

Body material-----Steel
 Color-----Olive drab w/yel-
 low markings

Filler and weight:

M549A1-----TNT 15 lb Supp
 Chg 0.30 lb TNT
 M549-----Comp B 16 lb
 Supp Chg 0.30 lb
 TNT

Propelling charge-----M4 series at Charge
 7 only.

Propelling charge-----M119A1; M203 with
 M549A1 projectile
 only

Primer-----M82

Fuzes-----PD: M557, M739
 Prox: M732, M728

Temperature Limits:

Firing:

Lower limit----- -50°F
 Upper limit----- +145°F

Storage:

Lower limit----- -65°F
 Upper limit----- +160°F (for periods
 not more than 4
 hr/day)

*Pallet:

Weight-----780 lb
 Dimensions-----14-5/8 x 29-1/8 x
 38-3/4 in.
 Cube-----9.5 cu ft

*NOTE: See SC for complete packing data including MSN's.

Shipping and Storage Data:

	M549	M549A1
Quantity-distance class	(18) 1.1	(18) 1.1
Storage compatibility group	D	D

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	<u>M549</u>	<u>M549A1</u>
DOT shipping class---	A	A
DOT designation-----	EXPLOSIVE PROJECTILE	EXPLOSIVE PROJECTILE
DODAC-----	1320-D579	1320-D579
Assembly Dwg No.-----	9235999	9235999-1

A 6000 meter safety zone is required short of the target because of the possibility of rocket motor non-ignition.

Ballistics:

Howitzer	Propelling Charge	Charge	Muzzle Velocity (m/s)	Maximum Range (mtrs)
M114A1	M4A2	7	560.8	19,300
M109	M4A2	7	560.8	19,300
M109A1)				
M109A2)	M4A2		567.5	19,500
M109A3)	M119A1	8	678.2	23,500
M198	M4A2	7	567.5	19,500
	M119A1	8	678.2	23,500
	M203	8	826.0	30,100

Overhead fire with the M728 proximity fuze is prohibited due to the possibility of down range prematures. Overhead fire with the M722 proximity fuze is prohibited due to incomplete test data.

Limitations:

M549 and M549A1:

The M549/M549A1 cannot be fired if the obturating band is missing or broken.

There are no firing tables for rocket-off firings of the M549/M549A1. The M549/M549A1 will be fired rocket-on only (rocket cap removal).

The M549/M549A1 cannot be fired in the M199 cannon if origin wear in the cannon exceeds 0.0 inches.

Use of the M119 propelling charge with the M549/M549A1 is prohibited. Rocket motor ignition failures resulting in short rounds will occur.

M549:

The M549 model cannot be fired with the M203 propelling charge.

M549A1:

Firing the M549A1 using the M728 proximity fuze and the M203 propelling charge combination is prohibited due to the possibility of premature inbore fuze functioning.

References:

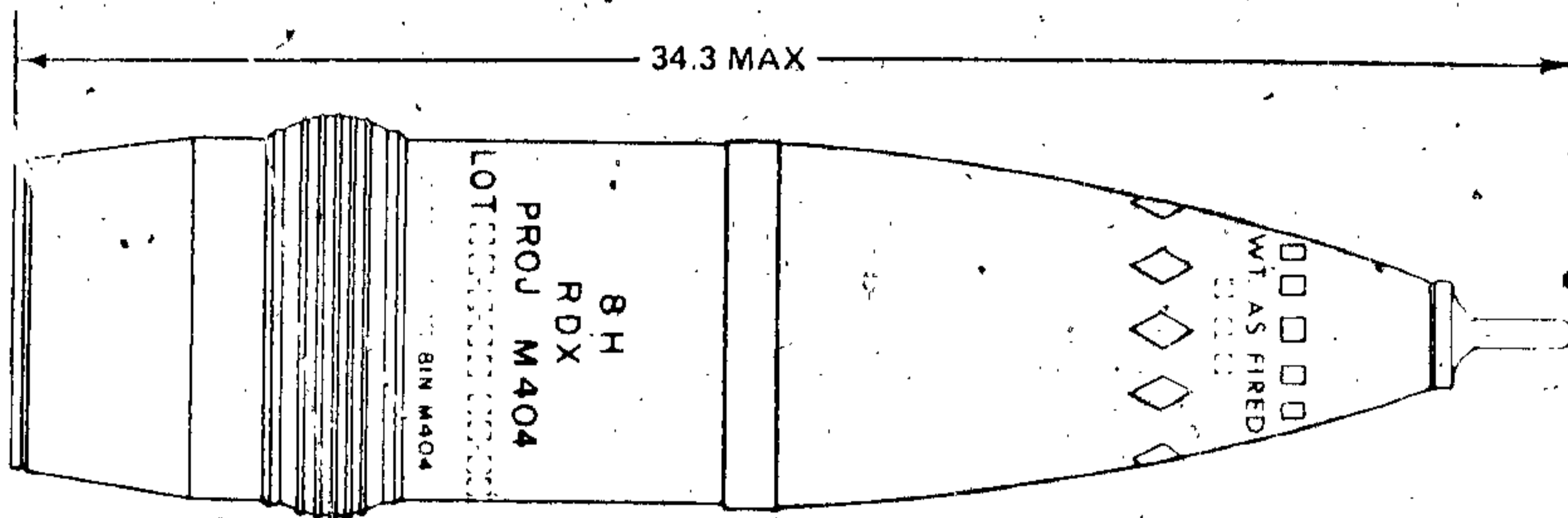
- DARCOM-P 700-3-3
- SB 700-20
- SC 1305/30-4L
- TM 9-1300-251-20
- TM 9-2350-217-10
- TM 9-2350-217-10N

TM 43-0001-28

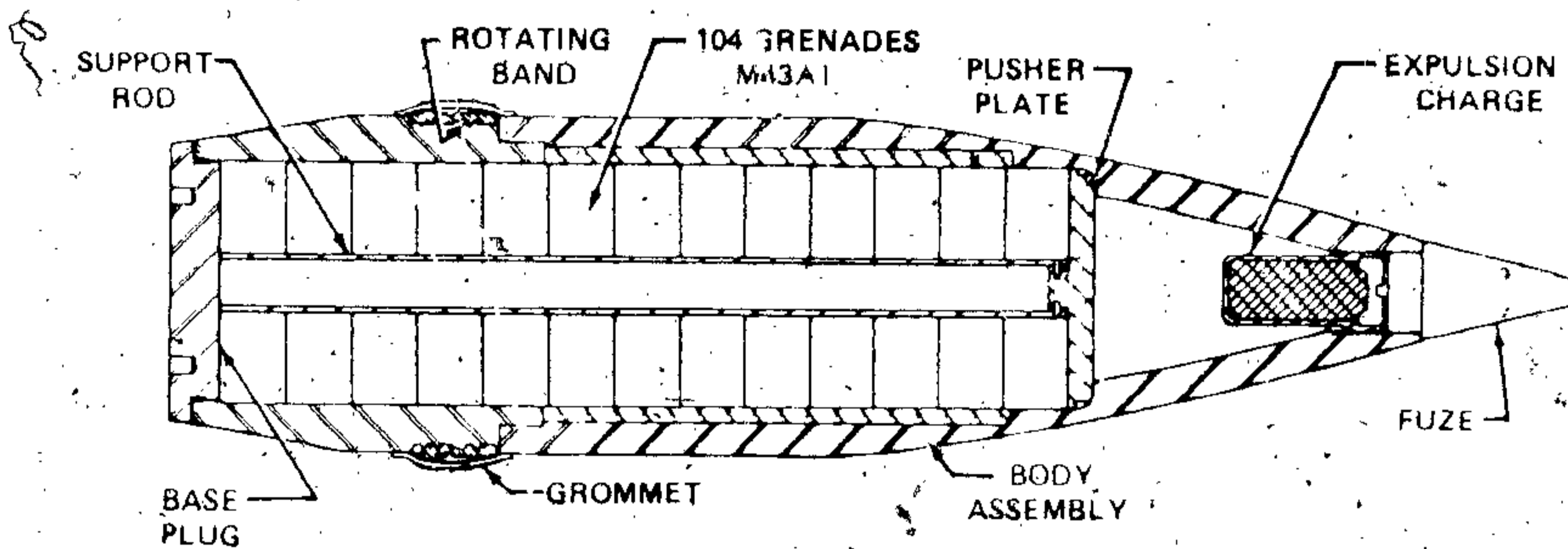
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3-118.2 Change 6

PROJECTILE, 8-INCH: HE, M404



AR 199426-A



AR199425-A

Type Classification:

Std AMCTC 2873 dtd 1964.

Use:

This projectile is used to deliver a concentration of antipersonnel grenades

Description:

This projectile is of the separate loading type. The fuze, propelling charge, and primer are handled and loaded separately. The projectile is fitted with an eyebolt lifting plug in place of a fuze for handling. The plug must be replaced by a fuze before the projectile is loaded. The projectile contains 13 layers of grenades with 8 grenades in each layer. The

grenades are contained by a base plug which is screwed into the base of the projectile. An expulsion charge is contained in the nose of the projectile and separated from the grenades by a pusher plate. The metal rotating band near the base of the projectile is protected during storage and handling by a removable grommet.

Functioning:

When the primer is detonated, the flash ignites the propelling charge producing gases which force the spin-stabilized projectile out of the gun tube and propel it to the target. The fuze, set to function at a pre-determined time in flight, initiates the expulsion charge ejecting the entire grenade load from the rear of the projectile. Centrifugal force disperses the grenades radially from the projectile

TM 43-0001-28

line-of-flight. The M43 grenade is an airburst submissile which is expelled from its housing on ground impact and projected upward to burst at 4 to 5 feet above the ground.

Tabulated Data:

Projectile:

Type-----HE
 Weight-----200 lb
 Length:
 w/ fuze-----34.9 in.
 w/ lifting plug-----34.3 in.
 Body material-----Forged steel
 Color-----Olive drab w/
 yellow dia-
 monds and
 markings

Filler and weight:

Number of grenades
 M43A1-----104
 Explosive, Comp A5,
 each grenade-----21.25 gm
 Explosive, Comp A5,
 each projectile-----4.87 lb
 Expulsion charge-----M10 propellant,
 60 gm

Components:

Propelling charge-----M1 (Zones 1-5),
 13.6 lb M1
 propellant;
 M2 (Zones 5-7),
 28.9 lb M1
 propellant
 Primer-----M82, MK2A4,
 MK15
 Fuze-----MT, M565; MTSQ,
 M548; or MTSQ,
 M577
 Cannon used with-----M2, M2A1, M2A2
 M47, or M110
 SP howitzer

Performance (full charge):

Maximum range-----16,788 meters
 Muzzle velocity-----587 meters/sec.
 (1950 ft/sec)

Weapon system information:

	Weapon	Model	Type
Cannon	M115 towed	M110SP	M55SP
		M2A2	
Tube	M2A1, M2	(M2A1E1)	M47
Prop. Cng.	M1, M2	M1, M2	M1, M2
Primer	MK2A4	M82, MK15	M82, MK15

Temperature Limits:

Firing:
 Lower limit----- -40°F (-40°C)
 Upper limit----- +125°F (51.6°C)

Storage:
 Lower limit----- -65°F (-53.8°C)
 Upper limit----- +165°F (73.9°C)

*Packing-----Pallet of 6 pro-
 jectiles

*Pallet:
 Weight-----1,253 lb
 Dimensions-----39-1/2 x 28-3/8
 x 19-1/4 in.
 Cube-----12.4 cu ft

*NOTE: See SC for complete packing data includ-
 ing NSN's.

Shipping and Storage Data:

Inhabited bldg. dist./DOD
 hazard class/division/
 storage compatibility
 group----- (18) 1.2D
 DOT shipping class-----A
 DOT designation-----EXPLOSIVE PRO-
 JECTILES
 DODAC-----1320-D684
 Drawing number-----8875941
 Packing drawing number-----7548346

WEIGHT ZONES

LOADED PROJECTILE (W/FUZE, W/O PLUG)

ZONE	POUNDS		MARKING
	OVER	UP TO & INCL	
2	193.4	196.3	□ □
3	195.9	198.8	□ □ □ □
4	198.4	201.3	□ □ □ □ □ □
5	200.8	203.8	□ □ □ □ □ □

Ballistics (M2, M2A1, M2A2 & M47 Cannons):

	Muzzle Velocity (fps)	Maximum Range (mtrs.)	Chamber Pressure (psi)
Charge 1, M1, green bag	820	5600	
Charge 2, M1, green bag	900	6600	
Charge 3, M1, green bag	1000	8000	
Charge 4, M1, green bag	1150	9700	
Charge 5, M1, green bag or M2, white bag	1380	11,600	
Charge 6, M2, white bag	1640	13,900	
Charge 7, M2, white bag	1950	16,800	

References:

DARCOM P 700-3-3

SB 700-20

SC 1305/30-1L

TM 9-1300-251-20

TM 9-1300-254-12

TM 9-2300-216-10

TM 9-2350-210-12

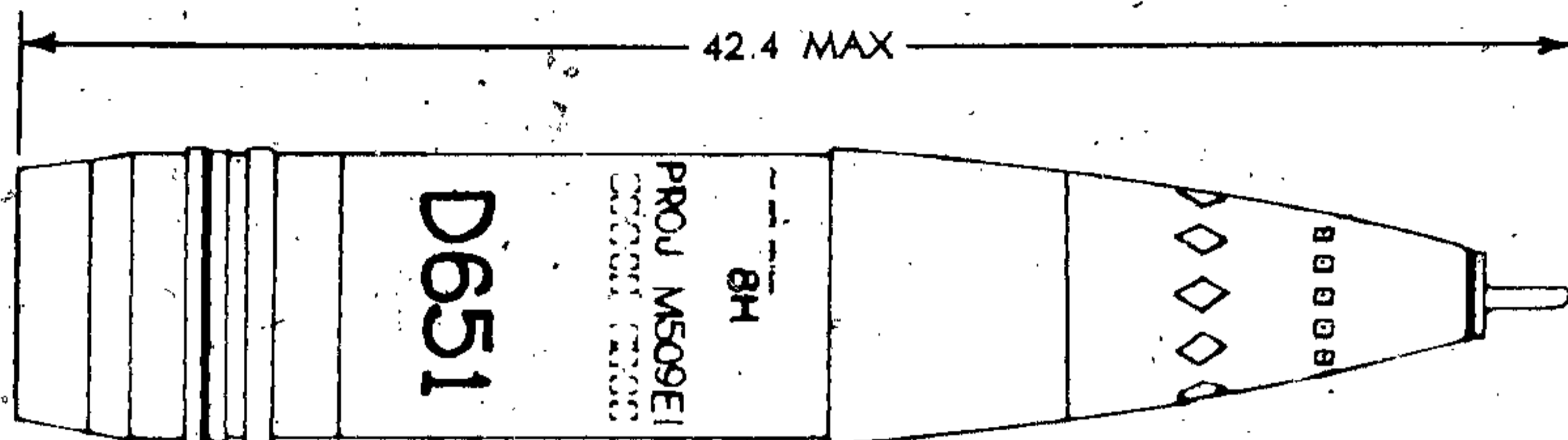
TM 9-1300-251-34

TM 43-0001-28

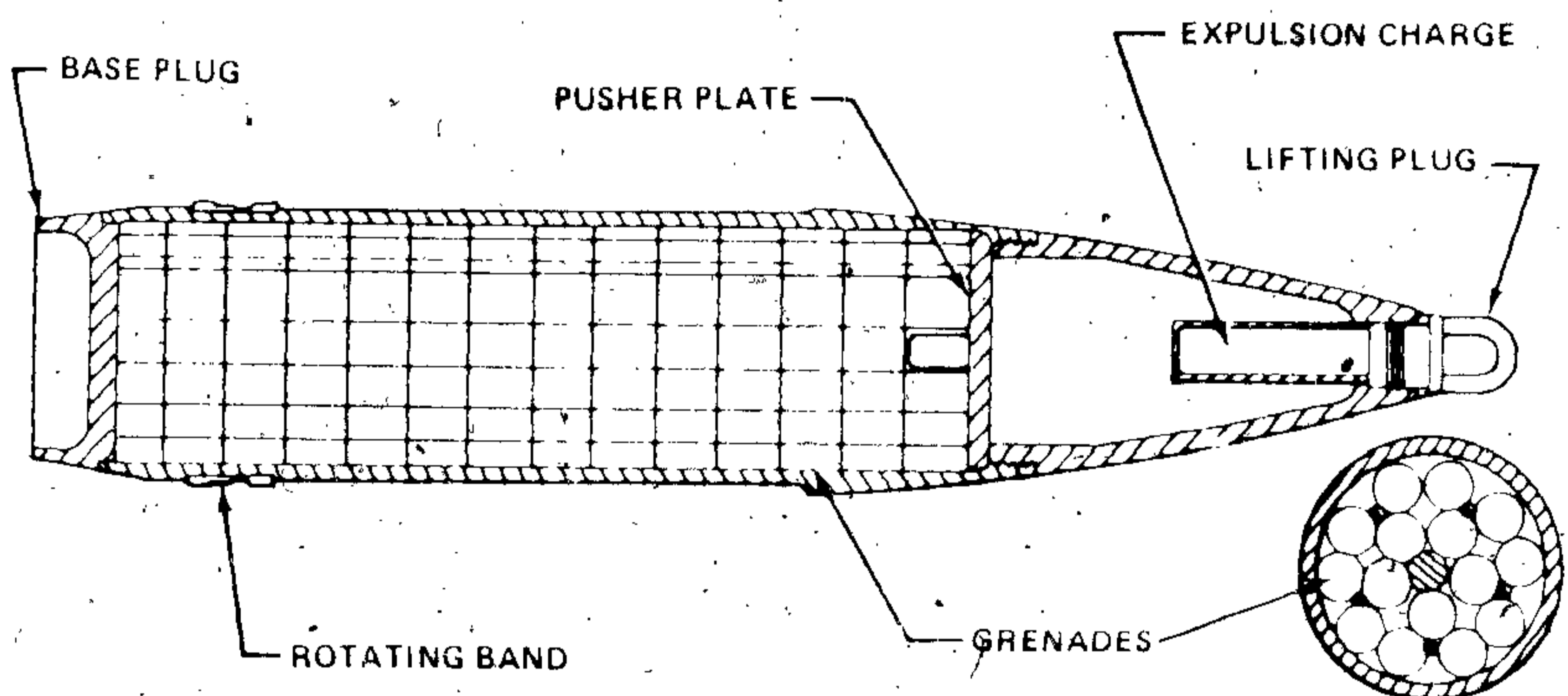
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3-138 Change 6

PROJECTILE, 8-INCH: HE, M509E1



AR 199424-B



AR 199423-B

Type Classification:

Std MSR 02746014 dtd 1974.

Use:

This projectile is used to deliver a concentration of antipersonnel/antimateriel grenades.

Description:

This projectile is of the separate loading type. The fuze, propelling charge, and primer are handled and loaded separately. The projectile is provided with an eyebolt lifting plug in place of a fuze for handling. This plug must be replaced by a fuze before the projectile is loaded. The projectile contains 13 layers of grenades with 15 grenades in each layer.

The grenades are contained by a base plug attached to the projectile with five shear pins. For normal use, an expulsion charge is fitted in a cavity in the nose of the projectile to eject the grenades. If desired, this expulsion charge may be replaced by a spotting charge designed to detonate the entire projectile as if it were a bulk-loaded HE projectile. The metal rotating band near the base of the projectile is protected during storage and handling by a removable plastic grommet.

Functioning:

When the primer is detonated, the flash ignites the propelling charge producing gases which force the spin-stabilized projectile out of the gun tube and propel it to the target. The fuze, having been set to function at a

predetermined time in flight, initiates the expulsion charge ejecting the entire grenade load from the rear of the projectile. Centrifugal force disperses the grenades radially from the projectile line-of-flight. The M42 grenades are ground burst submissiles which explode on impact with the alternate loading of the spotting charge in place of the expulsion charge, the functioning of the fuze detonates the entire projectile over the target permitting observation of the projectile fuze functioning in relation to the target.

Tabulated Data:

Projectile

Type -----HE
 Weight-----206.5 lb
 Length-----
 w/ fuze-----43.9 in.
 w/ lifting plug-----42.4 in.
 Body material-----Forged steel
 Color-----Olive drab w/yel-
 low diamonds and
 markings
 Filler and weight:
 Number of grenades,
 M42-----195
 Explosive, Comp A5,
 each grenade-----30.5 grams
 Explosive, Comp A5,
 each projectile-----13.1 lb
 Expulsion charge-----M10 propellant,
 130 grams

Components:

Propelling charge-----M1 (Zones 1-5),
 13.6 lb, M1 pro-
 pellant; M2, (Zones
 5-7), 28.5 lb,
 M1, propellant
 Primer-----M82, MK2A4, or
 MK15
 Fuze-----MTSQ, M577
 Cannon used with-----M110 SP howitzer
 Performance (full charge):
 Maximum range-----16,000 meters
 Muzzle velocity-----594.4 mps

Temperature Limits:

Firing:
 Lower limit----- -40°F (-40°C)
 Upper limit----- +125° (+51.6°C)
 Storage:
 Lower limit----- -65°F (-53.8°C)
 Upper limit----- +165°F (73.9°C)
 *Packing-----Pallet of 6 pro-
 jectiles
 *Pallet:
 Weight-----1,253 lb
 Dimensions -----48-1/8 x 31-5/8
 x 22-1/2 in.
 Cube-----19.8 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

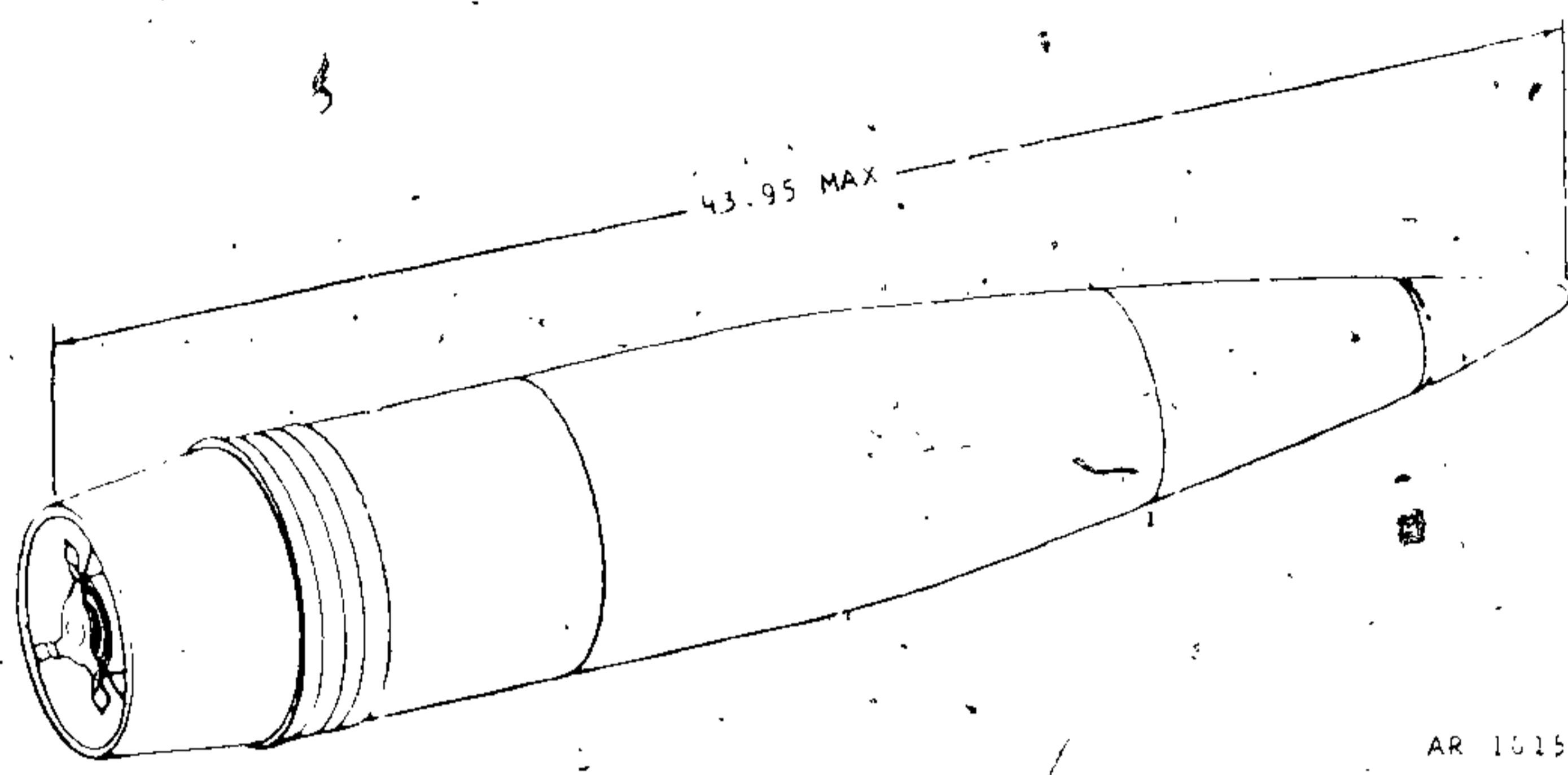
Inhabited bldg dist/DOD
 hazard class/division/
 storage compatibility
 group----- (21) 1.1D
 DOT shipping class-----A
 DOT designation-----EXPLOSIVE PRO-
 JECTILES
 DODAC-----1320-D651
 Drawing Number-----9298200
 Packaging drawing number-----9229038
 Grommet-----9270723

References:

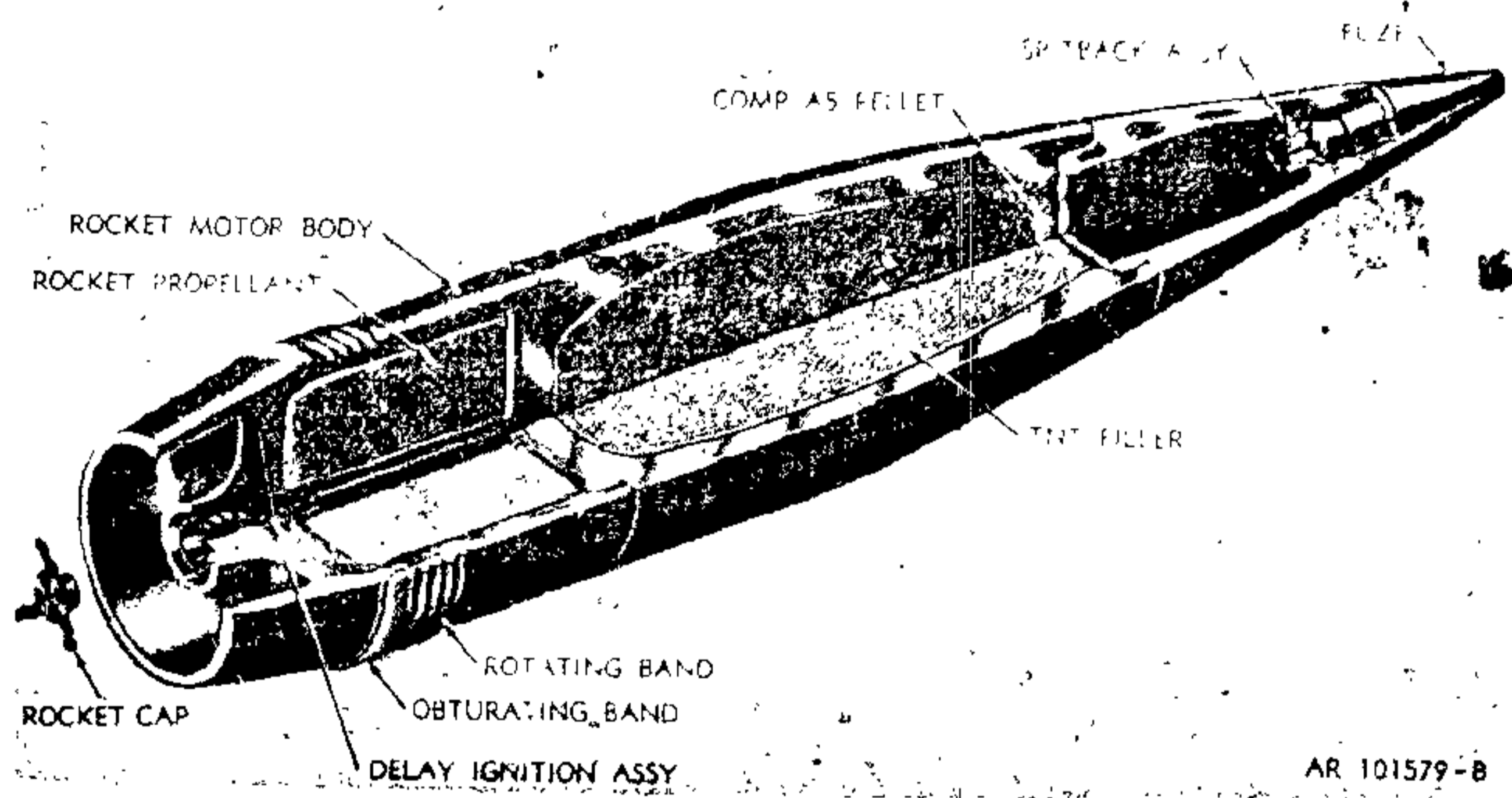
DARCOM P 700-3-3
 SB 700-20
 SC 1305/30-1L
 TM 9-1300-251-20
 TM 9-2300-216-10
 TM 9-1300-251-34

TM 43-0001-28

PROJECTILE, 8-INCH: HERA. M650



AR 101576A



AR 101579-B

Type Classification:

Std MSR 01796002.

Use

The 8-inch M650 projectile is a high-explosive, rocket-assisted round with extended range capability. It is intended to be employed against personnel and materiel targets at ranges in excess of those currently attainable with the standard M106 Projectile.

Description:

This Projectile consists of three major components, an ogive, the warhead and a solid propellant rocket motor. The three components

thread together to form a streamlined projectile. The aluminum ogive section contains a spittack booster assembly at the base of the fuze well and will accept fuzes of the shallow cavity type. The high fragmentation steel warhead is filled with TNT explosive. A Composition A8 booster pellet is located in the center of the TNT filler at the forward end of the warhead. The alloy steel rocket motor section contains the solid propellant rocket motor grain and delay ignition assembly. A rocket cap is threaded onto the nozzle exit cone at the base of the rocket motor. The rocket motor is encircled with a laser-welded overlay rotating band, which is backed up by a nylon obturating band. The projectile is fitted with a lifting plug at the nose and a grommet which protects the rotating band during shipping and handling.

Functioning:

The M650 Projectile may be fired either as a ballistic projectile, in the manner of a standard high explosive projectile or in a rocket assisted mode for extended range.

In the rocket motor off mode, the projectile is propelled through the bore of the weapon by gas pressure generated by the propelling charge. Spin stabilization is imparted to the projectile through the rotating band. The fuze is armed by a combination of spin and setback. Functioning of the fuze initiates the spitback booster which fires through the hollow ogive assembly to initiate the A5 booster pellet, which in turn functions the TNT filler detonating the warhead. In the rocket motor on mode, the rocket motor cap is removed before firing. This causes a mid flight rocket motor burn which increases the range.

Tabulated Data:

Complete round:

Zone	WEIGHT ZONES		Marking
	Over	Up to & Incl	
2	191.4	194.3	□ □
3	193.9	196.8	□ □ □
4	196.4	199.3	□ □ □ □
5 (Std)	198.9	201.8	□ □ □ □ □
6	201.4	204.3	□ □ □ □ □ □

Type-----HE, rocket assisted (HERA)
 Weight (as fired)-----200 lb (approx)
 Length (w/fired)-----43.95 in. max
 Length (w/lifting plug)---53.23 in. max
 Cannon used with-----M201E1 (M110A1E1 SP), M201 (M110A1 SP), M2A2 (M110 SP)

Projectile:

Body material-----HF-I Steel
 Windshield material-----Aluminum
 Color-----Olive drab w/yellow markings
 Filler and weight-----TNT, 25 lb (approx)
 Propelling charge-----M1, M2, M188, M188E1
 Primer-----M82
 Fuzes (Short intrusion)---PD: M557, M572, M739 MTSQ: M564, M582-VT: M732

Rocket Motor:

Body material-----Alloy steel
 Propellant grain-----Solid propellant nitrocellulose base
 Weight grain-----12 lb

Delay Assembly:

No. of increments	Weight	Composition
1	300 mg	Flash
5	900 mg (ea)	Delay
1	290 mg	Igniter

Rocket Propellant Grain

Igniter-----Type I Class 3
 Baron Potassium Nitrate Pellets - 5.5 gram

Temperature Limits:

Firing:
 Lower limit----- -50°F
 Upper limit----- +145°F
 Storage:
 Lower limit----- -50°F
 Upper limit----- +145°F
 *Packing-----6 projectiles on pallet
 *Pallet:
 Weight-----1260 lb
 Dimensions-----22-5/8 x 31-3/4 x 45-5/8 in.
 Cube-----20 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class-----1.2
 Storage compatibility group---D
 DOT shipping class-----A
 DOT designation-----EXPLOSIVE PROJECTILES
 DODAC-----1320-0624
 Assembly Dwg. No-----9280132 (Pallet), 9287994 (Projectile)

Ballistics:

M2A2 cannon (M110 SP Weapon):

	Muzzle velocity	Maximum range		Chamber pressure
		Rocket Off	Rocket On	
M1, Green bag				
Charge 1				
Charge 2				
Charge 3				
Charge 4				
Charge 5				
M2, White bag				
Charge 5				
Charge 6				
Charge 7				

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M201E1 cannon (M110A2 SP Howitzer):

	Muzzle velocity	Maximum range		Chamber pressure
		Rocket Off	Rocket On	
M1, Green bag				
Charge 1				
Charge 2				
Charge 3				
Charge 4				
Charge 5				
M2, White bag				
Charge 5				
Charge 6				
Charge 7				
M188, White bag				
Charge 8				
M188E1, white bag				
Charge 8				
Charge 9				

M201 Cannon (M110A1 SP Weapon):

	Muzzle velocity	Maximum range		Chamber pressure
		Rocket Off	Rocket On	
M1, Green bag				
Charge 1				
Charge 2				
Charge 3				
Charge 4				
Charge 5				
M2, White bag				
Charge 5				
Charge 6				
Charge 7				
M188, White bag				
Charge 8				

Limitations: None.

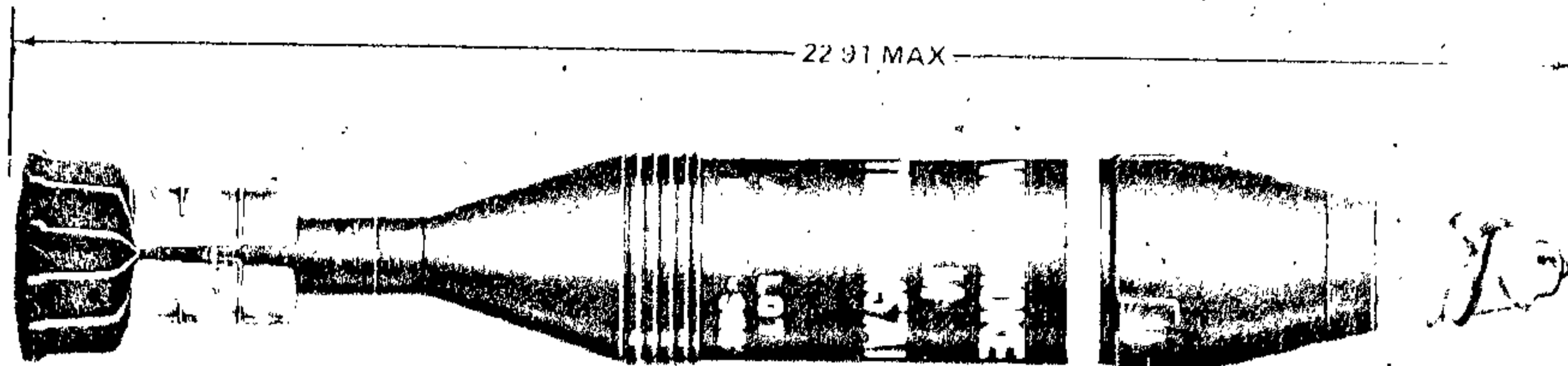
References: DARCOMP 700-3-3 TM 9-1300-251-20
 SB 700-20 TM 9-1300-251-34
 SC 1305/30 IL TM 9-2300-216-10

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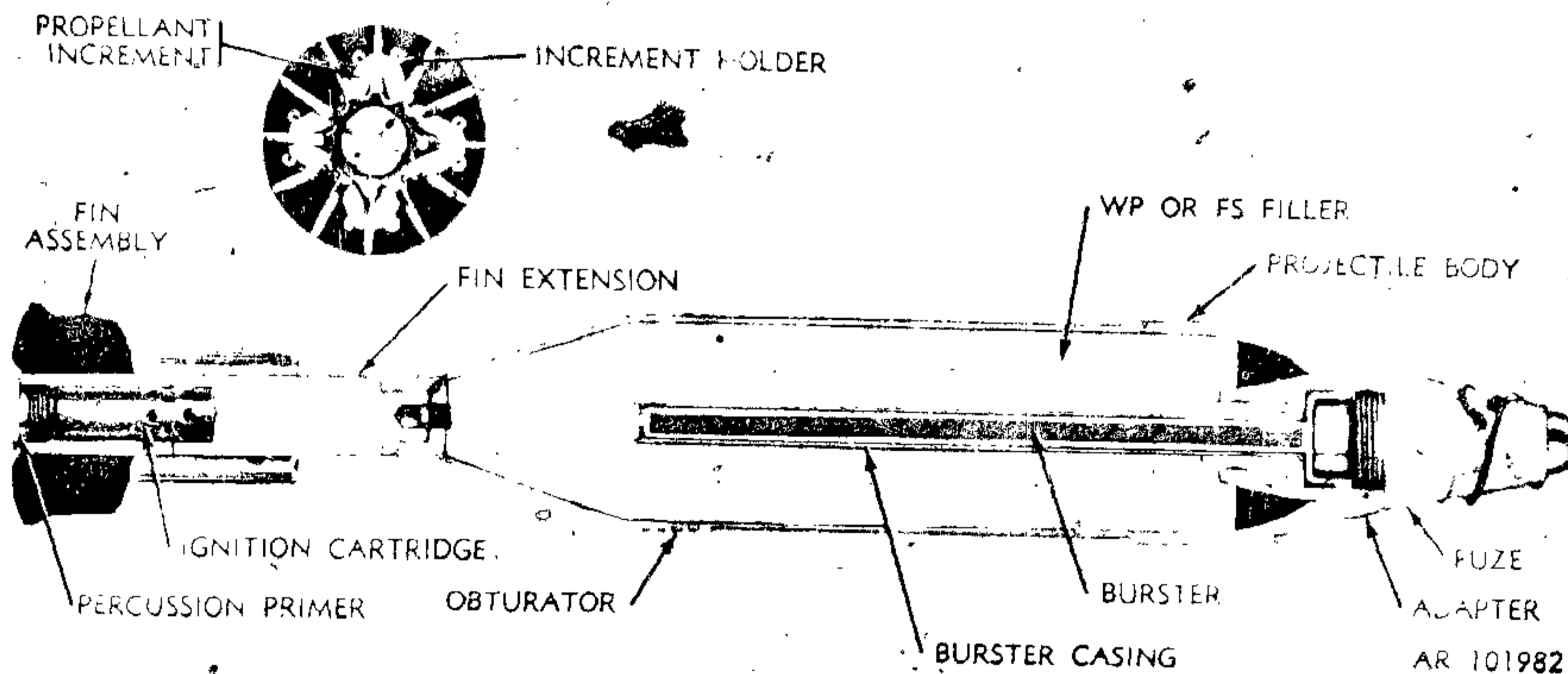
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CARTRIDGE, 81 MILLIMETER: SMOKE, WP, M57A1 AND M57



AR 101981



AR 101982

Type Classification:

- With WP Filler: CON 11756003.
- With FS Filler: OBS OTCM 37196-dtd 1961.

Use:

This cartridge is used against personnel and material as an incendiary device and also to produce screening smoke.

Description:

The complete round consists of a projectile body with a burster assembly, a point-detonating fuze, a fin assembly, a propellant charge, and an ignition cartridge with a percussion primer. The projectile body is of relatively thin-

walled steel, and is filled with white phosphorous (WP) or a liquid smoke filler (FS). The base of the projectile is internally threaded to accept the fin assembly, and the nose is fitted with a steel adapter. The adapter is internally threaded to accept the fuze, and is designed to hold the burster assembly. The burster assembly is a thin-walled steel tube filled with tetryl and extends into the smoke charge.

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 with the velocity required to reach the target. The fuze functions on impact, detonating the burster charge which ruptures the projectile and disperses the chemical filler. Both WP and FS react spontaneously on contact with the air; WP ignites producing a dense white smoke and some incendiary effect, while FS, combining with the moisture in the air, creates a cloud-like smoke screen without burning.

Difference Between Models:

The M57 is fitted with the M4 fin assembly and the M4A1 uses the M4A1 assembly. These differ in minor manufacturing details only. Cartridges with liquid smoke filler (FS) are classified as obsolete.

Tabulated Data:

Complete round:

Type-----Smoke
 Weight-----11.38 lb.
 Length-----22.91 in.
 Cannon used with-----M1, M29, M29A1
 Projectile:
 Body material-----Steel
 Color-----Grey w/yellow markings
 Filler and weight-----WP, 4.06 lb
 Burster charge-----Tetryl, 0.08 lb

Components:

Burster assembly-----M1
 Ignition cartridge-----M6
 Propellant charge-----M2A1
 Percussion primer-----M34
 Fin assembly-----M4, M4A1
 Fuze-----M525 series

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 in fiber container; 2 containers in wooden box

*Packing Box:

Weight-----43.0 lb
 Dimensions-----28 x 9 11/16 x 6-15/32 in.
 Cube-----1.0 cu. ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class----- (12) 1.2
 Storage compatibility group-----H
 DOT shipping class-----A
 DOT designation-----AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
 DODAC-----1315-C230
 Drawing number-----75-1-93

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum (meters)	Range (yds)
1		630	700
2		1199	1800
3		1646	1800
4		2169	2872

*Charge 1 is the ignition cartridge and one increment charge; Charge 4 is the ignition cartridge and four increment charges.

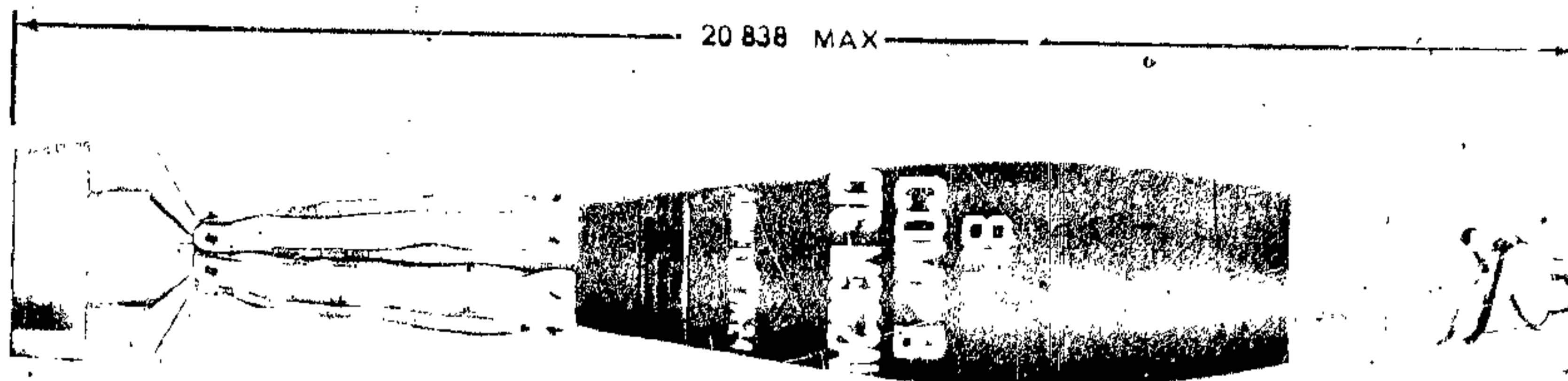
Limitations:

Store and transport WP rounds at temperatures below 117.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

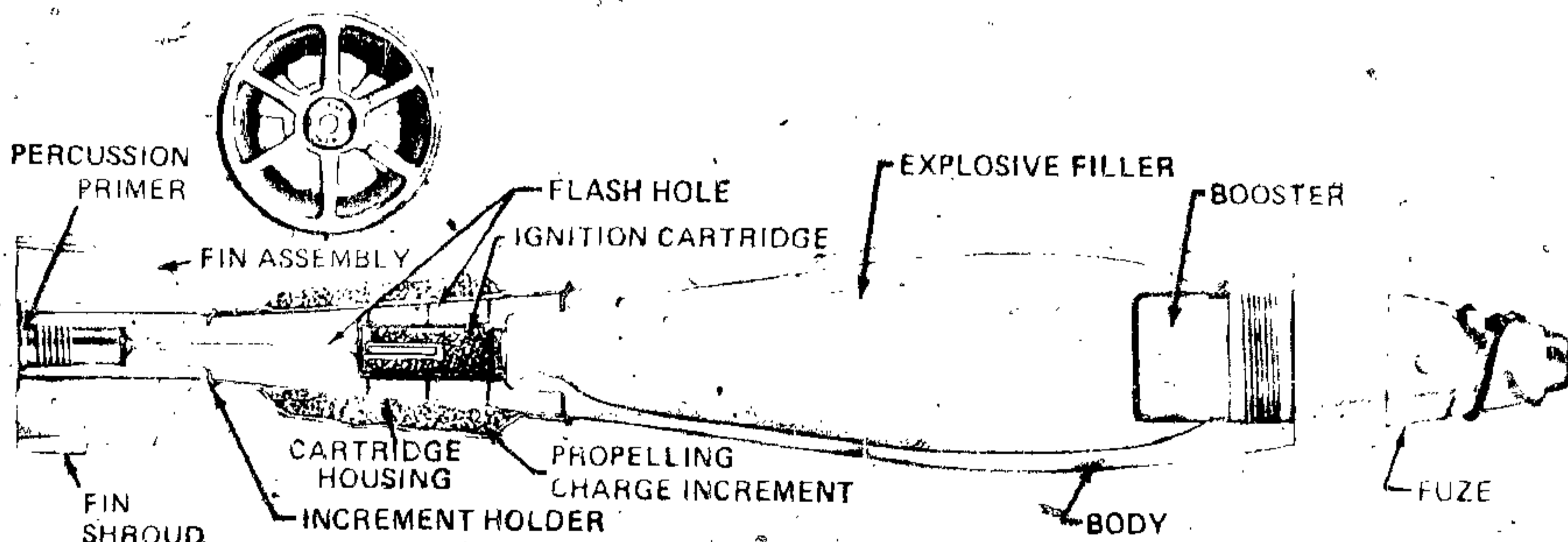
References:

- DARCOM P*700-3-3
- SB-700-20
- SC 1305/30-IL
- TM 9-1015-200-12
- TM 9-1300-251-20
- TM 9-3071-1

CARTRIDGE, 81-MILLIMETER: HE, M362A1 AND M362



AR199480



AR199480

Type Classification:

M362A1: Std AMCTC 1770 dtd 1964
 M362: CON 11756003

USE:

This cartridge is used against personnel and materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body, a point-detonating or a proximity fuze, a fin assembly that includes a cartridge housing and propellant increment charges, an ignition charge, and a percussion primer. The projectile body is of pearlitic malleable iron, and is threaded internally at the nose to accept the fuze and externally at the base to accept

the fin assembly. The projectile body is filled with Composition B high explosive.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the hub of the fin assembly strikes the firing pin in the base cap of the mortar. The burning primer flashes through the central flash hole in the cartridge housing, igniting the ignition cartridge. The cartridge ignites the propellant charge. Rapidly expanding gases from the burning propellant expel the projectile from the tube and propel it to the target. The projectile is fin-stabilized in flight. Functioning of the fuze detonates the fuze booster charge and, in turn, the high explosive charge. Depending upon the type of fuze used, the projectile bursts over or on the target, producing near optimum fragmentation and blast effect.

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Difference Between Models:

The projectile body of the M362 is of forged steel.

Tabulated Data:

Complete Round:

Type	HE
Weight, w/fuze	9.42 lb
Length, w/fuze	20.838 in. max
Cannon used with	M1, M2, M29A1
Projectile:	
Body material	M362A1, cast PMI M362, forged steel
Color	Olive drab w/yellow markings
Filler and weight	Comp. *B. 2.10 lb
Components:	
Ignition cartridge	M66
Propellant charge	M5
Percussion primer	M71, M71E1
Fin assembly	M141
Fuze	PD, M524 series PD, M526 series PD, M716 PRX, M517 PRX, M532

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 in fiber container; 3 containers in wooden box \

*Packing Box:

Weight----- 51.0 lb
Dimensions----- 25-11/16 x 13-9/16 x 6-11/32 in.
Cube----- 1.4 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class-----	4
Storage compatibility group-----	E
DOT shipping class-----	A
DOT designation-----	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DDOAC-----	1315-C222
Drawing number-----	1315-C222 M362A1, 8838144 M362, 7549034

Ballistics

Charge	Muzzle Velocity (fps)	Maximum Range (meters)	(yd)
0*	181	297	324
1	298	777	849
2	397	1301	1430
3	480	1791	1951
4	554	2246	2450
5**	620	2657	2910
6	673	3027	3300
7	722	3327	3740
8	775	3618	3940

*Charge 0 is the ignition cartridge only, Charge 1 is the ignition cartridge and one increment charge; Charge 8 is the ignition cartridge and eight increment charges.

**Charge 5 is the maximum authorized for firing in Mortar M1.

Limitations:

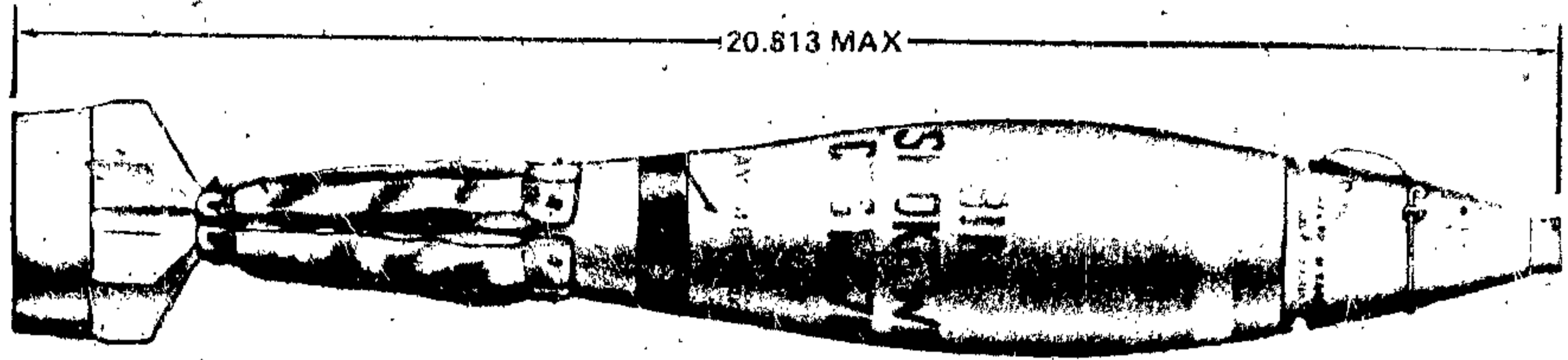
Rounds assembled with Fuze, PD, M524A1, M524A2, M524A3 or M524A4 are for USMC/USN use only.

References:

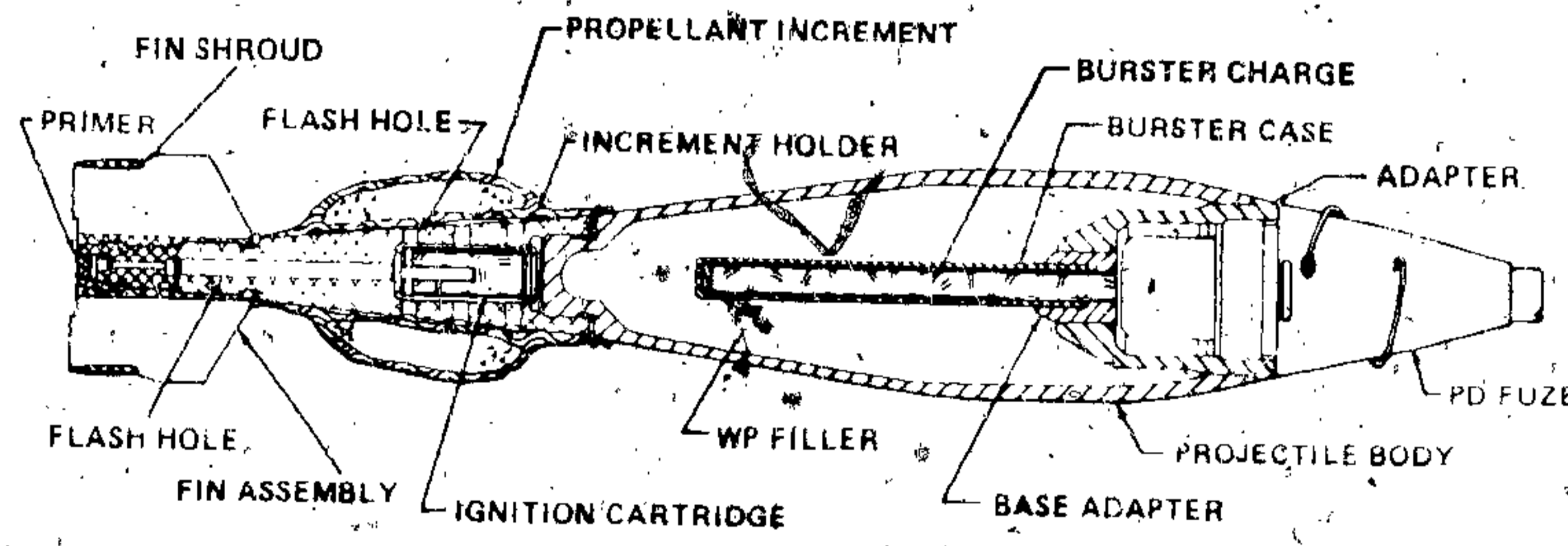
- TM 9-1015-200-12
- TM 9-1300-251-20
- SC 1305/30-1L

TM 43-0001-28

CARTRIDGE, 81-MILLIMETER: SMOKE, WP, M370



AR199488



AR199487

Type Classification:

Std AMTC 2048 dtd 1964.

Use:

This cartridge is used to produce a smoke screen.

Description:

The complete round consists of a projectile body with a burster assembly, a point-detonating fuze, a fin assembly that includes a cartridge housing, a propellant charge, an ignition charge, and a percussion primer. The projectile body is of relatively thin-walled steel, and is filled with white phosphorous. The base of the projectile is externally threaded to accept the cartridge housing of the fin assembly. The nose of the projectile is fitted with

a steel adapter designed to hold the burster casing, and internally threaded to accept the fuze. The burster casing is a thin-walled steel cylinder press-fitted into the adapter and containing a burster charge of RDX.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the hub of the fin assembly strikes the firing pin in the base cap of the mortar. The burning primer flashes through the central flash hole in the cartridge housing, igniting the ignition cartridge. The cartridge ignites the propellant charge. Rapidly expanding gases from the burning propellant expel the projectile from the tube and propel it to the target. The projectile is fin-stabilized in flight. The PD fuze functions on impact, detonating the burster charge which ruptures the projectile and disperses the white

Change 6

4-33



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phosphorous filler. WP ignites spontaneously
 on contact with the air producing dense white
 smoke.

Tabulated Data:

Complete round:
 Type----- SMOKE (WP)
 Weight----- 9.34 lb
 Length----- 20.813 in.
 Cannon used with---- M1, M29, M29A1
 Projectile
 Body material----- Steel
 Color:
 Old----- Grey w/yellow
 band and yellow
 markings.
 New----- Light green w/
 yellow band and
 light red markings.
 Filler and weight---- WP, 1.60 lb
 Booster charge----- RDX, 0.025 lb
 Components:
 Booster assembly---- M47
 Ignition cartridge--- M66
 Propellant charge--- M5
 Percussion primer--- M72E1
 Fin assembly----- M144
 Fuze----- PD, M524 series
 PD, M526 series

Shipping and Storage Data:

Quantity-distance
 class----- 5
 Storage compatibility
 group----- A
 DOT shipping class--- A
 DOT designation ---- AMMUNITION FOR CANNON
 WITH SMOKE PROJEC-
 TILES
 DODAC ----- 1315-C234
 Drawing number ----- 8848900

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (meters)	(yds)
0*		274	300
1		640	700
2		1188	1300
3		1691	1850
4		2148	2350
5**		2661	2920
6		2926	3200
7		3292	3600
8		3646	3987

*Charge 0 is the ignition cartridge only; Charge
 1 is the ignition cartridge and one increment
 charge; Charge 8 is the ignition cartridge and
 eight increment charges.

**Charge 5 is the maximum authorized for firing
 in Mortar M15

Limitations:

Store and transport WP rounds at temperatures
 below 111.4°F (melting point of WP). If imprac-
 tical, store rounds on bases, so that if WP melts
 it will resolidify with void space in normal posi-
 tion in the nose of the projectile. Erratic per-
 formance may occur if voids exist inside of WP
 filler. Rounds assembled with Fuze, PD, M524A1,
 M524A2, M524A3 or M524A4 are for USMC/USN use only.

References:

- DARCOM-P, 700-3-3
- TM 9-1015-215-12
- TM 9-3071-1
- SB 700-20
- SC 1305/301L

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 in fiber
 container; 3 fiber
 containers in
 wooden box

*Packing Box:

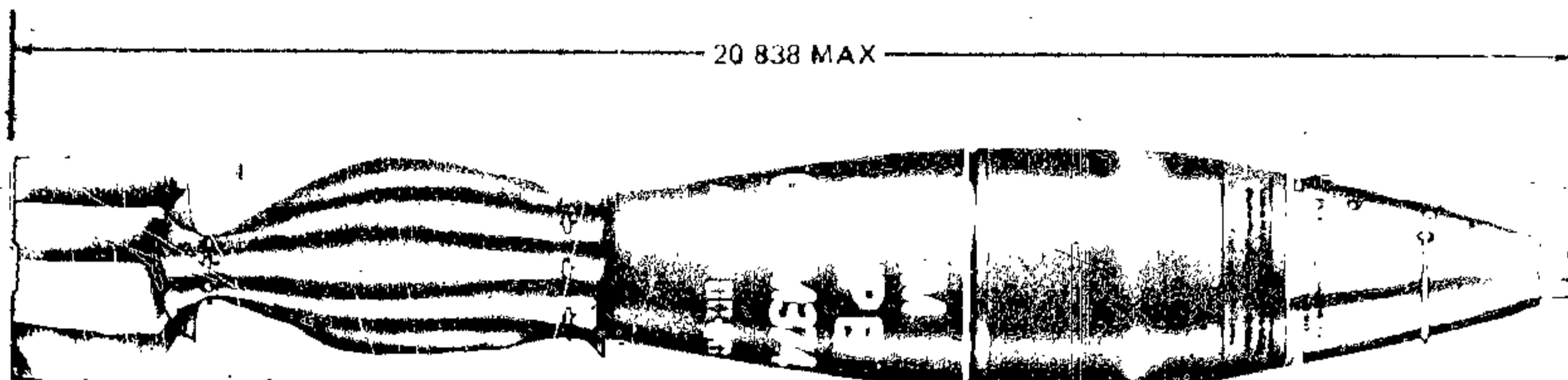
Weight----- 51.0 lb
 Dimensions----- 25-11/16 x 13-9/16
 x 6-11/32 in.
 Cube----- 1.4 cu ft

*NOTE. See SC for complete packing data includ-
 ing NSN's.

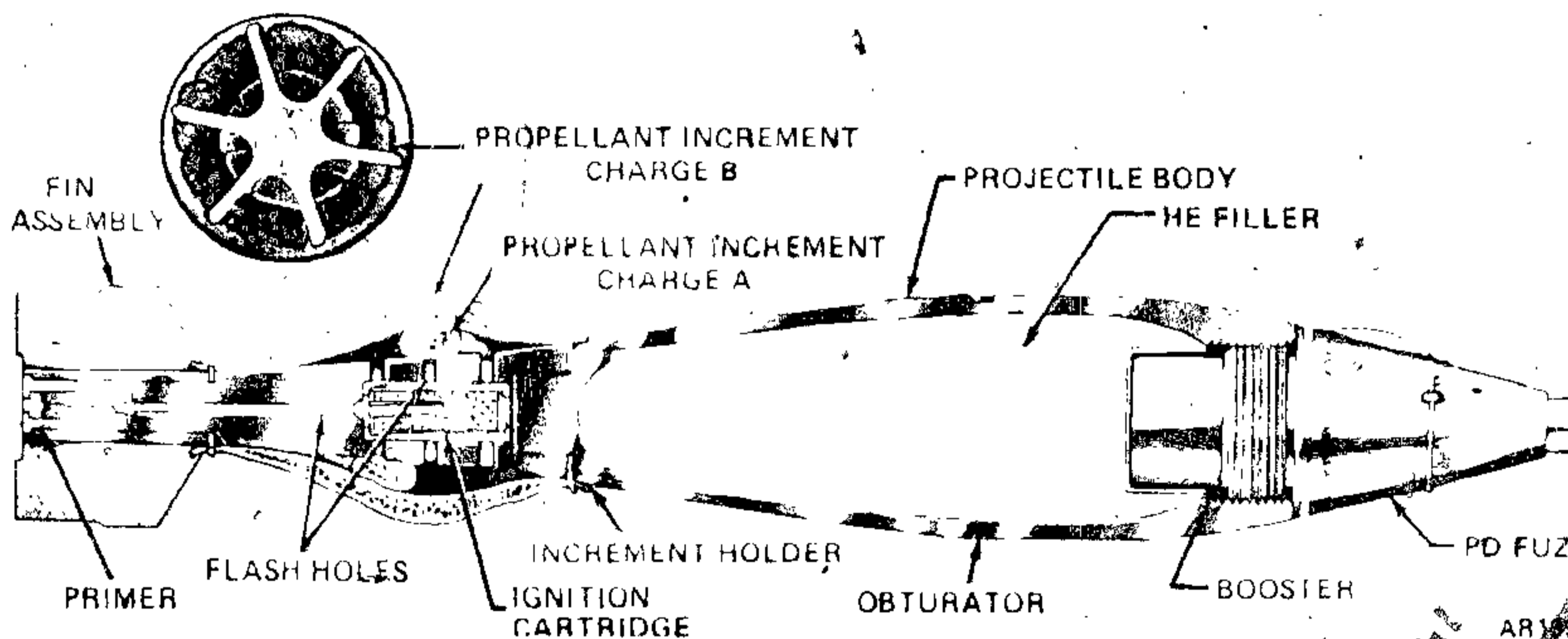


TM 43-0001-26

CARTRIDGE, 81 MILLIMETER: HE, M374A2 AND M374



AR199486



AR199486

Type Classification:

Std LCC-B, dtd 1975 (M374A2).
CON 11756003 (M374).

Use:

This cartridge is used against personnel and materiel, producing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body, a point-detonating or proximity fuze, a fin assembly that includes a cartridge housing, a propellant charge with two types of increment charges, an ignition charge, and a percussion primer. The projectile body is threaded

internally at the nose to accept the fuze and externally at the base to accept the fin assembly. The projectile is filled with composition B high explosive. The fins are cast 3 degrees to produce spin.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the hub of the fin assembly strikes the firing pin in the base cap of the mortar. The primer flashes through the central hole in the cartridge housing to ignite the ignition cartridge. The cartridge ignites the propellant charge, and rapidly expanding gases from the burning propellant expel the projectile from the tube and propel it to the target. The projectile is fin-stabilized in flight.

Functioning of the fuze detonates the fuze booster charge and, in turn, the high explosive charge. Depending upon the type of fuze used, the projectile bursts either over or on the target producing near optimum fragmentation and blast effect.

Differences Among Models:

The projectile body may be of forged steel or pearlitic malleable iron. Early production used the M66 ignition cartridge with the M149 fin assembly, while later series used the M285 cartridge and M170 fin assembly. Model M374A2 is a modification of M374 to include moisture-resistor ignition system, moisture-resistant propelling charges M90A1, and improved protective packaging.

Abbreviated Data:

Complete round:

Type ----- HE
 Weight ----- 9.34 lb
 Length ----- 20.838 in.
 Cannon used with ----- M1, M29, M29A1

Projectile:

Body material ----- Forged steel, or cast PMI
 Color ----- Olive drab w/yellow markings
 Filler and weight ----- Comp. B. 2.10 lb

Components:

Ignition cartridge --- M66A1 with fin assy M149;
 M285 with fin assy M170
 Propellant charge --- M90 (A and B); M374, M90A1 (A and B) M374A2
 Percussion primer --- M71A2
 Fin assembly --- M149 with ignition ctg. M66A1; M170 with ignition ctg. M285
 Fuze ----- PD, M524 series
 PD, M526 series
 PD, M567
 PD, M716
 Prox, M532

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 in jungle wrap, 1 round per plastic container in barrier bag; 3 containers per wooden box.

*Packing Box:

Weight ----- 51.0 lb
 Dimensions ----- 26-3/16 x 13-15/16 x 6-25/32 in.
 Cube ----- 1.4 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- (08) 1.2
 Storage compatibility group ----- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
 DODAC ----- 1315-C236, 1315-C256
 Drawing number ----- W/fuze, 8881026
 W/o fuze, 9225283

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (meters)	(yds)
0*	210	403	442
1	341	1001	1095
2	433	1529	1674
3	505	1988	2175
4	577	2475	2710
5**	656	2955	3237
6	709	3416	3740
7	764	3831	4190
8	814	4197	4598
9	856	4500	4932

*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 9 is the ignition cartridge and nine increment charges. (NOTE: Increment A is used as Charge 1 and will be one of the increments assembled when firing above Charge 1).

**Charge 5 is the maximum authorized for firing in Mortar M1.

Limitations:

Firing with more than five propellant increment charges (Charge 5) is not authorized in Mortar M1. When firing as many as 10 cartridges with maximum charge (Charge 9) in Mortar M29, the rate of fire will not exceed 12 rounds-per-minute. Occasional short rounds will occur when firing at charge 3 or below. Rounds assembled with Fuze, PD, M524A1, M524A2, M524A3,

M524A4 are for USMC/USN use only.

References:

TM 9-3071-1
TM 9-1015-200-12
TM 9-1300-251-20

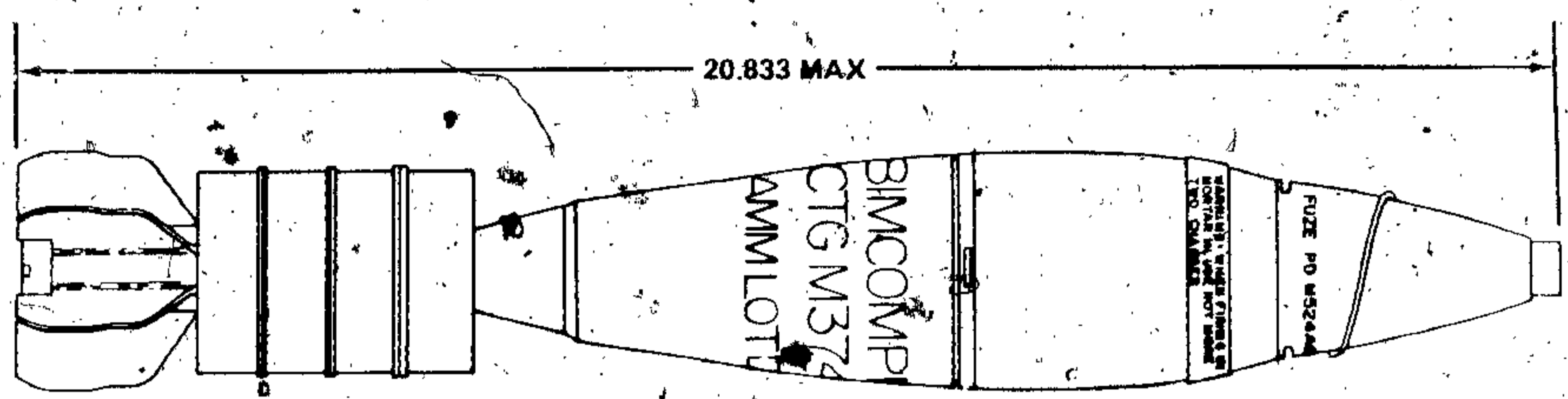
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TM-43-0001-28

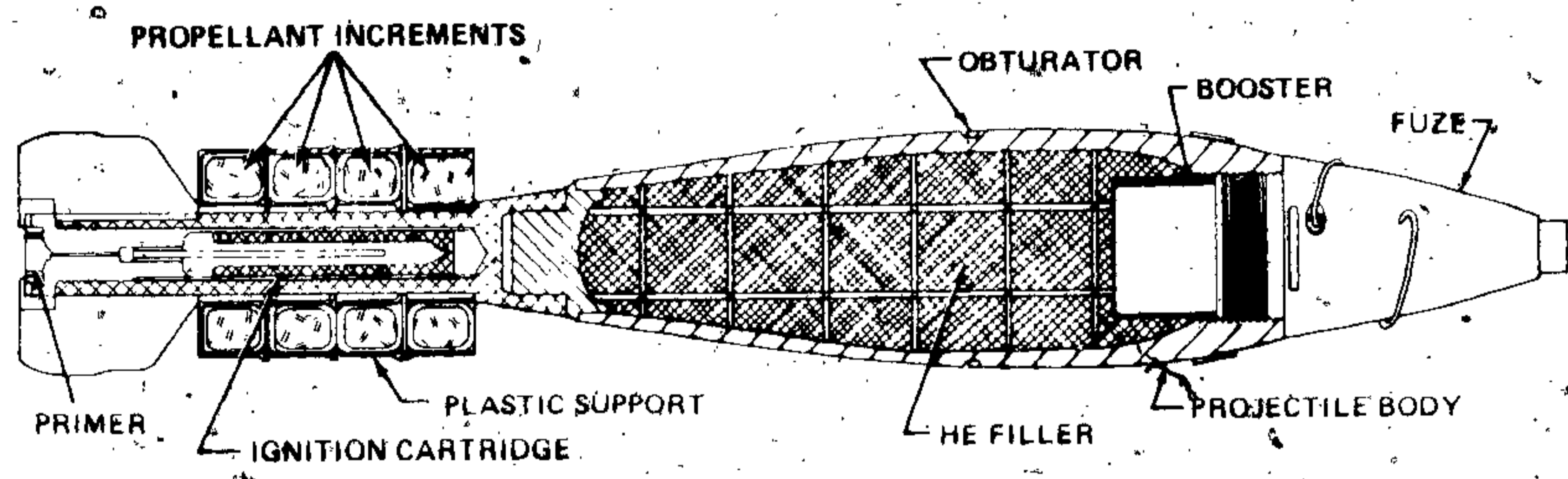
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TM 43-0001-28

CARTRIDGE, 81 MILLIMETER: HE, M374A3 (M374A2E1)



AR199480



AR199479

Type Classification:

Std MSR-05756028.

Use:

This cartridge is used against personnel and materiel, providing both blast and fragmentation effects.

Description:

The complete round consists of a projectile body, a point-detonating fuze, a fin assembly, four propellant charge increments, an ignition cartridge, and a percussion primer. The steel alloy body is threaded internally at the nose to accept the fuze, and threaded externally at the base to accept the fin assembly. The

projectile body is filled with Comp B high explosive. The paper and brass ignition cartridge assembly contains a Percussion Primer M35, a black powder pellet, and approximately 115 grains of Propellant M9. Surrounding the fin assembly are four horseshoe-shaped Propelling Charge M205 increments. Each Propelling Charge M205 increment consists of a nitrocellulose container holding approximately 400 grains of Propellant M10. A protective plastic propelling charge support surrounds the four propelling charge increments.

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

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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. Functioning of the fuze detonates the fuze booster charge, in turn, detonating the high explosive charge. The projectile bursts on the target, producing near optimum blast and fragmentation effect.

Tabulated Data:

Complete round:

Type-----HE
 * Weight (as fired)-----9.05 lb
 Length-----20.813 in. (20.833
 when assembled
 with Fuze PD,
 M524A6)
 Cannon used with-----M1, M29 and
 M29A1.

Projectile:

Body material-----Steel alloy
 Color-----O.D. w/yellow
 markings
 Filler and weight-----Comp. B, 2.10 lb
 Fuze-----PD, M567; PD,
 M524A6 (Alter-
 nate)
 Fin assembly-----M24
 Propelling charge-----M205
 Propellant-----M10
 Ignition cartridge-----M299
 Primer-----Perc., M35

Performance:

Charge	Muzzle Velocity (fps)	Maximum Range (meters)	(yds)
(0) ignition cartridge only	215	454	504
(1) ignition cartridge and 1 increment charge	438	1,633	1,814
(2) ignition cartridge and 2 increment charges	608	2,866	3,184
(3) ignition cartridge and 3 increment charges	750	4,013	4,459
(4) ignition cartridge and 4 increment charges	879	4,800	5,333

Maximum range-----5,333 yd
 Muzzle velocity-----879 fps

Temperature Limits:

Firing:

Lower limit-----
 Upper limit-----

Storage:

Lower limit----- -65°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 in jungle wrap; 3 containers in wirebound box

*Packing Box:

Weight-----49.4 lb
 Dimensions-----25-1/8 x 15-1/4 x 7-9/16 in.
 Cube-----1.7 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class----- (08) 1:2
 Storage compatibility group-----E
 DOT shipping class-----A
 DOT designation-----AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
 DODAC-----1315-6256
 Drawing number-----P9241291

Limitations:

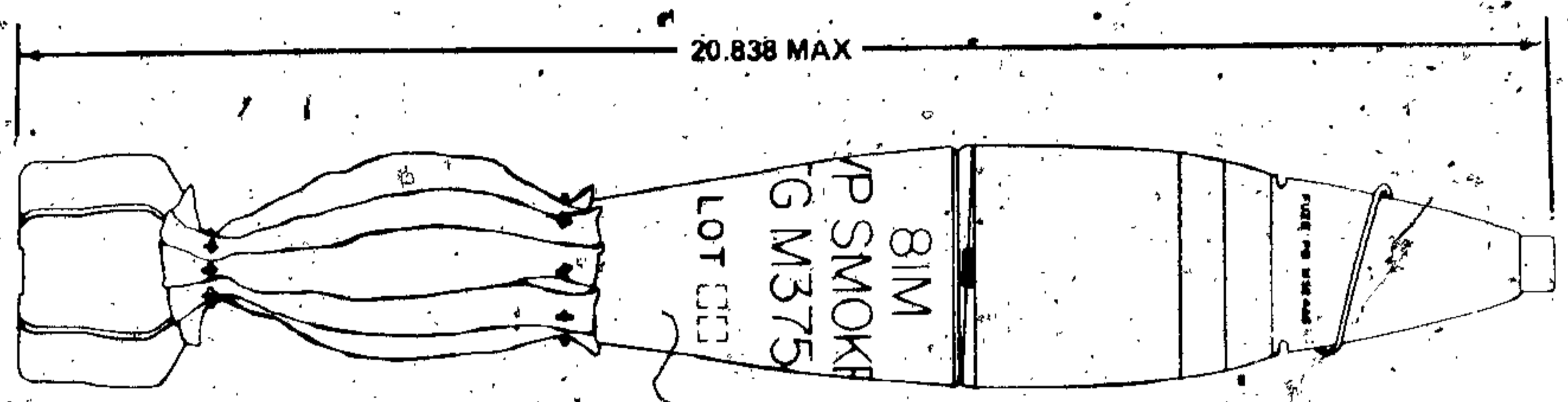
Firing with more than two propellant increments (Charge 2) is not authorized in Mortar M1.

References:

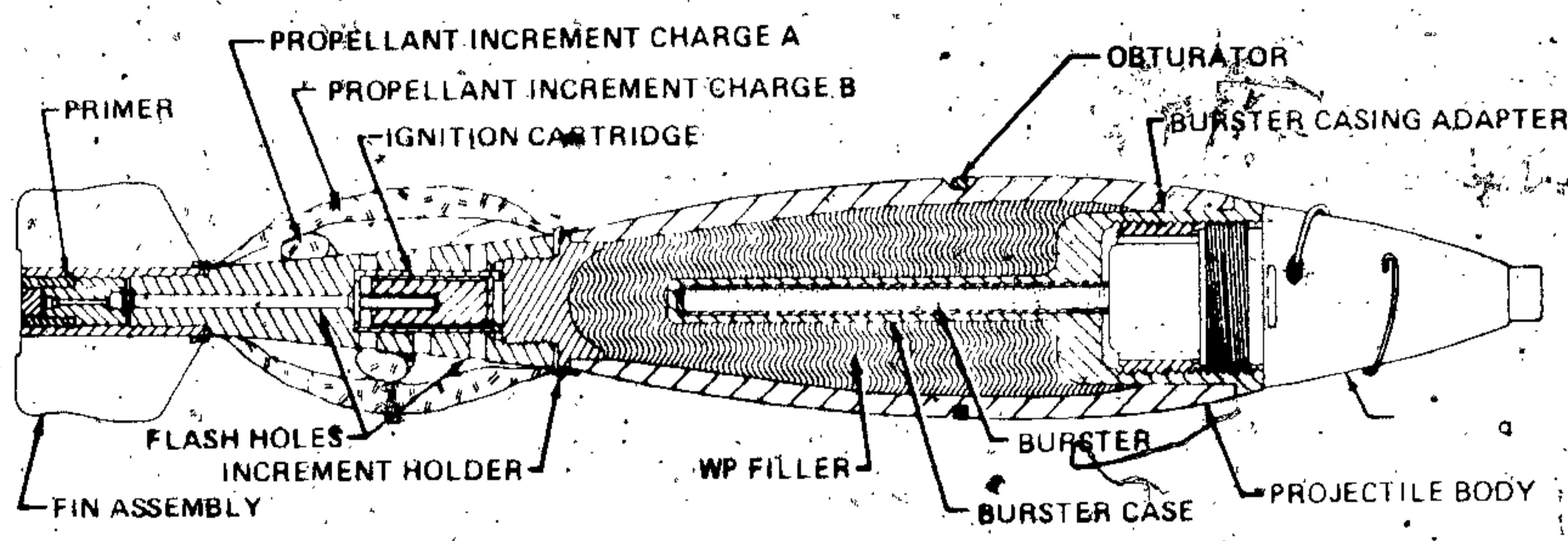
SC 1305/30-1L
 SB 700-20
 DARCOM-P 700-3-3
 TM 9-1015-200-12
 TM 9-1300-251-20
 TM 9-3071-1

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CARTRIDGE, 81-MILLIMETER: SMOKE, WP, M375A2 AND M375A1



AR199474



AR199473

Type Classification:

Std AMCTCM 7321 dtd 1969.

Use:

This cartridge is used to produce a screening smoke and as an incendiary device against personnel and materiel.

Description:

The complete round consists of a projectile body with burster assembly, a PD or proximity fuze, a fin assembly that includes a cartridge housing, a propellant charge including two types of increment charges, an ignition cartridge, and a percussion primer. The base of the projectile is externally threaded to accept the fin assembly. The projectile nose is fitted with an internally threaded adapter designed to receive

the fuze and hold the burster assembly. The burster assembly consists of a burster casing containing a small RDX burster charge. The burster casing is press-fitted into the adapter in the nose. The projectile is loaded with a white phosphorous filler. The fins are canted at 5 degrees at the rear to spin-stabilize the projectile in flight.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the hub of the fin assembly strikes the firing pin in the base cap of the mortar. The burning primer flashes through the central flash hole in the cartridge housing, igniting the ignition cartridge. The cartridge ignites the propellant charge. The propellant gases expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. Functioning of

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the fuze detonates the burster charge, which ruptures the projectile, dispersing the white phosphorous. The white phosphorous ignites on contact with the air, producing a cloud of dense white smoke with some incendiary effect.

Difference Between Models:

Models are identical except that the fin assembly with M375A2 is M170, while M375A1 uses M149 fin assembly. Also, M375A2 has a moisture-proof ignition system and propelling charge.

Tabulated Data:

Complete round:

Type ----- Smoke, WP
 Weight ----- 9.34 lb
 Length ----- 20.838 in.
 Gannon used with ----- M1, M29, & M29A1

Projectile:

Body material ----- Forged steel, or cast pearlitic malleable iron
 Color ----- Light green w/yellow band and light red markings
 Filler and weight ----- WP, 1.60 lb
 Fuze ----- PD, M524 series, PD, M526 series, PD, M567, PD, M716, or Prox., M532

Fin assembly ----- M170 (M375A2)
 M149 (M375A1)

Propelling charge:

Propellant ----- M90A1 (A&B)
 Ignition cartridge ----- M285 (M375A2)
 M66A1 (M375A1)
 Primer ----- Perc., M71A1 or M71A2

Performance:

Charge	Muzzle Velocity	Maximum Range	
	(fps)	(meters)	(yds)
(0) Ignition cartridge only	210	403	422
(1) Ignition cartridge and 1 increment charge	341	1,001	1,095
(2) Ignition cartridge and 2 increment charges	433	1,529	1,674
(3) Ignition cartridge and 3 increment charges	505	1,988	2,175
(4) Ignition cartridge and 4 increment charges	577	2,475	2,710
(5) Ignition cartridge and 5 increment charges	656	2,995	3,237
(6) Ignition cartridge and 6 increment charges	709	3,416	3,740

(7) Ignition cartridge and 7 increment charges	764	3,831	4,190
(8) Ignition cartridge and 8 increment charges	814	4,197	4,598
(9) Ignition cartridge and 9 increment charges	856	4,500	4,932

Maximum range ----- 4,932 yards
 Muzzle velocity ----- 856 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 in jungle wrap, or 1 round per plastic container in barrier bags, 3 containers in wooden box.

*Packing Box:
 Weight ----- 51.0 lb
 Dimensions ----- 26-13/16 x 13-15/16 x 6-25/32 in.
 Cube ----- 1.4 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 5
 Storage compatibility group ----- A
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
 DODAC ----- 1315-C276
 Drawing number ----- 9240953 (M375A2)
 9251985 (M375A1)

Limitations:

Increment A is used as Charge 1 and will be one of the increments assembled when firing above Charge 1. Firing with more than five propellant increment charges (Charge 5) is not authorized in Mortar M1. When firing as many as ten cartridges with maximum charge (Charge 9) in Mortar M29, the rate of fire will not exceed 12 rounds per minute.

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Occasional short rounds will occur when firing at Charge 3 or below in Mortar M29.

Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler. Rounds assembled with

Fuze, PD, M524A1, M524A2, M524A3 or M524A4 are for USMC/USN use only.

References:

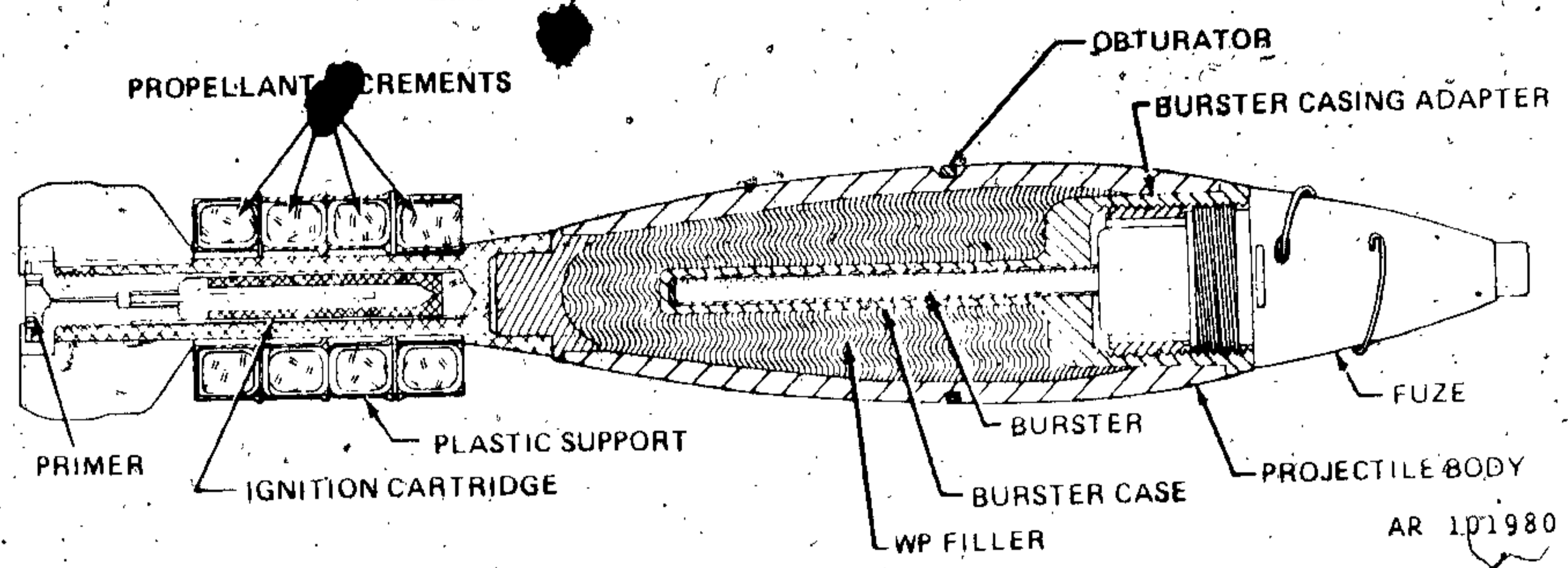
- DAPCOM-P 700-3-3
- TM 9-1015-215-12
- TM 9-3071-1
- SB 700-20
- SC 1305/30-IL

TM 43-0001-28

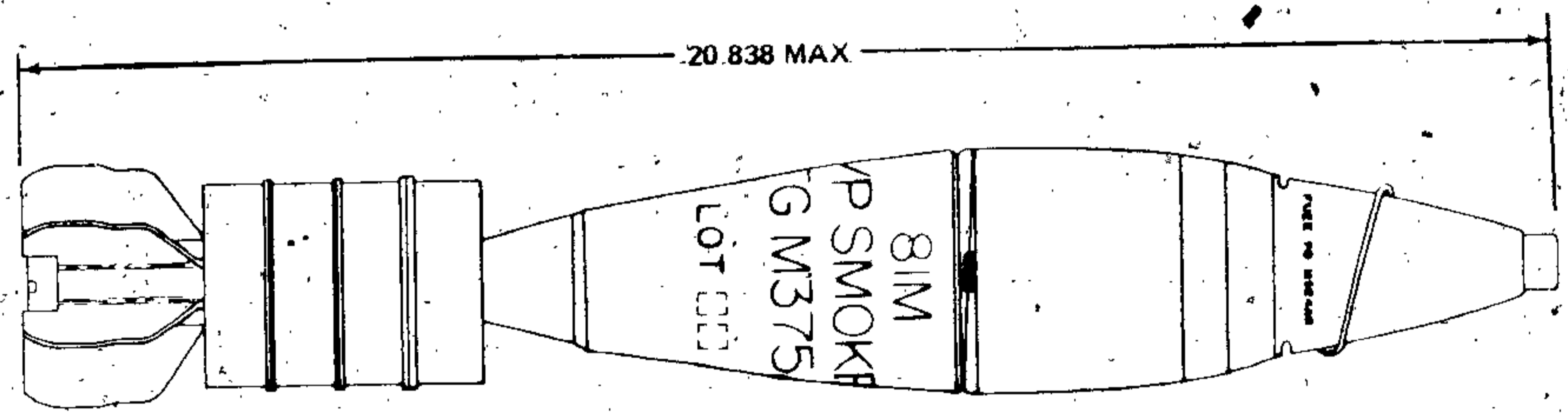
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TM 43-0001-28

CARTRIDGE, 81 MILLIMETER: SMOKE, WP, M375A3



AR 101980



AR 101979

Type Classification:

Std MSR-05756028

Use:

This cartridge is used to produce a screening smoke and as an incendiary device against personnel and materiel.

Description:

The complete round consists of a projectile body with burster assembly, a PD or proximity fuze, a fin assembly that includes a cartridge housing, a propellant charge including two types of increment charges, an ignition cartridge, and a percussion primer. The base of the projectile is externally threaded to accept the fin assembly. Surrounding the fin assembly are four

horseshoe-shaped Propelling Charge M205 increments. Each Propelling Charge M205 increment consists of a nitrocellulose container holding approximately 400 grains of Propellant M10. A protective plastic propelling charge support surrounds the four propelling charge increments. The projectile nose is fitted with an internally threaded adapter designed to receive the fuze and hold the burster assembly. The burster assembly consists of a burster casing containing a small RDX burster charge. The burster casing is press-fitted into the adapter in the nose. The projectile is loaded with a white phosphorous filler. The fins are canted at 5 degrees at the rear to spin-stabilize the projectile in flight.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in

TM 43-0001-28

The hub of the fin assembly strikes the firing pin in the base cap of the mortar. The burning primer flashes through the central flash hole in the cartridge housing, igniting the ignition cartridge. The cartridge ignites the propellant charge. The propellant gases expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. Functioning of the fuze detonates the burster charge, which ruptures the projectile dispersing the white phosphorous. The white phosphorous ignites on contact with the air, producing a cloud of dense white smoke with some incendiary effect.

Tabulated Data:

Complete round:

Type-----Smoke, WP
 Weight (as fired)-----9.10 lb
 Length-----20.838 in.
 Cannon used-----M1, M29 and M29A1

Projectile:

Body material-----Forged steel, or cast pearlitic malleable iron
 Color-----Light green w/ yellow band and light red markings
 Filler and weight-----WP, 1.60 lb
 Fuze-----PD, M567; PD, M524A6 (Alternate)

Fin assembly:

-----M24
Propelling charge:
 Propellant-----M205
 Ignition cartridge-----M299
 Primer-----Perc., M35

Performance:

Charge	Muzzle Velocity (fps)	Maximum Range	
		(meters)	(yds)
(0) ignition cartridge only	222	454	504
(1) ignition cartridge and 1 increment charge	438	1,633	1,814
(2) ignition cartridge and 2 increment charges	608	2,866	3,184
(3) ignition cartridge and 3 increment charges	750	4,013	4,459
(4) ignition cartridge and 4 increment charges	879	4,800	5,333

Maximum range-----5,333 yd
 Muzzle velocity-----879 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 in jungle wrap, 3 containers in wirebound box

*Packing Box:

Weight-----49.4 lb
 Dimensions-----25-1/8 x 15-1/4 x 7-9/16 in.
 Cube-----1.7 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class----- (12) 1.2
 Storage compatibility group-----G
 DOT shipping class-----A
 DOT designation-----AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
 DODAC-----1315-C276
 Drawing number-----9294735 (M375A3)

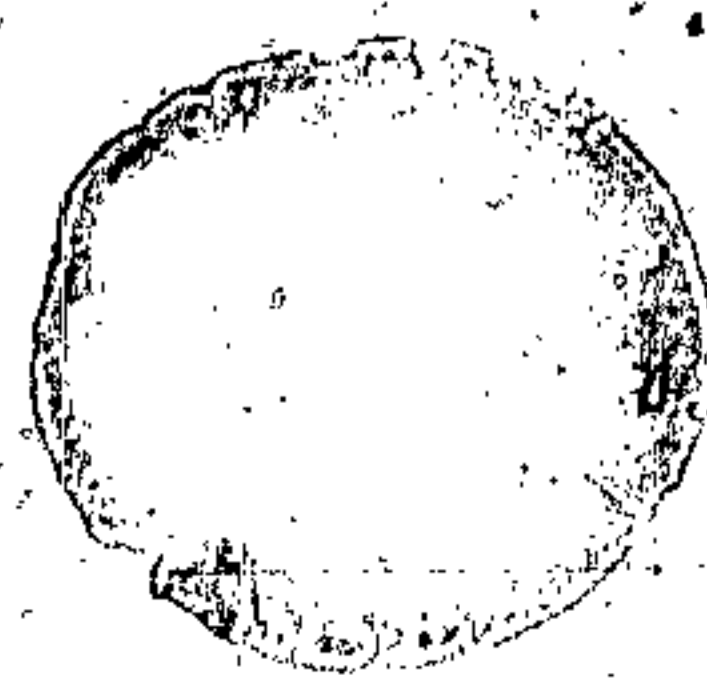
Limitations:

Firing with more than two propellant increments (Charge 2) is not authorized in Mortar M1.

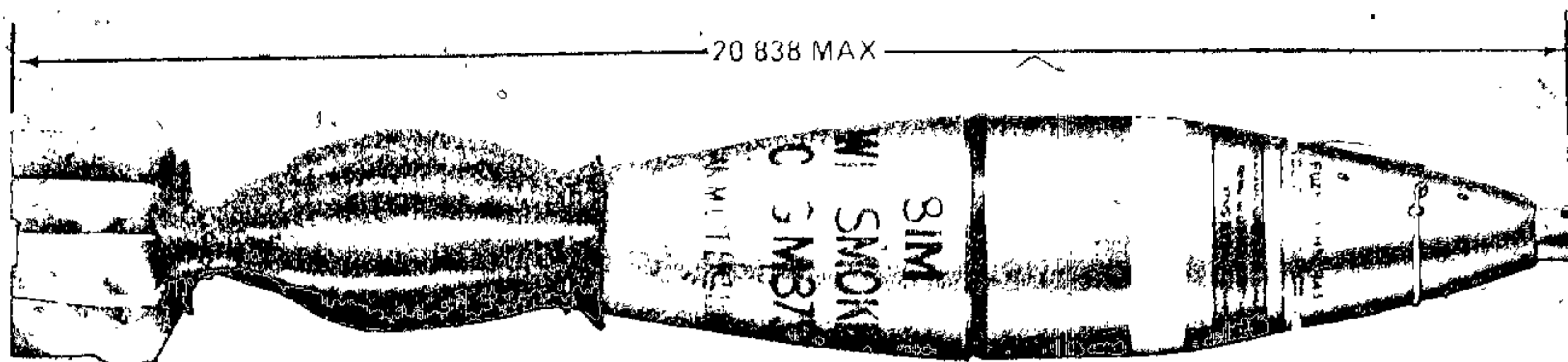
Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases; so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

References:

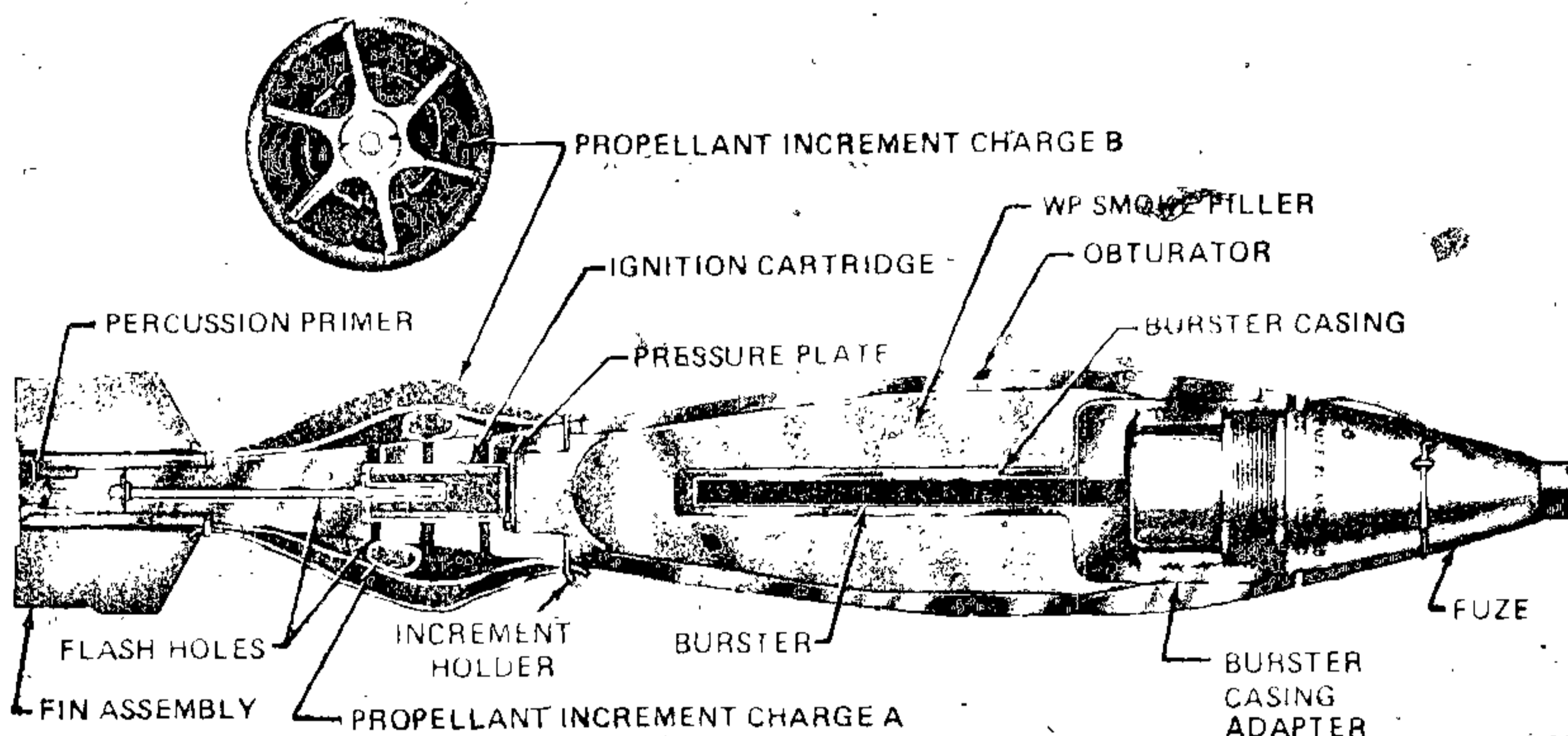
DARCOM-P 700-3-9
 TM 9-1015-215-12
 TM 9-3071-1
 SB 700-20
 SC 1305/30-IL



CARTRIDGE, 81-MILLIMETER, SMOKE, WP, M375



AR198478



AR198477

Type Classification:

Std AMTC 7379 dtd 1969.

Use:

This cartridge is used to produce a screening smoke and as an incendiary device against personnel and materiel.

Description:

The complete round consists of a projectile body with burster assembly, a PD or proximity fuze, a fin assembly that includes a cartridge housing, a propellant charge including two types of increment charges, an ignition cartridge, and a percussion primer. The base of the projectile is externally threaded to accept the fin assembly. The projectile nose is fitted with an internally threaded adapter designed to receive

the fuze and hold the burster assembly. The burster assembly consists of a burster casing containing a small RDX burster charge. The burster casing is press fitted into the adapter in the nose. The projectile is loaded with a white phosphorous filler. The fins are canted at 5 degrees at the rear to spin-stabilize the projectile in flight.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the hub of the fin assembly strikes the firing pin in the base cap of the mortar. The firing primer flashes through the central flash hole in the cartridge housing, igniting the ignition cartridge. The cartridge ignites the propellant charge. The propellant gases expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight.

* Functioning of the fuze detonates the burster charge, which ruptures the projectile, dispersing the white phosphorous. The white phosphorous ignites on contact with the air, producing a cloud of dense white smoke with some incendiary effect.

Tabulated Data:

Complete round:

Type ----- Smoke, WP
 Weight ----- 9.34 lb
 Length ----- 20.838 in.
 Cannon used with ----- M1, M29, & M29A1

Projectile:

Body material ----- Forged steel, or cast pearlitic malleable iron
 Color ----- Light green w/ yellow band and light red markings
 Filler and weight ----- WP, 1.60 lb
 Fuze ----- PD, M524 series, PD, M526 series, PD, M567, PD, M716, or Prox., M532
 Fin assembly ----- M149

Propelling charge:

Propellant ----- M90 (A&B)
 Ignition cartridge ----- M66A1
 Primer ----- Perc., M71A2

Performance:

Charge	Muzzle Velocity (fps)	Maximum Range (meters)	(yds)
(0) Ignition cartridge only	210	403	442
(1) Ignition cartridge and 1 increment charge	341	1,001	1,095
(2) Ignition cartridge and 2 increment charges	433	1,529	1,674
(3) Ignition cartridge and 3 increment charges	505	1,988	2,175
(4) Ignition cartridge and 4 increment charges	577	2,475	2,710
(5) Ignition cartridge and 5 increment charges	656	2,995	3,237
(6) Ignition cartridge and 6 increment charges	709	3,416	3,740
(7) Ignition cartridge and 7 increment charges	764	3,831	4,190
(8) Ignition cartridge and 8 increment charges	814	4,197	4,598
(9) Ignition cartridge and 9 increment charges	856	4,500	4,932

Maximum range ----- 4,932 yards
 Muzzle velocity ----- 856 fps

4-46 Change 6

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 in jungle wrap, or 1 round per plastic container in barrier bag; 3 containers in wooden box

*Packing Box:

Weight ----- 51.0 lb
 Dimensions ----- 26-13/16 x 13-15/16 x 6-25/32 in.
 Cube ----- 1.4 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 5
 Storage compatibility group ----- A
 DOT shipping class ----- A
 DOT designation ----- AMUNITION FOR CANNON WITH SMOKE PROJECTILES
 DODAC ----- 1315-C276
 Drawing number ----- 8885264

Limitations:

Increment A is used as Charge 1 and will be one of the increments assembled when firing above Charge 1. Firing with more than five propellant increment charges (Charge 5) is not authorized in Mortar M1. When firing as many as ten cartridges with maximum charge (Charge 9) in Mortar M29, the rate of fire will not exceed 12 rounds per minute. Occasional short rounds will occur when firing at Charge 3 or below in Mortar M29.

Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

Rounds assembled with Fuze, PD, M524A1, M524A2, M524A3 or M524A4 are for USMC/USN use only.

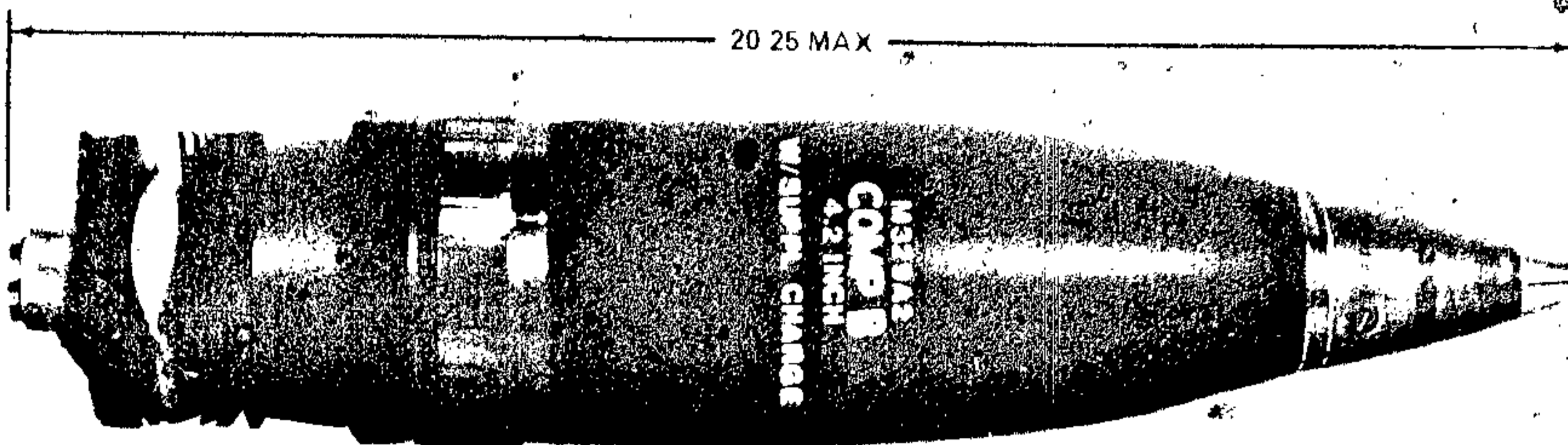
References:

- SC 1305/30-1L
- SB 700-20
- DARCOM-P 700-3-3

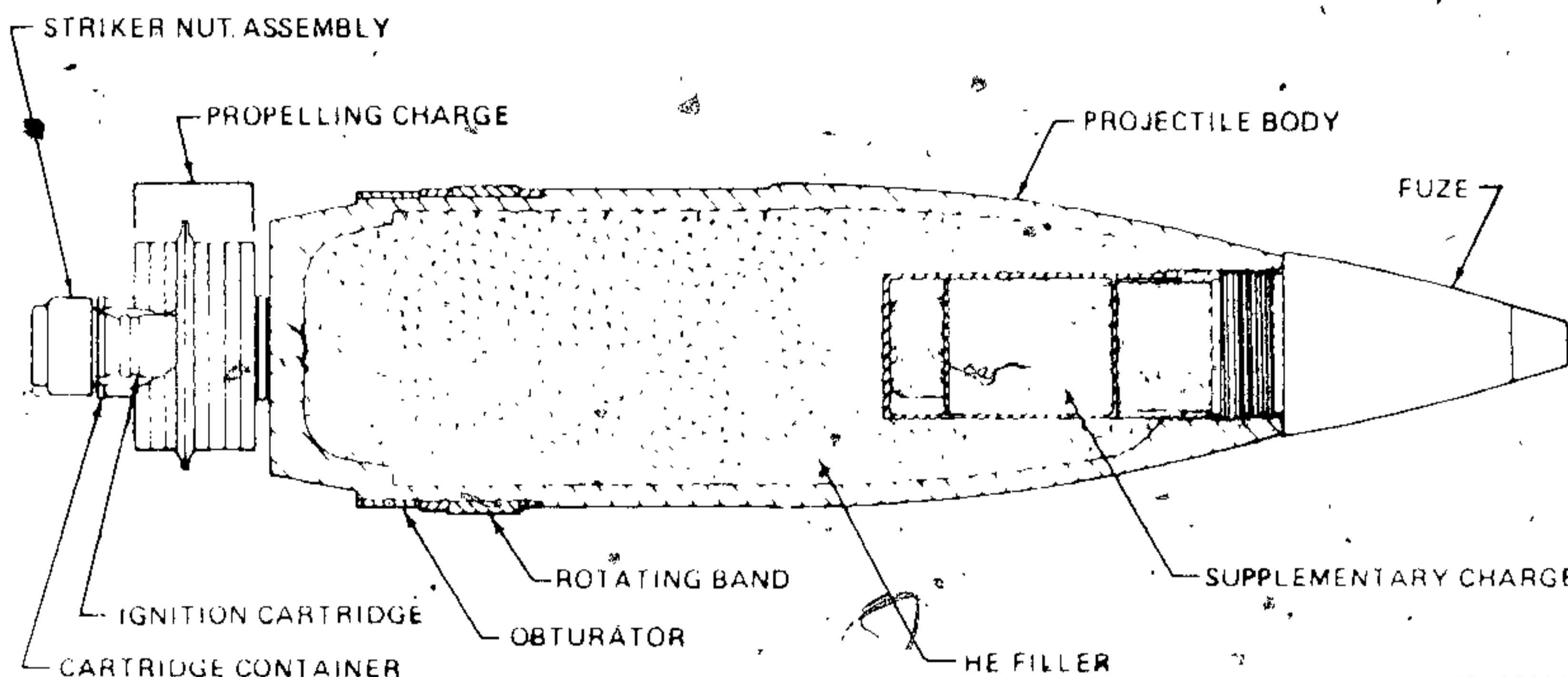
- TM 9-1015-200-12
- TM 9-1300-251-20
- TM 9-3071-1

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CARTRIDGE, 4.2-INCH: HE, M329A2 (M329A1E1)



AR199446



AR 199445-A

Type Classification:

Std LCC-A MSR 01756033.

Use:

This cartridge is used against personnel and materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body, a fuze, and a tail assembly. The forged steel body has a preengraved rotating band and a neoprene rubber obturating ring near the base, and is designed to accommodate an impact, delay, or proximity fuze. Below the nose is a deep

fuze cavity containing a TNT supplementary charge which is removed when using a long-intrusion proximity fuze. The tail assembly consists of a cartridge container and ignition cartridge, a propelling charge, and a striker nut assembly.

Functioning:

The cartridge is positioned so that the preengraved rotating band aligns with the rifling grooves in the bore of the tube. When the cartridge is released, it slides down the mortar tube until the striker point in the striker nut assembly strikes the weapon firing pin. The striker point functions the percussion primer in the ignition cartridge. The flash from the primer ignites the ignition cartridge which, in turn, ignites the propelling charge. The gas

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from the propelling charge exerts pressure on the base of the projectile, expands the obturator, and forces the projectile back up the tube. The pre-engraved rotating band is engaged in the rifling and imparts spin to the projectile. The spin stabilizes the projectile in flight. Functioning of the fuze detonates the supplementary charge and, in turn, the high explosive charge. Depending upon the type of fuze used, the projectile bursts either over or on the target, producing near optimum fragmentation and blast effect.

Tabulated Data:

Complete round:
Type-----HE
Weight-----22.00 lb
Length-----20.25 in.
Cannon used with-----M2, M30

Projectile:
Body material-----Forged steel
Color-----Olive drab w/yel-
low markings
Filler and weight-----Comp B. 5.75 lb

Components:
Ignition cartridge-----M2A2*
Propelling charge-----M36A2*
Fuzes-----PD, M557; MTSQ,
M548; Prox.,
M728, M732

Performance (full charge):
Maximum range-----6600 meters
Muzzle velocity-----308 mps

*NOTE: See separate data sheets.

Temperature Limits:

Firing:
Lower limit-----40°F
Upper limit-----+125°F

Storage:
Lower limit-----65°F (for period
not more than
3 days)
Upper limit-----+160°F (for per-
iod not more
than 4 hr/day)

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

*Packing Box:
Weight-----63 lb
Dimensions-----25-3/4' x 11-11/16
x 6-3/8 in.
Cube-----1.4 cu ft

*NOTE: See SC for complete packing data includ-
ing NSN's.

Shipping and Storage Data:

Quantity-distance class-----7
Storage compatibility group-----G
DOT shipping class-----A
DOT designation-----AMMUNITION FOR
CANNON WITH EX-
PLOSIVE PROJEC-
TILES
DODAC-----1315-C704
Drawing number-----9235654

Limitations:

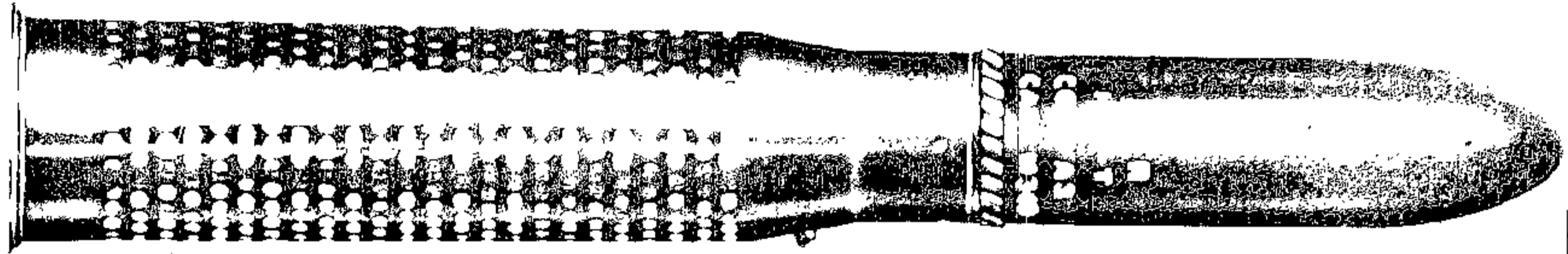
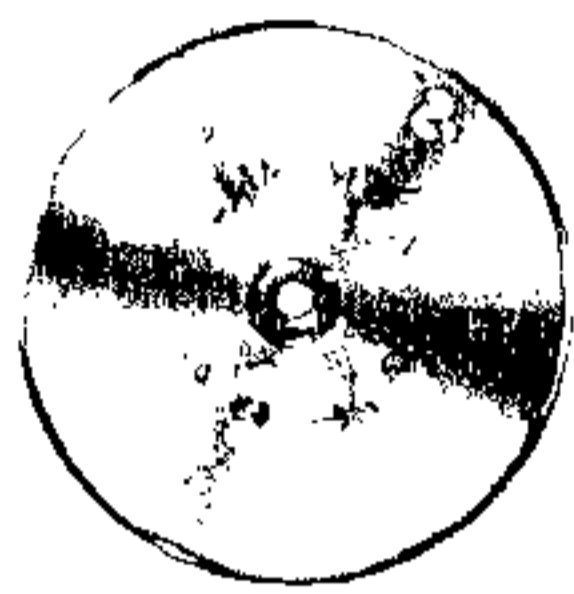
The supplementary charge must be removed
from the nose cavity before attempting to install
a long-intrusion proximity fuze.

References:

SC 1305/30-1L
TM 9-1015-215-12
TM 9-1300-251-20
TM 9-1320-241-12

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CARTRIDGE, 75MM: HEP-T, M349



26.36 MAX

AR 101989

Classification:

MSK 11756003.

This cartridge is designed for use against targets light materiel and personnel.

The complete round consists of a thin steel case with an internally threaded base, assembled to a perforated steel cartridge case. The cartridge contains a filler of 2.55 lb of propellant and employs a base-detonating fuze. The cartridge case contains a propelling charge of perforated propellant, and an igniter and primer, both of which are sealed in a double plastic liner, a percussion primer is

positioned in the base of the cartridge case.

Functioning:

When the weapon is fired, the firing pin strikes the primer and a flash from the primer ignites the tracer (which burns during the early stages of flight) and creates a gas which force the projectile out of the barrel and propel it to the target. On impact, the functioning of the fuze detonates the explosive

Tabulated Data:

Complete round:	
Type-----	HEP-T
Weight-----	16.33 lb
Length-----	26.36 in.
Cannon used with-----	M20 + T21E10

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Projectile:
 Explosive filler-----2.55 lb Comp A3
 Body material-----Steel
 Color-----Olive drab w/yel-
 low markings and
 black bands
 Cartridge case-----M31A1
 Primer-----M47 or M47B2
 Propellant:
 Type-----M10
 Weight-----3.36 lb
 Tracer-----Integral w/fuze
 Fuze, BD-----M91A1

Ballistics:

Maximum range-----7,180 yd;
 6,570 mtr
 Muzzle velocity-----1400 fps

Temperature Limits:

Firing:
 Lower limits-----40°F
 Upper limits-----+125°F
 Storage:
 Lower limits-----80°F (for pe-
 riods of not more
 than 3 days)

Upper limits-----+160°F (for pe-
 riods of not more
 than 4 hr/day)
 Packing-----1 cartridge per
 fiber container;
 2 containers per
 wooden box

Packing box:
 Weight filled-----95 lb
 Dimensions OD-----32 x 11-5/16 x
 7-9/32
 Cube-----1.52 cu ft

Shipping and Storage Data:

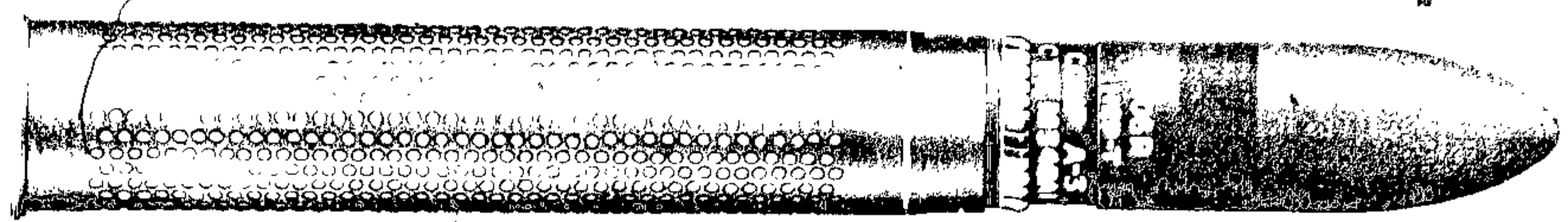
Quantity-distance class-----1.1
 Storage compatibility group-----E
 DOT shipping class-----A
 DOT designation-----AMMUNITION FOR
 CANNON WITH
 EXPLOSIVE PRO-
 JECTILE
 DODAC-----1315-C053
 Drawing No-----75-1-328

References:

TM 9-1300-203/2
 DARCOM-P 700-3-3
 SC 1305/30-1L

CARTRIDGE, 106 MILLIMETER: HEP-T, M346A1

301 MAX



AR 101983

Classification:

std JTCM 37119, dtd 1959.

This cartridge is intended for use against armor targets and is also effective against steel and light materiel.

Description:

The projectile is a thin-walled steel shell with a short ogive and flat base. It has two indexing buttons, spaced 180 degrees, on the forward bourrelet. A pre-engraved groove around the projectile just behind the base. The base is fitted with a functioning fuze with integral tracer. The body of the body is loaded with 7.72 pounds of explosive. The perforated steel cartridge case, which the projectile contains a propelling charge in a rayon and plastic liner. A percussion primer is press fitted to the base.

Operation:

When the weapon is fired, the firing pin strikes the primer and a flash from the primer ignites the tracer (which burns during the early stages of flight) and creates gases which force the projectile out of the gun tube and propel it to the target. On impact, the functioning of the fuze detonates the explosive.

Tabulated Data:

Complete round:

Type-----HEP-T
Weight-----37.37 lb
Length-----38 1/2 in.
Cannon used with-----M40A1 and M40A1C
Projectile:
Explosive filler-----7.72 lb Comp A3
Body materiel-----Steel
Color-----Olive drab w yellow markings and black band

Cartridge case-----M94B1

Propellant:

Type-----M26
Weight-----7.86 lb
Primer-----M57
Fuze BD-----M91A2

Ballistics:

Maximum range-----7,515 yd
Muzzle velocity-----1,635 fps

Temperature Limits:

Firing:

Lower limit-----40°F
Upper limit-----+125°F

Storage:

Lower limit-----80°F (for periods of not more than 3 days)

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Storage: - Continued
 Upper limit-----+160°F (for period
 of not more than
 4 hrs/day)

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

Packing Box:
 Weight-----95 lb
 Dimensions-----27-5/8 x 3-7/16
 x 4-13/16 in.
 Cube-----1.52 cu ft

Shipping and Storage Data:

Quantity-distance class-----1.1
 Storage compatibility group---E
 DOT shipping class-----A
 DOT designation-----AMMUNITION FOR
 CANNON WITH
 EXPLOSIVE PRO-
 JECTILE

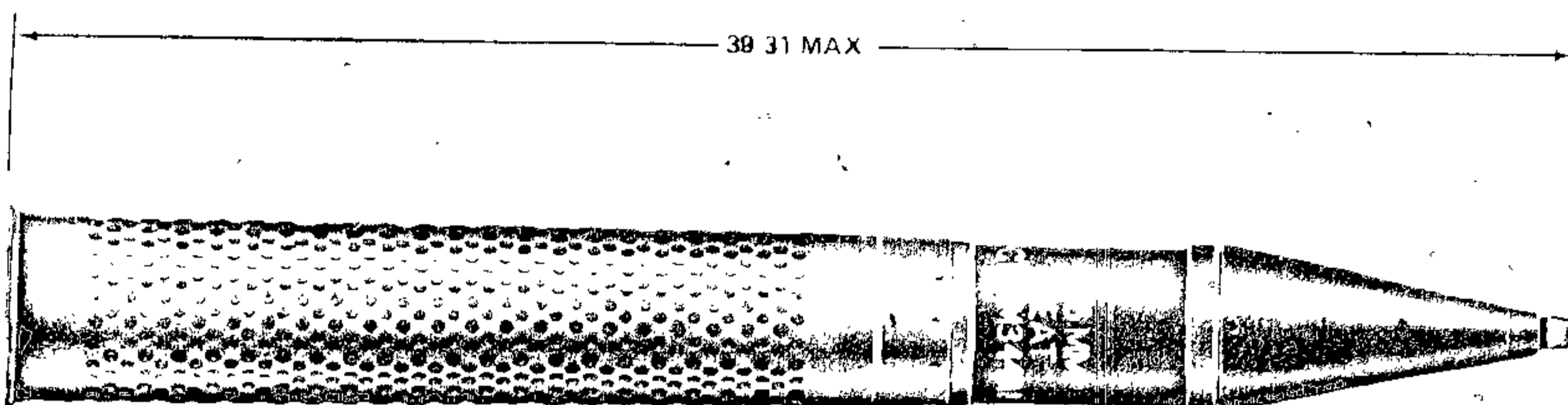
DODAC-----1315-C651
 Drawing No.-----8837335

References:

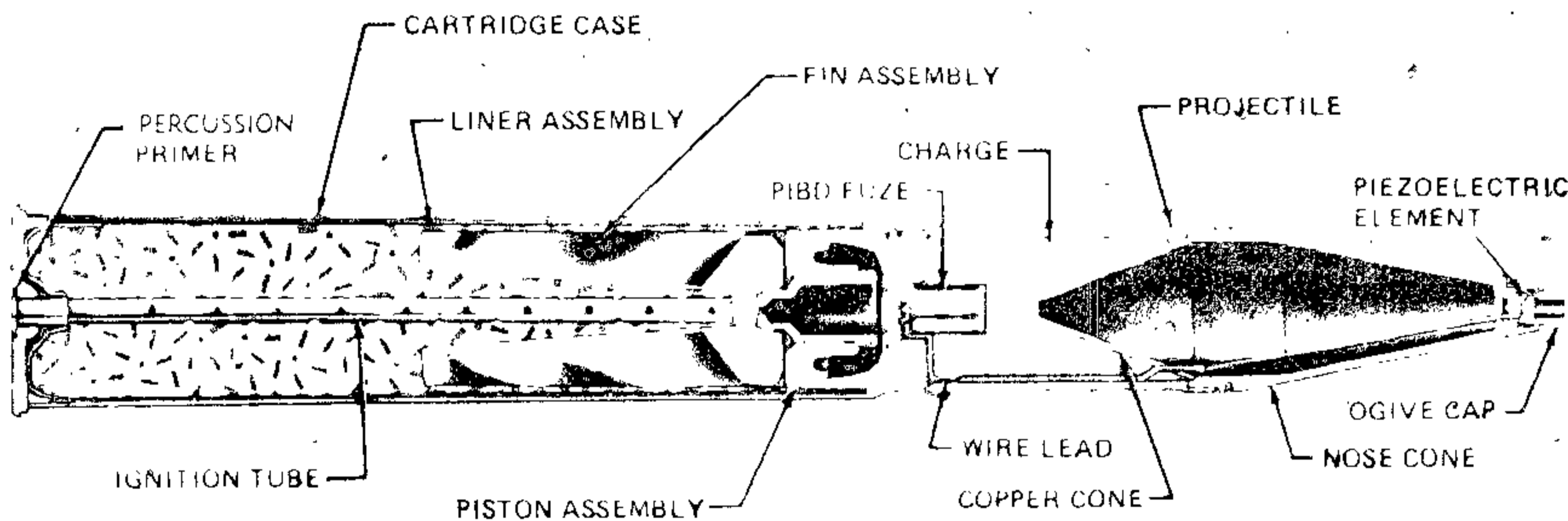
TM 9-1300-203/2
 DARCOM-P 700-3-3
 SC 1305/30-IL

TM 43-0001-28

CARTRIDGE, 106 MILLIMETER: HEAT, M344A1 AND M344



AR199753



AR199752

Type Classification:

Std OTCM 3711959, dtd 1958

This cartridge is used in 106mm recoilless rifles against armored targets.

Description:

The cartridge consists of a perforated, plastic-lined steel cartridge case crimped to a steel projectile containing a shaped charge. The nose cone adapter of the projectile carries a cap with a piezoelectric element to initiate the PIBD fuze in the base. A copper cone within the projectile shapes the charge. The hollow

space within the cone and the adapter provides the appropriate standoff distance between target and shaped charge. An aluminum chamber threaded to the base of the projectile supports the fuze, six folding fins, and a piston assembly for opening the fins. The cartridge case is loosely filled with propellant, and the base is fitted with a percussion primer. The ignition tube of the primer extends through the propelling charge.

Functioning:

The primer ignites the propelling charge when struck by the firing pin. The burning propellant generates rapidly expanding gases to propel the projectile through the barrel and to the target. Recoil is eliminated by controlled



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escape of propellant gases to the rear through openings in the breechblock. Gas pressure also builds up in the piston in the projectile base. When the projectile leaves the muzzle, the piston moves rearward to extend the fins for stability in flight. On impact, distortion of the piezoelectric element generates an electrical charge and initiates fuze functioning to detonate the projectile. Explosion of the shaped charge collapses the copper cone and focuses a high velocity shock wave and a jet of metal particles that penetrates the target.

Difference Between Models:

M344 has a propelling charge of 8.1 lb M10, and the design of the projectile charge-shaping cone is different from M344A1.

Tabulated Data:

Complete round:
 Type-----HEAT
 Weight-----37.23 lb
 Length-----39.31 in.
 Cannon used with-----M40A1, M40A1C

Projectile:
 Body material-----Steel
 Color:
 Old mfg-----Olive drab w/yellow markings
 New mfg-----Black w/yellow markings
 Filler and weight-----Comp B, 2.79 lb

Components:
 Cartridge case:
 M344A1-----M94B1
 M344-----M93 or M93B1
 Propelling charge-----M26 (M344A1);
 M10 (M344)
 Primer-----M57
 Fuze-----PI80, M509A1

Performance:
 Maximum range-----3000 m
 Muzzle velocity-----502.9 mps.

Temperature Limits:

Firing:
 Lower limit-----40°F
 Upper limit-----125°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-----1 round in fiber container; 2 containers in wooden box

*Packing box:
 Weight-----120 lb
 Dimensions-----45-1/16 x 12-5/8 x 7-11/16
 Cube-----2.5 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class-----5
 Storage compatibility group-----E
 DOT shipping class-----A
 DOT designation-----AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES

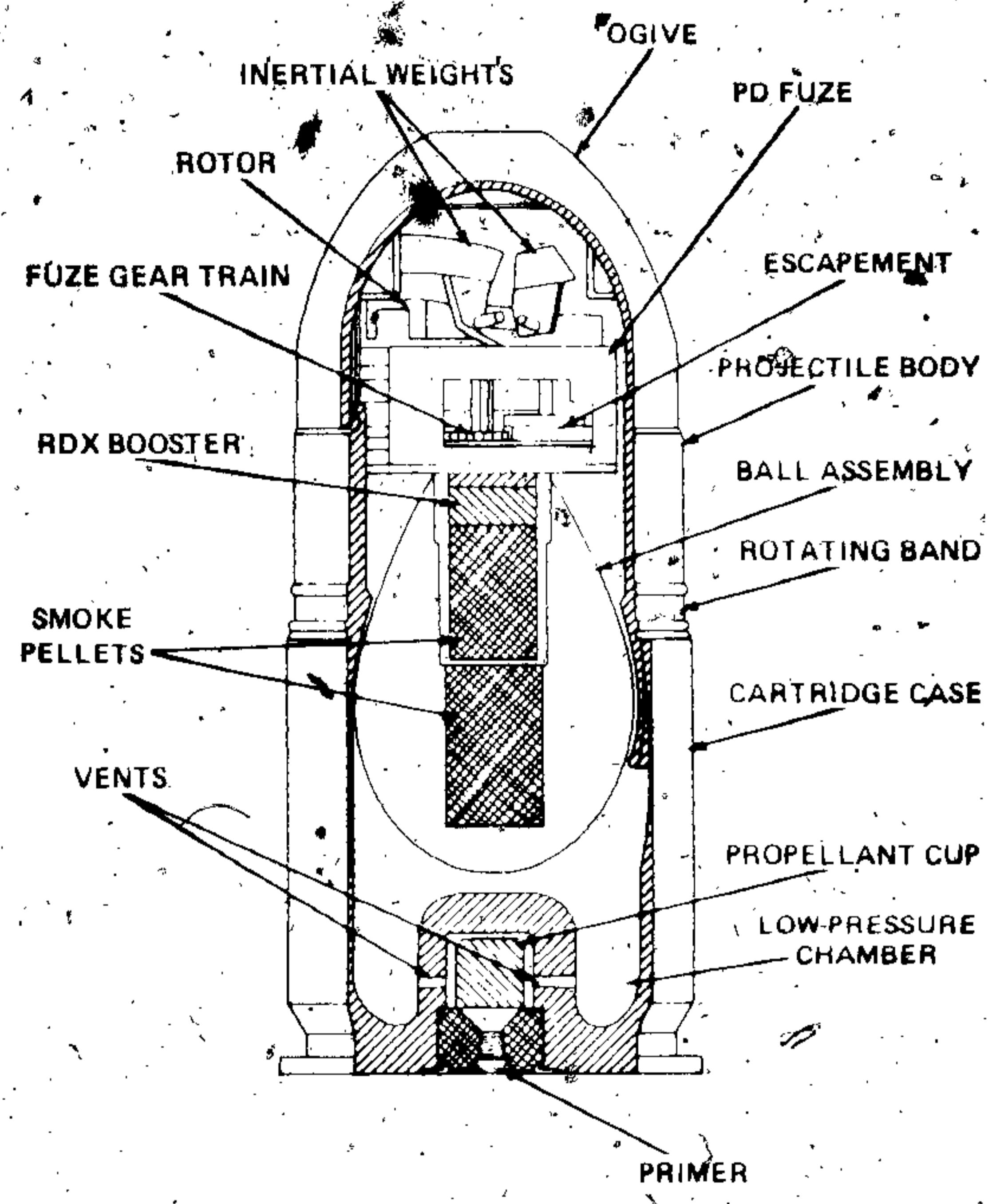
DODAC-----1315-C650
 Drawing number-----7549097 (M344A1);
 75-1-319 (M344)

References:

SC 1305/30-IL
 SB 700-20
 DARCOM-P 700-3-3
 TM 9-1000-205-12
 TM 9-1300-251-20

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CARTRIDGE, 40 MILLIMETER: PRACTICE, M407A1



AR19957

Type Classification:

Std AMCTC 2681, dtd 1964.

Use:

This cartridge is a fixed practice type ammunition designed to be fired from 40mm Grenade Launchers M79 and M203 (attached to the M16/M16A1 rifle).

Description:

This cartridge is a fixed round of ammunition consisting of an aluminum projectile body with a rotating band and a cartridge case assembly. A hollow aluminum ogive is fitted to the front end of the projectile. A plastic ball assembly containing an RDX booster pellet and

two yellow smoke pellets is fitted into the rear end of the projectile. A PD fuze assembly is threaded into the front opening of the ball assembly. The projectile assembly is press-fitted into a cartridge case. The case is a hollow bichambered aluminum cylinder with an annealed brass propellant cup assembly crimped into the center of the cartridge case. The cup contains the propelling charge and percussion primer in the center. The cup acts as a high-pressure chamber while the hollow cavity in the case, which surrounds the cup, acts as a low-pressure chamber.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge in the high-pressure chamber. The burning

propelling charge generates sufficient pressure to rupture the propellant cup and to release the expanding propellant gases through the vent holes into the low-pressure chamber. The rotating end around the projectile engages the rifling in the launcher tube imparting a spin of 3,600 rpm to the projectile. The pressure, created by the expanding propellant gases in the low-pressure chamber, forces the projectile through the tube with a muzzle velocity of 76 meters per second. When the projectile is fired, setback forces cause the fuze setback pin to retract from the fuze rotor. The rotor is held in an unarmed position by a firing pin, a centrifugal lock, and the setback pin in the fuze assembly. Centrifugal force, generated by the rotation of the projectile, causes the three pivoted inertia weights and the centrifugal lock in the fuze, to move outward. In turn, the spring loaded firing pin and the lock retract from the rotor and fuze gear train, respectively. The rotor, now free to rotate, lines up the fuze detonator with the explosive train. A fuze escapement mechanism delays arming by controlling rotor movement. The fuze arms after the projectile has traveled at least 14 to 27 meters (46 to 90 feet) from the launcher tube. Upon impact with the target, the firing pin is forced into the detonator. Concurrently, the detonator ignites the RDX booster pellet which fragments the plastic ball and ignites the two yellow smoke pellets, causing a puff of yellow smoke which simulates explosive impact.

Tabulated Data:

Complete round:

Type-----Practice
 Weight-----50 lb
 Length-----3.894 in.
 Weapons used with-----M79, M203 40mm
 grenade launchers
 (attached to M16/
 M16A1 rifle)

Projectile:

Body material-----Aluminum skirt
 and plastic
 ball
 Color-----Blue w/white
 markings
 Filler and weight-----Yellow dye
 Fuze-----PD, M551

Propelling charge:

Cartridge case-----M118
 Propellant-----M9, 330 mg
 Primer-----M42, FED 100.

Performance:

Maximum range-----400 meters
 Muzzle velocity-----76 mps (249 fps)

Temperature Limits:

Firing:
 Lower limit-----25°F (-31.5°C)
 Upper limit-----+110°F (43°C)
 Storage:
 Lower limit-----30°F (-34°C)
 Upper limit-----+145°F (62.5°C)

*Packing-----6 rounds per
 bandoleer; 12
 bandoleers (72
 rounds) per box

*Packing Box:

Weight-----54 lb
 Dimensions-----17-3/4 x 14-1/8
 x 11-15/32 in.
 Cube-----1.7 cu ft

*NOTE: See SC for complete packing data including NSN's.

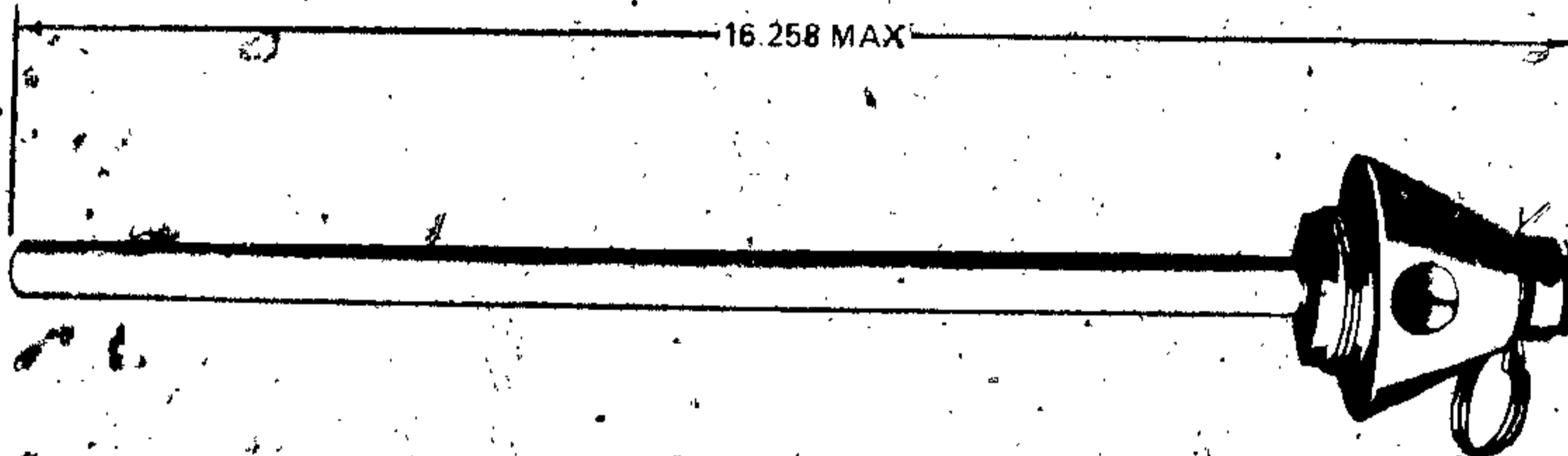
Shipping and Storage Data:

Quantity-distance class-----1.2
 Storage compatibility group-----C
 DOT shipping class-----C
 DOT designation-----CARTRIDGES,
 PRACTICE AMMUNI-
 TION
 DODAC-----1310-8577
 Cartridge drawing number-----8835952
 Packing drawing number-----8835104, 8835105

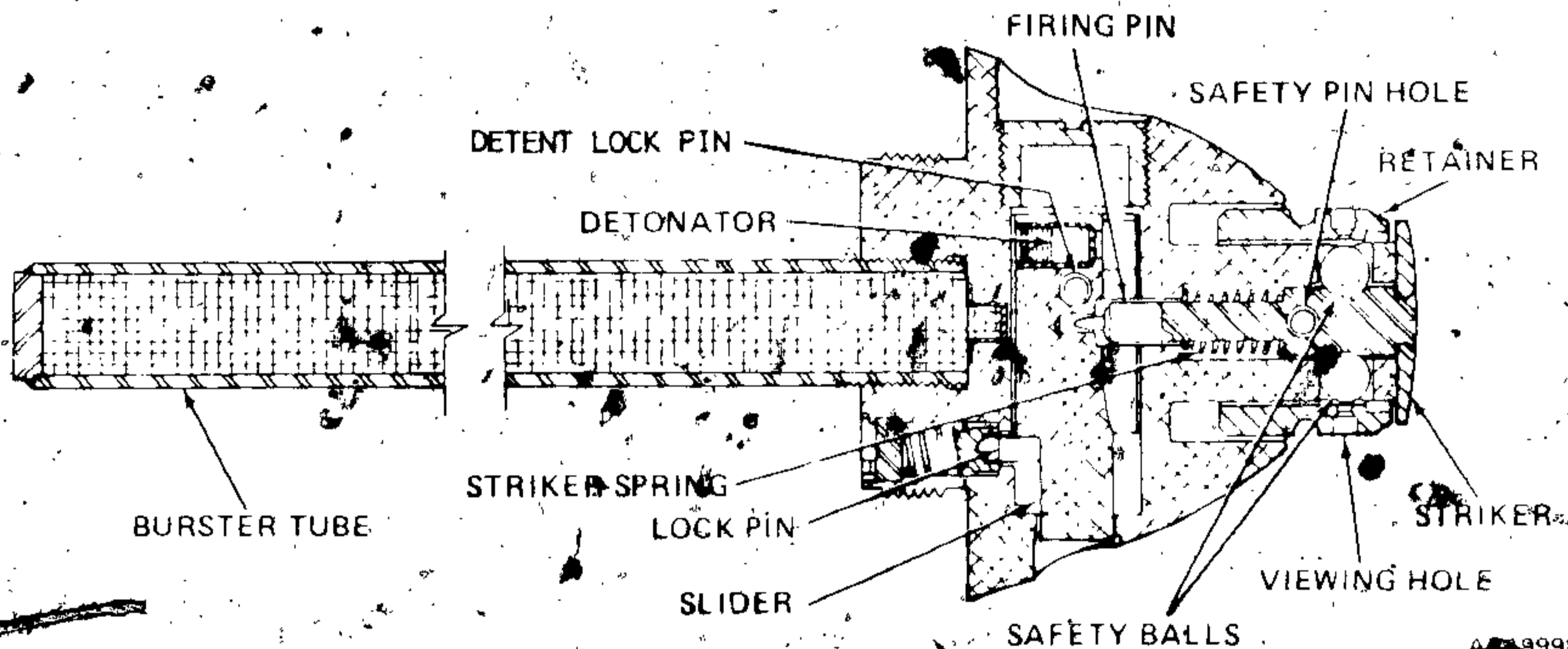
References:

SC 1305/30-11
 TM 9-1005-249-10
 TM 9-1010-205-10
 TM 9-1010-221-10
 SB 700-20

FUZE, POINT DETONATING: M8



AR199981



A 99980-A

Type Classification:

Std OTCM 36841 dtd 1958.

Use:

Point Detonating Fuze M8 is a superquick action impact fuze used with 4.2-inch mortar gas and smoke cartridges.

Description:

The aluminum body of the fuze contains a spring-loaded striker at the nose mounted within a movable circular retainer. The striker and integral firing pin are retained in the unarmed position by a shear wire (not shown in illustration) and a removable safety pin.

Two safety balls are positioned by detents between the striker and the retainer. A slider containing the detonator and designed to position the detonator in line with the firing pin is mounted transversely in the fuze body and is secured by a setback pin. A hole or slot is present in the retainer of some fuzes for viewing position of the safety balls. A 14-inch long burster tube is threaded into the base of the fuze.

Functioning:

The safety pin is pulled from the fuze just prior to firing. Upon firing, as the cartridge moves up the barrel, the retainer, acted upon by setback, breaks the shear wire positioning a slot in the retainer wall to accept the safety

balls. Centrifugal force moves the safety balls into this detent, and this movement assists the striker spring in forcing the striker forward about 1/4-inch to armed position. The firing pin on the lower end of the striker is withdrawn from a hole in the slider. At the same time, setback from firing withdraws the setback pin from the slider. Centrifugal force causes the slider to move outward until a shoulder contacts a stop on the fuze body, and another setback pin, also activated by centrifugal force, locks the slider in armed position. The detonator is now aligned with the firing pin, and detonation of the projectile will be superquick action at impact.

Tabulated Data:

Type -----	PD
Weight -----	1.90 lb
Length:	
Visible -----	2.15 in.
Overall -----	16.25 in.
Thread size -----	1.7-14NS-2A
Assembly Dwg. No. -----	73-2-311

Temperature Limits:

Refer to complete round upper and lower limits.

Explosive Components:

Detonator and tetryl burster tube.

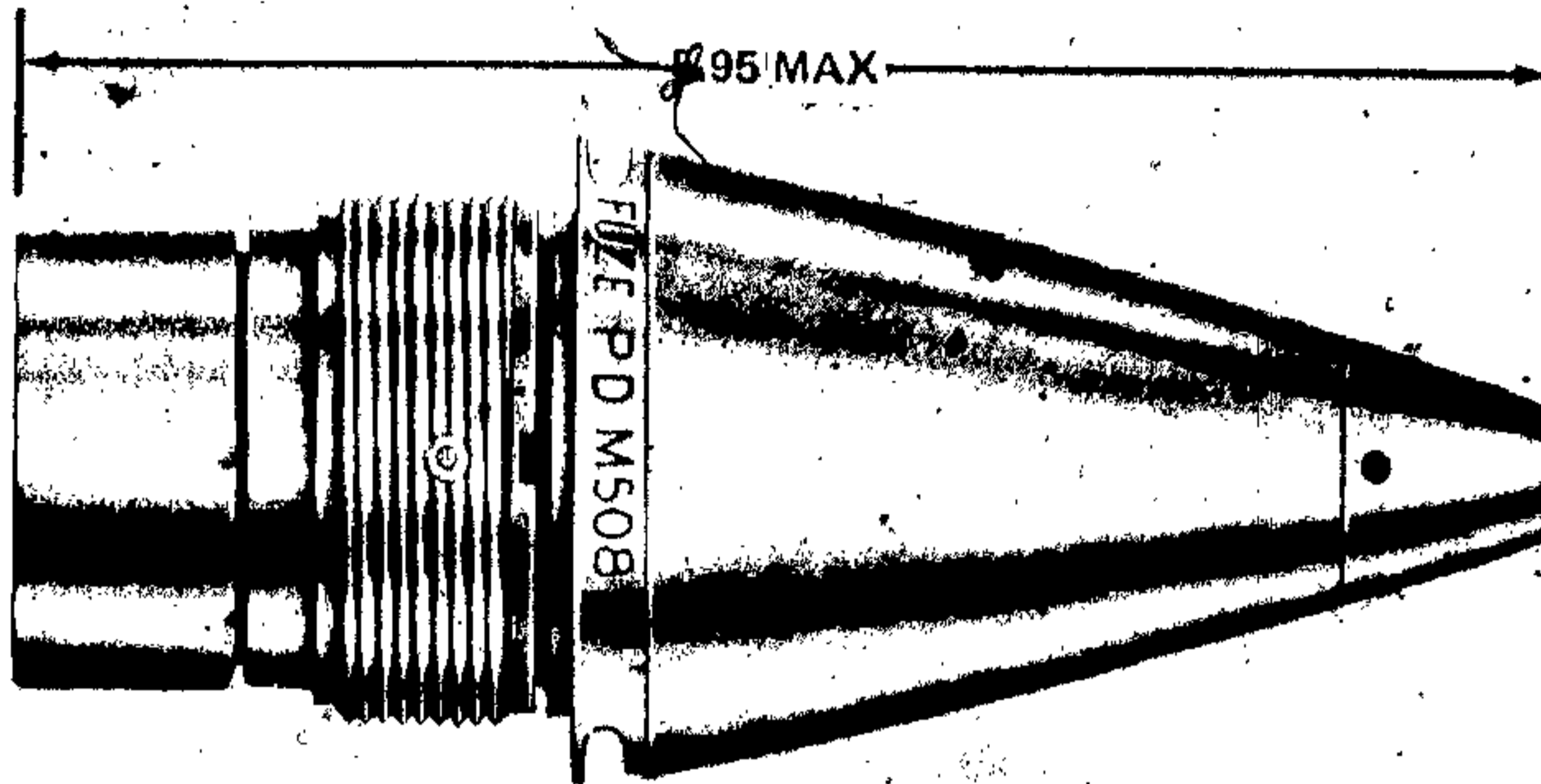
Limitations:

None.

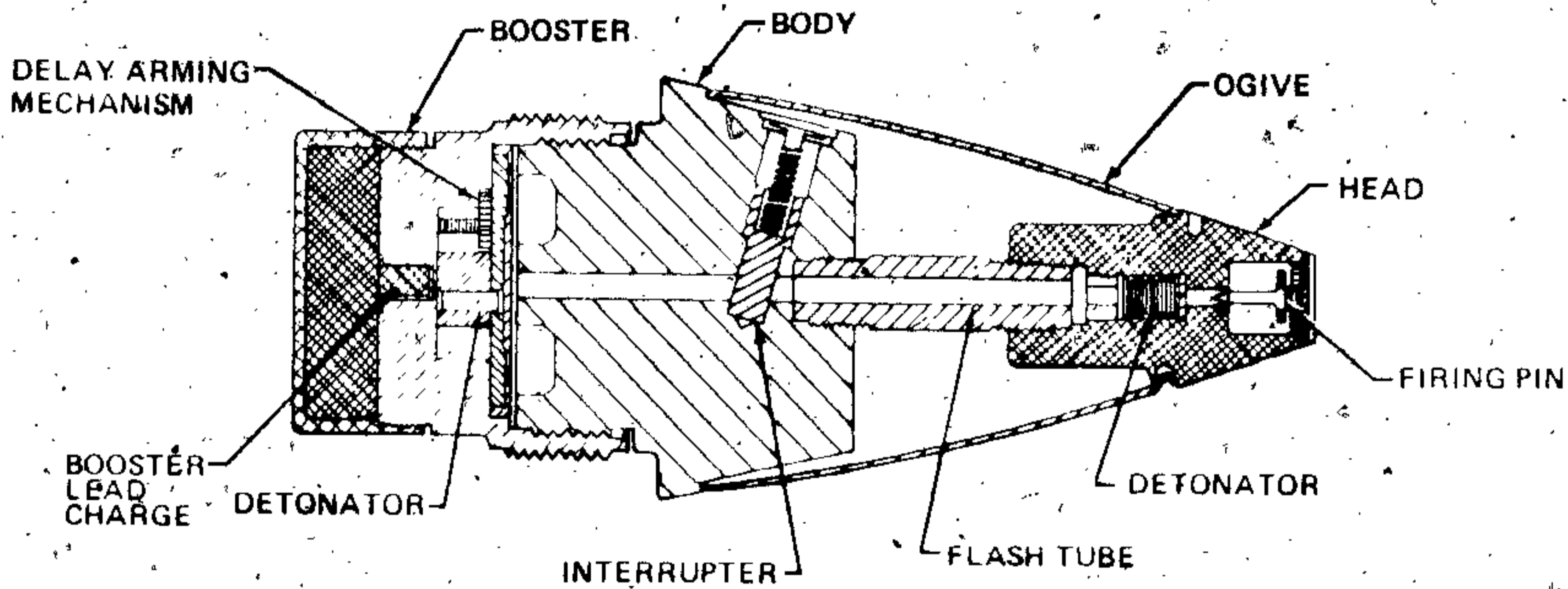
References:

- TM 9-1015-215-12
- TM 9-1300-251-20

FUZE, POINT DETONATING: M508A1 AND M508 SERIES



AR199950



AR199958

Type Classification:

Use:

Point Detonating Fuzes M508A1 and M508 are single-action, delayed arming impact fuzes used to detonate 105mm, 155mm, and 8-inch gas or smoke WP projectiles.

Description:

The M508 series fuzes consist of a PD head assembly containing a firing pin held in position by a firing pin support which prevents initiation of Detonator M18 until impact; a stamped steel

windshield to provide an aerodynamic shape to the fuze; a fuze body containing an interrupter assembly to provide bore-safe firing; and an M125A1 or M125 booster assembly. The boosters are physically similar. Booster M125A1 requires 200 feet of projectile travel before arming, and Booster M125 requires 150 feet. The threaded brass body of the booster contains a delayed arming mechanism, Detonator M17, and a tetryl lead charge. The delayed arming mechanism is operated by centrifugal force acting through a gear train to turn a rotor carrying Detonator M17. In the unarmed position, the detonator is held out of line with the flash hole in the booster cover by rotor detents. An aluminum cup containing a 340-grain tetryl charge is threaded onto the base of the booster.

TM 43-0001-28

Functioning:

No action occurs until the spin of the projectile, after firing, causes centrifugal force to withdraw the interrupter from the flash tube against the interrupter spring. At the same time, centrifugal force moves the rotor detents in the booster outward and starts the delayed arming gear train. The timing of the mechanism is such that when the rotor has aligned Detonator M17 with the flash hole to complete arming of the fuze, the projectile will be at least 150 feet from the muzzle. On impact, the firing pin is driven into the detonator in the fuze head to initiate projectile detonation.

Difference Between Models:

M508A1 has Booster M125A1 which requires 200 feet of travel to arm. M508 has booster M125 which requires 150 feet of travel to arm.

Tabulated Data:

Type-----PD
Weight-----2.15 lb
Length:
Visible-----3.74 in.
Overall-----5.95 in.
Assembly Dwg. No.-----7549041

Temperature Limits:

Firing:
Lower limit-----40°F
Upper limit-----+125°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 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 SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class-----1,2
Storage compatibility group---B
DOT shipping class-----A
DOT designation-----DETONATING FUZES - CLASS A EXPLOSIVES
DODAC-----1390-N326

Explosive Components:

Fuze Detonator M18, Booster Detonator M17, tetryl booster lead charge, and tetryl booster charge.

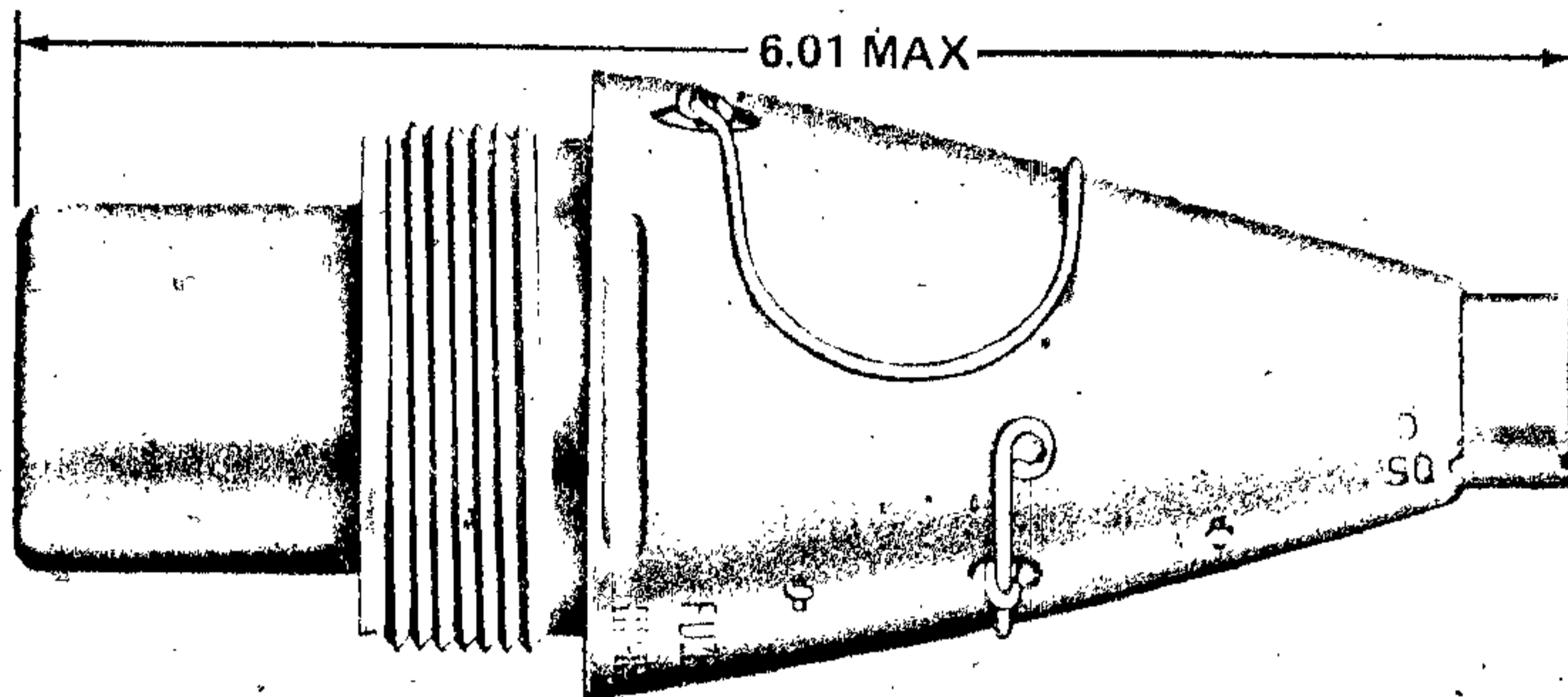
Limitations:

Overhead firing with HE Projectiles for practice is not authorized. To avoid premature functioning, do not use this fuze when firing during rain or snow.

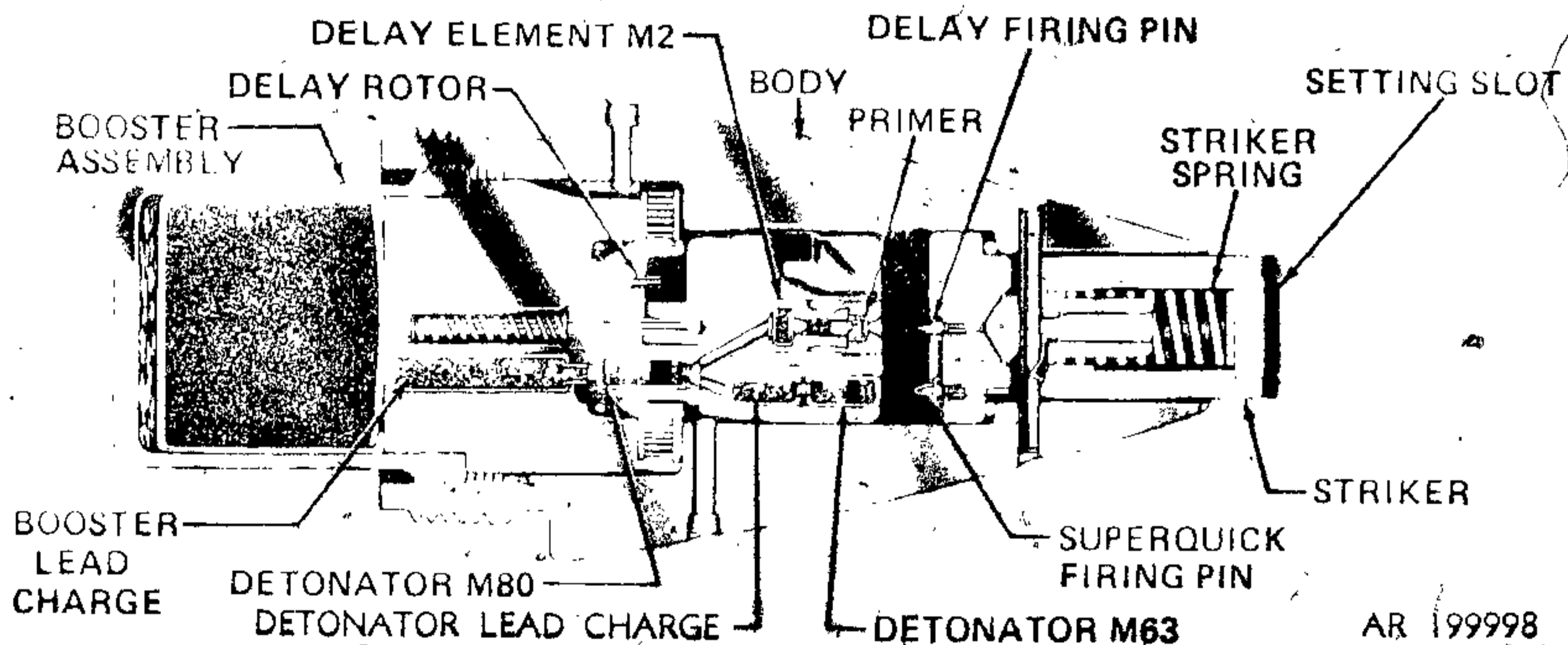
References:

- TM 9-1300-251-20
- SC 1340/98-IL
- SB 700-20
- TM 9-1015-203-12
- TM 9-1015-234-12
- TM 9-1025-200-12
- TM 9-2300-216-10
- TM 9-2350-217-10
- TM 9-2350-217-10N

FUZE, POINT DETONATING: M524 SERIES



AR199999



AR 199998

Type Classification:

Description:

Std A AMCTC 3402 dtd 1965 (M524A1, A2, A3, and A4 for USMC/USN use only).

Std A AMCTC 7075 dtd 1969.

SEE:

The fuze has an aluminum body threaded externally to fit the round and internally to accept a tetryl booster. The nose of the fuze is a spring-loaded striker with a slot for selection of superquick or delay action. Depending on that selection, either detonation train within the fuze body is initiated by independent firing pins. The S₁ train consists of Detonator M63 and has a detonator lead charge. The delay train includes primer and delay Charge M2. Either train fired detonator M80 and a booster lead charge to detonate the tetryl booster in the base. The fuze is bore safe by means of a delayed arming mechanism consisting

The M524 series point detonating fuze is used to detonate HE, M362 or Smoke WP, M374 or M575 ammunition fired from 81-mm mortars. The fuze is dual purpose, designed to function on impact or graze with superquick action or 0.05 second delay.

of a spring-loaded rotor released by setback upon weapon firing and a timing device. Two safety pins are provided, one to secure the internal plunger and one to secure the setback arming device. A pull wire connects the pins for removal before firing.

Functioning

Setback upon weapon firing trips the arming mechanism release, permitting the arming delay rotor to turn toward the armed position. The mechanism assures that arming will occur in not less than 1.25 seconds or more than 2.50 seconds after the round has left the muzzle of the mortar. If SQ action has been preselected explosion of the projectile will occur on impact by the SQ firing pin striking Detonator M63. If delay action was selected, the firing pin is not aligned with Detonator M63 and projectile charge detonation occurs 0.05 second after the delay firing pin operates on the delay train through Delay Charge M2. Each mode operates by separate flash tubes upon Detonator M80, the booster lead charge and the booster.

Difference Among Models:

Army Models M524A5 and M524A6 incorporate the second safety pin retaining the plunger and provide that the pin cannot be removed if the arming mechanism starts inadvertently. The models are similar except that Fuze M524A6 requires greater setback force to arm. Models M524A1, M524A2, M524A3 and M524A4 are for USN and USMC use only, and have only one safety pin (arming). Fuzes M524A1 and M524A4 incorporate design differences but function similarly. The delay charge in Fuze M524A2 is replaced by a non-delay element. Fuze M524A3 is capable only of superquick action.

Tabulated Data:

Type -----	PD
Weight -----	1.27 lb
Length -----	
Visible -----	3.80 in.
Overall -----	6.01 in.
Thread size -----	2-12NS-1
Assembly Dwg. No. (M524A6) -----	9205729

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 wire-bound box

*Packing box:
 Weight ----- 41.8 lb
 Dimensions ----- 14-7/8 x 12-13/16 x 9-1/8 in.
 Cube ----- 1.0 cu ft

*NOTE: See SC for complete packing data including N3N's.

Shipping and Storage Data:

Quantity-distance class -----	3
Storage compatibility group -----	B
DOT shipping class -----	A
DOT designation -----	DETONATING FUZES CLASS A EXPLOSIVES
DODAC -----	1390-N308

Explosive Components:

SQ action -----	Detonator M63, tetryl plunger, lead charge, Detonator M80, and tetryl booster.
Delay action -----	Primer, black powder Delay element M2, Detonator M80, and tetryl booster.

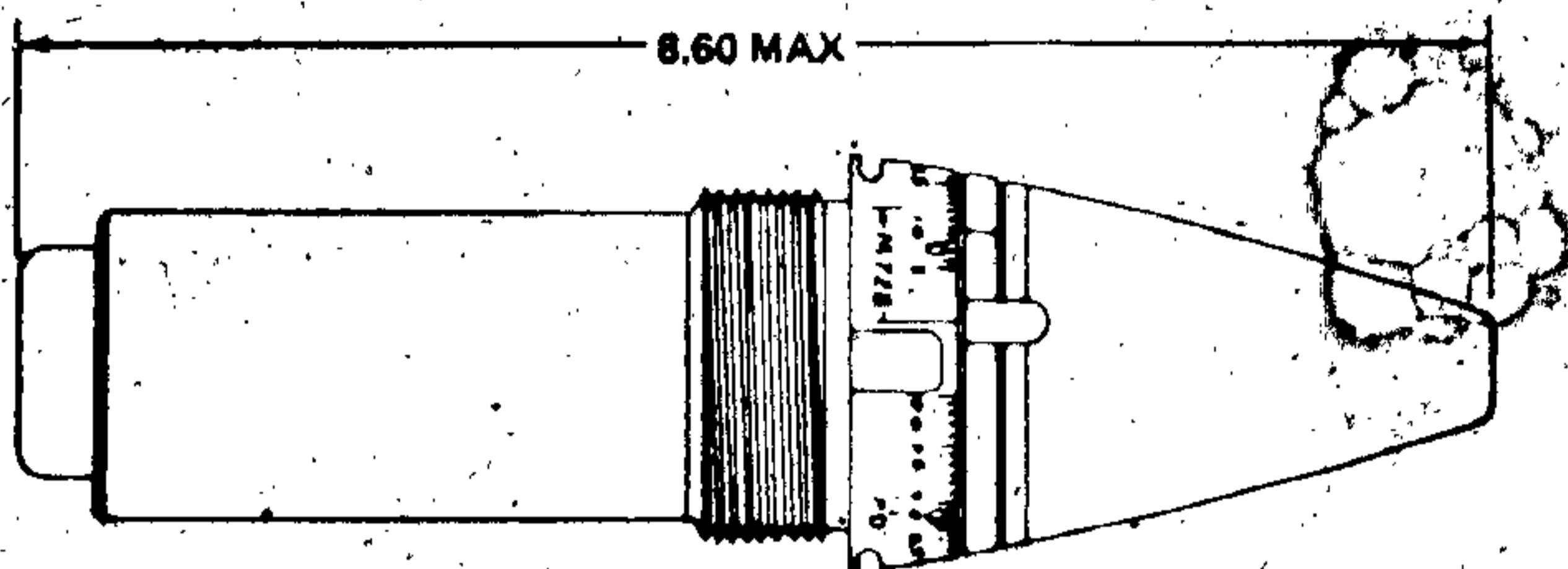
Limitations:

None

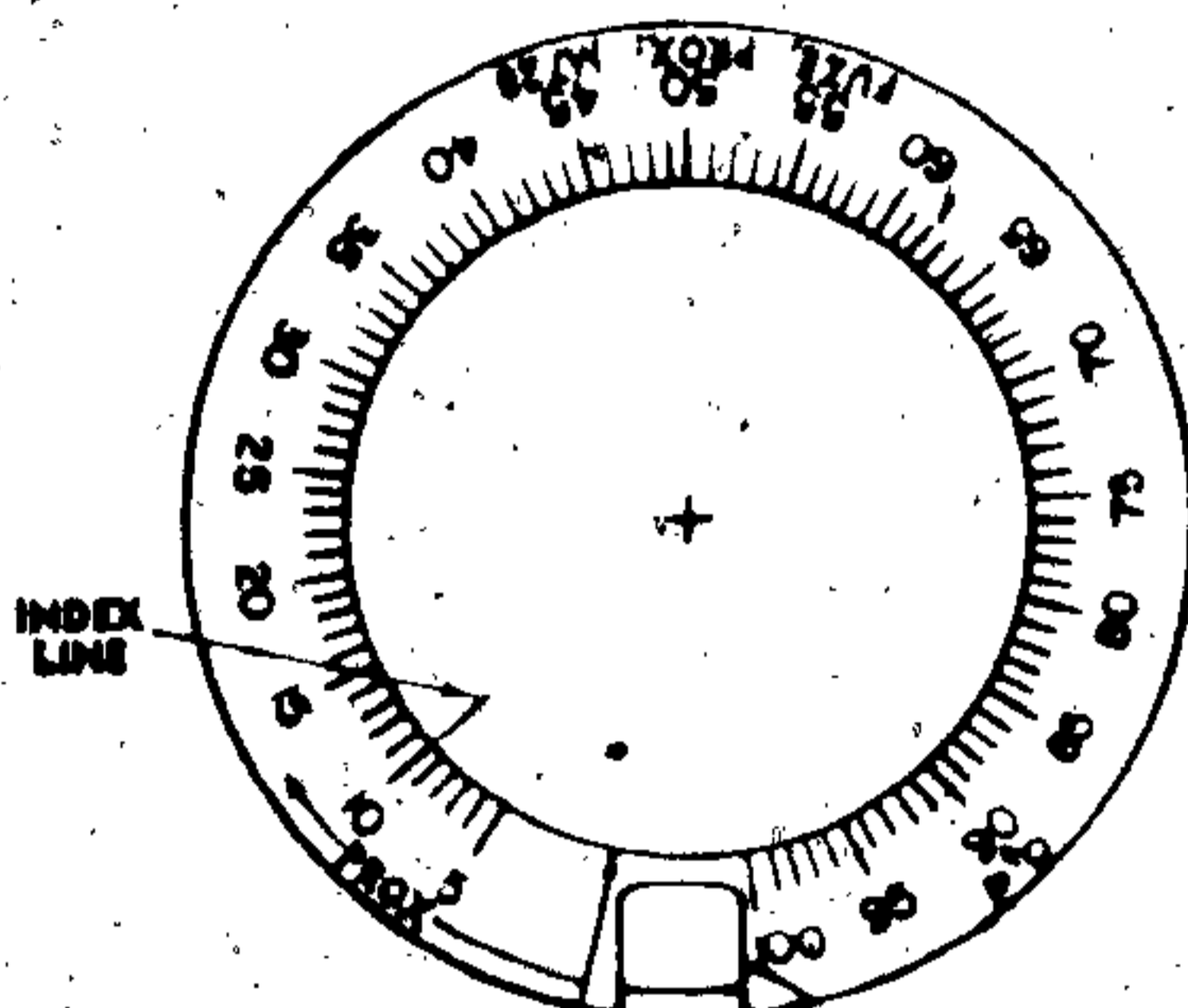
References:

- TM 9-1015-200-12
- TM 9-1300-251-20
- TM 9-2300-257-10
- SC 1340/98-IL

FUZE, PROXIMITY: M728



AR199893



AR199892

Type Classification:

Std AMCTC 9514 dtd 1972.

Use:

Proximity Fuze M728 is the latest model of the adjustable delayed-arming type designed for use with projectiles fired from 4.2-inch mortars, 105mm and 155mm howitzers; 175mm gun, and 8-inch howitzers against surface targets.

Description:

The fuze contains a radio continuous wave transmitter/detector with antennas and a power supply which performs the target detection function. A nose cone is fixed to a rotatable setting ring which has a single index line. The setting ring is connected to a clockwork timing mechanism within the fuze sleeve which energizes the proximity element upon approach to the target. In addition, a PD element is included to detonate the projectile on impact,

or if the proximity element fails to operate. Graduations from 5 to 100, representing seconds to target, and a PD set line are inscribed around the shoulder of the sleeve. On this model the PD mark coincides with the 90-second proximity setting. The plastic nose cone of the fuze has an anti-static protective coating. The setting ring and sleeve are metal. The slot in the setting ring is for time setting only. Slots in the fuze sleeve are for the fuze wrench when assembling the fuze to the projectile. The fuze is shipped with the index mark aligned with the 10-second mark on the fuze sleeve. The major difference between the M514A1E1 and the M728 is that the latter has a black anti-static coating which prevents the fuze from functioning prematurely during some adverse atmospheric conditions.

Functioning:

Fuzes are set to the calculated time of flight of the projectile to target unless point detonation is desired. Setback from weapon

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firing releases the timing mechanism and initiates the power supply and point detonation arming. The fuze is armed for point detonation after 3 seconds of flight. Approximately 3 seconds prior to set time, proximity arming occurs; also, radio wave transmission is initiated. When any part of the radio wave front is reflected to the fuze from the target, an interaction or doppler signal occurs between the reflected and transmitted wave. When the doppler signal reaches a predetermined amplitude, an electronic switch activates the explosive train at an optimum distance from the target. If the proximity mode does not function, the projectile will be detonated on impact by the PL element.

Tabulated Data:

Type-----Proximity
Weight-----2.19 lb
Length:
Visible-----3.74 in.
Overall-----8.60 in.
Thread size-----2.00-12NS-1
Assembly Dwg No.-----11718400

Temperature Limits:

Firing:
Lower limit-----40°F
Upper limit-----140°F
Storage:
Lower limit-----65°F
Upper limit-----145°F
*Packing-----8 fuzes in metal container; 2 containers in wirebound box

*Packing Box:

Weight-----63.0 lb
Dimensions-----14-5/8 x 12-13/16 x 12 in.
Cube-----1.3 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class-----7
Storage compatibility group-----B
DOT shipping class-----A
DOT designation-----DETONATING FUZES - CLASS A EXPLOSIVES
DODAC-----1390-N463

Explosive Components:

Time Mode: Primer, detonator, detonator lead charge, and booster charge.

PD Mode: Detonator, detonator lead charge, and tetryl booster charge.

Limitations:

Avoid firing at targets closer than as shown to friendly positions with the following cartridges, when using Fuze M728:

- 4.2-inch and 105mm--320 meters (350 yards)
155mm, 175mm and
8-inch-----731 meters (800 yards)

Premature bursts may occur when firing over ridges with clearance of less than 64 meters.

Fuze M728 is not to be fired over the heads of friendly troops.

References:

- TM 9-1015-203-12
TM 9-1015-215-12
TM 9-1025-200-12
TM 9-1300-251-20
TM 9-2350-210-12
TM 9-2300-216-10
SC 1340/98-IL

FUZES, INERT AND DUMMY

Type Classification:Use:

Inert and dummy fuzes are provided for ammunition such as target practice, test, and drill to simulate fuze assembly.

Description:

Dummy fuzes are manufactured especially for simulation purposes; and inert fuzes are assembled from burned-out or rejected parts of service fuzes. Consequently, in each case, the substitute fuzes resemble the service fuze for which training is conducted, and have the same dimensional and material characteristics. Generally, each inert or dummy fuze is designed for use with a specific dummy cartridge according to the following table:

Fuze, PD Inert, M51 series	Inert or dummy nose-fuzed rounds from 75mm to 8-inch
Fuze, PD Inert, M52 series	60mm Cartridge M49 series; 81mm Cartridge M43 series
Fuze, PD Inert, M89	57mm TP Cartridge M306
Fuze, PD Dummy M59	75mm Dummy Cartridge M19, 76mm Dummy Cartridge M20; 105mm Dummy Cartridge M14
Fuze, PD Dummy M69	40mm TP-T Cartridge M19 & Dummy Cartridge M25
Fuze, PD Dummy M73	175mm Dummy Cartridge M458
Fuze, PD Dummy M80	90mm Dummy Cartridge M12 series
Fuze, PD Dummy M553	105mm TP-T Cartridge M393 series

Functioning:

Not applicable.

Tabulated Data:

Fuze (Inert or Dummy):

Inert, PD, M51 series:

Weight-----2.15 lb

Length:

Visible-----3.74 in.

Overall-----5.93 in.

Service fuzes

simulated-----PD, M51 series

Inert, PD, M52 series:

Weight-----1.06 lb

Length:

Visible-----2.40 in.

Overall-----3.52 in.

Service fuzes

simulated-----PD, M52 series

Inert, PD, M89:

Weight-----0.37 lb

Length:

Visible-----1.72 in.

Overall-----2.52 in.

Service fuzes

simulated-----PD, M89

Dummy, PD, M59:

Weight-----1.4 lb

Length:

Visible-----3.75 in.

Overall-----4.55 in.

Service fuzes

simulated-----PD, M48 series, M51 series, M535, M557, M572

Dummy, PD, M69:

Weight-----0.225 lb

Length:

Visible-----1.9 in.

Overall-----2.375 in.

Service fuzes

simulated-----PD, MK27

Dummy, PD, M73:

Weight-----2.15 lb

Length:

Visible-----3.77 in.

Overall-----5.71 in.

Service fuzes

simulated-----M51 series, M535, M557, M572

Dummy, PD, M80:

Weight-----3.37 lb

Length:

Visible-----4.75 in.

Overall-----6.825 in.

Service fuzes

simulated-----MT, M43 series

Dummy, BD, M553:

Weight-----1.007 lb

Length:

Visible-----NA

Overall-----4.87 in.

Service fuzes

simulated-----BD, M534 series

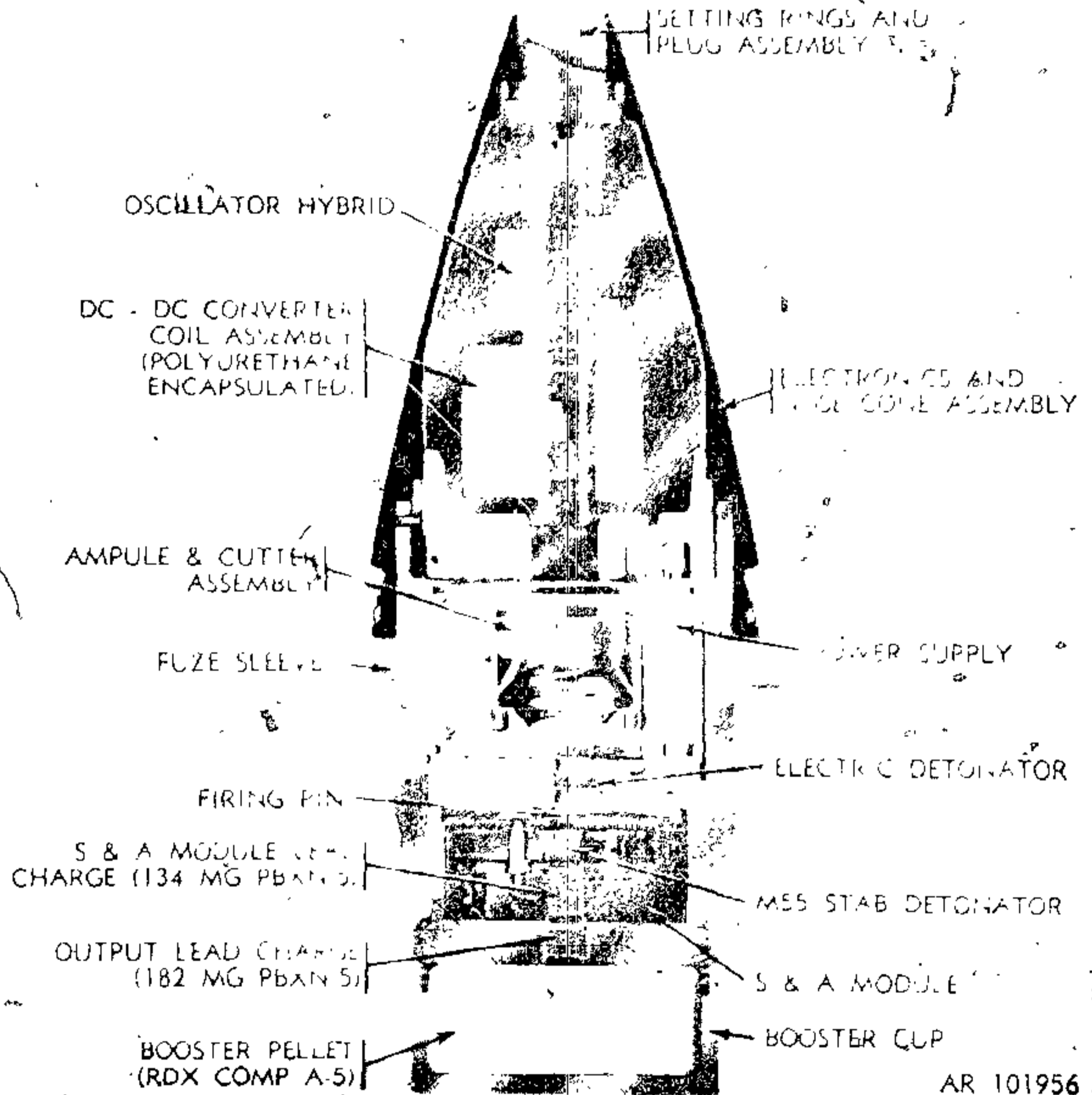
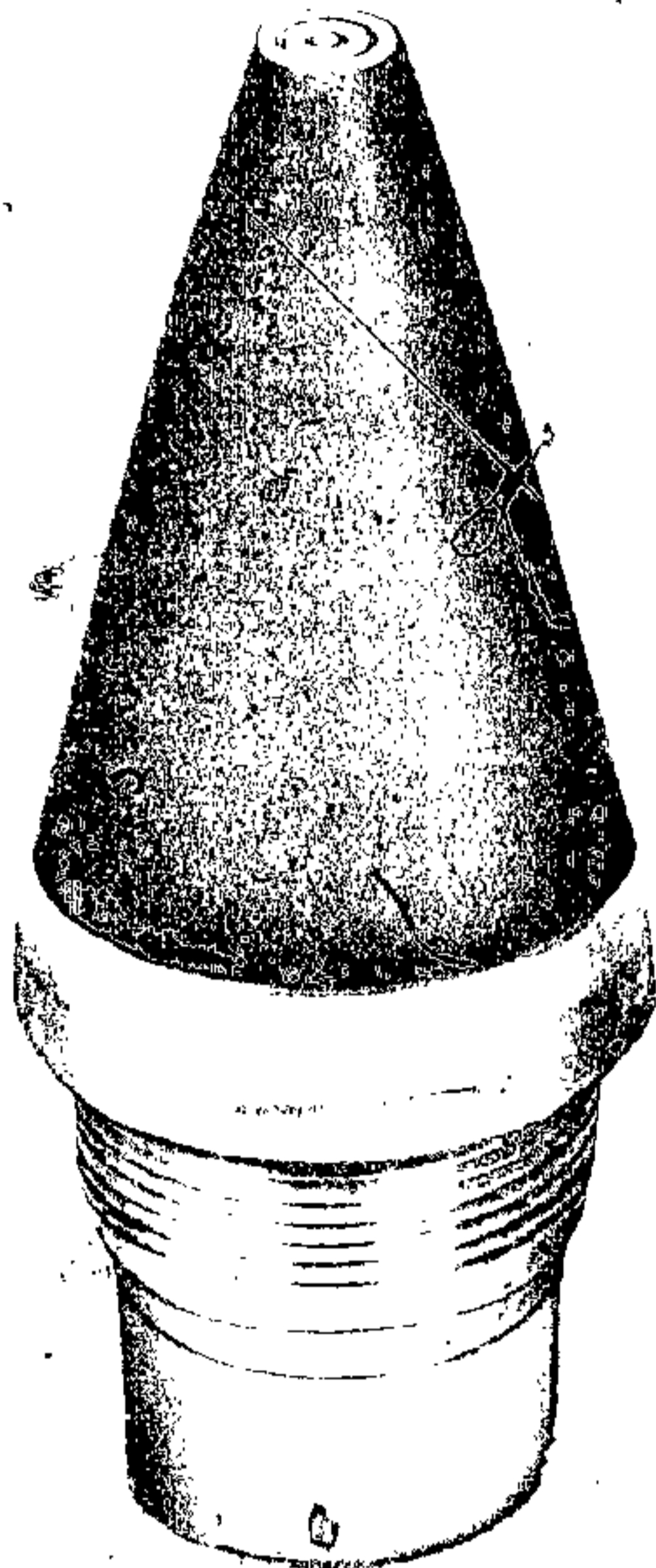
TM 43-0001-28

References:

TM 9-1300-251-20

Refer to operator's manuals.

FUZE, ELECTRONIC TIME M587



AR 101956

Type Classification:

Std MSR 03796007.

Use:

Electronic Time Fuze M587 is used with high explosive and related projectiles where a high explosive booster pellet is required to initiate the high explosive filler. The projectile must have a standard 2 inch thread fuze well cavity.

Description:

This electronic fuze has a black anodized aluminum ogive and a 2-inch threaded steel base to match the projectile nose and fuze cavity. The fuze nose has a series of rings by which the fuze is set, a series of pins within the fuze setter makes contact with the series of rings to impart the electronic impulses which set the desired time. The fuze will provide setting time from 1 to 200 seconds in increments of tenths of a second. The setting

of the fuze is accomplished by the use of the M36 Fuze Setter which is a hand-held battery powered electronic device that time sets the fuze in less than 1 second.

Operation

The fuzes employ an oscillator, a Metal Oxide Semiconductor (MOS) binary divider, and a binary counter using metal nitride oxide semiconductor (MNOS) memory devices that retains the time setting without the application of power.

In addition to providing the function signal to be set into the fuze, the counter circuitry provides timing signals approximately 3.4 and 0.2 seconds before function time. The 0.2-second timing signal is used only for set times at less than 3.4 seconds. Either arm signal permits the firing capacitor to charge. The electronics using MOS and MNOS devices are fabricated on two integrated circuit chips. The remainder of the electronics consists of two hybrid circuit packages and discrete parts. A reserve-type liquid electrolyte battery that is activated at gun launch powers the fuze during flight.

When a time fuze is correctly set using the M36 Fuze Setter, a display (consisting of light emitting diodes) presents the time set on the switches. Failure in the fuze or setter will cause a display indicating error (E). If the fuze setter battery voltage becomes low, the display will show the letter L and the set time indicating that the setter batteries should be recharged at the earliest opportunity. If the user wishes to interrogate (check) a fuze that has been previously set, he can move the MODE switch to the interrogate position and read the set time to the nearest 0.01 second. Interrogation does not change the fuze setting.

In the event PD action is desired, the fuze can be set for PD action as per fuze setter instruction.

The fuze can be reset repeatedly without damage and retains its last setting indefinitely.

Touching or shorting the series of nose pins on the fuze will not damage the fuze or change its setting.

The M587 fuze contains an electrical impact switch which becomes armed just prior to set time as well as a mechanical impact backup (the S&A slides forward to initiate the M55 stab detonator).

Functioning:

The fuze as received will be in an unarmed condition, set for PD action. The S&A assembly is not armed and requires setback and spin upon firing to actuate. The battery ampule is activated upon setback; i.e., breaks and releases an electrolyte to form a battery to provide electrical energy to operate the timing mechanism. Prior to firing, the fuze is placed on the desired round, secured by using an M18 fuze Wrench and then the desired time is set with the M36 setter. Upon firing, setback forces retract the setback pin in the S&A assembly and cause the power supply to activate by breaking the ampule and releasing the battery acid. The rotational spin imparted to the projectile, by the rifling of the weapon causes the electrolyte to move beyond the perimeter of its copper container into the battery cell stack and within 5-50 milliseconds full battery power will be achieved. The rotation also causes the spin detents within the S&A to open, allowing the gear train to run and arm. The S&A will be armed at 400-800 calibers of travel, depending upon weapon and zone of fire. At approximately 3.5 seconds prior to set time, the electrical PD impact switch becomes armed. If the M587 fuze does not function at set time, the S&A mechanism moves forward during impact and functions the M55 stab detonator when it strikes a fixed firing pin.

Tabulated Data:

Type	-----	Electronic Time (ET)
Weight	-----	1.81 lb.
Length:		
Visible	-----	3.758 in.
Overall	-----	5.968 in.
Thread size	-----	2.00, -12 UNS-1A
Assembly Dwg. No.	-----	11711435
Arming Distance	-----	400-800 calibers

Temperature Limits:

	Firing	Fuze	Setter
Lower limit	-----	-40°F (-40°C)	-40°F (-40°C)
Upper limit	-----	+145°F (+63°C)	+145°F (+63°C)

Storage

Fuze

Lower limit	-----	-65°F (-54°C) (for periods of not more than 3 days)
Upper limit	-----	+160°F (+71.1°C) (for periods of not more than 4 hrs per day)

M36 Setter

Lower limit----- -65°F (-54°C)
 Upper limit----- +160°F (+71.1°C)

For Charging
 Fuze Setter

Lower limit----- -40°F (-40°C)*
 Upper limit----- +145°F (+63°C)

*Charging of the setter battery at temperatures as low as -40°F (-40°C) may not adequately recharge the battery, however, no damage to the setter or its batteries will occur. In order to insure adequate charging of the battery, the temperature of the setter battery should be -10°F (-23°C) or higher.

Explosive Components:

Electric microdetonator -
 Explosive-----30 mg total
 M55 stat detonator - Explo-
 sive-----85 mg total
 Prime mix NOL #130-----15 mg
 Lead azide RD 1300-----51 mg
 RDX-----19 mg
 S&A lead charge (PBXN-5) -
 Explosive-----134 mg total

Output lead charge (PBXN-5) -
 Explosive-----182 mg total
 Booster pellet (Comp A-5) -
 Explosive-----27g total
 Packing-----8 Fuzes in metal
 containers
 2 containers in
 wirebound box

Packing Box:

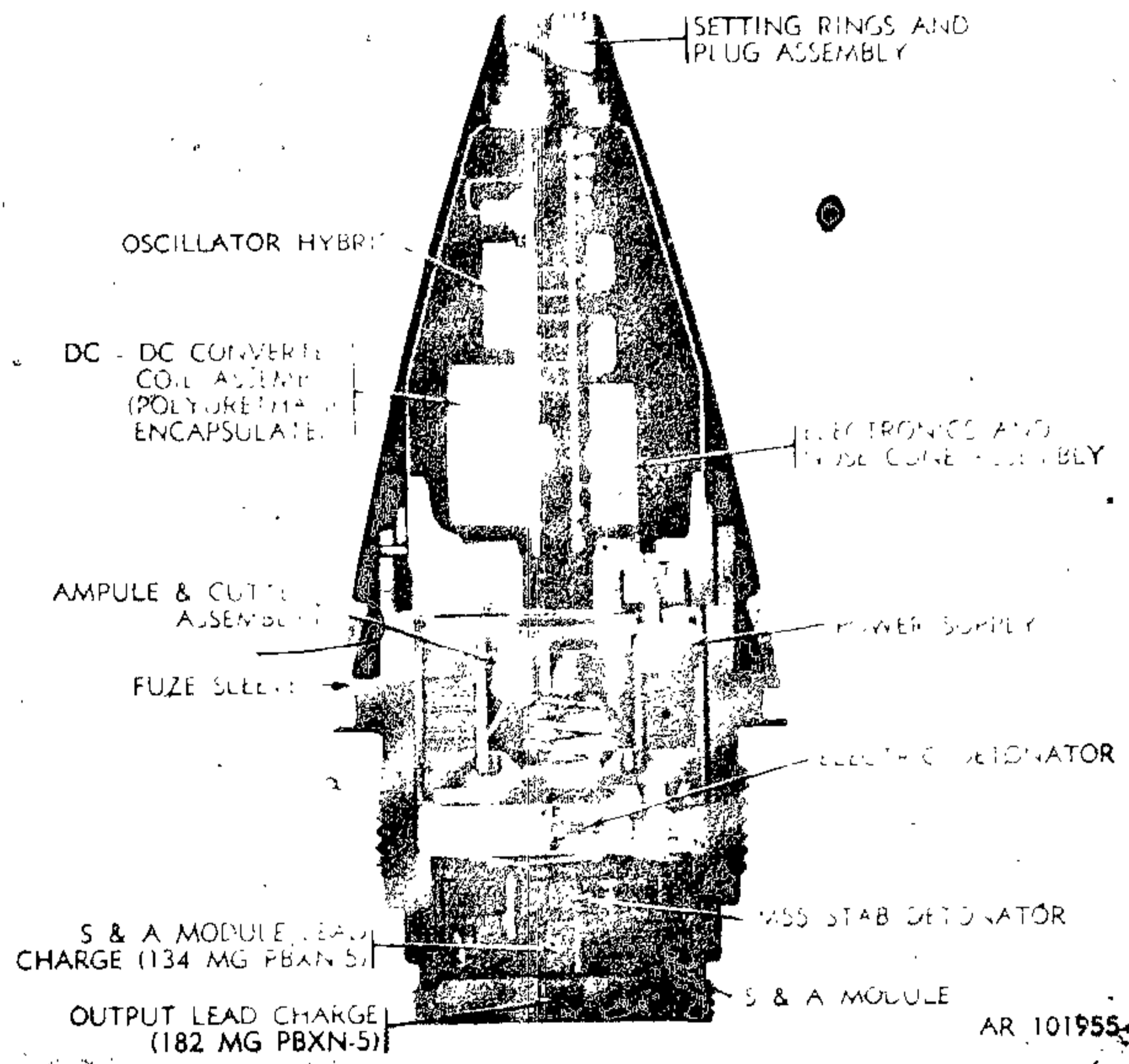
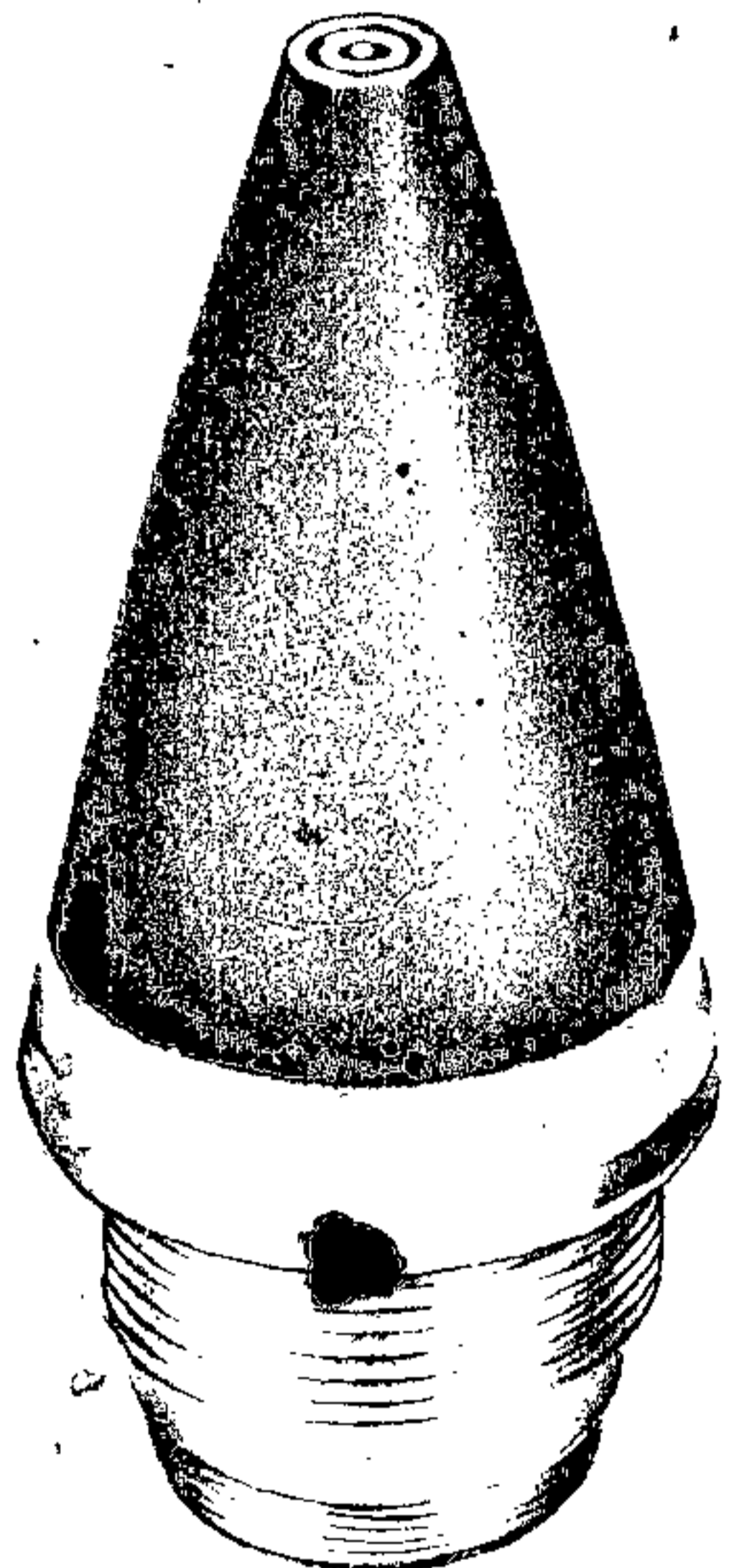
Weight-----55.8
 Dimensions-----14-5/8 in. x 12-
 13/16 in. x 9-
 1/8 in.
 Cube-----1.04 cu ft

Shipping and Storage Data:

Quantity-distance class-----1.1
 Storage compatibility group-----B
 DOT shipping class-----A
 DOT designation-----Detonating Fuzes
 Class A Explosives
 Handle Carefully -
 Do not store or
 load with any high
 explosives
 NSN (M587)-----1390-01-062-4574
 DODAC (M587)-----1390-N600
 NSN (Fuze Setter)-----1290-01-038-2035

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FUZE, ELECTRONIC TIME: M724



AR 101955

Type Classification:

Std MSR 03796007

The electronic time fuze M724 is used with case ejection type artillery projectiles where an initiation of an ejection charge is required. It is used predominately with the Improved Conventional Munitions. The projectile must have a standard 2-inch thread fuze well cavity.

Description:

This electronic time fuze has a black anodized aluminum ogive and a 2-inch threaded steel base to match the projectile nose and fuze cavity.

The fuze nose has a series of rings which are the means by which the fuze is set. A series of pins within the fuze setter makes contact with the series of rings to impart the electrical impulses which set the desired time. The fuze

will provide setting time from .2 to 200 seconds in increments of tenths of a second. The setting of the fuze is accomplished by use of the M36 Fuze setter which is a hand-held, battery-powered electronic device that time-sets the fuze in less than 1 second.

The M724 fuze contains an electrical impact switch which becomes armed just prior to set time.

Operation.

The fuzes employ an oscillator, a Metal Oxide Semiconductor (MOS) binary divider, and a binary counter using metal-nitride-oxide-semiconductor (MNOS) memory devices that retains the time setting without the application of power.

In addition to providing the functional signal as set into the fuze, the counter circuitry provides arming signals approximately 3.4 and 0.2 seconds before function time. The 0.2-second arming signal is used only for set times at less than 3.4 second. Either arm signal permits the firing capacitor to charge. The electronics using MOS and MNOS devices are fabricated on two integrated-circuit chips. The remainder of the electronics consists of 2 hybrid circuit packages and discrete parts. A reserve-type liquid electrolyte battery that is activated at gun launch powers the fuze during flight.

When a time fuze is correctly set using the M36 Fuze Setter, a display (consisting of light-emitting diodes) presents the time set on the switches. Failure in the fuze or setter will cause a display indicating error (E). If the fuze setter battery voltage becomes low, the display will show the letter L and the set time indicating that the setter batteries should be recharged at the earliest opportunity. If the user wishes to check a fuze that has been previously set, the MODE switch can be moved to the interrogate position and read the set time to the nearest 0.01 second. Interrogation does not change the fuze setting.

In the event PD action is desired, the fuze can be set for PD action as per fuze setter instruction.

The fuze can be reset repeatedly without damage and retains its last setting indefinitely.

Touching or shorting the series of nose rings on the fuze will not damage the fuze or change its setting.

Functioning:

The fuze as received will be in an unarmed condition, set for PD action. The S&A assembly is not armed and requires setback and spin upon firing to actuate. The battery ampoule is activated upon setback; i.e., breaks and releases an electrolyte to form a battery to provide electrical energy to operate the timing mechanism.

The fuze is placed on the desired round, secured by using an M18 Fuze Wrench and then the desired time is set with the M36 setter.

Upon firing, setback forces retract the setback pin in the S&A assembly and cause the power supply to activate by breaking the ampoule and releasing the battery acid.

The rotational spin imparted to the projectile by the rifling of the weapon causes the electrolyte to move beyond the perimeter of its copper container into the battery cell stack and within 5 - 50 milliseconds full battery power will be achieved. The rotation also causes the spin detents within the S&A to open, allowing the gear train to run and arm. The S&A will be armed at 400 - 800 calibers of travel, depending upon weapon and zone of fire. At approximately 3.5 seconds prior to set time, the electrical PD impact switch becomes armed.

The M724 fuze does not have a mechanical PD backup and, therefore, will not provide backup function upon impact. This is so designed to prevent contamination of an area with hazardous munitions which may later be occupied by friendly troops. This assumes that failure of the electronic time function will also cause failure of the electrical PD mechanism. The M724 contains the electric PD mode to enable it to be used as a spotting round fuze when coupled with a cargo round with a shaped charge adapter for munitions detonation in lieu of the normal base ejection.

Tabulated Data:

Type-----	Electronic Time (ET)
Weight-----	1.69 lb
Length:	
Visible-----	3.758 in.
Overall-----	5.268 in.
Thread size-----	2.00-12UNS-1A
Assembly Dwg No.-----	11711268
Arming distance-----	400 - 800 calibers

Temperature Limits:

Firing - Fuze:	
Lower limit-----	-40°F (-40°C)
Upper limit-----	+145°F (+71.1°C)

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Storage - Fuze:
 Lower limit----- -65°F (-54°C) (for
 periods of not
 more than 3 days)
 Upper limit----- +160°F (+71.1°C) (for
 periods of not
 more than 4 hr/
 day)

Storage - M36 Setter:
 Lower limit----- -65°F (-54°C)
 Upper limit----- +160°F (+71.1°C)

Charging - M36 Setter:
 Lower limit----- *-40°F (-40°C)
 Upper limit----- +145°F (+63°C)

*Charging of the setter battery at temperatures as low as -40°F (-40°C) may not adequately recharge the battery, however, no damage to the setter or its batteries will occur. In order to insure adequate charging of the battery, the temperature of the setter battery should be -10°F (-23°C) or higher.

Explosive Components:

Electric Microdetonator
 Explosive----- 30 mg total

M55 Stab Detonator:
 Explosive----- 85 mg total
 Prime Mix NOL #130----- 15 mg
 Lead Azide RD 1300----- 51 mg
 RDX----- 19 mg
 S&A Lead Charge (PBXN-5)
 Explosive----- 134 mg
 Output Lead Charge (PBXN-5)
 Explosive----- 182 mg
 Packing----- 8 fuzes in metal
 container; 2
 containers in
 wirebound box

Packing Box: (in wirebound box):

Weight----- 55.8 lb
 Dimensions----- 14-5/8 x 12-13/16
 x 9-1/8 in.
 Cube----- 1.04 cu ft

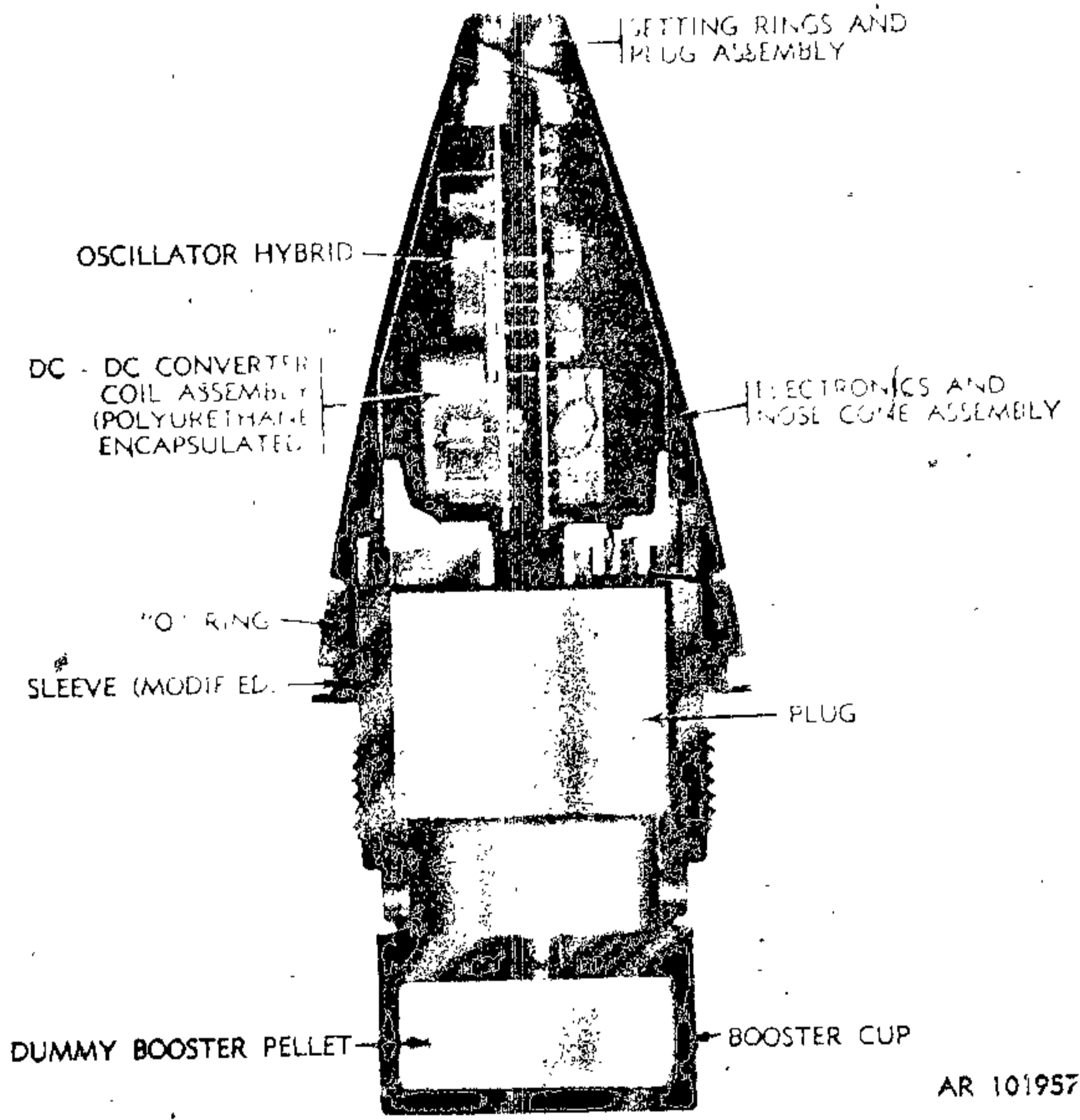
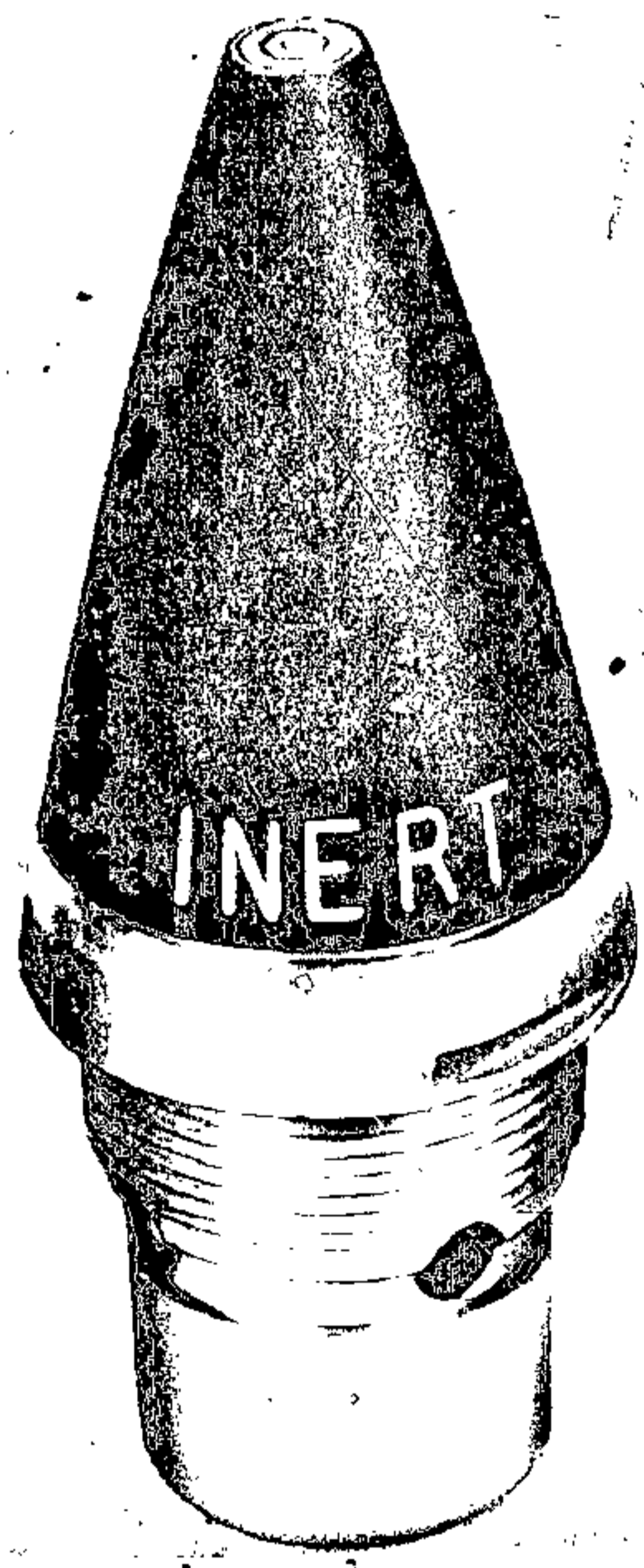
Shipping and Storage Data:

Quantity-distance class----- 1
 Storage compatibility group--- B
 DOT shipping class----- A
 DOT designation----- TIME FUZES -
 HANDLE CAREFULLY
 DODAC----- 1390-N601

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FUZE, ELECTRONIC TIME: TRAINING, M744



AR 101957

Type Classification:

Std - MSR 03796007

Use:

The inert training fuze M744 will be utilized as a training aid. The fuze is inert but electronically identical to M587 and M724 fuzes.

Description:

The inert electronic time fuze M744 comprises of a black anodizing aluminum

ogive and a 2-inch threaded steel base to match the projectile nose and fuze cavity.

The fuze nose has a series of rings. This is the means by which the fuze is set. A series of pins within the fuze setter makes contact with the series of rings to impart the electrical pulses which set the desired time. The fuze will provide setting time from .2 to 200 seconds in increments of tenths of a second.

Since the M744 is inert, the booster pellet cup is a replica of the explosive. There is no safety and arming (S & A) device and a block of aluminum takes the place of a battery.

Functioning:

The M744 inert training fuze interacts with the M36 setter identically to either the M587 or M724 fuzes. The fuze setter is a hand-held battery powered electronic device that time sets the fuze in less than 1 second. It allows test setting and verification readout of the M744.

Tabulated Data:

Type -----	Electronic Time (ET) Training
Weight -----	1.81 lb
Length:	
Visible -----	3.758 in.
Overall -----	5.968 in.
Thread size -----	2.00-12UNS-1A
Assembly Dwg. No. -----	11726800
Arming distance -----	400 - 800 caliber

Temperature Limits:

Firing:	
Lower limit -----	-40°F (-40°C)
Upper limit -----	+145°F (+63°C)
Storage - Fuzes:	
Lower limit -----	-65°F (-54°C) (for periods of not more than 3 days)
Upper limit -----	+160°F (+71.1°C) (for periods of not more than 4 hr/day)
Storage - M36 Setter:	
Lower limit -----	-65°F (-54°C)
Upper limit -----	+160°F (+71.1°C)
For Charging M36 Setter:	
Lower limit -----	*-40°F (-40°C)
Upper limit -----	+145°F (+63°C)

*Charging of the setter battery at temperatures as low as -40°F (-40°C) may not adequately recharge the battery, however, no damage to the setter or its batteries will occur. In order to insure adequate charging of the battery, the temperature of the setter battery should be -10°F (-23°C) or higher.

Packing -----	Eight fuzes in metal container; 2 containers in wire-bound box
Packing box - Fuze:	
Weight -----	55.8 lbs
Dimensions -----	14-5/8" x 12-13/16" x 9-1/8 in.
Cube -----	1.04
Carrying Case - Setter:	
Weight -----	25 lb 4 oz
Dimensions -----	12 x 13.36 x 6.09 in.

Shipping and Storage Data:

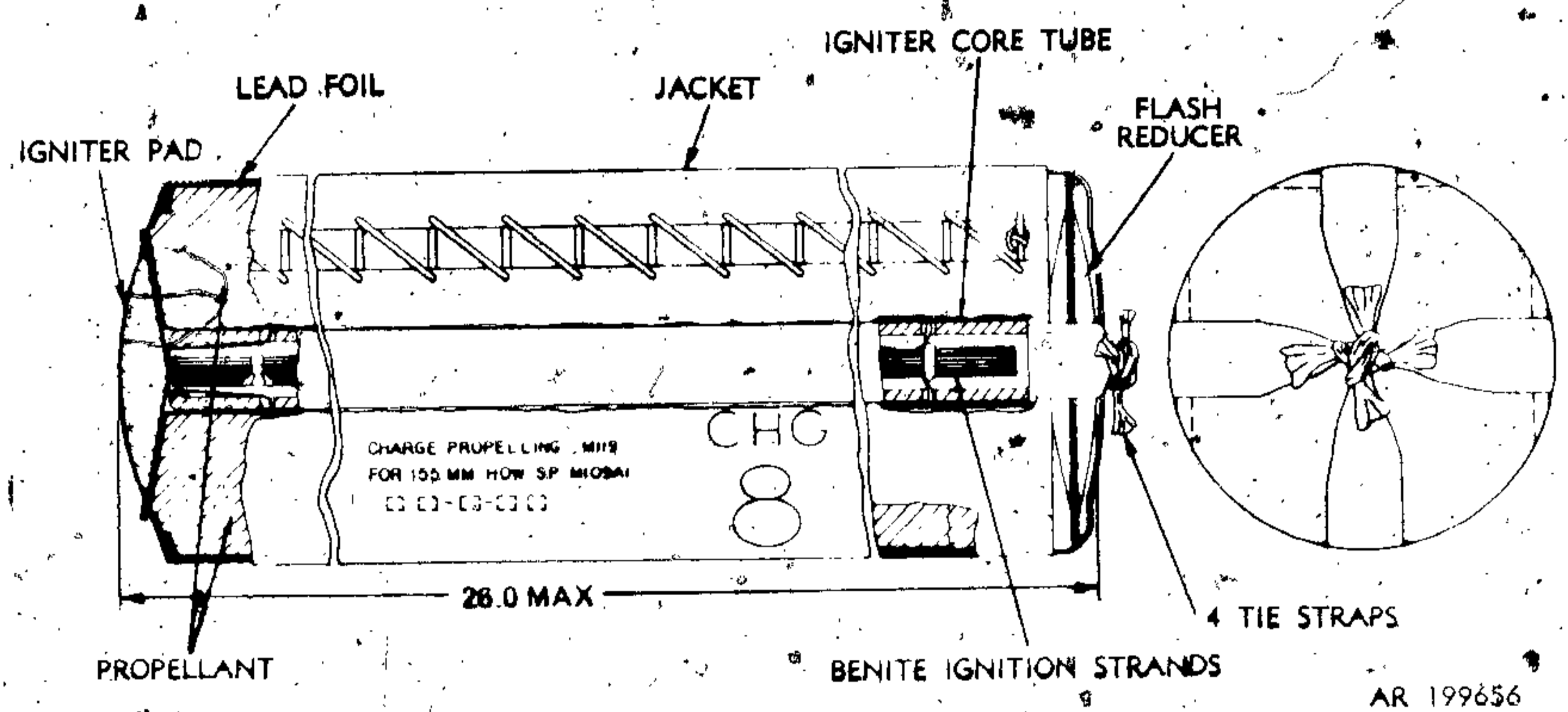
Quantity-distance class -----	N/A
Storage compatibility group -----	N/A
DOT shipping class -----	N/A
DOT designation -----	N/A
DODAC -----	N/A

Explosive Components:

Not Applicable

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CHARGE, PROPELLING, 155 MILLIMETER: M119 (M119A1)



AR 199656

Type Classification:

(M119) Std AMCTC 8204, dtd 1971.
M119A1 Std MSR 12776011.

Use:

This propelling charge is designated Zone 8 and extends the range of 155mm Howitzer M109A1 M109A2/A3 and M198.

Description:

Propelling Charge M119/M119A1 is a single-increment white bag charge. A perforated igniter core tube extends through the center of the propellant. The 26-inch length of the charge precludes use in any other weapon than the long tube howitzer. The forward end is sheathed in lead foil and also carries a one

pound flash reducer pad of potassium sulphate. A circular igniter pad of red cloth containing two ounces of clean burning igniter (CBI) is sewn to the base of the rayon propellant bag.

Functioning:

When the weapon is fired, the primer ignites the CBI in the igniter pad at the base of the propelling charge. The igniter flashes through the perforations in the igniter core tube to ignite the propellant. The burning propellant generates rapidly expanding gases to propel the projectile through the barrel and to the velocity required to reach the target. Blast overpressure and muzzle flash of the firing are reduced by the flash reducer included in the charge. The lead foil sheath serves to prevent copper build-up (coppering) in the weapon.



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Differences Between Models:

The basic difference between the M119 and M119A1 models is that the M119A1 has a donut shaped flash reducer that precludes non-ignition of the rocket motor of the M549/M549A1 Projectile. The M119A1 has a new molded center core igniter tube; a 360 degree basic igniter seam lacing jacket. A pull strap has also been added to the M119A1 charge that provides easier removal from the metal container. This pull strap must be removed from the charge before loading into the weapon tube.

Tabulated Data:

Type	White bag, separate loading
Weight	23 lb
Length	26 in.
Color	White w/black markings
Cannon used with	M185 (M109A1/A2/A3; M199 (M198)
Propellant	M6, 20.5 lb
Primer	M82
Performance (complete round)	
Maximum range	(18,692 yd) (17,092 m)
Muzzle velocity	2245 fps (684 mps)

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-65°F (for periods not more than 3 days)
Upper limit	+160°F (for periods not more than 4 hr/day)

*Packing-----1 propelling charge in palletized metal container PA37A1

*Prop. chg, container:

Weight	70 lb
Dimensions	29-1/4 x 8-1/4 x 8-1/4
Cube	1.2 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	1.3
Storage compatibility group	C
DOT shipping class	B
DOT designation	PROPELLANT EXPLOSIVE SOLID-CLASS B
DODAC	1320-D533
Assembly Dwg. No.	9226436 (M119); 9325852 (M119A1)
Container Dwg. No.	9234357

Preparation for Firing:

No preparation is required.

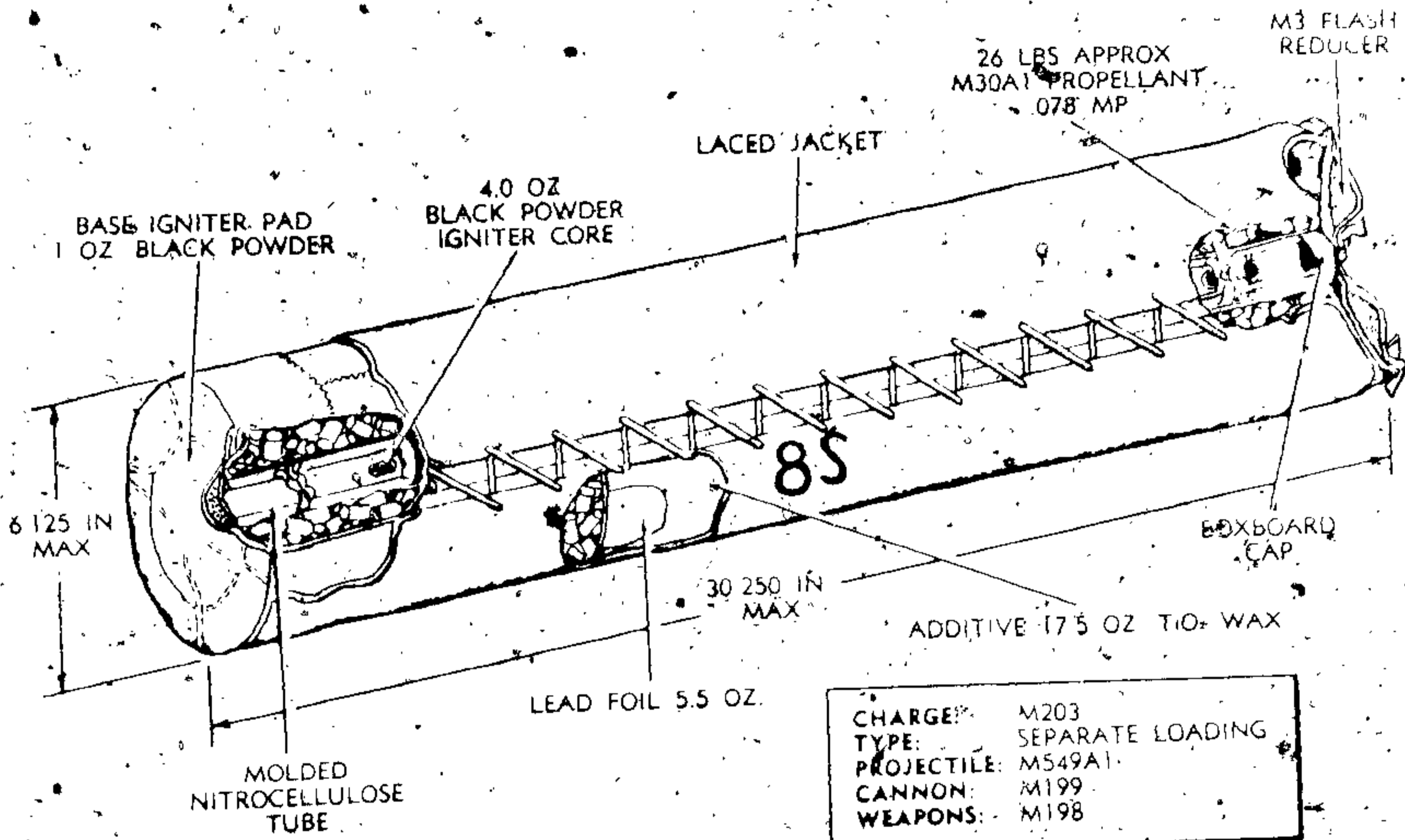
Limitations:

M119 not to be fired with the M549/M549A1 Projectile. Use only the M119A1 with the M549/M549A1 Projectile.

References:

TM 9-1300-251-20
TM 9-2350-217-10
TM 9-2350-217-10N

CHARGE, PROPELLING, 155 MILLIMETER: M203



CHARGE:	M203
TYPE:	SEPARATE LOADING
PROJECTILE:	M549A1
CANNON:	M199
WEAPONS:	M198

AR 101714

Type Classification:

Std MSR 01776003.

Use:

The M203 is a zone 8 S charge designed to supplement the standard M3, M4 and M119 series charges and to provide extended range for the 155mm Howitzer M198.

Description:

The M203 Propelling Charge is a single increment, red bag charge, approximately 30-1/4 in. long. The charge contains approximately 26 lb of the high energy M30A1 propellant in a cloth bag. A red cloth igniter pad containing 1 oz of black powder is sewn to the base of the charge. A central ignition core extends through the center of the charge for almost its entire length. This ignition core

consists of a nitrocellulose paper tube containing a bag of black powder which is sewn to the base igniter. A liner consisting of a cloth side impregnated with titanium dioxide and wax, and a lead side lines the forward end of the charge. Four tie straps sewn to the base of the charge run the length of the charge and are tied to the forward end of the charge. A donut shaped flash reducer is inserted under the tie straps at the forward end of the charge. A cylindrical jacket is placed over the charge length and tightly laced. This lacing jacket serves to provide necessary rigidity and structural stability of the assembled charge, and serves to differentiate the 8S from the M119/M119A1 zone 8 charge.

Functioning:

The flash from the black powder in percussion primer M82 ignites the igniter pad at the base of the charge. The burning igniter pad in turn ignites the black powder in the igniter core to spread ignition to the propelling charge.

Change 6

8-10.1

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Rapidly expanding gases from the burning charge propel the projectile through the barrel of the weapon with enough velocity to reach the target. The flash reducer functions to reduce blast overpressure and flash at the muzzle of the weapon.

Tabulated Data:

Type-----Red bag, separate loading
Weight-----26 lb
Length-----30-1/4
Color-----Red, w/black markings
Cannon used with-----M199 (M198) system
Propellant M30A1-----6 lb
Primer-----M82 (only)
Performance-----Zone 8 S

Temperature Limits:

Firing:
Lower limit-----50°F
Upper limit-----+125°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-----1 propelling charge in metal container PA68

Propelling charge containers:

Weight-----
Dimensions-----38 x 8-13/32 x 8-13/32 in.
Cube-----1.55 cu ft

Shipping and Storage Data:

Quantity-distance class-----1.3
Storage compatibility group-----C
DOT shipping class-----B
DOT designation-----Propellant, Explosive Solid - Class B
DODAC-----1320-D532
Assembly Dwg. No.-----9281897 (M203)
Container Dwg. No.-----9293303 (M203)

No preparation is required.

Limitations:

is used only with the M549A1 (TNT loaded) 155mm RAP Projectile, and the M483A1 155mm Projectile, and in the M198 Howitzer, and for firing in Zone 8.

References:

TM 9-4025-211-10
TM 9-1300-251-20

APPENDIX A

CARTRIDGE/PROJECTILE-FUZE COMBINATION CHARTS

IM 43-0001-28

CARTRIDGE/PROJECTILE-FUZE COMBINATIONS FOR GUNS

CALIBER	CARTRIDGE/PROJECTILE	FUZE																		
		M16A1	M16A2	M16A3	M16A4	M16A5	M16A6	M16A7	M16A8	M16A9	M16A10									
5.56mm	HE T HE1-1 MK2, SD, MK11, M3A1 HE T MK2 SD M3																			
5.56mm	HE HE T M352 SERIES HEAT M106 AP M106 SERIES																			
5.56mm	AP M106 APERS M106 HE M71 (NORMAL CAVITY) HE M71 (DEEP CAVITY) HE T M101 HEAT M101 SERIES HEAT M101 HEP M101 SERIES SMOKE AP M101 SERIES																			
5.56mm	APERS M106 HEAT M106 SERIES HEP M106 SERIES SMOKE AP M106																			
5.56mm	HE T M156 HEAT M156 SMOKE AP M156																			
5.56mm	HE T M657 HEAT M71 M106 SERIES HP T M101 (M111E3)																			
5.56mm	HE M101 HE M101 (NORMAL CAVITY) HE M101 (DEEP CAVITY) SMOKE AP M101 (AS HE M101)																			
5.56mm	HEP M101A1																			
5.56mm	HE M437 SERIES (DEEP CAVITY) HE M437 (SHALLOW CAVITY)																			

LEGEND
 ■ AS ISSUED OR COMPATIBLE
 P REQUIRES REMOVAL OF SUPPLEMENTAL CHARGE IF PRESENT

AR 101381

Figure A-1. Cartridge/Projectile-fuze combinations for guns.



Wohlschlag

TM 43-0001-28

CARTRIDGE-FUZE COMBINATIONS FOR MORTARS

WEAPON	CARTRIDGE	FUZE			
		P. II	V. I	NTSU	PROV
100 MILLIMETER M1 M19	HE M49 SERIES ILLUM M83 SERIES SMOKE WP M302 SERIES TP M302A2				
81 MILLIMETER M1 M29 M29A1	HE M41 SERIES HE M362 SERIES HE M374 SERIES ILLUM M301 SERIES SMOKE WP M75 SERIES SMOKE WP M75 SERIES TP M41 SERIES				
4.2 INCH M2 M30	US M61 GAS OR WP M2 SERIES HE M3 (NORM. CAVITY) HE M3A1 (DEEP CAVITY) HE M329 SERIES ILLUM M335A1 ILLUM M335A2 SMOKE WP M326 SERIES				

LEGEND

- AS ISSUED OR COMPATIBLE
- P - REQUIRES REMOVAL OF SUPPLEMENTAL CHARGE IF PRESENT

10 383 A

Figure A-3. Cartridge-fuze combinations for mortars.

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No. 7 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 10 April 1980

ARMY AMMUNITION DATA SHEETS
FOR
ARTILLERY AMMUNITION:
GUNS, HOWITZERS, MORTARS, RECOILLESS RIFLES,
GRENADE LAUNCHERS AND
ARTILLERY FUZES
(Federal Supply Class 1310, 1315, 1320, 1390)

TM 43-0001-28, 25 April 1977, is changed as follows:

1. Remove old pages and insert new pages as indicated below. New or changed material is indicated by a vertical bar in the margin of the page. Added or revised illustrations are indicated by a vertical bar adjacent to the identification number.

Remove pages

- 111 through vi
- 1-1 and 1-2
- 2-99 through 2-102
- 2-113 through 2-116
- 3-9 through 3-12
- 3-15 through 3-28
- 3-31 through 3-38
- 3-41 through 3-46
- 3-55 through 3-66
- 3-77 and 3-78
- 3-81 and 3-82
- 3-85 and 3-86
- 3-89 through 3-92
- 3-99 through 3-104
- 3-131 through 3-134
- 3-139 through 3-142
- 3-145 and 3-146
- 4-3 through 4-8
- 4-8.1 and 4-8.2
- 4-9 through 4-18
- 4-27 through 4-36
- 4-41 through 4-44
- 4-45 through 4-50
- 6-25 and 6-26
- 6-48.1 and 6-48.2
- None
- 7-51 and 7-52
- 7-93 through 7-96
- None

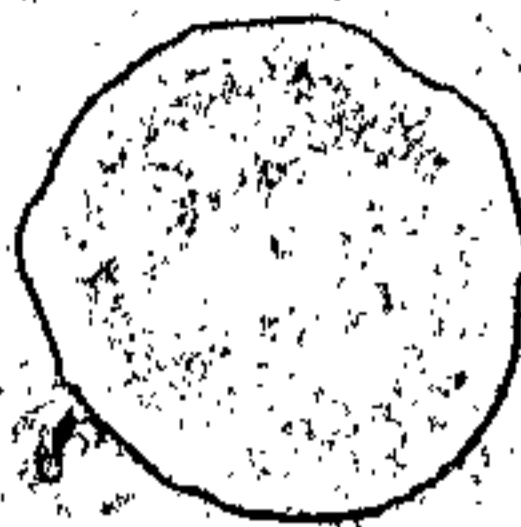
Insert pages

- 111 through vi
- 1-1 and 1-2
- 2-99 through 2-102
- 2-113 through 2-116
- 3-9 through 3-12
- 3-15 through 3-28
- 3-31 through 3-38
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- 6-48.1 and 6-48.2
- 7-36.3 and 7-36.4
- 7-51 and 7-52
- 7-93 through 7-96
- 8-30.01 through 8-30.04

2. File this change sheet in front of the publication for reference purposes.



By Order of the Secretary of the Army:



E.C. MEYER
General, United States Army
Chief of Staff

Official:

J.C. PENNINGTON
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-40, Organizational Maintenance requirements for Artillery Ammunition.

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APPENDIX A. CARTRIDGE/PROJECTILE-FUZE COMBINATION CHARTS-----A-1

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CHAPTER 1

INTRODUCTION

1-1. Purpose

This manual is a reference handbook published as an aid in planning, training, familiarization and identification of artillery ammunition, including guns, howitzers, recoilless rifles, mortars, 50mm grenade launchers, and artillery fuzes.

1-2. Scope

a. For each item of materiel, there are illustrations and descriptions, together with characteristics and related data. Included in the related data are weights, dimensions, performance data, packing, shipping and storage data, type classification, and logistics control codes (LCC).

b. Information concerning supply, operation, and maintenance of the items will be found in the publications referenced for those items. A complete listing of these publications is maintained in DA Pam 310 series indexes.

c. Within this manual, items with the following type-classifications are included:

- (1) Standard (LCC-A, LCC-B)
- (2) Contingency (CON)
- (3) Limited Procurement (LP)
- (4) Reclassified obsolete (OBS) for regular Army use; but used by National Guard or Reserve Units.
- (5) Reclassified OBS for all Army use, but used by Marine Corps, Air Force or Navy.
- (6) Reclassified OBS, no users, but US stocks remain.

d. Items with the following type classification are not included: Reclassified OBS for all US use. No US stocks remain. (Foreign use or stock may remain.)

e. Numerical values, such as weights, dimensions, candlepower, etc., are nominal values, except when specified as maximum or minimum. Actual items may vary slightly from these values. Allowable limits can be obtained from the drawings indicated in the data sheets.

1-3. Metric Conversion Chart

For approximate conversions to/from metric measures see figure 1-1.

1-4. Key to Abbreviations and Symbols

AP	-----	Armor piercing
APC	-----	Armor piercing capped
APDS	-----	Armor piercing, discarding sabot
APERS	-----	Antipersonnel
AT	-----	Antitank
BD	-----	Base detonating
BE	-----	Base ejection
CS	-----	A tactical riot control agent
DS	-----	Discarding sabot
GB	-----	Nonpersistent toxic (casualty) nerve gas
H	-----	Mustard gas
HD	-----	Distilled mustard gas
HE	-----	High explosive
HT	-----	Mixture of HD&T
HEAT	-----	High explosive antitank
HEAT-T-MP	-----	High explosive antitank with tracer, multi-purpose
HEDP	-----	High explosive dual purpose
HEI	-----	High explosive incendiary
HEP	-----	High explosive plastic
HERA	-----	High explosive rocket assisted
HVAP	-----	Hypervelocity, armor piercing
HVTP	-----	Hypervelocity, target practice
ILLUM	-----	Illuminating
MOD	-----	Modified
MK	-----	Mark
MP	-----	Multipurpose
MT	-----	Mechanical time
MTSQ	-----	Mechanical time and superquick

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MV ----- Muzzle velocity
 PD ----- Point detonating
 PI ----- Point initiating, base
 detonating
 PROX ----- Proximity
 PWP ----- Plasticized white phos-
 phorous
 RAP ----- Rocket assisted pro-
 jectile

SD ----- Self destroying
 T ----- Time fuze or for train-
 ing only
 -T ----- With tracer
 TP ----- Target practice
 TSQ ----- Time superquick
 VX ----- Persistent toxic
 (casualty) nerve gas
 WP ----- white phosphorous

METRIC CONVERSION CHART

Approximate Conversions to Metric Measures				
Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
WEIGHT				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³

TEMPERATURE					
Symbol	When You Know	Subtract	Multiply by	To Find	Symbol
F	Fahrenheit	32	5/9	Celsius	C

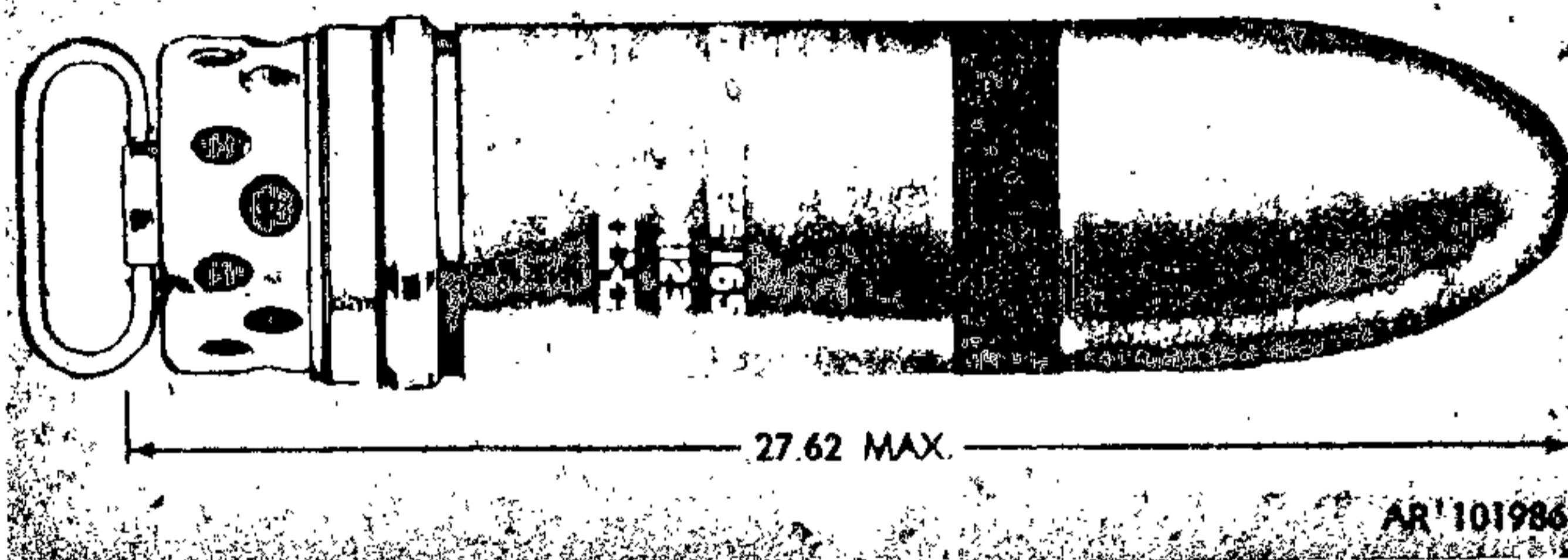
Approximate Conversions from Metric Measures				
Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	
WEIGHT				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³

TEMPERATURE					
Symbol	When You Know	Multiply by	Add	To Find	Symbol
C	Celsius	1.8	32	Fahrenheit	F

AR 101380-A

Figure 1-1. Metric conversion chart.

CARTRIDGE, 165MM: HEP, M123A1 AND M123

Type Classification:

Std AMCTC 4266 dtd 1966

Use:

This cartridge is a chemical energy round designed for demolition. It is capable of damaging or destroying the type of structures (log walls, concrete bunkers, etc.) and equipment (abandoned vehicles etc.) encountered on a battlefield. It is also effective as an antipersonnel round.

Description:

The M123A1 projectile is made of drawn plate steel with a blunt ogive. A copper rotating band encircles the

projectile just forward of the base. The projectile is cast loaded with a filler of approximately 35 pounds of Comp A3. A pressed felt washer and disk are positioned between the explosive charge and the base of the projectile to buffer the explosive from the shock of the setback. The base of the projectile is fitted with a base-detonating fuze and sealed with a steel plug. It is threaded externally for attachment to the mouth of the cartridge case. The cartridge case contains the propelling charge and a bagged supplementary igniter charge of 220 grains of black powder, heat-sealed in a polyethylene liner, which provides an improved moisture barrier over that in the M123. An electric primer is fitted to the base of the cartridge case. 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. On impact, the functioning of the fuze detonates the explosive.

Difference Between Models:

The M123 differs from the M123A1 in the following design aspects. The handle assembly requires 4 or 5 turns to release, in lieu of one-quarter turn; the base plug is aluminum instead of steel, and the cartridge case is a three-piece welded design with a plastic liner. The projectile loaded with a filler of Comp A3.

Tabulated Data:

Complete round:	
Type -----	HEP
Weight -----	67.60 lb
Length -----	27.62 in.
Cannon used with-	M135
Projectile:	
Explosive Filler-	35 lb Comp A3
Body Material ---	Steel
Color -----	Olive drab w/ yellow markings and black band.
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.
Primer -----	M73
Fuze BD -----	M62A2

Ballistics:

Maximum Range -----	1000 yd (914 mtr)
Muzzle Velocity -----	850 fps (259.08 mps)

Temperature Limits:

Firing:	
Lower limit -----	-40° F (-40° C)
Upper limit -----	+125° F (+52.0° C)
Storage:	
Lower limit -----	-80° F (For periods 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 per fiber container; one container per wooden box

*Packing Box:

Weight w/ctg -----	94.0 lb
Dimensions O.D. -----	30-1/16 x 7-3/8 x 7-7/16 in.
Cube -----	1.7 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping & Storage Data:

Quantity-distance class-	1.1
Storage compatibility group -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC -----	1315-D570
Drawing No. -----	8845043

Limitations:

Functional reliability is degraded when impacting other than sufficiently resistant objects. Duds will occur when firing ground impact if the terrain is of a soft medium (marshy, sandy, clay, mud or snow.)

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References:

TM 9-1300-803/2
SC 1305/30-IL
TM 9-2350-222-10
DARCOM-P 700-3-3
SB 700-29

Change 7

2-101

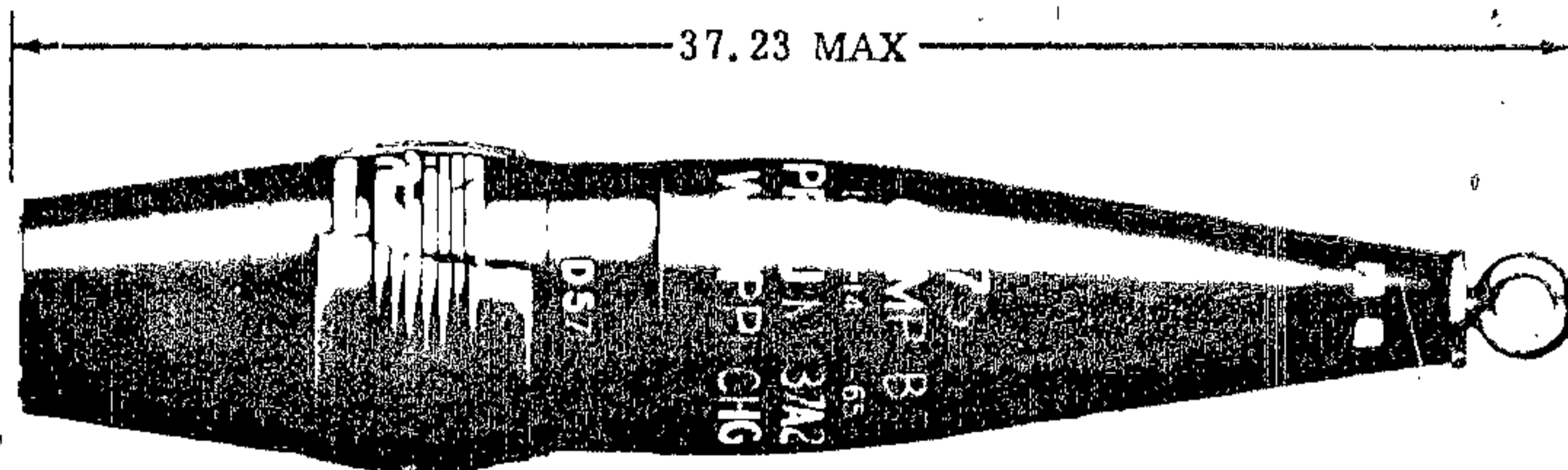
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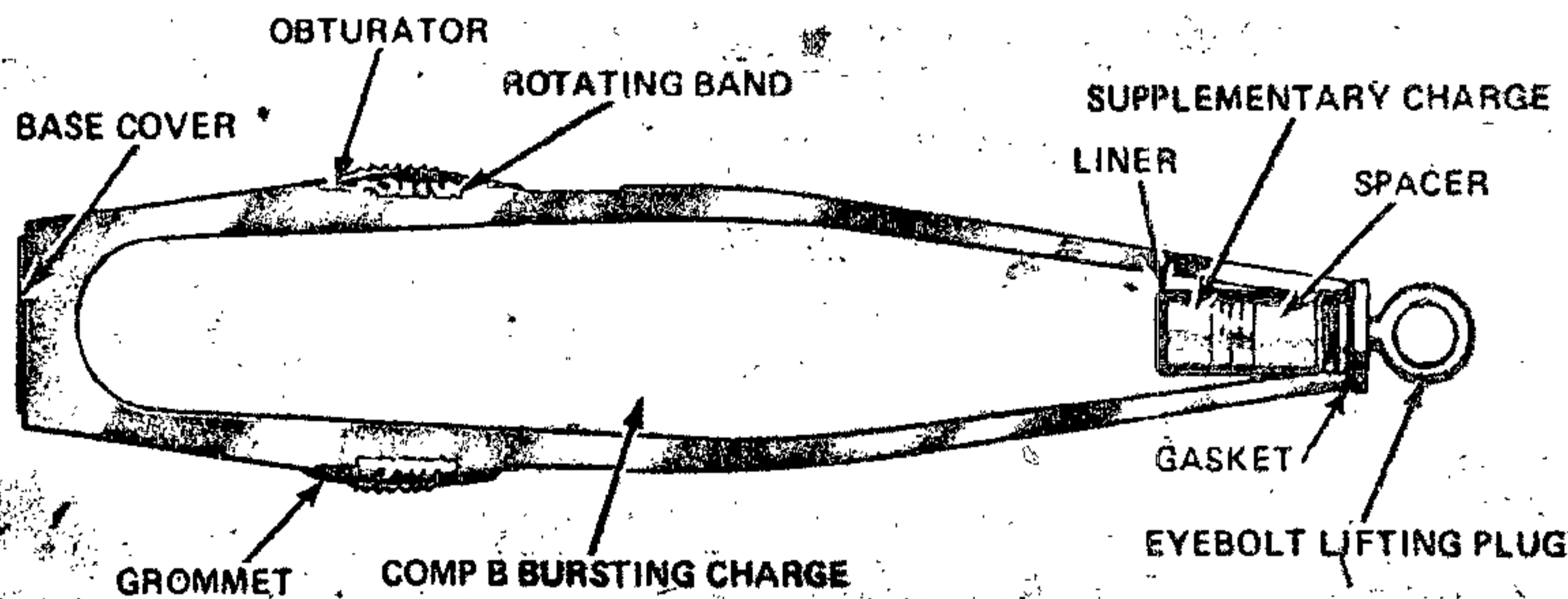
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Change 7

PROJECTILES, 175 MILLIMETER: HE, M437A2 AND M437A1



AR199602



Type Classification:

M437A2: Std AMCTC 3089 dtd 1965
 M437A1: Std AMCTC 3089 dtd 1965

Use:

These 175mm HE Projectiles M437A2 and M437A1 are high explosive rounds for the 175mm Gun Cannon M13 used for fragmentation, blast, and mining in support of ground troops and armored columns.

Description:

The projectile consists of a hollow steel forging with a boattailed base, a streamlined ogive, a gilding metal

rotating band, and a nylon obturating 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. The nose of the projectile is fitted with a threaded eyebolt lifting plug to facilitate handling and provide a closure for the fuze cavity. The projectile is made with a deep fuze cavity, and may be loaded with TNT or composition B. Deep cavity projectiles contain a supplementary charge in the fuze cavity. A cardboard spacer is placed in the fuze cavity between the supplementary charge and the lifting plug to limit movement of the supplementary charge during shipping and handling. The rotating band is protected by a removable grommet. The

loaded projectile is zoned into one of four weight zones ranging from 142.75 to 147.23 pounds: The weight zone of the projectile is indicated by the number of prick punch marks on the ogive of the projectile.

Functioning:

When the weapon is fired, Primer M82 ignites the igniter pad of the propelling charge. The burning pad ignites the black powder in the core assembly. Sparks and flame flash through perforations in the igniter core tubes in a pattern designed to assure uniform ignition of the propellant increments. Bore wear in the gun is reduced by an additive jacket assembled to increment 3 when firing at full charge. Gases generated by the burning propellant force the projectile through the gun tube with the velocity required to reach the target. The rotating band engages the barrel rifling to impart spin for stabilization in flight. The obturating band expands to prevent leakage of gas pressure past the projectile, and is discarded on leaving the weapon. Depending upon the type fuze employed, the projectile is detonated either on impact or on approach to the target.

Difference Between Models:

Model M437A2 is filled with Comp B; Model M437A1 is filled with TNT.

Tabulated Data:

Projectile:

Type ----- HE
 Weight Zone Information:
 WEIGHT ZONE
 LOADED PROJECTILE (W/O FUZE)

Zone	Over lb	Up To & Incl	Marking
1	142.75	143.96	□
2	143.84	145.05	□ □
3	144.93	146.14	□ □ □
4	146.02	147.23	□ □ □ □

Length:

W/O lifting plug ----- 34.14 in.
 W/lifting plug ----- 37.23 in. (max)
 Cannon (Weapon)
 used with ----- M113, M113A1
 Body material ----- Forged steel

Color ----- Olive drab w/
 yellow markings

Filler and weight:

M437A2 ----- Comp B 31 lb;
 Supp Chg 0.30 lb TNT
 M437A1 ----- TNT 30 lb; Supp
 Chg 0.30 lb TNT

Components:

Propelling charge - M86 series
 Primer ----- M82
 Fuzes ----- PD, M572; M739,
 MTSQ, M582
 prox, M728,
 M732

Temperature Limits:

Firing:

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

Storage:

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

*Packing ----- 6 projectiles
 per pallet

*Pallet:

Weight ----- 948 lb
 Dimensions ----- 42-3/16 x 25-5/8
 x 17-1/8 in.
 Cube ----- 10.6 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- (21) 1.1
 Storage compatibility
 group ----- D
 DOT shipping class ----- A
 DOT designation ----- EXPLOSIVE PRO-
 JECTILE
 DODAC ----- 1320-D572
 (M437A2,
 M437A1) w/
 Supplementary
 Charge 1320-
 D591 (M437A1,
 M437A2 without
 supplementary
 charge)

Assembly Dwg No ----- 8837902

Ballistics: (M113 and M113A1 Cannons)

velocity (1,675 fps) by up to 100 fps resulting in extended range.

Charge	Muzzle Velocity (fps)	Maximum Range (yd)	Maximum Range (mtr)	Chamber Pressure (psi)
M86				
*1	1675	16,515	15,100	10,100
2	2310	24,200	22,100	20,200
3	3000	35,800	32,700	45,700

References:

SC 1305/30-IL
 DARCOM-P 700-3-3
 TM 9-2300-216-10
 TM 9-1300-206
 TM 9-1300-251-20
 TM 9-1300-251-34
 TM 9-1300-250

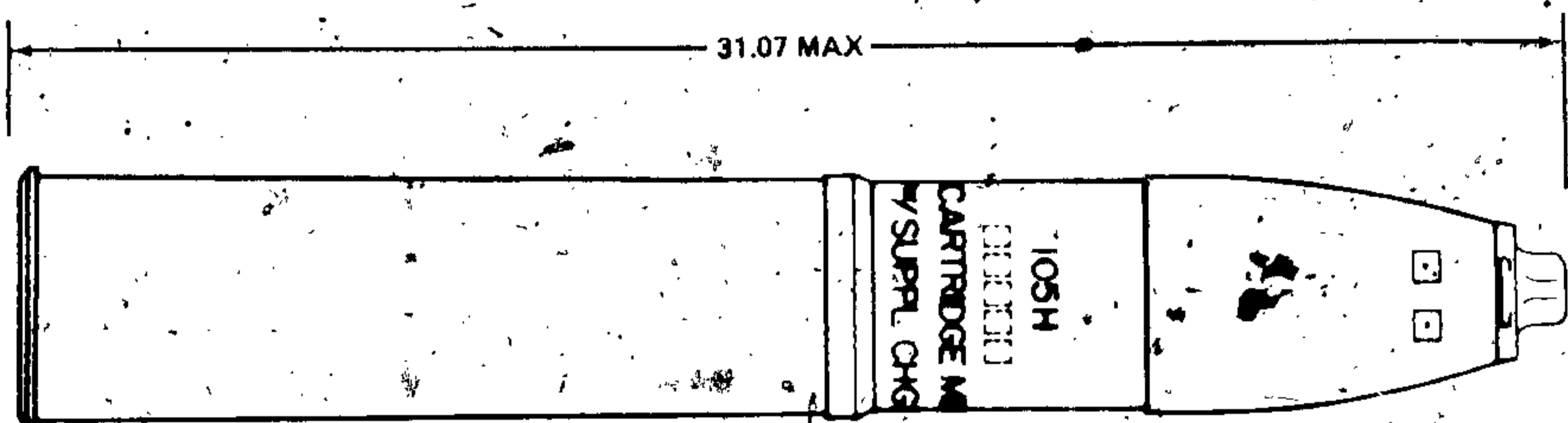
*When firing M86 series Propelling Charge at Zone 1 in a cold weapon expect the muzzle velocity to exceed the service

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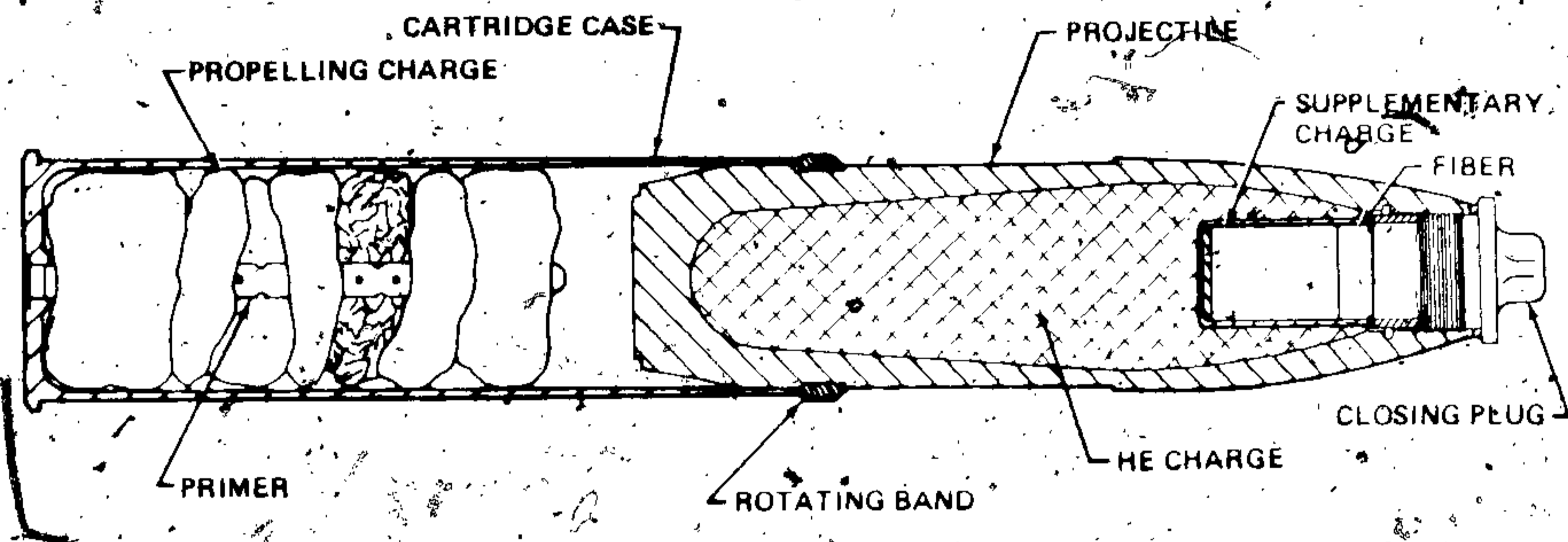
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CARTRIDGE, 105 MILLIMETER: HE, M1



AR199735



AR199734

Type Classification:

Std AMCTC 4181 dtd 1966

Use:

The projectile of this cartridge contains high explosive and is used for fragmentation, blast, and mining in support of ground troops and armored columns.

Description:

The projectile consists of a hollow steel forging with a boattail base, a streamlined ogive, and 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. The high explosive (HE) filler within the projectile may be either cast TNT or Composition B. A fuze cavity is either drilled or formed in the filler at the nose end of the projectile. This cavity may be either shallow or deep. A cavity liner, to preclude dusting of HE during transportation and handling, is seated in the cavity and expanded into the lower projectile fuze threads. A supplementary charge is placed in the fuze cavity of projectiles having deep cavities. Projectiles with shallow cavities or deep cavities containing a supplementary charge use only short intrusion

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fuzes, PD, or MT. Those with deep cavities will accept the long intrusion proximity fuze after removing the supplementary charge. Projectiles may be shipped with a PD or MTSQ fuze or with a closing plug. When shipped with a closing plug, a chip board spacer is assembled between the supplementary charge and plug to limit movement of the former during transportation and handling.

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 increment 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, the closing plug is removed and a fuze assembled to the projectile 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 tube imparts spin to the projectile providing inflight stability. Projectile functioning is dependent upon the fuze used and may function on impact (instantaneous or delay), function above ground either at a predetermined height based upon time of flight or function in proximity with the target area. Fuze function detonates the HE projectile filler resulting in projectile fragmentation and blast.

Tabulated Data:

Complete round:

Type ----- HE
Weight ----- 39.92 lb
Length ----- W/closing plug
31.07 in. max.
Cannon (weapon)
used with ----- M49 (M52, M52A1),
M2A1, M2A2 (M101,
M101A1), M103,
(M108), M137
(M102)

Projectile:

Body material ----- Forged steel
Color ----- Olive drab w/yel-
low marking

Filler weight:

Comp. B:
Normal cavity --- 5.08 lb
Deep cavity ---- 4.60 lb
TNT:
Normal cavity --- 4.80 lb
Deep cavity ---- 4.25 lb

Weight Zones:

Loaded Shell w/Suppl Charge (with-out fuze) Up to Over & Incl lb Zones Mark-ing

Pounds	29.90	30.60	1	□
	30.50	31.20	2	□ □
	31.10	31.80	3	□ □ □

NOTE: Comp B filled projectiles fall in weight zone 2-1/2 Cartridge Case:

Model	Matl	WT (lb) (approx)
M14	Brass	5.9
M14B1	Steel Drawn	5.4
M14B3	Steel, 5 pc spiral wrap	4.7
M14B4	Steel, 3 pc spiral wrap	4.7

Propelling charge:

Model ----- M67

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Components:

Increment No.	Prop. Comp. & Type	Web Size in. approx	Wt oz Approx
1	M1, Type II	.014	8.6 Single Perf
2	M1, Type II	.014	1.4 Single Perf
3	M1, Type I	.026	2.5 Multi Perf
4	M1, Type I	.026	3.8 Multi Perf
5	M1, Type I	.026	5.8 Multi Perf
6	M1, Type I	.026	8.8 Multi Perf
7	M1, Type I	.026	14.3 Multi Perf

Weight, Total Increments 1-7 ----- 2.83 lb
 Percussion primer assembly:

	M28A2	M28B2
Primer	M61	M61
Black powder	CI 1, Spec MIL-P-223 (Note B)	CI 1, Spec MIL-P-223 (Note B)
Weight (lb) (primer) (BP)	.00014	.00014
Body	.043 Brass, Type 1	.043 Steel, Type 2

Fuzes ----- PD, M557, M78 Series M739; MTSQ, M582, M564; Prox. M513 series, M728, M732

Performance:
 Using M52, M52A1 and M101/M101A1 howitzers.

Charge	Muzzle Velocity (fps)	(mps)	Maximum Range (mtr)	(yd)
1	650	198.1	3510	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 mtr (12,330 yd)
 Muzzle velocity --- 472.4 mps (1550 fps)

Using M102 and M108 howitzers.

Charge	Muzzle Velocity (fps)	(mps)	Maximum Range (mtr)	(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 mtr (12,590 yd)
 Muzzle velocity --- 494 mps (1621 fps)

Temperature Limits:

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

Storage:
 Lower limit ----- -80°F (for periods not exceeding three days) (-62.2°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 w/cartridge ----- 120 lb
 Dimensions ----- 37-1/4 x 11-15/16 x 7-19/32 in.
 Cube ----- 2.0 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity*distance class ----- (12) 1.2
 Storage compatibility group ----- E
 DOT shipping class --- A

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DOT designation ---- AMMUNITION FOR
CANNON WITH
EXPLOSIVE
PROJECTILES
DODAC ----- 1315-C445
Drawing number ---- 9211611 (ship-
ped without
fuze)

Limitations:

For proximity mode, VT M513 proximity
fuzes are limited to Zones 2 through 6.
Zone 7 in combat emergency only. For
Impact Action, Zones 4 through 6 only.

VT Fuze M728, for proximity or im-
pact action, Zones 1 through 6. Zone
7 for proximity action only in a combat
emergency.

References:

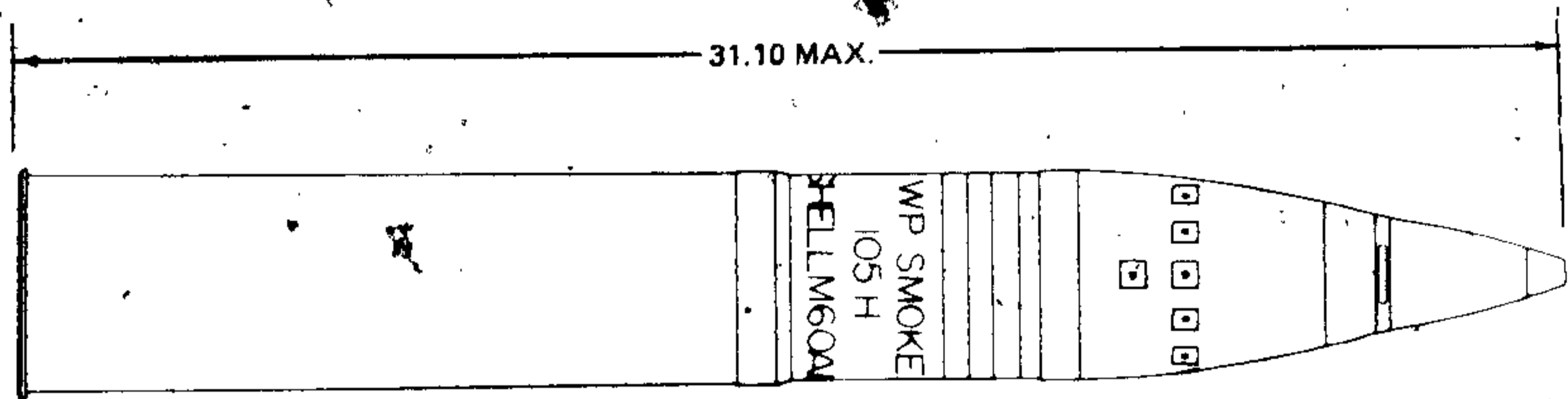
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- SB 700-20
- DARCOM-P 700-3-3
- TM 9-1015-203-12
- TM 9-1015-234-12
- TM 9-1300-251-20
- TM 9-2350-217-10



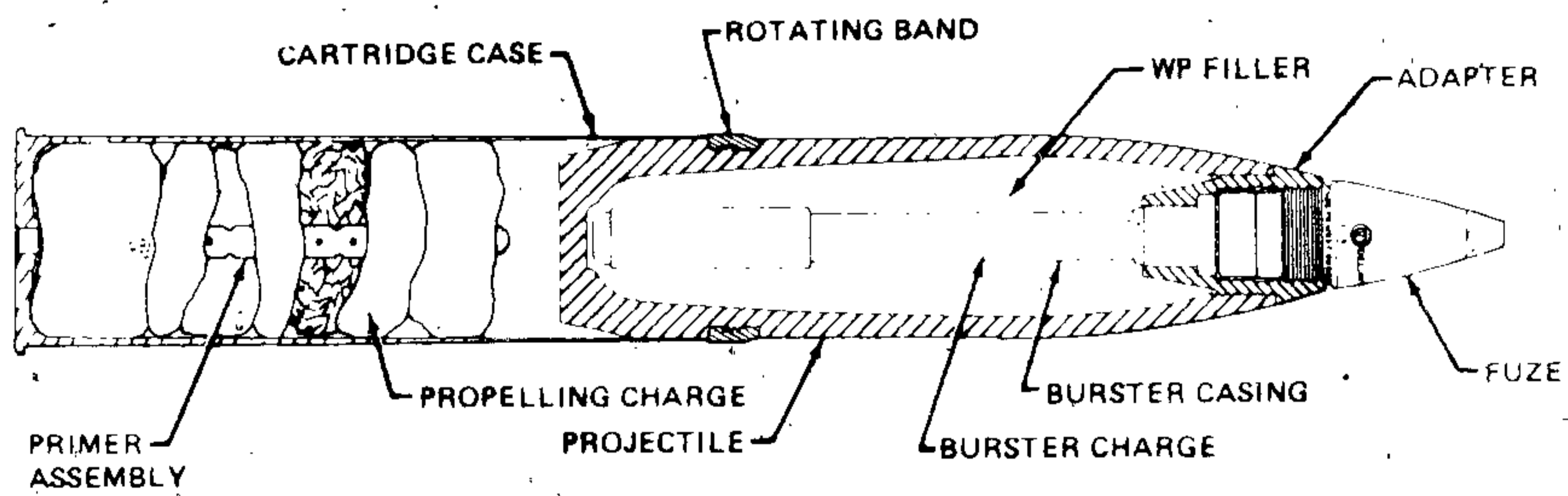
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CARTRIDGE, 105^{mm} MILLIMETER: SMOKE, WP, M60 SERIES



AR199721



AR199720

Type Classification:

Std AMCTC 9102 dtd 1972 (M60A2, M60A1) CON MSR 11756003 (M60)

Use:

The projectile of this cartridge contains white phosphorous (WP) which is dispersed over the target area for screening purposes. The WP also has a limited incendiary effect.

Description:

The projectile consists of a hollow steel forging with a boattail base, a streamlined ogive, and 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. The projectile cavity is filled with cast WP. A steel nose adapter, having a female fuze thread, with a press fitted burster casing, is threaded into the nose of the projectile providing a seal for the filler. A burster charge is placed inside the burster casing and a fuze is threaded into the adapter. 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 pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash

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tube containing black powder. The seven numbered increment 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, the closing plug is removed, and a fuze is assembled to the projectile 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 tube imparts spin to the projectile providing inflight stability. Projectile functioning is dependent upon the fuze used and may function on impact, or function above ground at a predetermined height based upon time of flight. The fuze detonates the burster charge, rupturing the projectile, and dispersing the WP filler. White phosphorous burns on contact with air, producing a dense white cloud of smoke used for ground cover or spotting.

Differences Among Models:

Model	Burster Casing Material	Burster Model No.	Burster Expl Comp	Fuze
M60	Steel	M5	Tetrytol	PD M557
M60A1	High strength aluminum	M53	Comp B	PD M557 or MTSQ, M564
M60A2	High strength aluminum	M53A1 (XM53E1)	Comp B5	PD M557 or MTSQ M564

Tabulated Data:

Complete round:

Type -----	Smoke, WP
Weight -----	42.92 lb
Length -----	31.10 in.
Cannon (weapon) used with -----	M49 (M52, M52A1), M2A1, M2A2 (101, M101A1), M103, (M108, M137) (M102)

Projectile:

Body material -----	Forged steel
Color:	
Old mfg -----	Gray w/yellow markings
New mfg -----	Light green w/yellow bands and light red markings
Filler and weight--	WP, 3.86 lb

WEIGHT ZONES

LOADED PROJECTILE (W/O FUZE OR PLUG)

Zones	Over lb	Up to & Incl lb	Marking
3	31.1	31.8	□ □ □ □
4	31.7	32.4	□ □ □ □ □
5	32.3	33.0	□ □ □ □ □ □
6	32.9	33.8	□ □ □ □ □ □ □

Fuze ----- PD, M557 or M739

Cartridge case:

Model	Matl	Wt (lb) (approx)
M14	Brass	5.9
M14B1	Steel, Drawn	5.4
M14B3	Steel, 5 pc spiral wrap	4.7
M14B4	Steel, 3 pc spiral wrap	4.7

Propelling charge:

Model ----- M67

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Components:

Increment No	Prop Comp & Type	Web Size in. Approx	Wt oz Approx	Perf
1	M1, Type II	.014	8.6	Single
2	M1, Type II	.014	1.4	Single
3	M1, Type I	.026	2.5	Multi
4	M1, Type I	.026	3.8	Multi
5	M1, Type I	.026	5.8	Multi
6	M1, Type I	.026	8.8	Multi
7	M1, Type I	.026	14.3	Multi

Weight, Total Increments 1-7 ----- 2.83 lb

Percussion Primer Assembly:

	M28A2	M28B2
Primer	M61	M61
Black powder	Cl 1, Spec MIL-P-223 (Note B)	Cl 1, Spec MIL-P-223 (Note B)
Weight (lb) (primer)	.00014	.00014
(BP)	.043	.043
Body	Brass, Type 1	Steel, Type 2

Performance:

For M52, M52A1 and M101/M101A1 howitzers.

Charge	Muzzle Velocity (mps)	Muzzle Velocity (fps)	Maximum Range (mtr)	Maximum Range (yd)
1	198.1	650	3510	3840
2	216.4	710	4110	4495
3	237.7	780	4860	5315
4	266.7	875	5950	6505
5	310.9	1020	7650	8370
6	376.4	1235	9380	10,260
7	472.4	1550	11,270	12,330

Maximum range ----- 11,270 mtr
 (12,330 yd)
 Muzzle velocity --- 472 mps (1550 fps)

For M102 and M108 howitzers.

Charge	Muzzle Velocity (mps)	Muzzle Velocity (fps)	Maximum Range (mtr)	Maximum Range (yd)
1	205	673	3700	4040
2	223	723	4300	4700
3	247	810	5200	5690
4	278	912	6300	6890
5	325	1066	8100	8500
6	393	1289	9600	10,500
7	494	1621	11,500	12,590

Maximum range ----- 11,500 mtr
 (12,590 yd)
 Muzzle velocity --- 494 mps (1621 fps)

Temperature Limits:

Firing:	M60	M60A1	M60A2(E3)
Lower limit	-40°F	-50°F	-50°F
Upper limit	+125°F	+145°F	+145°F
Storage:			
Lower limit	-65°F	-50°F	-50°F
Upper limit	+125°F	+145°F	+145°F
*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 7-19/31 in.		
Cube	2.0 cu ft		

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class	(12) J.2
Storage compatibility group	H
DOT shipping class	C
DOT designation	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC	1315-C454
Drawing number	9216521

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Limitations:

All models: this cartridge should be stored or transported at temperatures below the melting point (+ 111.4°F) of the WP filler, because of possible cavitation in the filler from melting and resolidification in the projectile cavity. If this is not practicable, the cartridge should be transported or stored with the nose end up to prevent cavitation.

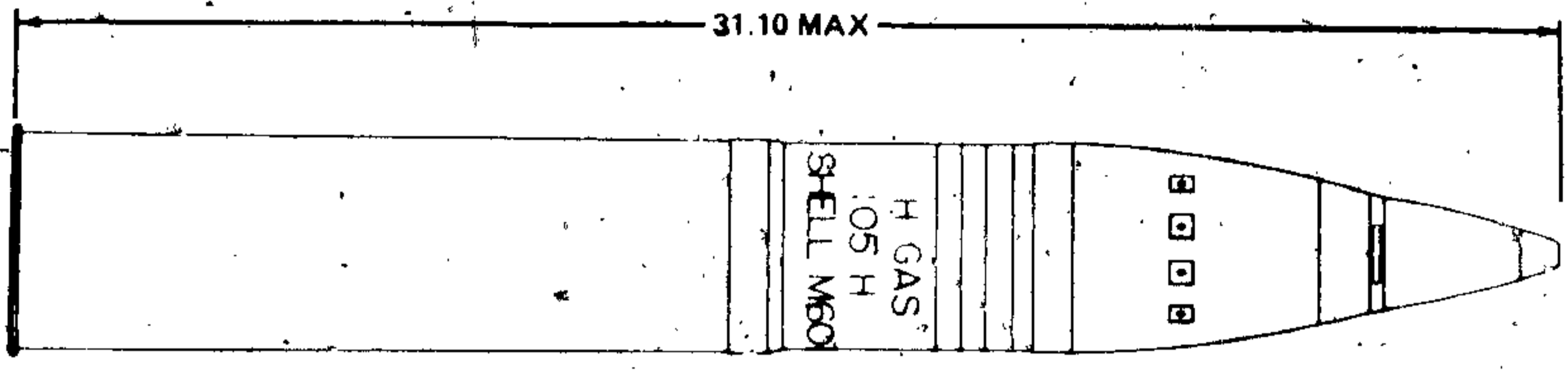
For M60 only: the burster casing in this cartridge contains tetryol and should not be transported, stored or fired at temperatures exceeding +125°F.

References:

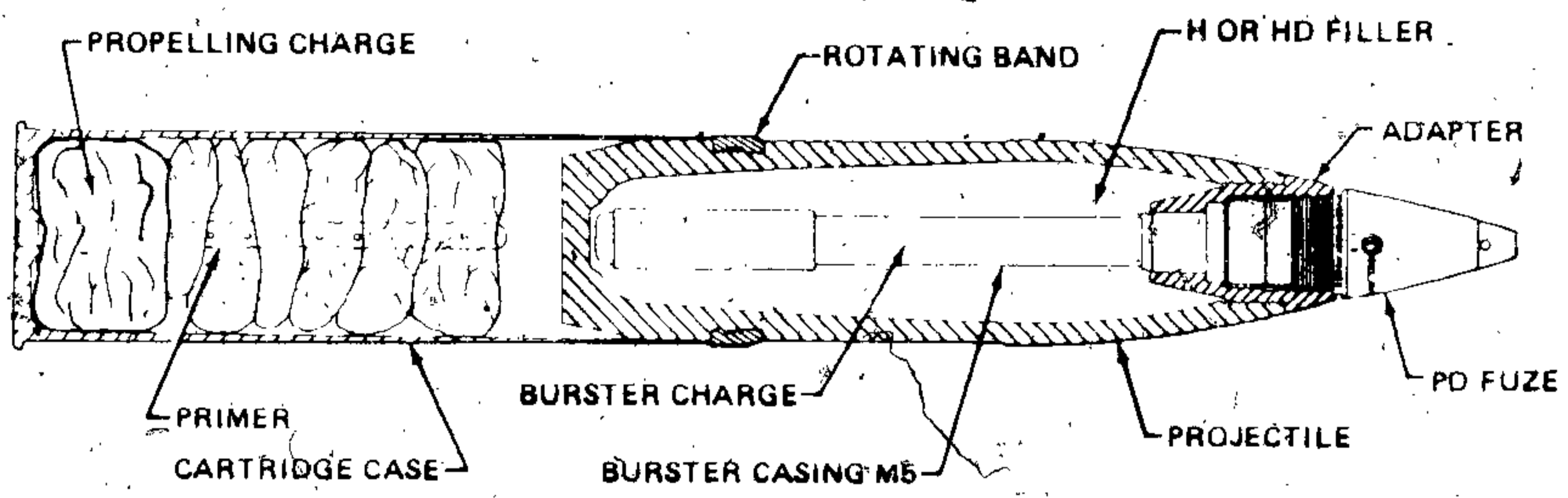
- SC 1305/30-IL
- SB 700-20
- DARCOM-P 700-3-3
- TM 9-1015-203-12
- TM 9-1015-234-12
- TM 9-1300-251-20
- TM 9-2350-217-10

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CARTRIDGE, 105 MILLIMETER: AGENT, H OR HD, M60



AR199737



AR199736

Type Classification:

Std OTCM 36841 dtd 1958.

Use:

The projectile of this cartridge contains a casualty producing agent for use against enemy personnel.

Description:

The projectile consists of a hollow steel forging with a boattail base, a streamlined ogive, and 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. The projectile cavity is filled with H (mustard) or HD (distilled mustard) in liquid form. A steel nose adapter, having a female fuze thread, with a press fitted burster casing is threaded into the nose of the projectile providing a seal for the filler. A tetrytol burster charge is placed inside the burster casing and a PD fuze threaded into the adapter. 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 pressed into the base. The percussion primer assembly consists of a percussion ignition element and a

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perforated flash tube containing black powder. The seven numbered increment 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:

The propelling charge is adjusted and the cartridge loaded 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 tube imparts spin to the projectile providing inflight stability. Upon impact with the target, the PD fuze detonates the burster charge rupturing the projectile and dispersing the chemical agent. The liquid agent evaporates forming a persistent gas to envelope the target areas.

Tabulated Data:

Complete round:

Type ----- Agent H or HD, persistent
 Weight ----- 42.92 lb
 Length ----- 31.07 in
 Cannon (weapon) used with ----- M1A1, M2A2 (M101, M101A1), M49 (M52, M52A1), M137, (M102) and M103 (M108)

Projectile:

Body material ---- Forged steel
 Color ----- Gray w/dark green bands (2)
 Filler and weight- 3.17 lb H, or 2.97 lb HD
 Fuze ----- PD M557, M739

**WEIGHT ZONES
 LOADED SHELL W/BURSTER CHARGE
 W/O FUZE**

Zone	Over lb	Up to. & Incl	Marking
2	30.5	31.2	□ □
3	31.1	31.8	□ □ □
4	31.7	32.4	□ □ □ □

Propelling charge:

Cartridge case ----- M14 series
 Propellant ----- M67, 2.825 lb
 Primer ----- M28A2, or M28B2

Performance:

For M52, M52A1 and M101/M101A1 howitzers.

Charge	Muz- zle (mps)	Velo- city (fps)	Maxi- mum (mtr)	Range and (yd)	Ele- va- tion (mil)	An- gle (deg)
1	198.1	650	3510	3840	782	44.0
2	216.4	710	4110	4495	780	43.9
3	237.7	780	4860	5315	774	43.6
4	266.7	875	5950	6505	784	44.1
5	310.9	1020	7650	8370	771	43.4
6	376.4	1235	9380	10,260	779	43.8
7	472.4	1550	11,270	12,330	783	44.0

Maximum range ----- 11,270 mtr (12,330 yd)
 Muzzle velocity ----- 472.4 mps (1550 fps)

For M102 and M108 howitzers.

Charge	Muz- zle (mps)	Velo- city (fps)	Maxi- mum (mtr)	Range and (yd)	Ele- va- tion (mil)	An- gle (deg)
1	205	673	3700	4040	689.6	38.7
2	223	732	4300	4700	694.1	39.0
3	247	810	5200	5690	742.7	41.7
4	278	912	6300	6890	687.2	38.6
5	325	1066	8100	8500	702.0	39.5
6	393	1289	9600	10,500	734.2	41.3
7	494	1621	11,500	12,590	728.4	40.9

Maximum range ---- 11,500 mtr
 (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 ----- -40° F-(-40°C)
 Upper limit ----- +125° F-(+52°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 SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class- (12) 1.2
 Storage compatibility
 group ----- K
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR
 CANNON WITH
 GAS PROJEC-
 TILES
 DODAC ----- 1315-C442
 Drawing Number ----- 75-1-109

Limitations:

The burster in this ammunition is loaded with tetrytol and may not be stored or fired at temperatures exceeding +125° F.

References:

DARCOM-P-700-3-3
 SB 700-20
 SC 1305/30-IL
 TM 9-1015-203-12
 TM 9-1015-234-12
 TM 9-1300-251-20
 TM 9-2350-217-10

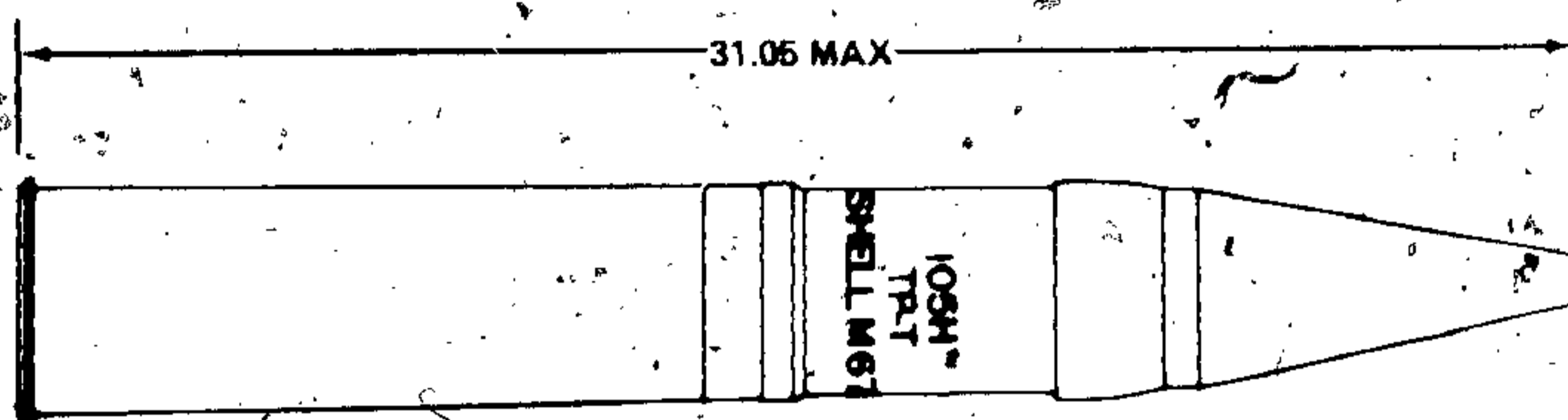
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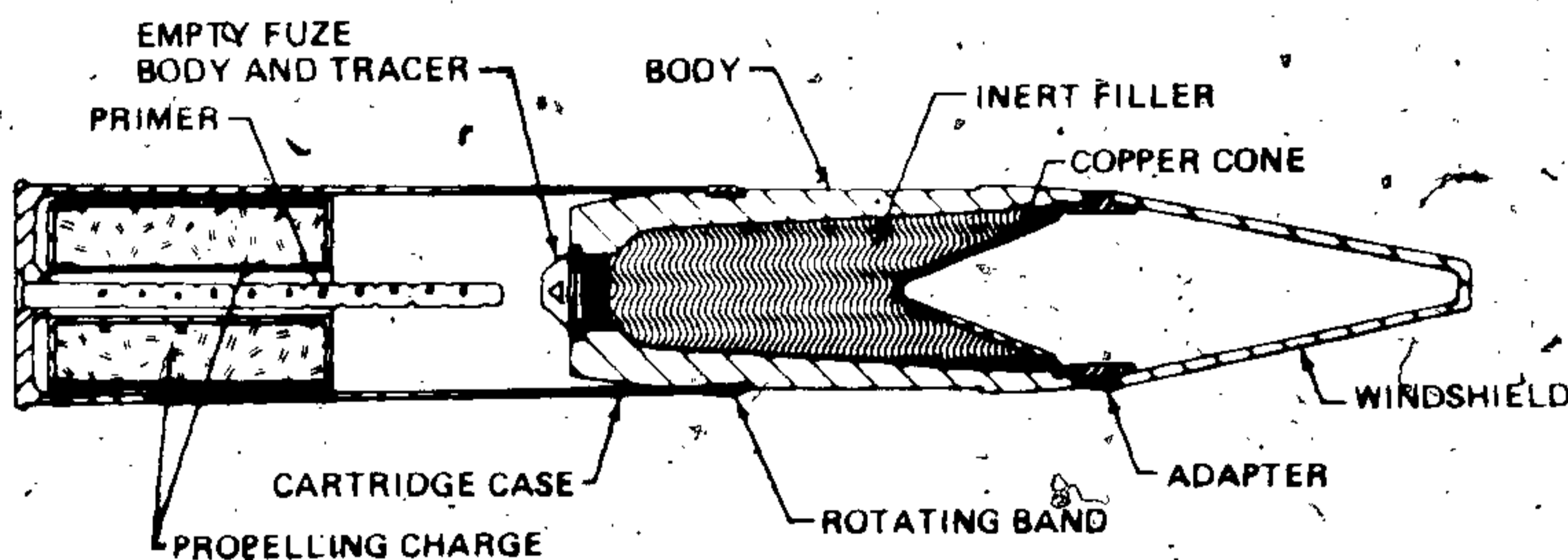
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TM 43-0001-28

CARTRIDGE, 105 MILLIMETER: TP-T, M67



AR199715



AR199714

Type Classification:

CONT AMCTC 8650, dtd. 1971.

Use:

This cartridge is used for training in marksmanship.

Description:

The projectile consists of a boat-tailed steel body fitted with a steel windshield and gilding metal rotating band. The windshield is a hollow steel cone fitted to the front of a steel adapter. The adapter is threaded into the front end of the projectile, and retains a copper conical liner in the projectile cavity. The projectile cavity contains an inert filler

instead of a shaped HE charge as in the service projectile. An empty fuze body with a live tracer is threaded into the base of the projectile. The complete projectile assembly is a free fit in the cartridge case. The cartridge case contains a percussion primer assembly and a single propelling charge increment. 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 single increment bag is assembled into the cartridge case around the primer assembly.

Functioning:

The weapon firing pin strikes the percussion primer which ignites the black powder in the

Change 7 3-23

Primer. The primer ignites the propelling charge uniformly through the perforations in the primer tube and also ignites the tracer. The rotating metal band around the projectile engages the rifling in the barrel to impart spin to the projectile for in-flight stability. The expanding gases from the propelling charge force the projectile through the barrel with the velocity required to reach the target. The tracer burns for a minimum of 3 seconds during projectile flight. The projectile is non-functional because it is an inert practice round lacking the penetrating capability of a service round.

Tabulated Data:

Complete round:

Type-----TP
 Weight-----37.06 lb
 Length-----31.05 in.
 Cannon (weapon) used with--M49 (M52, M52A1),
 M2A1, M2A2
 (M101, M101A1),
 M103 (M108),
 M137 (M102)

Projectile:

Body material-----Steel bar
 Color-----Blue or black
 w/white markings
 Filler and weight-----Inert filler,
 3.89 lb
 Tracer-----M5A2B1

Propelling charge:

Cartridge case-----M14 series
 M14-----Brass, 5.9 lb
 (approx)
 M14B4-----Steel, 3 pc
 spiral wrap,
 4.7 lb (approx)
 Propelling charge-----M1, 1.54 lb
 Primer-----M28A2, M28B2

Performance:

Maximum range-----8281 yd
 Muzzle velocity-----1250 fps

Temperature Limits:

Firing:

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

Storage:

Lower limit----- -80°F (for periods not exceeding 3 days) (-62.2°C)

Upper limit----- +160°F (for periods not exceeding 4 hr/day) (+71.1°C)

*Packing----- 1 round in fiber containers, 2 containers in wooden box

*Packing Box:

Weight-----120 lb
 Dimensions-----37-1/4 x 11-15/16
 x 7-19/32 in.
 Cube-----2.0 cu ft.

*NOTE: See SC for complete packing data including NSN's.

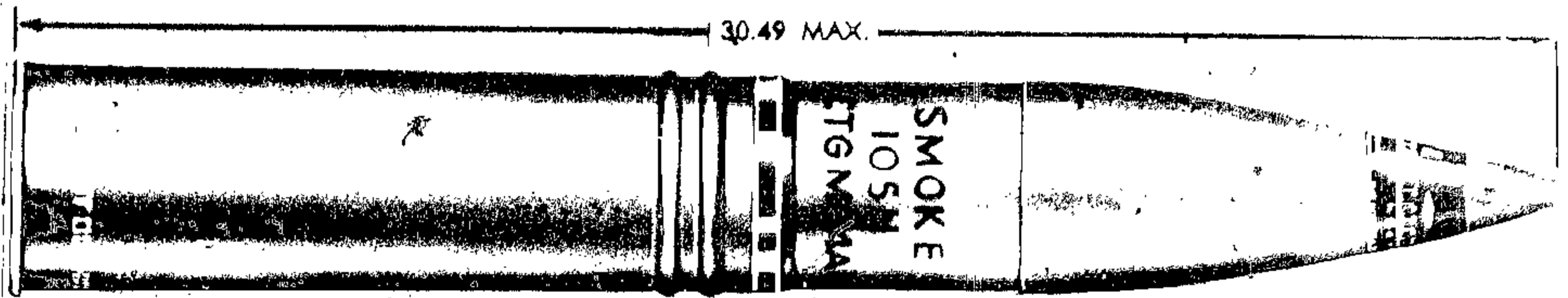
Shipping and Storage Data:

Quantity-distance class----- (08) 1.2
 Storage compatibility group----- C
 DOT shipping class----- 8
 DOT designation----- AMMUNITION FOR
 CANNON WITH
 INERT-CHARGED
 PROJECTILES
 DODAC----- 1315-C457
 Drawing number----- 75-1-491

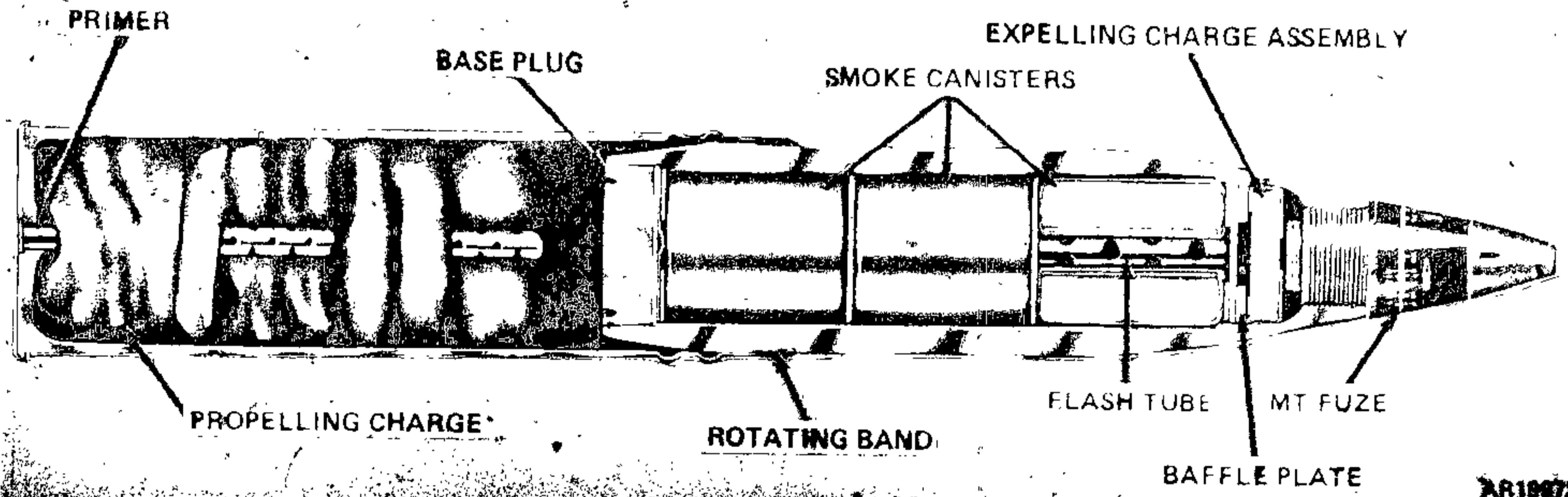
References:

DARCOM R 700-3-3
 SC 1305/30-1L
 SB 700-20
 TM 9-1015-203-12
 TM 9-1015-234-12
 TM 9-1300-251-20
 TM 9-2350-217-10

CARTRIDGE, 105 MILLIMETER, HC, BF, M84 SERIES



AR 199727



AR 199728

Type Classification:

Std AMTC 7621, dtd 1970 (M84A1, M84B1)
CON MSR 11756003 (Red, Green, and Yellow
Colored Smoke)

Use:

The projectile of this cartridge contains a smoke mixture which, when ignited and ejected, serves as a signal, a screen, or to spot a target.

Description:

The projectile body consists of a hollow steel forging with a boattail base, a streamlined ogive, gliding metal rotating band, and base plug. A black powder expelling charge is

assembled into the projectile at the nose end. Next, a steel baffle (pusher) plate, with a central hole, is assembled behind the expelling charge followed by three smoke canisters, alternating spacers, fillers, and the base plug. The spacers are assembled between canisters, as well as at the base, to insure a tight canister pack. An MTSQ or MT fuze is assembled to the nose of the projectile. The canisters are loaded with a central igniter tube. Around the igniter core is a first fire mix which serves to initiate the smoke mix. The smoke mix surrounds the first fire mix and when ignited generates a white (HC) or, in the case of the M84 and M84B1, HC or other colored smoke. The cartridge case contains a perforator assembly and seven individually numbered propelling charge increments. The base of the cartridge case is drilled and the primer

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assembly is press fitted in the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing black powder. The seven numbered increment-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

Adjust the propelling charge, if required, prior to 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 tube imparts spin to the projectile providing in-flight stability. The projectile functions above ground at a predetermined height based upon time of flight. The fuze initiates the black powder in the expelling charge which flashes through the center hole of the baffle plate initiating the first fire mix in the canisters. The burning black powder generates gas pressure against the baffle plate which, through the canisters, causes the base plate and canisters to leave the projectile. The first fire mix initiates the smoke charge. The canisters burn for 40 to 90 seconds.

Difference Among Models:

	<u>M84</u>	<u>M84B1</u>	<u>M84A1</u>
Body forging	Transom below Fuze Thd	Transom below Fuze Thd	No transom
Expelling charge	BP in cloth bag	BP plastic cup encased	BP in plastic cylinder
Nose Thd	1.7 x 14 TPI	1.7 x 14 TPI	2 x 12 TPI
Fuze	MTSQ M501 M501A1	MTSQ M501 M501A1	MTSQ M548 MT, M566
Spacers	Chipboard	Chipboard	Aluminum
Filler	Chipboard	Chipboard	Felt

	<u>M84</u>	<u>M84B1</u>	<u>M84A1</u>
Colors available	HC, red yellow green	HC, red, yellow green	HC, red yellow green

Tabulated Data:

Complete round:
 Type-----Smoke, HC (white)
 Weight-----41.96 lb
 Length-----30.49 in.
 Cannon used with-----M2A2, M103 or M137

Projectile:
 Body material-----Steel forging
 Color-----Light green w/
 *black markings
 Filler and weight-----HC 12.3 lb

Components:
 Cartridge case-----M14B4 (3 pc spiral steel)
 or M14B1 (drawn steel)
 Propelling charge-----M67, 2.83 lb

Chg Wt	In Oz	Approx	Type	Web	Approx
8.6			II	.014	
1.4			II	.014	
2.5			I	.026	
3.8			I	.026	
5.8			I	.026	
8.8			I	.026	
14.3			I	.026	

Primer-----M28B2, M28A2
 Fuze-----MT, M566 (M84A1HC)
 MTSQ, M577,
 (M84A1HC)
 MTSQ, M501,
 M501A1 (M84,
 M84B1 HC & C1d)

Performance:
Using M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle Velocity (fps)	Velocity (mps)	Maximum (mtr)	Range (yd)
1	650	198.1	3510	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 mtr
 (12,330 yd)
 Muzzle velocity-----472.4 mps
 (1550 fps)

Using M102 and M108 howitzers:

Charge	Muzzle Velocity (fps)	Muzzle Velocity (mps)	Maximum Range (mtr)	Maximum 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 mtr
 (12,590 yd)
 Muzzle velocity-----494 mps
 (1621 fps)

Temperature Limits:

Firing:

Lower limit----- -65°F (-54°C)
 Upper limit----- +145°F (63°C)

Storage:

Lower limit----- -65°F (-54°C)
 Upper limit----- +145°F (63°C)

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

*Packing Box:

Weight-----120 lb
 Dimensions-----37-1/4 x 11-15/16
 x 7-15/32 in.

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class----- (12) 1.2
 Storage compatibility group----- G
 DOT shipping class----- E
 DOT designation----- AMMUNITION FOR
 CANNON WITH
 SMOKE PROJEC-
 TILES
 DODAC----- 1315-0452
 Drawing number----- 9223421-1

References:

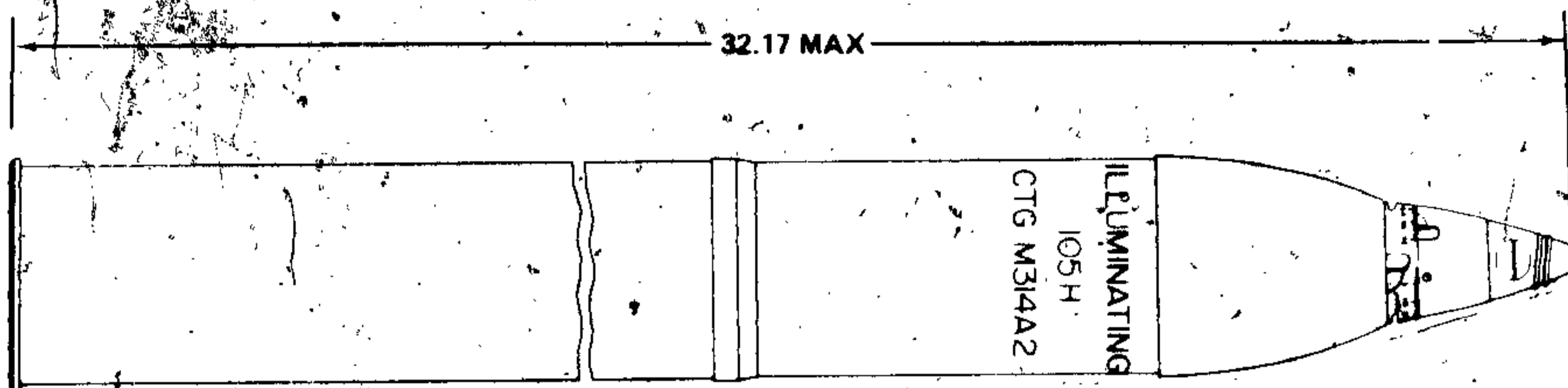
- SC 1305/30-IL
- SB 700-20
- DARCOM-R 700-3-3
- TM 9-1015-203-12
- TM 9-1015-234-12
- TM 9-1300-251-20
- TM 9-2350-217-10

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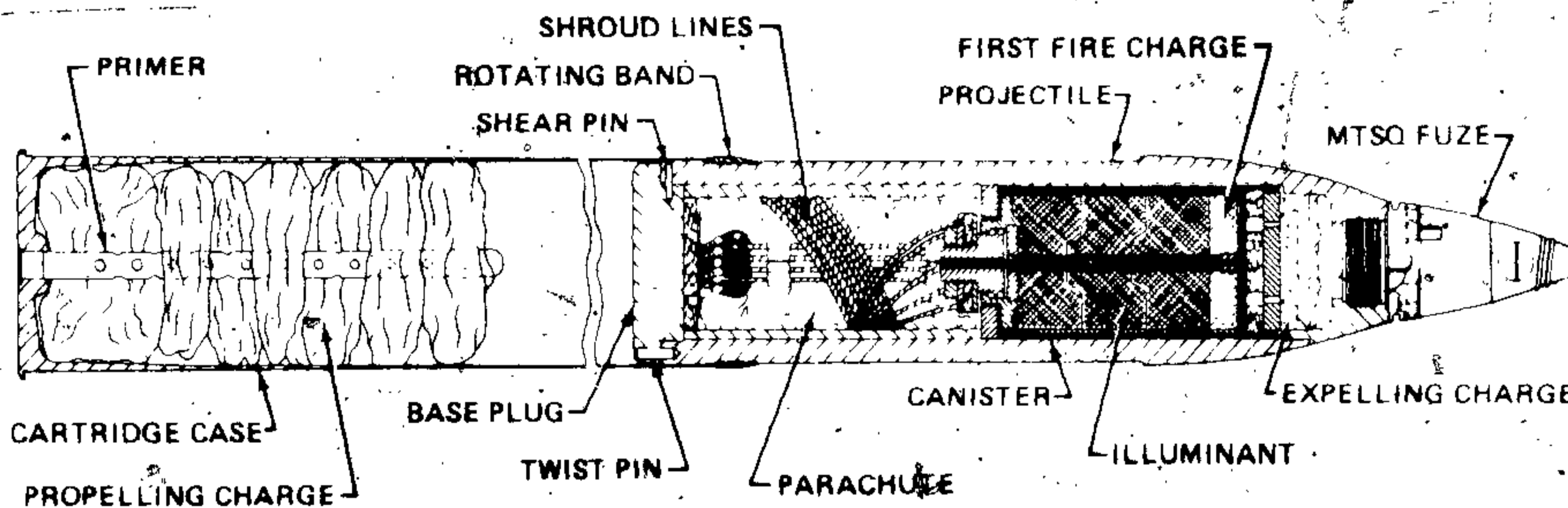
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CARTRIDGE, 105 MILLIMETER: ILLUMINATING, M314, M314A1, M314A2



AR199729



AR199728

Type Classification:

C & T AMTC 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 increment 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, the closing plug is removed and a fuze assembled to the projectile 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 tube imparts spin to the projectile providing in-flight stability. The MTSQ fuze functions and ignites the expelling charge, in turn, igniting 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,
 M101A), 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)	Muzzle Velocity (mps)	Maximum (mtr)	Range (yd)
1	650	198.1	3510	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 mtr
 12,330 yd
 Muzzle velocity-----472.4 mps
 1550 fps

Using M102 and M108 howitzers:

Charge	Muzzle Velocity (fps)	Muzzle Velocity (mps)	Maximum (mtr)	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 mtr
 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.

*Packing Box: — Continued
Cube-----2 cu ft

DODAC-----1315-C449
Drawing number-----75-1-229

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

References:

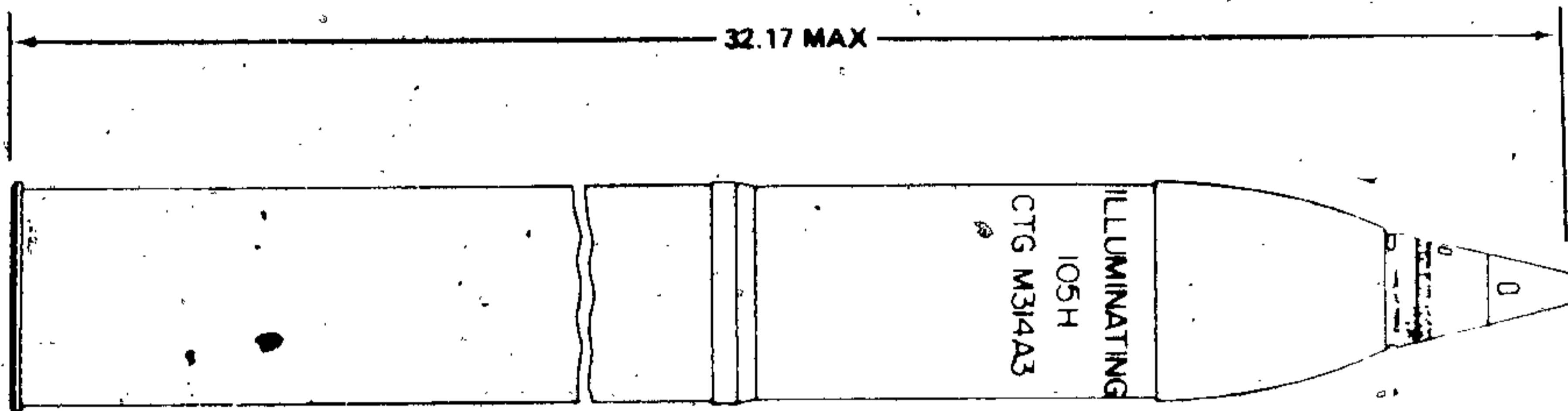
Quantity-distance class----- (08) 1.2
Storage compatibility group-----6
DOT shipping class-----A
DOT designation-----AMMUNITION FOR
CANNON WITH
ILLUMINATING
PROJECTILES

SC 1305/30-1L
SB 700-20
DARCOM-R 700-3-3
TM 9-1015-203-12
TM 9-1015-234-12
TM 9-1300-215-20
TM 9-2350-217-10

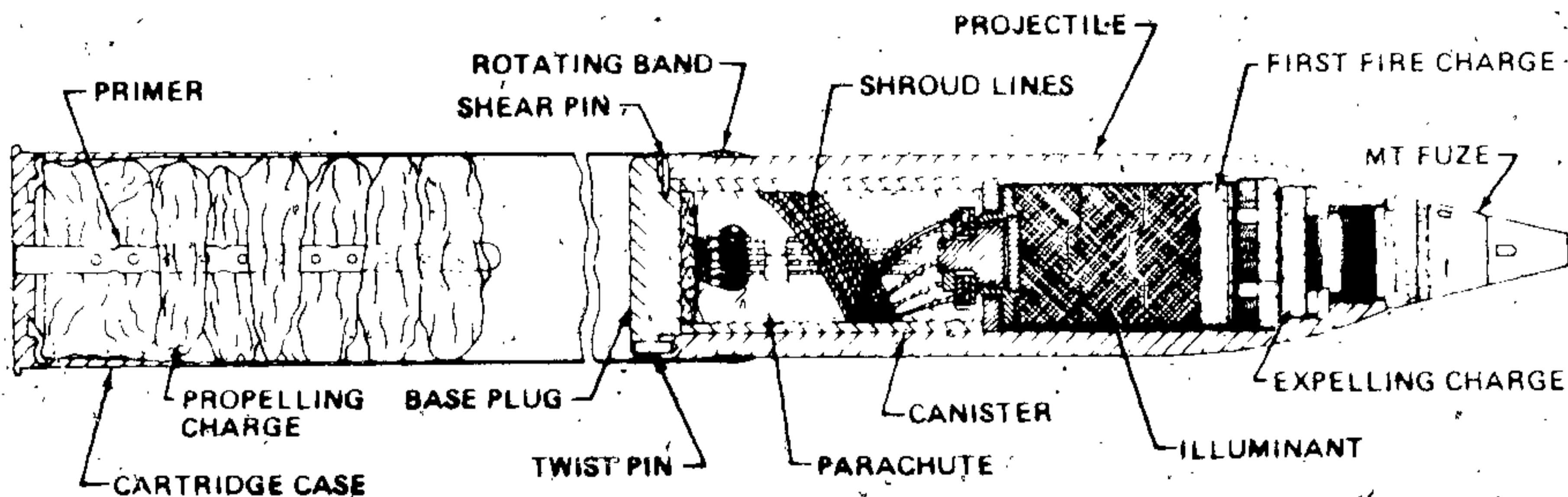
TM 43-0001-28

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CARTRIDGE, 105 MILLIMETER: ILLUMINATING, M314A3



AR199731



AR 199730

Type Classification:

Std AMTC 7467, dtd 1970.

Use:

This cartridge is intended for signalling or for illuminating a designated area.

Description:

The projectile is a hollow steel-forging with a streamlined ogive, a gilding metal rotating band, and a pinned base plug. The projectile is assembled with an MT fuze screwed into the nose. The projectile cavity contains an expelling charge, illuminating canister, and parachute assembly. The expelling charge consists of 0.18 lb of black powder contained in a sealed

plastic holder. The illuminating canister-body contains the illuminant and 0.15 lb of first fire composition. The illuminating canister body is fitted with anti-rotational brakes. 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 assembly 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 increment bags are tied together, in

TM 43-0001-28

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, the closing plug is removed and a fuze assembled to the projectile 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 tube imparts spin to the projectile providing in-flight stability. The M1 fuze functions and ignites the expelling charge, in turn, igniting the first-fire composition in the illuminant canister. The expelling charge also ejects the illumination canister and parachute assembly from the base of the projectile by blowing out the base plug. Concurrently, the parachute deploys and inflates. The canister body rotation or spin is rapidly decreased by the anti-rotational brakes which open to the airstream when the canister is ejected, and the illuminant is ignited by the first-fire composition. Average luminosity is 450,000 candlepower with a static 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, M101A), M103 (M108), M137 (M102)
- Projectile:
 - Body material-----Forged steel
 - Color-----White w/black markings
 - Expelling charge-----Black powder, 0.18 lb
 - Filler and weight-----Illum, 1.97 lb
 - Fuze-----MT, M565
- Propelling charge:
 - Cartridge case-----M14 series
 - M14-----Brass, 5.9 lb (approx)
 - M14B4-----Steel, 3 pc spiral wrap, 4.7 lb (approx)
 - Propellant-----M67, 2.83 lb

Percussion primer assembly:

	M28A2	M2882
Primer	M61, .00014 lb	M61, .00014 lb
Black powder	C1 1, MIL-P-223 (Note B), 0.043 lb	C1 1, MIL-P-223 (Note B), 0.043 lb
Body	Brass, Type 1	Steel, Type 2

Performance:

Using M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle Velocity (fps)	Muzzle Velocity (mps)	Maximum Range (mtr)	Maximum Range (yd)
1	650	198.1	3510	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 mtr.
12,330 yd
Muzzle velocity-----472.4 mps
1550 fps

Using M102 and M108 howitzers:

Charge	Muzzle Velocity (fps)	Muzzle Velocity (mps)	Maximum Range (mtr)	Maximum 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 mtr
12,590 yd
Muzzle velocity-----494 mps
1621 fps

Temperature Limits:

- Firing:
 - Lower limit-----40°F (-40°C)
 - Upper limit-----145°F (+63°C)
- Storage:
 - Lower limit-----65°F (-53.8°C)
 - Upper limit-----145°F (+63°C)
- *Packing-----1 round in fiber container; 2 containers in wooden box

*Packing Box:

- Weight-----114 lb
- Dimensions-----37-1/4 x 11-15/16 x 7-19/32 in.
- Cube-----2 cu ft

*NOTE: See SC for complete packing data including MSN's.

DODAC ----- 1315-C449
Drawing number ----- 9206821

Shipping and Storage Data:

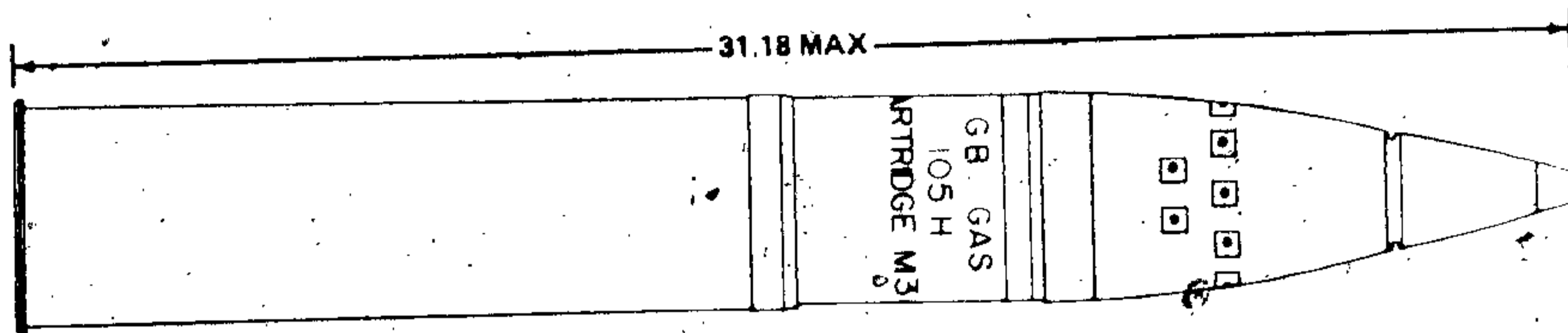
References:

Quantity-distance class----- (08) 1:2
Storage compatibility group----- G
DOT shipping class----- A
DOT designation----- AMMUNITION FOR
CANNON WITH
ILLUMINATING
PROJECTILES

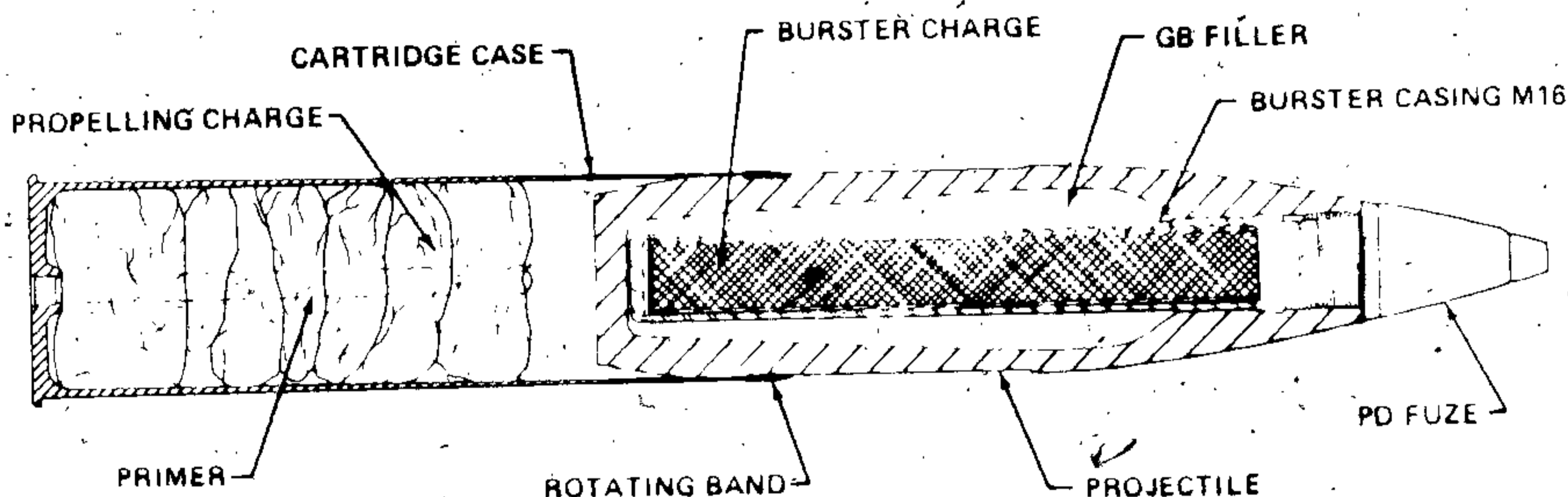
SC 1305/30-IL
SB 700-20
DARCOM-R 700-3-3
TM 9-1015-203-12
TM 9-1015-234-12
TM 9-1300-251-20
TM 9-2350-217-10

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CARTRIDGE, 105 MILLIMETER: AGENT, GB, M360



AR199739



AR199738

Type Classification:

Std OTCM 37119, dtd 1959.

Use:

This cartridge is used as a casualty producing round against personnel.

Description:

This cartridge is similar in external appearance to Cartridge HE M1. The projectile consists of a hollow one-piece steel forging, press-fitted with an M16 burster casing containing an M40 tetrytol burster charge, or M40A1 Composition B4 charge. The hollow projectile cavity is filled with a GB non-persistent liquid chemical agent. The projectile has a boattailed

base with stream-lined ogive and a gilding metal rotating band. A PD fuze is threaded into the nose of the projectile. The complete projectile assembly is free fitted into 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 increment 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, the closing plug is removed and a fuze assembled to the projectile 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 tube imparts spin to the projectile, providing flight stability. Projectile functioning is dependent upon the fuze used and may function on impact, instantaneous or delay. It can function above ground either at a predetermined height based upon time of flight or function in proximity with the target area. Fuze function detonates the burster charge, resulting in projectile rupture and dispersal of the chemical agent. The liquid agent evaporates, forming a non-persistent gas to envelope the area.

Tabulated Data:

Complete round:

Type-----Chemical Agent,
 GB, non-persistent
 Weight-----43.86 lb
 Length-----31.18 in.
 Cannon used with-----M2A1, M2A2,
 M103 and M137

Projectile:

Body material-----Steel, forged or
 bar
 Color-----Gray w/one green
 band and green
 markings (One
 yellow band w/
 explosive
 burster) (Later
 manufacture -
 three green
 bands)

Filler and weight-----GB, non-persistent,
 1.63 lb

WEIGHT ZONES

LOADED SHELL W/O FUZE & W/O BURSTER CHARGE

Zone	Over lb	Up to & Incl lb	Marking
5	30.39	31.09	□ □ □ □ □ □ □ □ □ □
6	30.99	31.59	□ □ □ □ □ □ □ □ □ □
7	31.59	32.29	□ □ □ □ □ □ □ □ □ □

No projectile wt zones lower than Zone 5.

Fuze-----PD, M739, M557

Propelling charge:

Cartridge case-----M14 series
 Propellant-----M67, 2.83 lb
 Primer-----M28A2, M28B2

Performance:

Using M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle (fps)	Velocity (mps)	Maximum (mtr)	Range (yd)
1	650	198.1	3510	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 mtr
 (12,330 yd)

Muzzle velocity-----472.4 mps
 (1550 fps)

Using M102 and M108 howitzers:

Charge	Muzzle (fps)	Velocity (mps)	Maximum (mtr)	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 mtr
 (12,590 yd)

Muzzle velocity-----494 mps
 (1621 fps)

Temperature Limits:

Firing:

Lower limit----- -40°F (-40°C)
 Upper limit----- $+125^{\circ}\text{F}$ ($+52^{\circ}\text{C}$)

Storage:

Lower limit----- -40°F (-40°C)
 Upper limit----- $+125^{\circ}\text{F}$ ($+52^{\circ}\text{C}$)

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

*Packing Box:

Weight-----117 lb
 Dimensions----- $37\text{-}1/4 \times 11\text{-}5/16 \times 7\text{-}19/32$ in.

Cube-----2 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class-----(12) 1.2
Storage compatibility group-----K
DOT shipping class-----A
DOT designation-----AMMUNITION FOR
CANNON WITH
GAS PROJECTILES
DODAC-----1315-C441
Drawing number-----75-1-363

Limitations:

Do not fire or store Cartridge M360 assembled with Burster M40 (loaded with tetrytol) at temperatures exceeding +125°F (+52°C). This restriction is not applicable to Burster M40A1.

Cartridges assembled with Burster M40A1 (M40E1) are authorized for use in all 105mm howitzer cannons. Cartridges assembled with Burster M40 are authorized for use in all 105mm howitzers except M108 and M102.

References:

SC 1305/30-1L
SB 700-20
DARCOM P 700-3-3
TM 9-1015-203-12
TM 9-1015-234-12
TM 9-1300-251-20
TM 9-2350-217-10

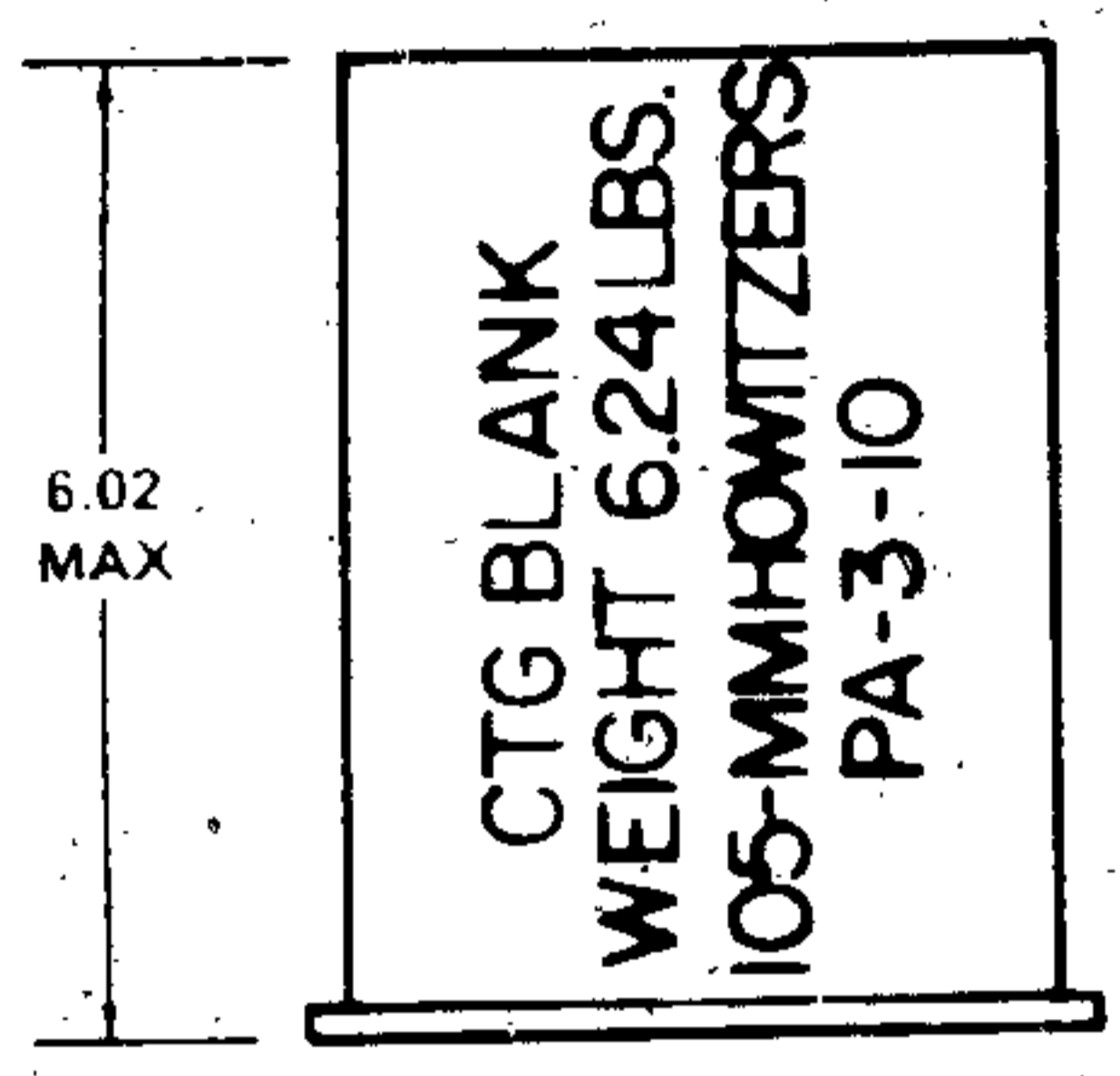
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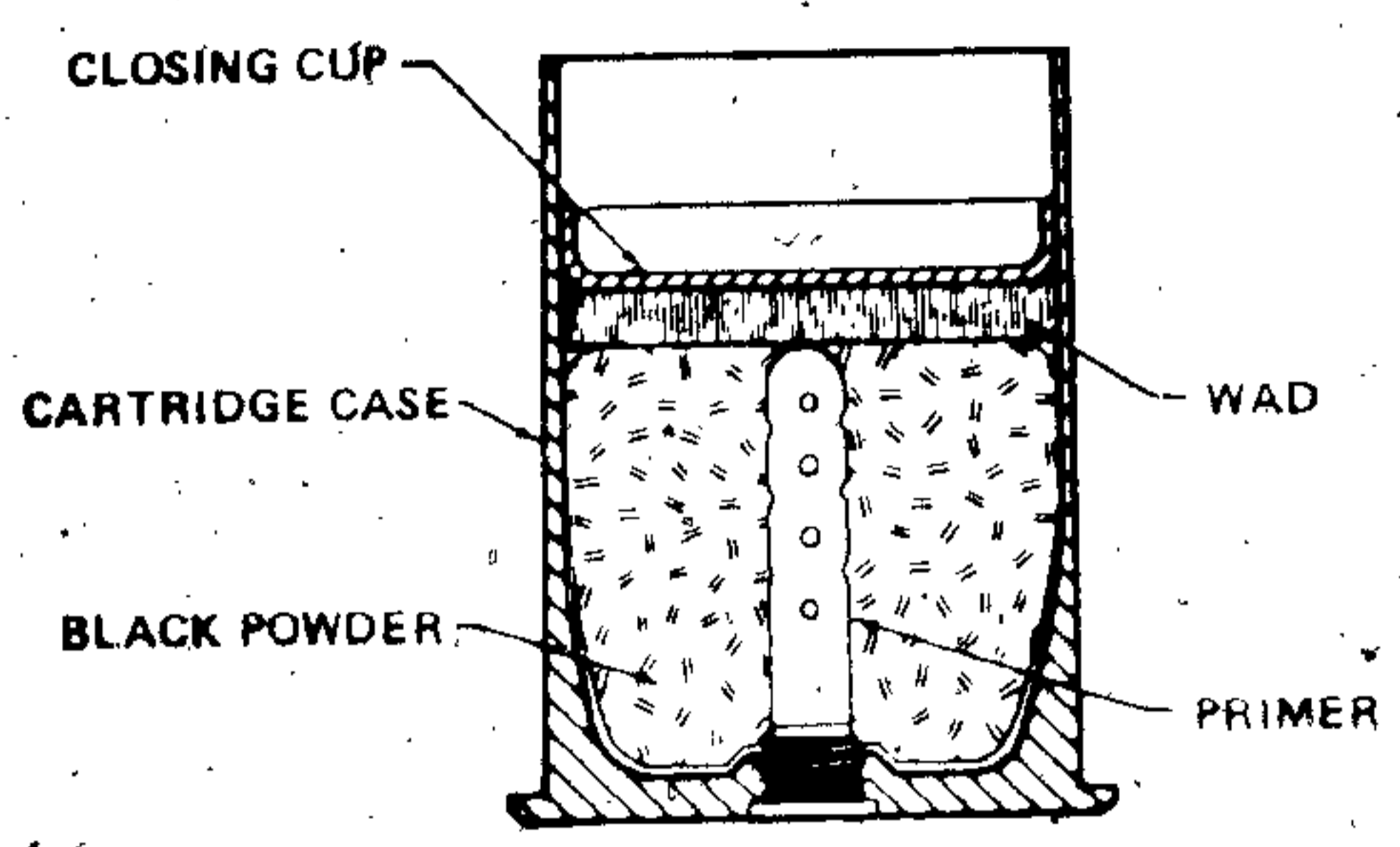
3-44

TM 43-0001-28

CARTRIDGE, 105 MILLIMETER: BLANK, M395



AR199713



AR199712

Type Classification:

Std OTCM, 38091, dtd 1962.

Use:

This cartridge is used for salutes and simulated fire.

Description:

The blank cartridge consists of a shortened cartridge case containing a black powder charge and primer. The shortened cartridge case is either brass, steel, or aluminum. The black powder charge in early production of this item is contained in a cloth bag and held in position by a closing cup or a plug assembly consisting of two pulp-board disks glued on either side of a hard felt disk and cemented in position about 0.5 inch from the mouth of the case. Renovated or newly manufactured blank cartridges are assembled with a loose powder charge contained by the cartridge case and retained by a fiberglass closing wad and a polystyrene closing cup glued in place with epoxy.

Functioning:

The weapon firing pin strikes the percussion primer igniting the black powder in the primer case, in turn, detonating the black powder charge which produces a loud report with flash and smoke.

Tabulated Data:

Complete round:

Type-----	Blank
Weight-----	6.24 lb
Length-----	6.02 in.
Cannon (weapon) used with-----	M2A1, M2A2 (M101, M101A1), M49 (M52, M52A1), M103 (M108), M137 (M102)

Propelling charge:

Cartridge case-----	M15, Brass M15B1, Steel M15B2, Aluminum
Propellant-----	Black Powder, 1.7 lb
Primer-----	M1A2, M1B1A2
Percussion element-----	M61
Body-----	8838089-10 (M1B1A2) 8838089-14 (M1A2)
Charge-----	Black powder, 100 ± 6 grains

Temperature Limits:

Firing:

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

TM 43-0001-28

Storage:

Lower limit----- -80°F (for periods not exceeding 3 days)
(-63°C)

Upper limit----- $+160^{\circ}\text{F}$ (for periods not exceeding 4 hr/day)
($+71^{\circ}\text{C}$)

Packing-----1 round in fiber container; 10 containers in wooden box

*Packing Box:

Weight-----96.0 lb

Dimensions----- $29\text{-}1/4 \times 12\text{-}1/16 \times 9\text{-}13/32$ in.

Cube-----1.9 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class-----1.3

Storage compatibility group-----C

DOT shipping class-----A

DOT designation-----AMMUNITION FOR CANNON WITHOUT PROJECTILES

DODAC-----1315-C440

Drawing number-----7549251

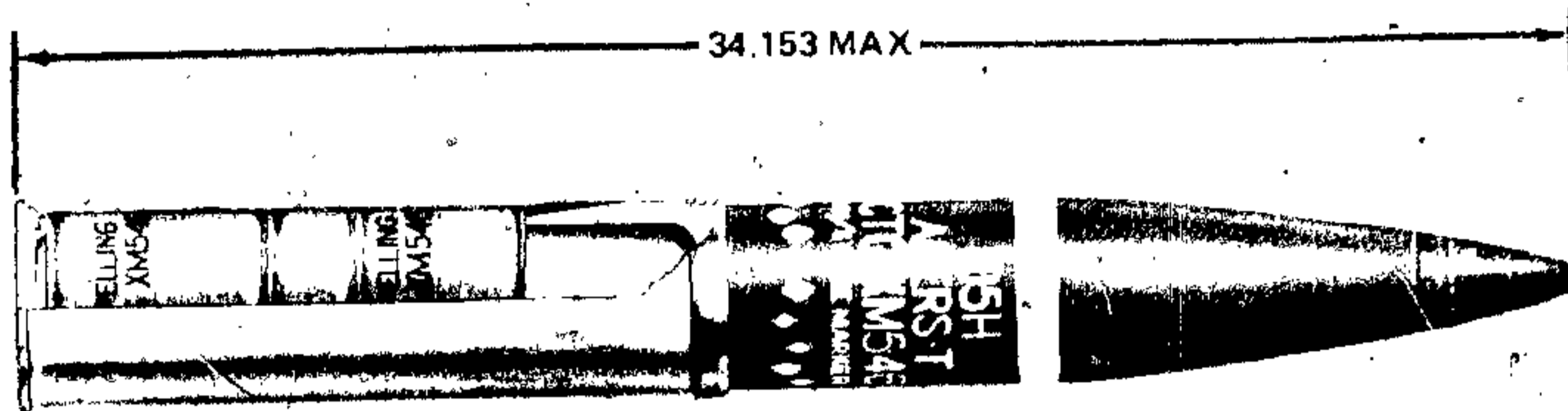
Limitations:

Closure debris from blank ammunition can be expelled a distance of 300 ft forward of the weapon muzzle.

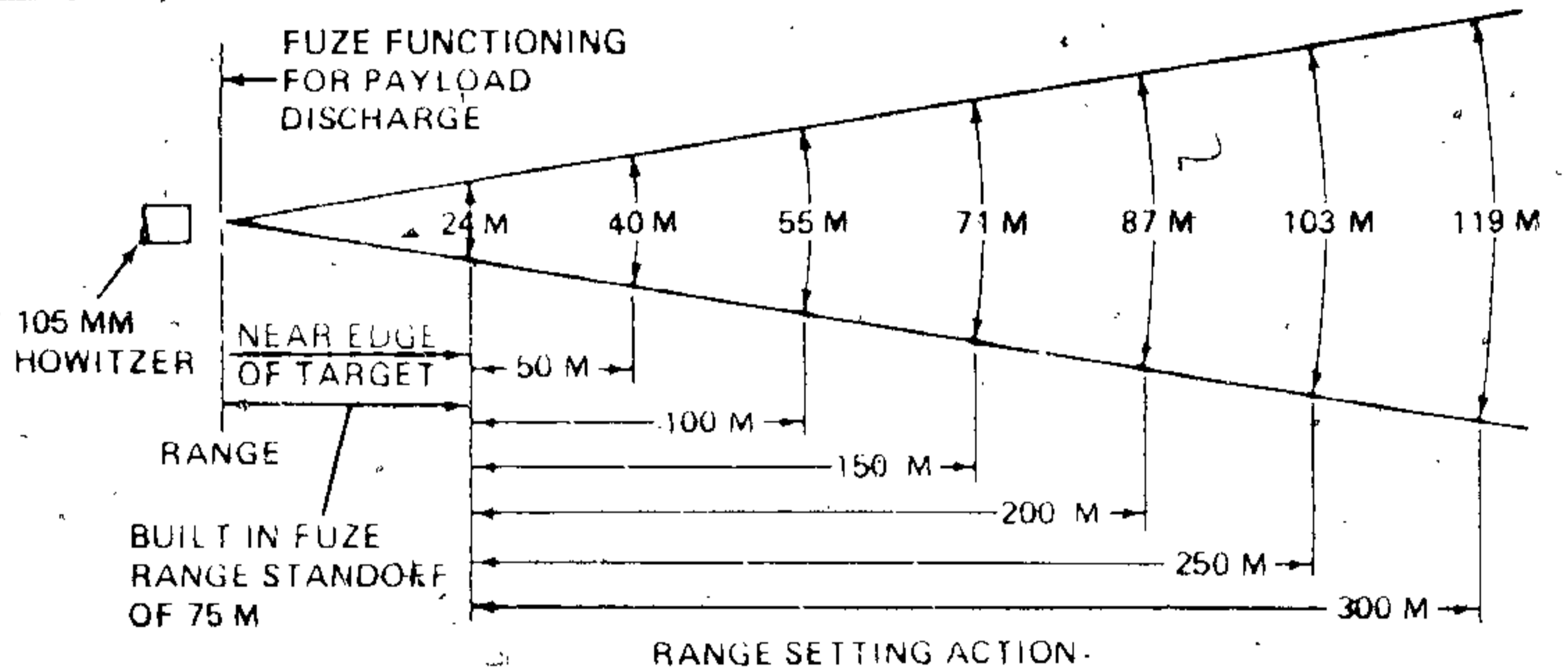
References:

- SC 1305/30-IL
- SB 700-20
- DARCOM-P 700-313
- TM 9-1015-203-12
- TM 9-1015-234-12
- TM 9-1300-251-20
- TM 9-2350-217-10

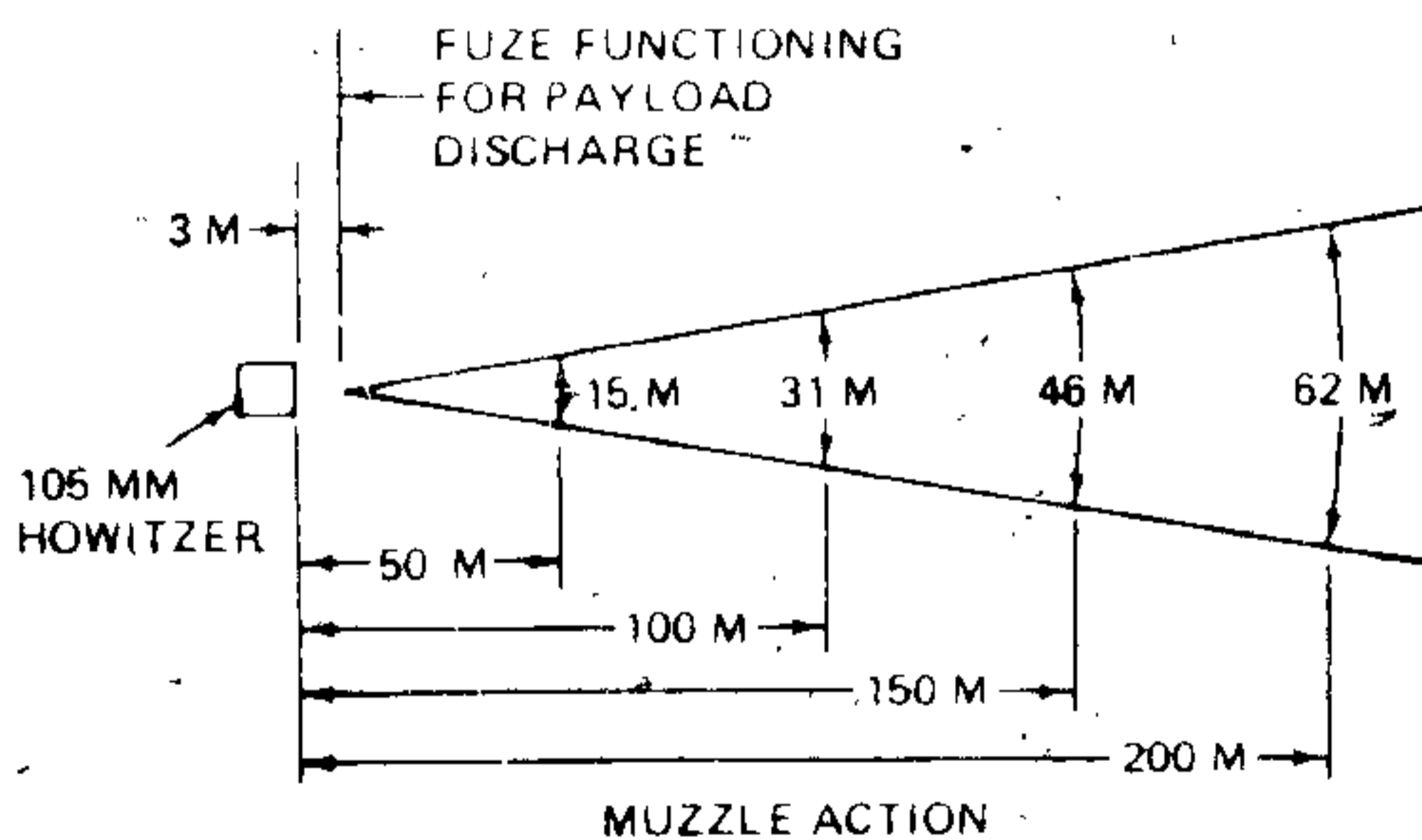
CARTRIDGE, 105 MILLIMETER: APERS-T, M546



AR199741



AR199740



AR199724

Type Classification:

Use:

Std MSR 09736030, dtd 1973.

This cartridge is designed for use against personnel in direct fire, muzzle action, and in a direct fire mission with a time setting other than muzzle action.

Change 7

3-55



IM 43-0001-28

Description:

The projectile body is an assembly of four pieces: base with sintered iron rotating band and M13 tracer, connector, forward body and fuze adapter. Inside the base of the projectile is a base charge. Forward of the base charge are assembled the tiers of flechettes, the centers of which form a flash tube. The fuze adapter is assembled forward of the first tier of flechettes. The fuze adapter contains an M67 detonator, M7 relay, four radially oriented M60 detonators and a pyrotechnic composition smoke marker pellet. The MT fuze M563 series is assembled into the fuze adapter. The cartridge case contains a percussion primer assembly and two individually bagged propelling charge increments, one numbered Zone 6 and the second, Zone 7. 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 perforated flash tube containing benite. The two increment bags are tied together with acrylic cord. The 6th increment is assembled around the primer flash tube at the base end of the cartridge case. The 7th increment is assembled around the flash tube toward the mouth of the cartridge case. The fuze may be set for muzzle action, for functioning at a minimum of 1/2 second or in tenths of a second up to 100 seconds after firing.

Functioning:

Prior to loading, the propelling charge is adjusted by cutting the cord and removing Zone 7 if Zone 6 is to be fired. If Zone 7 is to be fired, the charge is not touched. Also, if other than muzzle action is desired, the fuze is set. The cartridge is then loaded into the chamber of the cannon. 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 and initiates the M13 Tracer. Engagement of the projectile rotating band with the rifling of the weapon tube imparts spin to the projectile providing in-flight stability. When the fuze functions, it initiates the pyrotechnic composition smoke marker, the four radial M60 detonators, and M7 relay simultaneously. The four detonators break the forward body into four longitudinal pieces and projectile spin disperses the first four tiers of flechettes. Projectile

forward velocity is imparted to the flechettes. The M7 relay initiates the M87 detonator which flashes through the flash tube formed by the tiers initiating the base charge. The base charge then propels the last five tiers of projectiles from the connector and spin disperses the flechettes. If the fuze is set for muzzle action, it will function within three meters of the cannon muzzle. If set for time, i.e., 1/2-100 seconds, the fuze will function 75 meters prior to set time for optimum payload dispersal. The payload pattern of dispersal is shown in Figure-AR 199740. The tracer provides visual tracking of projectile trajectory.

Tabulated Data:

Complete round:

Type-----APERS-T
Weight-----38.25 lb
Length-----34.153 in. (max)
Cannon (weapon) used with---M2A1, M2A2
(M101, M101A1),
M49 (52), M52A1)
M103 (M108) and
M137 (M102)

Projectile:

Body material-----Aluminum/steel
Color-----Olive drab w/
white markings
and a row of
white diamonds
Filler and weight-----8,000-8 gr flech-
ettes, 9.145 lb

Components:

Cartridge case-----M1484
Propelling charge-----XM121
Increment loading assy-----6.2 oz propel-
lant M30A1,
single perfor-
ation, type II,
0.019 web.
27.4 oz propel-
lant M30A1,
multi perfora-
tion, type I,
0.039 web.
Charge, Propel-
ling for Ctg.
APERS M546
Primer-----M90
Benite strands-----380 + grains
Percussion primer Dwg-----7645339
Tracer-----M13
1.7 grains igniter composition
5.5 grains tracer composition
Fuze-----MT-M563-E1,
-E2, -E3, -E4



TM 43-0001-28

Performance:
 Range and velocity data:

Charge	Muzzle Velocity (fps)	Muzzle Velocity (mps)	Maximum Range (mtr)	Range (yd)
Charge 6 (M101/ M101A1)	1265	385	9500	10,400
Charge 7 (M101/ M101A1)	1635	504	11,600	12,690
Charge 6 (M102/ M108)	1408	429	10,100	11,050
Charge 7 (M102/ M108)	1800	549	12,400	13,590

Temperature Limits:

- Firing:
 Lower limit-----+30°F (-1.8°C)
 Upper limit-----+125°F (+52.0°C)
- Storage:
 Lower limit-----+80°F (for periods not more than 3 days)
 (-62.2°C)
 Upper limit-----+145°F (+63°C)
- *Packing-----1 round per fiber container; 2 containers per wooden box
- *Packing Box:
 Weight-----122 lb
 Dimensions-----44-3/4 x 12-1/16 x 7-9/16 in.
 Cube-----2.3 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

- Quantity-distance class----- (12) 1.2
 Storage compatibility group----- E
 DOT shipping class----- B
 DOT designation----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
 DODAC----- 1315-C513
 Drawing number----- 9211669

Limitations:

Cartridge M546 is not to be fired over the heads of friendly troops and is restricted to firing at Zone 7 only; however, when engaging stationary targets at ranges between 275 and 400 meters, Zone 6 firings with a fuze setting of 0.5 second is permitted.


References:

- SC 4305/30-1L
 SB 700-20
 DARCOM-P 700-3-3
 TM 9-1015-203-12
 TM 9-1015-234-12
 TM 9-1300-251-20
 TM 9-2350-217-10

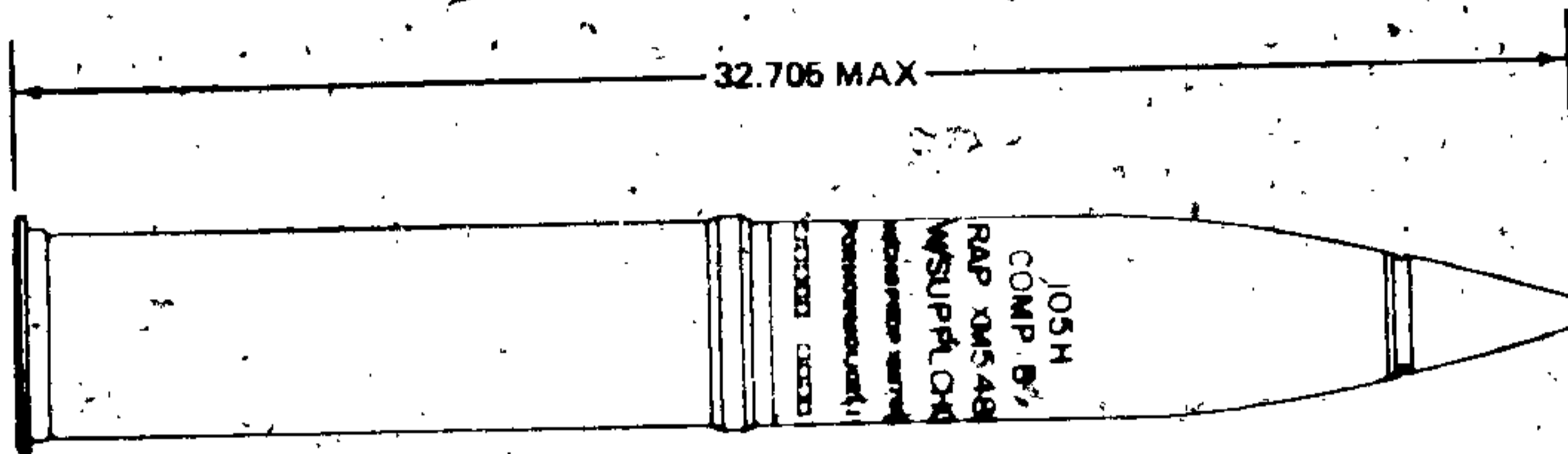
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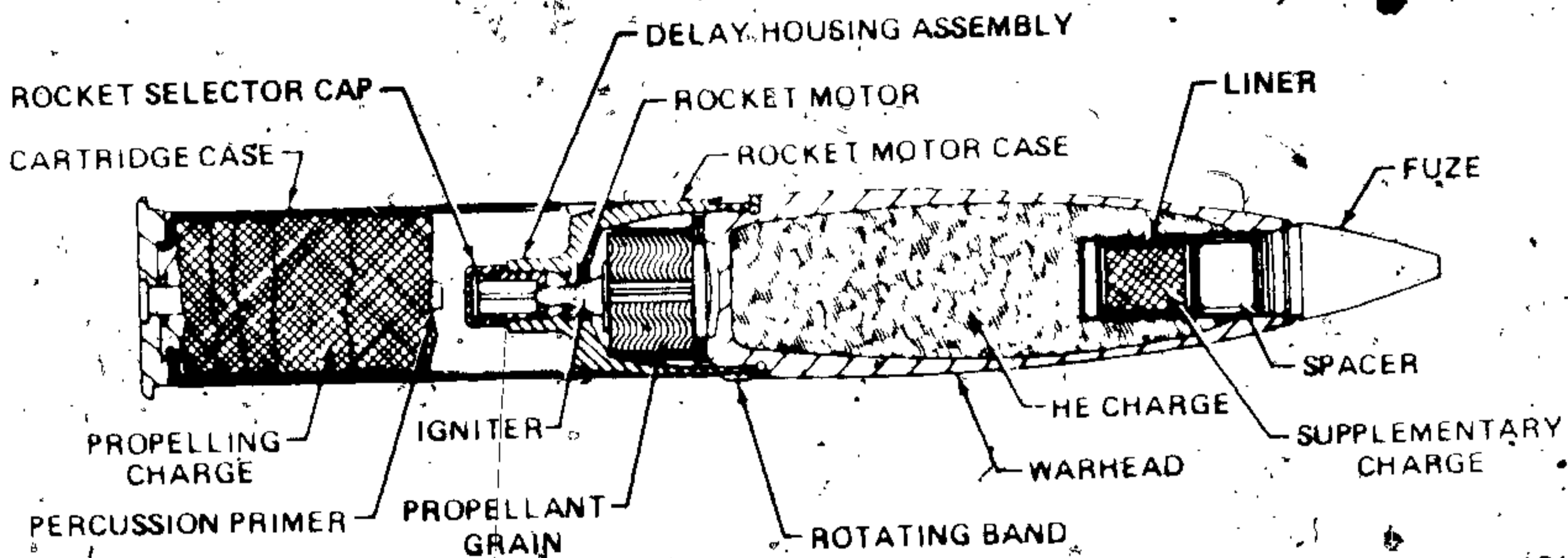


CARTRIDGE, 105-MILLIMETER: HERA, M548



AR199733

AR 199732



AR199732

Type Classification:

Std AMCTC 8414, dtd 1971.

Use:

This cartridge is a high explosive, rocket-assisted round with extended range capability used for fragmentation, blast and mining in support of ground troops and armored columns.

Description:

The projectile consists of two pieces, a streamlined warhead and rocket motor body of boattail design. The nose of the warhead is threaded for a fuze and the warhead is filled

with cast Composition B having a deep cavity and supplementary charge. The rocket motor body contains the rocket grain and rocket ignition system, contained in a spike at the rear of the body. The spike housing ignition system is fitted with a cap. A sintered iron rotating band is swaged to the rocket motor body and the body threaded to the warhead to complete the projectile assembly. The cartridge case contains a primer and five individually bagged and numbered propelling charge increments. The base of the cartridge case is drilled and a percussion primer assembly is pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing benite. The five numbered increment bags are tied together, in numerical order,

3, 4, 5, 6 and 7 with acrylic cord. These are assembled into the cartridge case, around the primer flash tube, with Increment 3 at the base of the cartridge case and Increment 7 toward the mouth of the cartridge case.

Functioning:

Rocket "OFF-MODE" — If the projectile is unfuzed, the closing plug is removed and a fuze assembled to the projectile, and if required, is set. The cartridge is loaded into the weapon. Upon firing, impact of the weapon firing pin results in the initiation of the percussion primer which, in turn, ignites the benite 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 tube imparts spin to the projectile providing in-flight stability. Projectile functioning is dependent upon the fuze used and may function on impact (instantaneous or delay), function above ground either at a predetermined height based upon time of flight, or function in proximity with target area. Fuze function detonates the HE projectile filler resulting in projectile fragmentation and blast.

Rocket "ON-MODE" — The fuze is assembled to the projectile as in the Rocket "OFF-MODE." The rocket cap, on the spike of the projectile, is removed and the cartridge case with propellant is slipped over the projectile and the cartridge loaded into the weapon. After firing, the burning propellant gases initiate the ignition composition which, in turn, ignites the delay composition. Approximately 16 seconds later (the projectile has left the tube and is traveling down-range), the balance of the rocket motor ignition system ignites the rocket motor. The rocket motor burns for 2 seconds boosting the projectile velocity resulting in a greater projectile range. Fuze initiation, as described for Rocket "OFF-MODE," detonates the projectile HE filler resulting in projectile fragmentation and blast.

Tabulated Data:

Complete round:

Type-----HERA
 Weight-----38.5 lb
 Length-----32.7 in.
 Cannon (weapon) used with---M49 (M52, M52A1),
 M2A1, M2A2
 (M101, M101A),
 M103 (M108),
 M137 (M102)

Projectile:

Body material-----High carbon steel forging
 Color-----Olive drab w/yellow markings
 Filler and weight-----Comp B; 5.2 lb
 Fuzes-----Prox. M728; PD, M739, M557

Propelling charge:

Cartridge case:
 M14-----Brass, 5.9 lb (approx)
 M14B1-----Steel, down, 5.4 lb (approx)
 M14B4-----Steel, 3 pc spiral wrap, 4.7 lb (approx)
 Propelling charge-----M176, 2.84 lb
 Percussion primer assembly-----M108
 Primer-----Dwg No. 9212386
 Benite (BP)-----210 grains
 Motor body-----Steel alloy forging
 Rocket propellant grain---XM33 propellant Nitrocellulose base 1.06 lb

Delay assembly:

No. increments	Weight	Composition
1	250 mg	Flash
6	950 mg (ea)	Delay
1	200 mg	Igniter

Flash composition:

Constituent	Parts by wt.
Zirconium-----	58 ± 1.0
Chromium oxide-----	16 ± 1.0
Molybdenum trioxide-----	25 ± 1.0
Vinyl alcohol Acetate resin (solids)----	1.0 ± 0.1

Igniter composition:

Constituent	Parts by wt.
Zirconium-----	65 ± 1.0
Iron oxide-----	25 ± 1.0
Diatomaceous earth-----	10 ± 1.0
Vinyl alcohol Acetate resin (solids)----	1 ± 0.1

Delay composition:

Constituent	Parts by wt.
Tungsten-----	42.5 ± 5
Barium chromate-----	45 ± 5

<u>Constituent</u>	<u>Parts by wt.</u>
Potassium perchlorate-----	12.5 ± 0.25
Vinyl alcohol	
Acetate resin (solids)-----	1 ± 0.1
*Rocket propellant grain igniter:	
Type 1 Class 3 boron potassium nitrate pellets 5.0 grains (approx)	
Performance:	
Maximum range-----	16,404 yd (15,000 mtr)
Muzzle velocity-----	548.64 mps (1,800 fps)
<u>Temperature Limits:</u>	
Firing:	
Lower limit-----	-40°F (-40°C)
Upper limit-----	+145°F (+63°C)
Storage:	
Lower limit-----	-65°F (-53.8°C)
Upper limit-----	+150°F (+65.6°C)
*Packing-----	1 round in fiber container; 2 containers in wooden box
*Packing-Box:	
Weight-----	122 lb
Dimensions-----	45-19/32 x 11-13/16 x 7-11/16 in.
Cube-----	2.4 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class-----	(12) 1.2
Storage compatibility group---	E
DOT shipping class-----	A
DOT designation-----	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC-----	1315-0463
Drawing number-----	9212376

Limitations:

Charge 7 is authorized for firing in both Rocket-On and Rocket-Off modes. Charges 3, 4, 5, and 6 are authorized for Rocket-Off mode firing only under emergency combat conditions.

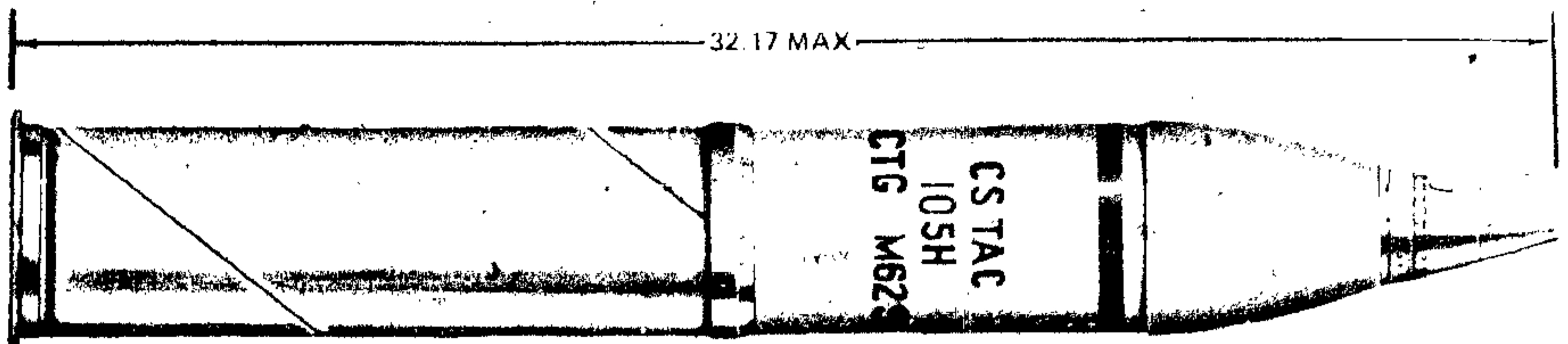
References:

- SC 1305/30-IL
- SB 700-20
- DARCOM-P 700-3-3
- TM 9-1015-203-12
- TM 9-1015-234-12
- TM 9-1300-251-20
- TM 9-2350-217-10

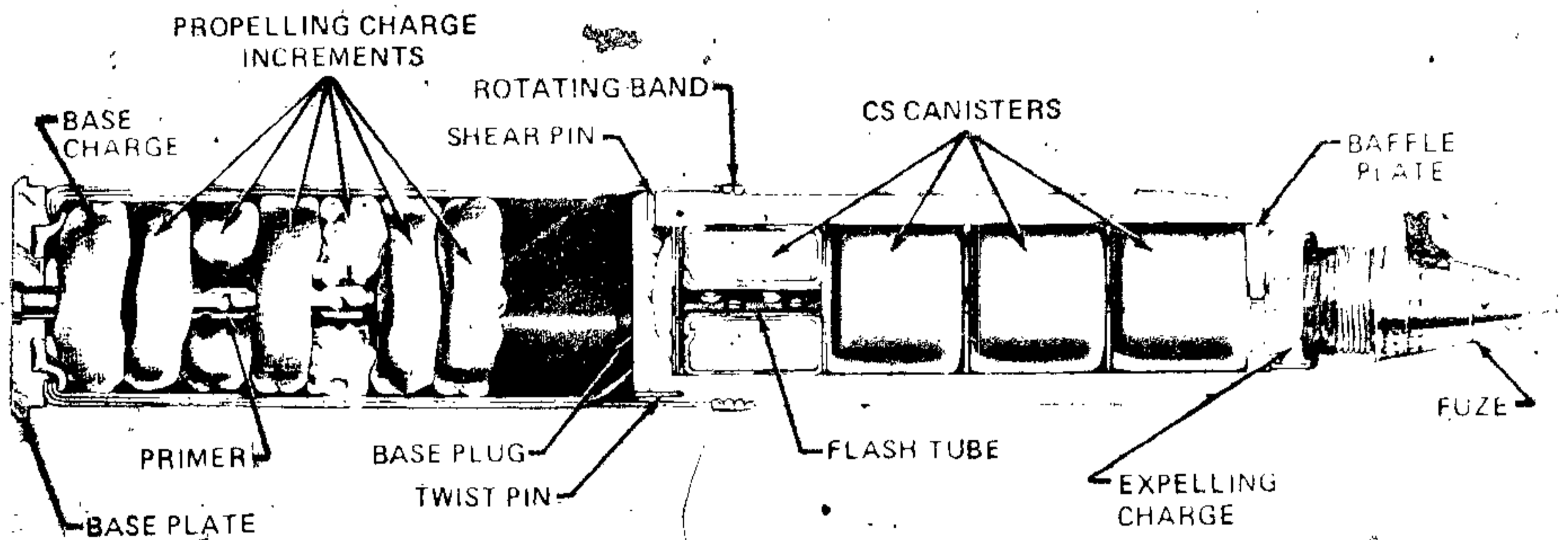
TM 43-0001-28

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CARTRIDGE, 105 MILLIMETER: TACTICAL CS, M629



AR 199717-A



AR199716

Type Classification:

CONT MSR 03736119, dtd 1973.

Use:

This cartridge contains a CS riot control agent which emits irritating fumes intended to harass personnel.

Description:

This cartridge is similar in external configuration to Illuminating Cartridge M314A2E1. The projectile consists of a hollow steel forging with streamlined ogive, gilding metal rotating band, and pinned steel base plug. An MT or MTSU fuze is internally threaded into the nose of the projectile. The projectile cavity contains an expelling charge and four CS pyrotechnic-filled canisters. The expelling charge

consists of 1.78 oz of black powder in a plastic container. It is assembled to the rear of the fuze and separated from the CS canisters by an aluminum baffle plate with flash hole. Each CS canister contains @ 825 lb of CS pyrotechnic mix and 0.81 oz of starter mix. Located in the center of each CS canister is a perforated flash tube. The baseplug is held in place by three shear pins and three twist pins. The complete projectile assembly is free-fitted to a steel 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 increment 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, the closing plug is removed and a fuze assembled to the projectile 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 tube imparts spin to the projectile providing in-flight stability. Projectile functioning is dependent upon the fuze used and may function on impact (instantaneous or delay), function above ground either at a predetermined height based upon time of flight, or function in proximity with the target area. The fuze functions and ignites the black powder in the expelling charge. The flash from the expelling charge ignites the four CS canisters through the perforations in the flash tubes. Concurrently, the pressure from the ignition of the expelling charge shears the retaining pins, blows out the base plug and expels the burning canisters into the airstream. The CS pyrotechnic mixture in the canisters burns and emits irritating fumes for approximately 60 seconds.

Tabulated Data:

Complete round:

Type-----Riot control, CS
 weight-----42.0 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/1 red
 band and red
 markings (1
 yellow band with
 explosive burster)
 Filler and weight-----Starter mixture,
 riot mixture
 CS, 6.66 lb
 Fuze-----MTSQ, M548, MT
 M565

Propelling charge:

Cartridge case-----M14 series:
 M14-----Brass, 5.9 lb
 (approx)
 M14B1-----Steel, drawn,
 5.4 lb (approx)
 M14B4-----Steel, 3 piece,
 spiral wrap
 4.7 lb (approx)

Percussion primer assembly:

	<u>M28B2</u>	<u>M28A2</u>
Primer & weight	M61, .00014 lb	M61, .00014 lb
Black powder	C1 1, MIL-P-223 (Note B)	C1 1, MIL-P-223 (Note B)
Weight	0.043 lb	0.043 lb
Body	Steel, Type 2	Brass, Type 1

Performance:

Using M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle Velocity (fps)	Muzzle Velocity (mps)	Maximum (mtr)	Range (yd)
1	650	198.1	3510	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 mtr
 12,330 yd
 Muzzle velocity-----472.4 mps
 1550 fps

Using M102 and M108 howitzers:

Charge	Muzzle Velocity (fps)	Muzzle Velocity (mps)	Maximum (mtr)	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 mtr
 12,590 yd
 Muzzle velocity-----494 mps
 1621 fps

Temperature Limits:

Firing:

Lower limit-----40°F (-40°C)
 Upper limit-----+145°F (+63°C)

Storage:
 Lower limit----- -40°F (-40°C)
 Upper limit----- +145°F (+63°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----- 2.0 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class----- (12) 1.2
 Storage compatibility group----- G
 DOT shipping class----- B
 DOT designation----- AMMUNITION FOR,
 CANNON WITH CS
 PROJECTILES
 CLASS B DOT
 SPECIAL PERMIT
 NO. 5208

DODAC----- 1315-C468
 Drawing number----- 9220225

Limitations:

Do not fire this cartridge with the fuze set on the "S" shipping mark as issued, because fuze functioning after approximately 2 seconds may be anticipated. Do not attempt to reset the fuze until just before firing. Fuzes reset for firing, but not fired, should be reset on the "S" setting.

References:

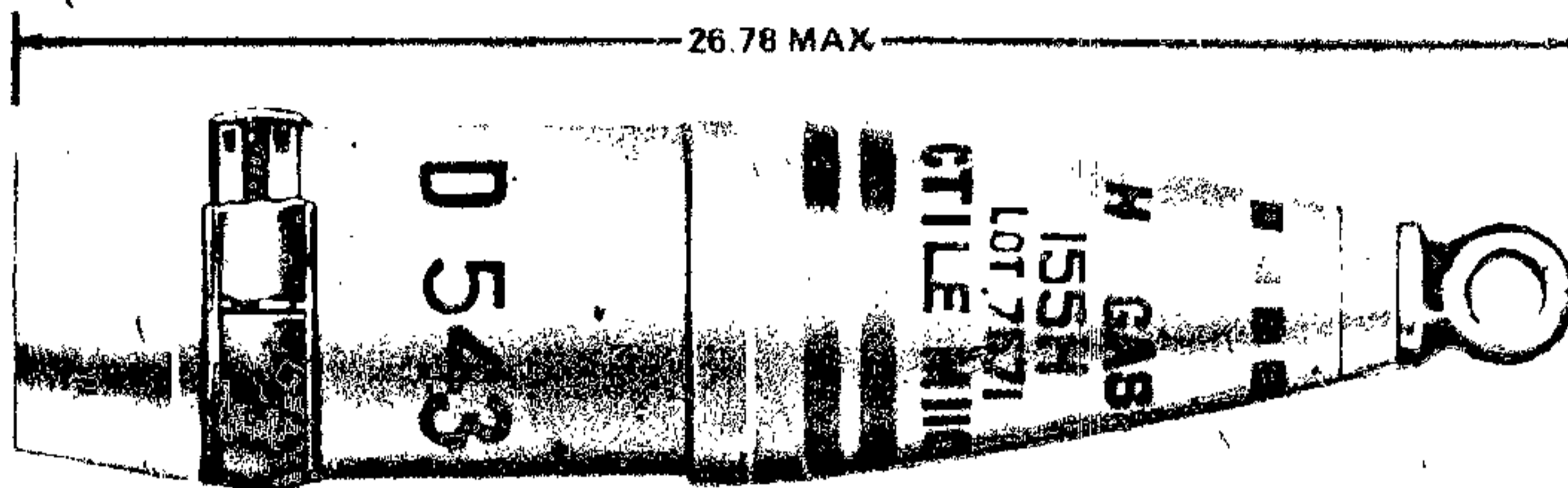
SC 1305/30-1L
 SB 700-20
 DARCOM P 700-3-3
 TM 9-1015-203-12
 TM 9-1015-234-12
 TM 9-1300-251-20
 TM 9-2350-217-10

TM 43-0001-28

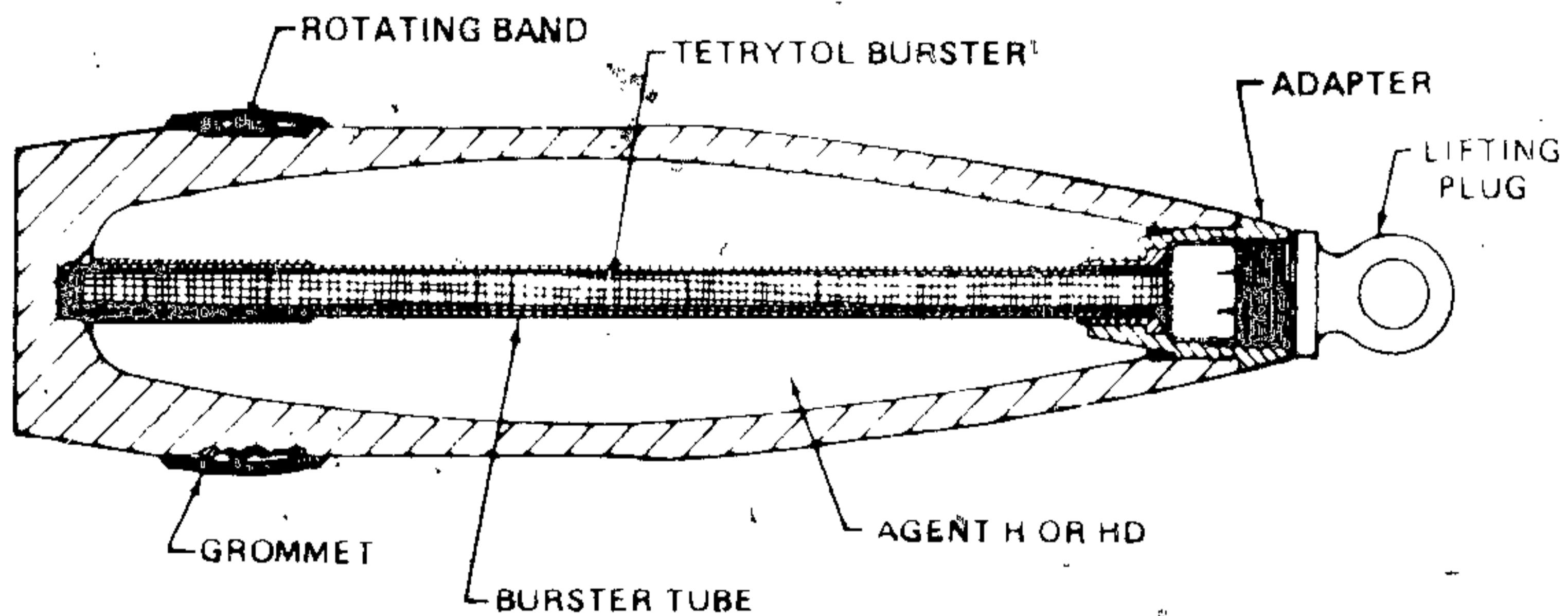
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3-66 (3-67 through 3-70 deleted) Change 5

PROJECTILE, 155 MILLIMETER: AGENT H/HD, M110



AR199682



AR199682

Type Classification:

Std OTCM 36841 dtd 1958

Use:

This projectile is fired from 155mm howitzers to produce a toxic effect on personnel and to contaminate habitable areas.

Description:

The projectile is a hollow steel casing containing a burster extending through the center. The burster tube is loaded with tetrytol and the remaining space within the projectile is filled with 11.7 lb of Agent H or Agent HD. A lifting plug is installed in the nose fuze cavity for

use in shipping and handling. A rotating band encircles the projectile case near the nose and is protected by a grommet to be removed during loading of the projectile in the weapon. The fuze is normally used with the projectile. The characteristics are the same as the HE, M107 projectile.

Functioning:

When the weapon is fired, the burning propellant generates rapidly expanding gases that propel the projectile through the barrel with the velocity required to reach the target. The rotation of the rotating band engages the barrel rifling to impart spin to the projectile during its flight. The rotating band also functions to prevent escape of gas pressure past the projectile. The PD fuze functions on impact to explode

Change

the burster. The burster ruptures the projectile case and disperses the agent.

Tabulated Data:

WEIGHT ZONES

Loaded Shell Without Fuze
Lifting Plug And Grommet

Zone	Over Pounds	Up to & Including Pounds	Mark
2	90.0	91.3	□ □
3	91.1	92.4	□ □ □
4	92.2	93.5	□ □ □ □

Projectile:

Type ----- H/HD agent
 Weight w/lifting plug ----- 94.59 lb
 Length w/lifting plug ----- 26.78 in.
 Cannon used with ----- M1, M1A1, M1A2, M45, M126, M126A1, M185, M199
 Body material ----- Steel
 Color:
 Old mfg ----- Gray w/green markings and two green bands
 New mfg ----- Blue-gray w/green markings, two green bands and one yellow band
 Filler and weight:
 H or HD ----- 11.7 lb
 Primers ----- M82 (M126, M126A1, M199, M185 cannon) MK2A4 (M1, M1A1, M1A2, M45 cannon)
 Fuzes ----- PD M557; M739 MTSQ, M564

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 not more than 3 days
 Upper limit ----- +125°F (+52.0°C)
 for 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 3C for complete packing data including NSN's:

Shipping and Storage Data:

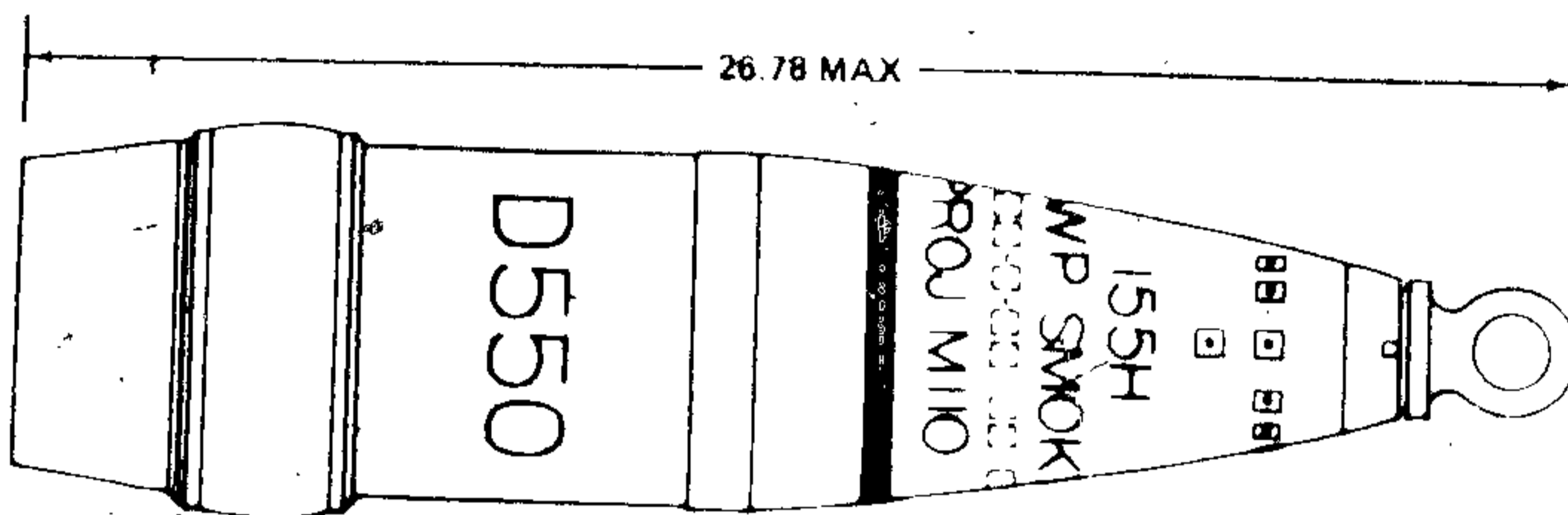
Quantity-distance class ----- (12) 1.2
 Storage Compatibility group ----- K
 DOT shipping class ----- A
 DOT designation ----- EXPLOSIVE PROJECTILES
 DODAC ----- 1320-D543
 Assembly Dwg. No ----- 75-14-317

Ballistics:

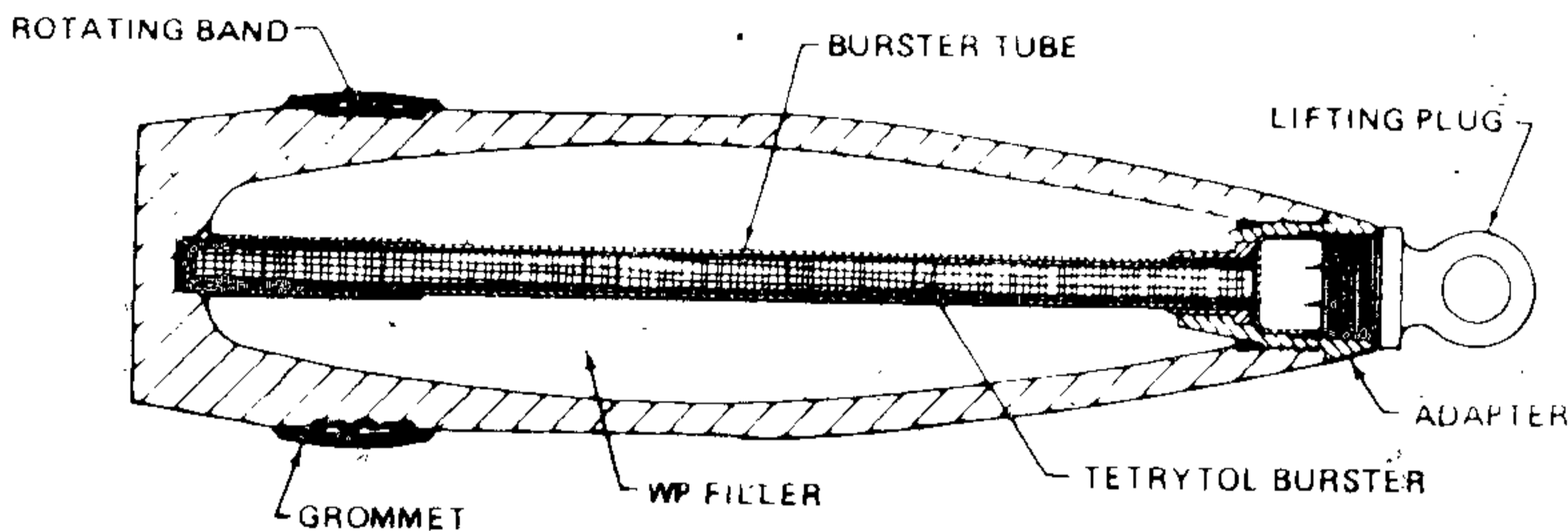
Cannon M1, M1A1, M45:

Charge	Muzzle Velocity (mps)	Max Range (mtr)	Elevation (mil)
1, M3, green bag	207.3	3900	774.4
2, M3, green bag	234.7	4800	698.8
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

PROJECTILE, 155 MILLIMETER: SMOKE WP, M110 AND M110A1



AR 199679 A



AR199678

Type Classification:

Std

Use:

These projectiles are fired from 155mm howitzers to produce screening smoke. The projectiles also have a slight incendiary effect.

Description:

The 155mm Smoke WP, M110, and M110A1 projectiles consist essentially of a steel shell (casing) containing an M8 burster loaded with

tetrytol running through the center of the shell and an explosive filler of 15 parts WP (white phosphorous). An adapter in the nose of the projectile is threaded to receive the fuze. For shipping and handling, a lifting plug is installed in the nose fuze cavity. A rotating band encircles the projectile case near the base and is protected by a grommet for shipment and handling. The grommet is to be removed before loading the projectile in the weapon. A fuze is normally used with these projectiles. Except for the WP contents, these projectiles are exactly the same as the projectile (M110) M110, and the ballistics and configuration are the same as the HE, M107 projectile.

Functioning:

When the weapon is fired, the burning propellant charge generates rapidly expanding gases to propel the projectile through the barrel and to the velocity required to reach the target. The rotating band engages the barrel rotating band also provides a seal to prevent leakage of gas pressure past the projectile. When the fuze functions, the burster is detonated to rupture the projectile case and disperse the contents. White phosphorous ignites spontaneously upon contact with air and produces a dense white smoke.

Tabulated Data:

WEIGHT ZONES

Loaded Projectile Without Fuze,
Lifting Plug And Grommet

Zone	Over Pounds	Up To & Incl Pounds	Marking
5	93.3	94.6	□ □ □ □ □ □ □ □
6	94.4	95.7	□ □ □ □ □ □ □ □
7	95.5	96.8	□ □ □ □ □ □ □ □
8	96.6	97.9	□ □ □ □ □ □ □ □

Complete round:

Type ~~Smoke W P~~ Smoke W P
 Weight w lifting plug ----- 98.49 lb nominal
 Length w lifting plug ----- 26.78 in max
 Cannon used with -- M1, M1A1, M1A2, M45, M126, M126A1, M185, M199
 Filler weight ----- 15.6 lb W P
 Projectile:
 Body material ----- Steel
 Color ----- Light green w/ yellow band and light red markings
 Propelling charge -- M3/M4 series, M119/M119A1
 Primers ----- MK2A4 (M1, M1A1, M1A2, M45 cannon) M82, (M126, M126A1, M185, M199 cannon)
 Fuze ----- PD M557; M739, MTSQ: M564

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 not more than 3 days
 Upper limit ----- +125° F - +52.0° C
 for not more than 4 hr/day
 * Packing ----- 8 projectiles on pallet
 * Pallet:
 Weight ----- 830 lb
 Dimensions ----- 27-1/8 x 13-5/8 x 32 in.
 Cube ----- 6.8 cu ft

*NOTE: See SC for complete packing data including NSN's

Shipping and Storage Data:

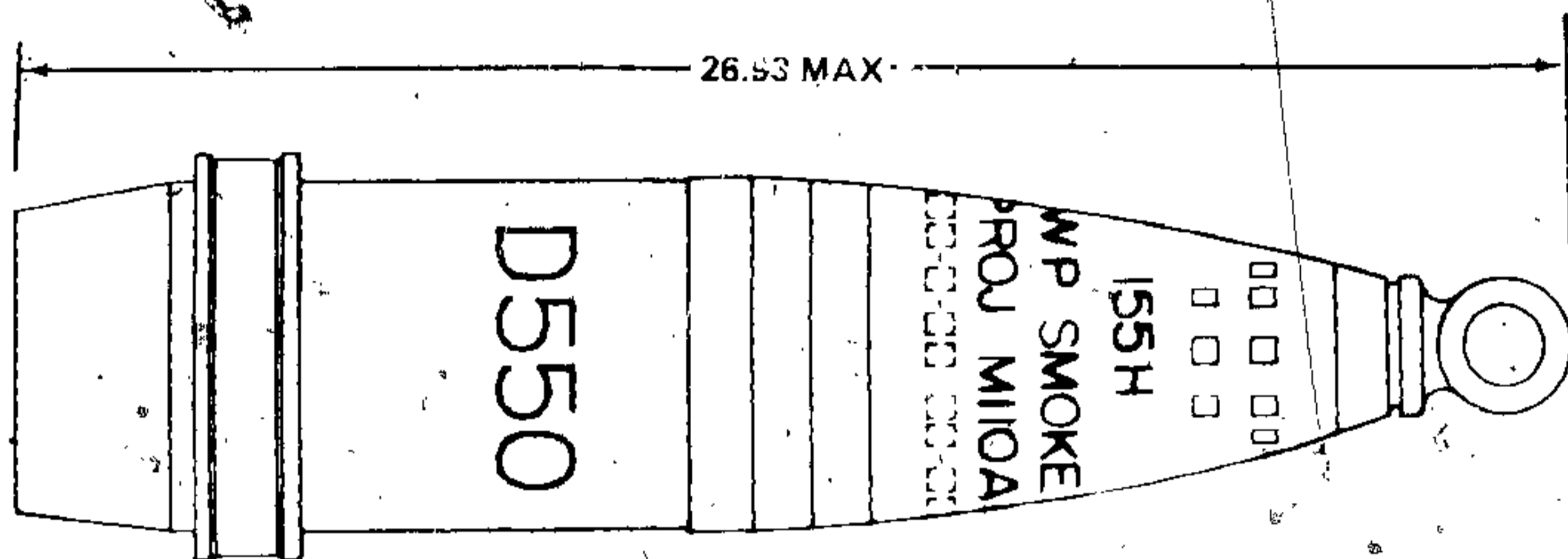
Quantity-distance class ----- (12) 1.2
 Storage compatibility group ----- H,
 DOT shipping class ----- A
 DOT designation ----- EX PLOSIVE PROJECTILES
 DODAC ----- 1320-D550
 Assembly Dwg. No. ----- 9210424

Ballistics:

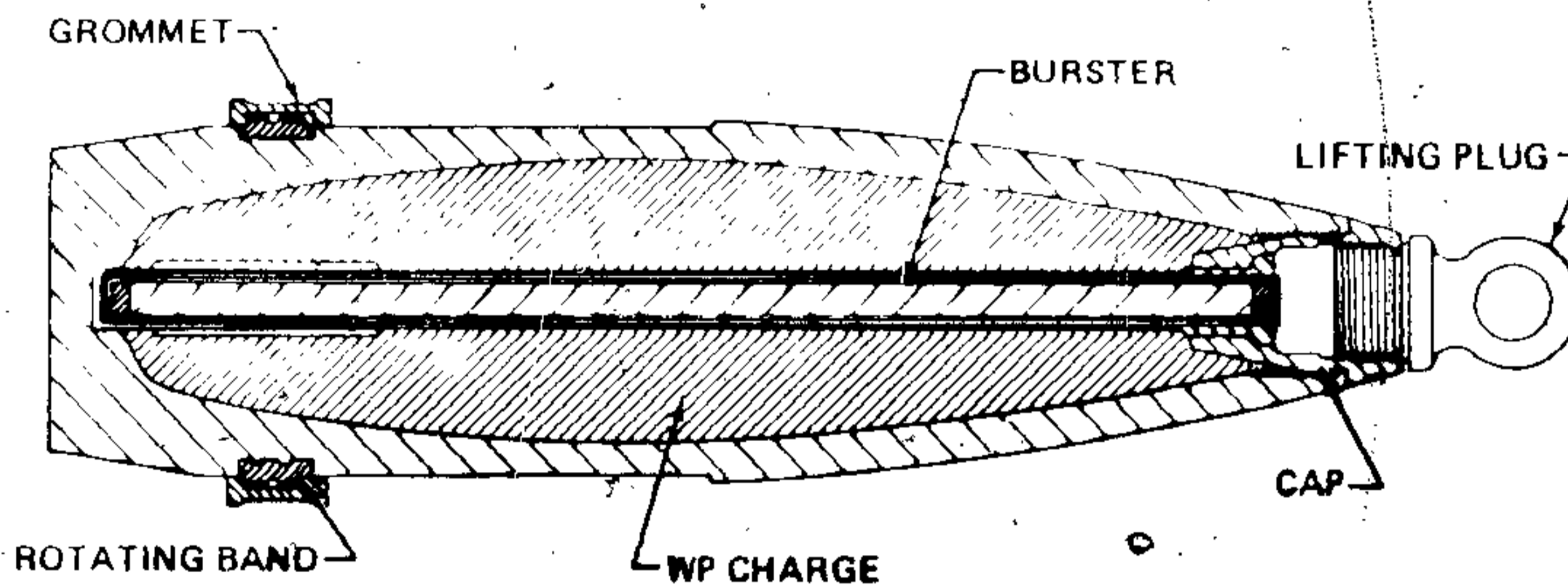
Cannon M1, M1A1, M45:

Charge	Muzzle Velocity (mps)	Max Range (mtr)	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

PROJECTILE, 155 MILLIMETER: SMOKE WP, M110A2 (M110E3)



AR 199681-A



AR199680

Type Classification:

Std AMCTC 9019 dtd 1972

Use:

This projectile is fired from 155mm howitzers to provide screening smoke. The projectile also has a slight incendiary effect.

Description:

The projectile is essentially a steel shell filled with 15.6 lb of white phosphorous (WP) with an M54A1 burster extending through the center, and an adapter in the nose of the projectile is threaded to receive the fuze. The

burster tube is made from high strength aluminum alloy and is filled with Composition B5. An aluminum plug seals the base of the tube, and the tube is secured in the projectile well by a threaded cap assembled below the fuze well cap. For shipment and handling, a lifting plug is installed in the fuze cavity. A rotating band encircles the projectile near the base and is protected by a grommet to be removed before loading the projectile in the weapon. A PD fuze is normally used with this projectile, although an NTSQ fuze may also be employed. Except for the WP contents, this projectile is the same as the projectile H HD M110, and the ballistics are the same as the HE M107 projectile.

TM 43-0001-28

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 target. The rotating band engages the barrel rifling to impart spin to the projectile for stability in flight. The fuze normally installed functions on impact and detonates the burster. The burster ruptures the projectile case and disperses the WP filler. White phosphorous ignites spontaneously upon contact with air and produces a dense white smoke.

Difference Between Models:

Model M110A2 has an improved burster providing greater high temperature tolerance than the tetrytol bursters used in previous models of the WP, M110 series.

Tabulated Data:

WEIGHT ZONES

Loaded Projectile Without Fuze,
Lifting Plug And Grommet

Zone	Over Pounds	Up To & Incl Pounds	Marking
5	93.3	94.6	□ □ □ □ □ □ □ □
6	94.4	95.7	□ □ □ □ □ □ □ □
7	95.5	96.8	□ □ □ □ □ □ □ □
8	96.6	97.9	□ □ □ □ □ □ □ □

Complete round:

Type ----- Smoke WP
 Weight w/lifting plug ----- 98.49 lb nominal
 Length w/lifting plug ----- 26.93 in. max
 Cannon used with -- M1, M1A1, M1A2, M45, M126, M126A1, M185, M199

Projectile:

Body material ---- Steel
 Color ----- Light green w/ yellow band and light red markings

Filler and weight

White phosphorous, 15.6 lb

Propelling charge -----

M3/M4 series, M119/M119A1

Primer -----

MK2A4 (M1A1, M1A2, M45 cannon)
 M82 (M126, M126A1, M185 cannon)

Fuze -----

PD, M557; M739, MTSQ M564

Temperature Limits:

Firing:

Lower limit ----- -65°F (-53.8°C)
 Upper limit ----- +125°F (+52.2°C)
 (for not more than 3 days)

Storage:

Lower limit ----- -80°F (-64.5°C)
 Upper limit ----- +160°F (+73.0°C)
 (for not more than 4 hr/day)

*Packing -----

8 projectiles on pallet

*Pallet:

Weight ----- 830 lb
 Dimensions ----- 27-1/8 x 13-5/8 x 32 in.
 Cube ----- 6.8 cu ft

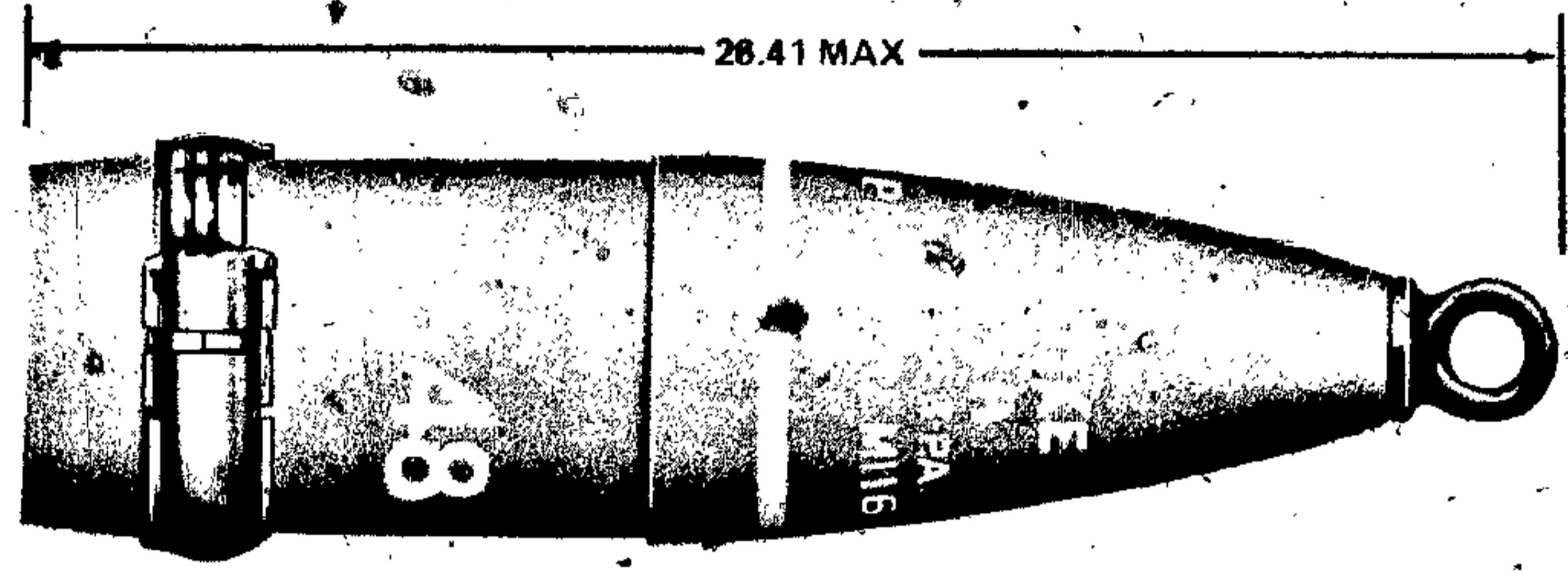
*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

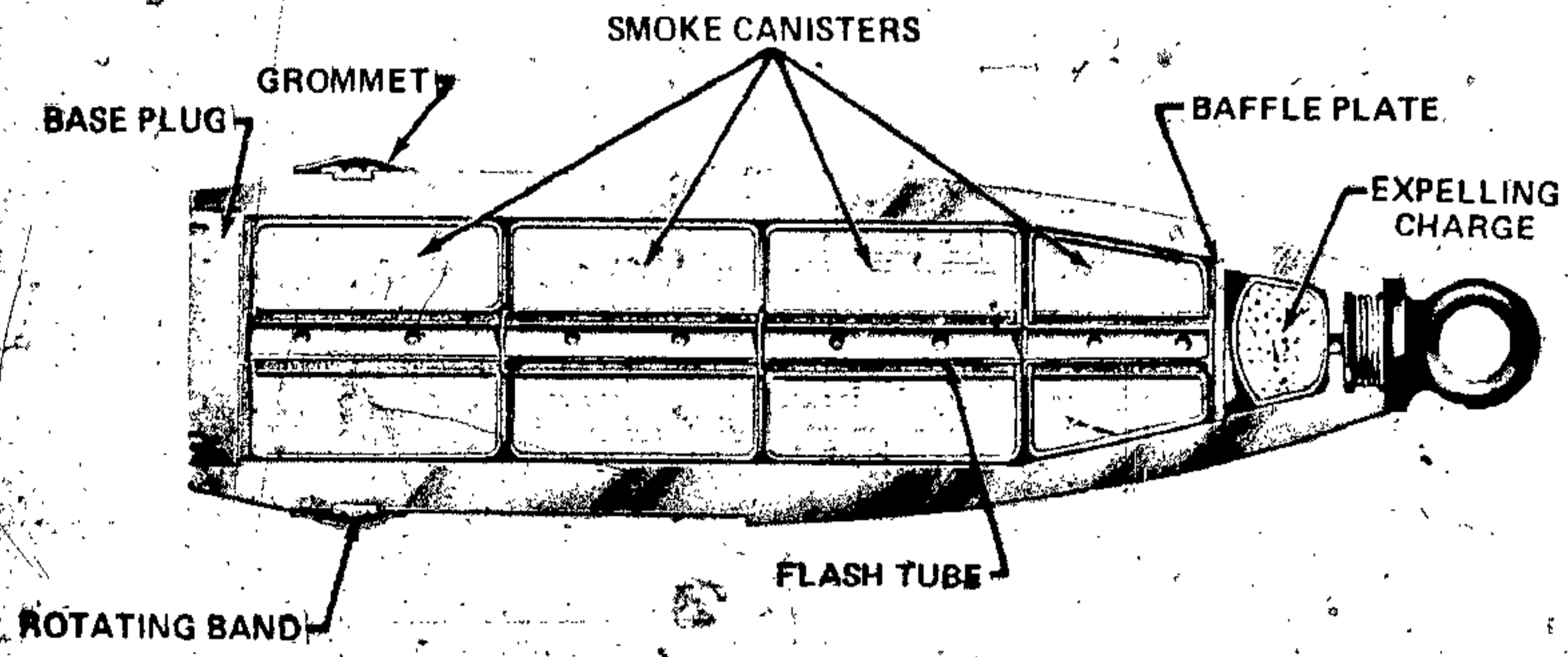
Quantity-distance class ---- (12) 1.2
 Storage compatibility group ----- H
 DOT shipping class ----- A
 DOT designation ----- EX PLOSIVE PROJECTILES
 DODAC ----- 1320-D550
 Assembly Dwg. No. ----- 9217030

TM 43-0001-28

PROJECTILE, 155 MILLIMETER: SMOKE BE, M116 AND M116B1, HC AND COLORED



ART10077



ART10077

Type Classification:

Std OTCM 36841 dtd 1958

Use:

The projectile is fired from 155mm howitzers and is used for screening, spotting, or signaling.

Description:

This base-ejection type projectile is a hollow steel shell containing four canisters of chemical smoke compound. The canister filler may be either hexachloroethane-zinc (HG) or a smoke mixture in colors of green, red or yellow. The canisters are stacked within the projectile and each has a perforated central tube so that in the stack a flash tube is continuous through the contents. The front canister is cone-shaped

to conform to the curvature of the projectile case. An expelling charge of black powder is contained in the nose of the projectile under the fuze cavity. The fuze cavity is fitted with a lifting ring plug for shipment and handling. A baffle plate with a central hole near the flash tube separates the expelling charge from the first smoke canister. A rotating band with a protective grommet for shipment and handling encircles the projectile near the base. The base is closed with a metal closure disk and threaded plug.

Functioning:

When the weapon is fired, the burning propelling charge generates rapidly expanding gases to propel the projectile through the barrel with the velocity required to reach the target. The rotating band engages the barrel rifling to impart spin to the projectile. The rotating band also forms a seal to prevent leakage of gas pressure past the

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projectile. Functioning of the fuze ignites the expelling charge. The expelling charge flashes through the central tube to ignite the smoke canisters, blow off the base, and expel the canisters. An effective smoke cloud is produced within 30 sec, and maximum smoke emission occurs in about one minute.

Difference Among Models:

The expelling charge in Model M116B1 (.34 lb of black powder) is contained in a polyethylene cup instead of in a cloth bag as in M116 (.29 lb of black powder). Also, the copper closure disk used in Model M116 has been replaced with a steel disk in the newer model.

Tabulated Data:

Zone	WEIGHT ZONES		Marking (Zone squares)
	Over Pounds	Up to & Incl Pounds	
2	90.7	92.0	□ □
3	91.8	93.1	□ □ □
4	92.7	94.4	□ □ □ □
5	94.0	95.3	□ □ □ □ □

Weight Zone applies to HC canister loaded projectiles without fuze, lifting plug, gasket and grommet.

Complete round:

Type -----	Smoke HC or colored
Weight as fired:	
HC -----	94.80 lb
Colored -----	86.23 lb
Length w/lifting plug -----	26.41 in. nominal
Cannon used with -----	M1, M1A1, M1A2, M45, M126, M126A1, M185

Projectile:

Body material -----	Forged steel
Color -----	Newer - Light green w/black markings (Colored smoke - Color indicated by a series of 3 C-s) Older - Gray w/yellow markings
Filler and weight -----	HC: 25.84 lb Colored smoke: 17.19 lb

Propelling charge -----	M3/M4 series, M119
Primers -----	MK2A4 (M1, M1A1, M1A2, M45 cannon) M82 (M126, M126A1, M185 cannon)
Fuzes -----	M150, M501 series

Temperature Limits, Firing:

Lower limit -----	-40°F (-70°C)
Upper limit -----	+125°F (+52.0°C)

Temperature Limits, Storage:

Lower limit -----	-80°F for periods not more than 3 days (-52.2°C)
Upper limit -----	+160°F for periods not more than 4 hr/day (+71.1°C)

*Packing ----- 8 projectiles on pallet

*Pallet:

	Colored Smoke	HC Loaded
Weight -----	727 lb	802 lb
Dimensions -----	27-1/8 x 13-1/8 x 32 in.	27-1/8 x 13- 5/8 x 32 in.
Cube -----	6.7 cu ft	6.7 cu ft

*NOTE: See SC 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:

HC -----	1320-D548
Red -----	1320-D549
Yellow -----	1320-D551
Green -----	1320-D547
Violet -----	1320-D554
Assembly Dwg No. -----	9227998

TM 43-0001-28

Ballistics:

Cannon M1, M1A1, M45:

Charge	Muzzle Velocity (mps)	Max Range (mtr)	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

Cannon M126/M126A1:

Charge	Muzzle Velocity (mps)	Max Range (mtr)	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
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 (mps)	Max Range (mtr)	Elevation (mil)
1, M3A1, green bag	212.8	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 (mps)	Max Range (mtr)	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
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

TM 43-0001-28

References:

DARCON-P 700-3-3

SC 1305/30-IL

SB 700-20

TM 9-1025-200-12

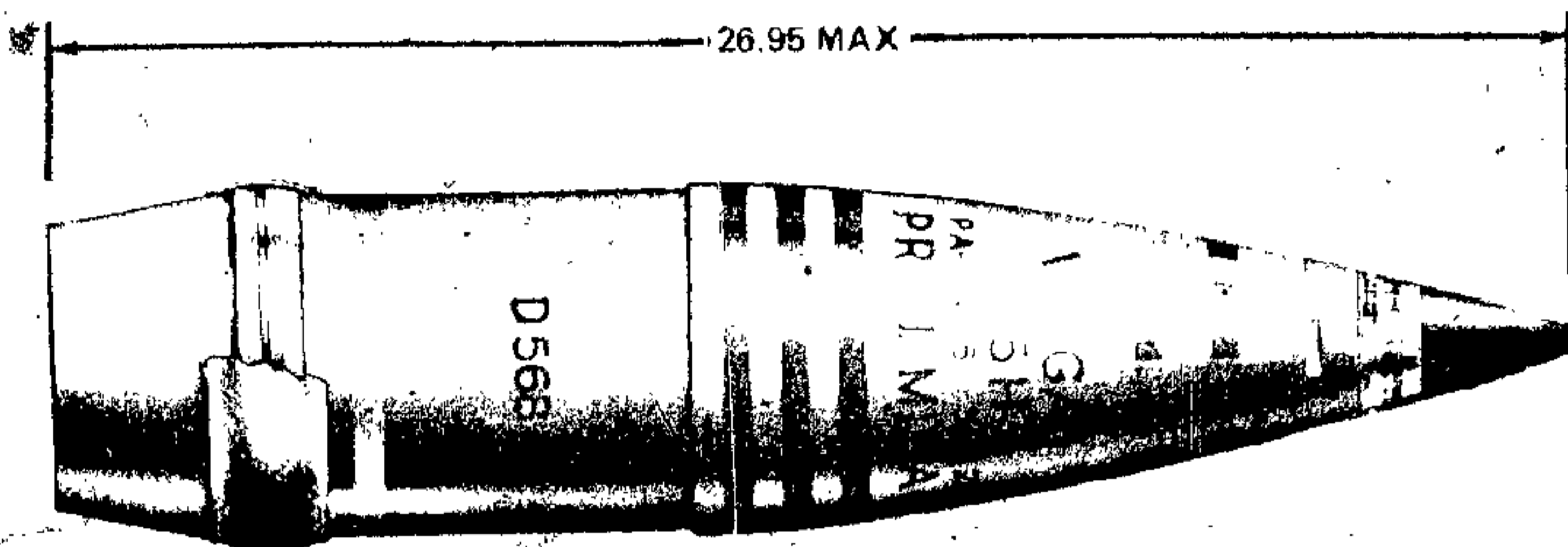
TM 9-1300-251-20

TM 9-1300-251-34

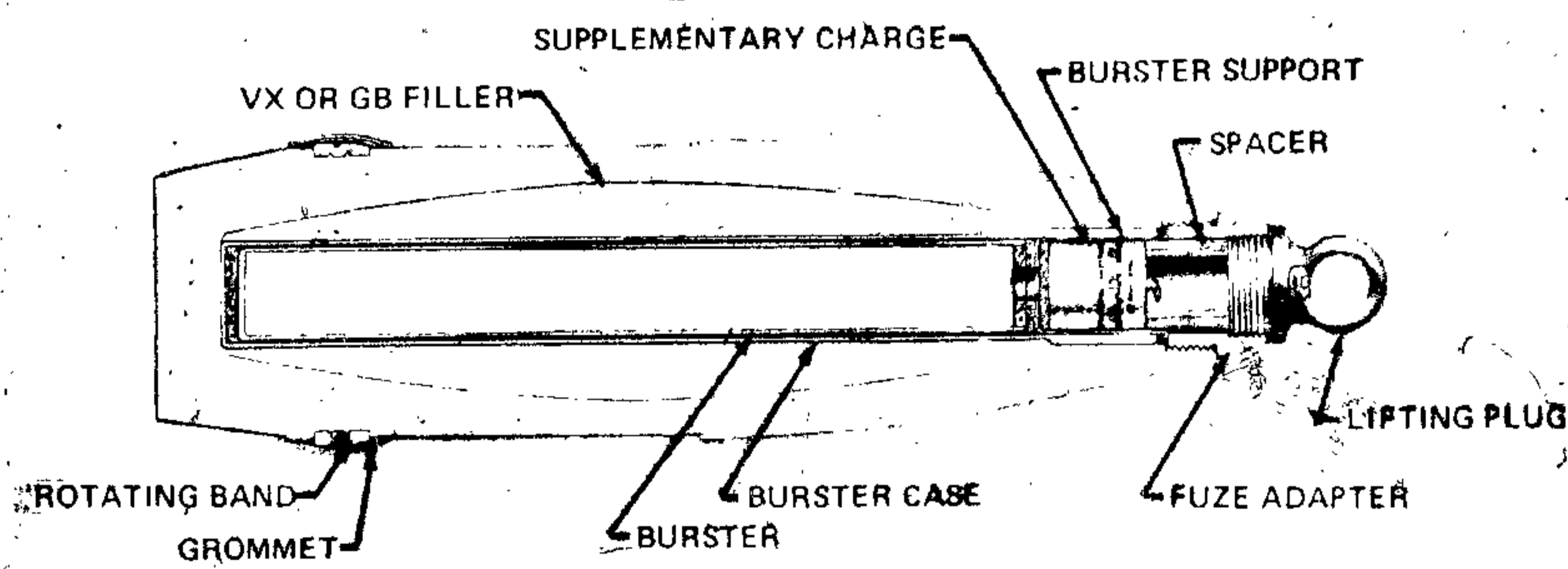
TM 9-2350-217-10

TM 9-2350-217-10N

PROJECTILE, 155 MILLIMETER: VX (Persistent) or GB (Non-Persistent), M121 A1



AR 199671-A



AR109570

Type Classification:

Std OTCM 37870 dtd 1961

Use:

This projectile is used in 155mm howitzers to produce casualties. Projectiles filled with VX agent may also be used to contaminate habitable areas.

Description:

The projectile is a hollow, deep-cavity steel shell containing essentially a supplementary charge, burster, and gas filler VX or GB. Burster M71 is a thin metal cylinder filled with

Composition B extending through the center of Burster Casing M15. The remainder of the interior space of the projectile is filled with liquefied VX or GB agent. The neck of the burster tube seals the agent cavity. The nose of the steel projectile is closed with a threaded adapter to seal in the burster tube and supplementary TNT charge (0.3 lb), and also to provide a fuze receptacle. For shipment and handling, an adapter-type lifting plug is installed in the fuze cavity. A point-detonating or proximity fuze is installed before loading the weapon. When a proximity fuze is used, the supplementary charge is removed. A rotating band encircles the projectile near the base and is protected by a grommet during shipment and handling.

Functioning:

When the weapon is fired, the burning propellant generates rapidly expanding gases to propel the projectile through the barrel with the velocity required to reach the target. The soft alloy of the rotating band engages the barrel rifling to impart spin to the projectile for stability in flight. The rotating band also forms a seal to prevent escape of gas pressure past the projectile. When a PD fuze is used, the fuze detonates the supplementary charge on impact. The supplementary charge detonates the burster which ruptures the projectile case and heats the agent so that dispersal is in the gaseous state. When a proximity fuze is employed, detonation of the burster tube results directly from action of the fuze booster and occurs on approach to the target.

Difference Between Models:

Payload may be either 6.0 lb of VX or 6.5 lb of GB agent; type is specified in external marking.

Tabulated Data:

WEIGHT ZONES

Loaded Projectile Without Fuze,
Lifting Plug And Grommet

Zone	Over Pounds	Up To & Incl Pounds	Marks
2	90.0	91.3	□ □
3	91.1	92.4	□ □ □
4	92.0	93.7	□ □ □ □
5	93.3	94.6	□ □ □ □ □
6	94.4	95.7	□ □ □ □ □ □
7	95.5	96.8	□ □ □ □ □ □ □
8	96.6	97.9	□ □ □ □ □ □ □ □
9	97.7	99.0	□ □ □ □ □ □ □ □ □
10	98.8	100.1	□ □ □ □ □ □ □ □ □ □

Complete round:

Type ----- Agent VX (persistent) or GB (non-persistent)

Projectile:

Weight ----- 98.9 lb
Length w/lifting plug ----- 26.95 in. max

Cannon used with ----- M1, M1A1, M45, M128, M126A1, M185, M199
Body material ----- Steel
Color: GB loading ----- Gray w/green markings and one green band (Later manufacture - three green bands).

VX loading:
Old ----- Gray w/green markings and two green bands
New ----- Three green and one yellow band

Filler and weight ----- VX, 6.0 lb or GB, 6.5 lb
Propelling charges ----- M3 or M4 series
Primers ----- M82 or MK2A4 (depending on cannon model)
Fuzes ----- PD M557; M739
PROX: M728

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 ----- 8 projectiles on pallet
*Pallet:
Weight ----- 831 lb
Dimensions ----- 27-1/8 x 13-5/8 x 32 in.
Cube ----- 6.8 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class -- (12) 1.2
 Storage compatibility group ----- K
 DOT shipping class ----- A
 DOT designation ----- EXPLOSIVE
 PROJEC -
 TILES
 DODAC:
 VX ----- 1320-D568
 GB ----- 1320-D542
 Assembly Dwg: Nos:
 VX filling assembly --- 8861031
 GB filling assembly --- 8861030
 Loading assembly, VX
 or GB ----- 8861029

Ballistics:

Cannon M1, M1A1, M45:

Charge	Muzzle Velocity (mps)	Max Range (mtr)	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	12,000	759.8
7, M4A1, white bag	563.9	14,600	740.8

Cannon M126/M126A1:

Charge	Muzzle Velocity (mps)	Max Range (mtr)	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
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	12,000	746.2
7, M4A2, white bag	562.4	14,600	772.5

Cannon M185:

Charge	Muzzle Velocity (mps)	Max Range (mtr)	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	10,300	756.1
6, M4A2, white bag	475.5	12,400	758.4
7, M4A2, white bag	565.4	14,800	760.3
8, M119/M119A1	684.3	18,100	781.5

Cannon M199:

Charge	Muzzle Velocity (mps)	Max Range (mtr)	Elevation (mil)
1, M3A1, green bag	212.8	4000	673.6

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<u>Charge</u>	<u>Muzzle Velocity (mps)</u>	<u>Range (mtrs)</u>	<u>Elevation (mils)</u>
2, M3A1, green bag	239.8	5000	722.4
3, M3A1, green bag	280.8	6500	890.4
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

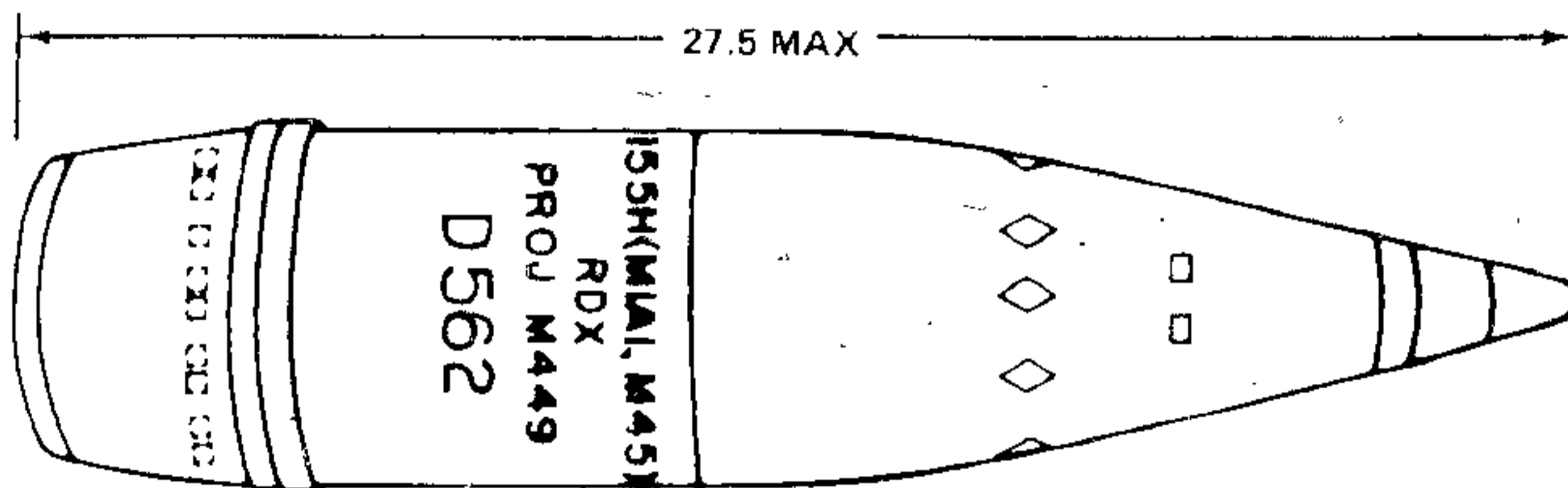
Limitations:

When contingency plans so require, the projectiles may be transported fully assembled with explosive components. Otherwise, assembly is prohibited except for storage and use.

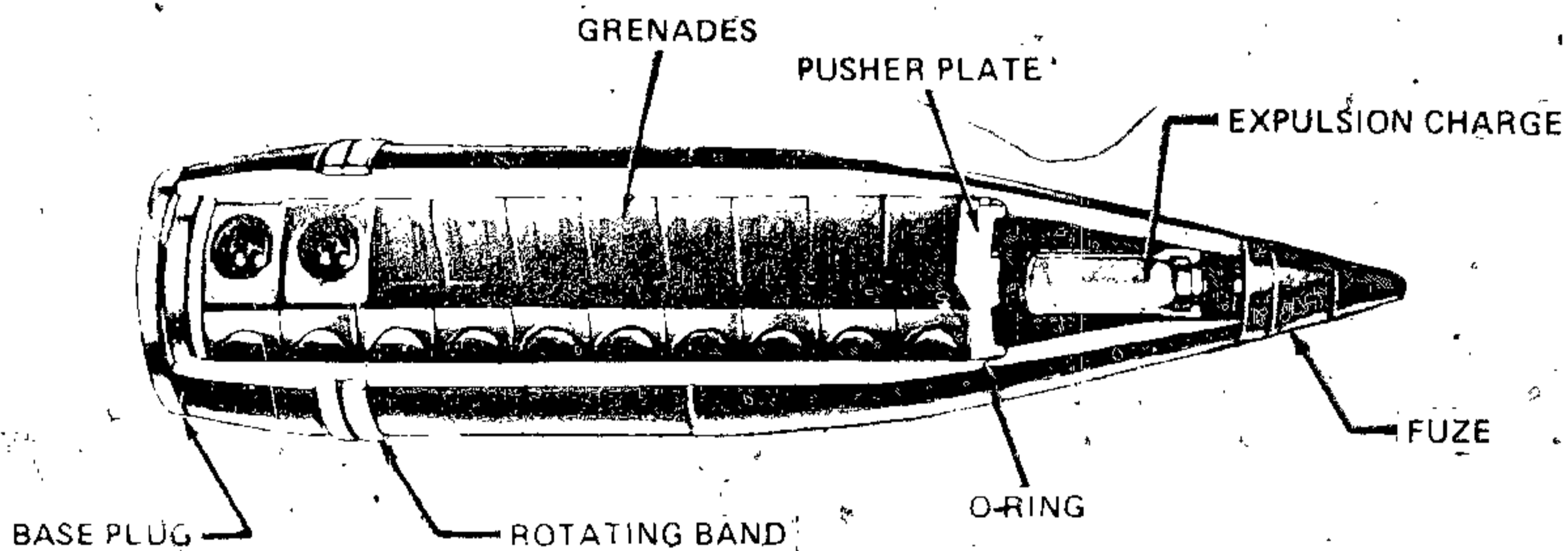
References:

SC 1305/30-IL
SB 700-20
DARCOM-P 700-3-3
TM 9-1025-200-12
TM 9-1300-251-20
TM 9-2350-217-10
TM 9-2350-217-10N

PROJECTILE, 155 MILLIMETER: HE, M449 SERIES



AR 199430-A



AR199429

Type Classification:

Std AMCIC 8982

Use:

This projectile is used to deliver a concentration of antipersonnel grenades.

Description:

This projectile is of the separate loading type. The fuze, propelling charge, and primer are handled and loaded separately. The projectile is provided with an eyebolt lifting plug in place of a fuze for handling. The plug must be replaced by a fuze before the projectile is loaded. The projectile contains 10

layers of grenades with six grenades in each layer. The grenades are contained by a base plug attached to the projectile with shear pins. An expulsion charge is contained in the nose of the projectile and separated from the grenades by a pusher plate. The metal rotating band near the base of the projectile is protected during storage and handling by a removable grommet.

Functioning:

When the primer is detonated, the flash ignites the propelling charge producing gases which force the spin-stabilized projectile out of the gun tube and propel it to the target. The fuze, having been set to function at a pre-determined time in flight, initiates the expulsion charge ejecting the entire grenade load from the

rear of the projectile. Centrifugal force disperses the grenades radially from the projectile line-of-flight. The M43 grenade is an air-burst submissile which is expelled from its housing on impact and projected upward to burst at 4 to 6 feet above the ground.

Tabulated Data:

Projectiles:

Type ----- HE
 Weight as fired:
 M449 ----- 95.0 lb
 M449E1 ----- 95.0 lb
 M449A1
 (M449E2) ----- 93.5 lb
 Length:
 W/ fuze ----- 27.5 in.
 W/ lifting plug ----- 26.9 in.
 Body material ----- Forged steel
 Color ----- Olive drab w/ yellow diamonds and markings

Filler and weight:

Number of grenades ----- 60
 Explosive, Comp A5, each grenade ----- 21.25 grams
 Explosive, Comp A5, each projectile ----- 2.80 lb

Type of grenades:

M449 ----- M43
 M449E1 ----- M43E1
 M449A1
 (M449E2) ----- M43A1, (M43E2)

Expulsion charge ----- M10 propellant, 30 grams

Components:

Propelling charge:

M3, M3A1 ----- Propellant M1, 5.0 lb (Zones 1-5)
 M4, M4A1 ----- Propellant M1, 13.5 lb (Zones 3-7)
 M119/M119A1 ----- Propellant M6, 20.5 lb (Zone 8)

Primer ----- M82, MK2A4 or MK15
 Fuze ----- MT, M565
 Cannon used with ----- M1, M1A1, M1A2, M43, M126, M126E1, M185 and M199

Performance (full charge):

Maximum range ----- 14,600 mtr
 Muzzle velocity ----- 563.0 mtr/sec

Temperature Limits:

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

Storage:
 Lower limit ----- -65°F (-53.8°C)
 Upper limit ----- +165°F (+73.9°C)

*Packing ----- Pallet of 8 projectiles

*Pallet:

Weight (loaded):
 M449 or M449E1 ----- 804 lb
 (M449E2) ----- 793 lb
 Dimensions ----- 32.0 x 27-1/8 x 13-5/8 in.
 Cube ----- 6.8 cu ft

*NOTE: See SC for complete packing data including NSN's

Shipping and Storage Data:

Quantity-distance class ----- 1.2
 Storage compatibility group ----- D
 DOT shipping class ----- A
 DOT designation ----- EXPLOSIVE PROJECTILES

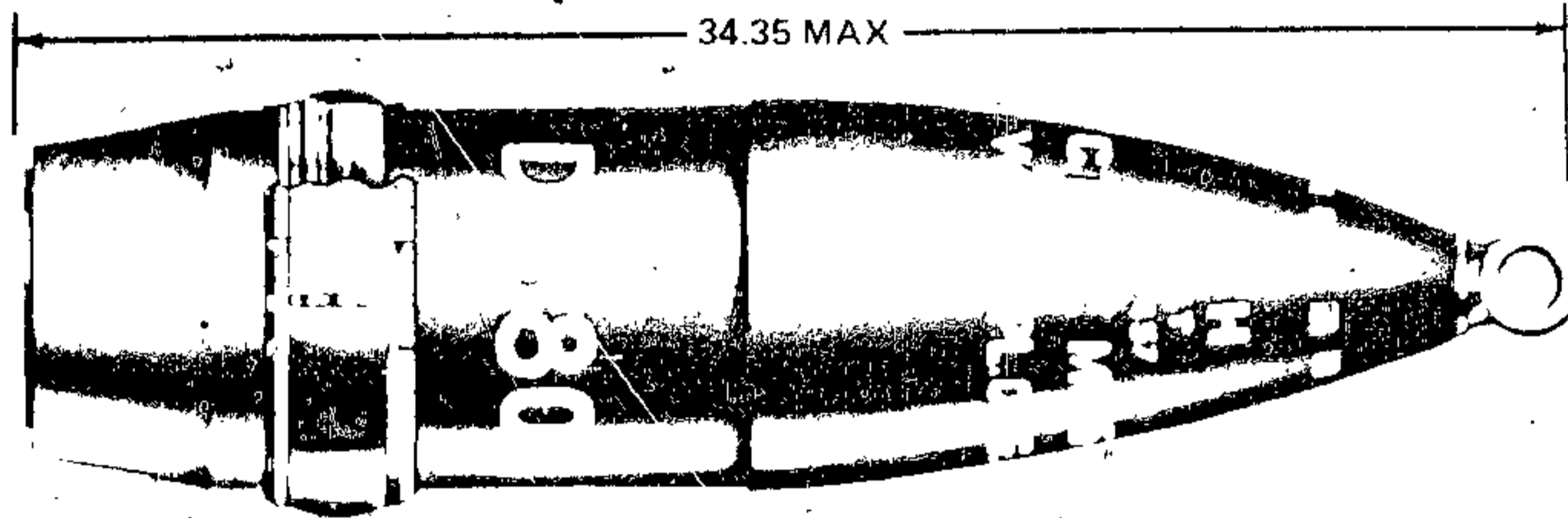
DODAC:

M449 and M449E1 ----- 1320-D561
 M449A1, M449E2) ----- 1320-D562

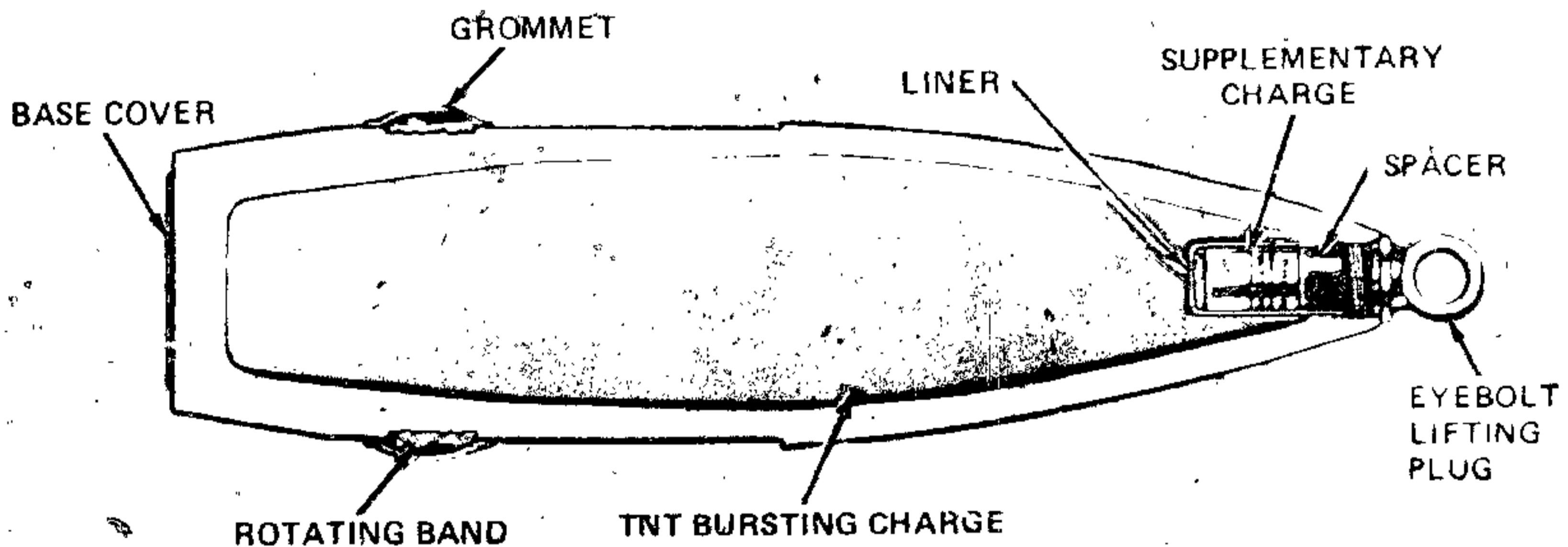
Projectile drawing

number ----- 8875850
 Packing drawing number ----- 7549275

PROJECTILE, 8 INCH: HE, M106



AR199705



AR199704

Type Classification:

Std OTCM 36841, dtd 1958

Use:

This projectile is used against personnel and materiel, producing blast and fragmentation at the target.

Description:

The projectile consists of a hollow steel forging with a boat-tailed 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. The nose of the projectile is fitted with a threaded eyebolt lifting plug to facilitate handling and provide a closure for the nose cavity. The projectile is made with either a shallow or deep nose cavity and may be loaded with TNT or Composition B. Deep cavity projectiles contain a supplementary charge in the nose cavity. A cardboard spacer is placed in the nose cavity between the supplementary charge and the lifting plug to limit movement of the supplementary charge during shipping and handling. The rotating band is protected by a removable grommet. The loaded projectile is divided into one of five weight zones ranging from 191.4 to 204.3 pounds. The weight

zone of the projectile is indicated by the number squares and prick punch marks on the ogive of the projectile.

Functioning:

The grommet and lifting plug are removed from the projectile and 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 supplementary charge is removed. Fuze arming occurs after firing, during projectile flight downrange. Depending upon the type of fuze fitted, the fuze functions detonating the projectile on impact, after an elapsed time or on sensing of the target.

Tabulated Data:

Projectile: HE
Type ----- HE

WEIGHT ZONE INFORMATION

ZONE	OVER UP TO & INCL		MARKING
	LB		
2	191.4	194.3	□ □
3	193.9	196.8	□ □ □
4	196.4	199.3	□ □ □ □
5	198.9	201.8	□ □ □ □ □
6	201.4	204.3	□ □ □ □ □ □

Length:
W/O Lifting Plug- 31.43 in.
W/Lifting Plug -- 34.35 in. (max)
Diameter:
Rotating Band -- 8.28 in.
Bourrelet ----- 7.998 (max)
Body material ----- Steel
Color ----- Olive drab w/yel-
low markings
Filler and weight -- TNT 36.3 lb Comp
B 38.8 lb
Supplementary
charge ----- TNT 0.3 lb
Grommet ----- 3 types, metal.
w/wire/ties,
fiberglass or
plastic w/
metal lever

Weapon system information:

	Weapon	Model	Type
	M115 towed	M110SP	M55SP
Cannon		M2A2	
Tube	M2A1, M2	(M2AJE1)	M47
Prop Chg	M1, M2	M1, M2	M1, M2
Primer	MK2A4	M82, MK15	M82, MK15
Fuze PD	M78, M557, M739	Same	Same
Fuze MTSQ	M564, M582	Same	Same
Fuze Prox			M728, M732

Temperature Limits:

Firing:
Lower limit ----- -40°F (-40°C)
Upper limit ----- +125°F (+52°C)
Storage:
Lower limit ----- -80°F for peri-
ods of not
more than 3
days (63°C)
Upper limit ----- +160°F for not
more than 4
hr/day
(71.1°C)
*Packing ----- 6 projectiles
on pallet
*Pallet:
Weight ----- 1253 lb
Dimensions ----- 39-1/2 x
28-1/2 x
19-1/4 in.
Cube ----- 12.4 cu ft

Shipping and Storage Data:

Quantity-distance
class ----- 6
Storage compatibility
group ----- A
DOT shipping class ----- A
DOT designation ----- EXPLOSIVE PRO-
JECTILE
DODAC ----- 1320-D680
Drawing number ----- 9207909

Ballistics (XM201 Cannon)

	Muzzle Velocity (fps)	Maximum Range (mtr)	Chamber Pressure (psi)
Charge 1, M1, green bag	838	5946	
Charge 2, M1, green bag	920	7099	
Charge 3, M1, green bag	1016	8450	
Charge 4, M1, green bag	1161	10,435	
Charge 5, M1, green bag or M2, white bag	1390 1463	12,405 12,987	
Charge 6, M2, white bag	1705	15,203	
Charge 7, M2, white bag	1991	17,901	
Charge 8, XM188E2, white bag	2330	21,300	31,900

Ballistics-(M2, M2A1, M2A2 & M47 Cannons)

	Muzzle Velocity (fps)	Maximum Range (mtr)	Chamber Pressure (psi)
Charge 1, M1, green bag	820	5600	
Charge 2, M1, green bag	900	6600	
Charge 3, M1, green bag	1000	8000	
Charge 4, M1, green bag	1150	9700	
Charge 5, M1, green bag or M2, white bag	1380	11,600	
Charge 6, M2, white bag	1640	13,900	
Charge 7, M2, white bag	1950	16,800	

Limitations:

None

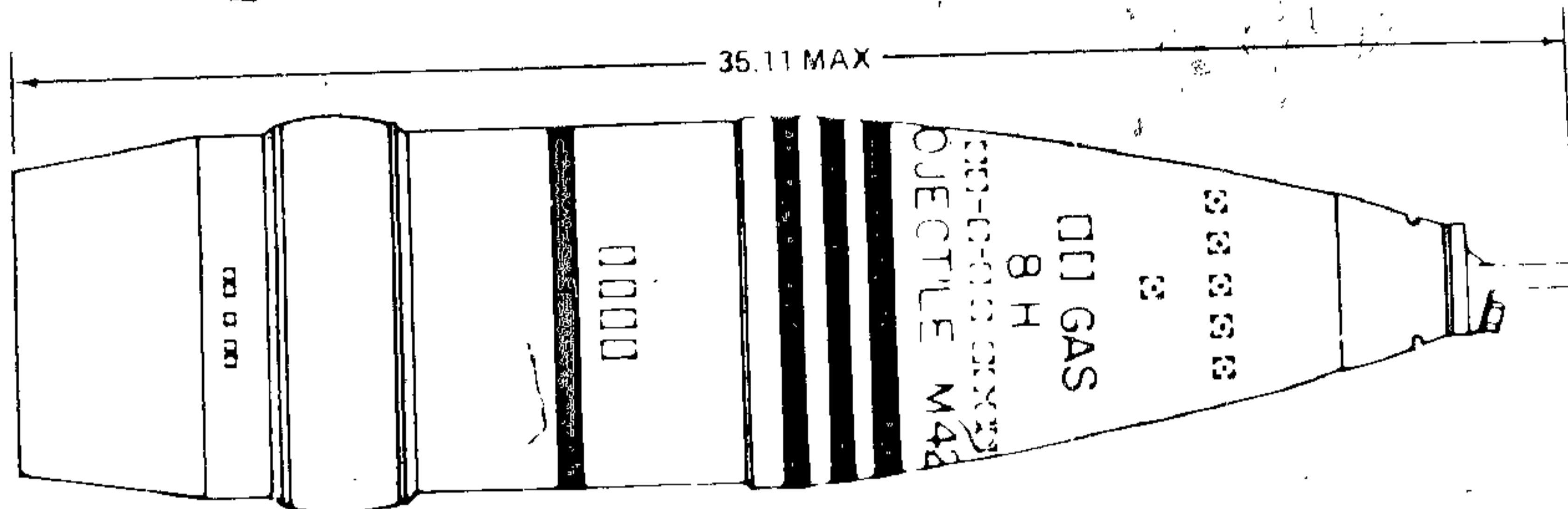
References:

- | | |
|------------------|------------------|
| SC 1305/30-1L | TM 9-1300-206 |
| SB 700-20 | TM 9-1300-251-20 |
| DARCOM-P 700-3-3 | TM 9-1300-251-54 |
| TM 9-2300-216-10 | TM 9-3004 |
| TM 9-1300-250 | TM 9-2350-210-12 |

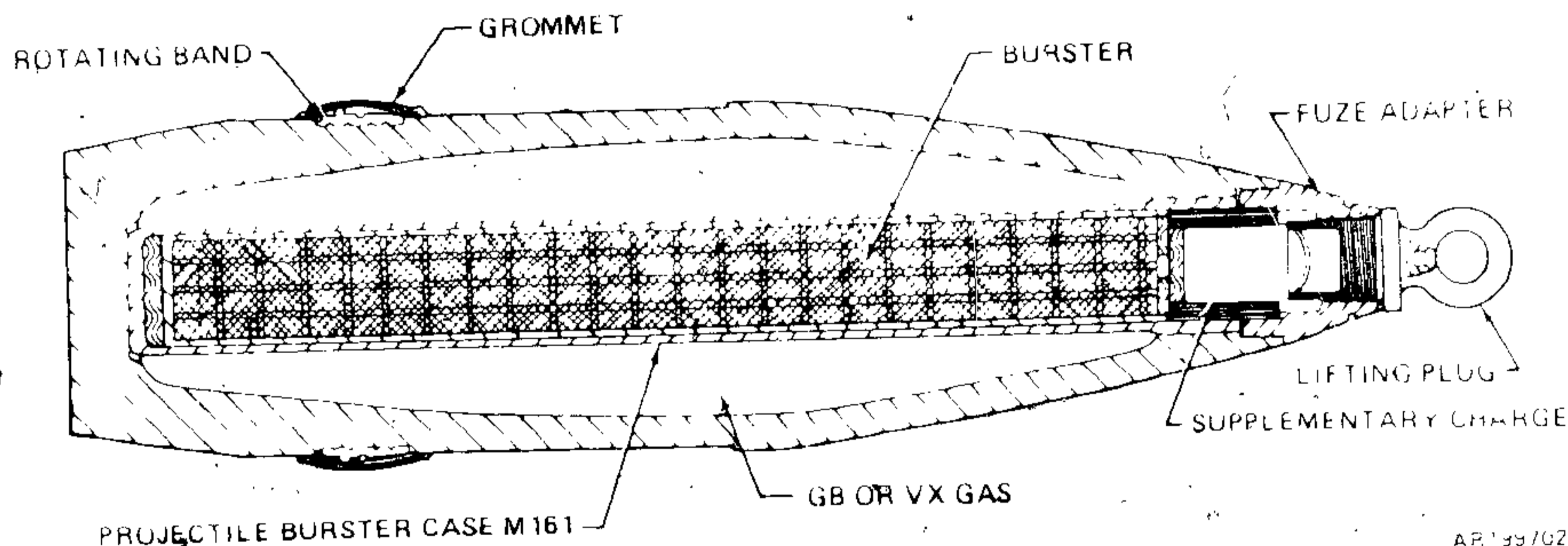
TM 43-0001-28

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PROJECTILE, 8 INCH: AGENT, GB (non-persistent) AND VX (persistent), M426



AR199703



AR199702

Type Classification:

Std OTCM 37836 dtd 1961

Use:

Projectile M426 is used in 8 inch howitzer cannons to deliver and disperse casualty producing agents. When filled with VX agent, the projectile is also used to contaminate habitable areas and thus deny such areas to the enemy.

Description:

The projectile is a hollow steel forging, ballistically similar to the standard HE Projectile M106. A tubular burster casing of this metal,

containing a Composition B burster, occupies the center of the shell and seals in the agent. The remainder of the interior space is filled with 14.5 pounds of liquefied GB nonpersistent or VX persistent gas. A threaded steel adapter provides a receptacle for a point-detonating or proximity fuze. For shipment and handling, an eyelet lifting plug is installed in the fuze cavity of the adapter. A rotating band of lifting metal encircles the casing near the rear, and is protected by a grommet.

Functioning:

Ignition of the primer by the breech firing pin results in ignition of the propelling charge. The burning propellant generates rapidly expanding gases

TM 43-0001-28

to propel the projectile through the cannon barrel at the velocity required to reach the target. The rotating band of soft gilding metal is incised by the barrel rifling and imparts a high rate of spin to the projectile. The snug fit of the rotating band also serves to prevent escape of gas pressure past the projectile. The spin insures stable flight of the projectile. When a point-detonating fuze is employed, impact causes the fuze to detonate the supplementary charge and the supplementary charge detonates the burster tube. The burster ruptures the shell case, releasing the agent. The liquefied agent expands to a gaseous state by heating from the burster charge. If a proximity fuze is fitted, action on the burster tube is direct from the booster element of the fuze, and projectile rupture occurs on approach to the target.

Tabulated Data:

Complete round:

Type ----- GB or VX

WEIGHT ZONE INFORMATION

Zone	Over lb	Up to & Incl	Marking
2	191.4	194.3	□ □
3	193.9	196.4	□ □ □
4	196.4	197.3	□ □ □ □
5	198.9	201.8	□ □ □ □ □
6	201.4	204.3	□ □ □ □ □ □

Length:

With lifting plug - 35.11 in. max

Without lifting

plug ----- 31.37 in. max

Cannon used with -- M2, M2A1, M47, and M2A2

Projectile:

Body material ----- Forged steel

Color:

GB ----- Gray w/green markings and 1 green band (Later manufacture 3 green and 1 yellow band)

VX ----- Gray w/green markings and 2 green bands (old markings) 3 green and 1 yellow bands (new markings)

Propelling charge - M1 green bag, M2 white bag

Primers ----- MK2A4, M82

Fuzes ----- PD, M557, M739, Prox M728

Temperature Limits:

Firing:

Lower limit ----- -40° F (-40° C)

Upper limit ----- +125° F (+52° C)

Storage:

Lower limit ----- -80° F (for periods not more than 3 days) (-62.2° C)

Upper limit ----- +160° F (for not more than 4 hr/day) (+71.1° C)

*Packing ----- 6 projectiles on pallet

*Pallet:

Weight ----- 1253 lb

Dimensions ----- 39-1/2 x 28-1/2 x 19-1/4 in.

*NOTE: See 5C for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
 class ----- 5
 Storage compatibility
 group ----- A
 DOT shipping class -- A
 DOT designation --- EXPLOSIVE PRO-
 JECTILE
 DODAC:
 GB ----- 1320-D696
 VX ----- 1320-D695
 Assembly Dwg No:
 GB ----- 8860620-1
 VX ----- 8860620-2

Ballistics (M2, M2A1, M2A2 & M47 cannons):

	Muzzle Velocity (fps)	Maximum Range (mtr)
Charge 1, M1, green bag	820	5600
Charge 2, M1, green bag	900	6600
Charge 3, M1, green bag	1000	8000
Charge 4, M1, green bag	1150	9700
Charge 5, M1, green bag or M2, white bag	1380	11,600
Charge 6, M2, white bag	1640	13,900
Charge 7, M2, white bag	1950	16,800

Limitations:

None

References:

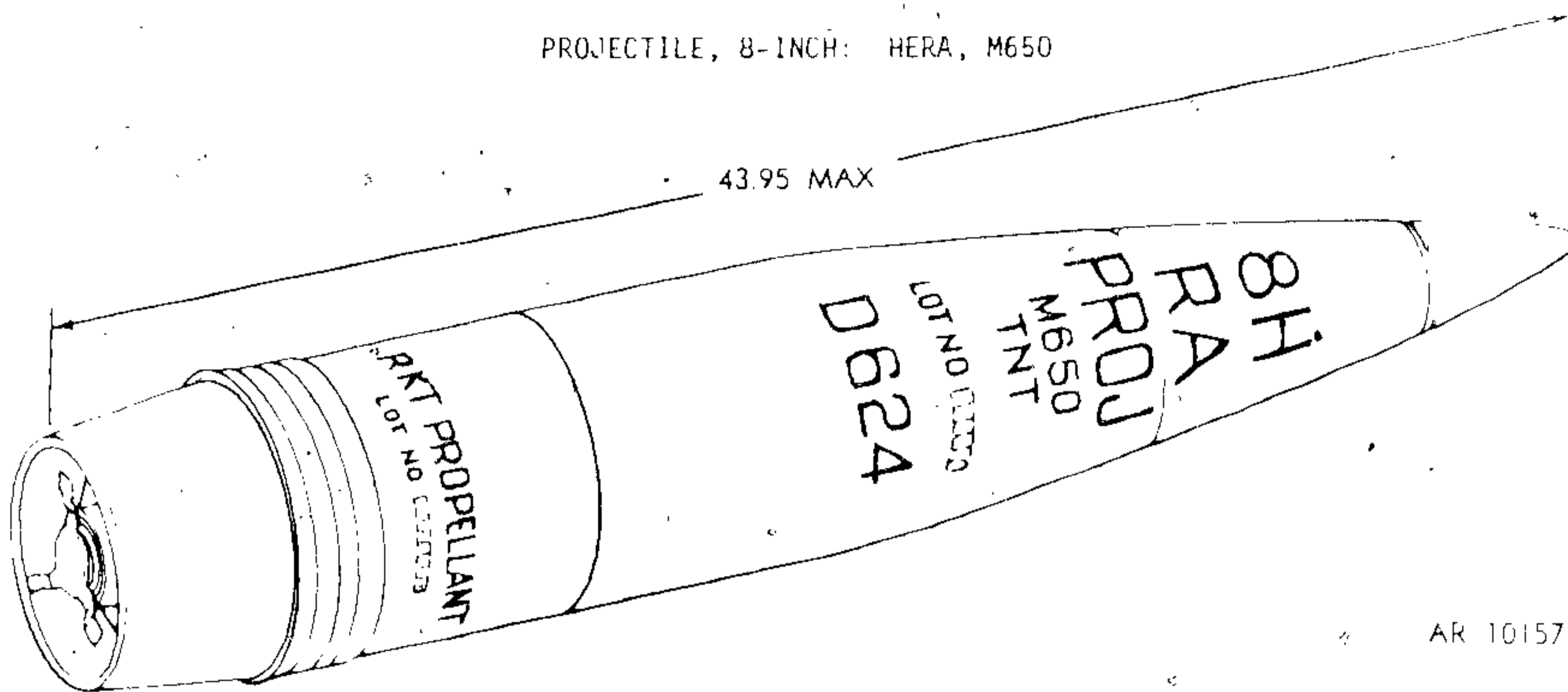
SC 1305/30-IL
 SC 700-20
 DARCOM-P 700-3-3
 TM 9-2300-216-10
 TM 9-1300-250
 TM 9-1300-206
 TM 9-1300-251-20
 TM 9-1300-251-34

JM 43-0001-28

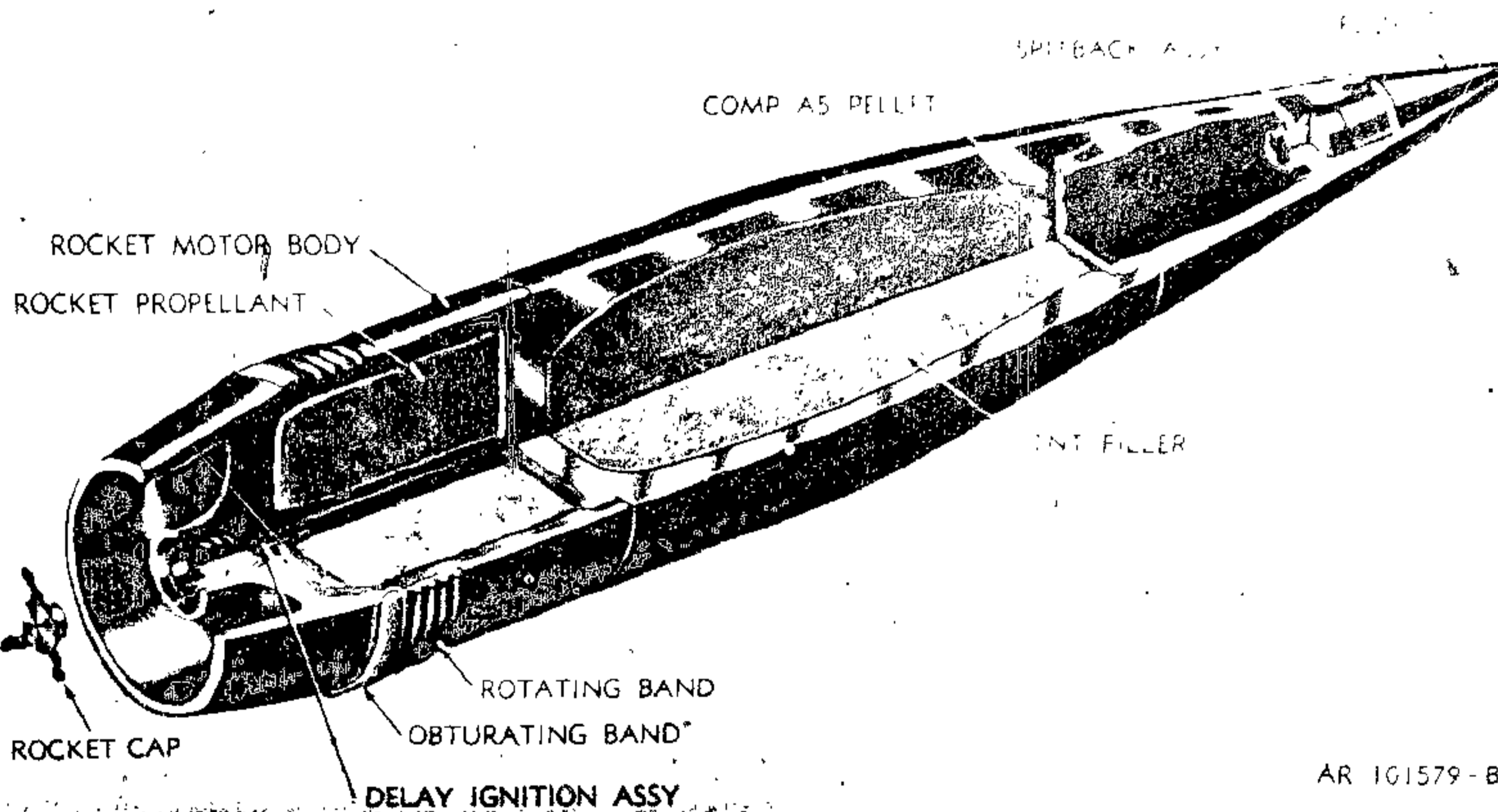
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3-142 Change 7

PROJECTILE, 8-INCH: HERA, M650



AR 101578-B



AR 101579-B

Type Classification:

Std MSR 01796002.

Use:

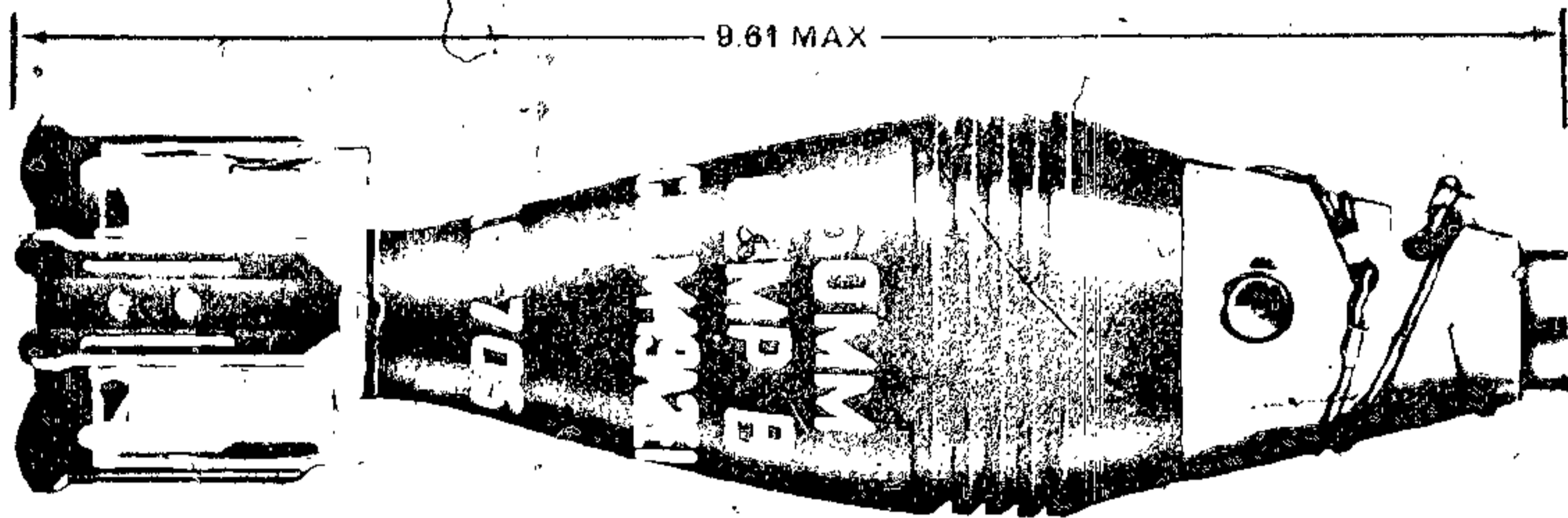
The 8-inch M650 projectile is a high-explosive, rocket-assisted round with extended range capability. It is intended to be employed against personnel and materiel targets at ranges in excess of those currently attainable with the standard M106 Projectile.

Description:

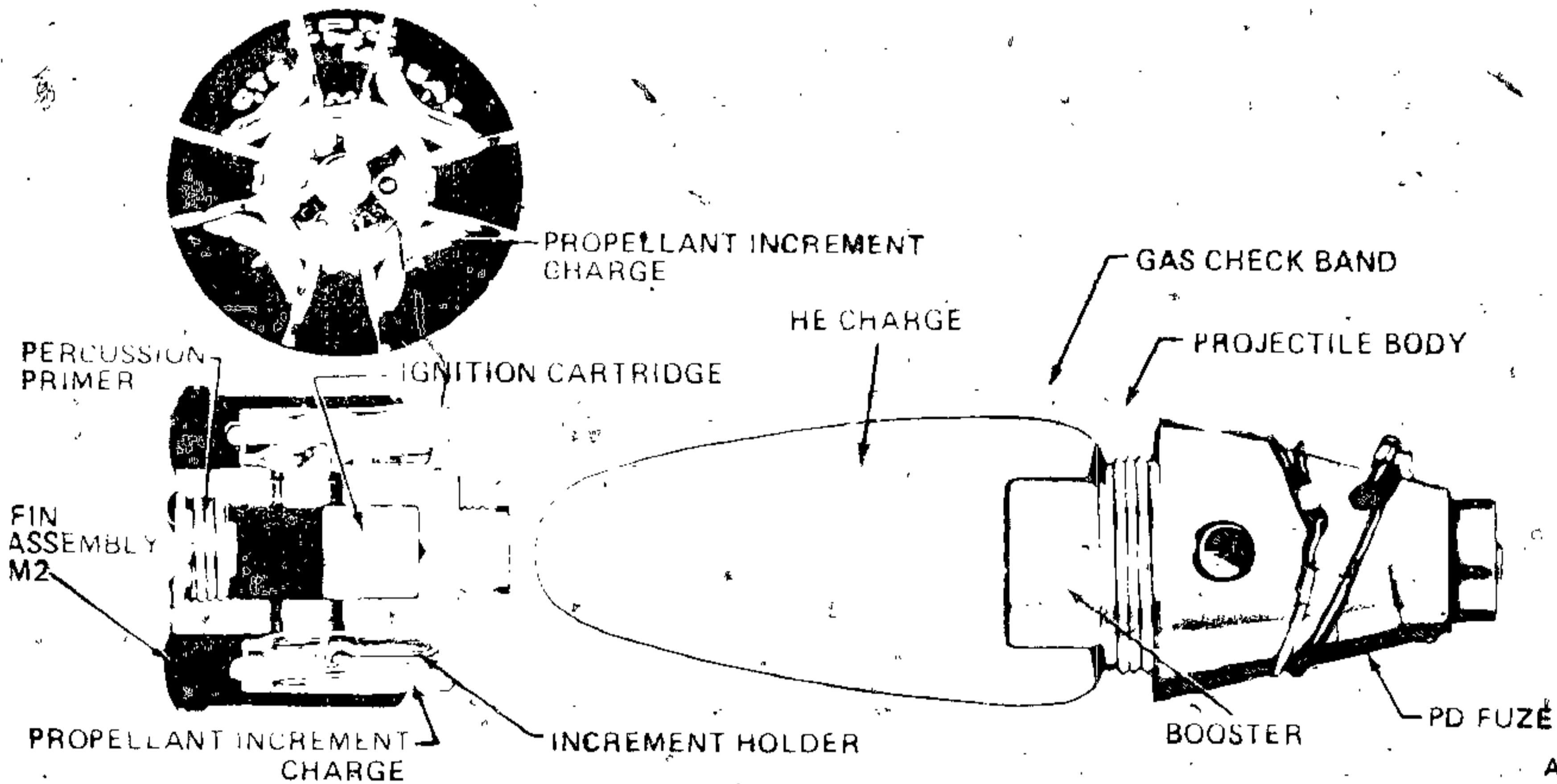
This Projectile consists of three major components, an ogive, the warhead and a solid propellant rocket motor. The three components

thread together to form a streamlined projectile. The aluminum ogive section contains a spitback booster assembly at the base of the fuze well and will accept fuzes of the shallow cavity type. The high fragmentation steel warhead is filled with TNT explosive. A Composition A5 booster pellet is located in the center of the TNT filler at the forward end of the warhead. The alloy steel rocket motor section contains the solid propellant rocket motor grain and delay ignition assembly. A rocket cap is threaded onto the nozzle exit cone at the base of the rocket motor. The rocket motor is encircled with a cover welded overlay rotating band, which is locked up by a nylon obturating band. The projectile is fitted with a lifting plug at the nose and a grommet which protects the rotating band during shipping and handling.

CARTRIDGE, 60 MILLIMETER: HE, M49A3 (M49A2E1) AND M49A2



AR199518



AR199517

Type Classification:

M49A3: Std AMCTC 6632, dtd 1969.
 M49A2: Std UTCM 37119, dtd 1959.

Use:

This cartridge is fired in 60mm Mortars M2 or M19 for use against personnel and materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body, a point-deterating fuze (staked), a fin assembly, four increments of propellant charge, an ignition cartridge, and a percussion primer. The projectile body is of pearlitic malleable iron (PMI), and is threaded internally at the

nose to accept the fuze and at the base to accept the fin assembly. The body is filled with Composition B high explosive.

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 flash from 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 mortar tube and propel it to the target. The projectile is fin-stabilized in flight. The point-deterating fuze functions on impact, deterating the fuze booster charge and, in turn, the high explosive charge. The high explosive charge shatters the projectile

TM 43-0001-28.

body, producing near optimum fragmentation and blast effect at the target.

Difference Between Models:

The projectile body of the M49A2 is of forged steel, and is filled with flaked TNT.

Tabulated Data:

Complete round:

Type-----HE
Weight w/ fuze-----3.07 lb
Length w/ fuze-----9.61 in.

Projectile:

Body material:
M49A3-----Cast PMI
M49A2-----Forged steel
Color-----Olive drab w/yel-
low markings

Filler and weight:

M49A3-----Comp 8, 0.42 lb
M49A2-----TNT, 0.34 lb

Components:

Ignition cartridge-----M5A1
Propellant charge-----M3A1
Percussion primer-----M32
Fuze assembly-----M2
Fuze-----PD, M525 series
PD, M717

Temperature Limits:

Firing:

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

Storage:

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

*Packing: One round in fiber container; 10 con-
tainers in wooden box.

Packing Box:

Weight-----49 lb
Dimensions-----17-9/16 x 12-1/8
x 8-7/32 in.
Cube-----1.3 cu ft.

*NOTE: See SC for complete packing data includ-
ing M/N's.

Shipping and Storage Data:

Quantity, distance, class----- (08) 1.2
Storage compatibility group-----E
DOT shipping class-----A
DOT designation-----AMMUNITION FOR
CANNON WITH
EXPLOSIVE PRO-
JECTILES
DODAC-----1310-B632
Drawing number-----9207925

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range	
		(yd)	(mtr)
0*	189	332	303
1	292	784	716
2	377	1204	1101
3	449	1594	1458
4	518	1978	1809

*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 4 is the ignition cartridge and 4 increment charges.

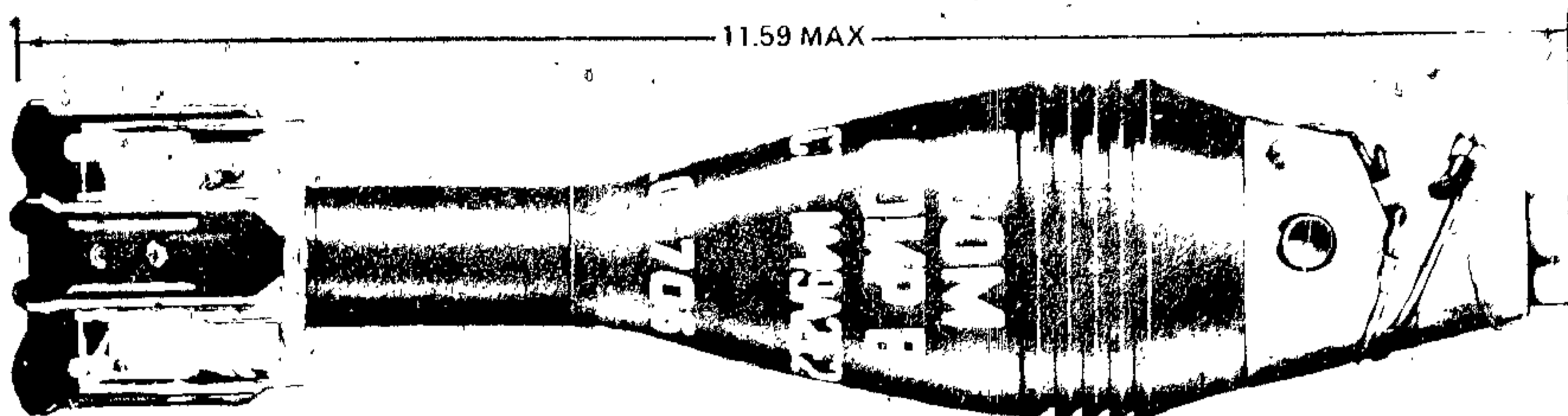
Limitations:

Although this cartridge is safe for firing at standard temperatures, excessive pressure may develop at Charge 4 below 0°F. Maximum allowable rate of fire: 30 rounds-per-minute for periods not exceeding one minute; 18 rounds-per-minute for periods not exceeding 4 minutes; 8 rounds-per-minute indefinitely.

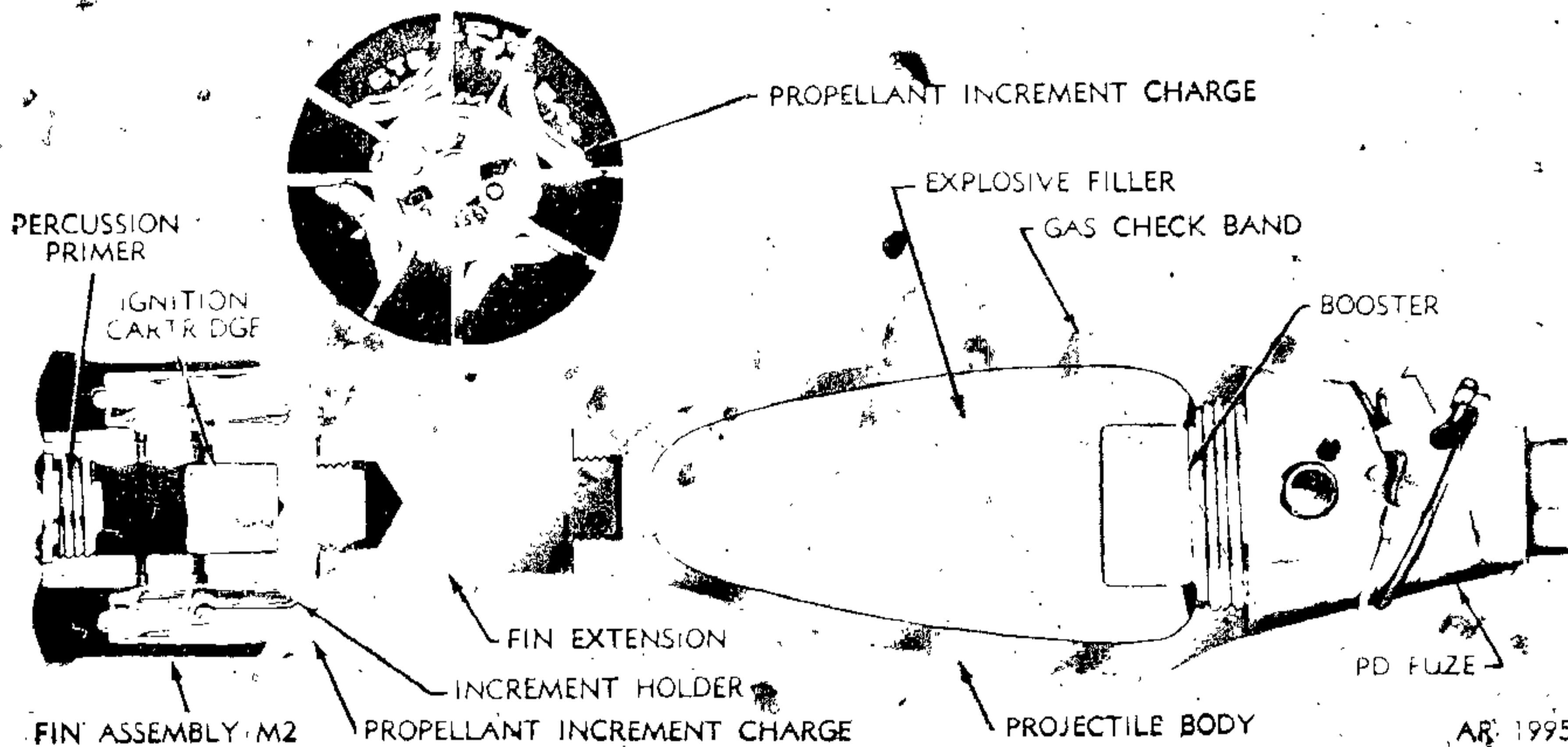
References:

- FM 23-85
- SC 1305/30-IL
- TM 9-3071-1
- TM 9-1015-215-12

CARTRIDGE, 60 MILLIMETER: HE, M49A4 (M49A2E2)



AR199516



AR 199515

Type Classification:

CON MSR 11756003 (M49A4).

OBS MSR 11756003 (M49A2).

Use:

This cartridge is fired in 60mm Mortars M2 and M19 for use against personnel and light materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body; a point-detonating fuze (staked), a fin assembly with a 2-in. extension, four increments

of propellant charge, an ignition cartridge, and a percussion primer. The projectile body is of forged steel or pearlitic malleable iron (PMI), and is threaded internally at the nose to accept the fuze and at the base to accept the fin extension. The body is filled with composition B high explosive.

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 firing pin the primer ignites the ignition cartridge and the cartridge ignites the propellant charge. Rapidly expanding gases from the burning

TM 43-0001-28

propellant expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. The point-detonating fuze functions on impact, detonating the fuze booster charge and, in turn, the Composition B high explosive. The bursting charge shatters the projectile body, producing near optimum fragmentation and blast effect at the target.

Tabulated Data:

Complete round:

Type-----HE
 Weight w/fuze-----0.325 lb
 Length w/fuze-----11.59 in.

Projectile:

Body material-----Forged steel or
 cast PMI
 Color-----Olive drab w/yel-
 low markings
 Filler and weight-----Comp B, 0.42 lb

Components:

Ignition cartridge-----M5A2
 Propellant charge-----M181
 Percussion primer-----M32
 Fin assembly-----M2 plus extension
 Fuze-----PD, M525 series;
 PD, M717

Temperature Limits:

Firing:

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

Storage:

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

*Packing:

1 round in fiber
 container; 12
 containers in
 wooden box

*Packing Box:

Weight-----55.5 lb
 Dimensions-----16-1/16 x 13-5/8
 x 11-5/16 in.
 Cube-----1.4 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class----- (08) 1.2
 Storage compatibility group-----E
 DOT shipping class-----A
 DOT designation-----AMMUNITION FOR
 CANNON WITH
 EXPLOSIVE PRO-
 JECTILES
 DODAC-----1310-B632
 Drawing number-----9220179

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range	
		(yd)	(mtr)
0*	169	280	256
1	247	700	639
2	373	1163	1069
3	450	1587	1452
4	520	1985	1814

*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge, Charge 4 is the ignition cartridge and 4 increment charges.

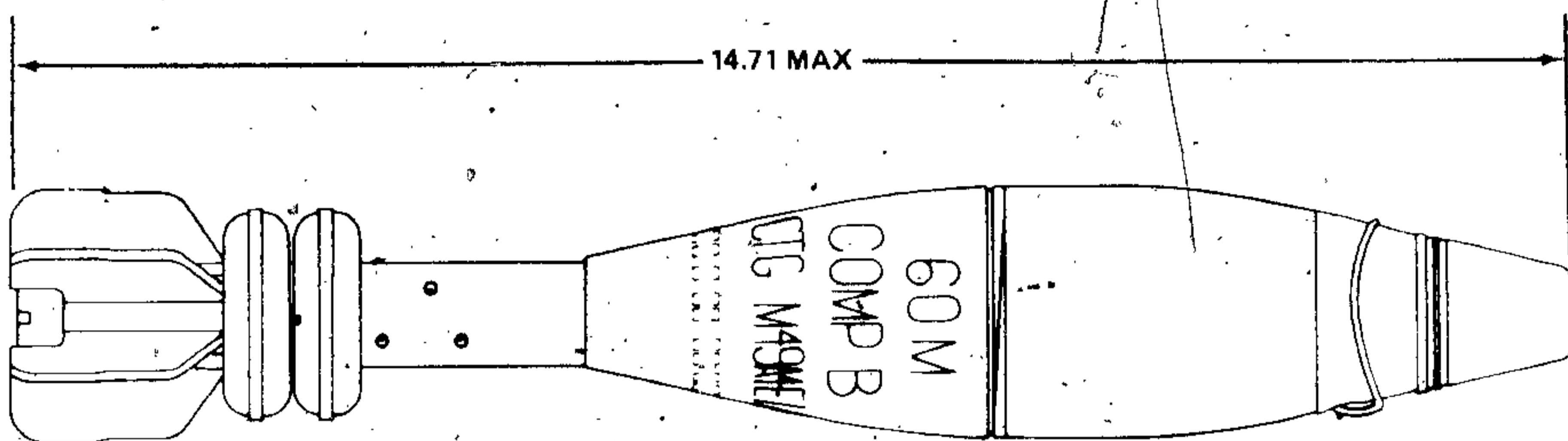
Limitations:

Excessive short rounds may occur when this round is fired at temperatures below 0°F. Maximum allowable rate of fire: 30 rounds-per-minute for periods not exceeding 1 minute; 18 rounds-per-minute for periods not exceeding 4 minutes; 8 rounds-per-minute indefinitely.

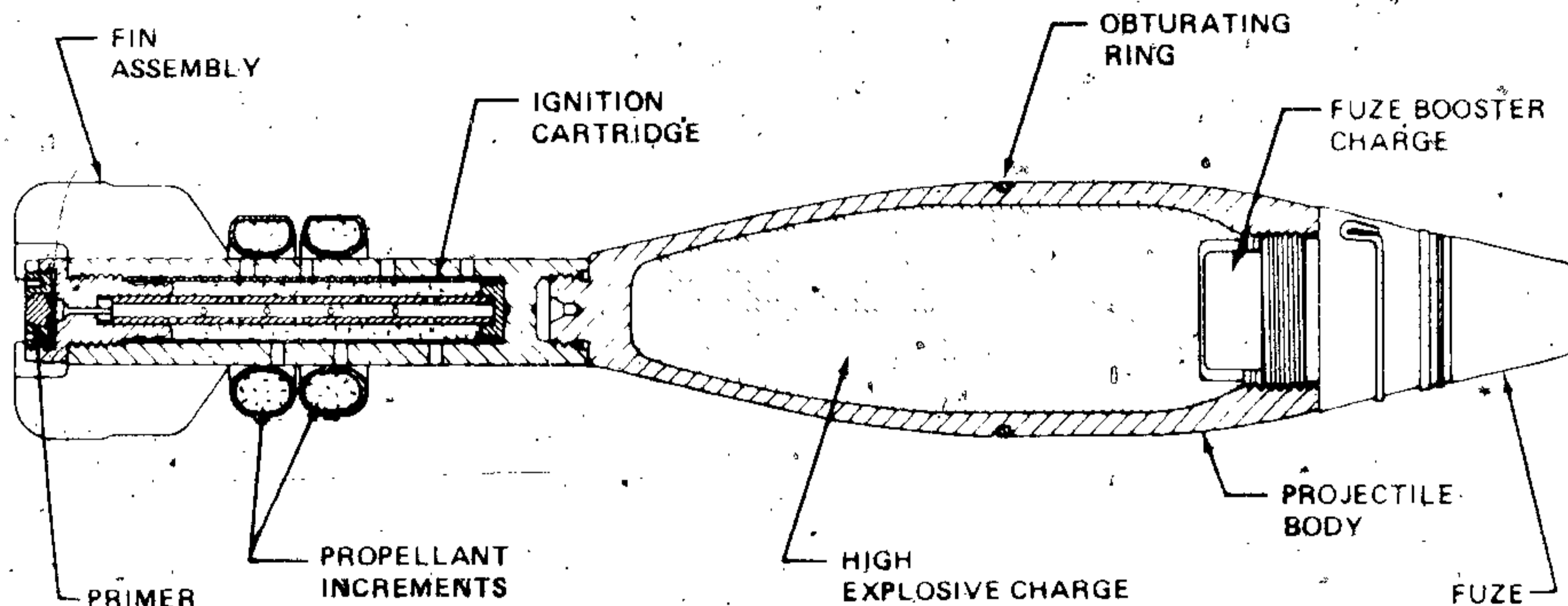
References:

FM 23-85
 SC 1305/30-IL
 TM 9-3071-1
 TM 9-1015-215-12

CARTRIDGE, 60 MILLIMETER: HE, M49A5 (M49A4E1)



AR199514



AR199513

Type Classification:

Use:

This cartridge is used against personnel and light materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body, a fin assembly, two increments of propellant charge, and an ignition cartridge with a percussion primer. The alloy steel projectile body is internally threaded at the nose to accept the fuze, externally threaded at the base to accept the fin assembly, and grooved to hold

the Delrin obturating ring. The body is loaded with Composition B high explosive.

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 flash from 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 mortar tube and propel it to the target. The projectile is fin-stabilized in flight. The point-detonating fuze functions on impact, detonating the fuze booster charge and, in turn, the Composition B high explosive. The bursting charge shatters the projectile body, producing near optimum fragmentation and blast effect at the target.

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Tabulated Data:

Complete round:

Type-----HE
 * Weight w/ fuze-----3.90 lb
 Length w/ fuze-----14.71 in.
 Cannon used with-----M19

Projectile:

Body material-----Alloy steel
 Color-----Olive drab w/ yellow markings
 Filler and weight-----Comp. B, 0.79 lb

Components:

Ignition cartridge-----XM702
 Propellant charge-----XM204
 Percussion primer-----M35
 Fin assembly-----XM25
 Fuze-----PD, XM935

Temperature Limits:

Firing:

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

Storage:

Lower limit-----65°F (for period not more than 3 days) (-53.8°C)
 Upper limit-----160°F (for period not more than 4 hr/day) (+71.1°C)

*Packing-----1 round in fiber container; 8 containers in metal box; 2 metal boxes in wirebound box

*Packing Box:

Height-----100 lb
 Dimensions-----
 Cube-----2.0 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class----- (08) 1.2
 Storage compatibility group-----E
 DOT shipping class-----A
 DOT designation-----AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES

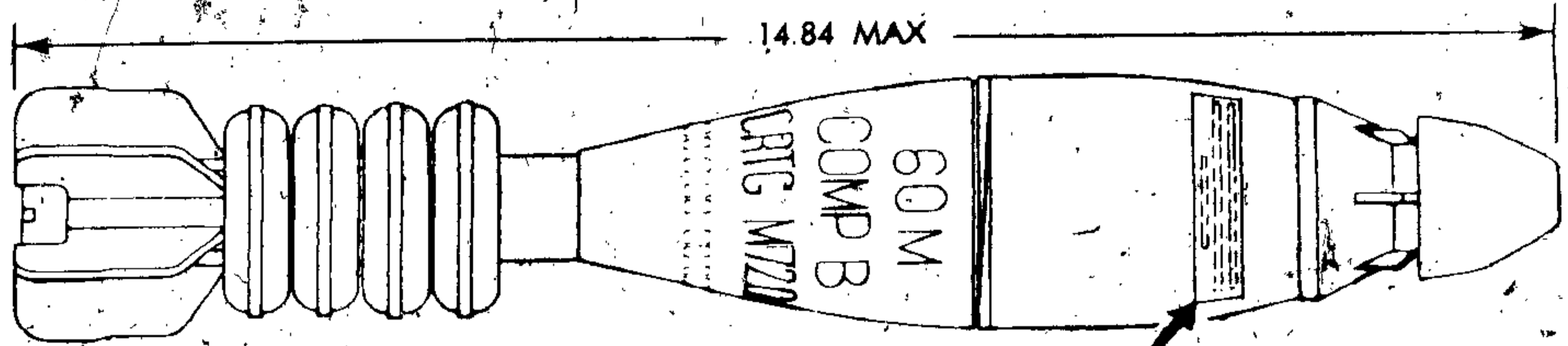
DODAC-----1310-
 Drawing number-----9241292

References:

DEP 9-1310-522-12
 FM 23-85
 SC 1305/30-II
 TM 9-3071-1
 TM 9-1015-215-12

TM 43-0001-28

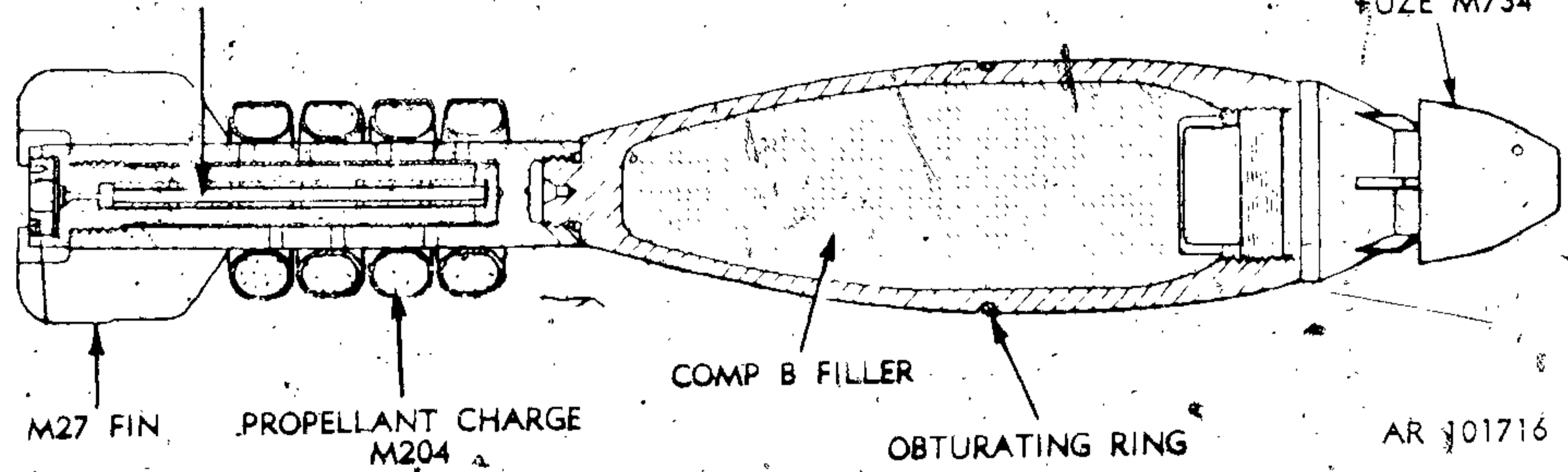
CARTRIDGE, 60 MILLIMETER: HE, M720



WARNING: WHEN FIRING IN 60MM MORTAR M19 USE NO MORE THAN TWO CHARGES

IGNITION CARTRIDGE M702

MULTI-OPTION FUZE M734



Type Classification:

Std MSR 01786006.

Use:

This cartridge is fired in the 60mm M224 Mortar in the Lightweight Company System. It is used against troops (either on the open or in foxholes), light vehicles, light bunkers and similar targets.

Description:

The complete round consists of a projectile body, a multi-option fuze, a fin assembly, four increments of propellant charge, ignition cartridge and obturating ring. The projectile body is of alloy steel and is threaded internally at the nose to accept the fuze and at the base to accept the fin assembly. The body is filled with Composition B high explosive.

Functioning:

When the cartridge is loaded, it slides down the mortar tube. The firing pin at the bottom of the tube initiates the primer. The flash from the primer ignites the ignition cartridge, which in turn ignites the propellant charge. Rapidly expanding gases from the burning propellant expands the obturating ring, accelerating the cartridge and propelling it in flight. Stabilization in flight is accomplished by aerodynamic and spin action of the fin assembly.

Tabulated Data:

Complete round:

Type	HE
Weight w/fuze	3.75 lb
Length w/fuze	14.85 in.
Cannon used with	M19, M224

TM 43-0001-28

Projectile:

Body material-----Alloy steel*
 Color-----Olive drab
 Filler and weight-----Comp B
 Components:
 Ignition cartridge-----M702
 Propellant charge-----M204
 Percussion primer-----M35
 Fin assembly-----M27
 Fuze-----Multi-Option M734

Temperature limits:

Firing:
 Lower limit----- -50°F (-58.2°C)
 Upper limit----- $+145^{\circ}\text{F}$ ($+63^{\circ}\text{C}$)

Storage:
 Lower limit----- -80°F (for period not more than 3 days) (-62.2°C)
 Upper limit----- $+160^{\circ}\text{F}$ (for period not more than 4 hr/day) ($+71.1^{\circ}\text{C}$)

*Packing-----1 round in fiber container; 8 fiber containers in metal container; 2 metal containers in wirebound box.

*Packing Box:
 Weight-----112 lb
 Dimensions-----14-15/16 x 13-3/16 x 17-3/4 in.
 Cube-----2.1 cu ft

*NOTE See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class----- (08) 1.2
 Storage compatibility group-----E

DOT shipping class-----A
 DOT marking-----AMMUNITION FOR CANNON W/EXPLOSIVE PROJECTILE
 DODAC-----1310-B642
 Drawing number-----9275526

Ballistics:

Charge	Muzzle Velocity (fps)	Minimum Range (mtr)	Maximum Range (mtr)
0*	210	70	400
1	415	250	1340
2	560	350	2150
3	680	500	2890
4	810	650	3490

*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one propellant charge; Charge 4 is the ignition cartridge and 4 propellant charges.

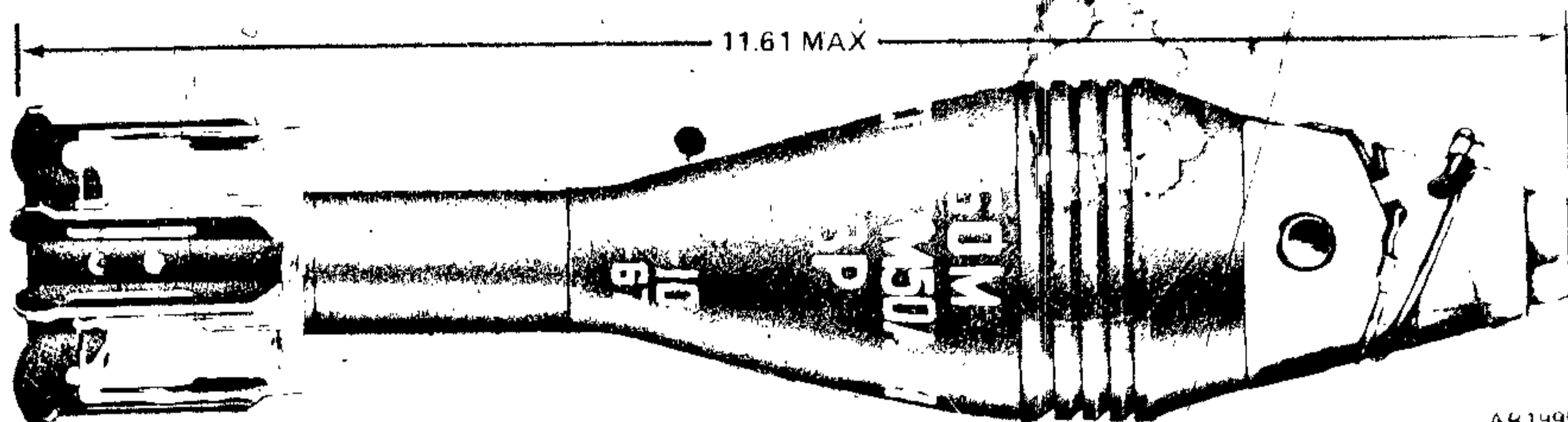
Limitations:

Do not fire the M720 cartridge in the M19 mortar above propellant charge 2.
 Do not fire the M720 cartridge with charge greater than 1 in the hand held mode.

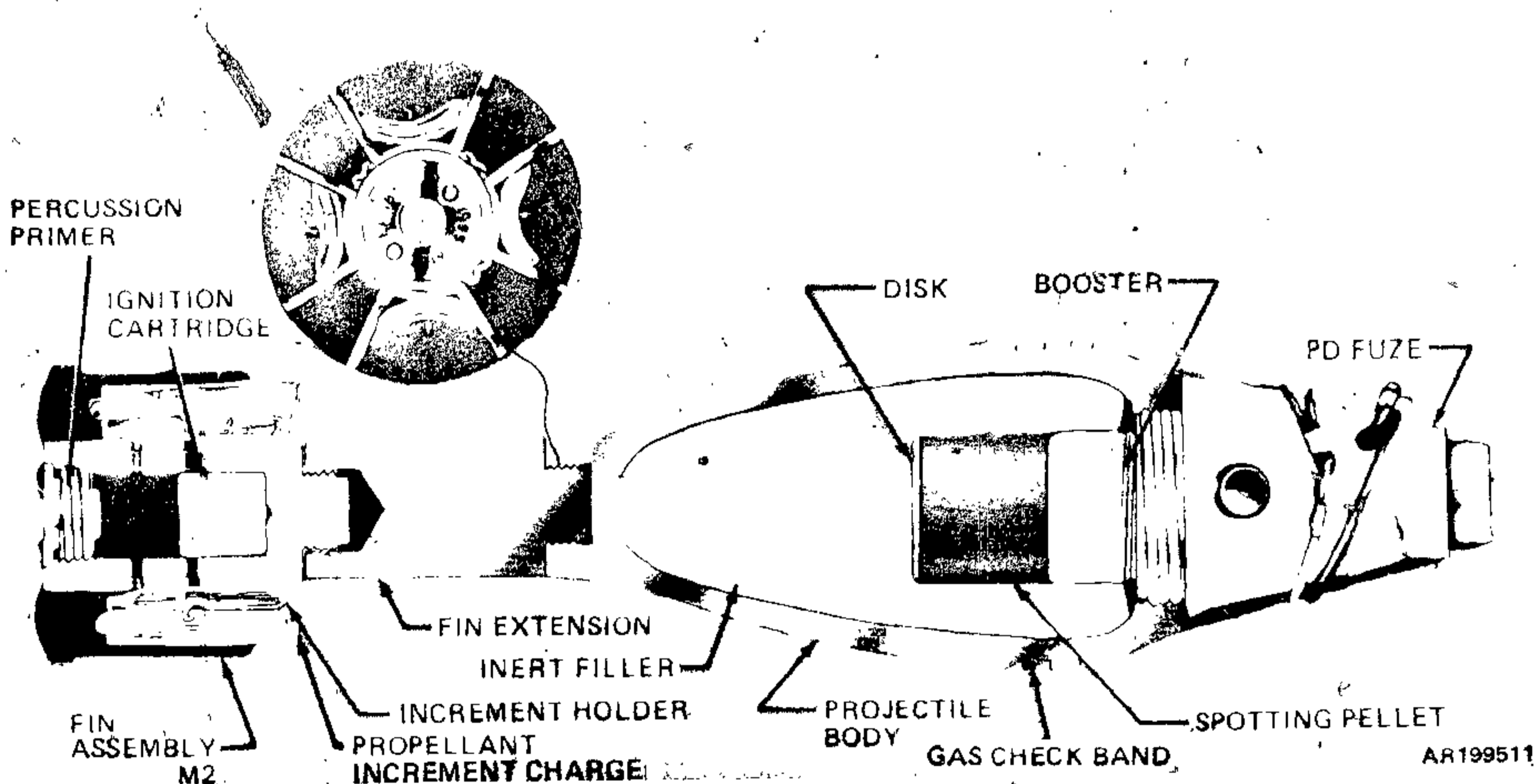
References:

- FM 23-85
- SC 1305/30-1L
- TM 9-1010-223-10
- TM 9-1025-215-12
- TM 9-1300-251-20
- TM 9-1300-251-34
- TM 9-3071-1

CARTRIDGE, 60 MILLIMETER: TARGET PRACTICE, M50A3 (M50A2E1)



AR199512



AR199511

Type Classification:

C & T AMTC 6632, dtd 1969.

Use:

This cartridge is fired in 60mm Mortars M2 and M19 for target practice, and contains a spotting charge for observation.

Description:

The complete round consists of a projectile body, a point-detonating fuze, a fin assembly with a 2 in. extension, four increments of propellant charge, and an ignition cartridge with a percussion primer. The projectile body is of forged steel or pearlitic malleable iron (PMI), and is threaded internally at the nose to accept

the fuze and at the base to accept the fin extension. The body is loaded with an inert plaster filler to simulate the weight and ballistic characteristics of a high explosive cartridge. A pellet of black powder for a spotting charge is loaded in a cavity just below the booster casing of the fuze.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin of the base cap of the mortar. The flash from the primer ignites the ignition cartridge, and the cartridge ignites the propellant charge. Expanding gases from the burning propellant expel the projectile from the mortar tube and propel it to the target. The projectile is

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fin-stabilized in flight. The point-detonating fuze functions on impact, detonating the fuze booster charge and the spotting charge.

Tabulated Data:

Complete round:
 Type-----TP
 Weight w/fuze-----03.15 lb
 Length w/fuze-----11.61 in.

Projectile:
 Body material-----Forged steel or cast PMI
 Color-----Blue w/white markings and brown band
 Filler and weight-----Inert, 0.29 lb
 Spotting charge-----Black powder, 0.55 lb

Components:
 Ignition cartridge-----M5A1
 Propellant charge-----M181
 Percussion primer-----M32
 Fin assembly-----M2 plus extension
 Fuze-----PD, M525 series

Temperature Limits:

Firing:
 Lower limit----- -40°F (-40°C)
 Upper limit----- $+125^{\circ}\text{F}$ ($+52.0^{\circ}\text{C}$)

Storage:
 Lower limit----- -80°F (for period not more than 3 days) (-62.2°C)
 Upper limit----- $+160^{\circ}\text{F}$ (for period not more than 4 hr/day) ($+71.1^{\circ}\text{C}$)

*Packing-----1 round in fiber container; 10 containers in wooden box

*Packing Box:
 Weight-----49.0 lb
 Dimensions-----17-9/16 x 12-1/8 x 8-7/32 in.
 Cube-----1.3 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class----- (08) 1.2
 Storage compatibility group-----E
 DOT shipping class-----A
 DOT designation-----AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
 DODAC-----1310-B633
 Drawing number-----9220383

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum (yd)	Range (mtr)
0*	169	280	256
1	247	700	639
2	373	1163	1069
3	450	1587	1452
4	520	1963	1814

*Charge 0 is the ignition cartridge only. Charge 1 is the ignition cartridge and one increment charge; Charge 4 is the ignition cartridge and 4 increment charges.

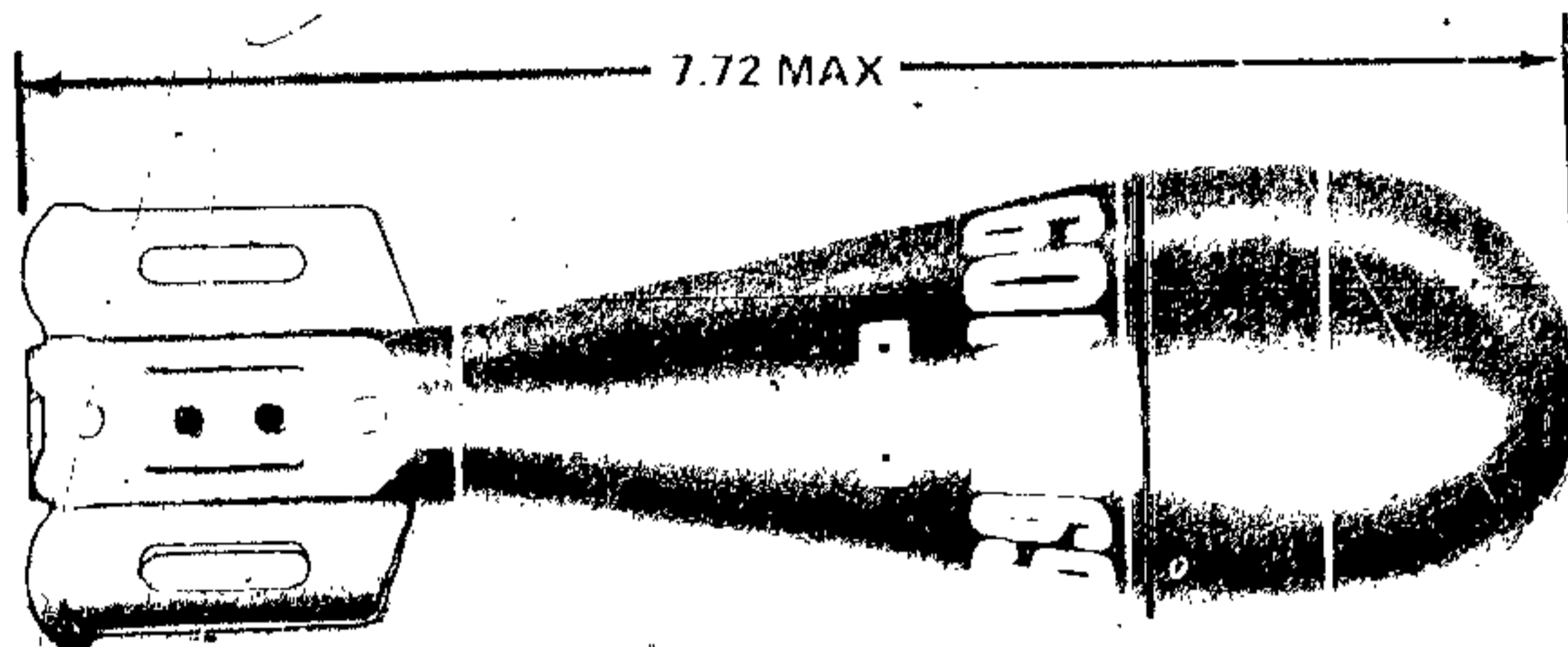
Limitations:

Excessive short rounds may occur when this round is fired at temperatures below 0°F . Maximum allowable rate of fire: 30 rounds-per-minute for periods not exceeding 1 minute; 18 rounds-per-minute for periods not exceeding 4 minutes; 8 rounds-per-minute indefinitely.

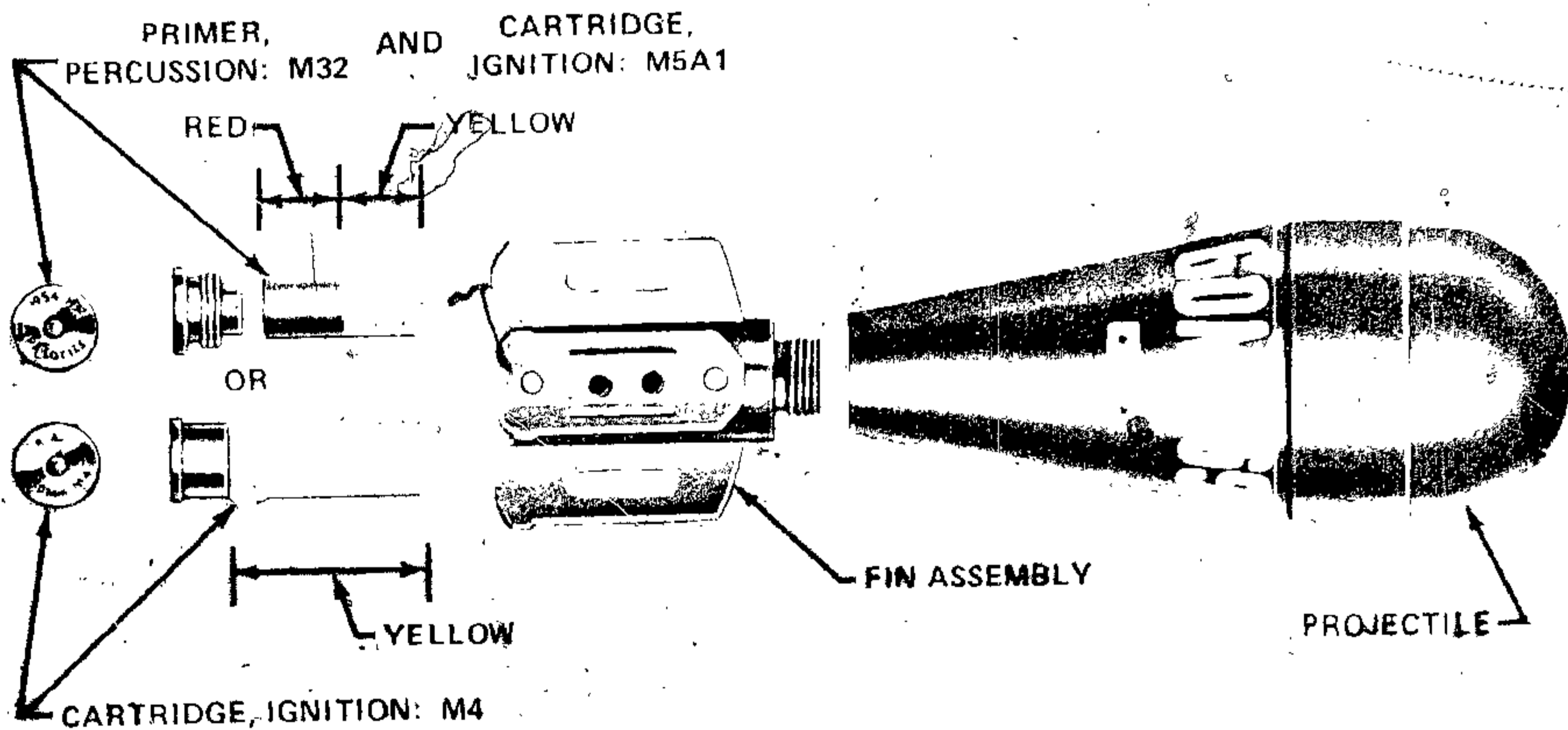
References:

SC 1305/30-1L
 TM 9-3071-1
 TM 9-1015-215-12

CARTRIDGE, 60 MILLIMETER: TRAINING, M69



AR199510



AR199509

Type Classification:

Std OTCM 37119, dtd 1959.

Use:

This cartridge is used for training in the loading and firing of 60mm Mortars M2 and M19.

Description:

Unlike other mortar ammunition, the components of this round are issued separately. This facilitates replacement of damaged, worn, or expended parts. The complete round consists of an inert projectile, a fin assembly, an ignition cartridge, and a percussion primer. The pear-shaped, cast iron projectile has no provision

for a fuze, and is internally threaded at the base to accept the fin assembly.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer of the ignition cartridge strikes the firing pin of the base cap of the mortar. The primer detonds the ignition cartridge. Since this round is fired only at Charge 0, the gases from the ignition cartridge expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. Since the cartridge is inert, there is no detonation upon impact, and the cartridge may be recovered for reuse.

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Tabulated Data:

Complete round:

Type-----Training
Weight assembled-----4.43 lb
Length assembled-----7.72 in.
Projectile:
Body material-----Cast iron
Color:
Old mfg-----Black or blue w/
white markings
New mfg-----Bronze w/white
markings
Filler and weight-----Inert
Components:
Ignition cartridge-----M5A1 or M4 (com-
plete)
Propellant charge-----None
PerCussion primer-----M32
Fin assembly-----M5 (or modified
M2)
Fuze-----None

Temperature Limits:

Firing:

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

Storage:

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

*Packing-----A training kit used
in the field holds
10 training car-
tridges and acces-
sories

*Packing Box:

Weight-----4.65 lb
Dimensions-----21-7/16 x 18-5/16
x 7-27/32 in.
Cube-----1.4 cu ft

*NOTE: See SC for complete packing data includ-
ing NSN's.

Shipping and Storage Data:

Quantity-distance class-----N/A
Storage compatibility group-----N/A
DOT shipping class-----N/A
DOT designation-----AMMUNITION FOR
CANNON WITH
INERT PROJECTILES
DODAC-----1310-8629
Drawing number-----9222994

Ballistics:

Charge-----0
Muzzle velocity-----46.4 mps (152.24 fps)
Maximum range-----193 mtr. (211.14 yd)

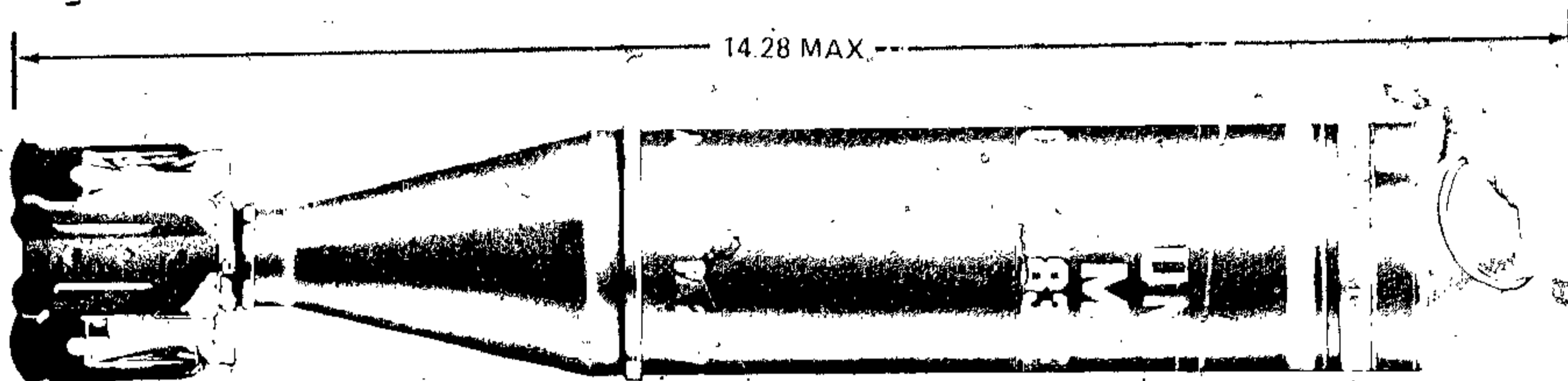
Limitations:

This round is to be fired at Charge 0 only.

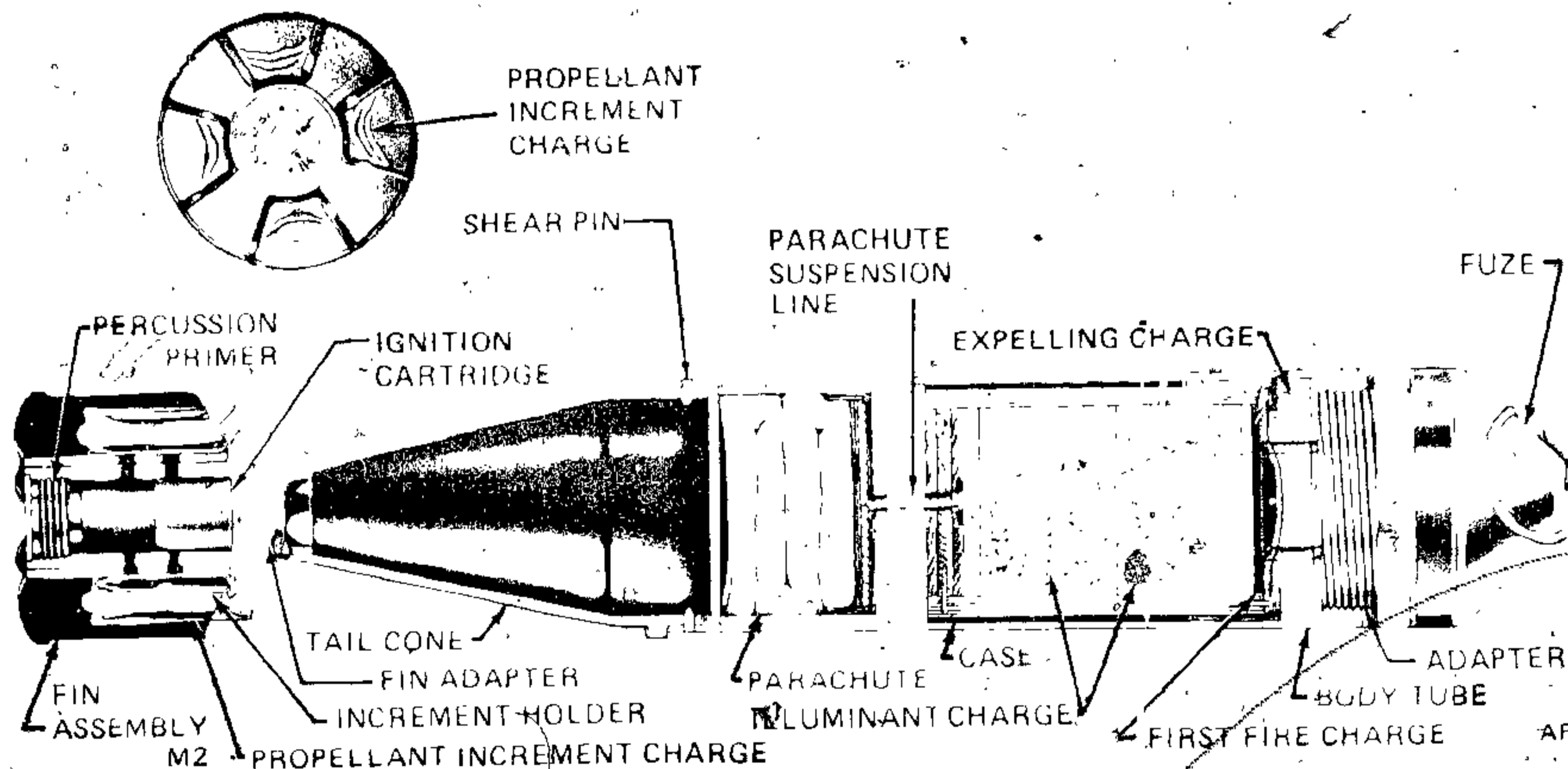
References:

SC 1305/30-1L
TM 9-3071-1
TM 9-1015-215-12

CARTRIDGE, 60 MILLIMETER: ILLUMINATING, M83A3, M83A2, AND M83A1



AR199508



AR199507

Type Classification:

M83A3: Std AMCIC 8346, dtd 1971.
 M83A2&A1: C&T OTCM 37119, dtd 1959.

Use:

This cartridge provides illumination for observation during night missions.

Description:

The complete round consists of a body tube, a tail cone assembly, an illuminant charge, a parachute assembly, a time fuze, a fin assembly with four increments of propellant charge, an ignition cartridge, and a percussion primer.

The nose of the thin-walled steel body tube is fitted with a steel adapter, which is internally threaded to accept the fuze. The fuze is fitted with an internally threaded adapter to accept the fin assembly, and is attached to the body tube with four equally spaced shear pins. The illuminant assembly, which consists of a first-fire charge and an illuminant charge, is contained in a boxboard casing which is attached to the parachute with a suspension line. An expelling charge directly below the fuze ejects the illuminant and parachute assembly.

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 flash from the primer ignites the ignition cartridge. The cartridge ignites the propellant charge, and the gases from the propellant charge expel the projectile from the mortar tube and propel it to the desired height. The projectile is fin-stabilized in flight. The time fuze functions approximately 15 seconds after firing, detonating the expelling charge and igniting the first-fire charge through a length of quickmatch. The expelling charge separates the cone from the tube allowing the parachute and illuminant assembly to fall free. The first-fire charge ignites the illuminant charge, and the parachute deploys to support the burning charge.

Tabulated Data:

NSN
 Complete round:
 Type ----- Illuminating
 Weight w/ fuze ----- 4.15 lb
 Length w/ fuze ----- 14.28 in.
 Projectile:
 Body material ----- Steel tubing
 Color ----- White w/black marking
 Filler and weight ----- Illuminant, 0.49 lb
 Illuminant charge:
 M83A3 M83A2 M83A1
 Burn time ----- 32 sec 32 sec 25 sec
 Candlepower ----- 250,000 250,000 145,000

Components:
 Ignition cartridge ----- M5A2
 Propelling charge:
 M83A3 ----- M182
 M83A2 & M83A1 ----- M3A1
 Percussion primer ----- M32
 Fin assembly ----- M2
 Fuze ----- Time, M65A1

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°F)
 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; multiple packing of fiber/metal containers in wooden box

*Packing Box:
 Weight ----- 57 lb
 Dimensions ----- 18-15/16 x 10-3/4 x 11-27/32 in.
 Cube ----- 1.4 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- (08) 1.2
 Storage compatibility group ----- G
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES
 DODAC ----- 1310-8627
 Drawing number ----- M83A3, 9207516
 M83A2, 75-1-143

Ballistics:

Charge	Muzzle Velocity (fps)	Horizontal Range (yd)	Horizontal Range (mtr)	Height of Burst (yd)	Height of Burst (mtr)	Elevation (deg/min)
2*	312	475	434	170	155	68/00
2	312	500	457	157	144	66/45
2	312	525	480	145	133	65/30
3	374	875	800	152	139	51/45
4	434	1100	1006	175	160	45/15

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

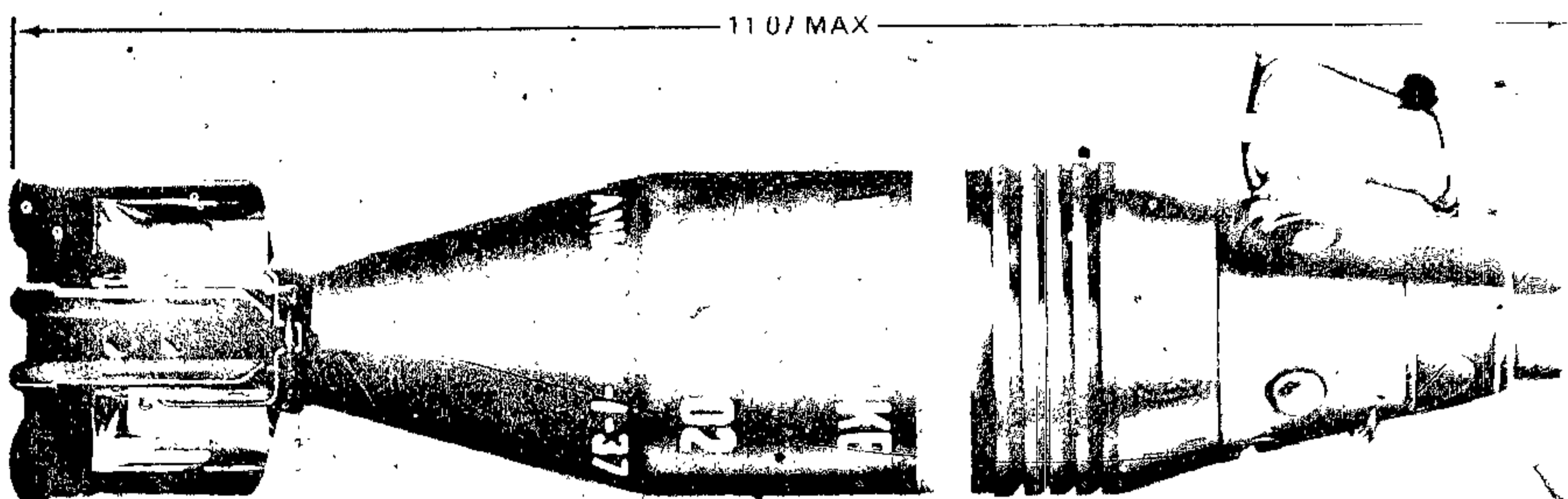
Limitations:

Firing this cartridge below Charge 2 will result in duds.

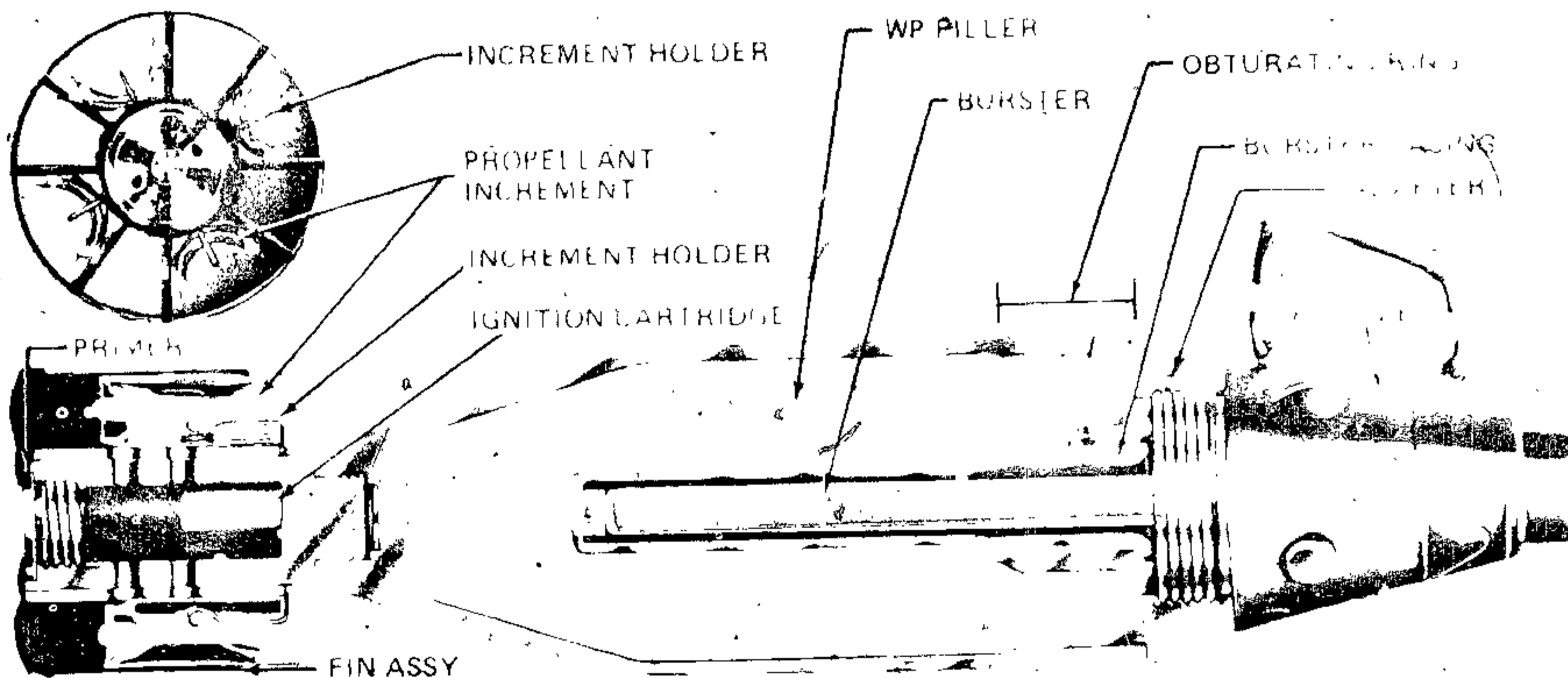
References:

DARCOM-P 700-3-3
 SC 1305/30-IL
 TM 9-1015-215-12
 TM 9-3071-1

CARTRIDGE, 60 MILLIMETER: SMOKE, WP, M302



AR199506



AR199505

Type Classification:

C&T OTCM 37119, dtd 1959.

Use:

This smoke cartridge is fired in 60mm Mortars M2 or M19 and is used for screening and spotting.

Description:

The complete round consists of a projectile with a PL Fuze, a fin assembly, four propellant increments, an ignition cartridge, and a percussion primer. The projectile body is of relatively thin-walled steel construction with cylindrical side walls, a conical base, and is filled with a charge of white phosphorous. The projectile base is internally threaded to accept

the fin assembly. The projectile is fitted with a steel adapter, threaded into the fuze and designed to hold the base of the burster assembly. One of two burster assemblies is used, differing only in the construction of the steel burster. Both carry the same designation. The burster consists of tetryl pellets under pressure, and the burster casing is press fitted into the adapter in the projectile nose.

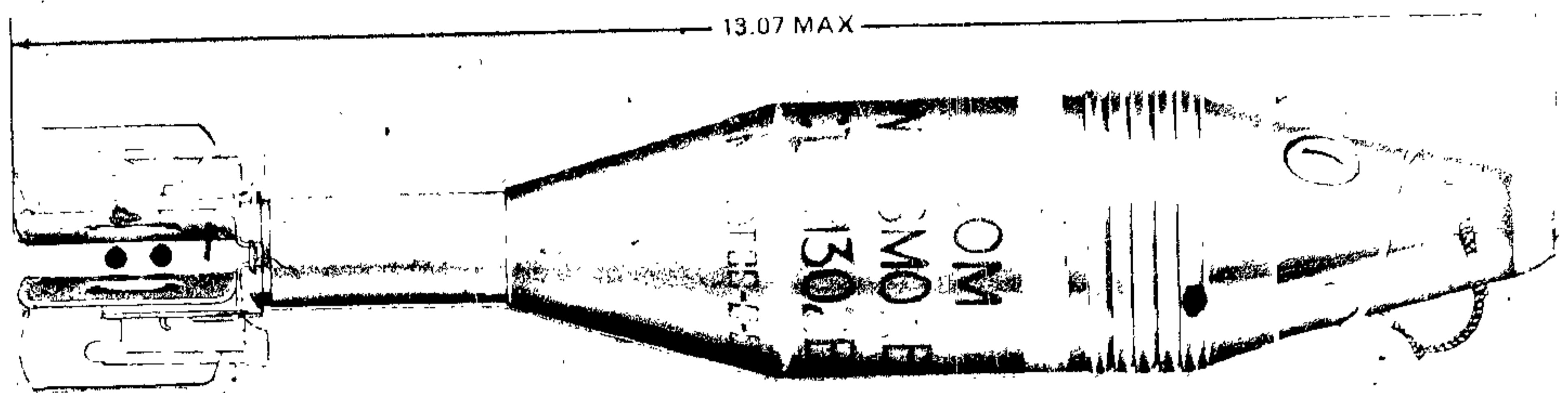
Functioning:

When the cartridge is loaded, it is fired into the mortar tube until the percussion primer strikes the base of the mortar. The primer ignites the ignition cartridge. The ignition cartridge ignites the propellant

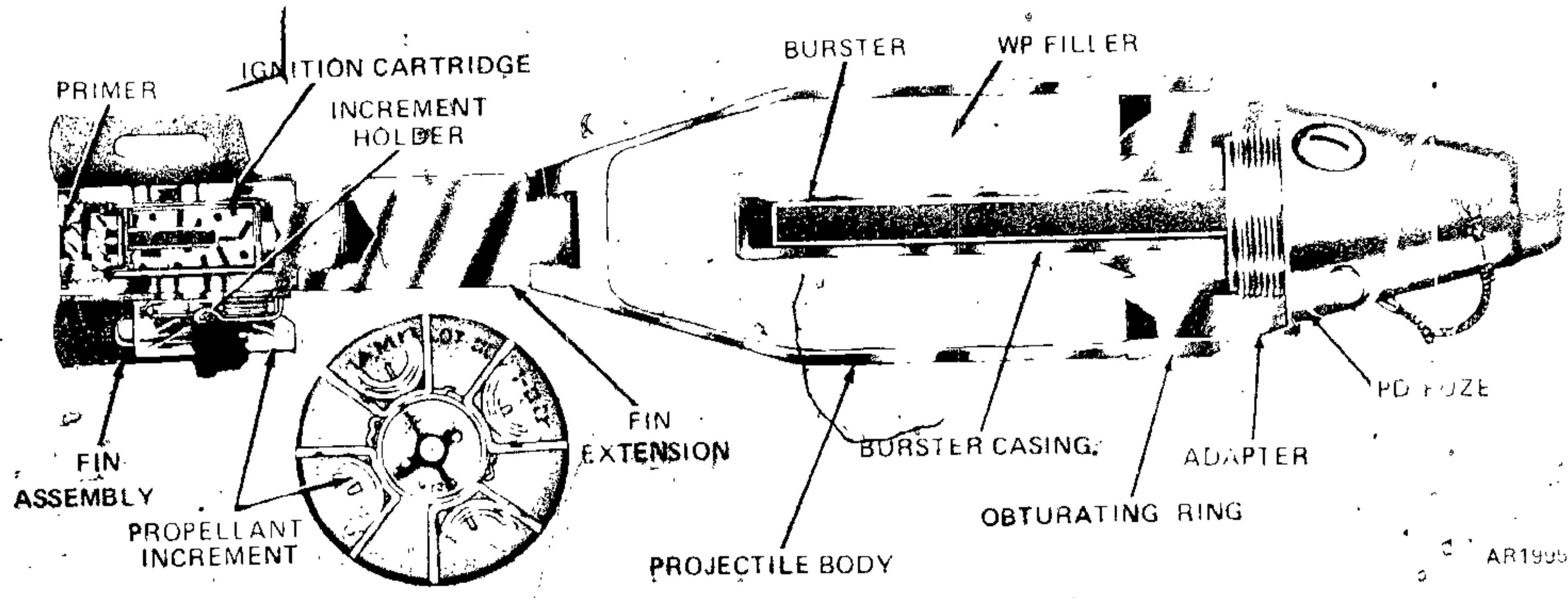
Change

TM 43-000

CARTRIDGE, 60 MILLIMETER: SMOKE, WP; M302A1 (M302E1)



AR199504



AR1995

Type Classification:

C&T OTCM 37119, dtd 1959.

Use:

This smoke cartridge is fired in 60mm Mortars M2 or M19 and is used for screening and spotting.

Description:

The complete round consists of a projectile body with a PD fuze, a fin assembly and a 2-inch extension, four increments of propellant charge, an ignition cartridge, and a percussion primer. The projectile body is a relatively thin-walled steel cylinder with a conical base, and is filled with a charge of white phosphorous. The base is internally threaded to accept the fin assembly. The projectile nose is fitted with a steel adapter, internally threaded to accept the fuze, and designed to hold the sleeve of the

burst assembly. One of two types of burster assemblies is used, differing only in the construction of the steel burster casing. Both carry the same designation. The burster charge consists of tetryl pellets under pressure, and the burster casing is press-fitted into the adapter in the projectile nose.

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 of the mortar. The flash from the primer ignites the ignition cartridge. The ignition cartridge ignites the propellant charge, and the gases from the propellant charge expel the projectile from the mortar tube and propel it to the target. The burster functions on impact, detonating the burster charge, which ruptures the projectile and disperses the white phosphorous filler. The white

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phosphorous ignites on contact with air, producing a cloud of dense white smoke.

Tabulated Data:

Complete round:
Type-----Smoke (WP)
Weight w/ fuze-----4.10 lb
Length w/ fuze-----13.07 in.

Projectile:
Body material-----Forged steel
Color-----Light green w/yel-
low band and
light red mark-
ings
Filler and weight-----WP, 0.75 lb
Burster charge-----Tetryl, 0.38 oz

Components:
Ignition cartridge-----M5A2
Propellant charge-----M181
Percussion primer-----M32
Projectile burster-----M19
Fin assembly-----M2 plus extension
Fuze-----PD, M527B1

Temperature Limits:

*Firing:
Lower limit----- -40°F (-40°C)
Upper limit----- $+125^{\circ}\text{F}$ ($+52.0^{\circ}\text{C}$)

Storage:
Lower limit----- -80°F (for peri-
od not more than
3 days) (-62.2°C)
Upper limit----- $+160^{\circ}\text{F}$ (for peri-
od not more than
4 hr/day)
($+71.1^{\circ}\text{C}$)

*Packing -----One round in fiber
container; nine
containers in
wooden box

*Packing Box:
Weight-----56.6 lb
Dimensions----- $17\text{-}3/4 \times 10\text{-}7/8 \times$
 $11\text{-}27/32$ in.
Cube-----1.3 cu ft

*NOTE: See SC for complete packing data includ-
ing NSN's.

Shipping and Storage Data:

Quantity-distance class----- (12) 1.2
Storage compatibility group-----H
DOT shipping class-----A
DOT designation-----AMMUNITION FOR
CANNON WITH
SMOKE PROJEC-
TILES.

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DODAC-----1310-8630
Drawing number-----9215575

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range	
		(mtr)	(yd)
0*	156	195	213
1	244	488	535
2	316	839	916
3	380	1164	1272
4	439	1448	1582

*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 4 is the ignition cartridge and four increment charges.

Limitations:

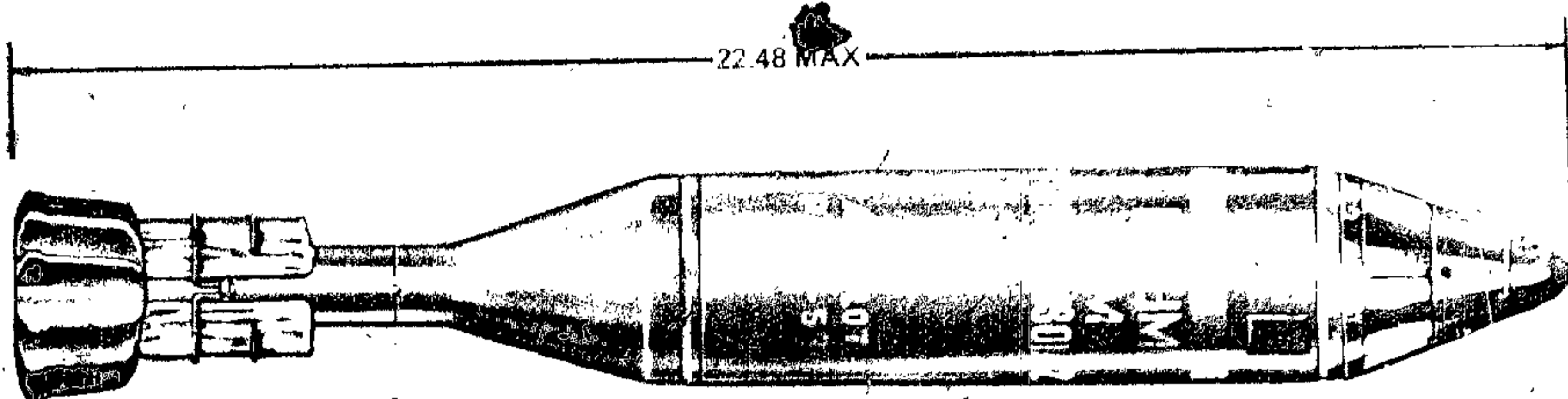
Excessive short rounds may occur when this round is fired at temperatures below 0°F . Maximum allowable rate of fire: 30 rounds-per-minute for periods not exceeding 1 minute, 18 rounds-per-minute for periods not exceeding 4 minutes; 8 rounds-per-minute indefinitely.

Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

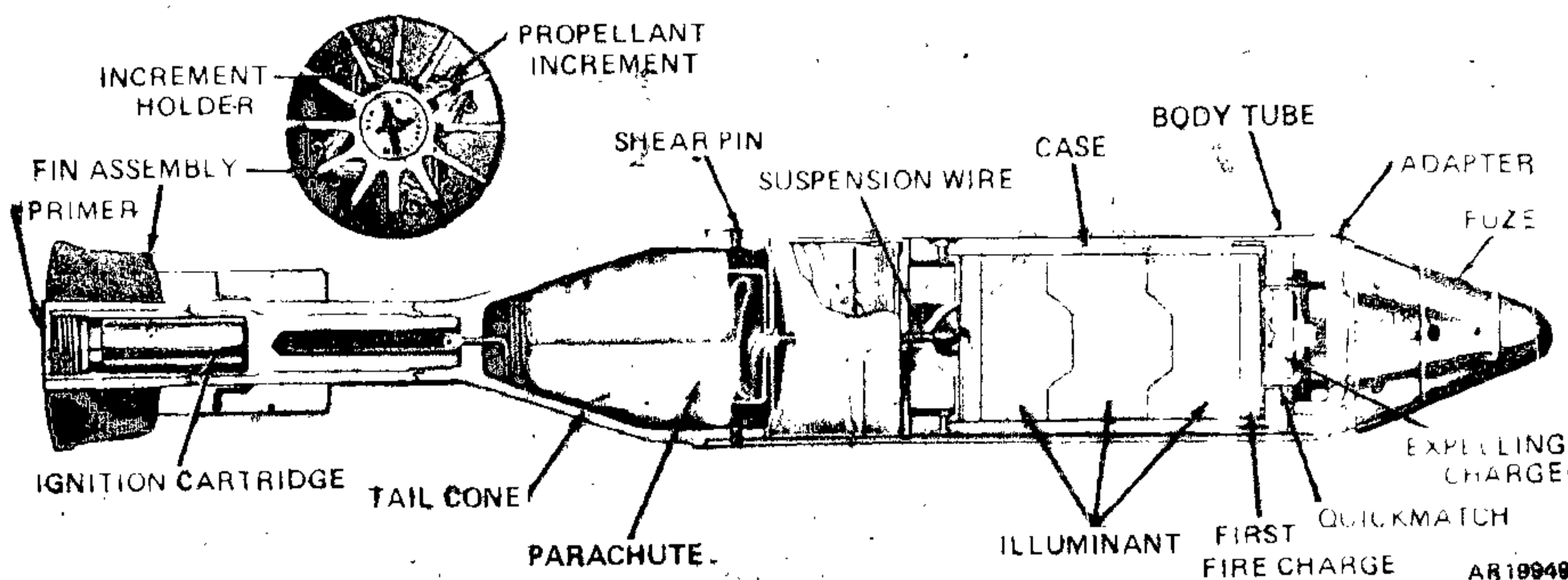
References:

DARCOM-P 700-3-3
TM 9-1015-215-12
TM 9-3071-1
SB 700-20
SC 1305/301L

CARTRIDGE, 81 MILLIMETER: ILLUMINATING, M301A2 AND M301A1



AR199494



AR199493

Type Classification:

CONT MSR 11756003.

Use:

This cartridge 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 fin 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 of the ignition cartridge strikes the base of the base cap of the mortar. The primer ignites the propellant charge, and the propellant rapidly expands from the burning propellant expelling the projectile from the tube and propel it to the desired height. The projectile is fin-stabilized.

Charge

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

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 SC for complete packing data including MSN's.

Shipping and Storage Data:

Quantity-distance class----- (08) 1.2
 Storage compatibility group-----G
 DOT shipping class-----A
 DOT designation-----AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES
 DODAC-----1315-0226
 Drawing number-----8865058

Ballistics:

Charge	Muzzle Velocity (fps)	Range to burst	
		(mtr)	(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.

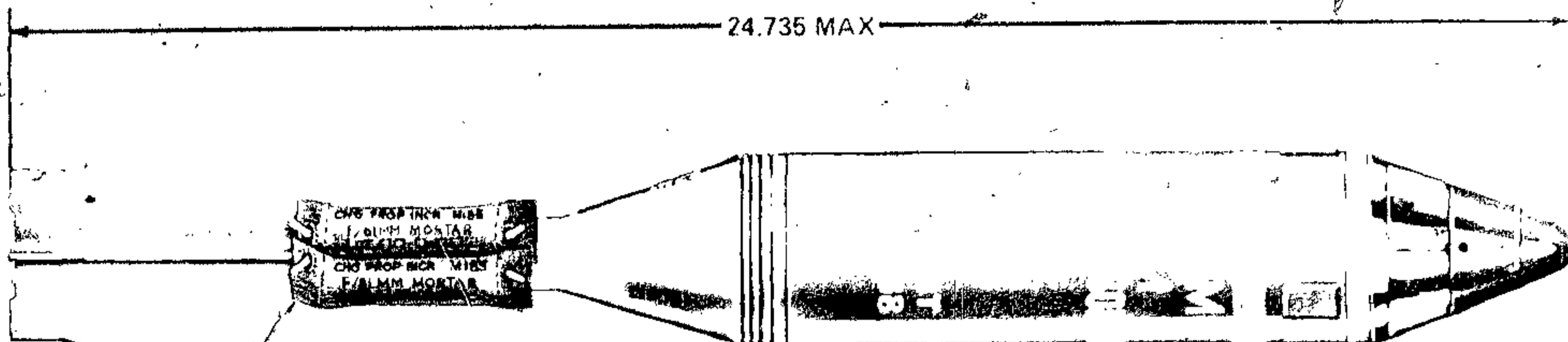
Limitations:

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

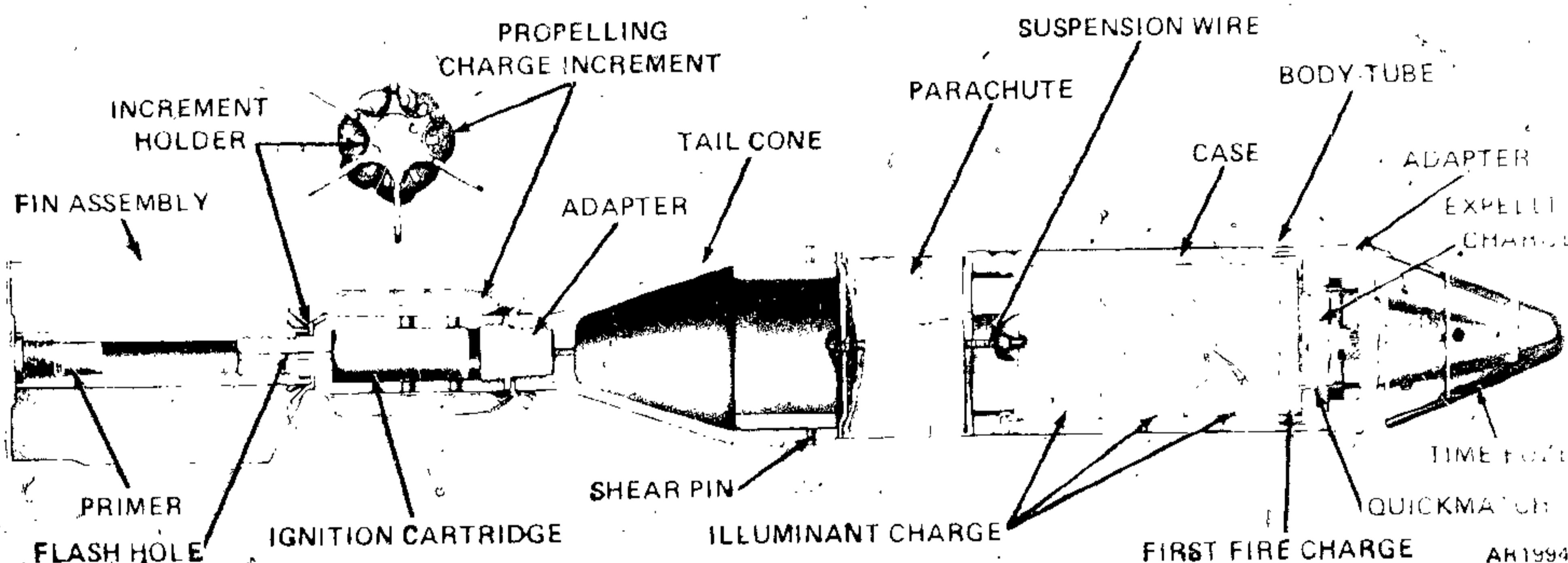
References:

DARCOM-P 700-3-3
 SB 700-20
 SC 1305/30-1L
 TM 9-1015-200-12
 TM 9-1300-251-20
 TM 9-3071-1

CARTRIDGE, 81 MILLIMETER: ILLUMINATING, M301A3



AR19942



Type Classification:

Std AMCTG 6390, dtd 1968.

Use:

This cartridge 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 a cartridge housing and propellant increment charges, and an ignition cartridge with percussion primer. The nose of the thin-walled steel

tubing body is fitted with a steel adapter and is internally threaded to accept the fuze. The tail cone may be internally or externally threaded, depending upon the model. Models that are internally threaded require an adapter for attaching the fin assembly. The tail cone is attached to the body 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 hub of the fin assembly strikes the firing pin in the base cap of the mortar. The

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Burning primer flashes through the central flash hole in the cartridge housing, igniting the ignition cartridge. The cartridge ignites the propellant charge, and rapidly expanding gases from the burning propellant expel the projectile from the tube and propel it to the desired height. The projectile's 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 also separates the core from the tube allowing the illuminant candle and parachute assembly to fall free. The first-fire charge ignites the illuminant, and the parachute deploys to support the candle. Burning time is at least 60 seconds with a minimum of 500,000 candlepower.

Difference between Models:

Fin assembly attaches with or without adapter, depending upon design of the tail cone.

Tabulated Data:

Complete round:

Type ----- Illuminating
Weight ----- 10.1 lb
Length ----- 24.735 in.
Cannon used with ----- M1, M29, M29A1

Projectile:

Body material ----- Steel tube
Color ----- White w/black markings
Filler and weight ----- Illuminating, 1.37 lb

Components:

Ignition cartridge ----- M66E1
Propellant charge ----- M185
Percussion primer ----- M71A2
Fin assembly ----- M158
Fuze ----- Time, M84A1

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 SC for complete packing data including NSN's.

Shipping and Storage Data:

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 ----- 9220705

Ballistics:

Charge	Fuze Setting (sec)	Horizontal Range (mtr)	Height of burst (mtr)	Elevation (mil)
3*	20.6	250	600	1501.1
3	19.93	250	600	1501.1
3	15.9	1050	600	1042.1
4	19.8	1550	600	1004.3
5	22.1	2050	600	942.6
6	26.1	2450	600	967.4
7	27.6	2950	600	904.7
8	29.8	3150	600	883.9

*Charge 3 is the ignition cartridge and three increment charges; Charge 8 is the ignition cartridge and eight increment charges.

Limitations:

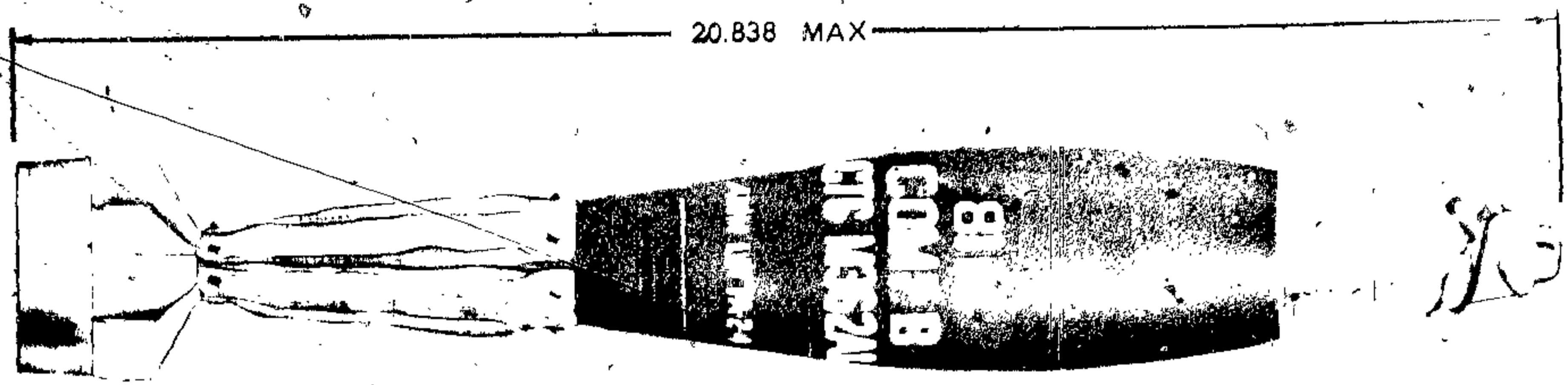
Firing with less than three propellant increment charges (Charge 3) is not authorized. Exposure of the propelling charge to moisture can produce short rounds.

References:

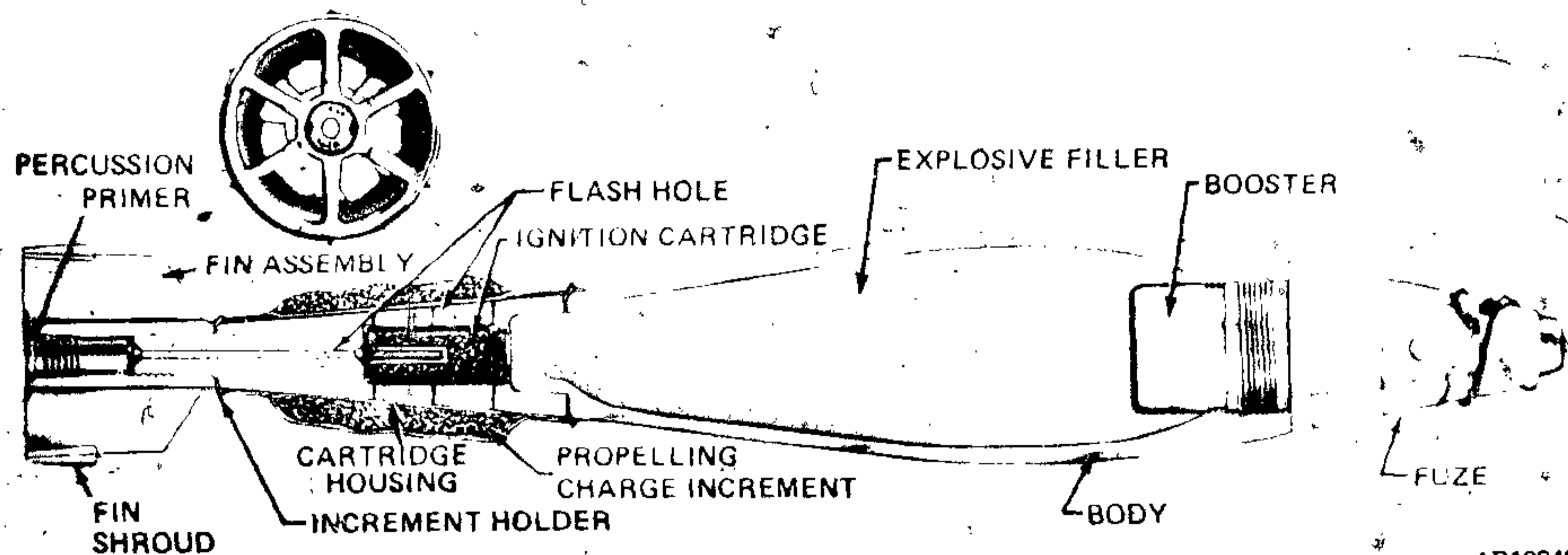
- DARCOM-P 700-3-3
- SB 700-20
- SC 1305/30-1L
- TM 9-1015-200-12
- TM 9-1300-251-20
- TM 9-7031-1

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CARTRIDGE, 81 MILLIMETER: HE, M362A1 AND M362



AR199490



AR199489

Type Classification:

M362A1: Std AMCTC 1770, dtd 1964.
M362: CON 11756003.

Use:

This cartridge is used against personnel and materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body, a point-detonating or a proximity fuze, a fin assembly that includes a cartridge housing and propellant increment charges, an ignition charge, and a percussion primer. The projectile body is of pearlitic malleable iron (PMI), and

is threaded internally at the nose to accept the fuze and externally at the base to accept the fin assembly. The projectile body is filled with Composition B high explosive.

Functioning:

When the cartridge is loaded, it slides in the mortar tube until the percussion primer of the hub of the fin assembly strikes the firing pin in the base cap of the mortar. The primer flashes through the central flash hole in the cartridge housing, igniting the propellant cartridge. The cartridge initiates the propellant charge. Rapidly expanding gases from the propellant expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. For point-detonating fuze detonates the fuze booster charge and

change

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turn, the high explosive charge. Depending upon the type of fuze used, the projectile bursts over or on the target, producing near optimum fragmentation and blast effect.

Difference Between Models:

The projectile body of the M362 is of forged steel.

Tabulated Data:

Complete round:

Type-----HE
Weight, w/fuze-----9.42 lb
Length, w/fuze-----20.838 in. (max)
Cannon used with-----M1, M29, M29A1

Projectile:

Body material-----M362A1, cast PMI
M362, forged steel
Color-----Olive drab w/yel-
low markings
Filler and weight-----Comp B, 2.10 lb

Components:

Ignition cartridge-----M66
Propellant charge-----M5
Percussion primer-----M71, M71E1
Fin assembly-----M141
Fuze-----PD, M524 series
PD, M526 series
PD, M716
PRX, M532

Temperature Limits:

Firing:

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

Storage:

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

*Packing:

One round in fiber
container, three
containers in
wooden box

*Packing Box:

Weight-----51.0 lb
Dimensions-----25-11/16 x 13-9/16
x 6-11/32 in.
Cube-----1.4 cu ft

*NOTE: See SC for complete packing data includ-
ing NSN's.

Shipping and Storage Data:

Quantity-distance class----- (08) 1.2
Storage compatibility group-----E
DOT shipping class-----A
DOT designation-----AMMUNITION FOR
CANNON WITH
EXPLOSIVE
PROJECTILES
DODAC-----1315-C222
1315-C223
Drawing number-----M362A1, 8838144
M362, 7549034

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range	
		(mtr)	(yd)
0*	181	297	324
1	298	777	849
2	397	1301	1430
3	480	1791	1951
4	554	2246	2450
5**	620	2657	2910
6	673	3027	3300
7	722	3327	2740
8	775	3618	3940

*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 8 is the ignition cartridge and eight increment charges.
**Charge 5 is the maximum authorized for firing in Mortar M1.

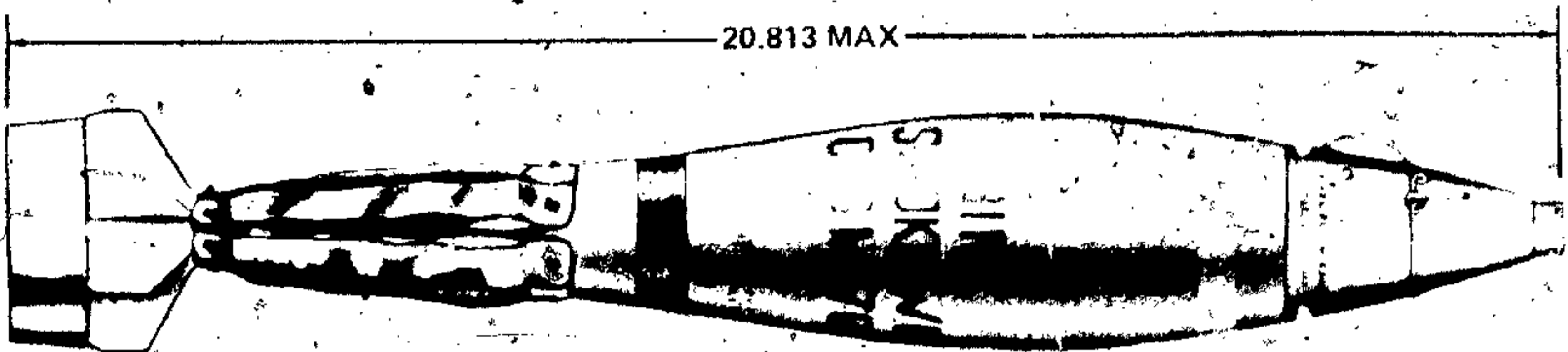
Limitations:

See above chart.

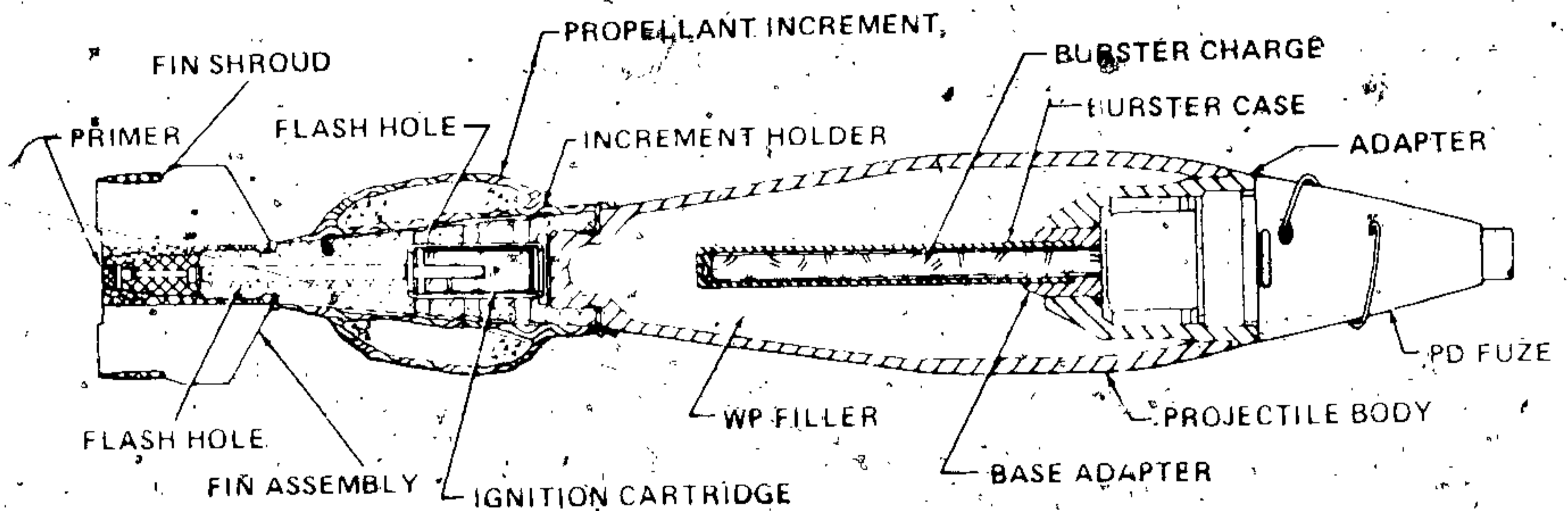
References:

- TM 9-1015-200-12
- FM 9-1300-251-20
- TM 9-7031-1
- SC 1305/30-1L

CARTRIDGE, 81 MILLIMETER SMOKE, WP, M370



AR199488



AR199487

Type Classification:

Std AMCTC 2048, dtd 1964.

Use:

This cartridge is used to produce a smoke screen.

Description:

The complete round consists of a projectile body with a burster assembly; a point-detonating fuze; a fin assembly that includes a cartridge housing, a propellant charge, an ignition charge, and a percussion primer. The projectile body is of relatively thin-walled steel, and is filled

with white phosphorous. The base of the projectile is externally threaded to accept the cartridge housing of the fin assembly. The nose of the projectile is fitted with a steel adapter designed to hold the burster casing, and internally threaded to accept the fuze. The burster casing is a thin-walled steel cylinder press-fitted into the adapter and containing a burster charge of RDX.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the hub of the fin assembly strikes the firing pin in the base cap of the mortar. The burning primer flashes through the central flash

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hole in the cartridge housing, igniting the ignition cartridge. The cartridge ignites the propellant charge. Rapidly expanding gases from the burning propellant expel the projectile from the tube and propel it to the target. The projectile is fin stabilized in flight. The PD fuze functions on impact, detonating the burster charge which ruptures the projectile and disperses the white phosphorous filler. WP ignites spontaneously on contact with the air producing dense white smoke.

Calculated Data:

Complete round:

Type ----- SMOKE (WP)
Weight ----- 9.34 lb
Length ----- 20.813 in.
Cannon used with ----- M1, M29, M29A1
Projectile
Body material ----- Steel
Color
Old ----- Grey w/yellow
band and yellow
markings
New ----- Light green w/yel-
low band and
light red mark-
ings
Filler and weight ----- WP, 1.60 lb
Bursting charge ----- RDX, 0.025 lb
Components:
Booster assembly ----- M47
Ignition cartridge ----- M66
Propellant charge ----- M5
Percussion primer ----- M71E1
Fin assembly ----- M141
Fuze ----- PD, M524A4
PD, M526 series

Temperature Limits:

Firings

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

Storage

Lower limit ----- -80°F (for peri-
od not more than
3 days) (-62.2°C)
Upper limit ----- +100°F (for peri-
od not more than
4 hr/day)
(+71.1°C)

Tracking

----- One round in fiber
container; three
fiber containers
in wooden box

Packing Box:

Weight ----- 51.0 lb
Dimensions ----- 25-11/16" x 13-9/16"
x 6-11/32" in.
Cube ----- 1.4 cu ft

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*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- (12)-1.2
Storage compatibility group ----- H
DOT shipping class ----- A
DOT designation ----- AMMUNITION FOR
CANNON WITH
SMOKE PROJECTILES
DODAC ----- 1315-C234
Drawing number ----- 8848900

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range	
		(mtr)	(yd)
0*		274	300
1		640	700
2		1188	1300
3		1691	1850
4		2148	2350
5**		2661	2920
6		2926	3200
7		3292	3600
8		3646	3987

*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 8 is the ignition cartridge and eight increment charges.

**Charge 5 is the maximum authorized for firing in Mortar M1.

Limitations:

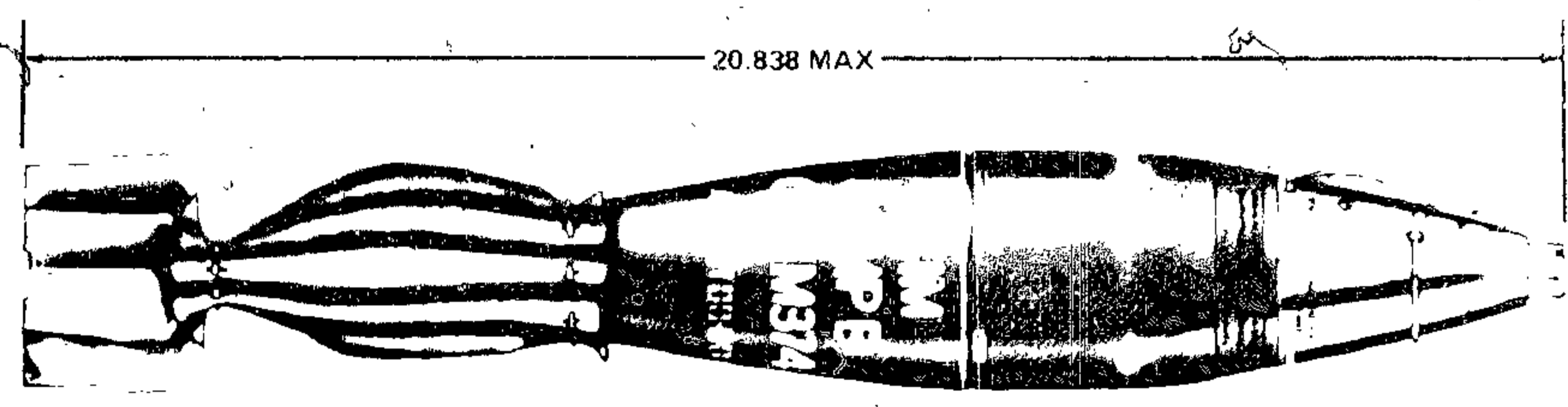
Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

References:

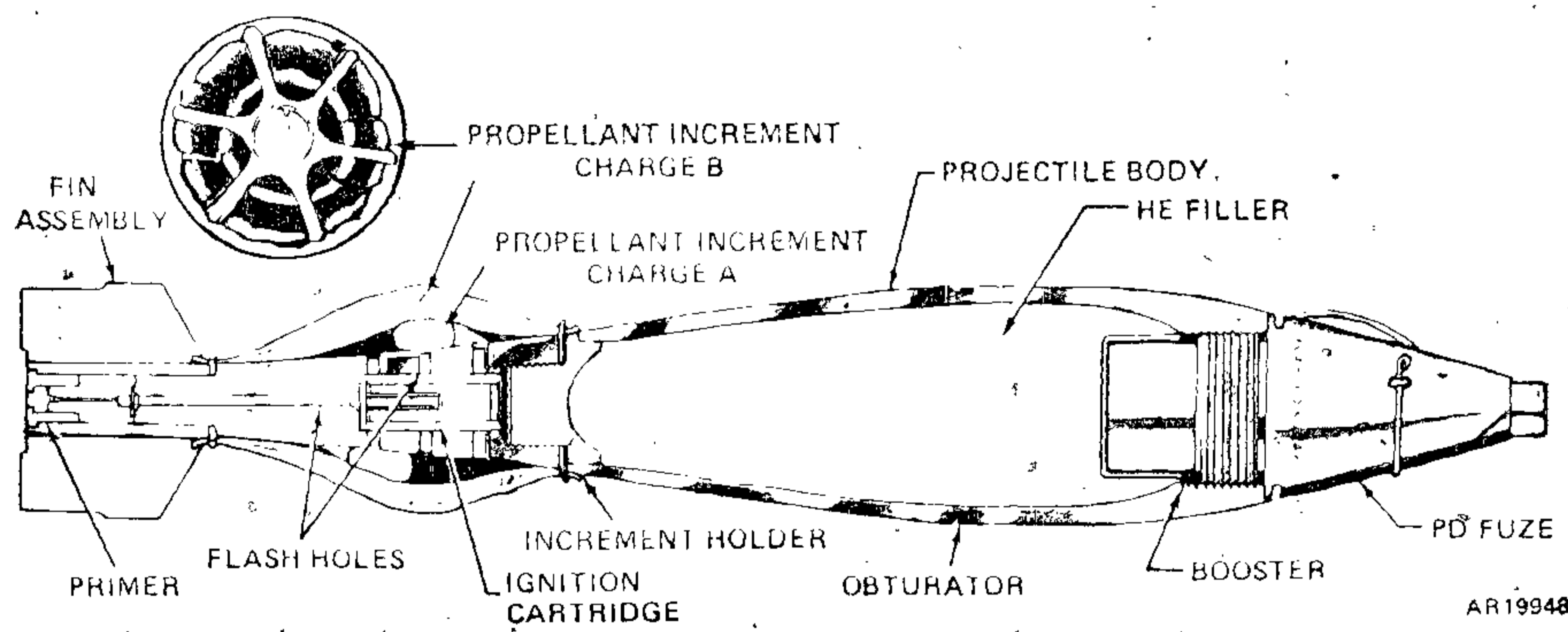
DARCOM-P 700-3-3
TM 9-1015-215-12
TM 9-3071-1
SB 700-20
SC 1305/30-IL

TM 43 0001-28

CARTRIDGE, 81 MILLIMETER: HE M374A2 AND M374



AR199486



AR199485

Type Classification:

Std Lcc-8, dtd 1975 (M374A2).
CON 11756003 (M374).

Use:

This cartridge is used against personnel and materiel, producing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body, a point-detonating or proximity fuze, a fin assembly that includes a cartridge housing, a propellant charge with two types of increment charges, an ignition charge, and a percussion primer. The projectile body is threaded internally at the nose to accept the fuze and

externally at the base to accept the fin assembly. The projectile is filled with Composition E high explosive. The fins are canted 5° to produce spin.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussive primer in the hub of the fin assembly strikes the firing pin in the base cap of the mortar. The firing primer flashes through the central hole in the cartridge housing to ignite the ignition cartridge. The cartridge ignites the propellant charge, and rapidly expanding gases from the burning propellant expel the projectile from the tube and propel it to the target. The projectile is fin-stabilized in flight. Functioning of the fuze detonates the fuze booster charge and, in turn, the high explosive charge. Depending on

TM 43-0001-28

the type of fuze used, the projectile bursts either over or on the target producing near optimum fragmentation and blast effect.

Differences Among Models:

The projectile body may be of forged steel or pearlitic malleable iron (PMI). Early production used the M66 ignition cartridge with the M149 fin assembly, while later series used the M285 cartridge and M170 fin assembly. Model M374A2 is a modification of M374 to include moisture-proof ignition system, moisture-resistant propelling charges, and improved protective packaging.

Tabulated Data:

Complete round:

Type-----HE
 Weight-----9.34 lb
 Length-----20.838 in.
 Cannon used with-----M1, M29, M29A1

Projectile:

Body material-----Forged steel, or cast PMI
 Color-----Olive drab w/yellow markings
 Filler and weight-----Comp B, 2.10 lb

Components

Ignition cartridge-----M66A1 with fin assembly M149
 M285 with fin assembly M170
 Propellant charge-----M90 (A and B) M374
 M90A1 (A and B)
 M374A2

Percussion primer-----M71A2

Fin assembly-----M149 with ignition cartridge M66A1
 M170 with ignition cartridge M285

Fuze-----PD, M524 series
 PD, M526 series
 PD, M567
 PD, M716
 Prox, M532

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 per fiber container in jungle wrap, one round per plastic container in barrier bag; three containers per wooden box

Packing Box:

Weight-----51.0 lb
 Dimensions-----26-3/16 x 13-15/16 x 6-25/32 in.
 Cube-----1.4 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class----- (08) 1.2
 Storage compatibility group-----E
 DOT shipping class-----A
 DOT designation-----AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
 DODAC-----1315-G236, 1315-C256
 Drawing number:
 With fuze-----8881026
 Without fuze-----9225283

Ballistics:

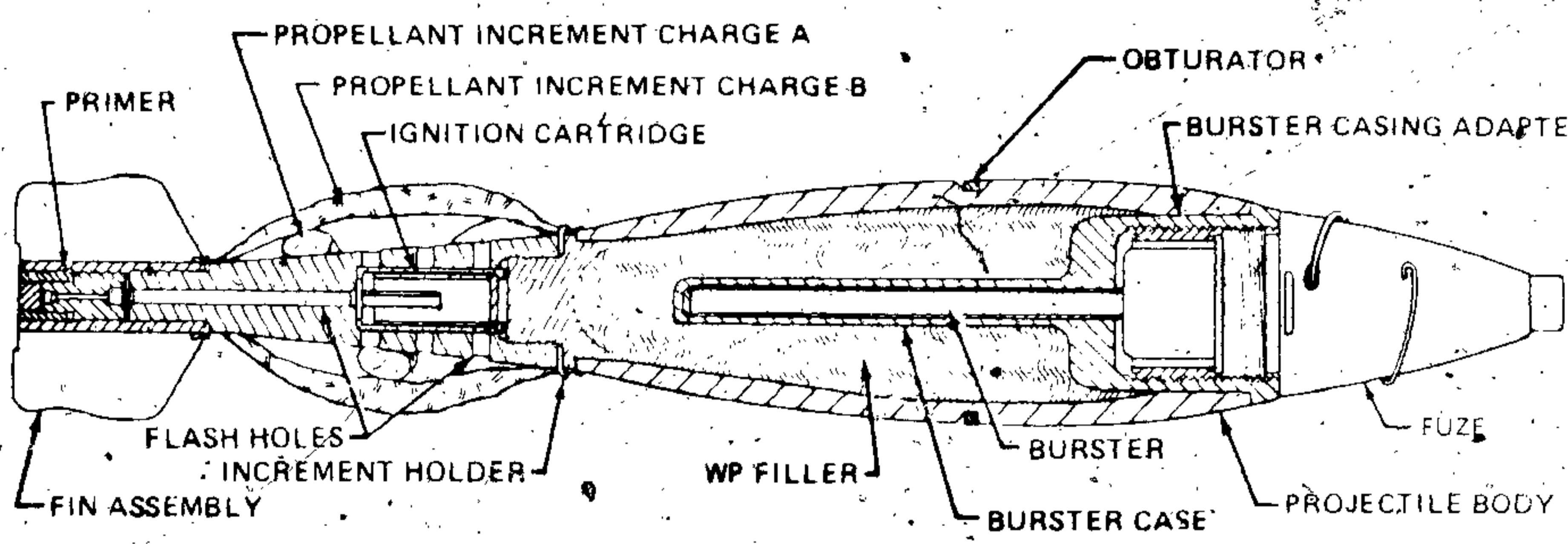
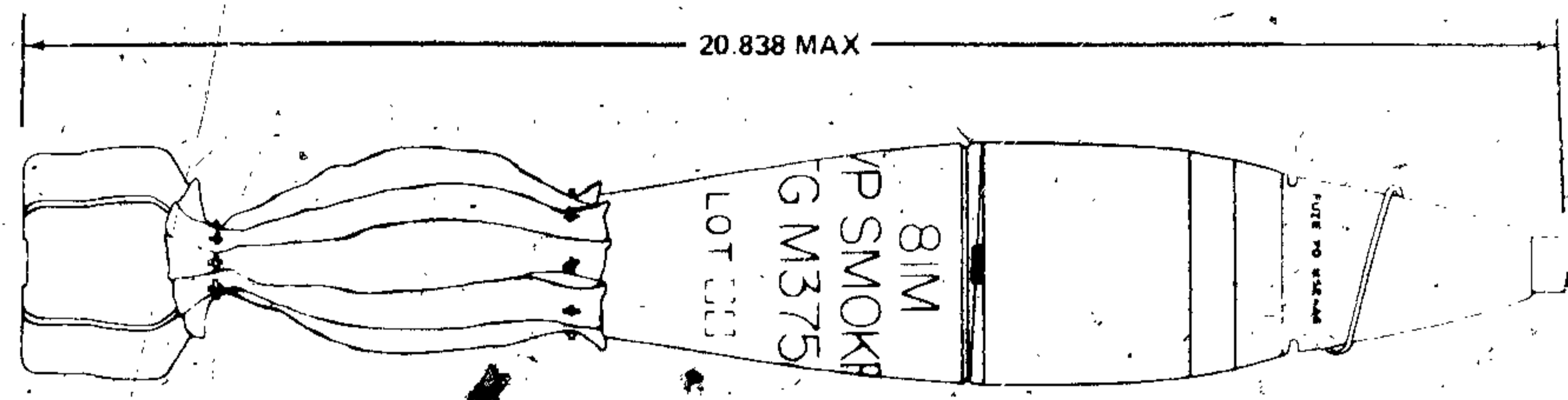
Charge	Muzzle Velocity (fps)	Maximum Range	
		(mtr)	(yd)
0*	210	403	442
1	341	1001	1095
2	433	1529	1674
3	505	1988	2175
4	577	2475	2710
5**	656	2955	3237
6	709	3416	3740
7	764	3831	4190
8	814	4197	4598
9	856	4500	4932

*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 9 is the ignition cartridge and nine increment charges. (NOTE: Increment A is used as Charge 1 and will be one of the increments assembled when firing above Charge 1.)

**Charge 5 is the maximum authorized for firing in Mortar M1.

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CARTRIDGE, 81 MILLIMETER: SMOKE, WP, M375A2 AND M375A1



Type Classification:

Std AMCTCM 7321, dtd 1969.

Use:

This cartridge is used to produce a screening smoke and as an incendiary device against personnel and materiel.

Description:

The complete round consists of a projectile body with burster assembly, a PD or proximity fuze, a fin assembly that includes a cartridge housing, a propellant charge including two types of increment charges, an ignition cartridge, and a percussion primer. The base of the projectile is externally threaded to accept the fin assembly. The projectile nose is fitted with an internally threaded adapter designed to

receive the fuze and hold the burster assembly. The burster assembly consists of a burster casing containing a small RDX burster charge. The burster casing is press-fitted into the adapter in the nose. The projectile is loaded with a white phosphorous filler. The fins are canted at 5 degrees at the rear to spin-stabilize the projectile in flight.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the hub of the fin assembly strikes the firing pin in the base cap of the mortar. The burning primer flashes through the central hole in the cartridge housing, igniting the ignition cartridge. The cartridge ignites the propellant charge. The propellant gases expel the projectile from the mortar tube and propel it to the target. The projectile is fin-



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stabilized in flight. Functioning of the fuze
actuates the burster charge, which ruptures
the projectile, dispersing the white phosphor-
ous. The white phosphorous ignites on contact
with the air, producing a cloud of dense white
smoke with some incendiary effect.

Difference Between Models:

Models are identical except that the fin
assembly with M375A2 is M170, while M375A1 uses
M149 fin assembly. Also, M375A2 has a moisture-
proof ignition system and propelling charge.

Tabulated Data:

Complete round:

Type	Smoke, WP
Weight	9.34 lb
Length	20.838 in.
Cannon used with	M1, M29, & M29A1
<u>Projectile</u>	
Body material	Forged steel, or cast pearlitic malleable iron
Color	Light green w/yel- low band and light red mark- ings
Filler and weight	WP, 1.60 lb
Fuze	PD, M524 series, PD, M526 series, PD, M567, PD, M716, or Prox., M532
Fin assembly	M170 (M375A2) M149 (M375A1)
<u>Propelling charge:</u>	
Propellant	M90A1 (A & B)
Ignition cartridge	M285 (M375A2) M66A1 (M375A1)
Primer	Percussion, M71A1 or M71A2

Performance:

Charge	Muzzle Velocity (fps)	Maximum Range	
		(mtr)	(yd)
(0) Ignition cartridge only	210	403	422
(1) Ignition cartridge and 1 increment charge	341	1,001	1,095
(2) Ignition cartridge and 2 increment charges	433	1,529	1,674
(3) Ignition cartridge and 3 increment charges	505	1,988	2,175
(4) Ignition cartridge and 4 increment charges	577	2,475	2,710
(5) Ignition cartridge and 5 increment charges	656	2,995	3,237

(6) Ignition cartridge and 6 increment charges	709	3,416	3,740
(7) Ignition cartridge and 7 increment charges	764	3,831	4,190
(8) Ignition cartridge and 8 increment charges	814	4,197	4,598
(9) Ignition cartridge and 9 increment charges	856	4,500	4,932

Maximum range-----4,932 yd
(4508.27 mtr)
Muzzle velocity-----856 fps (260.9 mps)

Temperature Limits:

Firing:

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

Storage:

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

*Packing

One round per
fiber container
in jungle wrap,
or one round per
plastic container
in barrier bags;
three containers
in wooden box

*Packing Box:

Weight-----51.0 lb
Dimensions-----26-13/16 x 13-
15/16 x 6-25/32
in.
Cube-----1.4 cu ft

*NOTE: See SC for complete packing data includ-
ing NSN's.

Shipping and Storage Data:

Quantity-distance class	(12) 1.2
Storage compatibility group	H
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH SMOKE PROJEC- TILES
DODAC	1315-C276
Drawing number	9240953 (M375A2) 9251985 (M375A1)

Limitations:

Increment A is used as Charge 1 and will be
one of the increments assembled when firing above
Charge 1. Firing with more than five propellant

Increment charges (Charge 5) is not authorized in Mortar M1. When firing as many as ten cartridges with maximum charge (Charge 9) in Mortar M29, the rate of fire will not exceed 12 rounds per minute. Occasional short rounds will occur when firing at Charge 3 or below in Mortar M29.

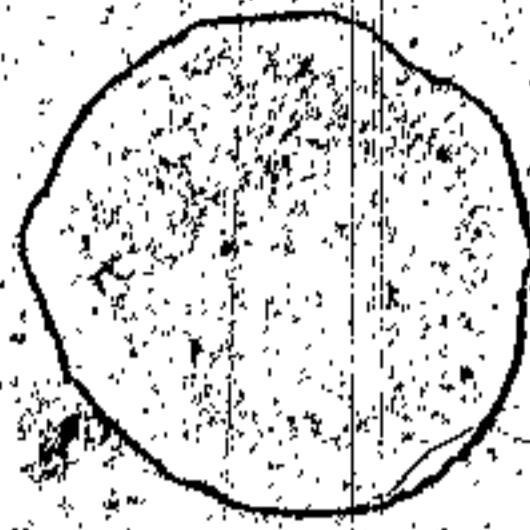
Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile.

Erratic performance may occur if voids exist inside of WP filler. Rounds assembled with Fuze, PD, M524A1, M524A2, M524A3 or M524A4 are for USMC/USN use only.

References:

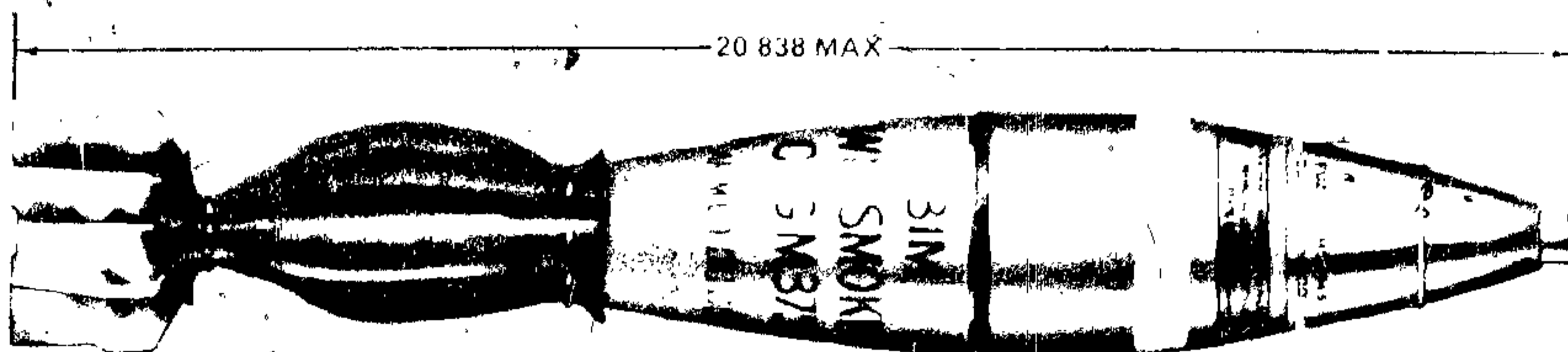
DARCOM-P 700-3-3
TM 9-1015-215-12
TM 9-3071-1
SB 700-20
SC 1305/301L

TM 43-0001-28

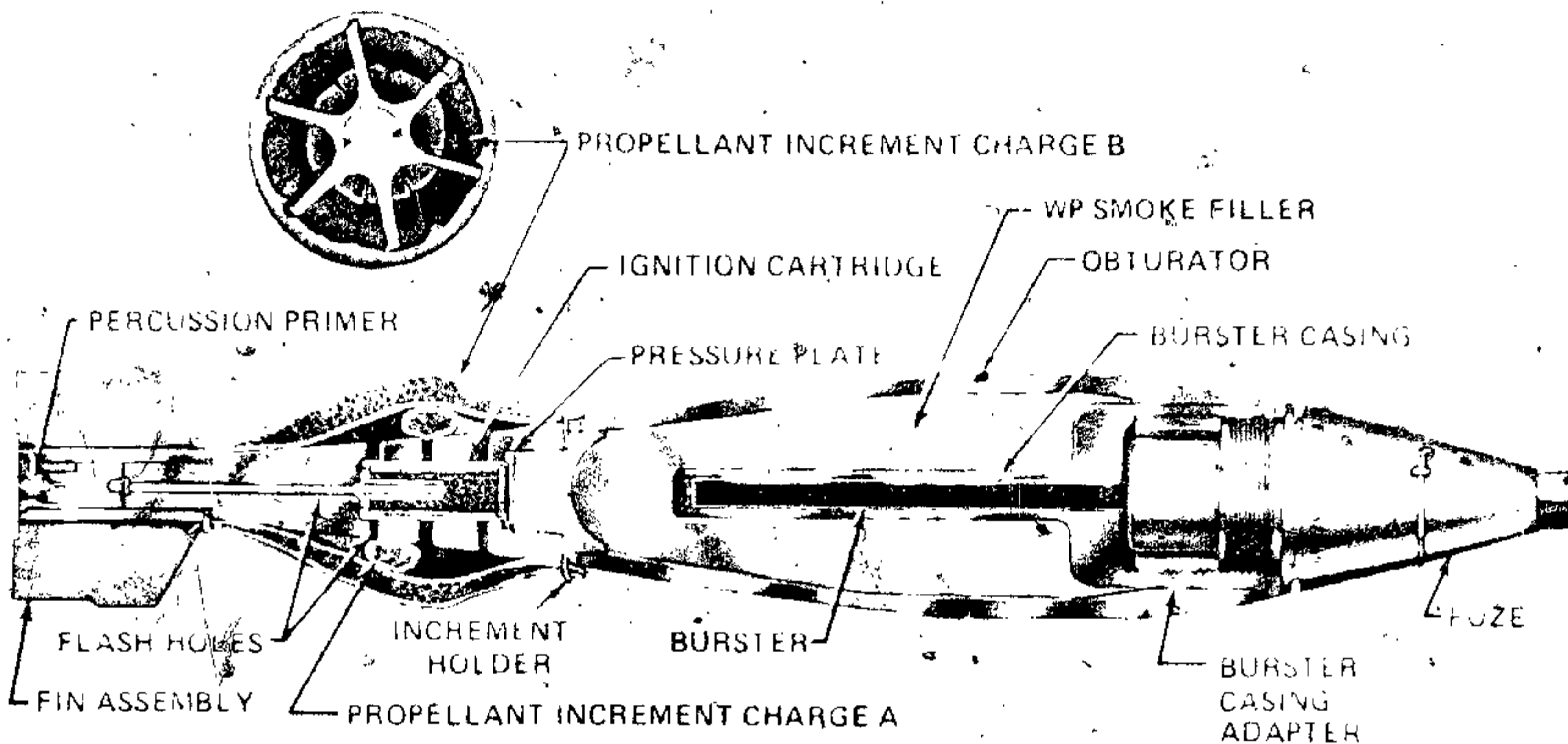


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CARTRIDGE, 81 MILLIMETER: SMOKE, WP, M375



AR199478



AR199477

Type Classification:

Std AMCTC 7379 dtd 1969.

Use:

This cartridge is used to produce a screening smoke and as an incendiary device against personnel and materiel.

Description:

The complete round consists of a projectile body with burster assembly, a fuze or proximity fuze, a fin assembly that includes a cartridge housing, a propellant charge including two types of increment charges, an ignition cartridge, and a percussion primer. The

base of the projectile is externally threaded to accept the fin assembly. The projectile nose is fitted with an internally threaded adapter designed to receive the fuze and hold the burster assembly. The burster assembly consists of a burster casing containing a small RDX burster charge. The burster casing is press-fitted into the adapter in the nose. The projectile is loaded with a white phosphorous filler. The fins are canted at 5 degrees at the rear to spin-stabilize the projectile in flight.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the hub of the fin

assembly strikes the firing pin in the base cap of the mortar. The burning primer flashes through the central flash hole in the cartridge housing, lighting the ignition cartridge. The cartridge ignites the propellant charge. The propellant gases expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. Functioning of the fuze detonates the booster charge, which ruptures the projectile, dispersing the white phosphorus. The white phosphorus ignites on contact with the air, producing a cloud of dense white smoke with some incendiary effect.

Tabulated Data:

Complete round:

Type ----- Smoke, WP
 Weight ----- 9.34 lb
 Length ----- 20.838 in.
 Cannon used with ----- M1, M29, & M29A1

Projectile:

Body material ----- Forged steel, or
 cast pearlitic
 malleable iron
 Color ----- Light green w/
 yellow band
 and light red
 markings

Filler and weight ----- WP, 1.60 lb
 Fuze ----- PD, M524 series,
 PD, M526 series,
 PD, M567, PD,
 M716, or Prox.,
 M532

Fin assembly ----- M149
 Propelling charge:
 Propellant ----- M90 (A&B)
 Ignition car-
 tridge ----- M66A1
 Primer ----- Perc., M71A2

Performance:

Charge	Muzzle Velocity (fps)	Maximum Range (mtr)	(yd)
(0) Ignition car- tridge only.	210	403	442
(1) Ignition car- tridge and 1 increment charge.	341	1,001	1,095
(2) Ignition car- tridge and 2 increment charges.	433	1,529	1,674
(3) Ignition car- tridge and 3 increment charges.	505	1,988	2,175

(4) Ignition car- tridge and 4 increment charges.	577	2,475	2,710
(5) Ignition car- tridge and 5 increment charges.	656	2,995	3,237
(6) Ignition car- tridge and 6 increment charges.	709	3,416	3,740
(7) Ignition car- tridge and 7 increment charges.	764	3,831	4,190
(8) Ignition car- tridge and 8 increment charges.	814	4,197	4,598
(9) Ignition car- tridge and 9 increment charges.	856	4,500	4,932

Maximum range ----- 4,932 yd
 (4508.23 mtr)
 Muzzle velocity ----- 856 fps (260.9
 mps)

Temperature Limits:

Firing:

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

Storage:

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

*Packing

----- 1 round per
 fiber con-
 tainer in
 jungle wrap,
 or 1 round
 per plastic
 container in
 barrier bag;
 3 containers
 in wooden box.

*Packing Box:

Weight ----- 51.0 lb
 Dimensions ----- 26-13/16 x
 13-15/16 x
 6-25/32 in.
 Cube ----- 1.4 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance
class ----- (12) 1.2
Storage compatibility
group ----- H
DOT shipping class -- A
DOT designation ---- AMMUNITION FOR
CANNON WITH
SMOKE PROJEC-
tiles
DODAC ----- 1315-C276
Drawing number ---- 8885264

Limitations:

Increment A is used as Charge 1 and will be one of the increments assembled when firing above Charge 1. Firing with more than five propellant increment charges (Charge 5) is not authorized in Mortar M1. When firing as many as ten cartridges with maximum charge (Charge 9) in Mortar M29, the rate of fire will not exceed 12 rounds per minute.

Occasional short rounds will occur when firing at Charge 3 or below in Mortar M29.

Store and transport WP rounds at temperatures below 111.4°K (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler. Rounds assembled with Fuze, PD, M524A1, M524A2, M524A3 or M524A4 are for USMC/USN use only.

References:

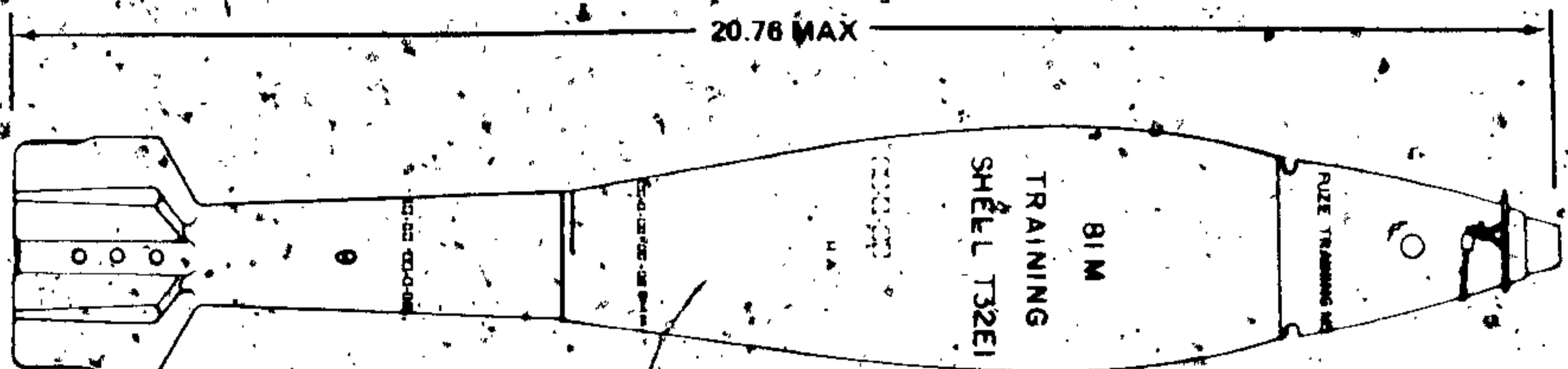
SC 1305/30-IL
SB 700-20
DARCOM-P 700-3-3
TM 9-1015-200-12
TM 9-1300-251-20
TM 9-3071-1

TM 43-0001-28

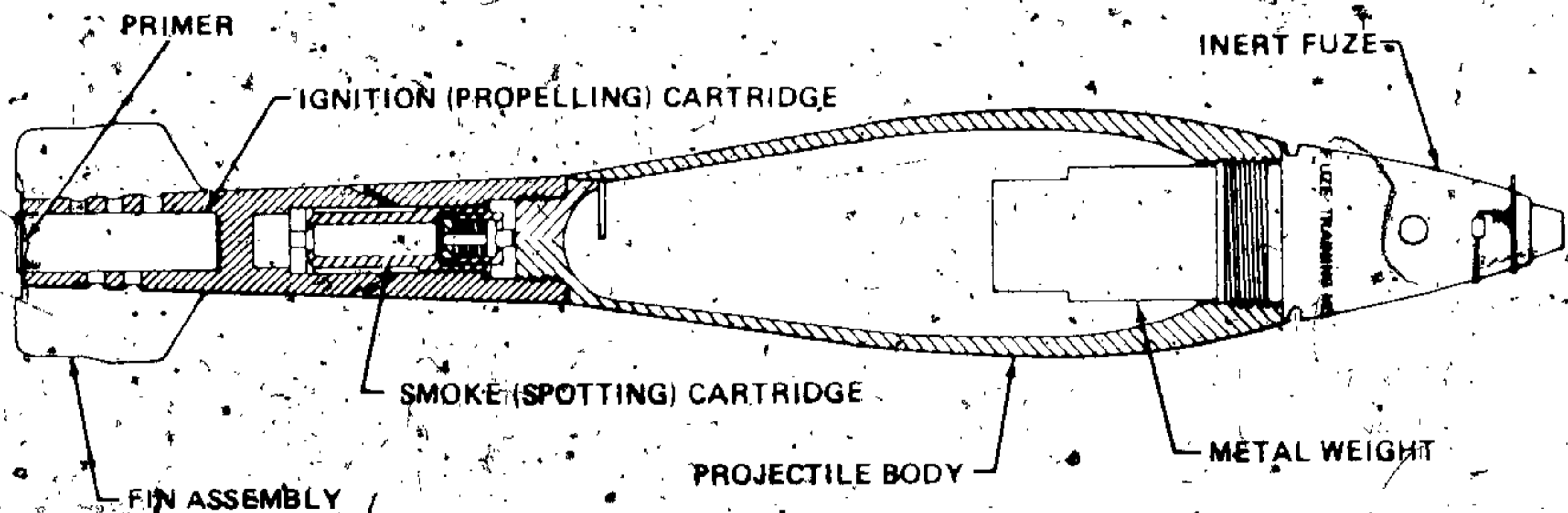
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4-48 Change 7

CARTRIDGE, 81 MILLIMETER; TRAINING, M445 (T32E1)



AR189472



AR189471

Type Classification:

Std OTCM 37767 dtd 1961

Use:

This cartridge is used for training in the loading and firing of the 81mm mortar.

Description:

Unlike other mortar ammunition, the components of this round are issued separately. This facilitates replacement of damaged, worn, or expended parts. The complete round consists of a projectile body, a training fuze, and a fin assembly, designed to hold an

ignition cartridge and a smoke cartridge. The projectile is internally threaded at the nose to accept the training fuze, and externally threaded at the base to accept the fin assembly.

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. Since this round is fired only at Charge 0, the gases from the ignition cartridge expel the projectile from the mortar tube and propel it to the target. The smoke cartridge detonates on impact,

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providing a spotting charge. The ignition and smoke cartridge are replaceable, and the round is designed for reuse.

Tabulated Data:

Complete round:

Type ----- Training
Weight ----- 9.58 lb
Length ----- 20.76 in.
Cannon used with -- M1, M29, M29A1

Projectile:

Body material ----- Bar steel
Color: -----
Old ----- Black or blue
w/white markings
New ----- Bronze w/
white markings
Filler and weight - Steel weight,
2.19 lb
Fuze ----- Inert, M531
Fin assembly ----- M151

Propelling charge:

Ignition cartridge- M100
Primer ----- Percussion

Performance:

Maximum range ----- 172 mtr (188.7
yd)
Muzzle velocity ----- 41.3 mps (135
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 (for per-
iod not more
than 4 hr/day)
(+71.1°C)

*Packing

1 training
cartridge,
3 fin assem-
blies, and 3
dummy fuzes
in wooden box

*Packing Box

Weight ----- 45.0 lb
Dimensions ----- 28-5/16 x
6-13/32 x
12-11/16 in.
Cube ----- 1.3 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class- (08) 1.2
Storage compatibility
group ----- E
DOT shipping class ----- B
DOT designation ----- AMMUNITION
FOR CANNON
WITH SMOKE
PROJECTILES
DODAC ----- 1315-C228
Drawing number ----- P87815

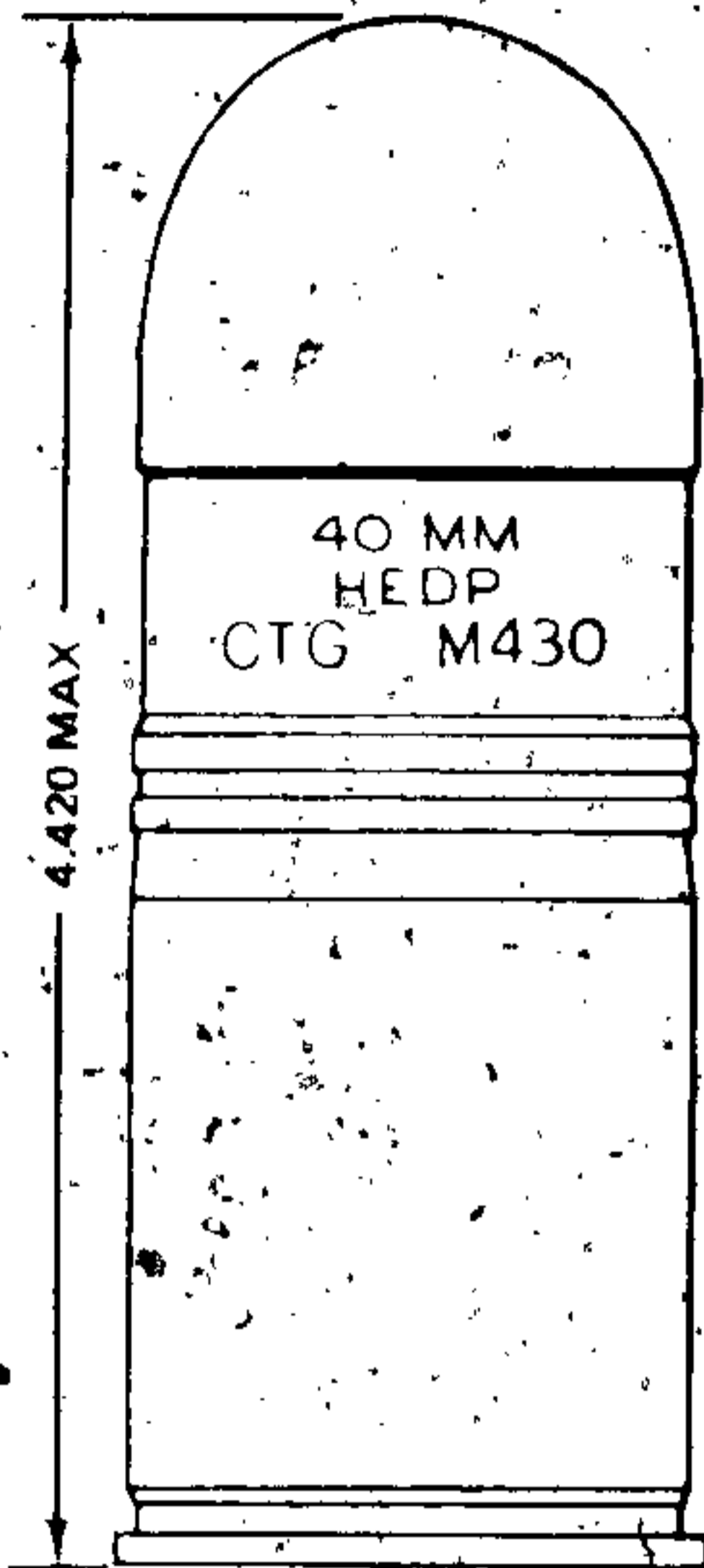
Limitations:

This round is to be fired at Charge 0 only.

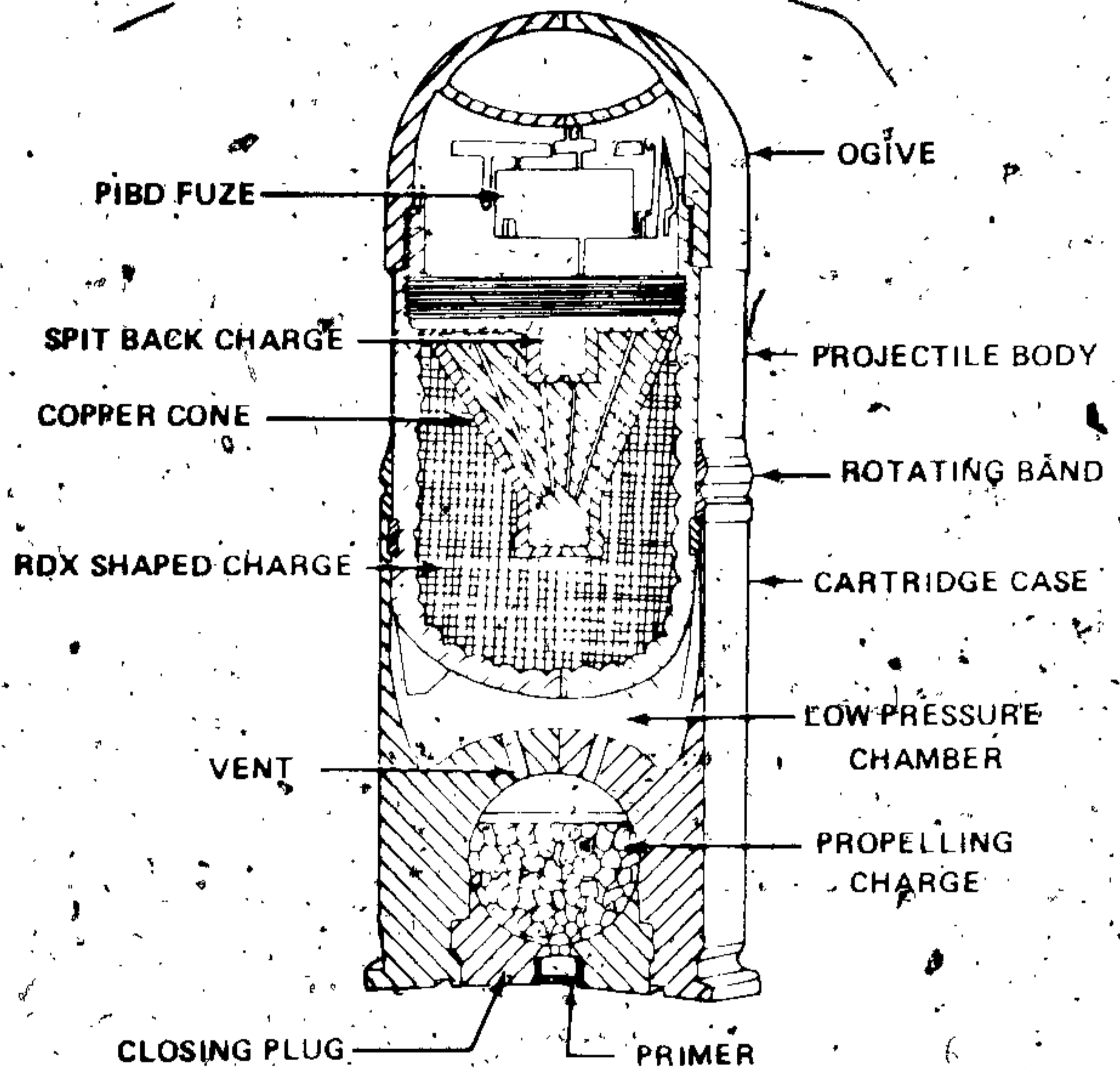
References:

SC 1305/30-IL
SB 700-20
DARCOM-P 700-3-3

CARTRIDGE, 40-MILLIMETER: HEDP, M430



AR 199556-A



AR199555

Type Classification:

Std AMCTC 8664 dtd 1971

Use:

This cartridge is a high explosive, dual purpose, impact type round designed to penetrate two inches of steel armor at 0 angle of obliquity and inflict personnel casualties in the target area. It is fired from 40mm Grenade Launchers M75 and M129, and from the 40mm Machine Gun MK19 Mod 1.

Description:

This cartridge is a fixed round of ammunition consisting of an internally embossed one-piece steel projectile body which is fitted to a cartridge

case assembly.] A PIBD fuze assembly with a Comp. B spitback charge and copper cone liner is threaded into the open well of the projectile cavity. The fuze assembly seals the front end of the projectile cavity which contains the high explosive shaped charge. The projectile assembly is press-fitted into a cartridge case. The case is a hollow, two-chambered aluminum cylinder with a metal closing plug crimped into the open well of the propellant chamber in the cartridge base. The propellant chamber, which contains the propelling charge, has vent holes in the top and is sealed at the bottom by a closing plug. A percussion primer is crimped into the center opening in the closing plug. The propellant chamber acts as high-pressure chamber, and the upper hollow cavity in the case acts as a low-pressure chamber.

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Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge. Pressure, generated by the burning propellant in the high-pressure chamber, forces the expanding gases through the vent holes into the low-pressure chamber, and propels the projectile forward. The rotating band around the projectile engages the rifling in the launcher tube imparting a spin of 12,000 rpm to the projectile. The expanding gases in the low-pressure chamber force the projectile through the barrel with a velocity of 242 meters per second. When the projectile is fired, setback force causes the fuze setback pin to move rearward from the fuze rotor. The rotor is held out of line with the fuze detonator by the setback pin and fuze centrifugal lock which engages the star wheel of the fuze timing mechanism. When the projectile attains sufficient spin, the centrifugal lock releases the star wheel and arming begins. The rotor springs start rotation of the rotor which is sustained by centrifugal force. A fuze escapement assembly, which engages the rotor gear, delays arming of the fuze. After the projectile has traveled 18 to 30 meters from the launcher tube, the rotor is locked in the armed position and the fuze is armed. Upon impact with the target, the firing pin is driven into the detonator, which in turn initiates the setback charge, producing a jet which initiates the RDX explosive charge. Concurrently, the RDX filler detonates, producing an armor piercing jet of molten metal and fragmentation of the projectile body.

Tabulated Data:

Complete round:

Type -----	HEDP
Weight -----	0.75 lb
Length -----	4.42 in.
Weapons used with -----	M75, M129, 40mm Grenade Launchers, M19 Mod 1 40mm machine gun

Projectile:

Body material ---	Blank and draw steel w/copper cone
-------------------	------------------------------------

Color -----	Olive drab w/ yellow markings & yellow ogive
Filler and weight ---	Comp A5, 38 grams
Fuze -----	PIBD, M549
Propelling charge:	
Cartridge case -----	M169
Propellant -----	M2, 4.64 grams
Primer -----	Perc, FED215
Performance:	
Maximum range -----	2,200 mtr
Muzzle velocity ---	244 mps (795 fps)
Arming distance ---	18 to 30 mtr (59 - 98 ft)

Temperature Limits:

Firing:	
Lower limit -----	-65°F (-53.8°C)
Upper limit -----	+125°F (+52.0°C)
Storage:	
Lower limit -----	-65°F (-53.8°C)
Upper limit -----	+165°F (73.9°C)
*Packing	50 rounds in linked belt
*Packing Box:	
Weight -----	53 lb
Dimensions -----	25-11/16 x 16-1/4 x 6-27/32 in.
Cube -----	1.7 cu ft

*NOTE: See SC for latest packing data including NSN's.

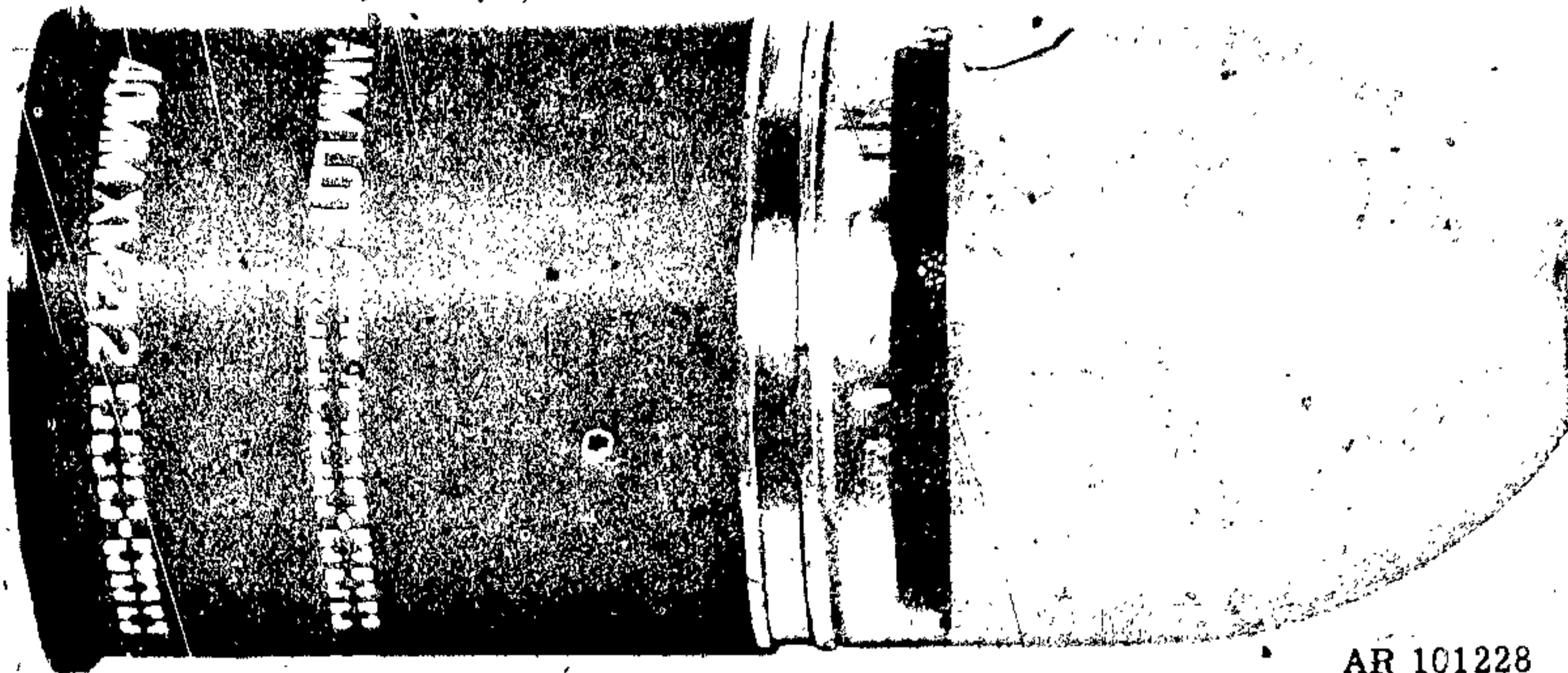
Shipping and Storage Data:

Quantity-distance class-	1:1
Storage compatibility group -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC -----	1310-B542
Cartridge drawing number -----	9205427
Packing drawing number -----	9251995

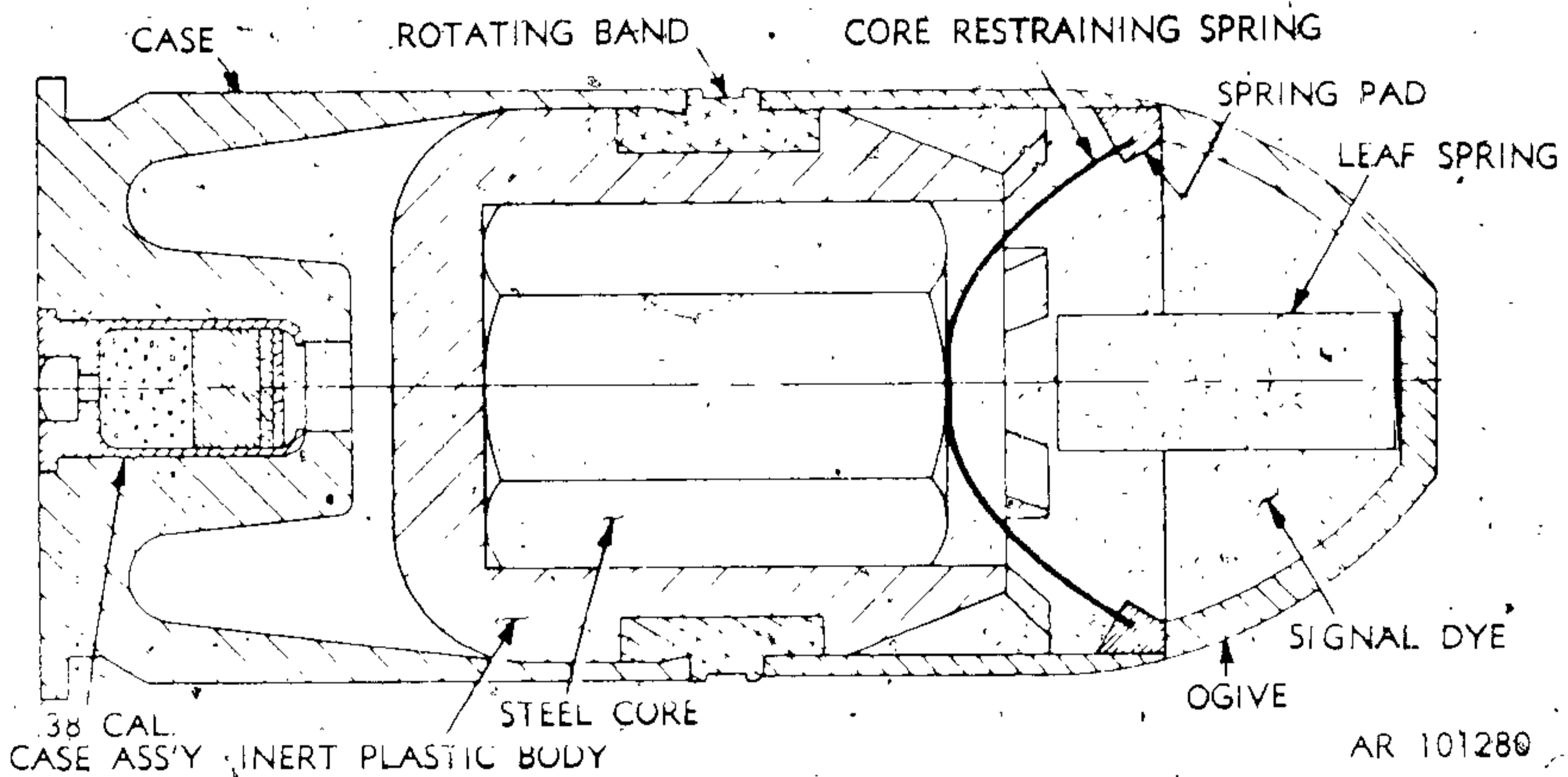
References:

- SC 1305/30-IL
- SB 700-20

CARTRIDGE, 40MM: PRACTICE, M781



AR 101228



AR 101280

Type Classification:

None assigned.

Use:

This cartridge is a fixed, practice-type ammunition designed to be fired from 40mm Grenade Launchers M79 and M203 (attached to the M16/M16A1 rifle).

Description:

This cartridge is a fixed round of ammunition consisting of a plastic projectile body with a rotating band and a cartridge case assembly. A hollow plastic ogive is filled with a high visibility, yellow-orange dye. The projectile assembly is attached to a cartridge case

with an attached adhesive substance. The case is a hollow bichambered plastic cylinder. A .38 caliber blank cartridge is press-fitted into the base of the cartridge case and provides the gas pressure needed to propel the projectile through the launcher barrel.

Functioning:

The weapon firing pin strikes the .38 caliber blank cartridge primer, igniting the propelling charge. The burning propelling charge generates sufficient pressure to release the expanding propellant gases through the vent hole into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher tube imparting a spin of 3,600 rpm to the projectile. The pressure,

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created by the expanding propellant gases in the low-pressure chamber, forces the projectile through the tube with a velocity of 76 meters per second. Upon impact with the target, the frangible ogive ruptures and releases the dye causing a puff of yellow-orange smoke which simulates explosive impact.

Tabulated Data:

NSN 1310-01-050-7967

Complete round:

Type -----	Practice
Weight -----	205 gms
Length -----	4.05
Weapons -----	Used with M79, M203 (attached to M16/M16A1 rifle) 40mm grenade launchers.

Projectile:

Body material ---	Plastic
Color -----	Blue w/white markings
Filler and weight-	Orange dye
Fuze -----	None

Propelling charge:

Cartridge case --	M212
Propellant -----	M9, 340 mg
Primer -----	No. 1-1/2 (commercial)

Performance:

Maximum range ---	400 mtr. (437.6 yd)
Muzzle velocity -	76 mps (250 fps)

Temperature Limits:

Firing:

Lower limit -----	-25° F - (-31.6°C)
Upper limit -----	+110° F - (+43.3°C)

Storage:

Lower limit -----	-30° F - (-34.4°C)
Upper limit -----	+145° F - (+63°C)

*Packing ----- 75 rounds per
box

*Packing Box:

Weight -----	53 lb
Dimensions -----	22-3/8 x 11.0 x 11-5/8 in.
Cube -----	1.7 cu ft

*NOTE: See SC for complete packing data.

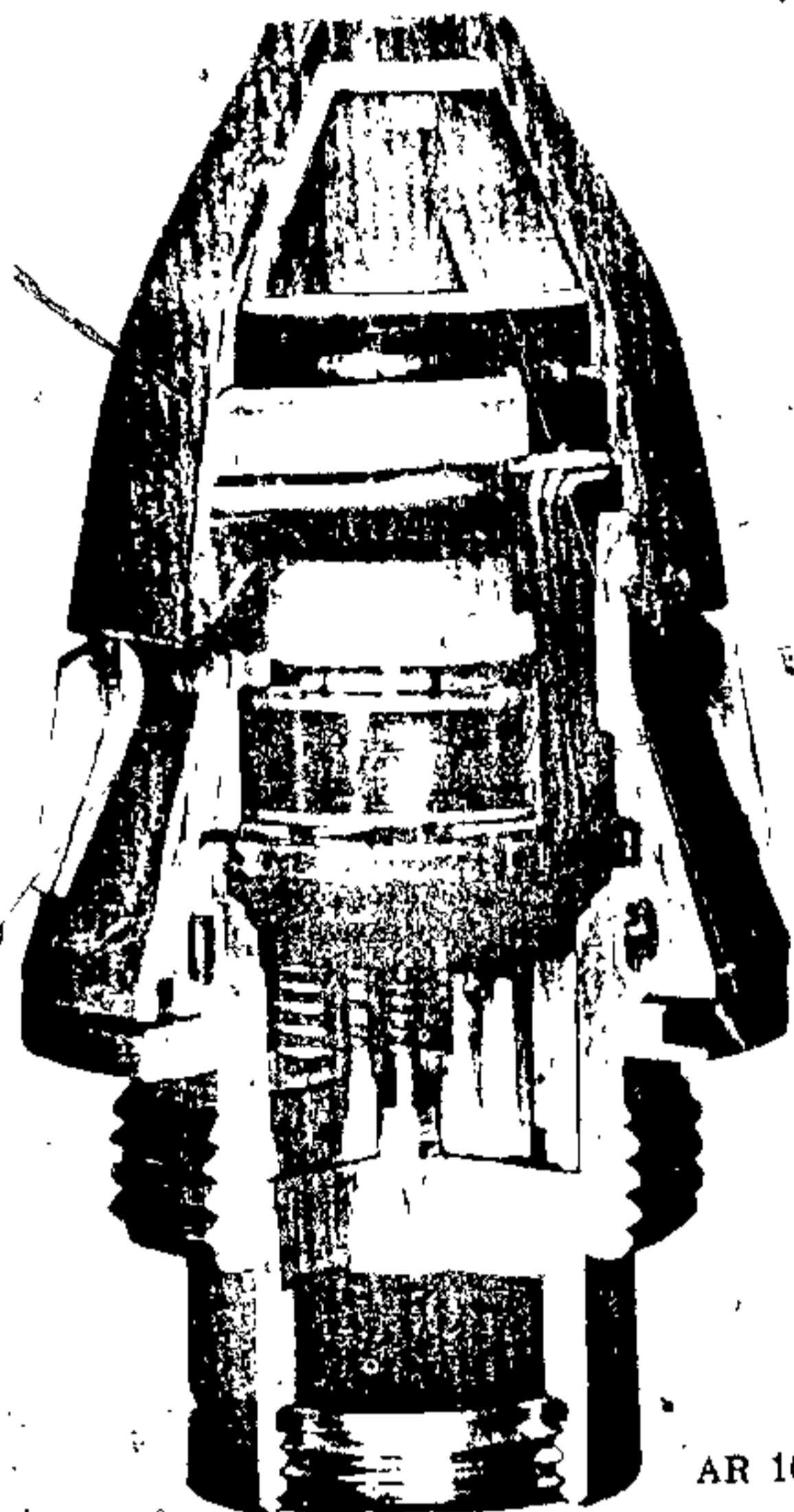
Shipping and Storage Data:

Quantity-distance class-	1.4
Storage compatibility group -----	S
DOT shipping class -----	C
DOT designation -----	CARTRIDGE, PRACTICE AM- MUNITION
DODAC -----	B519
Cartridge Dwg. No. -----	9322240
Packing Dwg. No. -----	9325896

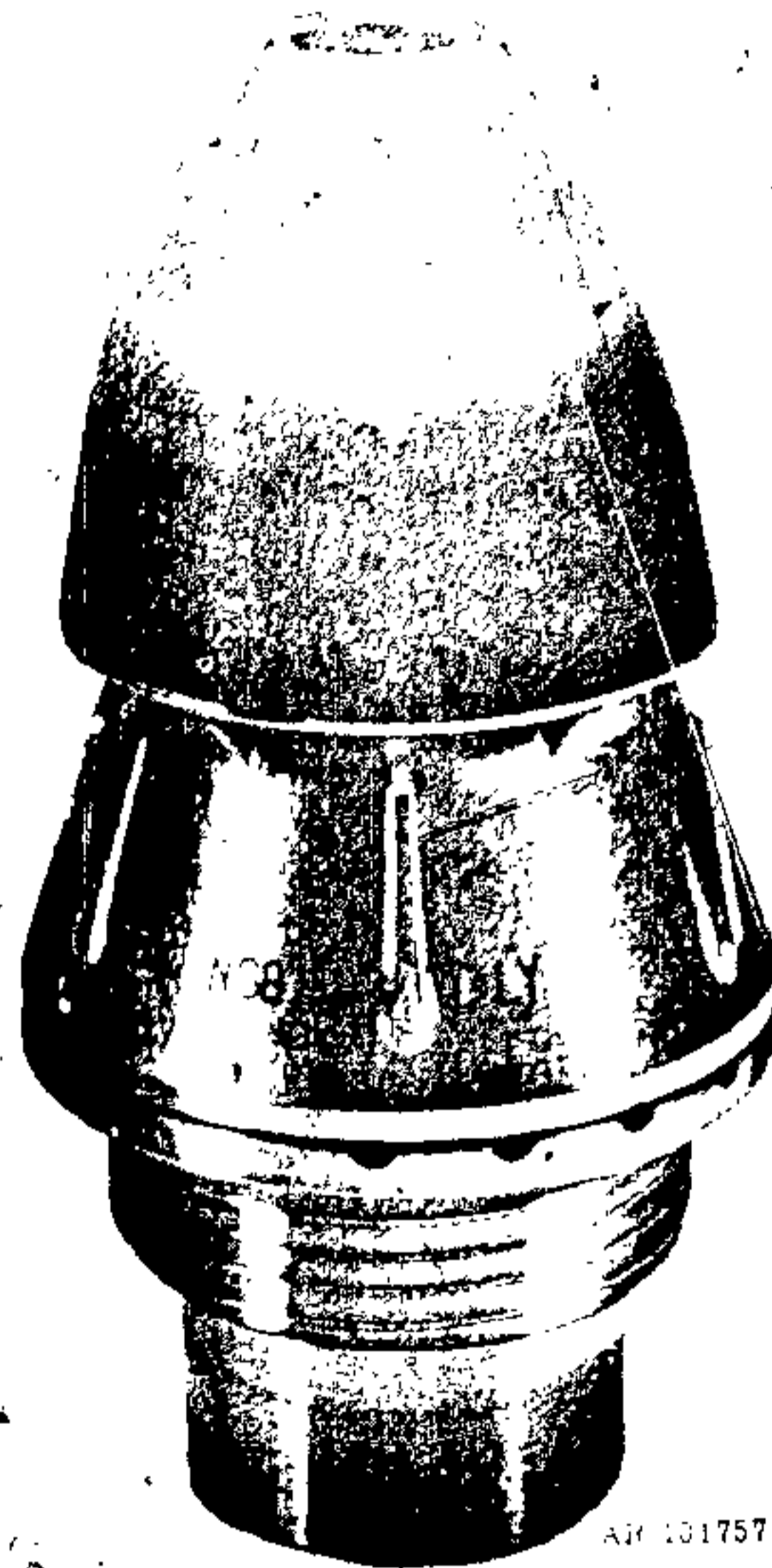
References:

SC 1305/30-IL SB 700-20
TM 9-1095-249-10
TM 9-1010-205-10
TM 9-1010-221-10

FUZE, MULTI-OPTION; M734



AR 101758



AR 101757

Type Classification:

Standard, MSR 01786006.

Use:

Multi-Option Fuze M734 is designed to provide a selectable function capability for use with mortar cartridges. The four settings are PRX (Proximity); NSB (Near Surface Burst), IMP (Impact), and DLY (Delay).

Description:

Externally, the fuze consists of a head which may be rotated for option selection relative to a base which is rigidly screwed into the projectile. Markings PRX, NSB, IMP and DLY are on the head and the corresponding index line on the base. The two-piece fuze head consists of a plastic ogive con-

taining the electronic assembly, rigidly attached to an aluminum ogive base containing the electronic assembly, rigidly attached to an aluminum ogive base containing the turbine alternator (T/A). The aluminum fuze base contains the safety and arming assembly (S&A).

Functioning:

Two distinct gun firing signals are required to arm the fuze: (1) Setback acceleration for the time duration of in-bore travel of the projectile and (2) travel through the air at projectile velocity for more than a minimum distance. Acceleration-time is measured by a setback device in the S&A before disengaging from the S&A rotor. Air velocity distance is measured by airflow through ports in the ogive which rotate the turbine of the T/A. A predetermined number of turns through a mechanical gear

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reduction unscrews a jackscrew lock from the S&A rotor. An interlock, between zigzag setback device and gearing prevents spurious air turbine rotation (e.g., blowing hard into inlet hole). Once released by the locks, the spring driven rotor turns 180° to armed position, aligning explosive elements and connecting the electric detonator to the electronics.

The T/A is also an electrical generator which powers fuze electronics. Voltage (v) and frequency (f), of T/A output depend on velocity of the fuze through the air. The fuze electronics monitor voltage and frequency to provide a fuze electrical-function delay, additional to and greater than the mechanical arming delay.

Multi-Option Functioning:

The three function modes PRX, NSB and IMP are electrical and detonate the fuze through the electric detonator in the S&A. DLY function is completely mechanical and is always available after arming, thereby serving as backup for all electrical functions. PRX provides airburst detonation (mean HOB 3 to 13 ft) for maximum fragmentation spread. NSB is a desensitized PRX (mean HOB 0 to 3 ft) for near-contact bursts. IMP is by closure of an electrical impact switch, airburst capability being suppressed. Fuze electronics automatically provide cascading functionality in descending order, should the set function not receive sufficient signal to trigger. Examples: Set PRX, M734 could also function NSB or IMP (and of course DLY); Set NSB, M734 could function IMP (and DLY). Only in DLY setting is there no backup.

Regulated Data:

Type	Multi-Option (PRX, NSB, IMP, DLY)
Weight	0.50 lb ± 0.3 lb
Length:	
Visible	2.605 in.
Overall	3.715 in. max
Intrusion	1.110 max

Thread size ----- 1.50 - 12 UNF-1A
Assembly Dwg. No. ----- 11723100

Temperature Limits:

Firing:
 Lower limit ----- -50°F (-45.5°C)
 Upper limit ----- +145°F (+63°C)
Storage:
 Lower limit ----- -50°F (-45.5°C)
 Upper limit ----- +160°F (+71.1°C)

*Packing ----- 36 w/styro-foam separators per metal box.

Packing Box:

Weight -----
Dimensions -----
Cube ----- 1.5 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 1.4
Storage compatibility group ----- B
DOT shipping class ----- A
DOT description ----- Detonating Fuzes-Class C Explosives,
DODAC ----- 1390-
Packaging Dwg. No. ----- 9298146

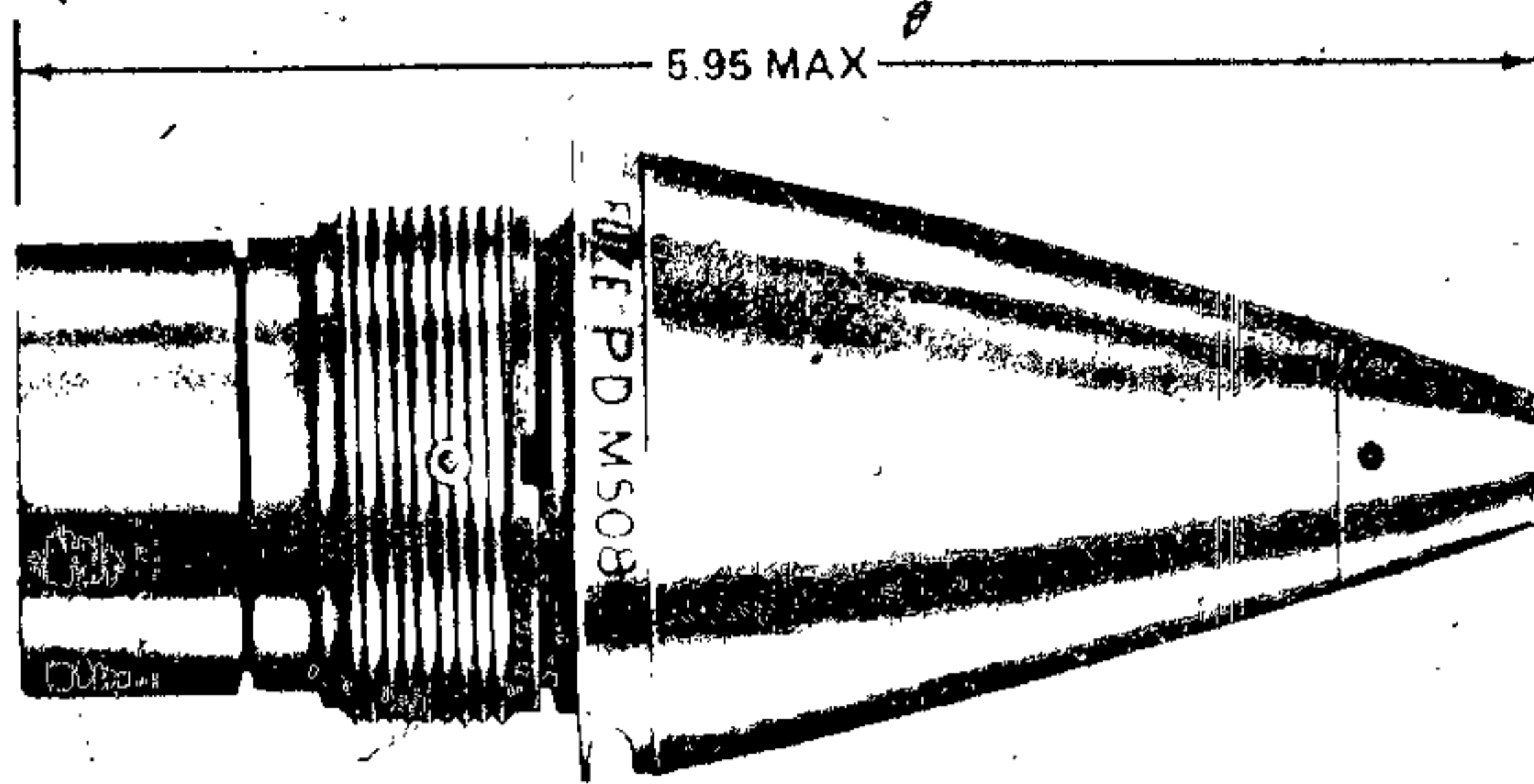
Limitations:

None

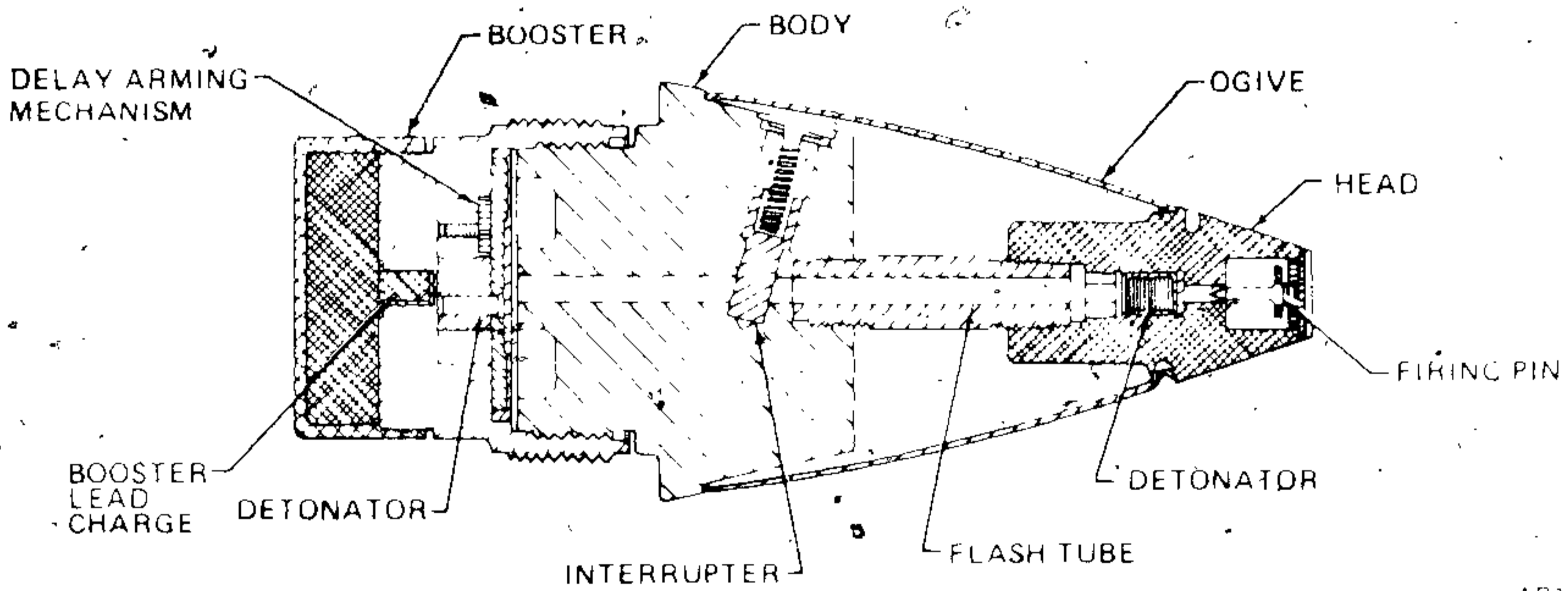
References:

SC 1340/98 IL

FUZE, POINT DETONATING: M508A1 AND M508 SERIES



AR199959



AR199958

Type Classification:

OBS-MSR11756003

Use:

Point Detonating Fuzes M508A1 and M508 are single-action, delayed arming impact fuzes used to detonate 105mm, 155mm, and 8-inch gas or smoke WP projectiles.

Description:

The M508 series fuzes consist of a PD head assembly containing a firing pin held in position by a firing pin support which prevents initiation of Detonator M18 until impact; a stamped steel windshield to provide an aero-

dynamic shape to the fuze; a fuze body containing an interrupter assembly to provide bore-safe firing; and a M125A1 or M125 booster assembly. M508A1 and M508 are physically similar. M508A1 requires 200 feet of projectile travel before arming, and Booster M125 requires 150 feet. The threaded base of the booster contains a delayed arming mechanism, Detonator M17, and a 340-grain lead charge. The delayed arming mechanism is operated by centrifugal force acting through a gear train to turn a rotating firing Detonator M17. In the arming position, the detonator is held out of line with the flash hole in the fuze cover by rotor detents. An arming pin containing a 340-grain titanyl lead charge threaded onto the base of the booster

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Functioning:

No action occurs until the spin of the projectile, after firing, causes centrifugal force to withdraw the interrupter from the flash tube against the interrupter spring. At the same time, centrifugal force moves the rotor detents in the booster outward and starts the delayed arming gear train. The timing of the mechanism is such that when the rotor has aligned Detonator M17 with the flash hole to complete arming of the fuze, the projectile will be at least 150 feet from the muzzle. On impact, the firing pin is driven into the detonator in the fuze head to initiate projectile detonation.

Difference Between Models:

M508A1 has Booster M125A1 which requires 200 feet of travel to arm. M508 has booster M125 which requires 150 feet of travel to arm.

Tabulated Data:

Type ----- PD
Weight ----- 2.15 lb
Length:
Visible ----- 3.74 in.
Overall ----- 5.95 in.
Assembly Dwg. No. -- 7549041

Temperature Limits:

Firing:
Lower limit ----- -40°F (-40°C)
Upper limit ----- +125°F (+52.0°C)
Storage:
Lower limit ----- -80°F (for periods not more than 3 days) (-62.2°C)
Upper limit ----- +160°F (for periods not more than 4 hr/day) (+71.1°C)

*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 SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 1.1
Storage compatibility group ----- B
DOT shipping class ----- A
DOT designation ----- DETONATING FUZES CLASS A EXPLOSIVES
DODAC ----- 1390-N326

Explosive Components:

Fuze Detonator M18, Booster Detonator M17, tetryl booster lead charge, and tetryl booster charge.

Limitations:

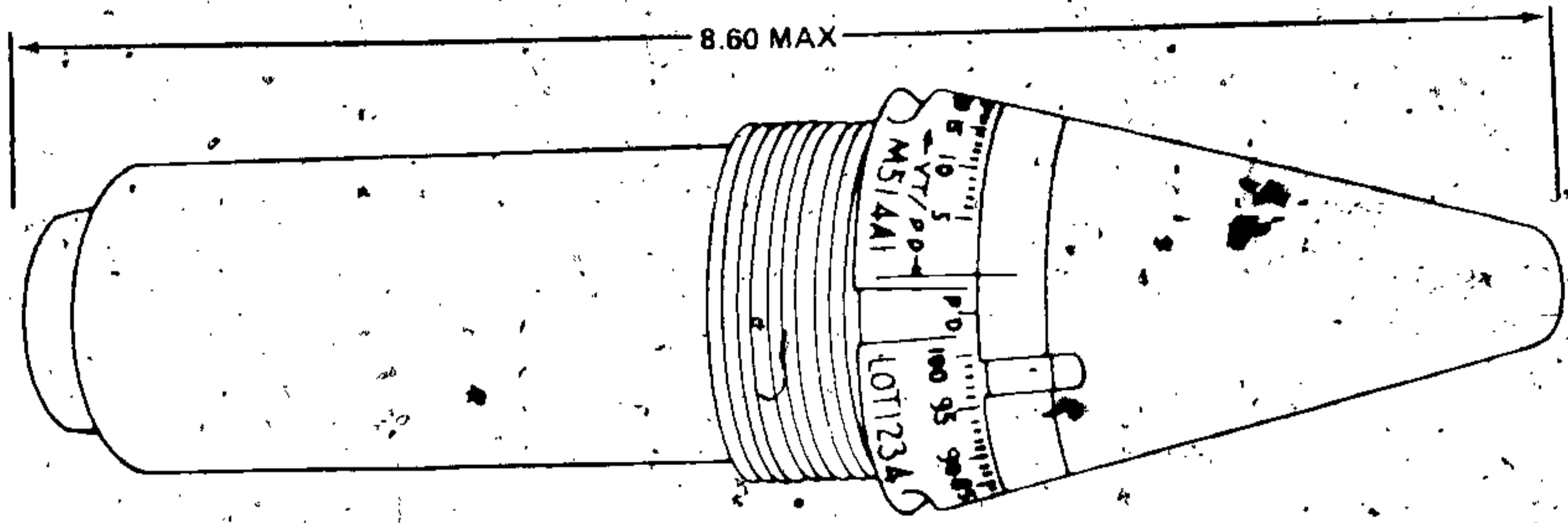
Overhead firing with HE Projectiles for practice is not authorized. To avoid premature functioning, do not use this fuze when firing during rain or snow.

References:

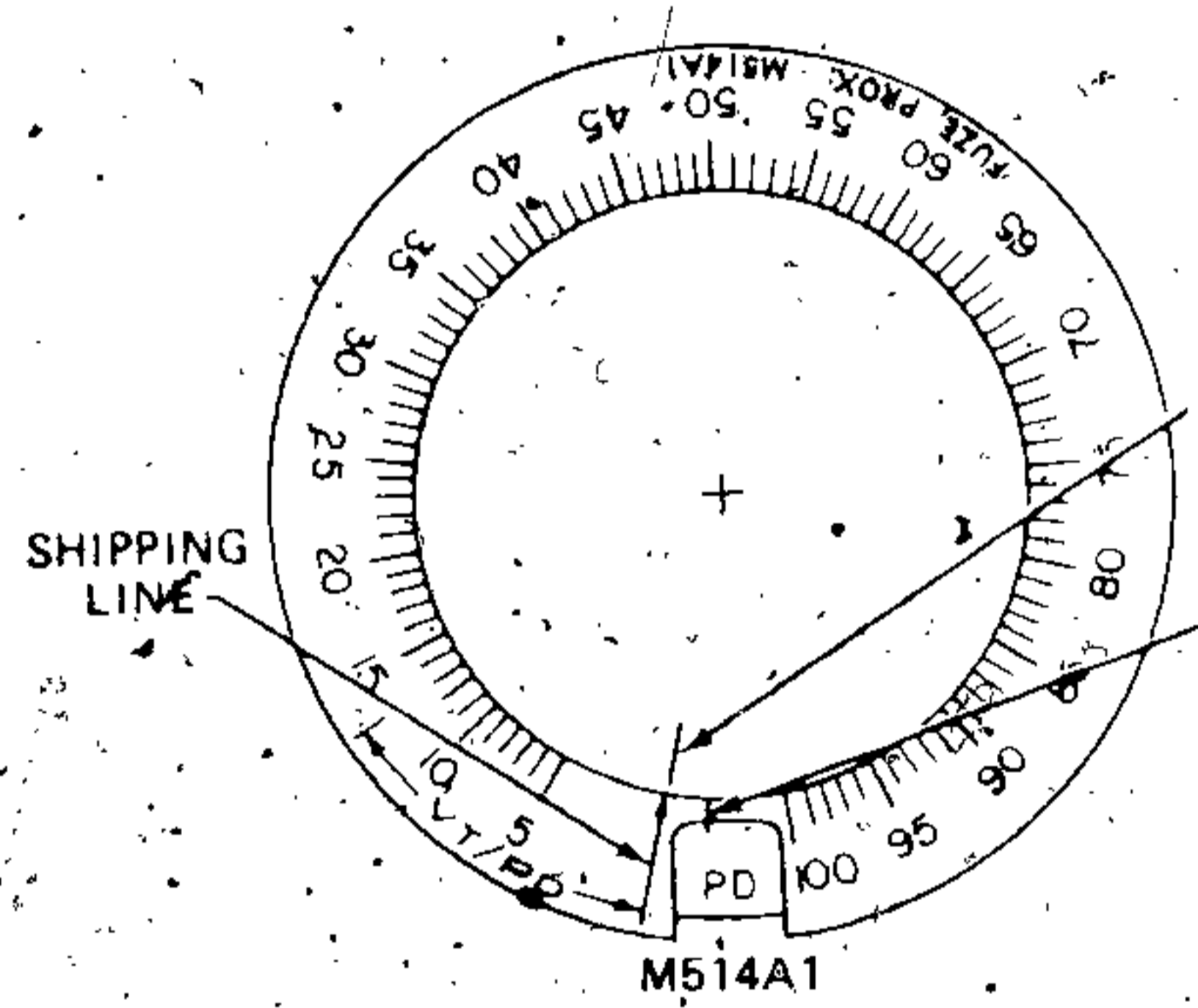
- TM 9-1300-251-20
- SC 1340/98-IL
- SB 700-20
- TM 9-1015-203-12
- TM 9-1015-234-12
- TM 9-1025-200-12
- TM 9-2300-216-10
- TM 9-2350-217-10
- TM 9-2350-217-10N

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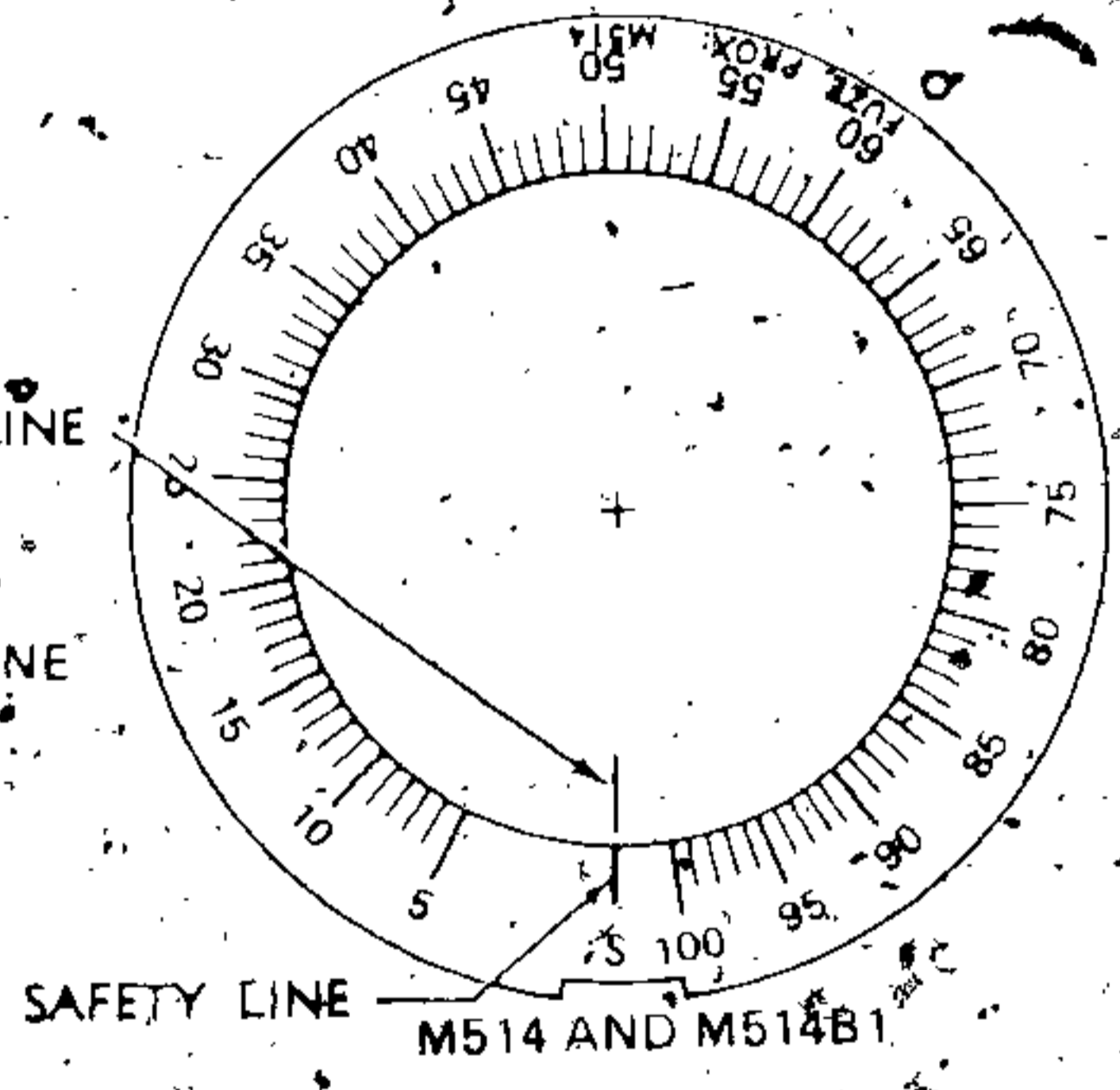
FUZE, PROXIMITY: M514, M514B1, M514A1



AR199895



M514A1



M514 AND M514B1

AR199894

Type Classification:

Obsolete MSR 017560-8 dtd 1975
For training use only

Description:

These fuzes are of the adjustable delayed-arming type which are activated by the receipt of reflected radio transmissions emitted from the fuze upon target approach. The fuzes contain radio transmitters, antennas and receivers and are energized upon firing. Certain models of this fuze provide for impact functioning (PD action) or the option for a PD setting, but this characteristic is not common to all models.

The fuzes have a windshield/nose cone of plastic attached to a metal setting ring. The ring and fuze sleeve are made of steel or aluminum. The shoulder of the sleeve is marked with a PD setting where applicable and time graduations from 5 to 100 seconds representing the time of flight to the target. The setting index mark is located on the plastic nose cone. The M514A1 series nose cones identified as 'KEL-F' are authorized for use in the 175mm gun system at all charges (refer to Difference Among Models).

Functioning:

Fuzes are normally set to the calculated time of flight in seconds of the

projectile, unless point detonation is desired. Setback from weapon firing starts the aiming cycle by releasing the timing mechanism and initiating the power supply. The fuze is armed for point detonation after 3 seconds of flight. The proximity element becomes armed within 3 seconds of setback. When any part of the radio wave front is reflected to the fuze from the target, an interaction or doppler signal occurs between the reflected and transmitted wave. When the doppler signal reaches a predetermined amplitude an electronic switch activates the explosive train at an optimum distance from the target. If for any reason the proximity mode does not function, the projectile will detonate on impact, with the exception of Model M514A1.

Differences Among Models:

Feature	M514	M514B1	M514A1
PD setting	No	No	Yes
PD impact action sleeve material	Yes Steel	Yes Alum.	No Alum.
Use of desensit. cap XM5	Yes	Yes	Yes
Weapon Prop. Chg combinations: 155mm	Chg 3 & above GB Chg 5 & above WB	Chg 3 & above GB Chg 5 & above WB	PD mode Chg 4 & above GB Chg 6 & above WB
175mm			Chg 1 & 2 (KEL-F) All chgs
8-in.	Chg 3 & above GB All chgs. WB	Chg 3 & above GB All chgs. WB	Chg 3 & above GB All chgs. WB (PD mode: Chg 4 & above GB Chg 6 & above WB)

*NOTE: Model M514A3 (M514A1E1) on separate data sheet.

Tabulated Data:

Type ----- Proximity
 Weight ----- 2.35 lb
 Length: Visible ----- 3.74 in.
 Overall ----- 8.60 in.
 Assembly Dwg. No. --- 795245

Temperature Limits:

Firing:
 Lower limit ----- 0°F (-18°C)
 Upper limit ----- +120°F (+49°C)
 Storage:
 Lower limit ----- -20°F (-29°C)
 Upper limit ----- +130°F (+54.4°C)

*Packing ----- 8 fuzes in metal container; 2 containers in wire-bound box

*Packing Box:
 Weight ----- 63.0 lb
 Dimensions ----- 14-5/8 x 12-13/16 x 11-15/16 in.
 Cube ----- 1.3 cu ft

*NOTE: See SC for complete packing data including NSN's.

Shipping and Storage Data:

Quantity-distance class ----- 1.2
 Storage compatibility group ----- B
 DOT shipping class ----- A
 DOT designation ----- DETONATING FUZES-CLASS A EXPLOSIVES HANDLE CAREFULLY DO NOT STORE OR LOAD WITH ANY HIGH EXPLOSIVES
 DODAC ----- 1390-N411

Explosive Components:

Primer, detonator, detonator lead charge, and tetryl booster charge in either detonation mode.

Limitations:

Do not use these fuzes for firing at targets closer than 731 meters (800 yards) to friendly positions. Use the highest charge commensurate with range for maximum fuze reliability. Fuzes are not fully effective against airborne targets. After proximity arming, fuzes may function under influence of nearby bursts or fragments. Firing on overcast days can result in increased

frequency of downrange prematures. Not all models are interchangeable for use in all weapon systems. (See Difference Among Models.)

References:

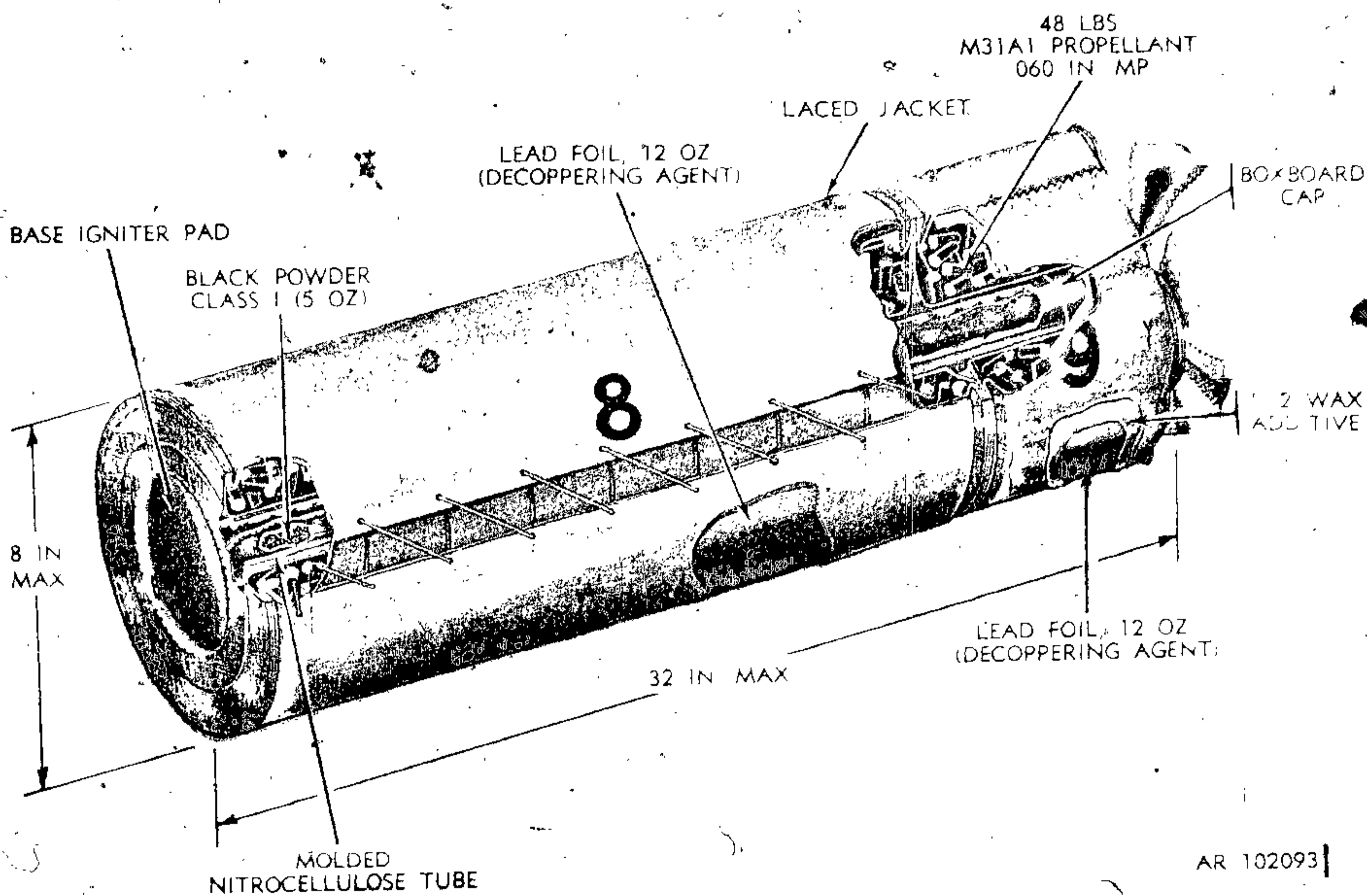
SC 1340/98 IL
SB 700-20
TM 9-1015-234-12
TM 9-1025-200-12
TM 9-1300-251-20
TM 9-2300-216-10
TM 9-2350-210-12
TM 9-2350-217-10
TM 9-2350-217-10N

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CHARGE, PROPELLING, 8-INCH: M188A1



AR 102093

Type Classification:

Std MSR 08756016

Use:

The 8-inch: M188A1 separate-loading propelling charge provides extended range (zones 8 and 9) in the 8-inch: M110A2 Self-Propelled Howitzer.

Description:

The M188A1 is a two increment (zones 8 and 9) white-lag charge, 32 in. long by 8 in. in diameter. The charge weighs 50 lb and contains 48 lb of high-energy propellant M31A1. An igniter pad, containing 1 oz of black powder, is attached

to the base of the charge by a 360° seam. An igniter core extends through the center of the charge for almost its entire length. This center core consists of a molded nitrocellulose tube 1.4 in. in diameter, containing a 5 oz bag of class 1 black powder which is sewn to the igniter pad at the base of the charge.

An additive to reduce gas tube wear and assist in decoppering, lines the increment 9 charge bag. This liner consists of a lead side and a titanium side which is impregnated with a compound of titanium dioxide and paraffin wax. The increment 8 charge bag is lined with lead foil for decoppering. A 26 in. long lacing jacket is positioned at the

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the increment 8 charge bag to increase the structural stability of the charge. Four tie straps, sewed to the base of the increment 8 charge bag, run the length of the two increment charges and are tied with interlapping square knots at the forward end of increment 9. A paper igniter protector cap is placed over the igniter pad at the base of the charge when it is packed for shipment. This igniter protector cap must be removed before firing.

Functioning:

The flash from the black powder in percussion primer M82 ignites the igniter pad at the base of the charge. The burning igniter pad in turn ignites the black powder in the igniter core to spread ignition to the propelling charge. Rapidly expanding gases from the burning charge propel the projectile through the barrel of the weapon with enough velocity to reach the target.

Tabulated Data:

Propelling Charge:

Type -----	Separate loaded Propelling charge, white bag
Model -----	M188A1
Weight -----	50 lb (22.7 kg)
Length -----	32.0 in. (81.3 cm)
Color -----	White w/black markings

Propellant:

Composition ----	M31A1 (48.0 lb) (21.7 kg)
Green type	
Multi-perf.	
Web -----	.060 in. (.153 cm)
Weight	
Increment 8 --	42 lb (19.05 kg)
Increment 9 --	6 lb (2.72 kg)
Igniter:	
Base Pad ----	1 oz BP (28 g)
Center Core --	5 oz BP (141.7 g)
Weight of Liner-Primer -----	4 oz (113.4 g)
Primer -----	M82
Canon used w/	M201A1
Muzzle Velocity-	(Zone 8) 2330 fps (710 mps)
Muzzle Velocity-	(Zone 9) 2530 fps (771 mps)
Chamber pressure-	(Zone 8) 32,000 psi (22,499,200 kg/m ²)

Chamber pressure -- (Zone 9) 39,600 psi (27,842,760 kg/m²)

Temperature Limits:

Firing:

Lower limit -----	-50°F (-45.5°C)
Upper limit -----	+145°F (+63°C)

Storage:

Lower limit -----	-80°F (-62.2°C)
	3 days or less
Upper limit -----	+160°F (+71.1°C)
	4 hr or less per day

Packing: ----- 1 Charge per Metal Container 20 Containers per pallet

Container: PA66

Weight -----	76 lb (34.7 kg)
Dimensions -----	37-3/4 in. x 10-15/32 in. diam or 95.9 x 26.6
Cube -----	2.4 cu ft (.068 cu mtr)

Pallet:

Weight -----	1730 lb (784.7 kg)
Dimensions -----	49 x 53-1/2 x 40-3/4 in. (1.24 x 1.36 x 1.04 mtr)
Cube -----	61.8 cu ft (1.75 cu mtr)

Shipping and Storage Data:

Quantity-distance class-	1.3
Storage Compatibility group -----	C
DOT shipping class -----	B
DOT designation -----	PROPELLANT EXPLOSIVES CLASS B SOLID
DODAC -----	1320/D662
Drawing No. (M188A1) --	11829092

Limitations:

The M188A1 propelling charge cannot be stored or shipped in the vertical position.

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References:

- TM 43-0001-28
- TM 9-1300-251-20
- TM 9-1300-251-34
- TM 9-1300-206
- TM 9-2350-304-10

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