

TECHNICAL MANUAL

ARMY AMMUNITION DATA SHEETS

ARTILLERY

AMMUNITION

GUNS, HOWITZERS,

MORTARS,

RECOILLESS RIFLES,

GRENADE LAUNCHERS,

AND

ARTILLERY FUZES

(FSC 1310, 1315, 1320, 1390)

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

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HEADQUARTERS, DEPARTMENT OF THE ARMY

APRIL 1994

CHANGE )  
 )  
NO. 11 )

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, DC, 27 October 2003

**Army Ammunition Data Sheets  
for  
Artillery Ammunition  
Guns, Howitzers, Mortars, Recoilless Rifles, Grenade  
Launchers and Artillery Fuzes  
(Federal Supply Class 1310, 1315, 1320, 1390)**

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

TM 43-0001-28, 28 April 1994, is changed as follows:

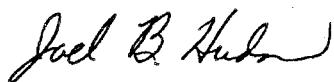
1. File this change sheet in front of the publication for reference purposes.
2. Remove old pages and insert new pages as indicated below.
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4. Added or revised illustrations are indicated by a vertical bar adjacent to the illustration identification number.

<u>Remove Pages</u>	<u>Insert Pages</u>
A thru D	A thru D
i thru x	i thru x
2-24.1 and 2-24.2	None
None	3-74.1 and 3-74.2
None	4-10.1 thru 4-10.4
None	4-14.1 and 4-14.2
None	4-30.1 and 4-30.2
4-106.1 and 4-106.2	4-106.1 and 4-106.2
4-115 thru 4-118	4-115 thru 4-118
None	6-58.1 and 6-58.2
None	7-46.5 and 7-46.6
None	7-96.1 and 7-96.2
8-17 and 8-18	8-17 and 8-18
None	8-56.1 and 8-56.2

By Order of the Secretary of the Army:

PETER J. SCHOOMAKER  
General, United States Army  
Chief of Staff

Official:



JOEL B. HUDSON  
Administrative Assistant to the  
Secretary of the Army  
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HEADQUARTERS  
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WASHINGTON, DC, 28 February 2003

**Army Ammunition Data Sheets**  
**for**  
**Artillery Ammunition:**  
**Guns, Howitzers, Mortars, Recoilless Rifles, Grenade**  
**Launchers and Artillery Fuzes**  
**(Federal Supply Class, 1310, 1315, 1320, 1390)**

DISTRIBUTION STATEMENT A: Approved for public release; distribution unlimited.

TM 43-0001-28, 28 April 1994, is changed as follows:

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Remove Pages

A thru D  
i thru iv  
None  
None  
4-115 and 4-116  
4-119 and 4-120  
B-4.1 and B-4.2  
B-5 and B-6

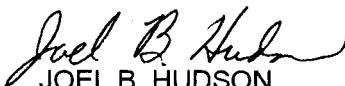
Insert Pages

A thru D  
i thru iv  
2-114.1 and 2-114.2  
2-120.1 thru 2-120.3  
4-115 and 4-116  
4-119 and 4-120  
B-4.1 and B-4.2  
B-5 and B-6

By Order of the Secretary of the Army:

ERIC K. SHINSEKI  
*General, United States Army*  
*Chief of Staff*

Official:

  
JOEL B. HUDSON  
*Administrative Assistant to the*  
*Secretary of the Army*  
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HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, DC, 10 December 2001

**Army Ammunition Data Sheets**  
**for**  
**Artillery Ammunition:**  
**Guns, Howitzers, Mortars, Recoilless Rifles, Grenade**  
**Launchers and Artillery Fuzes**  
**(Federal Supply Class, 1310, 1315, 1320, 1390)**

DISTRIBUTION STATEMENT A: Approved for public release; distribution unlimited.

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Remove Pages

A thru D  
i and ii  
vii and viii  
None  
3-39 and 3-40  
3-77 and 3-78  
None  
7-46.3 and 7-46.4  
7-147 thru 7-150  
8-15 and 8-16  
B-3 and B-4  
None  
B-5 and B-6  
B-13 and B-14  
C-3 and C-4

Insert Pages

A thru D  
i and ii  
vii and viii  
2-24.1 and 2-24.2  
3-39 and 3-40  
3-77 and 3-78  
6-61 and 6-62  
7-46.3 and 7-46.4  
7-147 thru 7-150  
8-15 and 8-16  
B-3 and B-4  
B-4.1 and B-4.2  
B-5 and B-6  
B-13 and B-14  
C-3 and C-4

By Order of the Secretary of the Army:

ERIC K. SHINSEKI  
*General, United States Army*  
*Chief of Staff*

Official:

  
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*Administrative Assistant to the*  
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0133007

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CHANGE )  
      )  
NO. 8   )

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, DC, 30 August 2001

**Army Ammunition Data Sheets**  
**for**  
**Artillery Ammunition:**  
**Guns, Howitzers, Mortars, Recoilless Rifles, Grenade**  
**Launchers and Artillery Fuze**  
**(Federal Supply Class, 1310, 1315, 1320, 1390)**

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Remove Pages

A thru D  
 iii and iv  
 vii and viii  
 None  
 3-183 thru 3-186  
 None  
 B-9 thru B-12

Insert Pages

A thru D  
 iii and iv  
 vii and viii  
 3-68.1 thru 3-68.4  
 3-183 and 3-184  
 8-16.1 thru 8-16.4  
 B-9 thru B-12

By Order of the Secretary of the Army:

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*General, United States Army*  
*Chief of Staff*

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 JOEL B. HUDSON  
*Administrative Assistant to the*  
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CHANGE

NO. 7

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
Washington, DC, 15 September 2000

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

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

TM 43-0001-28, dated 28 April 1994, is changed as follows:

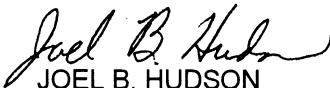
1. Remove old pages and insert new pages as indicated below.
2. New or changed material is indicated by a vertical bar in the margin of the page.
3. Added or revised illustrations are indicated by a vertical bar adjacent to the illustration identification number.

Remove pages	Insert pages
A thru D	A thru D
i thru x	i thru x
None	4-12.1 and 4-12.2
None	4-106.1 and 4-106.2
4-115 and 4-116	4-115 and 4-116
None	4-119 and 4-120
6-59 and 6-60	6-59 and 6-60
None	7-46.1 thru 7-46.4

File this change sheet in front of the publication for reference purposes.

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Administrative Assistant to the  
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ERIC K. SHINSEKI  
General, United States Army  
Chief of Staff

Distribution:

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TM 43-0001-28.

CHANGE

NO. 6

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
Washington, DC, 15 March 2000

**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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**Remove pages**

A thru D  
7-58.1 and 7-58.2

**Insert pages**

A thru D  
7-58.1 and 7-58.2

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*Administrative Assistant to the  
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ERIC K. SHINSEKI  
*General, United States Army*  
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TM 43-0001-28.

CHANGE

NO. 5

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
Washington, DC, 4 January 2000

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

DISTRIBUTION STATEMENT A: Approved for public release, distribution is unlimited.

TM 43-0001-28, dated 28 April 1994, is changed as follows:

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Remove pages	Insert pages
A thru D	A thru D
i and ii	i and ii
v and vi	v and vi
3-155 and 3-156	3-155 and 3-156
3-159 and 3-160	3-159 and 3-160
None	6-59 and 6-60
B-3 and B-4	B-3 and B-4
B-5 and B-6	B-5 and B-6
B-9 and B-10	B-9 and B-10

2. File this change sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army.

Official.

ERIC K. SHINSEKI  
*General, United States Army*  
*Chief of Staff*

JOEL B. HUDSON  
*Administrative Assistant to the*  
*Secretary of the Army*  
0001206

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**TM 43-0001-28**

**C4**

**CHANGE**

**NO. 4**

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
Washington, DC, *1 March 1999*

**ARTILLERY AMMUNITION DATA SHEETS  
FOR  
GUNS, HOWITZERS, RECOILLESS RIFLES,  
GRENADE LAUNCHERS, AND ARTILLERY FUZES**

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Remove Pages

A thru D  
4-111 and 4-112  
None  
None

Insert Pages

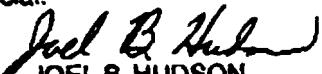
A thru D  
4-111 and 4-112  
4-112.1 and 4-112.2  
4-117 and 4-118

2. File this change page in front of manual for reference purposes.

TM 43-0001-28

By Order of the **Secretary of the Army**:

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DENNIS J. REIMER  
General, United States Army  
Chief of Staff

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Change )  
      )  
No. 3 )

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
Washington, D.C., 31 July 1996  
94

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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Remove pages	Insert pages
v and vi	v and vi
None	6-57 and 6-58

2. File this change sheet in front of the publication for reference purposes.

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JOEL B. HUDSON

Administrative Assistant to the  
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CHANGE )  
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NO.    2   )

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
Washington, DC, 30 August 1996

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

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Remove pages

v thru viii  
3-75 and 3-76  
3-169 thru 3-172  
None  
4-77 and 4-78  
7-33 and 7-34  
7-89 and 7-90  
8-5 thru 8-8  
B-13 and B-14

Insert pages

v thru viii  
3-75 and 3-76  
3-169 thru 3-172  
4-66.1 and 4-66.2  
4-77 and 4-78  
7-33 and 7-34  
7-89 and 7-90  
8-5 thru 8-8  
B-13 and B-14

2. File this change sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army:

Official:

  
**JOEL B. HUDSON**

Administrative Assistant to the  
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No.     1    )

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
Washington, D. C., 30 May 1995

**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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<u>Remove pages</u>	<u>Insert pages</u>
A and B	A thru D
i and ii	i and ii
vii and viii	vii and viii
1-1 and 1-2	1-1 and 1-2
3-5 thru 3-8	3-5 thru 3-8
3-11 and 3-12	3-11 and 3-12
3-17 thru 3-24	3-17 thru 3-24
3-27 and 3-28	3-27 and 3-28
3-31 thru 3-34	3-31 thru 3-34
3-39 thru 3-44	3-39 thru 3-44
3-47 and 3-48	3-47 and 3-48
3-51 and 3-52	3-51 and 3-52
3-55 and 3-56	3-55 and 3-56
3-59 and 3-60	3-59 and 3-60
3-63 and 3-64	3-63 and 3-64
3-67 and 3-68	3-67 and 3-68
3-71 thru 3-74	3-71 thru 3-74
3-77 and 3-78	3-77 and 3-78
3-81 and 3-82	3-81 and 3-82
3-85 and 3-86	3-85 and 3-86
3-89 and 3-90	3-89 and 3-90
3-93 and 3-94	3-93 and 3-94
3-97 and 3-98	3-97 and 3-98
3-101 and 3-102	3-101 and 3-102
3-105 and 3-106	3-105 and 3-106
3-109 thru 3-112	3-109 thru 3-112
3-115 and 3-116	3-115 and 3-116
3-119 and 3-120	3-119 and 3-120
3-125 thru 3-128	3-125 thru 3-128
3-133 thru 3-136	3-133 thru 3-136
3-139 and 3-140	3-139 and 3-140
3-143 and 3-144	3-143 and 3-144
3-147 and 3-148	3-147 and 3-148
3-151 and 3-152	3-151 and 3-152
3-157 and 3-158	3-157 and 3-158
3-161 and 3-162	3-161 and 3-162

Remove pages

3-167 thru 3-170  
 3-175 thru 3-184  
 7-5 and 7-6  
 7-9 thru 7-14  
 7-17 thru 7-22  
 7-27 thru 7-36  
 7-39 and 7-40  
 7-43 thru 7-48  
 7-51 thru 7-58  
 None  
 7-59 thru 7-82  
 7-85 and 7-86  
 7-89 thru 7-94  
 7-97 and 7-98  
 7-101 thru 7-110  
 7-113 thru 7-126  
 7-131 and 7-132  
 7-135 and 7-136  
 7-139 and 7-140  
 7-143 and 7-144  
 7-147 thru 7-150  
 B-5 and B-6  
 B-9 thru B-12

Insert pages

3-167 thru 3-170  
 3-175 thru 3-184  
 7-5 and 7-6  
 7-9 thru 7-14  
 7-17 thru 7-22  
 7-27 thru 7-36  
 7-39 and 7-40  
 7-43 thru 7-48  
 7-51 thru 7-58  
 7-58.1 thru 7-58.2  
 7-59 thru 7-82  
 7-85 and 7-86  
 7-89 thru 7-94  
 7-97 and 7-98  
 7-101 thru 7-110  
 7-113 thru 7-126  
 7-131 and 7-132  
 7-135 and 7-136  
 7-139 and 7-140  
 7-143 and 7-144  
 7-147 thru 7-150  
 B-5 and B-6  
 B-9 thru B-12

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Official:



JOEL B. HUDSON  
*Acting Administrative Assistant to the  
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00284

GORDON R. SULLIVAN  
*General, United States Army*  
*Chief of Staff*

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**LIST OF EFFECTIVE PAGES**

INSERT LATEST CHANGED PAGES. DESTROY SUPERSEDED PAGES.

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Dates of issue for original and changed pages are:

Original .....	0 .....	28 April 1994	Change .....	6 .....	15 March 2000
Change .....	1 .....	30 May 1995	Change .....	7 .....	15 September 2000
Change .....	2 .....	30 August 1996	Change .....	8 .....	30 August 2001
Change .....	3 .....	31 July 1996	Change .....	9 .....	10 December 2001
Change .....	4 .....	1 March 1999	Change .....	10 .....	28 February 2003
Change .....	5 .....	4 January 2000	Change .....	11 .....	27 October 2003

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 891, CONSISTING OF THE FOLLOWING:

Page	*Change	Page	*Change	Page	*Change
Cover .....	0	3-39.....	9	3-95 thru 3-97.....	1
A thru C.....	11	3-40 and 3-41 .....	0	3-98.....	1
D.....	8	3-42.....	1	3-99 thru 3-101 .....	0
i.....	11	3-43.....	0	3-102.....	1
ii .....	10	3-44.....	1	3-103 thru 3-105 .....	0
iii thru ix .....	11	3-45 thru 3-47.....	0	3-106.....	1
x.....	0	3-48.....	1	3-107 thru 3-109 .....	0
1-1 .....	0	3-49 and 3-50 .....	0	3-110.....	1
1-2 .....	1	3-51.....	1	3-111.....	0
1-3 and 1-4 .....	0	3-52 thru 3-54.....	0	3-112.....	1
2-1 thru 2-24.....	0	3-55.....	1	3-113 thru 3-115 .....	0
2-25 thru 2-114.....	0	3-56 thru 3-58.....	0	3-116.....	1
2-114.1 and 2-114.2 .....	10	3-59.....	1	3-117 thru 3-119 .....	0
2-115 thru 2-120.....	0	3-60 thru 3-62.....	0	3-120.....	1
2-120.1 thru 2-120.4.....	10	3-63.....	1	3-121 thru 3-125 .....	0
2-121 thru 2-164.....	0	3-64 thru 3-66.....	0	3-126.....	1
3-1 thru 3-5.....	0	3-67.....	1	3-127.....	0
3-6 .....	1	3-68 .....	0	3-128.....	1
3-7 .....	0	3-68.1 thru 3-68.4.....	8	3-129 thru 3-132 .....	0
3-8 .....	1	3-69 and 70.....	0	3-133.....	1
3-9 and 3-10 .....	0	3-71.....	1	3-134 and 3-135.....	0
3-11 .....	1	3-72 and 3-73 .....	0	3-136.....	1
3-12 thru 3-16.....	0	3-74.....	1	3-137 thru 3-139 .....	0
3-17 .....	1	3-74.1 and 3-74.2 .....	11	3-140.....	1
3-18 and 3-19 .....	0	3-75 and 3-76 .....	2	3-141 thru 3-143 .....	0
3-20 and 3-21 .....	1	3-77.....	9	3-144.....	1
3-22 and 3-23 .....	0	3-78.....	1	3-145 thru 3-147 .....	0
3-24 .....	1	3-79 thru 3-81.....	0	3-148.....	1
3-25 and 3-26 .....	0	3-82.....	1	3-149 thru 3-151 .....	0
3-27 .....	1	3-83 thru 3-85.....	0	3-152.....	1
3-28 thru 3-31.....	0	3-86.....	1	3-153 and 3-154.....	0
3-32 .....	1	3-87 thru 3-89.....	0	3-155 and 3-156.....	5
3-33 .....	0	3-90.....	1	3-157.....	1
3-34 .....	1	3-91 thru 3-93.....	0	3-158 .....	0
3-35 thru 3-38.....	0	3-94.....	1	3-159 and 3-160.....	5

\*Zero in this column indicates an original page

**LIST OF EFFECTIVE PAGES - Continued**

Page No.	*Change No.	Page No.	*Change No.	Page No.	*Change No.
3-161 .....	1	7-6.....	1	7-63.....	0
3-162 thru 3-166.....	0	7-7 thru 7-9.....	0	7-64.....	1
3-167 .....	1	7-10 and 7-11 .....	1	7-65.....	0
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**TECHNICAL MANUAL****No. 43-0001-28**

**HEADQUARTERS  
DEPARTMENT OF THE ARMY  
Washington, DC, 28 April 1994**

**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 ERRORS AND RECOMMENDING IMPROVEMENTS**

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 letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) located in the back of this manual directly to Logistics Support Engineering Division (AMSTA-AR-WEL-A), U.S. Army TACOM, Armament Research, Development and Engineering Center, Picatinny Arsenal, NJ 07806-5000. You may also send in your recommended changes via electronic mail or by fax. Our e-mail address is LSB@PICA.ARMY.MIL. Our fax number is DSN 880-4633, Commercial (973) 724-4633. A reply will be furnished to you.

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# CHAPTER 1

## INTRODUCTION

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### **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 weight, dimensions, performance data, packing, shipping and storage data, type classification, and logistics control code (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. Appendix A and TM 43-0001-28-4 through TM 43-0001-28-10 list authorized Cartridge/Projectile Fuze and Propelling Charge Combinations. These lists (i.e., charts) supersede the fuze and propelling charge combinations referenced on the data sheets.

d. 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 U.S. stocks remain.

Items with the following type classification are not included: Reclassified OBS for

all U.S. use. No U.S. stocks remain. (Foreign use or stock may remain.)

f. 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. 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
HC -----	Hexachloroethane-zinc
HD -----	Distilled mustard gas
HE -----	High explosive
HT -----	Mixture of HD&T
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
HVT-----	Hypervelocity, target practice
ILLUM -----	Illuminating
LCC -----	Logistics Control Code (class)
MOD -----	Modified
MK -----	Mark
MP.....	Multipurpose
MT -----	Mechanical time
MTSQ -----	Mechanical time and superquick
MV -----	Muzzle velocity
PD -----	Point detonating
PIBD -----	Point initiating, base detonating
PROX -----	Proximity
PWP .....	plasticized white phosphorous
RAP -----	Rocket assisted projectile

S&A	Safe and Arming
SD	Self destroying
T	Time fuse or for training only
-T	With tracer
TP	Target practice
TSQ	Time superquick
UNO	United Nations Organization
VX	Persistent toxic (casualty) nerve gas
WP	White phosphorous

#### 1-4. METRIC CONVERSION CHART

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

Table 1-1. Metric Conversion Chart

Approximate Conversions to Metric Measures				
Symbol	When You Know	Multiply By	To Find	Symbol
<b>LENGTH</b>				
in.	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
<b>AREA</b>				
in <sup>2</sup>	square inches	6.5	square centimeters	cm <sup>2</sup>
ft <sup>2</sup>	square feet	0.09	square meters	m <sup>2</sup>
yd <sup>2</sup>	square yards	0.8	square meters	m <sup>2</sup>
mi <sup>2</sup>	square miles	2.6	square kilometers	km <sup>2</sup>
	acres	0.4	hectares	ha
<b>WEIGHT</b>				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lbs)	0.9	tonnes	t
<b>VOLUME</b>				
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 <sup>3</sup>	cubic feet	0.03	cubic meters	m <sup>3</sup>
yd <sup>3</sup>	cubic yards	0.76	cubic meters	m <sup>3</sup>

TEMPERATURE				
Symbol	When You Know	Subtract	Multiply by	To Find Symbol
°F	Fahrenheit	32	0.55	Celsius °C

#### Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply By	To Find	Symbol
<b>LENGTH</b>				
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
<b>AREA</b>				
cm <sup>2</sup>	square centimeters	0.16	square inches	in <sup>2</sup>
m <sup>2</sup>	square meters	1.2	square yards	yd <sup>2</sup>
km <sup>2</sup>	square kilometers	0.4	square miles	mi <sup>2</sup>
ha	hectares (10,000m <sup>2</sup> )	2.5	acres	
<b>WEIGHT</b>				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000kg)	1.1	short tons	
<b>VOLUME</b>				
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 <sup>3</sup>	cubic meters	35	cubic feet	ft <sup>3</sup>
m <sup>3</sup>	cubic meters	1.3	cubic yards	yd <sup>3</sup>
<b>TEMPERATURE</b>				
Symbol	When You Know	Subtract	Multiply by	To Find Symbol
°C	Celsius	1.8	32	Fahrenheit °F

## **1-5. QUANTITY-DISTANCE CLASSES AND STORAGE COMPATIBILITY GROUPS**

Quantity-Distance (QD) classes and Storage Compatibility Groups (SCG) listed in this manual are changed. For conversion to new system see table 1-2.

**Table 1-2. Quantity-Distance Classes and Storage Compatibility Groups**

Quantity-distance hazard class <sup>1/</sup>		Storage compatibility group <sup>1/3/</sup>
Old	New <sup>2/</sup>	Typical - New
8	6.1	
7	1.1	D
6	1.2(18)	E
5	1.2(12)	
4	1.2(08)	F
3	1.2(04)	G
2	1.3 1.4	S

Notes:

<sup>1/</sup> New QD and SCG'S are compatible with classes used by NATO nations.

<sup>2/</sup> Numbers in parentheses are minimum distances x 100 feet to protect against specific fragment hazards and vary with items and types of ammunition. (Refer to TM 9-1300 -206.)

<sup>3/</sup> There is no simple conversion from old SCG's to new system. The SCG groups listed in this column are typical for the majority of items in the corresponding listed QD class but do not apply to every individual item in the class. For SCG of individual items refer to TM 9-1300-206.

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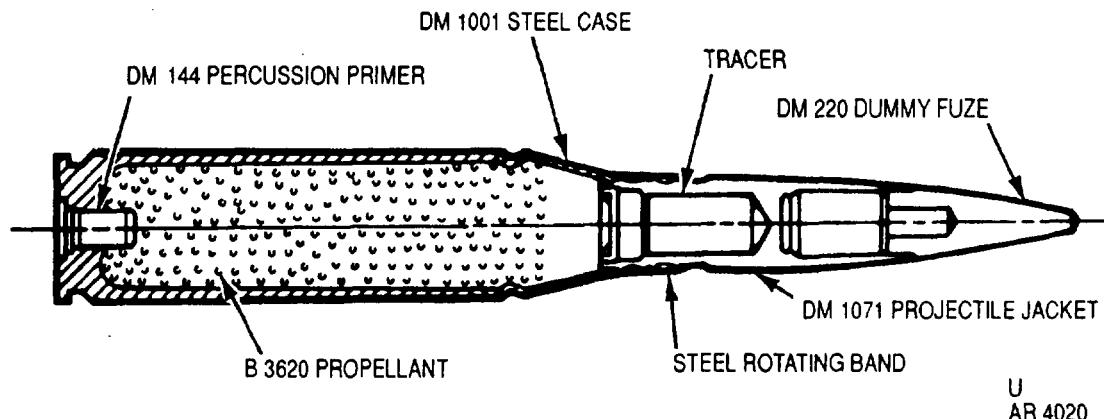
**CHAPTER 2**

**ARTILLERY AMMUNITION**

**FOR**

**GUNS**

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**CARTRIDGE, 35 MILLIMETER: TP-T M968 WITH IGNITOR, ELECTRIC, M63****Type Classification:**

LPU, 30 May 88.

**Use:**

The M968 cartridge and the M63 igniter are assembled to the cartridge adaptor component of the weapon system. See Mauser Tank Precision Gunnery Inbore Device (TPGID) Operator's Manual for loading sequence. The M968 cartridge is a target practice round for use in the 35mm TPGID system, which is mounted inside the 120mm smooth bore M256 cannon. It is designed to simulate the flight characteristics of the M830 and M831 rounds out to 1,800 meters.

**Description:**

**Cartridge M968.** The projectile consists of a DM1071 projectile jacket, a DM220 dummy point-detonating fuze, a tracer, and a press-seated steel rotating band. The projectile is crimped to a DM1001 steel cartridge case, which holds approximately 0.69 pound (0.31 kg) of B3620 single-base propellant and is fitted with a DM144 percussion primer.

**Ignitor M63.** The M63 igniter consists of a closing plug assembly, an igniter body assembly and an ignitor element assembly. The ignitor element assembly is loaded with approximately 0.006 ounce (0.17 g) of igniter material (40% Potassium Chlorate, 32% Lead Thiocyanate, 18% Charcoal, and 10% Egyptian Lacquer) and is assembled to the ignitor body.

The closing plug assembly contains approximately 0.007 ounce (0.198 g) of black powder and is also assembled to the igniter body.

**Functioning:**

The TPGID cartridge adaptor is loaded into the 120mm smooth bore cannon in the normal manner. Upon initiation of the M63 igniter in the weapon, gases from the igniter force the piston/firing pin mechanism to strike the percussion primer of the M968. Functioning of the percussion primer initiates the B3620 propellant. The resulting gases drive the projectile from the gun and ignite the tracer. The projectile is spin stabilized during its flight to target.

**Tabulated Data:****M968 Cartridge.**

Type classification ----- LPU, 30 May 88  
Complete round:

Type -----	Fixed, TP-T
Length -----	15.24 in. (38.71 Cm)
Weight -----	3.46 lb (1.57 kg)
Cannon used with -----	35mm TPGID system mounted to 120mm smooth bore M256 cannon
Assembly drawing -----	12910291
Color-----	Blue w/white marking on projectile

Temperature limits:  
 Firing:  
 Lower limit ----- -25°F (31.7°C)  
 Upper limit ----- (+37.8°C)

Storage:  
 Lower limit ----- -25°F (-31.7°C)  
 Upper limit ----- +125°F (+51.7°C)

Packaging:  
 Packing and marking drawing ----- 12910292  
 \*Packing ----- 2 rounds per styrofoam pack; 8 styrofoam packs per metal container; 10 metal containers per pallet

Metal container:  
 Weight (w/ammo) ----- 99 1b (45 kg)  
 Dimensions ----- 27.1 in. L x 7.8 in. W x 7.8 in. H (68.9 cm L x 19.8 cm W x 19.8 cm H)  
 Cube ----- 0.96 cu ft (0.03 cu m)

M63 Ignitor.

Type classification ----- N/A  
 Complete round:  
 Type ----- Ignitor, electric  
 Length ----- 1.72 in. (4.37 cm)  
 Weight ----- 1.68 oz (47.63 g)  
 Cannon used with ----- 35mm TPGID system mounted to 120mn smooth bore M256 cannon  
 Assembly drawing----- 8839497  
 Color ----- Brass with black marking

Temperature limits:  
 Firing:  
 Lower limit ----- -25°F (-31.7°C)  
 Upper limit ----- +100°F (+37.8°C)

Storage:  
 Lower limit ----- -25°F (-31.7°C)  
 Upper limit ----- +125°F (+51.7°C)

Packaging:  
 Inner packing drawing ----- 8837898  
 Outer packing drawing ----- 8837897  
 \*Packing ----- 50 igniters per carton; 9 cartons per box

Box container:  
 Weight ----- 75 lb (34 kg)  
 Dimensions ----- 15 in. L x 9.375 in. W x 7.44 in. H (38 cm L x 23.813 cm W x 18.9 cm H)  
 Cube ----- 0.7 cu ft (0.02 cm)

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

### Shipping and Storage Data:

#### M968 Cartridge.

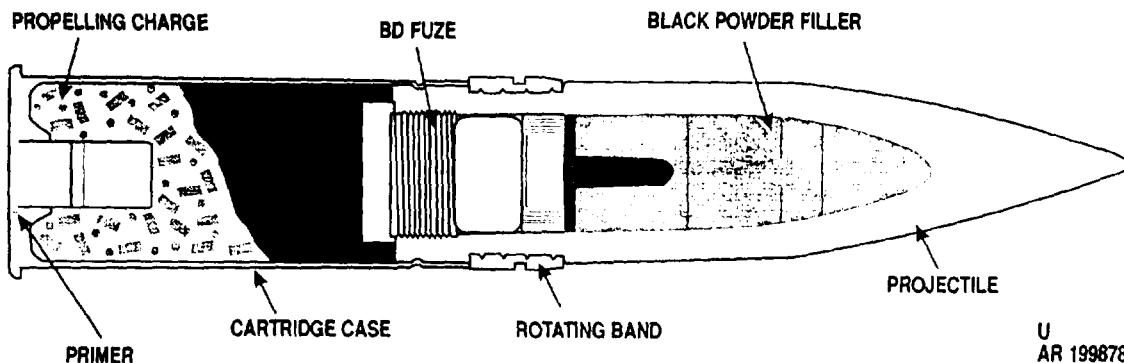
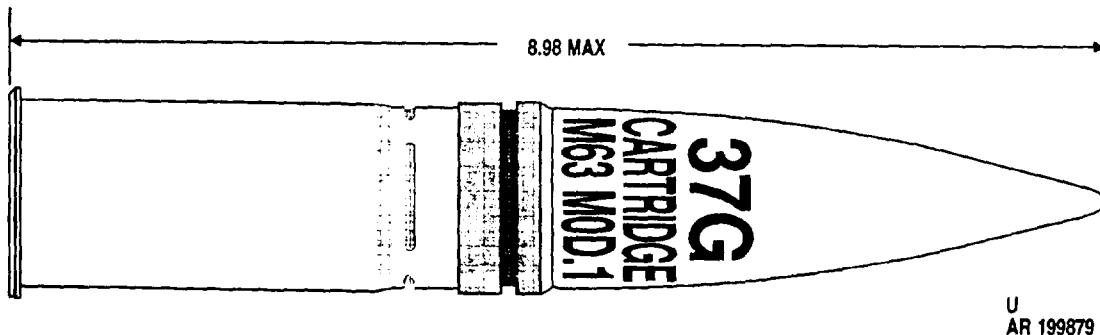
UNO serial number ----- 0339  
 DOT hazard class ----- (08) 1.4C  
 DOD storage compatibility group ----- C  
 DOT designation ----- AMMUNITION FOR CANNON W/SOLID PROJECTILE, CLASS C EXPLOSIVE  
 DODAC ----- 1310-B591

M63 Ignitor.

DOT hazard class ----- (04) 1.2 C  
 DOD storage compatibility group ----- G  
 DOT designation ----- CANNON PRIMER - HANDLE CAREFULLY  
 DODAC ----- 1305-N700

### NOTE

Only the M968 is to be fired from the 35mm TPGID system.

**CARTRIDGE, 37 MILLIMETER: TP, M63, MOD 1****Type Classification:**

STD OTCM 37119 dtd 1959.

**Use:**

This target practice cartridge is used in subcaliber 37mm 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. Upon 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 lb
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, 1.5 lb
Fuze -----	M58

**Propelling charge:**

Cartridge case -----	MK1A2, MK1A2B1
----------------------	-------------------

**Propellant -----** M2, 0.56 lb

**Primer -----** M23A2 percussion

**Performance:**

Maximum range -----	4459 m (4980 yd)
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 4 hr/day)

\***Packing -----** 1 round per fiber container; 20 containers per wooden box

\* **Packing box:**

Weight -----	60.5 lb
Dimensions -----	23-11/16 x 11-7/16 x 6-19/32 in.
cube -----	1 cu ft

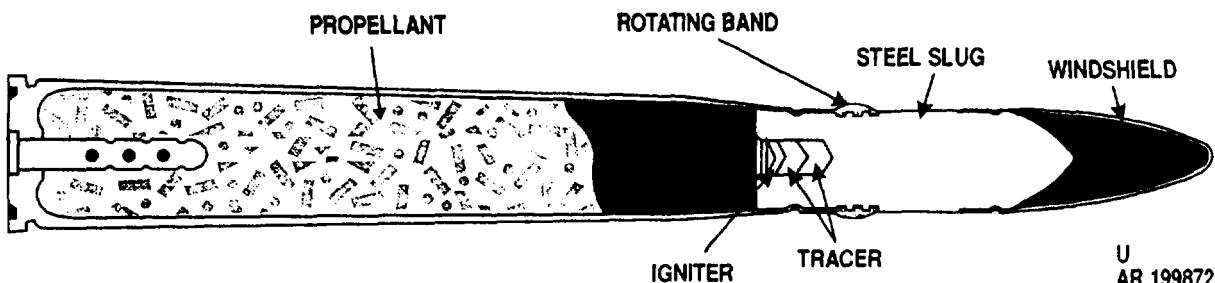
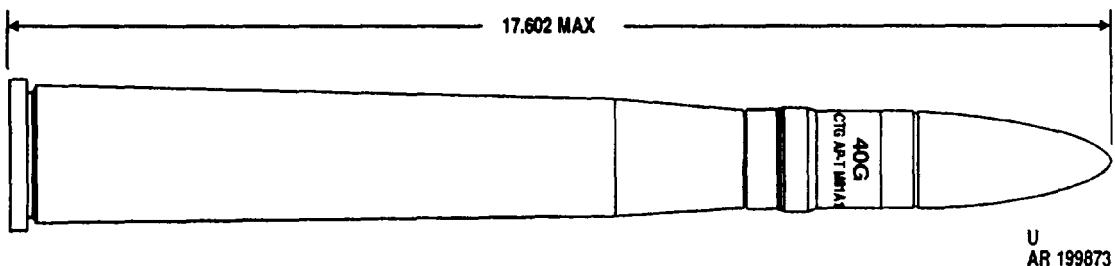
\* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

#### **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:**

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

**CARTRIDGE, 40 MILLIMETER: AP-T, M81A1 AND M81****Type Classification:**

CONT AMCTC 6418 dtd 1968.

**Use:**

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

**Description:**

The projectile for the M81A1 cartridge 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 1,000 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 car-

tridge 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. Upon impact, the thin windshield crumbles, but the hardened steel slug penetrates the armor of the target.

**Difference Between Models:**

The windshield on the 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 lb  
 Length ----- 17.6 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  
                          yd)  
 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 hr/day)

\*Packing ----- 1 per fiber con-  
 tainer; 8 con-  
 tainers per  
 wooden box

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

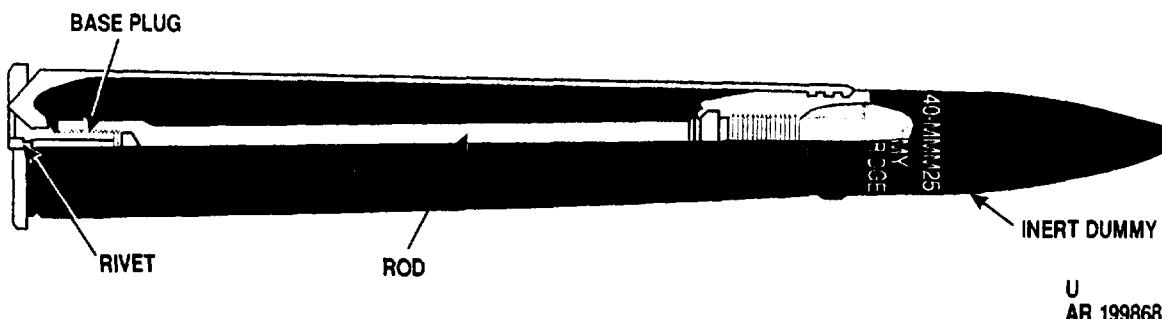
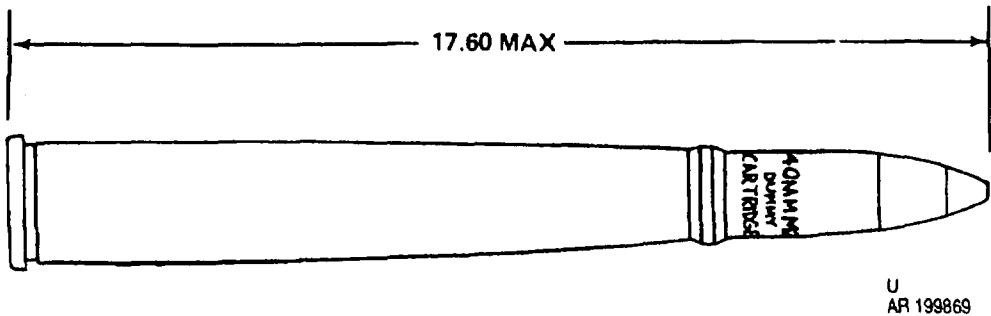
\* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

UNO serial number ----- 0328  
 Quantity-distance class ----- (08) 1.2  
 Storage compatibility group --- C  
 DOT shipping class ----- B  
 DOT designation ----- AMMUNITION  
                          FOR CANNON  
                          WITH SOLID  
                          PROJECTILES  
 DODAC ----- 1310 -B552  
 Drawing number ----- 75-1-140

**References:**

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

**CARTRIDGE, 40 MILLIMETER: DUMMY, M25****Type Classification:**

STD OTCM 36841 dtd 1958.

**Use:**

This dummy cartridge is used in 40mm 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 nonfunctioning.

**Tabulated Data:****Complete round:**

Type -----	Dummy
Weight -----	4.75 lb
Length -----	17.6 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 1b  
 Dimensions ----- 21-1 1/16 x  
 7-3 1/32 x  
 12-9/16 in.  
 Cube ----- 1.3 cu ft

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

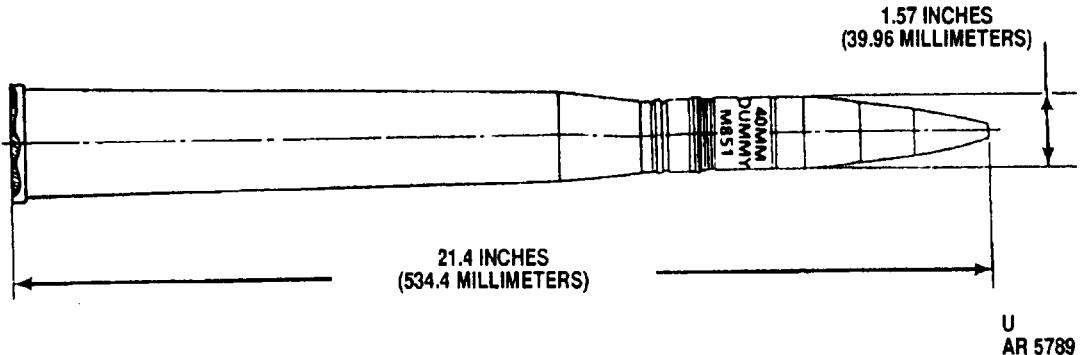
**Shipping and Storage Data:**

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:**

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

**CARTRIDGE, 40 MILLIMETER: DUMMY, M851  
(FOR SGT YORK)**



**Type Classification:**

STD LEC-A MSR 05826003.

**Use:**

This completely inert round is used to train personnel to load and unload the Sgt York 40mm gun M247.

**Description:**

The dummy cartridge is completely inert and is machined from a solid aluminum alloy bar.

**Functioning:**

The dummy cartridge is nonfunctioning and cannot be fired.

**Tabulated Data:**

Complete round:

Type -----	Dummy
Weight -----	5.5 lb (2.42 kg)
Length -----	21.04 in. (534.4 mm)

Color -----	Bronze metal colored w/white markings
-------------	---------------------------------------

*Packing box:	
Weight -----	1500 lb
Dimensions -----	28 in. (71.12 cm) x 56.3 in. (143 cm) x 43.1 in. (109.47 cm)
Cube -----	38.9 cu ft (1.08 cu m)

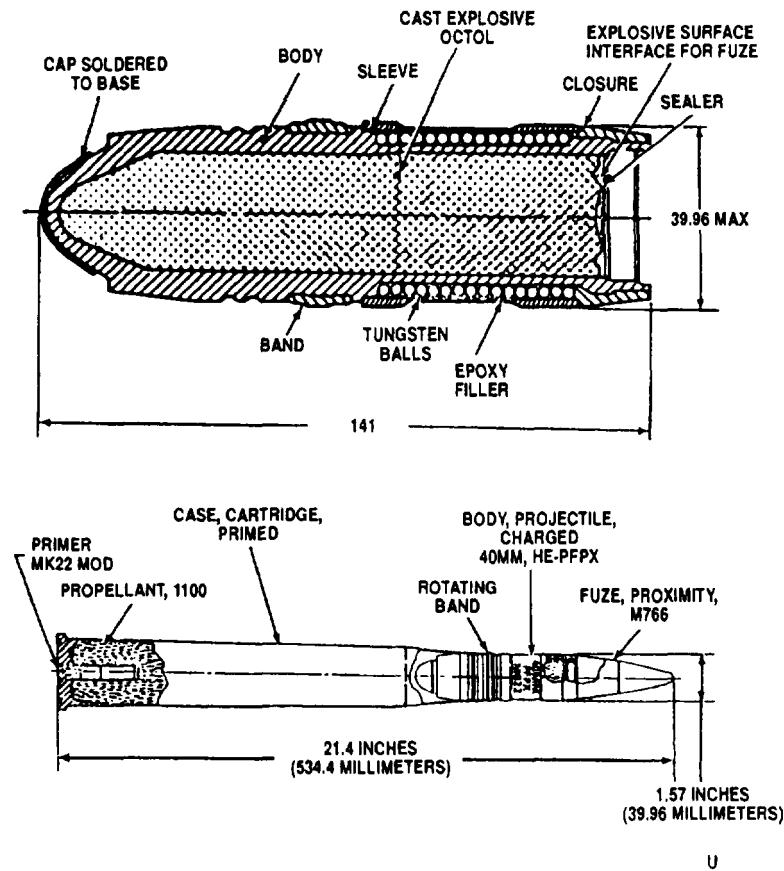
\* NOTE: See SC for complete packing data including NSN's.

**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-B583
Drawing number -----	12600005

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**CARTRIDGE, 40 MILLIMETER: HE M822 WITH FUZE PROXIMITY, M766  
(FOR SGT YORK)**

U  
AR 5788

**Type Classification:**

STD MSR 05826003.

**Use:**

This cartridge with the proximity fuze is primarily used against low flying aircraft. It is fired from the Sgt York 40mm gun M247.

**Description:**

The projectile of this cartridge is made of alloy steel with tungsten pre-fragmented spheres. It is filled with Octol (120 g). This projectile is designed to fragment and disburse tungsten spheres upon detonation of explosive charge. The cartridge is brass and crimped to the projectile. The cartridge case contains approximately 500 grams of propellant. The base of the cartridge case contains a percussion

primer containing black powder and a percussion element. The color of the projectile body is painted yellow with black markings. The projectile nose is threaded to receive the proximity fuze. The M766 proximity fuze is radar controlled and functions either upon target impact or when in close proximity to the target.

**Functioning:**

When the firing pin of the weapon strikes the percussion primer, the black powder ignites which, in turn, ignites the propellant. This causes the rapidly expanding gases, generated by the burning propellant, to propel the projectile toward the target. Upon approaching or impacting the target, the proximity fuze detonates the Octol causing the projectile to burst and disburse the tungsten spheres and other fragments.

**Tabulated Data:**

Complete round:  
 Type ----- HE  
 Weight ----- 5.5 lb (2490 g)  
 Length ----- 21 in. (534 mm)  
 Cannon used ----- M266

Projectile:  
 Body material ----- Alloy steel  
                           w/tungsten pre-  
                           fragmented  
                           spheres  
 Color ----- Yellow body w/  
                           black markings  
 Filler and weight ----- Octol, 120 g

Components:  
 Tracer ----- N/A  
 Fuze ----- M766 proximity  
 Cartridge case ----- Brass  
 Propellant and weight ----- Single base, sin-  
                           gle perforated,  
                           515 g  
 Primer ----- MK22

Performance:  
 Muzzle velocity ----- 1100 mps

Temperature limits:  
 Firing:  
 Lower limit ----- -40°F (-40°C)  
 Upper limit ----- +140°F (+60°C)

Storage:  
 Lower limit ----- -80°F (-62°C)  
                           (for period not  
                           more than 3  
                           days)

Upper limit ----- +160°F (+71°C)  
                           (for period not  
                           more than 4  
                           hr/day)

\*Packing ----- 192 cartridges  
                           per box; 48  
                           clips, 4 rounds  
                           per clip

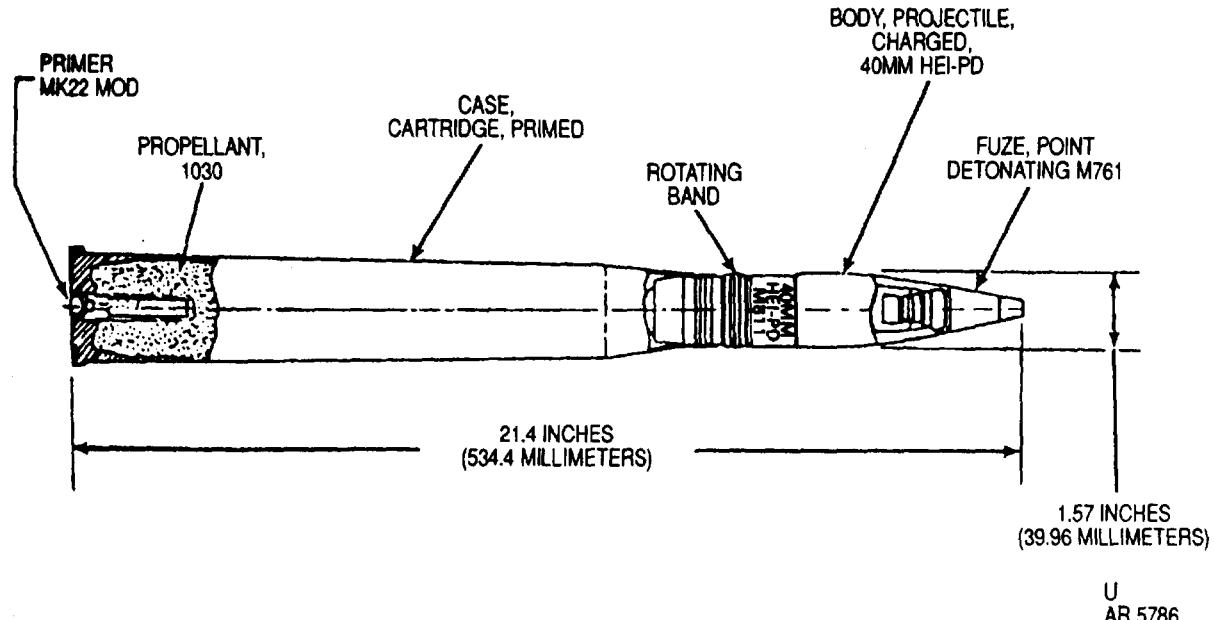
\*Packing box:  
 Weight (empty) ----- 242 lb  
 Weight (loaded) ----- 1500 lb  
 Dimensions ----- 56.3 x 43.1 x  
                           28 in.  
 cube ----- 39.9 cu ft

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

**Shipping and Storage Data:**

UNO serial number ----- 0321  
 Quantity-distance class ----- (0.4) 1.2  
 Storage compatibility group --- E  
 DOT shipping class ----- A  
 DOT description ----- AMMUNITION  
                           FOR CANNON  
                           WITH  
                           EXPLOSIVE  
                           PROJECTILE  
 DODAC ----- 1310-B518  
 Drawing number ----- 12600002

**CARTRIDGE, 40 MILLIMETER: HEI M811 WITH POINT-DETONATING FUZE M761  
(FOR SGT YORK)**



U  
AR 5786

**Type Classification:**

STD MSR 05826003.

**Use:**

This cartridge is used against low flying aircraft and also ground targets. It is fired from the Sgt York 40mm gun 247.

**Description:**

The projectile of this cartridge is high-explosive incendiary with a point-detonating delay action fuze. The projectile is alloy steel filled with Octol (165 g). The projectile nose is threaded to receive the fuze. The cartridge case is brass and crimped rigidly to the projectile. The cartridge case contains approximately 500 grams of propellant. The base of the cartridge case contains a percussion primer consisting of a perforated tube containing black powder and a percussion element. The color of the projectile body is painted yellow with black markings and a light red band. The M761D point-detonating fuze has a delay action module, is graze sensitive, and is self-destructing.

**Functioning:**

When the firing pin of the weapon strikes the percussion primer, the black powder ignites which, in turn, ignites the propellant. The rapidly expanding gases generated by the burning propellant propels the projectile. Upon impact, the target fuze detonates the high-explosive incendiary charge of the projectile.

**Tabulated Data:**

Complete round:

Type -----	HEI
Weight -----	5.5 lb (2490 g)
Length -----	21 in. (534 mm)
Cannon used -----	M266

Projectile:

Body material -----	Alloy steel
Color -----	Yellow body w/black markings; 1 light red band
Filler and weight -----	Octol, 165 g

Components:

Tracer -----	N/A
Fuze -----	M761 PD (delay)

Components (cont):  
 Cartridge case ----- Brass  
 Propellant and weight ----- Single base, single perforated,  
                                   500 g

Performance:  
 Muzzle velocity ----- 1100 mps

Temperature limits:  
 Firing:  
   Lower limit ----- -40°F (-40°C)  
   Upper limit ----- +140°F (+60°C)

Storage:  
   Lower limit ----- -80°F (-62°C)  
     (for period not  
     more than 3  
     days)  
   Upper limit ----- +160°F (+71°C)  
     (for period not  
     more than 4  
     hr/day)

\*Packing ----- 192 cartridges  
                           per metal shipping container;  
                           48 clips, 4  
                           rounds per clip

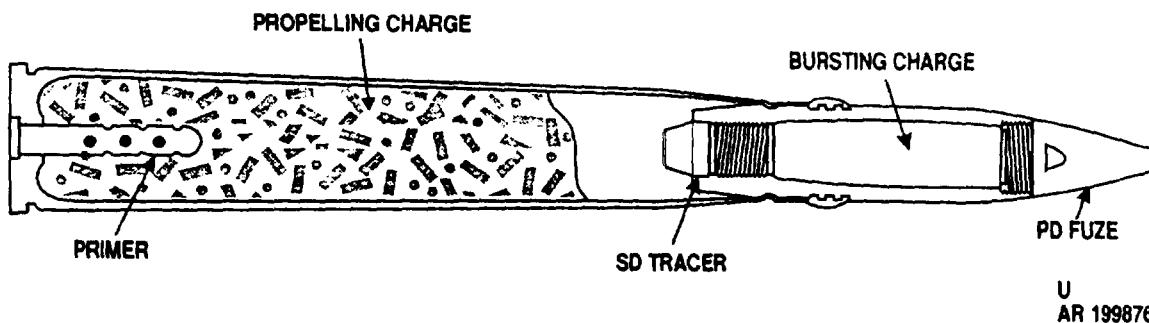
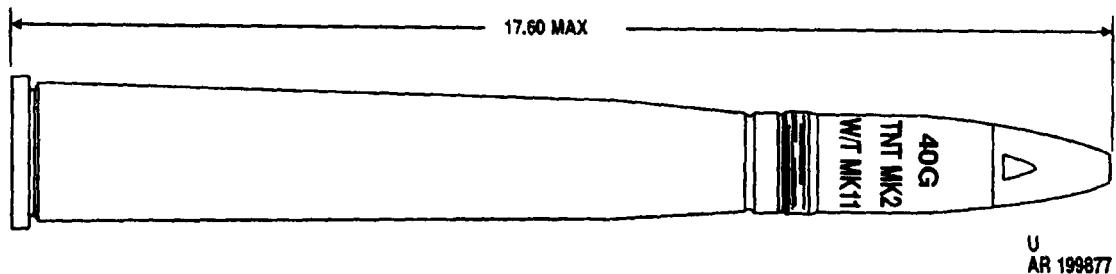
\*Packing box:  
 Weight (empty) ----- 242 lb  
 Weight (loaded) ----- 1500 lb  
 Dimensions ----- 56.3 x 43.1 x  
                           28 in.  
 cube ----- 38.9 cu ft

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

#### **Shipping and Storage Data:**

UNO serial number ----- 0321  
 Quantity-distance class ----- (04) 1.2  
 Storage compatibility group--- E  
 DOT shipping class ----- A  
 DOT description ----- AMMUNITION  
                                   FOR CANNON  
                                   WITH  
                                   EXPLOSIVES  
 DODAC ----- 1310-B517  
 Drawing number ----- 12600009

**CARTRIDGE, 40 MILLIMETER: HE-T, SD, MK11, MK2, MV2870 AND SD, M3  
OR M3A1, MV2700**



**Type Classification:**

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

**Use:**

This cartridge is used in 40mm gun cannons for firing against materiel.

**Description**

The thin-walled projectile contains a TNT bursting charge, a point-detonating fuze, and a self-destroying tracer. The projectile nose is internally threaded to receive the fuze. The boat-tailed base has a self-destroying tracer assembly threaded internally. The assembly protruding approximately 0.6 inch from the base, contains an igniting charge, a 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 the projectile by means of a 360° crimp. This cartridge provides a muzzle velocity of 2,870 feet per second.

**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.

**Difference Between Models:**

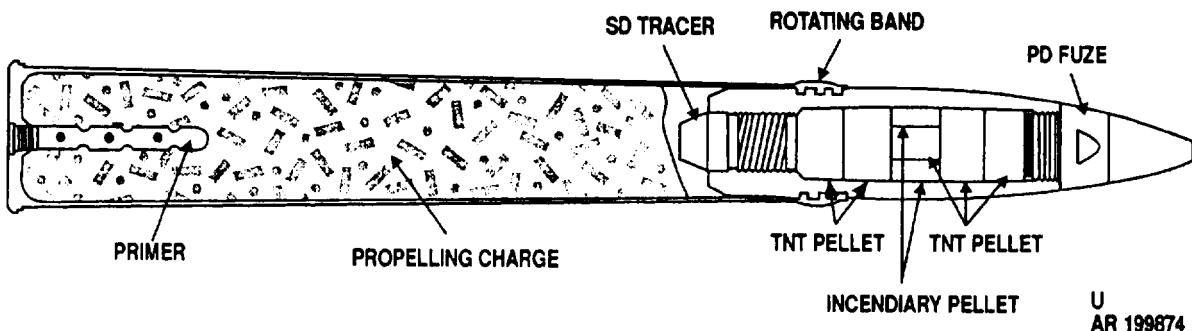
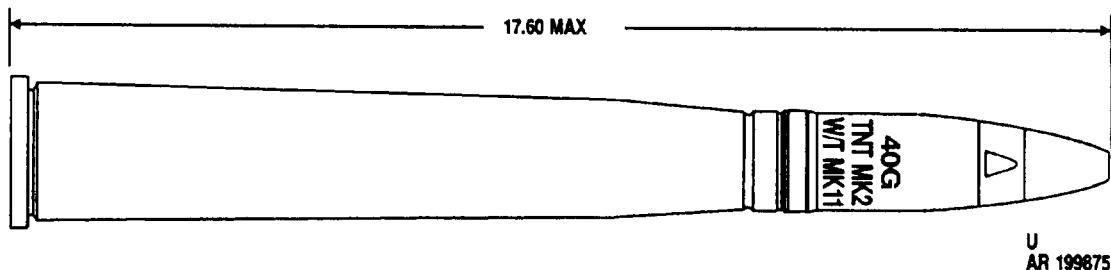
The MV2700 is similar except the tracer is M3 or M3A1 and the projectile is loaded with tetryl.

**Tabulated Data:**

Complete round:

Type	-----	HE-T, SD
Weight	-----	4.75 lb
Length	-----	17.6 in.

<b>Complete round (cont):</b>	
Cannon used with -----	M1 series, M2 series or MK1 (Navy)
<b>Projectile:</b>	
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
<b>Components:</b>	
Cartridge case -----	M25, M25B1
Propelling charge -----	M1 propellant, 0.72 lb
Primer -----	M38, M38B2 or M K 2
Tracer -----	MK11, MK11 Mod 2; M3, M3A1-Red
Bursting charge -----	Pressed TNT
Fuze -----	PD-MK27 (M3 or M3A1) M27, M71 (MK11, MK11 Mod 2)
<b>Performance:</b>	
Maximum range -----	SD, MK2 (2870 fps): 4300 yd (tracer burn-out); SD, MK2 (2700 fps): 5700 yd (tracer burn-out)
<b>Temperature limits:</b>	
<b>Firing:</b>	
Lower limit -----	-40°F
Upper limit -----	+125°F
<b>Storage:</b>	
Lower limit -----	-80°F (for period not more than 3 days)
	Upper limit ----- + 160°F (for period not more than 4 hr/day)
	*Packing (Navy) ----- 4 cartridges per charger clip; 4 clips (16 cartridges) per metal box
	*Packing box (Navy):
	Weight ----- 110 lb
	Dimensions ----- 22 x 11-3/4 x 11-3/4 in.
	Cube ----- 1.7 cu ft
	*Packing (Army) ----- 1 round per fiber container; 8 containers per wooden box
	*Packing box (Army):
	Weight ----- 59 lb
	Dimensions ----- 21-11/15 x 12-9/16 x 7-31/32 in.
	Cube ----- 1.3 cu ft
* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.	
<b>Shipping and Storage Data:</b>	
UNO serial number -----	0321
Quantity-distance class -----	(08) 1.2
Storage compatibility group ---	E
DOT shipping class -----	A
DOT designation -----	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC -----	1310-B562
Drawing number -----	75-1-166
<b>References:</b>	
AMC-P 700-3-3	
SB 700-20	
TM 9-1300-251-20	

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

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

**Use:**

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

**Description:**

The relatively thin-walled projectile contains a burster charge, an incendiary charge, a point-detonating fuze, and a self-destroying (SD) tracer. The projectile nose is threaded to receive the fuze. The SD tracer assembly is contained in the boat-tailed base of the projectile, which is internally threaded, and it extends approximately 0.6 inch beyond the base. The SD 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 Between 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, SD
Weight	4.75 lb
Length	17.6 in.
Cannon used with	M1 series, M2 series, MK1 (Navy)

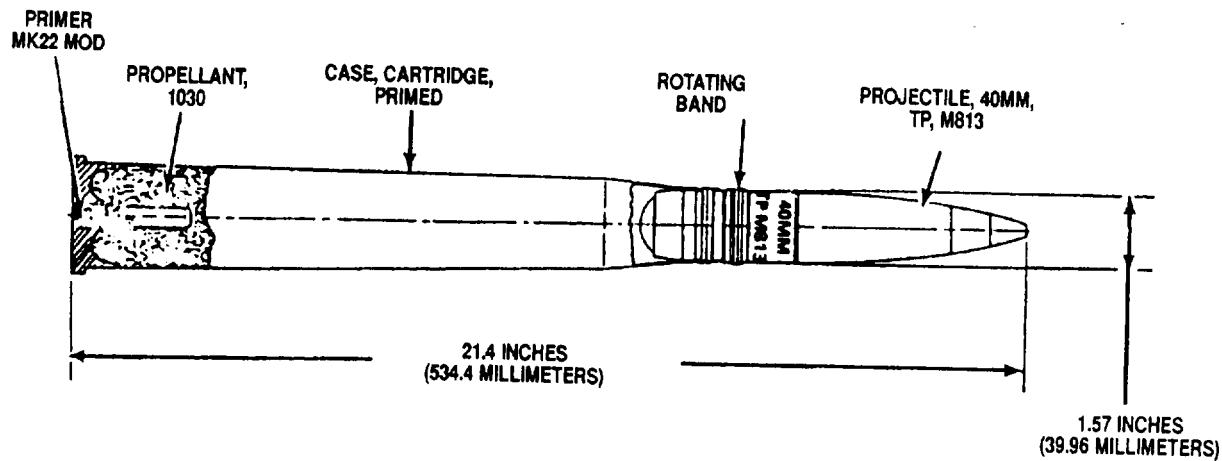
Projectile:		*Packing (Navy)-----	4 cartridges in charger clip; 4 charger clips in metal box
Body material -----	Steel		
Color:			
Army mfg-----	Olive drab w/yellow marking	Weight -----	110 lb
Navy mfg -----	Green w/black band	Dimensions -----	22 x 11.75 x 11.75 in.
Filler and weight -----	TNT, 0.14 lb (tracer incen- diary charge, 36 gr)	Cube -----	1.7 cu ft
Components:		*Packing (Army) -----	1 cartridge in fiber container; 8 containers in wooden box
Cartridge case -----	MK2, MK2 Mod, or MK3		
Tracer -----	MK11, MK11 M o d s	*Packing box:	
Tracer charge -----	Igniting charge, a red tracer composition, and a relay igniting charge of black powder	Weight -----	59 lb
Faze -----	PD, MK27	Dimensions -----	2 1 - 1 1 / 1 6 x 7-31/32 x 12-9/16 in.
Propelling charge -----	M1 propellant, 0.72 lb	Cube -----	1.3 cu ft
Primer -----	MK22, M38A1, M38B2		
Burster charge -----	TNT powder and incendiary charge		
Performance:		*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.	
Maximum range -----	3932 m (4300 yd)		
Muzzle velocity -----	879 mps (2890 fps)		
Temperature limits:			
Firing:			
Lower limit -----	-40°F	Shipping and Storage Data:	
Upper limit -----	+125°F		
Storage:			
Lower limit -----	-80°F (for period not more than 3 days)	UNO serial number -----	0321
Upper limit -----	+160°F (for period not more than 4 hr/day)	Quantity-distance class -----	(08) 1.2

**Shipping and Storage Data:**

UNO serial number -----	0321
Quantity-distance class -----	(08) 1.2
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:**

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

**CARTRIDGE; 40 MILLIMETER: TP, M813 (SGT YORK)**U  
AR 5787**Type Classification:**

STD MSR 05826003.

**Use:**

This fixed cartridge is used for target practice in the Sgt York 40mm gun M247.

**Description:**

The projectile is filled with inert material and simulates the DIVAD combat round (HE M811). A rotating band encircles the projectile near the base where the projectile is assembled into the cartridge case. The projectile is painted blue with white markings. The cartridge case is brass and crimped to the projectile. The cartridge case contains approximately 515 grams of propellant. The base of the case forms an extractor rim and contains a percussion primer.

**Functioning:**

When the firing pin of the weapon strikes the percussion primer, the black powder ignites which, in turn, ignites the propellant. This

causes rapidly expanding gases, generated by the burning propellant, to propel the projectile toward the target. The inert projectile does not detonate on impact.

**Tabulated Data:**

Complete round:	TP
Type	TP
Weight	5.5 lb (2490 g)
Length	21 in (534 mm)
Cannon used	M266
Projectile:	
Body material	Carbon steel
Color	Blue w/white
Filler	markings Inert material
Components:	
Tracer	N/A
Fuze	N/A
Cartridge case	Brass
propellant and weight	Single base, single perforated, 515 g
Primer	MK22
Performance:	
Muzzle velocity	1100 mps

Temperature limits:  
 Firing:  
 Lower limit ----- -40°F (-40°C)  
 Upper limit ----- +140°F (+60°C)

Storage:  
 Lower limit ----- -80°F (-62°C)  
 (for period not  
 more than 3  
 days)  
 Upper limit ----- +160°F (+71°C)  
 (for period not  
 more than 4  
 hr/day)

\*Packing ----- 192 cartridges  
 per box, 16  
 rounds per  
 layer; 48 clips, 4  
 rounds per clip

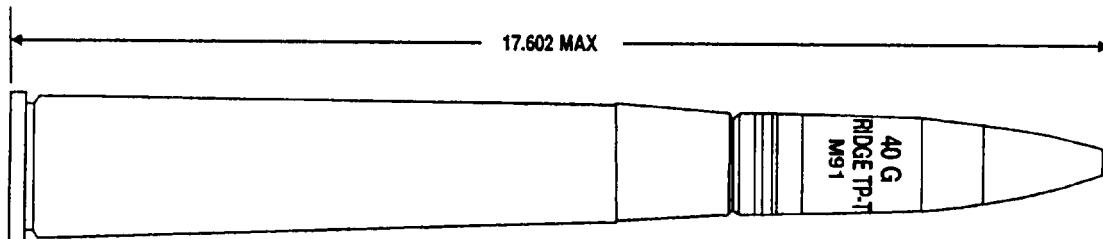
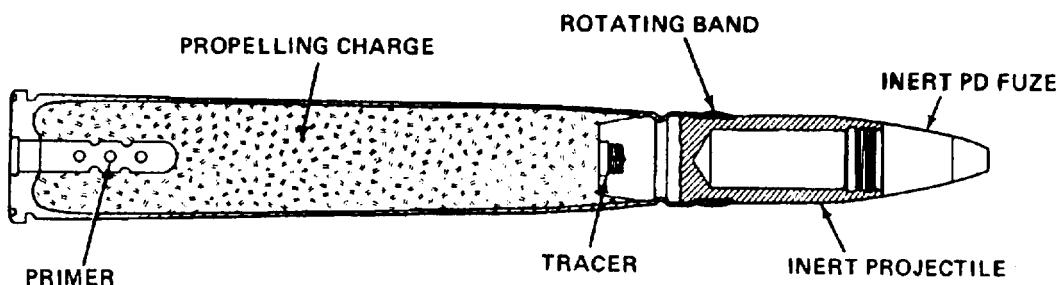
\*Packing Box:  
 Weight (empty) ----- 242 lb

Weight (loaded) ----- 1500 lb  
 Dimensions ----- 56.3 x 43.1 x  
 28 in.  
 Cube ----- 38.9 cu ft

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

**Shipping and Storage Data:**

UNO serial number ----- 0417  
 Quantity-distance class ----- (02) 1.3  
 Storage compatibility group--- C  
 DOT shipping class ----- B  
 DOT description ----- AMMUNITION  
 FOR CANNON  
 WITH EMPTY  
 PROJECTILE  
 DODAC ----- 1310-B511  
 Drawing number ----- 12600003

**CARTRIDGE, 40 MILLIMETER: TP-T, M91**U  
AR 199871

AR199870

**Type Classification:**

CONT OTCM 37119 dtd 1959.

**Use:**

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

**Description:**

The projectile, filled with an inert material, simulates the high-explosive 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 and is filled with loose propellant. The base of the case forms an extractor rim and it contains a percussion primer which consists 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. 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 lb
Length -----	17.6 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  
 Fuze ----- Dummy, M69 or M69B1 Inert, M71 or MK27  
**Propelling charge:**  
 Cartridge case ----- M25, M25B1  
 Propellant and weight ----- M1, 0.721b  
 Primer ----- M38A1, M38B2, MK22  
**Performance:**  
 Maximum range ----- 10,058 m (11,000 yd)  
 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 hr/day)  
**\*Packing (Navy)**----- 4 cartridge per charger clip; 4 clips in metal box

**\*Packing box (Navy):**  
 Weight ----- 111 lb  
 Dimensions ----- 22 x 11.75 x 11.75 in.  
 cube ----- 1.7 cu ft  
**\*Packing (Army)**----- 1 round per fiber container; 2 containers per wooden box  
**\*Packing box (Army):**  
 Weight ----- 59 lb  
 Dimensions ----- 21-11/16 x 7-31/32 x 12-9/16 in.  
 cube ----- 1.3 cu ft

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

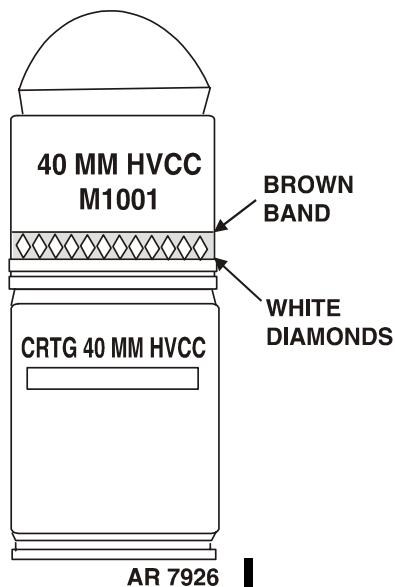
#### **Shipping and Storage Data:**

UNO serial number ----- 0328  
 Quantity-distance class ----- (08) 1.2  
 Storage compatibility group--- C  
 DOT shipping class ----- B  
 DOT designation ----- AMMUNITION FOR CANNON WITH INERT LOADED PROJECTILES  
 DODAC ----- 1310-B564  
 Drawing number ----- 75-1-173

#### **References:**

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

**CARTRIDGE, 40 MILLIMETER: HIGH VELOCITY CANISTER CARTRIDGE (HVCC),  
M1001**



**Type Classification:**

STD. 9 April 2001.

**Use:**

Cartridge, 40mm: High Velocity Canister Cartridge (also known as HVCC or the 40mm Canister Cartridge) is used against personnel out to 100 meters from the weapon. It is used with the Mk19 MOD 3 Grenade Machine Gun (GMG).

**Description:**

The cartridge is a fixed round of ammunition consisting of a projectile assembly and a cartridge case assembly. The projectile has an aluminum sabot body with 113 steel flechettes, an aluminum nosecap, a pusher cap, valve plate, spring, bore rider retaining disk, rubber pad, obturator and an expulsion charge. The cartridge case is aluminum with a high pressure and a low pressure chamber and a percussion primer.

**Functioning:**

When the firing pin of the Mk19 MOD 3 GMG strikes the percussion primer, propellant gases in the high-pressure chamber blow through vent holes into the low-pressure chamber to propel the projectile forward. Propellant gas is bled into the base of the canister projectile through a hole in the bottom of the

sabot body. The force of the gas acting on the valve plate pushes it forward against a spring and opens the plenum chamber. Propelling gas ignites the expulsion charge located in the plenum chamber and expulsion charge gas pushes the valve plate closed and pushes the pusher cup forward. The pusher cup is loaded with a quantity of 113 flechettes. The forward motion of the pusher cup and the flechettes releases the nosecap. Once the nosecap is released, the pusher cup and flechettes are free to deploy. No parts of the canister projectile are left in the bore of the Mk19 MOD 3 GMG after firing.

**Tabulated Data:**

NSN .....	1310-01-464-4117 (USA)
.....	1310-01-464-4121 (USMC)
DODAC .....	1310-BA11

Complete round:

Type.....	Canister
Weight .....	0.75 lb
Length .....	4.392 in.
Weapons used with.....	40mm Mk19 MOD 3 Grenade Machine Gun

Projectile:  
 Body material ..... Aluminum  
 Color ..... Olive Drab  
 Filler and weight..... 113 steel  
                                   felchettes  
 Fuze ..... None

Propelling charge:  
 Cartridge case ..... M169  
 Propellant.....M2  
 Primer ..... Percussion, FED  
                           215  
 Expulsion charge ..... WC231 Ball powder

Performance:  
 Maximum range.....100 m  
 Muzzle velocity .....790 fps

**Temperature limits:**

Firing:  
 Lower limit .....-50°F  
 Upper limit.....+120°F

Storage:  
 Lower limit ..... -65°F  
 Upper limit..... +165°F

Packing .....32 rounds per  
 PA120 metal container

\*Packing Box:  
 Weight ..... 42 lb  
 Dimensions ..... 18.76 x 10.39 x  
                           6.36 in.  
 Cube ..... 0.72 cu ft

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

**Shipping and Storage Data:**

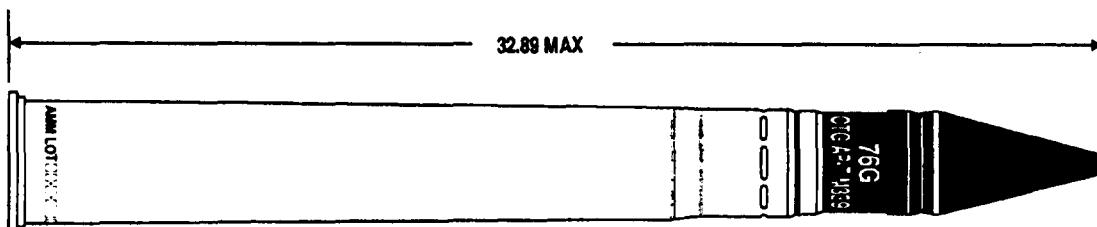
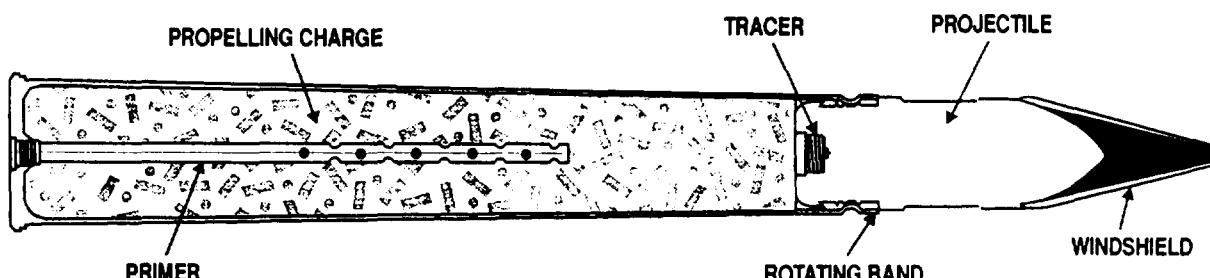
UNO serial number ..... 0321  
 Hazardclass/divisionandstoragecompatibilitygroup  
 DOT class ..... 1.2E  
 DOT marking ..... CAR-  
                           TRIDGES FOR  
                           WEAPONS  
 DODAC ..... 1310-BA11

Cartridge drawing number ..... 1225707  
 Packing drawing number ..... 12928042

**References:**

SB 700-20  
 TM 9-1010-230-10  
 TM 9-1300-251-20&P  
 TM 9-1300-251-34&P

## CARTRIDGE, 76 MILLIMETER: AP-T, M339

U  
AR 199863U  
AR 199862**Type Classification:**

OBS MSR 11756003.

**Use:**

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

**Description:**

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

**Tabulated Data:**

Complete round:

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

Projectile:

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

**Components:**

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

**Performance:**

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

**Temperature limits:**

**Firing:**

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

**Storage:**

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

**\*Packing -----**

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

**\*Packing box:**

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

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

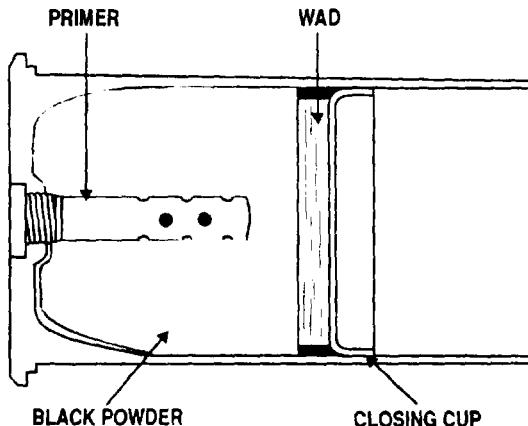
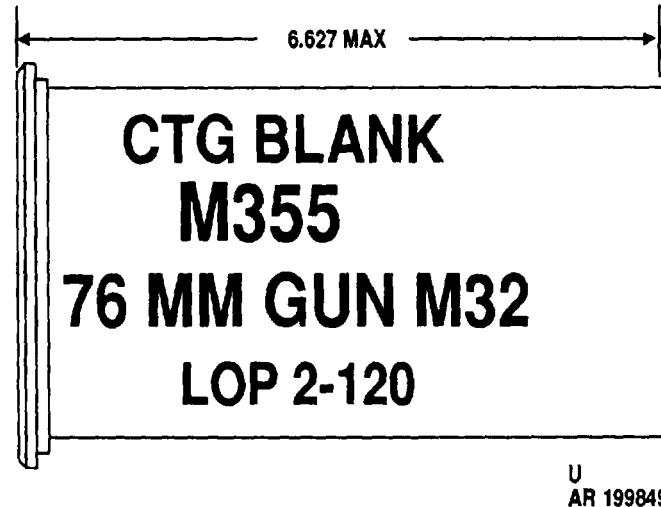
#### **Shipping and Storage Data:**

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

#### **References:**

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

## CARTRIDGE, 76 MILLIMETER: BLANK, M355A2



U  
AR 199848

**Type Classification:**

OBS MSR 11756003.

**Use:**

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

**Description:**

The cartridge contains a charge of sodium nitrate black powder, loosely assembled 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 lb
Length	-----	6.627 in.
Cannon used with	-----	M32, M48

<b>Components</b>		
Body material -----	Brass or steel	Dimensions ----- 22-1/4 x 11-1/8
Color -----	Blue or black w/white marking	x 10 in.
Filler and weight -----	BP, 1 lb	Cube ----- 1.43 cu ft
Cartridge case -----	M101 (brass); M101B1 (steel)	
Primer -----	M70percussion	
Temperature limits:		
Firing:		
Lower limit -----	-40°F	* NOTE: See DOD Consolidated Ammunition
Upper limit -----	+125°F	Catalog for complete packing data including
Storage:		NSN's.
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; 8 containers per wooden box	
*Packing box:		
Weight -----	58 lb	

Dimensions ----- 22-1/4 x 11-1/8  
x 10 in.

Cube ----- 1.43 cu ft

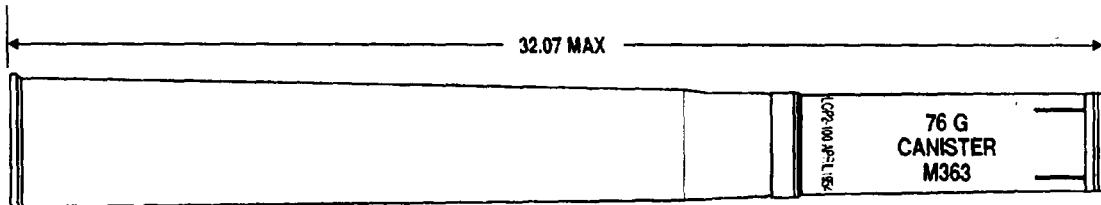
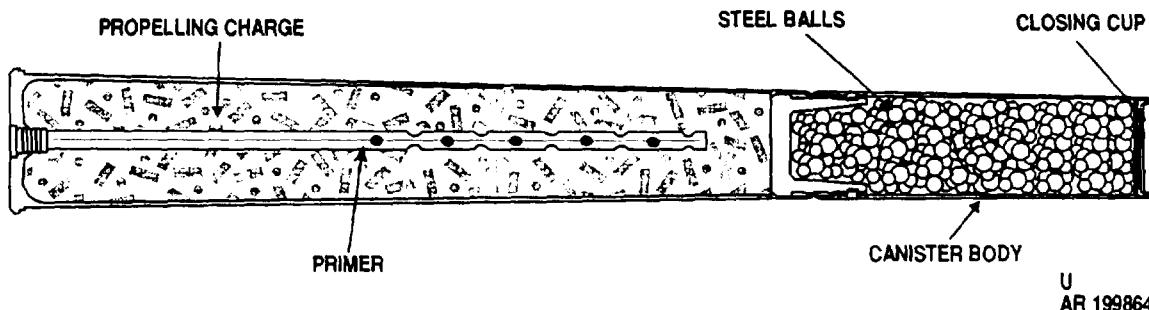
\* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

#### **Shipping and Storage Data:**

UNO serial number -----	0327
Quantity-distance class -----	1.3
Storage compatibility group--	C
DOT shipping class -----	B
DOT designation -----	AMMUNITION FOR CANNON WITHOUT PROJECTILES
DODAC -----	1315-C131
Drawing number -----	7549267

#### **References:**

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

**CARTRIDGE, 76 MILLIMETER: CANISTER, M363**U  
AR 199865U  
AR 199864**Type Classification:**

OBS MSR 11756003.

**Use:**

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

**Description:**

The canister has a heavy steel base and a lightweight body and is 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 light-weight 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, the air pressure on the closing cup and the 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.

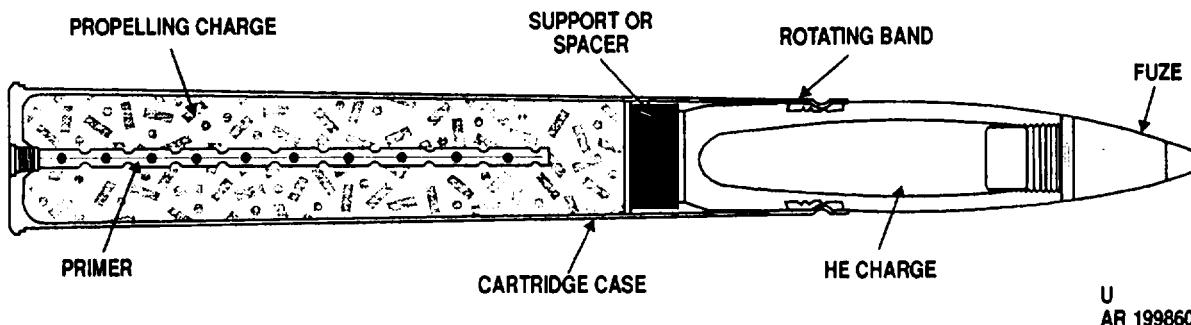
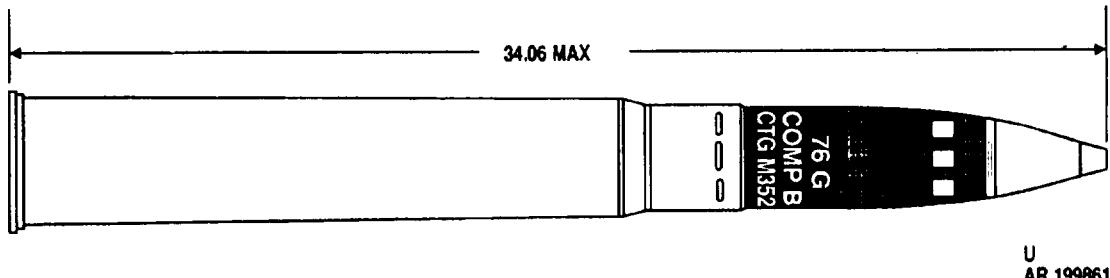
**Tabulated Data:**

Complete round:

Type	-----	Antipersonnel
Weight	-----	27.18 lb
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 lb
Components:		
Cartridge case	-----	M88B1, M88
Propelling charge	-----	M6, 5 lb
Primer	-----	M62, percussion
Performance:		
Maximum range	-----	155 m (192 yd)
Muzzle velocity	-----	716 mps (2400 fps)
Temperature limits:		
Firing:		
Lower limit	-----	-40°F
Upper limit	-----	+125°F
Storage:		
Lower limit	-----	-80°F (for period not more than 3 days)
Upper limit	-----	+160°F (for period not more than 4 hr/day)
*Packing	-----	1 round per fiber container; 2 containers per wooden box
*Packing box:		
Weight	-----	88 lb
Dimensions	-----	37-5/16 x 11 x 7-5/32 in.
Cube	-----	1.7 cu ft
*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.		
<b><u>Shipping and Storage Data:</u></b>		
UNO serial number	-----	0328
Quantity-distance class	-----	(08) 1.2
Storage compatibility group	-----	C
DOT shipping class	-----	B
DOT designation	-----	Ammunition FOR CANNON WITH SOLID PROJECTILE
DODAC	-----	1315-C121
Drawing number	-----	9204458
<b><u>References:</u></b>		
AMC-P 700-3-3		
SB 700-20		
TM 9-1300-251-20		

## CARTRIDGE, 76 MILLIMETER: HE, M352

Type Classification:

OBS MSR 11756003.

Use:

This fixed cartridge is intended for fragmentation, blast, or mining effect and is used in 76mm 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. U on impact, fuze functioning detonates the explosive charge creating blast and fragmentation.

Tabulated Data:

Complete round:

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

Projectile:

Body material -----	Steel
Color -----	Olive drab w/ yellow marking
Filler and weight -----	Comp B, 1.46 lb

**Components:**

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

**Performance:**

Maximum range -----	14,338 m (16,010 yd)
Muzzle velocity -----	716 mps (2400 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 -----

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

Weight -----	86 lb
--------------	-------

Dimensions -----	39.15/16 x 10-15/16 x 7-3132 in.
Cube -----	1.8 cu ft

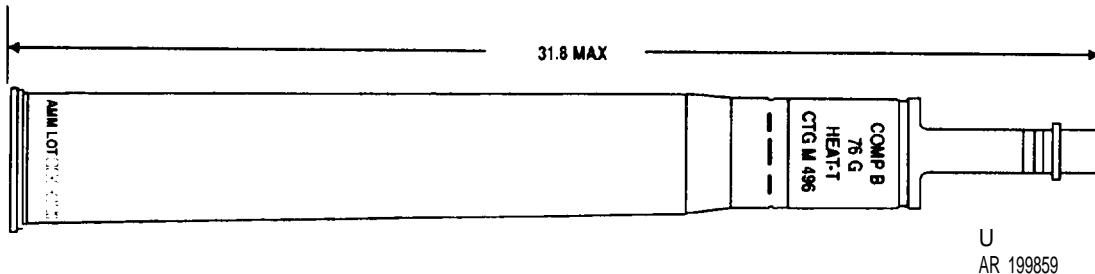
\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

UNO serial number -----	0321
Quantity-distance class -----	(08) 1.2
Storage compatibility group---	E
DOT shipping class -----	A
DOT designation -----	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC -----	1315-C122
Drawing number -----	75.1-293

**References:**

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

**CARTRIDGE, 76 MILLIMETER: HEAT-T, M496****Type Classification:**

OBS MSR 11756003.

**Use:**

This fixed ammunition cartridge is used in 76mm 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 standoff 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 point-initiating, base-detonating (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 boom and fin assembly provides stability in flight and the tracer provides a visible trace of the trajectory. Upon impact, the piezoelectric

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 lb
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, 1.1 lb

Components:

Cartridge case -----	M171A1
Propelling charge -----	M6, 5.06 lb
Primer -----	M81, percussion
Tracer -----	M13
Fuze -----	PIBD-509A1

Performance:

Maximum range -----	7488 m (8360 yd)
Muzzle velocity -----	1060 mps (3550 fps)

Temperature limits:

Firing:

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

Storage:

Lower limit -----	-80°F (for period not more than 3 days)
-------------------	---

Upper limit -----	+160°F (for period not more than 4 hr/day)
-------------------	--

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

\*Packing box:  
Weight ----- 72.5 lb  
Dimensions ----- 37-1/16 x11x  
7-5/32 in  
Cube ----- 1.7 cu ft

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

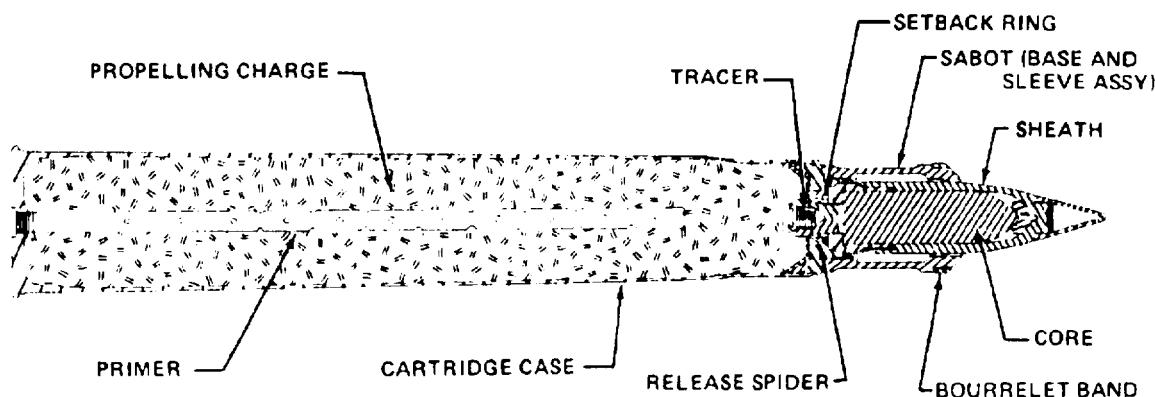
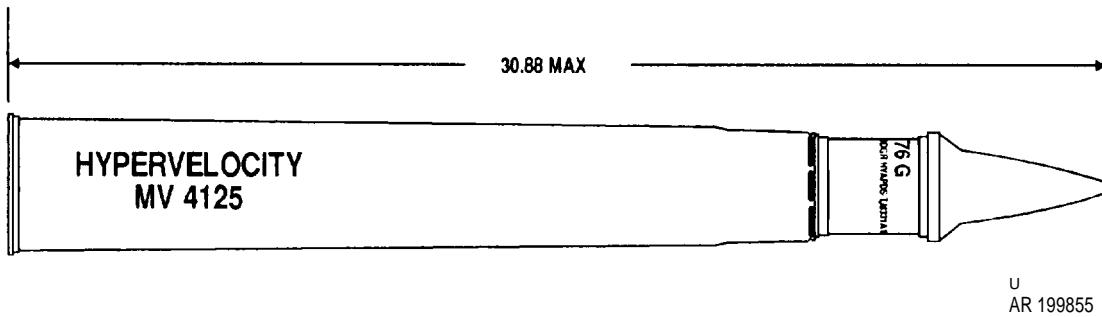
**Shipping and Storage Data:**

UNO serial number ----- 0321  
Quantity-distance class ----- (12) 1.2

Storage compatibility group --- E  
DOT shipping class ----- A  
DOT designation ----- AMMUNITION  
FOR CANNON  
WITH  
EXPLOSIVE  
PROJECTILES  
DODAC ----- 1315-C110  
Drawing number ----- 8848863

**References:**

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

**CARTRIDGE, 76 MILLIMETER: HVAP-DS-T, M331A1 AND M331A2**

AR 199854

**Type Classification:**

OBS MSR 11756003.

**Use:**

This fixed ammunition is intended for use in 76mm 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-overband 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. Upon 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 lb
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 lb  
 Primer ----- M58 percussion  
 Tracer ----- M5 (M331A1);  
 M5A3 (M331A2)

Performance:  
 Maximum range ----- 21,607 m  
 (24,127 yd)  
 Muzzle velocity ----- 1231 mps (4125  
 fps)

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

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

\*Packing box:  
 Weight ----- 71 lb  
 Dimensions----- 36-3/4 x 11-1/16  
 x 7-5/32 in.  
 Cube ----- 1.68 cu ft

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

#### Shipping and Storage Data:

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

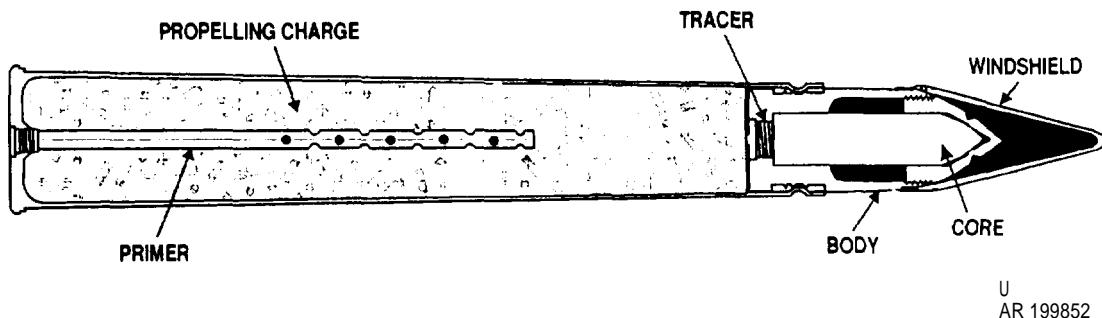
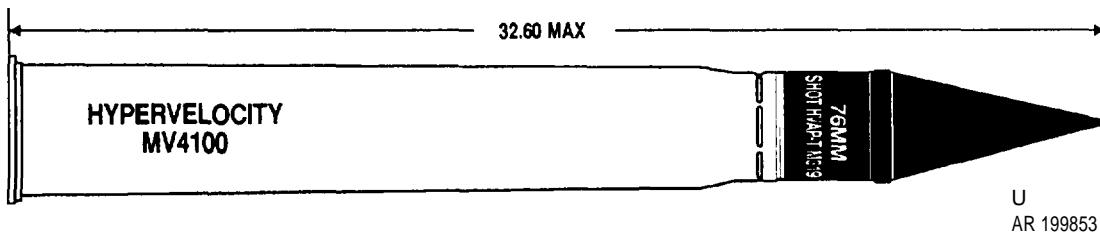
DODAC ----- 1315-C125  
 Drawing number ----- 75-1-308

#### 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:

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

**CARTRIDGE, 76 MILLIMETER: HVAP-T, M319**U  
AR 199852**Type Classification:**

C &amp; T AMCTC 6267 dtd 1968.

**Use:**

This fixed ammunition is a high velocity cartridge intended for use in 76mm 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 it 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. Upon 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 lb
Length	32.6 in

Cannon used with ----- M32, M48

**Projectile:**

Body material	Aluminum alloy
Core	Tungsten carbide
Color	Black w/white markings

**Components:**

Cartridge case	M88B1, M88
Propelling charge	M6, 5.03 lb
Primer	M62, M58 percussion

Tracer	M5A1B1 or M5A1
--------	----------------

**Performance:**

Maximum range	9885 m (11,038 yd)
Muzzle velocity	1234 mps (4135 fps)

## Temperature limits:

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

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

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

\*Packing box:  
 Weight ----- 66.75 lb  
 Dimensions ----- 37-3/16 x 11-1/6  
                   x 7-5/32 in.  
 Cube ----- 1.7 cu ft

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

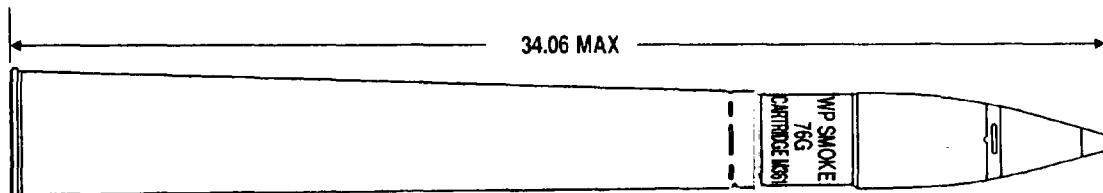
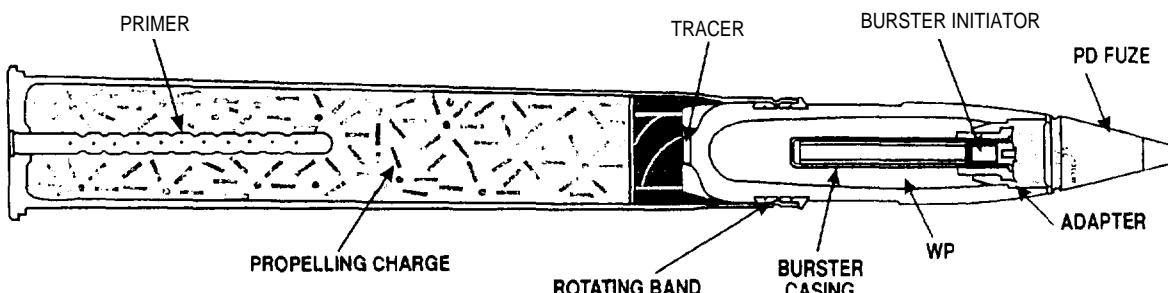
**Shipping and Storage Data:**

UNO serial number ----- 0328  
 Quantity-distance class ----- (08) 1.2  
 Storage compatibility group--- C  
 DOT shipping class ----- B  
 DOT description ----- AMMUNITION  
                   FOR CANNON  
                   WITH SOLID  
                   PROJECTILES  
 DODAC ----- 1315-C124  
 Drawing number ----- 75-1-295

**References:**

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

## CARTRIDGE, 76 MILLIMETER: SMOKE, WP, M361A1 OR M361

U  
AR 199851U  
AR 199850**Type Classification:**

OBS MSR 11756003.

**Use:**

This fixed ammunition is used in 76mm guns for screening and spotting tire. The cartridge also has a slight incendiary effect.

**Description:**

The projectile body is a thin walled, forged steel casing. The point-detonating fuzed projectile contains a white phosphorous (WP) filler and a combination one-piece aluminum burster casing and adapter. The burster casing houses a projectile burster and a burster initiator loaded with tetrytol. The brass or steel cartridge case assembled to the projectile contains a single-base propellant and 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. Gases created by the burning propellant force the projectile from the gun barrel. Upon impact, the burster initiator, activated by the point-detonating fuze, detonates the burster charge. This ruptures the projectile casing and expells the WP filler. Upon contact with the air, the WP ignites creating a dense white smoke.

**Difference Between Models:**

The M361 is similar to the M361A1 except that the burster is contained in a two-piece steel casing and the adapter is a separate component. Also, the 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 lb
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 mark- ing

Filler and weight -----	WP, 1.38 lb
Burster -----	M28, 1.2 oz

Burster initiator -----	tetrytol
	M2

## Component:

Cartridge case -----	M361A1; M88B1; M361: M88
Propelling charge -----	M6, 3.64 lb
Primer -----	M68, M58 per- cussion
Fuze -----	PD: M521 (M361A1); M48A3 (M361)

## Performance:

Maximum range -----	14,594 m (16,296 yd)
Muzzle velocity -----	713 mps (2400 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 lb  
Dimensions ----- 39-15/16 x  
10-15/16 x  
7-3/32 in.  
Cube ----- 1.8 cu ft

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

**Shipping and Storage Data:**

UNO serial number -----	0245
Quantity-distance class -----	(12) 1.2
Storage compatibility group---	H
DOT shipping class -----	A
DOT designation -----	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC -----	1315-C128
Drawing number -----	P85133

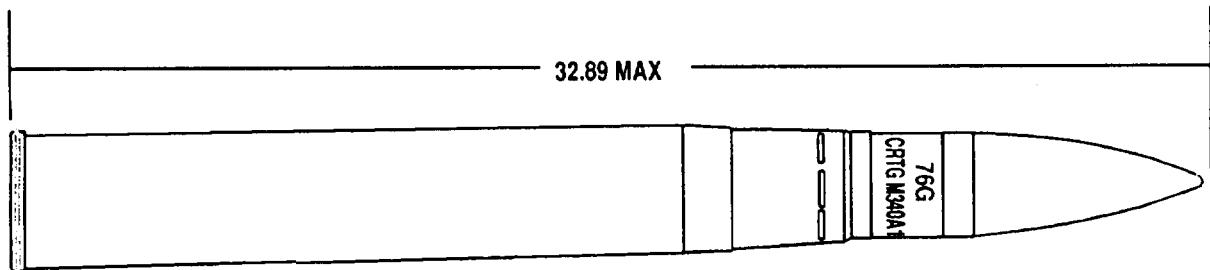
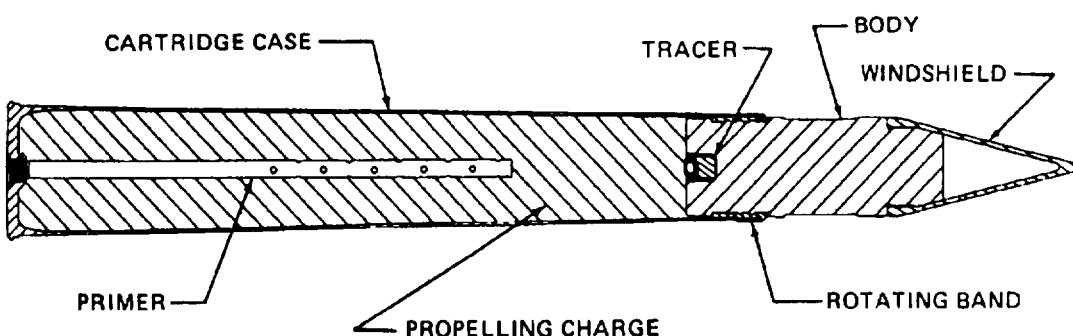
**Limitations:**

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

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 the WP filler.

**References:**

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

**CARTRIDGE, 76 MILLIMETER: TP-T, M340A1 AND M340**U  
AR 199857U  
AR 199856**Type Classification:**

OBS MSR 11756003.

**Use:**

This cartridge 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. Upon impact, there is little penetration of the target because the round lacks armor-piercing capability.

**Difference Between Models:**

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

**Tabulated Data:**

Complete round:

Weight	-----	TP-T
Length	-----	27.32 lb
Cannon used with	-----	32.89 in
		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, 5.6 lb
Primer	M58, percussion
Tracer	M5A2B1 (M340); M13 (M340A1)
Performance:	
Maximum range	14,704 m (16,419 yd)
Muzzle velocity	955 mps (3200 fps)
Temperature limits:	
Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for period not more than 3 days)
Upper limit	+160°F (for period not more than 4 hr/day)

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

\*Packing box:  
 Weight ----- 88 lb  
 Dimensions ----- 38-5/8 x 11-1/16  
                          x 7-5/32 in.  
 Cube ----- 1.8 cu ft

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

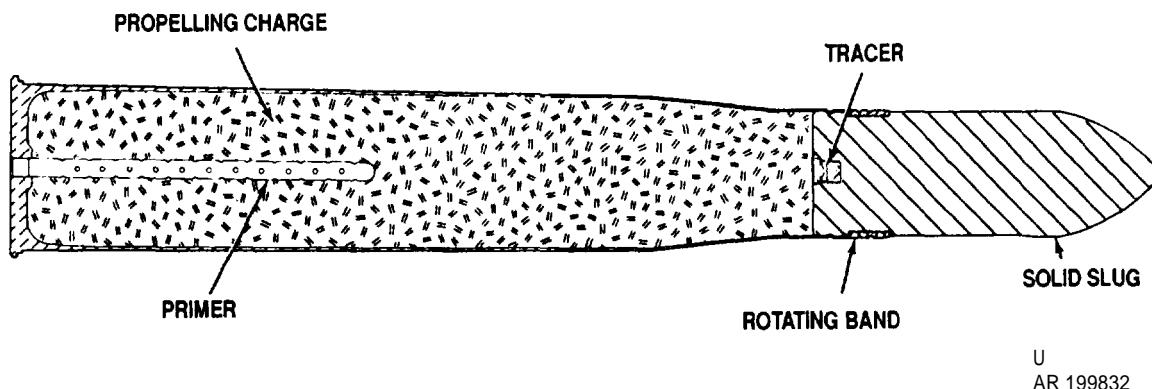
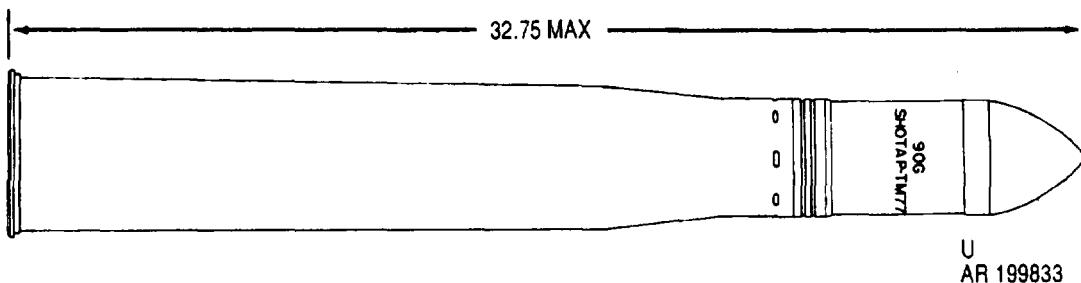
### **Shipping and Storage Data:**

UNO serial number ----- 0328  
Quantity-distance class ----- (08) 1.2  
Storage compatibility group-- C  
DOT shipping class ----- B  
DOT designation ----- AMMUNITION  
FOR CANNON  
WITH SOLID  
PROJECTILES  
DODAC ----- 1315-C127  
Drawing number ----- 8857345

## References:

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

## CARTRIDGE, 90 MILLIMETER: AP-T, M77

**Type Classification:**

OBS MSR 11756003.

**Use:**

This cartridge is an obsolescent armor-piercing model currently used for training purposes in 90mm 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. The gases propel the projectile out of the gun tube and ignite the tracer which burns for a minimum of three 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 lb
Length	32.75 in.
Cannon used with	M36, M41 or M54

## Projectile:

Body material	Steel
Color	Black w/white marking

## Components:

Cartridge case	M19, M19B1
Propelling charge	M6, 7.31 lb
Primer	M28A2, M28B1
Tracer	M3

## Performance:

Maximum range	11,270 m (12,325 yd)
Muzzle velocity	821 mps (2700 fps)

## Temperature limits:

## Firing:

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

## Storage:

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

## \*Packing -----

1 round per  
 fiber container;  
 2 containers per  
 wooden box

## \*Packing box:

Weight ----- 132 lb  
 Dimensions ----- 43-5/8 x 13 x  
 8-5/32 in.  
 Cube ----- 2.69 cu ft

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

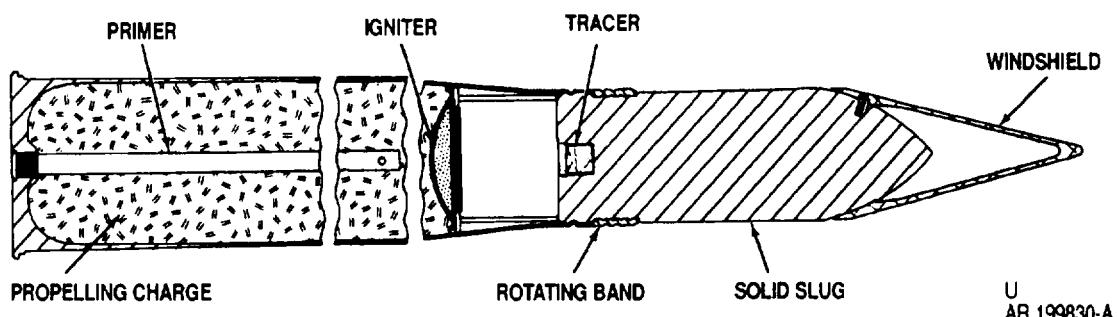
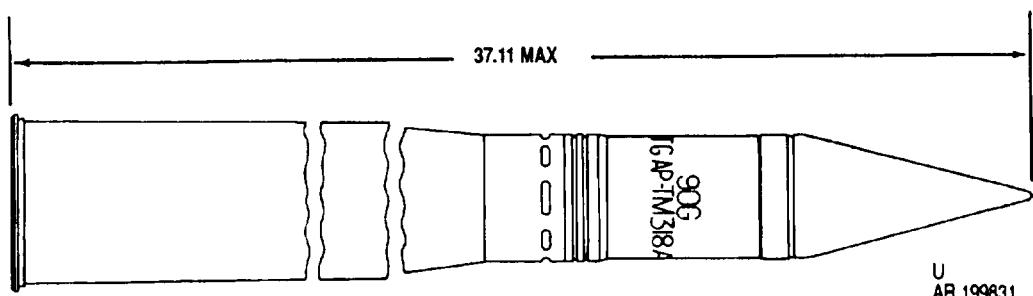
**Shipping and Storage Data:**

UNO serial number -----  
 Quantity-distance class ----- 5  
 Storage compatibility group--- E  
 DOT shipping class ----- B  
 DOT designation ----- AMMUNITION  
 FOR CANNON  
 WITH SOLID  
 PROJECTILES  
 DODAC ----- 1315-C259  
 Drawing number ----- 75-1-136

**References:**

AMC-P 700-3-3  
 SB 700-20  
 TM9-1300-251-20

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



**Type Classification:**

STD OTCM 36841 dtd 1958 (M318).  
STD OTCM 37119 dtd 1959 (M318A1).

**Use:**

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

**Description:**

The body of the projectile is made of hardened steel, has a flat base, and has a nose that is shaped to a relatively short ogive. A lightweight 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 projec-

tile out of the gun tube and ignite the tracer which burns for a minimum of three 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 (T33E7) or M318A1	AP-T	43.91 lb
Type -----		AP-T	
Weight -----	43.98 lb	43.91 lb	
Length -----	37.43 in.	37.11 in.	

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

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

## Components:

	<u>M318</u>	<u>M318 (T33E7) or M318A1</u>
Cartridge case -----	M19, M19B1	M108, M108B1
Propelling charge---	M6, 8.6 lb	M17, M30, 8.6 lb
Primer -----	M49 (T33)	M58
Tracer -----	(Red)	M5A2B1, M5A2B1, M5A2 or M5A2, 0.1 lb
Performance:		M13, 7.5 g
Maximum range -----	19,570 m (20,400 yd)	21,031 m (23,000 yd)
Muzzle velocity -----		(2800 fps) (3000 fps)
Temperature limits:		
Firing:		
Lower limit -----	-40°F	
Upper limit -----	+125°F	
Storage:		
Lower limit -----	-80°F (for period not more than 3 days)	
Upper limit -----	+160°F (for period not more than 4 hr/day)	
*Packing -----		1 round per fiber container; 2 containers per wooden box

## \*Packing box:

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

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

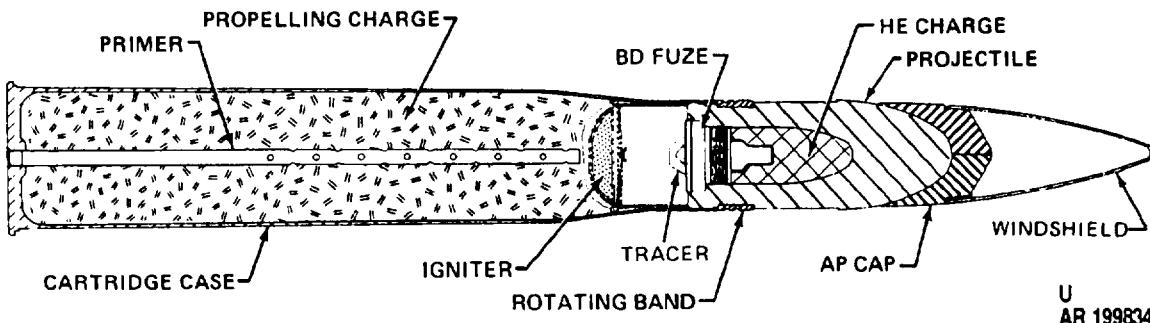
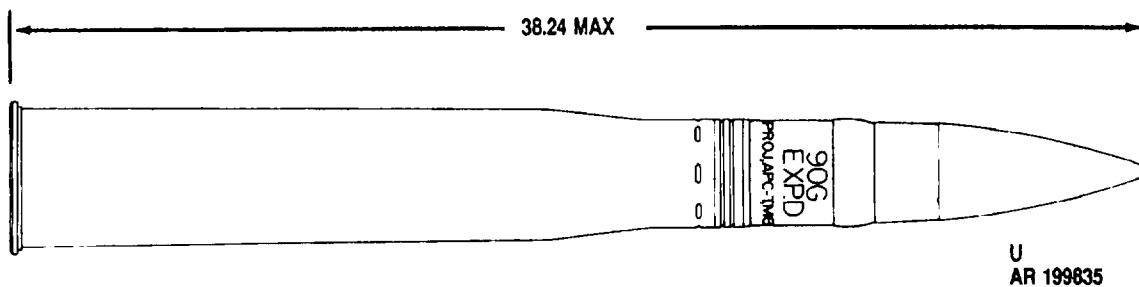
**Shipping and Storage Data:**

UNO serial number ----- 0328  
Quantity-distance class ----- (08) 1.2  
Storage compatibility group--- C  
DOT shipping class ----- B  
DOT designation ----- AMMUNITION  
FOR CANNON  
WITH SOLID  
PROJECTILES  
DODAC ----- 1315-C285  
(MV3000);  
1315-C259  
(MV2800)  
Drawing number ----- 75-1-358  
(M318);  
9207966  
(M318A1)

**References:**

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

## CARTRIDGE, 90 MILLIMETER: APC-T, M82

**Type Classification:**

OBS MSR 11756003.

**Use:**

This cartridge is fired from 90mm 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. It 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 three 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.

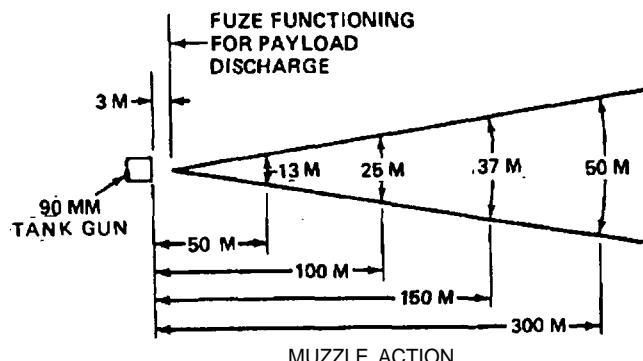
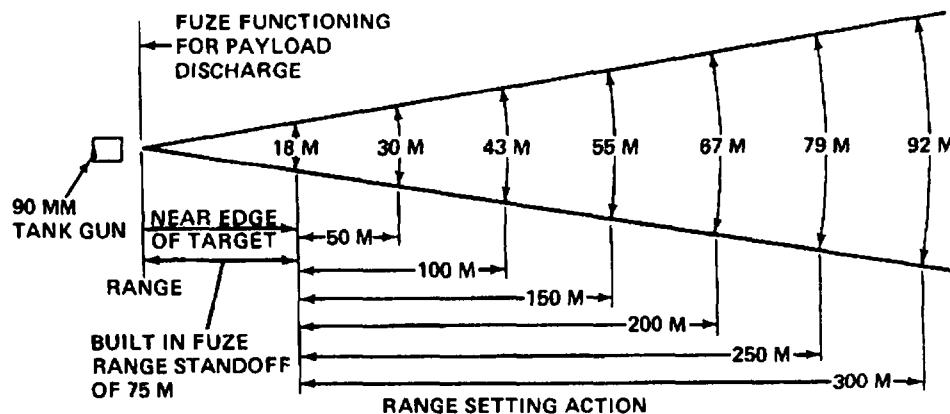
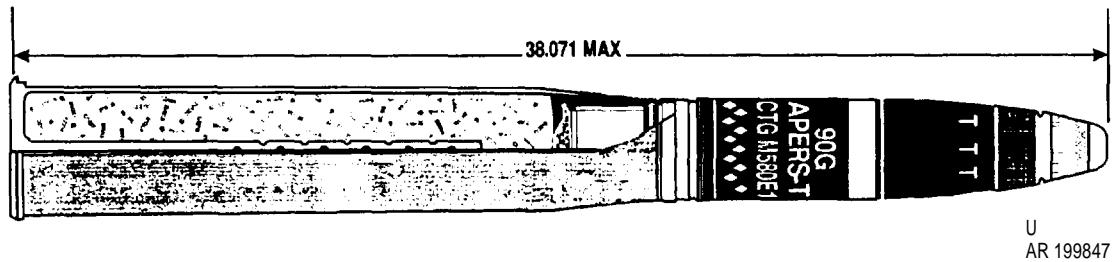
**Tabulated Data:**

Complete round:

Type	APC-T
Weight	42.75 or 43.87 lb
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 lb
Primer	-----	M28A1, M49
Tracer	-----	Integral with fuze (red)
Fuze	-----	BD, M68 or M68A1
Performance:		
Maximum range	-----	19,570 m (21,400 yd)
Muzzle velocity	-----	790 mps (2600 fps); 851 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 hr/day)
*Packing	-----	1 round per fiber container; 2 containers per wooden box
* Packing box:		
Weight	-----	136.5 lb
Dimensions	-----	44-21/32 x 13 x 7-3/8 in.
Cube	-----	2.75 cu ft
* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.		
<b><u>Shipping and Storage Data:</u></b>		
UNO serial number	-----	0321
Quantity-distance class	-----	(08) 1.2
Storage compatibility group	-----	E
DOT shipping class	-----	A
DOT designation	-----	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	-----	1315-C260
Drawing number	-----	75-1-145
<b><u>References:</u></b>		
AMC-P 700-3-3		
SB 700-20		
TM 9-1300-251-20		

## CARTRIDGE, 90 MILLIMETER: APERS-T, M580

Type Classification:

STD AMCTC 9575 dtd 1972.

Use:

This fixed cartridge is fired from 90mm 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 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. A mechanical-time 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 lb
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	4200, 8 gr, flechettes, 4.5 lb
Components:	
Cartridge case	M200
Propelling charge	M6, 9 lb
Primer	M58 percussion
Tracer	M13 red, 0.13 lb

Base charge	M9, 25 gr
Fuze	MT, M711
Performance:	
Maximum range	4389 m (4800 yd)
Muzzle velocity	914.4 mps (3000 fps)
Maximum effective range (from point of fuze functioning)	300 m (328 yd)
Temperature limits:	
Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for period not more than 3 days)
Upper limit	+160°F (for period not more than 4 hr/day)
*Packing	1 round per fiber container; 2 containers per wooden box
*Packing box:	
Weight	128 lb
Dimensions	44-13/16 x 13-3/16 x 8-7/16 in.
Cube	2.8 cu ft

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

### **Shipping and Storage Data:**

UNO serial number	0321
Quantity-distance class	(12) 1.2
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1315-C275
Drawing number	9216454

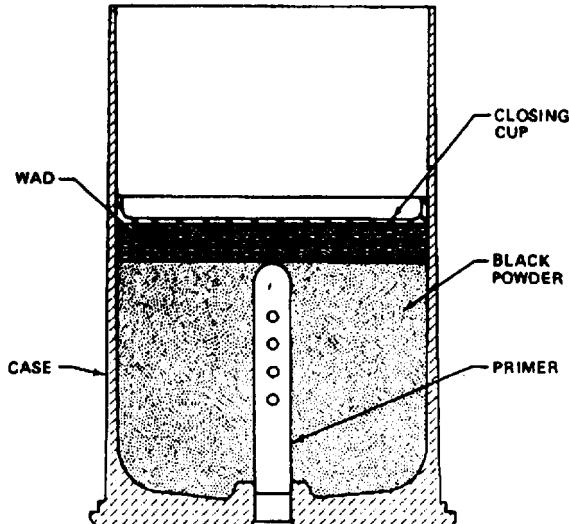
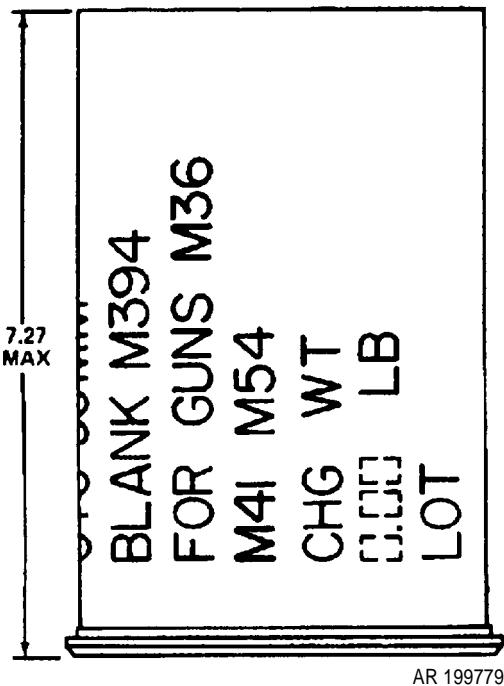
### **Limitations:**

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

### **References:**

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

## 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 90mm 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 lb
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 hr/day)

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

*Packing box:	
Weight -----	98.6 lb
Dimensions -----	25-13/16 x 12-15/16 x 10-23/32 in.
Cube -----	2.12 cu ft

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

**Shipping and Storage Data:**

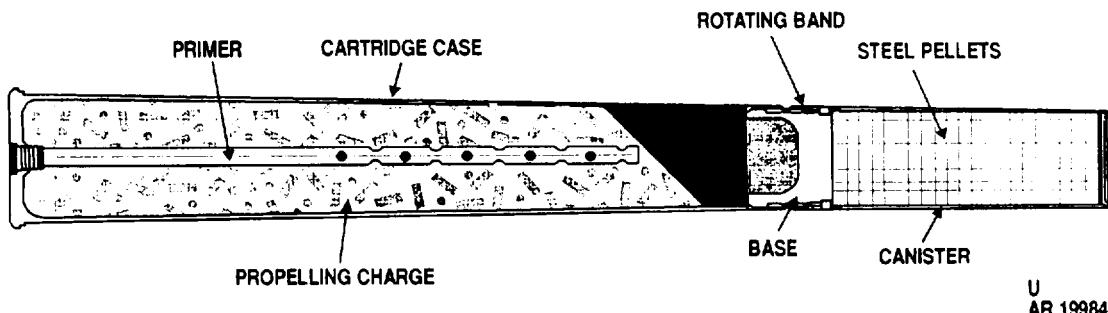
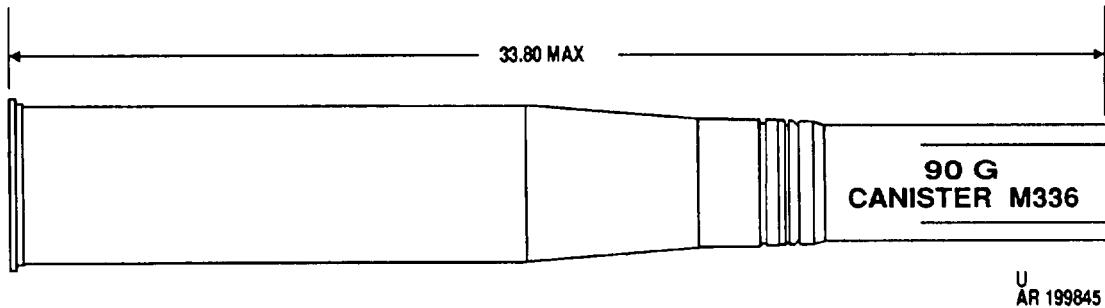
UNO serial number ----- 0327  
Quantity-distance class ----- 1.3  
Storage compatibility group--- C  
DOT shipping class ----- B  
DOT designation ----- AMMUNITION  
FOR CANNON  
WITHOUT  
PROJECTILES  
DODAC ----- 1315-C261  
Drawing number ----- 7549210

**Limitations:**

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

**References:**

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

**CARTRIDGE, 90 MILLIMETER: CANISTER, M336****Type Classification:**

CON MSR 11756003.

**Use:**

This cartridge is fired from 90mm guns and is intended primarily for antipersonnel 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, the air pressure on the closing disk and the 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 lb
Length -----	33.8 in.
Cannon used with -----	M36, M41, M54

Projectile:

Body material -----	Steel
Color-----	Olive drab w/white marking
Filler and weight -----	1281 slugs, 14.9 lb

Propelling charge:

Cartridge case -----	M108B1
Propellant -----	M2, 8 lb
Primer -----	M58 percussion

Performance:

Minimum effective range ---	0 m
Maximum effective range ---	183111 (200 yd)
Muzzle velocity -----	858 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 hr/day)  
 \*Packing ----- 1 round per  
                   fiber container;  
                   2 containers per  
                   wooden box

## \*Packingbox:

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

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

**Shipping and Storage Data:**

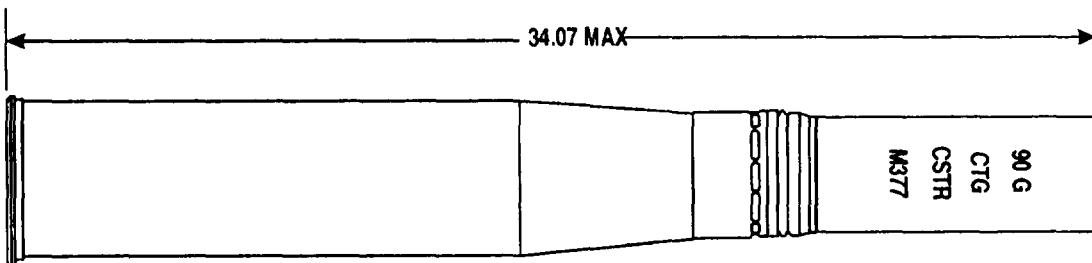
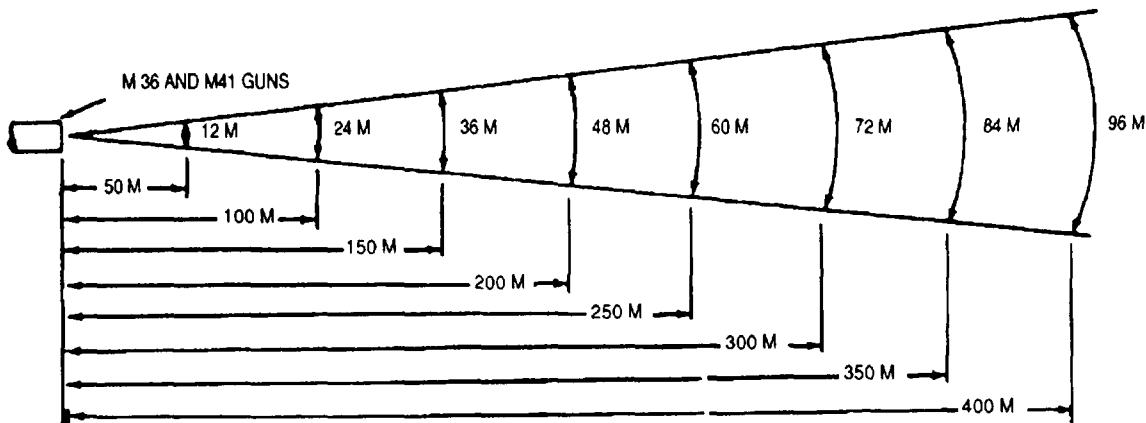
UNO serial number ----- 0328  
 Quantity-distance class ----- (08) 1.2  
 Storage compatibility group--- C  
 DOT shipping class ----- B  
 DOT designation ----- AMMUNITION  
                   FOR CANNON  
                   WITH SOLID  
                   PROJECTILES  
 DODAC ----- 1315-C262  
 Drawing number ----- 9214203

**Limitations:**

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

**References:**

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

**CARTRIDGE, 90 MILLIMETER: CANISTER, M377**U  
AR 199043U  
AR 199842**Type Classification:**

CON MSR 11756003.

This cartridge is fired from 90mm 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, the air pressure on the closing cup and the 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°.

**Tabulated Data:**

Complete round:

Type	-----	Canister
Weight	-----	39.3 lb
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 ----- 5600, 8 gr flechettes, 6.8 lb

Components:  
 Cartridge case ----- M108B1  
 Propelling charge ----- M6, 9 lb  
 Primer ----- M58 percussion

Performance:  
 Minimum range ----- 0 m  
 Maximum range ----- 402 m (440 yd)  
 Muzzle velocity ----- 851 mps (2950 fps)

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

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

\*Packing box:  
 Weight ----- 118 lb

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

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

#### **Shipping and Storage Data:**

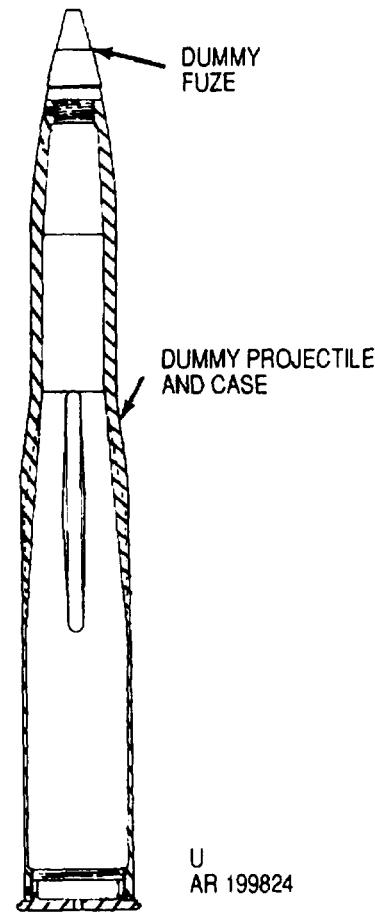
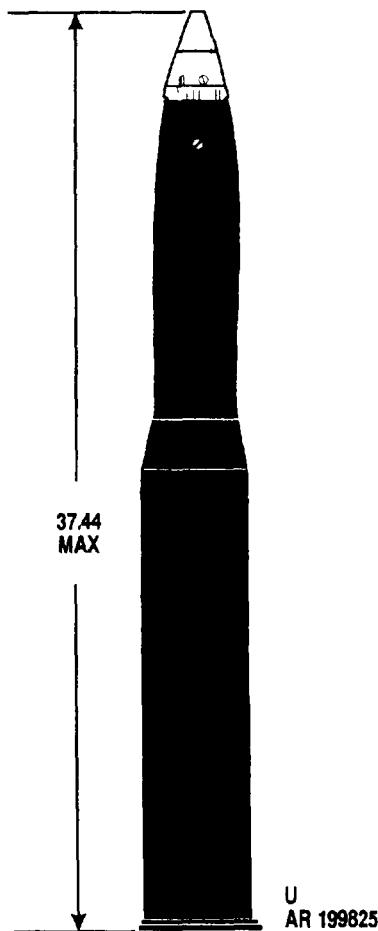
UNO serial number ----- 0328  
 Quantity -distance class ----- (08) 1.2  
 Storage compatibility group--- C  
 DOT shipping class ----- B  
 DOT designation ----- AMMUNITION FOR CANNON WITH SOLID PROJECTILES  
 DODAC ----- 1315-C601  
 Drawing number ----- 9214706

#### **Limitations:**

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

#### **References:**

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

**CARTRIDGE, 90 MILLIMETER: DUMMY, M12, M12B1 AND M12B2****Type Classification:**

CON MSR 11756003.

**Use:**

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

**Description:**

The dummy cartridge simulates a high-explosive loaded round of 90mm 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 an inert fuze or it may be unfuzed.

**Functioning:**

The dummy cartridge is completely inert and is nonfunctioning.

**Tabulated Data:**

Complete round:

Type -----	Dummy
Weight -----	42.04-44.00 lb
Length -----	37.44 in.
Cannon used with -----	M36, M41 or M54

Projectile:

Body material -----	Manganese bronze
Color -----	Bronze w/white marking
Fuze -----	Dummy M80

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

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

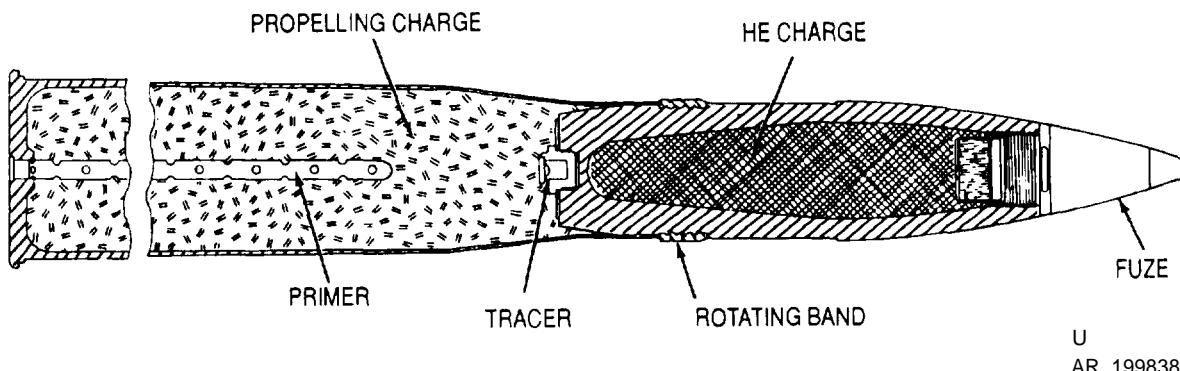
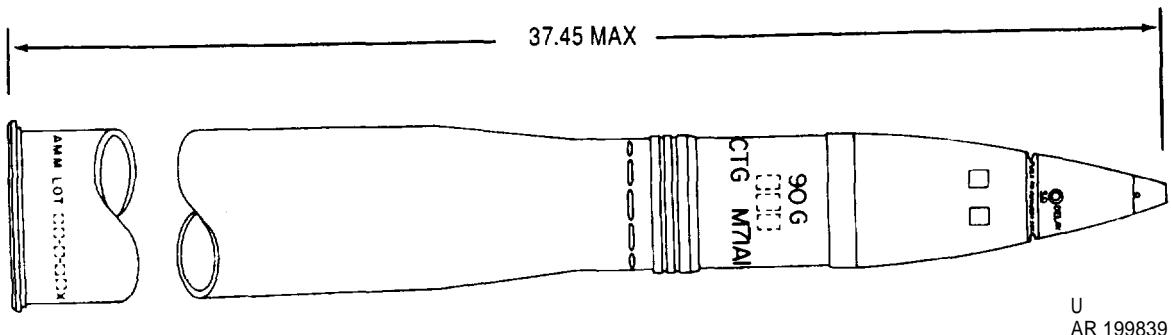
\* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

Quantity-distance class ----- N/A  
Storage compatibility group --- N/A  
DOT shipping class ----- N/A  
DOT designation ----- None  
DODAC ----- 1315-C263  
Drawing number ----- 72-3-76

**References:**

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

**CARTRIDGE, 90 MILLIMETER: HE-T, M71A1, AND HE, M71****Type Classification:**

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

**Use:**

This cartridge is used in 90mm guns against personnel and materiel, producing blast and fragmentation at the target.

**Description:**

The hollow steel forged projectile has a boat-tailed base and a streamlined ogive. Fuze cavity may be a normal or a deep cavity type. The projectile is loaded with 2.15 pounds (1.68 lb, 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 super-quick 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  
 Weight ----- 38.8-39.54 lb 41.19-41.93 lb  
 Length ----- 37.46 in.  
 Cannon used with ----- M36, M41 or  
 M54

Projectile:

Body material ----- Steel  
 Color ----- Olive drab  
 w/yellow marking  
 Filler and weight ----- Comp B, 2.15 lb

Component:

Cartridge case ----- M19, M19B1  
 Propelling charge ----- M1 5.33 lb  
                           (M71A1); M6 or  
                           M15, 7.31 lb  
                           (M71)  
 Primer ----- M28B2, M28A2  
 Tracer ----- XM10 (M71A1)  
 Fuze ----- PD, M51A5,  
                           M557; MTSQ,  
                           M520 Series,  
                           M564

Performance:

Maximum range ----- 15,800 m  
                           (17,300 yd)  
                           (M71A1);  
                           17,800 m  
                           (19,475 yd)  
                           (M71)  
 Muzzle velocity ----- 730 mps  
                           (2400 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 hr/day)

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

**\*Packing box:**

Weight ----- 132 lb  
 Dimensions ----- 43-5/8 x 13 x  
                           8-5/32 in.  
 Cube ----- 2.69 cu ft

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

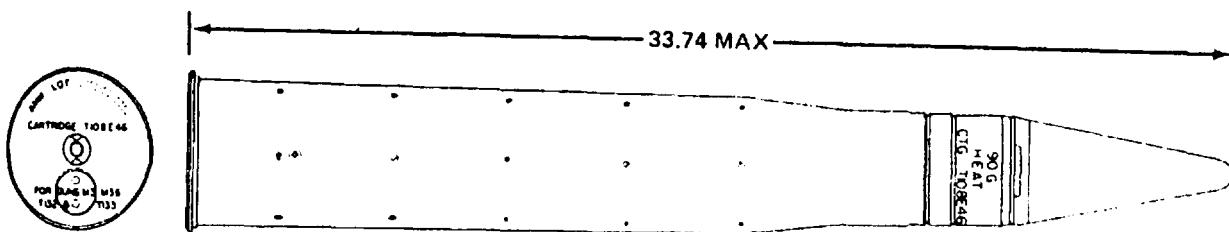
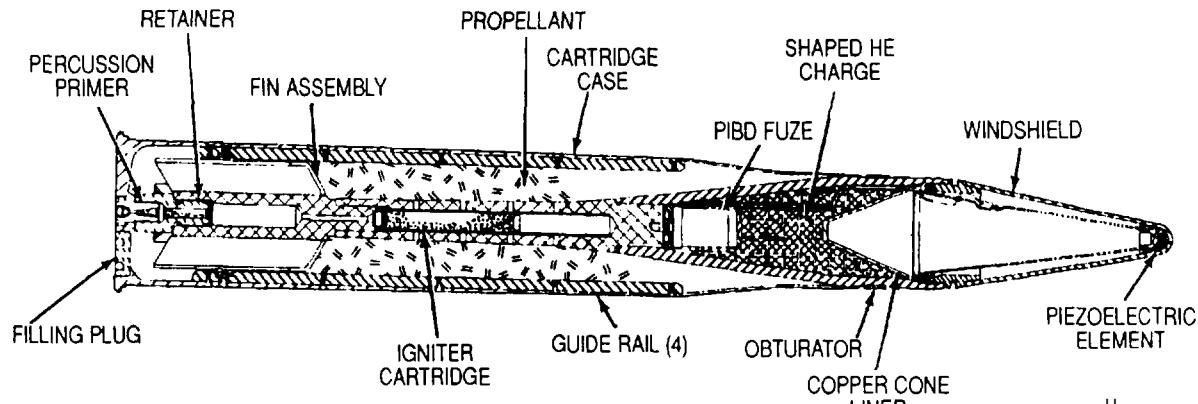
**Shipping and Storage Data:**

UNO serial number ----- 0321  
 Quantity-distance class ----- (12) 1.2  
 Storage compatibility group--- E  
 DOT shipping class ----- A  
 DOT designation ----- AMMUNITION  
                           FOR CANNON  
                           WITH  
                           EXPLOSIVE  
                           PROJECTILE  
 DODAC ----- 1315-C280  
                           (M71A1); 1315-  
                           C265 (M71);  
                           1315-C266  
                           (M71); 1315-  
                           C267 (M71)  
 Drawing number ----- 8849017-1  
                           (M71A1);  
                           75-1-157 (M71)

**References:**

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

## CARTRIDGE, 90 MILLIMETER: HEAT, M348A1 (T108E46) AND M348 (T108E40)

U  
AR 199520U  
AR 199519**Type Classification:**

OBS AMCTC 6267 dtd 1968.

**Use:**

This cartridge is fired from 90mm 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 Composition B charge, and a streamlined windshield houses a piezoelectric element to initiate the point-initiating, base-detonating fuze in the base. An obturator band encircles the projectile above the lip of the cartridge case. An igniter and fin assembly is threaded into 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 seven grains of black powder. The interior of the cartridge case is fitted with guided 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 2,800 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 piezoelectric 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 focused high velocity shock wave which causes failure of the target armor, and a jet of molten metal penetrates the target interior.

#### **Difference Between Models:**

The 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 lb
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 lb

##### Components:

Cartridge case -----	T27E2
Propelling charge -----	M6 (80 oz); M1 (87 oz)

Primer ----- T69

Igniter, fin assembly ----- T33E2

Fuze ----- PIBD, M509A1

##### Performance:

Maximum range -----	11,650 m (13,010 yd)
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Muzzle velocity -----	832 mps (2800 fps)
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#### Temperature limits:

##### Firing:

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

##### Storage:

Lower limit -----	-80°F (-62.2° C) (for period not more than 3 days)
-------------------	---

Upper limit -----	+ 160°F (+71.1°C) (for period not more than 4 hr/day)
-------------------	--

##### \*Packing -----

##### \*Packing box:

Weight -----	115.7 lb
Dimensions -----	39-15/16 x 13 x 8-5/32 in.

Cube ----- 2.4 cu ft

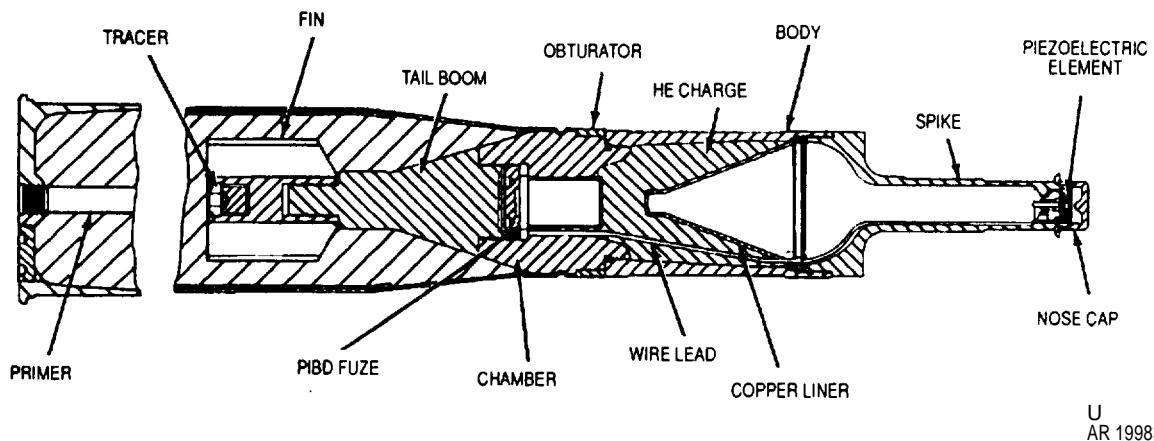
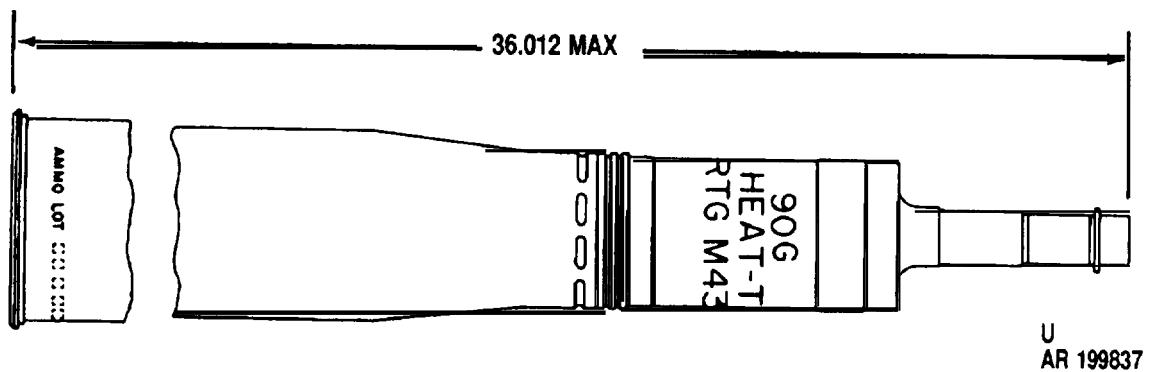
\* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

#### **Shipping and Storage Data:**

UNO serial number -----	0321
Quantity-distance class -----	(12) 1.2
Storage compatibility group -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC -----	1315-C268
Assembly drawing number -----	75-1-359

#### **References:**

TM 9-1300-251-20

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

STD AMCTC 8823 dtd 1971.

**Use:**

This cartridge is intended for use in 90mm 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 base-detonating 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 2,500 yards. The projectile is detonated upon impact by fuze functioning. Upon detonation, the cone collapses creating an intensely focused high velocity shock wave and a jet of metal particles that penetrates the target.

**Difference Between Models:**

The M431A1 is similar to the M431 except that the cartridge case contains a wax-impregnated titanium dioxide ( $TiO_2$ ) liner designed to reduce gun wear. A  $TiO_2$  additive liner with high melt wax and a mylar barrier is used on the M431A2.

**Tabulated Data:**

## Complete round:

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

## Projectile:

Body material ----- Steel  
 Color ----- Black w/yellow  
 marking  
 Filler and weight ----- Comp B, 1.2 lb

## Components:

Cartridge case ----- M114A1  
 Propelling charge ----- M30, 8.25 lb  
 Primer ----- M79  
 Tracer ----- M13  
 Faze ----- PIBD-M509A1

## Performance:

Maximum range ----- 8138 m (8900  
 yd)  
 Muzzle velocity ----- 1216 mps (4000  
 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 containers per  
 wooden box

\*Packing box:  
 Weight ----- 106 lb  
 Dimensions ----- 40-1/2 x 12-3/8 x  
 6-5/8 in.  
 Cube ----- 1.9 cu ft

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

**Shipping and Storage Data:**

UNO serial number ----- 0321  
 Quantity-distance class ----- (12) 1.2  
 Storage compatibility group --- E  
 DOT shipping class ----- A  
 DOT designation ----- AMMUNITION  
 FOR CANNON  
 WITH  
 EXPLOSIVE  
 PROJECTILES  
 DODAC ----- 1315-C294  
 Drawing number ----- 8822481

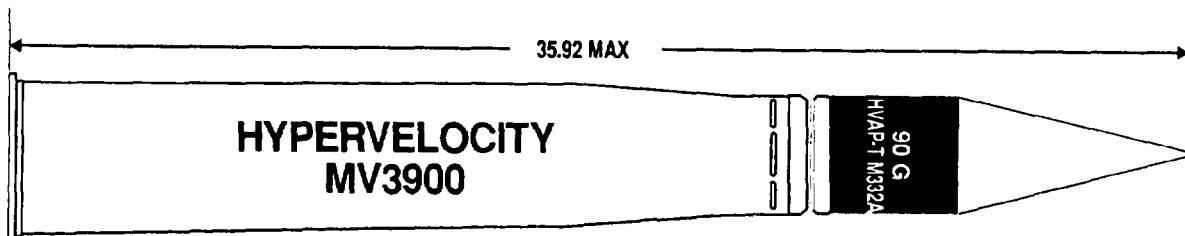
**Limitations:**

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

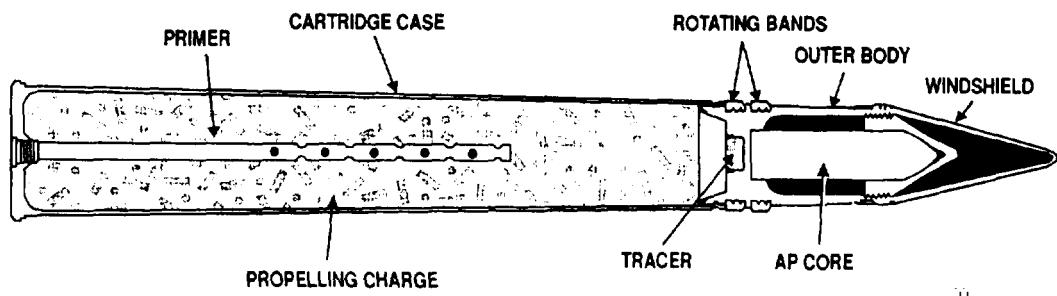
**References:**

AMC-P 700-3-3

TM 9-1300-251-20

**CARTRIDGE, 90 MILLIMETER: HVAP- M332A1**

AR 199823

U  
AR 199822**Type Classification:**

CON MSR 11756003.

**Use:**

This high velocity armor-piercing cartridge is designed for use in 90mm 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 bourrelet, 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 three seconds of projectile flight. Upon impact, the outer shell crumples and the tungsten carbide core penetrates the target solely by kinetic energy.

**Tabulated Data:**

## Complete round:

Type	HVAP
Weight	32.3 lb
Length	35.92 in.
Cannon used with	M36, M41 or M54

## 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 m (15,700 yd)
Muzzle velocity -----	1165 mps (3875 fps)
Temperature limits:	
Firing:	
Lower limit -----	+40°F
Upper limit -----	+125°F
Storage:	
Lower limit -----	-80°F (for period not more than 3 days)
Upper limit -----	+160°F (for period not more than 4 hr/day)
*Packing -----	1 round per fiber container; 2 containers per wooden box
*Packing box:	
Weight -----	119 lb
Dimension -----	42-7/16 x 12-15/16 x 8-3/32 in.
Cube -----	2.6 cu ft

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

#### **Shipping and Storage Data:**

UNO serial number -----	0328
Quantity-distance class -----	(08) 1.2
Storage compatibility group---	C
DOT shipping class -----	B
DOT designation -----	AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC -----	1315-C270
Drawing number -----	75-1-310

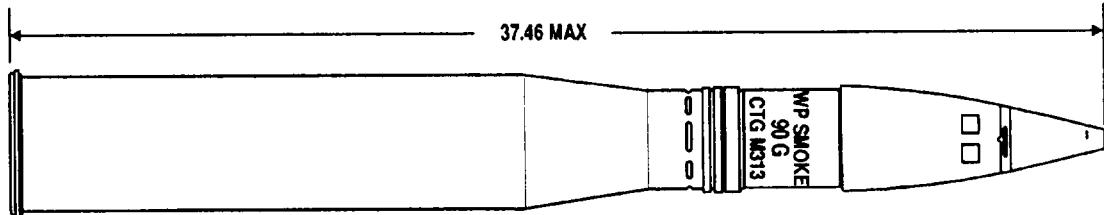
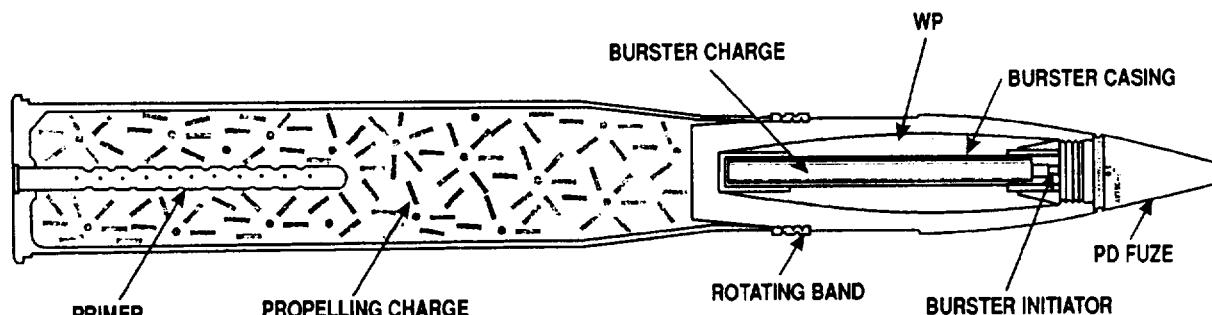
#### **Limitations:**

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

#### **References:**

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

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

U  
AR 199829U  
AR 199828**Type Classification:**

STD OTCM 37119 dtd 1959 (M313).  
STD OTCM 37619 dtd 1960 (M313C).

**Use:**

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

**Description:**

The projectile consists of a hollow steel forging with a boat-tailed base and streamlined ogive. The projectile nose is threaded to receive an adapter for the point-detonating fuze and to 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 pro-

vides a tight seal for the charge of white phosphorous (WP).

**Functioning:**

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

**Difference Between Models:**

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

**Tabulated Data:**

Complete round:

	<u>M313</u>	<u>M313C</u>
Type -----	Smoke (WP)	Smoke (WP)
Weight -----	42.52 lb	40.52 lb
Length -----	37.44 in.	37.46 in.
Cannon used with -----	M36, M41 or M54	
Projectile:		
Body material-----	Steel	
Color-----	Gray w/yellow band and marking (green wired marking for later manufac- ture)	
Filler and weight -----	WP, 1.97 lb	
Components:		
Cartridge case -----	M19, M19B1	
Propelling charge -----	(M313) M15, M6, 7.31 lb; (M313C) M1, 5.33 lb	
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 m (19,375 yd); (M313C) 15,362 m (16,800 yd)	
Muzzle velocity -----	(M313) 821 mps (2700 fps); (M313C) 730 mps (2400 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 lb  
 Dimensions ----- 43-5/8 x 13 x  
8-5/32 in.  
 Cube ----- 2.69 cu ft

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

**Shipping and Storage Data:**

UNO serial number ----- 0245  
 Quantity-distance class ----- (12) 1.2  
 Storage compatibility group --- H  
 DOT shipping class ----- A  
 DOT designation ----- AMMUNITION  
FOR CANNON  
WITH SMOKE  
PROJECTILES  
 DODAC ----- 1315-C258  
 Drawing number ----- 8858640

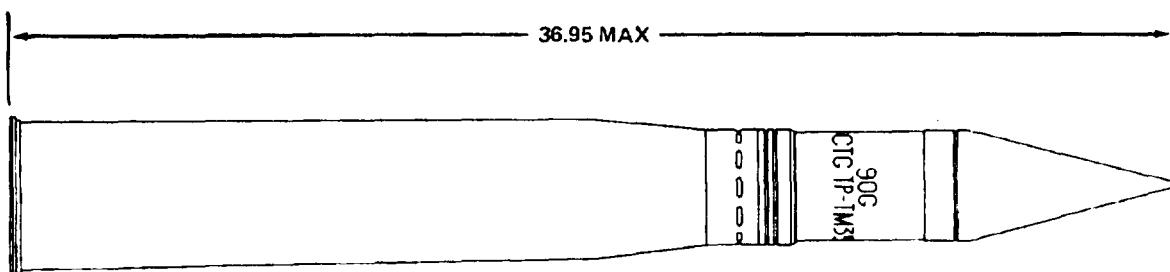
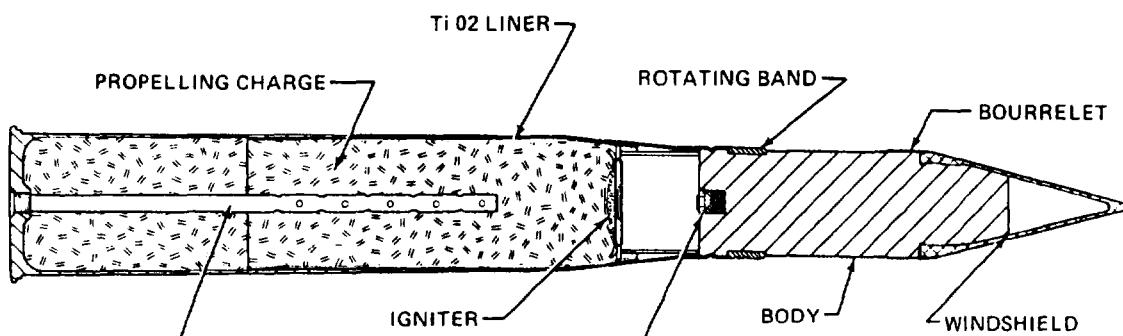
**Limitations:**

Since the burster in this ammunition is loaded with tetrytol, it is not to be stored or fired at temperatures 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 resolidify with void space in normal position in nose of projectile. Erratic performance may occur if voids exist inside the WP filler.

**References:**

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

**CARTRIDGE, 90 MILLIMETER: TP-T M353 (T22E1), M353A1 (M353E1) AND M353A2**U  
AR 199827U  
AR 199826**Type Classification:**

OBS OTCM 37344 (M353).  
 STD AMCTC 4634 dtd 1966 (M353A1).  
 STD AMCTC 4634 dtd 1966 (M353A2).

**Use:**

This cartridge is used in 90mm 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 Between Models:**

M353 does not contain a cartridge case liner.

M353A1 contains TiO<sub>2</sub> liner with low temperature melt wax.

M353A2 contains TiO<sub>2</sub> liner with high temperature melt wax.

**Tabulated Data**

Complete round:

Type	TP-T
Weight	43.9 lb
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
Primer -----	M58
Tracer -----	M5A2, M5A2B1, M13

**Performance:**

Maximum range -----	21,031 m (23,000 yd)
Muzzle velocity -----	914 mps (3000 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 lb
Dimensions -----	44 x 12-7/8 x 8-1/8 in.
Cube -----	2.64 cu ft

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

**Shipping and Storage Data:**

UNO serial number -----	0328
Quantity-distance class -----	(08) 1.2
Storage compatibility group-----	C
DOT shipping class -----	B
DOT designation -----	AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC -----	1315-C290
Drawing number -----	8861603

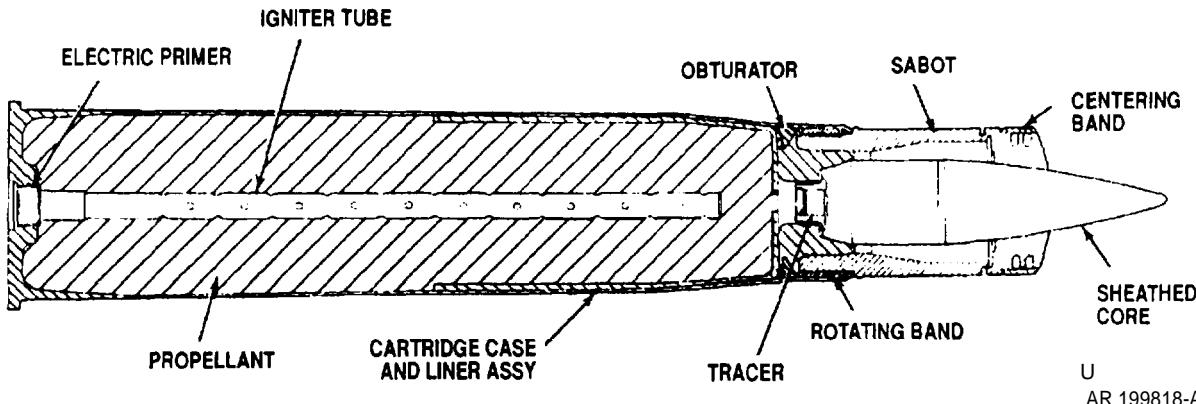
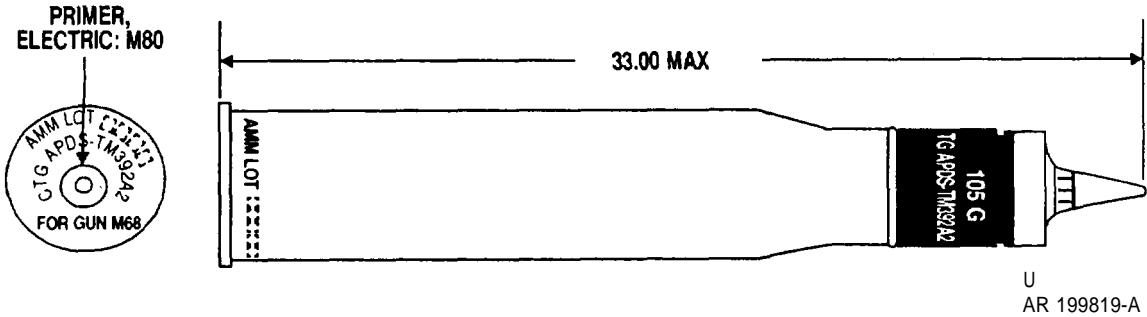
**Limitations:**

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

**References:**

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

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

**Type Classification:**

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

**Use:**

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

**Description:**

The projectile consists of a sheathed tungsten carbide core with tracer and a sabot. The core, which is the armor-piercing element, is carried within the sheath with the sabot assembled on the exterior surface. A plastic band is positioned on the outside diameter of the sabot at the forward end. A fiber rotating band and a rubber obturator are assembled on the outside diameter near the base of the sabot. The

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

**Functioning:**

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

**Difference Between Models:**

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

**Tabulated Data:**

Complete round:

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

Projectile:

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

Components:

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

Performance:

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

Temperature limits:

Firing:  
 Lower limit ----- -40°F  
 Upper limit ----- +125°F  
 Storage:  
 Lower limit ----- -80°F (for period  
 not more than 3  
 days)  
 Upper limit ----- +160°F (for  
 period not more  
 than 4 hr/day)  
 \*Packing ----- 1 round per  
 fiber container;  
 2 containers per  
 wooden box  
 \*Packing box:  
 Weight ----- 126 lb

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

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

**Shipping and Storage Data:**

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

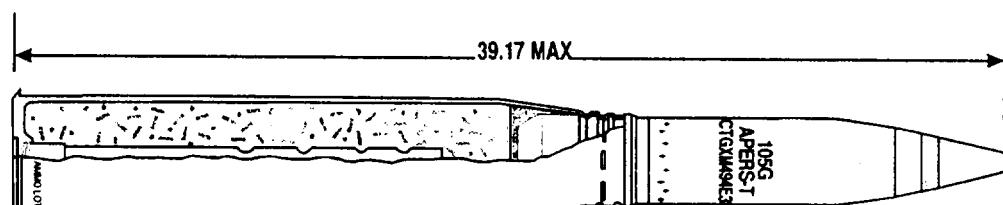
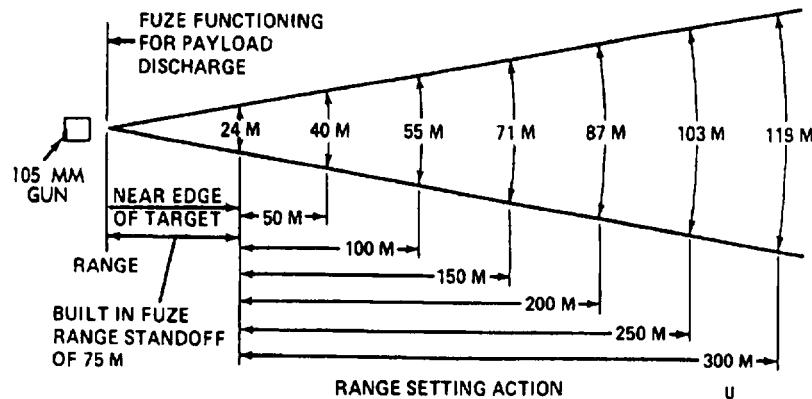
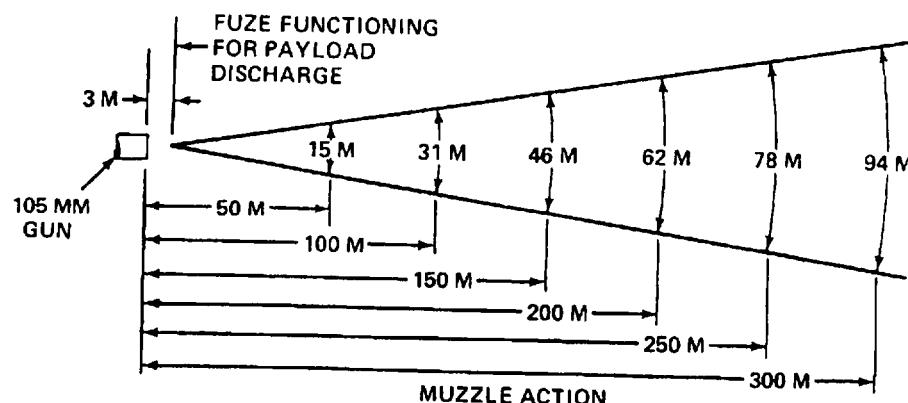
**Limitations:**

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

**References:**

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

## CARTRIDGE, 105 MILLIMETER: APERS-T, M494

PRIMER,  
ELECTRIC: M86U  
AR 199821-AU  
AR 199820U  
AR 199882**Type Classification:**

STD AMCTC 9575 dtd 1972

**Use:**

This fixed cartridge is fired from 105mm 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. A mechanical-time 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. Upon 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 lb
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 lb

#### Components:

Cartridge case -----	M150B1
Propelling charge -----	M6, 9.2 lb
Primer -----	M86 electric
Tracer -----	M13
Fuze -----	MT-M571

### Performance:

Maximum range -----	4400 m (4840 yd)
Muzzle velocity -----	821 mps (2700 fps)

Flechette range from point of fuze function ----- 300 m (330 yd)

### Temperature limits:

#### Firing:

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

#### Storage:

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

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

#### \*Packing box:

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

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

### **Shipping and Storage Data:**

UNO serial number -----	0321
Quantity-distance class -----	(12) 1.2
Storage compatibility group -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC -----	1315-C519
Drawing number -----	9229962

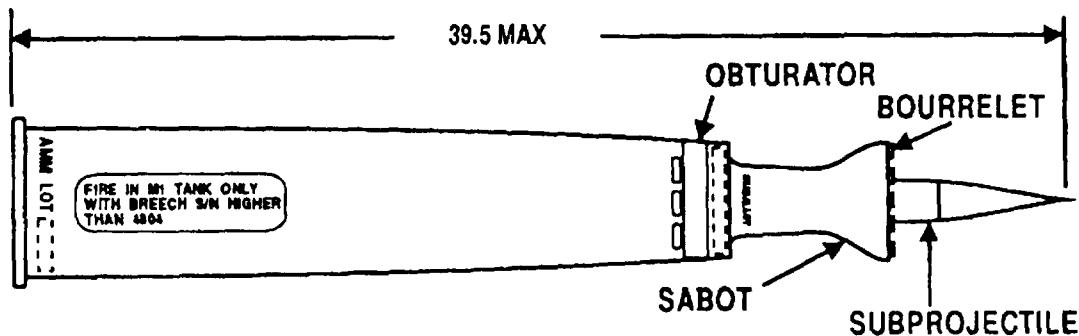
### **Limitations:**

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:**

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

## CARTRIDGE, 105 MILLIMETER: APFSD-T, M900

U  
AR4815**Type Classification:**

TC LRP Dec 1989.

**Use:**

This is a kinetic energy, armor-piercing antitank round intended for use with the 105mm, M68 series gun mounted on M1 tanks only.

**Description:**

The M900 is a U.S. designed and developed 105mm APFSDS-T cartridge. The complete round contains a propulsion system consisting of an M148A1B1 steel cartridge case, an M43 LOVA propellant, an M128 primer, and a gun tube wear-reducing titanium dioxide liner which is assembled to the interior wall of the cartridge case. The projectile portion of the round consists of a subprojectile and a sabot. The subprojectile is made up of monolithic depleted uranium core, which is fitted with an aluminum windshield, a steel tip, and an aluminum fin assembly. The sabot is comprised of three 120° aluminum sections which are assembled around the subprojectile. A steel bourrelet, containing three shear cuts, is screwed to the sabot forward face. A nylon obturator and polypropylene seal is assembled around the sabot, and a silicone rubber seal is applied over the rear face of the sabot. An M13 tracer is assembled to the fin and is held in place by a threaded plug and disc assembly.

**Functioning:**

The M900 is loaded and fired from the M68 series, 105mm gun in the normal manner.

Initiation of the electric primer ignites the propelling charge generating gases which drive the projectile from the gun and ignite the tracer. The silicone seal at the rear of the sabot prevents gas leakage between the sabot segments and the driving forces (gas) propelling the subprojectile downbore. Upon leaving the gun, aerodynamic forces cause the sabot to separate from the subprojectile allowing the subprojectile to continue on a true course to target while the sabot segments fall quickly to earth. Target penetration is effected strictly by the high kinetic energy of the subprojectile impacting the target.

**Tabulated Data:**

## Complete round:

Type	Fixed, APFSDS-T
Weight	40.8 lb (18.5 kg)
Length	39.5 in. (100.4 cm)
Assembly drawing	12910111
Color	Black w/white markings
Projectile weight as fired	15.1 lb (6.86 kg)
Propellant	13.5 lb

## Temperature limits:

## Firing:

Lower Limit	-20°F (-28.9°C)
Upper Limit	+120°F (+48.9°C)

## Storage:

Lower Limit	-35°F (-37.2°C)
Upper Limit	+145°F (+62.8°C)

Performance:	75 KSI @ 70°F
Velocity	1505 MPS

Packaging (light weight container):  
 Inner pack drawing ----- N/A  
 Outer pack drawing ----- 12561500  
 Weight (empty) ----- 17 lb  
 Dimensions ----- 6.84 x 6.84 x  
                           44.5 in.  
 Cube (ft) ----- 1.2 cu ft  
 \*Packing ----- one round per  
                           light weight  
                           metal container:  
                           30 containers  
                           per metal pallet

Pallet (w/30 containers):  
 Weight (empty) ----- 1033 lb  
 Dimensions ----- 44-1/2 x 42 x 39  
                           in.  
 Cube ----- 42.2 cu ft

\* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSNs.

#### **Shipping and Storage Data:**

UNO serial number ----- 0328  
 Quantity-distance class ----- (04) 1.2  
 Storage compatibility group --- C  
 DOT shipping class ----- A

NOTE: Some quantities of M900 primers are marked "XM128". The "X" marking is to be disregarded, XM128 primers are the same as type classified M128 primers.

DOT container marking ----- CARTRIDGES  
                                   FOR  
                                   WEAPONS,  
                                   INERT PRO-  
                                   JECTILE AND  
                                   DOT E-9649  
 DODAC ----- 1315-C543  
 NSN----- 1315-01-324-  
                                   6633  
 Drawing number ----- 12910111

#### **Limitations:**

Projectile is not to be disposed of by burning or detonation.

#### **NOTE**

Loss or unauthorized firings of the M900 must be reported to the HQ, AMCCOM RPO within 24 hours of the discovery.  
 Report to:

CDR USA AMCCOM  
 ATTN: AMSMC-SF (RPO)  
 Rock Island, IL 61299-6000  
 DSN: 793-2969/2964/2965/2966  
 Commercial: (309)782-2961/2965  
                                   782-2964/2966

The M900 is a full service round which may only be fired during war emergency. All peacetime firings are prohibited except on ranges which are Nuclear Regulator Commission (NCR) approved and/or have host nation agreement. The M900 will not be fired over the heads of friendly troops unless troops are protected by adequate cover. Troops may be struck by the discarded sabot.

#### **WARNING**

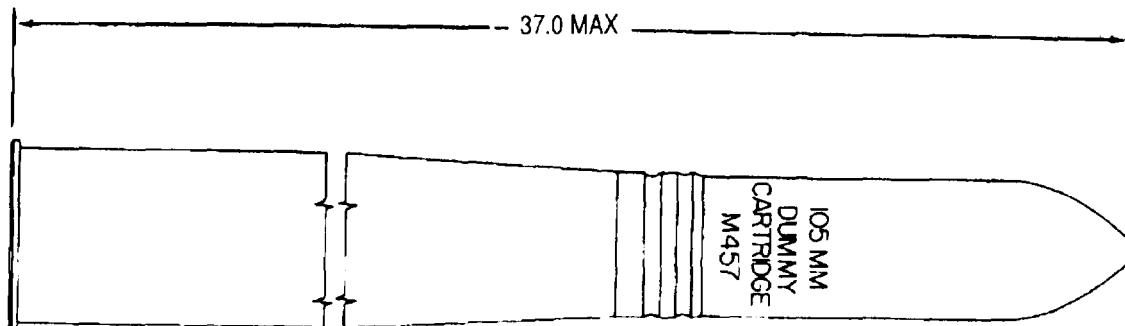
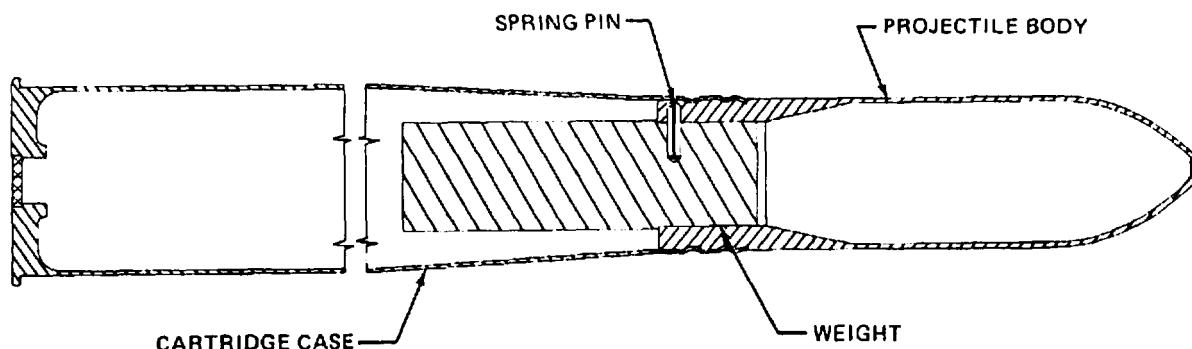
- **THE M900 IS AUTHORIZED FOR USE IN M1 TANKS ONLY. FIRING THE M900 FROM ANY OTHER 105MM TANK SYSTEM MAY RESULT IN THE FAILURE OF THE GUN MOUNT. FIRING THE M900 IN UNAUTHORIZED GUN MOUNTS WILL RESULT IN FAILURE OF THE RECOIL MECHANISM HYDRAULIC SEALS.**

- **DO NOT FIRE THE M900 FROM 105MM, M68 SERIES CANNON EQUIPPED WITH BREECHES HAVING SERIAL NUMBERS LOWER THAN 4804. BREECHES WITH SERIAL NUMBERS LOWER THAN 4804 CAN FAIL CATASTROPHICALLY WITHOUT WARNING. INITIAL QUANTITIES MAY BE STENCILED WITH A NOTE INDICATING A CUTOFF POINT FOR THE BREECHES AT SERIAL NUMBER 6000. THIS NUMBER SHOULD NO LONGER BE CONSIDERED VALID.**

- **DO NOT FIRE M900 CARTRIDGES WHERE THE PROJECTILE IS LOOSE WITHIN THE CARTRIDGE CASE; I. E., ROTATING, WOBBLING, RATTLING, OR ANY OTHER UNSECURED MANNER. THIS CONDITION MAY RESULT IN EXCESSIVE PRESSURE WHILE FIRING RESULTING IN CATASTROPHIC BREECH FAILURE.**

- HATCHES MUST REMAIN CLOSED AND THE TURRET VENT BLOWER MUST REMAIN ON WHEN FIRING TO PREVENT BUILDUP OF TOXIC GAS (CARBON MONOXIDE). CREW MEMBERS ARE REQUIRED TO WEAR SINGLE HEARING PROTECTION (COMBAT CREWMEN HELMET) DURING ALL M900 FIRING. OBSERVERS ON THE GROUND SHOULD STAY BEHIND THE TANK AND WEAR DOUBLE HEARING PROTECTION DURING MAIN TANK WEAPON FIRING.

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**CARTRIDGE, 105 MILLIMETER: DUMMY, M457**U  
AR 199809U  
AR 199808**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 105mm gun cannon.

**Description:**

The cartridge simulates a loaded round of 105mm high-explosive plastic 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 lb
Length -----	37 in.
Cannon used with -----	M68

## Projectile:

Body material -----	Steel
Color -----	Blue w/white marking (unpainted on bronze body for later manufacturer)

## Components:

Cartridge case -----	M148A1B1
Propelling charge -----	N/A
Primer -----	N/A

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

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

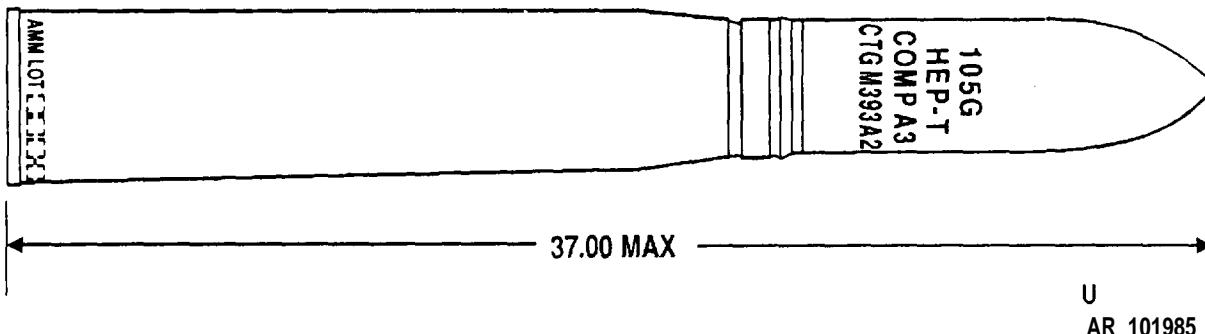
\* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

Quantity-distance class -----	N/A
Storage compatibility group ---	N/A
DOT shipping class -----	N/A
DOT designation -----	NON- EXPLOSIVE AMMUNITION
DODAC -----	1315-C514
Drawing number -----	10534154

**References:**

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

**CARTRIDGE, 105 MILLIMETER: HEP-T, M393A2 AND M393A1****Type Classification:**

STD AMCTC 3325 dtd 1965.

**Use:**

This cartridge is designed for use against armored targets, light materiel, and personnel.

**Description:**

The cartridge carries a payload of 6.6 pounds of Composition 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 (BD) 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. Upon impact, the fuze functions initiating the explosive filler.

**Difference Between Models:**

The M393A1 differs from the M393A2 in that the M393A1 employs the BD fuze M534 while the M393A2 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

Projectile:

Filler -----	M68
Explosive (393A2) -----	Comp A, 6.6 lb
Explosive (393A1) -----	Comp A, 6.3 lb
Body materiel -----	Steel
Color -----	Olive drab w/ yellow markings and black band

Components:

Cartridge case -----	M150B1 (steel); M150 (brass)
Propellant -----	M1, 5.9 lb
Primer (electric) -----	M86
Tracer -----	M12

Performance:

Maximum range -----	9510 m (10,400 yd)
Muzzle velocity -----	2400 m (731.5 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 hr/day)

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

\*Packing box:  
Weight (w/2 ctgs )----- 137 lb  
Dimensions OD----- 43-1/2 x 14 x  
                          8-1/2 in.  
Cube ----- 3 cu ft

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

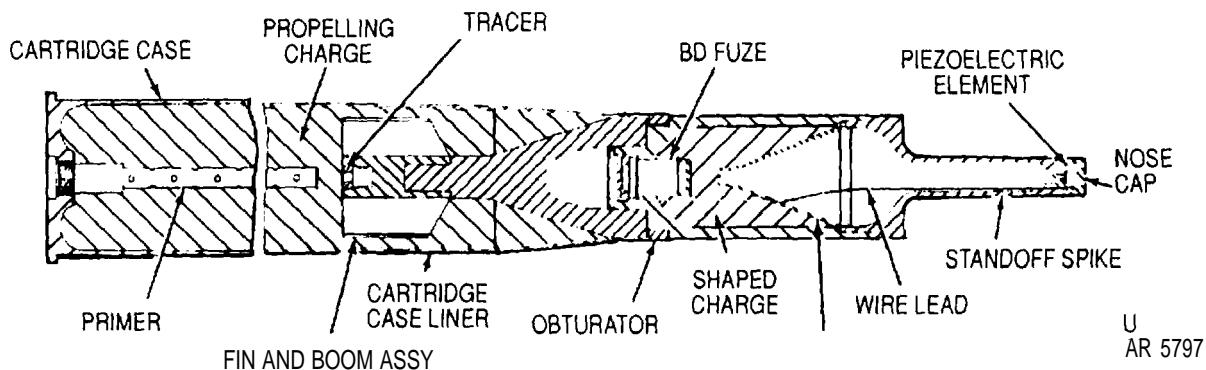
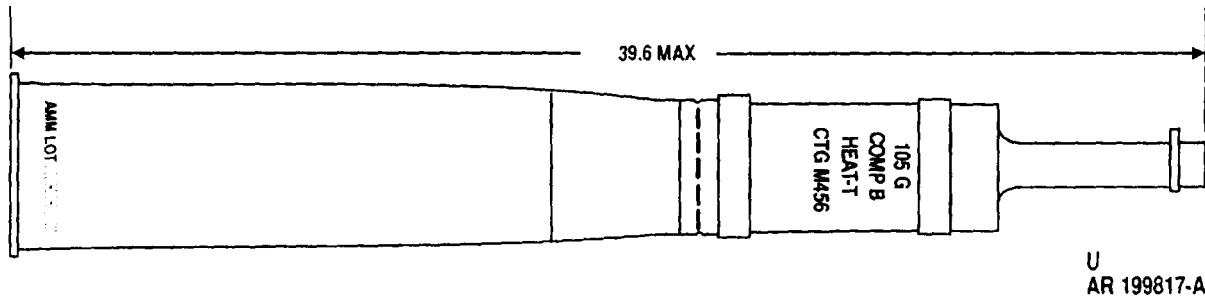
**Shipping and Storage Data:**

UNO serial number ----- 0006  
Quantity-distance class ----- 1.1

Storage compatibility group --- E  
DOT shipping class ----- A  
DOT designation ----- AMMUNITION  
FOR CANNON  
WITH  
EXPLOSIVE  
PROJECTILE  
DODAC ----- 1315-C429;  
                          1315-C518  
Drawing number ----- M393A2  
                          8886470  
                          M393A1-  
                          8853735

**References:**

AMC-P 700-3-3  
SB 700-20

**CARTRIDGE, 105 MILLIMETER: HEAT-1; M456 SERIES**U  
AR 5797**Type Classification:**

STD AMCTC 4677 dtd 1966 (M456A1),  
OBS MSR 11756003 (M456).

**Use:**

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

**Description:**

The steel body projectile is fitted with a plastic obturator, a threaded standoff spike assembly, a fin and boom assembly, and a point-initiating point-detonating fuze. A funnel-shaped copper liner within the body shapes the explosive charge of Composition B. A piezoelectric element retained in a nose cap is fitted to the spike assembly, and is connected to the base-detonating 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. Upon impact, fuze functioning detonates the projectile and the cone collapses, creating a high velocity focused shock wave and a jet of metal particles that penetrates the target.

**Difference Between Models:**

The three models in the M456 series differ in the use of cartridge case liners. The M456.41 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.

**Tabulated Data:**

Complete round:

Type ----- HEAT-T  
 Weight ----- 481b  
 Length ----- 39.6in.  
 Cannon used with ----- M68

Projectile:

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

Filler and weight ----- CompB, 2.14 lb

Components:

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

Performance:

Maximum range ----- 8200 m (8975 yd)  
 Muzzle velocity ----- 1173 mps (3850 fps)

Temperature limits:

Firing:

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

Storage:

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

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

\*Packing box:  
 Weight ----- 132 lb  
 Dimensions ----- 45-13/16 x 14-3/16 x 8-25/32 in.  
 Cube ----- 3.3 cu ft

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

**Shipping and Storage Data:**

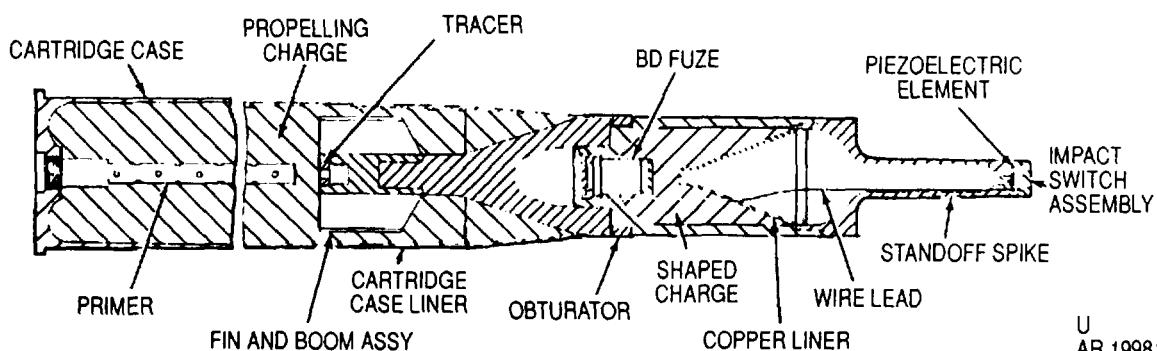
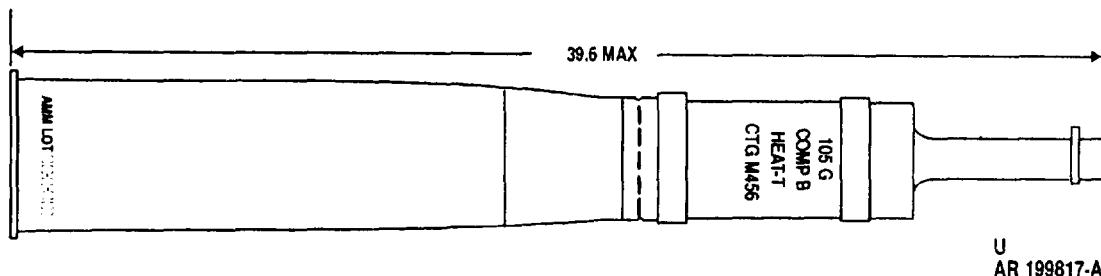
UNO serial number ----- 0321  
 Quantity-distance class ----- (12) 1.2  
 Storage compatibility group --- E  
 DOT shipping class ----- A  
 DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES  
 DODAC ----- 1315-C508  
 Drawing number ----- 8861065

**Limitations:**

Do not fire M456El cartridges which have been tank transported at temperatures above 120°F

**References:**

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

**CARTRIDGE, 105 MILLIMETER: HEAT-T-ME M456A2****Type Classification:**

Recommended STD by General Officers Review, 3 June 1980.

**Use:**

This cartridge is a high-explosive antitank cartridge and is intended for use on 105mm guns M68 against armored targets.

**Description:**

The steel body of the projectile is fitted with a plastic obturator and seal, a threaded standoff spike assembly covered by an impact switch assembly (held in place with a collar), a fin and boom assembly and a point-initiating point-detonating fuze. A funnel-shaped copper liner within the body shapes the explosive charge of Composition B. A power supply

retained by the impact switch assembly is fitted to the spike assembly, and is connected to the base-detonating fuze in the body. The addition of the impact switch assembly provides for a higher functioning reliability in that initiation can occur upon contact with any part of the standoff spike assembly, i.e., improved performance on irregular surfaces and graze functioning. 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. Upon impact, fuze functioning detonates the projectile and the cone collapses, creating a high velocity focused shock wave and a jet of metal particles that penetrate the target.

**Difference Between Models:**

<u>M456</u>	<u>M456E1</u>	<u>M456A1</u>	<u>M456A2</u>
No cartridge case liner	Cartridge case liner with wax titanium dioxide on one side	Cartridge case liner with wax titanium dioxide covered with mylar	Same as M456A1
Aluminum chamber chamber (base of projectile body)	Aluminum chamber (base of projectile body)	Early production and aluminum chamber body (After Aug 67 enclose)	Collar ring to retain impact switch assembly (FFAIS - Full Frontal Area Impact Switch)

**Tabulated Data:**

Complete round:	
Type	HEAT-T
Weight	49 lb
Length	39.6 in.
Cannon used with	M68
Projectile:	
Body material	Steel
Color	Black w/yellow markings
Filler and weight	Comp B, 2.14 lb
Components:	
Cartridge case	M148A1B1
Propellant	M30
Primer	M83
Tracer	M13
Fuze	PIBD-M509A1
Performance:	
Maximum range	8200 m (8975 yd)
Muzzle velocity	1173mps (3850 fps)

Temperature limits:

## Firing:

Lower limit -----	40°F (-400C)
Upper limit -----	+125°F (+52.0°C)

## Storage:

Lower limit -----	-65°F (-53.8°C)
Upper limit -----	+145°F (+63°C)

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

## \*Packing box:

Weight -----	141 lb
Dimensions -----	45-13/16 x 13-15/16 x 8-7/16 in.
Cube -----	3.1 cu ft

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

**Shipping and Storage Data:**

UNO serial number -----	0321
Quantity-distance class -----	(08) 1.2
Storage compatibility group--	E
DOT shipping class -----	A
DOT designation -----	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC -----	1315 -C508
Drawing number -----	9312816

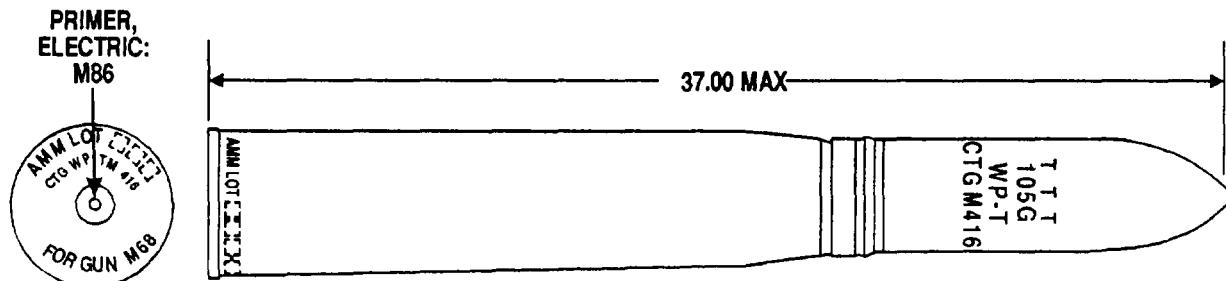
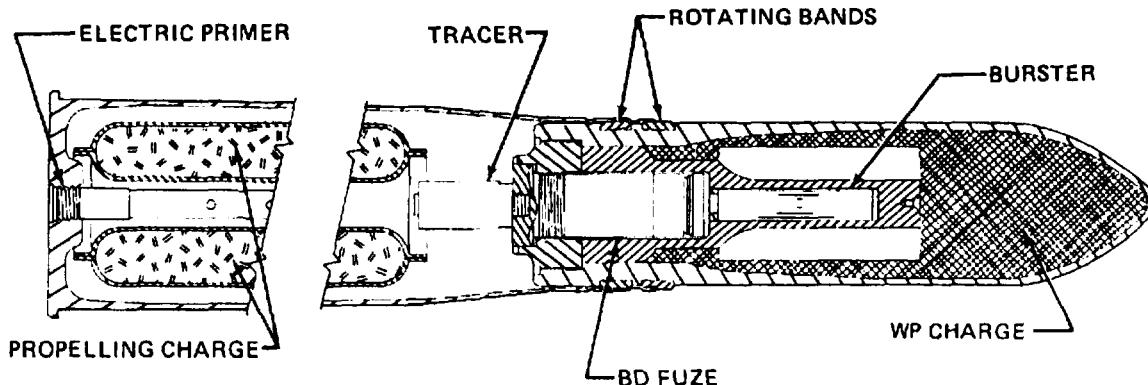
**Limitations:**

Firing this cartridge over the heads of friendly troops is prohibited, unless troops are protected by adequate cover. This limitation is based upon the possibility of an airburst down-range.

**References:**

AMC-P 700-3-3
SB 700-20
TM 9-1300-250
TM 9-1300-251-20
TM 9-1300-251-34

## CARTRIDGE, 105 MILLIMETER: SMOKE, W-T, M416

U  
AR 199815-A

AR1W814

**Type Classification:**

STD AMCTC 2173 dtd 1964.

**Use:**

This cartridge is intended for screening and spotting fire from 105mm 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. Upon impact, the fuze functions and detonates the burster charge which ruptures the projectile and disperses the WP filler. Upon contact with the air, WP ignites producing a dense cloud of smoke.

**Tabulated Data:**

Complete round:

Type -----	Smoke WP-T
Weight -----	45.5 lb
Length -----	37 in.
Cannon used with -----	M68

Projectile:  
 Body material ----- Steel  
 ----- Light green  
     w/yellow band  
     and light red  
     markings  
 Filler and weight ----- WP, 6 lb

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

Performance:  
 Maximum range ----- 9150 m (10,000  
     yd)  
 Muzzle velocity ----- 730 mps (2400  
     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 4hr/day)  
 \*Packing ----- 1 round per  
     fiber container;  
     2 containers per  
     wooden box  
 \*Packing box:  
 Weight ----- 137 lb

Dimensions ----- 43-1/2 x 14 x  
 8-1/2 in.  
 Cube ----- 3 cu ft

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

**Shipping and Storage Data:**

UNO serial number ----- 0245  
 Quantity-distance class ----- (12) 1.2  
 Storage compatibility group--- H  
 DOT shipping class ----- A  
 DOT designation ----- AMMUNITION  
     FOR CANNON  
     WITH SMOKE  
     PROJECTILES  
 DODAC ----- 1315-C512  
 Drawing number ----- 8886487

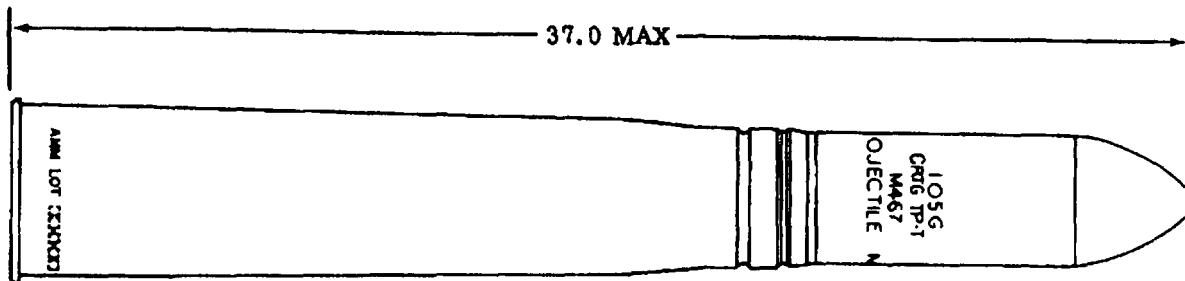
**Limitations:**

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 the WP filler.

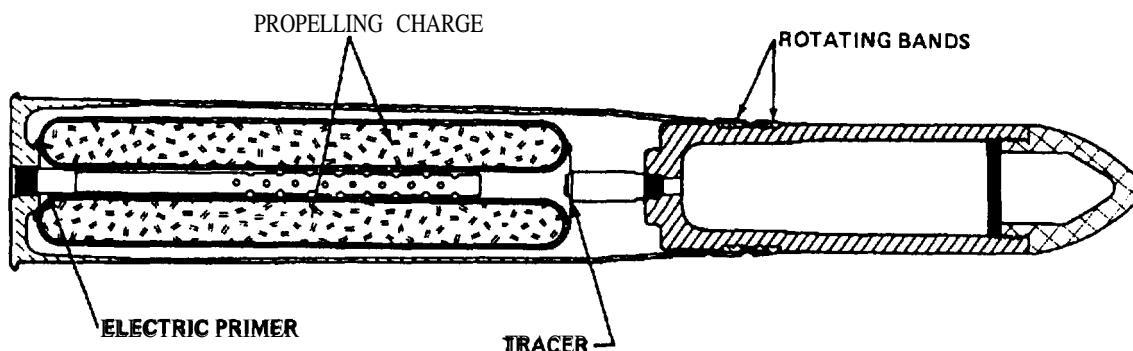
**References:**

AMC-P 700-3-3  
 SB 700-20  
 TM 9-1015-203-12  
 TM 9-1015-234-10  
 TM 9-1300-251-20  
 TM 9-2350-311-10

## CARTRIDGE, 105 MILLIMETER: TP-T, M467



AR19911



AR19810

Type Classification:

STD MSR 0173625 dtd 1973,

Use:

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

Description:

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

Functioning:

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

Tabulated Data:

## Complete round:

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

## Projectile:

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

## Components:

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

## Performance:

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

**Temperature limits:****Firing:**

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

**Storage:**

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

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

\*Packing box:  
 Weight ----- 137 lb

Dimensions ----- 43-1/2 x 14 x  
                      8-1/2 in.  
 Cube ----- 3 cu ft

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

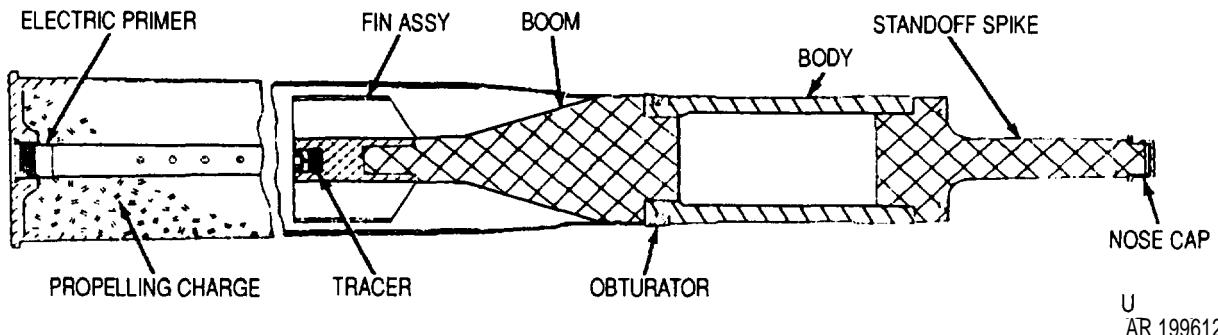
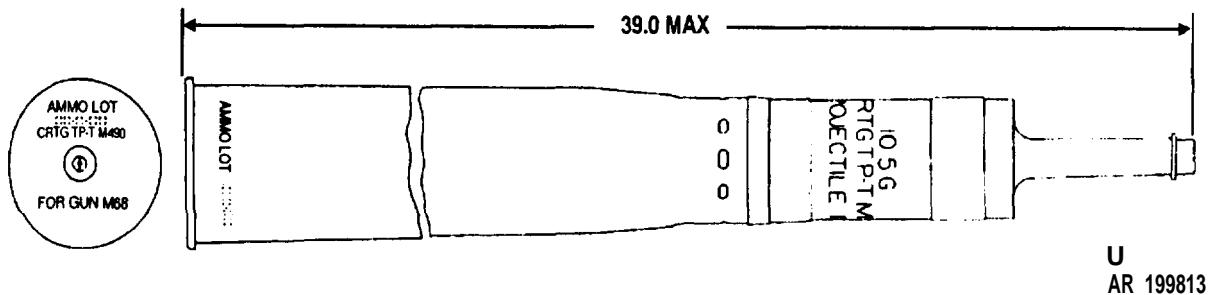
**Shipping and Storage Data:**

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

**References:**

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

## CARTRIDGE, 105 MILLIMETER: TM490

**Type Classification:**

STD AMCTC 1103 dtd 1963.

**Use:**

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

**Description:**

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

**Functioning:**

The electrically initiated primer ignites the propelling charge. Gases produced by the

burning propellant propel the projectile from the gun and ignite the tracer which burns for a minimum of 2.5 seconds.

**Tabulated Data:**

Complete round:

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

Projectile:

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

Components:

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

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

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

Storage:  
 Lower limit ----- -80°F (-62.2°C)  
                          (for period not  
                          more than 30  
                          days)  
 Upper limit ----- +160°F (71.1°C)  
                          (for period not  
                          more than 4  
                          hr/day)

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

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

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

### **Shipping and Storage Data:**

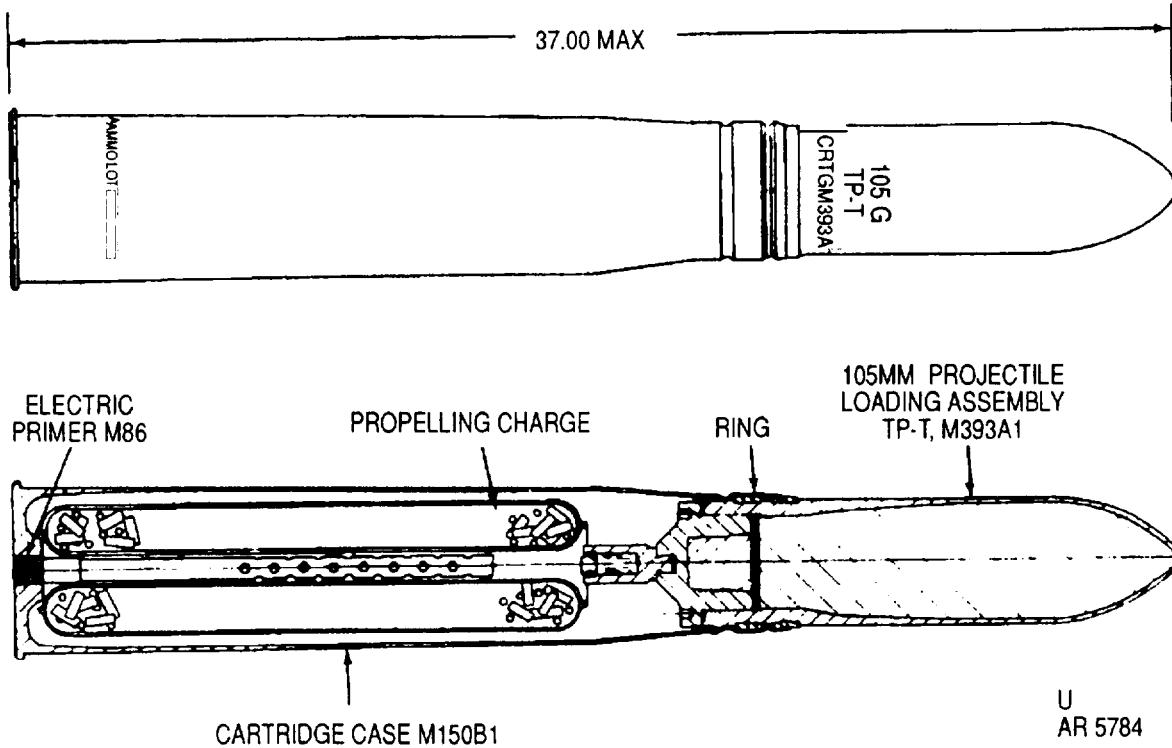
UNO serial number ----- 0328  
 Quantity-distance class ----- (04) 1.2  
 Storage compatibility group --- C  
 DOT shipping class ----- B  
 DOT designation ----- AMMUNITION  
                          FOR CANNON  
                          WITH EMPTY  
                          PROJECTILES  
 DODAC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

### **Limitations:**

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

### **References:**

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

**CARTRIDGE, 105 MILLIMETER: TP-T, M393A1****Type Classification:**

STD.

**Use:**

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

**Description:**

The cartridge is similar in appearance and is ballistically matched to the high-explosive plastic round M393A1 and M393A2. The projectile is filled with inert material and has a tracer at the base. The projectile is assembled to a steel cartridge case fitted with the same model (M86) electric primer as the service round and contains the same type bagged propelling charge.

**Functioning:**

When the weapon is fired, the electrically initiated primer ignites the propelling charge. Gases produced by the burning propellant propel the projectile from the gun and ignite the tracer, enabling the gunner in tracking the target.

**Tabulated Data:**

Complete round:

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

Projectile:

Type of filler -----	E (inert)
Body material -----	Steel
Color -----	Blue w/white markings

Components:

Cartridge case -----	M150B1 (steel)
Propellant -----	M1 (5.9 lb)
Primer (electric) -----	M86
Tracer -----	M12

Performance:

Maximum range -----	9510 m (10,400 yd)
Muzzle velocity -----	731.5 mps (2400 fps)

Temperature limits:

Firing:

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

Storage:

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

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

\*Packing box:

Weight (w/2 ctgs)-----	137 lb
Dimensions OD-----	43-1/2 x 14 x 8-1/2 in.
Cube -----	3 cu ft

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

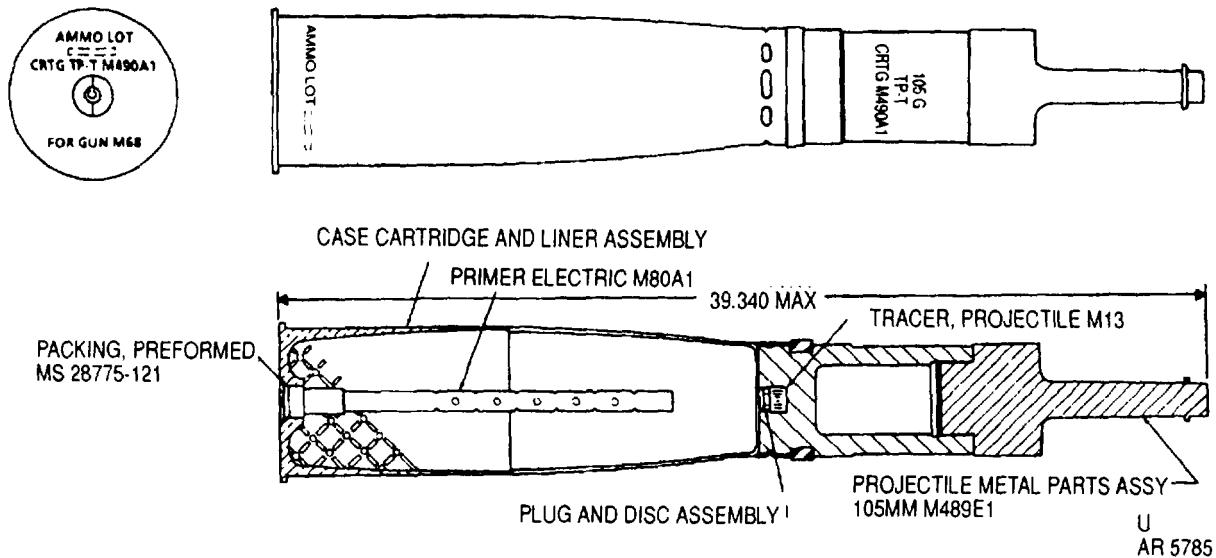
#### Shipping and Storage Data:

UNO serial number -----	0328
Quantity-distanceclass -----	(08) 12
Storage compatibility group ----	C
DOT shipping class -----	A
DOT designation -----	AMMUNITION FOR CANNON WITH INERT LOADED PROJECTILE
DODAC -----	1315-C503
Drawing number -----	9335943

#### References:

SB 700-20

## CARTRIDGE, 105 MILLIMETER: TP-T, M490A1

**Type Classification:**

STD MSR 06846011.

**Use:**

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

**Description:**

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

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

**Functioning:**

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

**Tabulated Data:**

Complete round:

Type -----	TP.T
Weight -----	45.81 lb
Length -----	39.34 in.
Cannon used with -----	M68

Projectile:

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

Components:

Cartridge case -----	M148A1B1, M148A2B1*
Propelling charge -----	M14
Primer -----	M80A1
Tracer -----	M13
Fuze -----	N/A

Performance:

Maximum range -----	8975 yd
Average velocity -----	3850 fps

Temperature limits:

Firing:

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

Storage:

Lower limit -----	-80°F (-62.2°C) (for period not more than 3 days)
Upper limit -----	+160°F (+71.0°C) (for period not more than 4 hr/day)

\* M148A2B1 uses spiral-wrapped cartridge case.

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

## \*\*Packing box:

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

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

**Shipping and Storage Data:**

UNO serial number ----- 0328  
Quantity-distance class ----- (04) 1.2

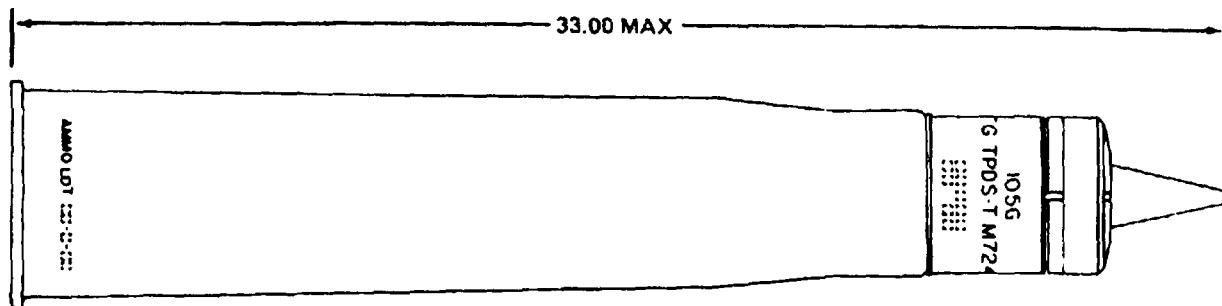
Storage compatibility group --- C  
DOT shipping class ----- B  
DOT designation ----- AMMUNITION  
FOR CANNON  
WITH EMPTY  
PROJECTILES  
Drawing number ----- 9343009  
12935040\*\*\*  
DODAC ----- 1315-C511

\*\*\* This drawing shows the M490A1 assembled  
with the spiral-wrapped cartridge case.

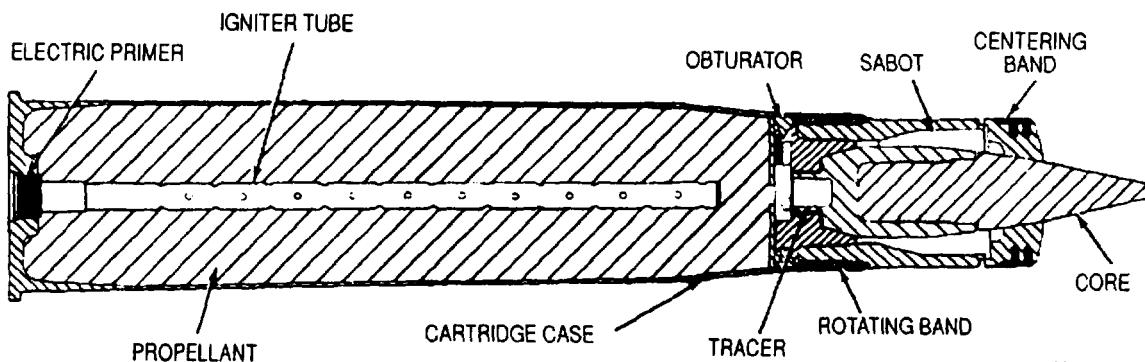
**References:**

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

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



AR 199807

U  
AR 199806-A**Type Classification:**

STD MSR 05746014 dtd 1974.

**Use:**

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

**Description:**

The discarding sabot round is similar in external appearance and is ballistically similar to 2,000 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. Some M724A1's may be assembled with the spiral-wrapped cartridge case.

**Functioning:**

The electrically initiated primer ignites the propelling charge and tracer. Cases 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. The M724A1 is a United States manufactured car-

**Tabulated Data:**

Complete round:

Type ----- TPDS-T  
 Weight ----- 321b  
 Length ----- 33in.  
 Cannon used with ----- M68

Projectile:

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

Components:

Cartridge case ----- M115B1,  
                           M115B1A1\*  
 Propelling charge ----- M1  
 Primer ----- M80A1  
 Tracer ----- M13

Performance:

Maximum range ----- 16,739 m  
                           (18,450 yd)  
 Muzzle velocity ----- 1539 mps (5080  
                           fps)

Temperature limits:

Firing:

Lower limit ----- -40°F (-400C)  
 Upper limit ----- +125°F (+520C)

Storage:

Lower limit ----- -80°F (-62.20°C)  
                           (for period not  
                           more than 3  
                           days)  
 Upper limit ----- +160°F  
                           (+71.1°C) (for  
                           period not more  
                           than 4 hr/day)

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

\*\*Packing box:

Weight ----- 107 lb  
 Dimensions ----- 39-7/8 x 14-1/8 x  
                           8-23/32 in.

Cube ----- 2.8cu ft

\* M1 15B1A1 uses spiral-wrapped cartridge case.

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

**Shipping and Storage Data:**

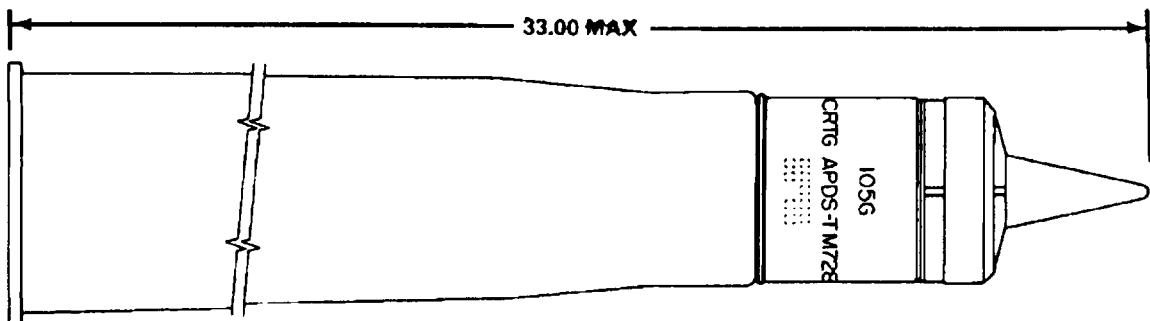
UNO serial number ----- 0328  
 Quantity-distance class ----- (04) 1.2  
 Storage compatibility group--- C  
 DOT shipping class ----- B  
 DOT decimation ----- AMMUNITION  
                           FOR CANNON  
                           WITH SOLID  
                           PROJECTILES  
 DODAC ----- 1315-C520  
 Drawing number ----- 9278500  
                           12935041\*\*\*

\*\*\* This drawing shows the M724A1 assembled with the spiral-wrapped cartridge case.

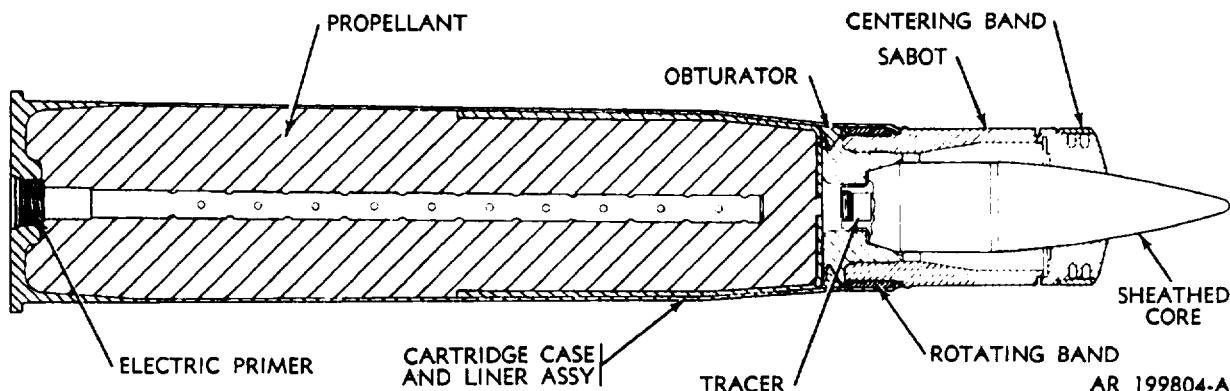
**References:**

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

## CARTRIDGE, 105-MILLIMETER: APDS-T, M728



AR199806

**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, 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 lb
Length -----	33.0 in.

Cannon used with ----- M68

Projectile:

Body material -----	Sabot-magnesium/aluminum penetrator tungsten/nickel/copper
---------------------	--

Projectile: (cont.)  
 Color ----- Black w/white-marking  
 Components:  
 Cartridge case ----- M115B1  
 Propelling charge ----- M30  
 Primer ----- M80A1  
 Tracer ----- M13  
 Performance:  
 Effective range ----- 5,000 m  
 Maximum range ----- 50,879 m  
 Muzzle velocity ----- 4,680 fps

**Temperature Limits:**

Firing:  
 Lower limit ----- -60°F (-53.8°C)  
 Upper limit ----- +125°F (+52.0°C)

Storage:  
 Lower limit ----- -65°F (-53.8°C)  
 Upper limit ----- +145°F (+63°C)

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

\*Packing Box:  
 Weight ----- 126 lb  
 Dimensions ----- 39-7/8 x 14-1/8 x 8-23/32 in.

cub ----- 2,8 cu ft

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

**Shipping and Storage Data:**

UNO serial number ----- 0328  
 Storage class/SCG ----- (08) 1.2C  
 DOT shipping class ----- B  
 DOT designation ----- AMMUNITION FOR CANNON WITH SOLID PROJECTILES  
 DODAC ----- 1315-C494  
 Drawing number ----- 9276810

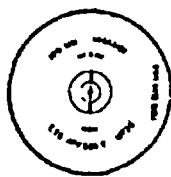
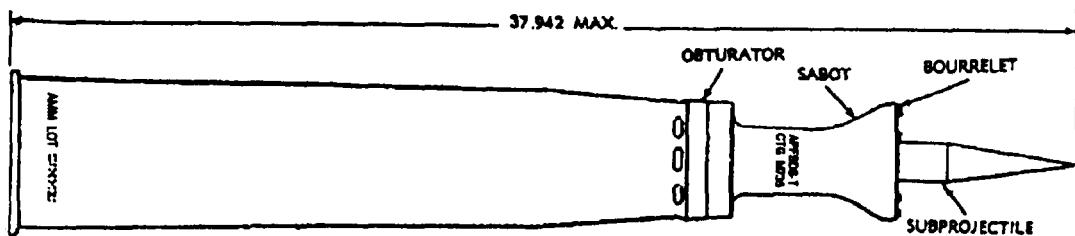
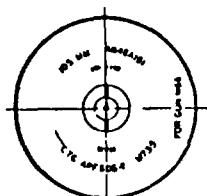
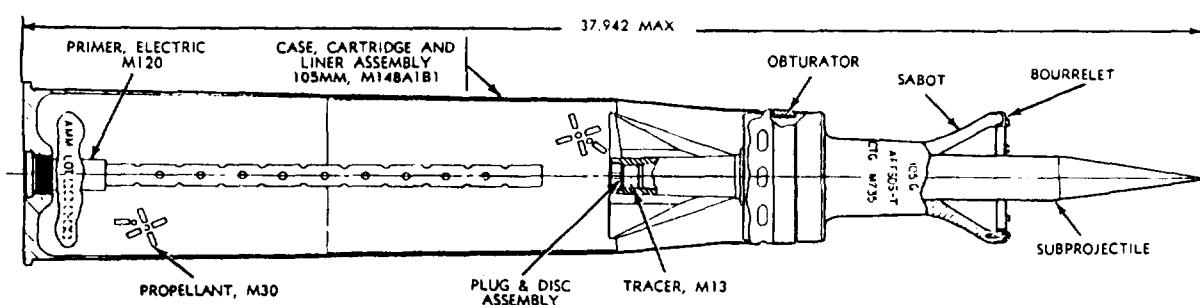
**Limitations:**

None.

**References:**

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

## CARTRIDGE, 105-MILLIMETER: APFSDS-T M735

U  
AR 101660-A

AR 100995-C

**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 subprojectile and sabot. The subprojectile 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 degree sections, is assembled around the subprojectile. A steel hourrelet, containing three shear cuts, is screwed to the sabot forward face. A nylon obturator and polypropylene seal 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 lb 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 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 drawing number -	9296707
Color -----	Black w/white markings

**Temperature Limits:**

## Firing:

Lower limit -----	-25°F (-32°C)
Upper limit -----	+125°F (+52°C)

## Storage:

Lower limit -----	-65°F (-53.8°C)
Upper limit -----	+ 160°F (+71.1°C)

**Performance:**

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

**Packaging:**

Inner pack drawing -----	9293481
Outer pack drawing -----	9293479
Weight -----	132.0 lb
Cube -----	3.4 ft

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

*Packing Box:	
Weight -----	124.0 lb
Dimensions -----	47-7/16 x 13-5/16 x 7-1/16 in.
Cube -----	2.5 cu ft

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

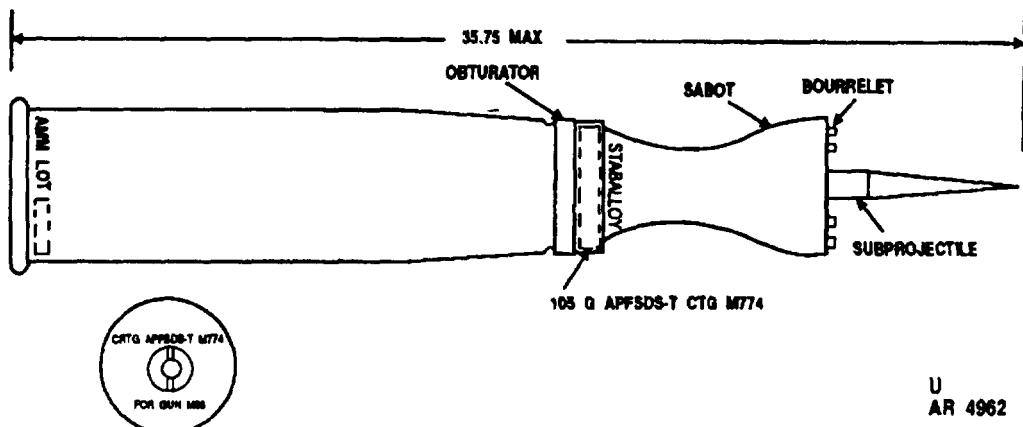
**Shipping and Storage Data:**

UNO serial number -----	0328
Storage class/SCG -----	(08) 1.2 C
DOT shipping class -----	B
DOT classification -----	AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC -----	1315-C521

**References:**

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

## CARTRIDGE, 105-MILLIMETER: APFSDS-T, M774

Type Classification:

LCCA Oct 1980.

Use:

This cartridge is an armor-piercing anti-tank cartridge and is intended for use in 105-mm, M68 gun against armored targets.

Description:

The projectile consists of a subprojectile and sabot. The subprojectile consists of a monolithic staballoy (depleted uranium) core, which is fitted with an aluminum windshield with steel tip to eliminate aerodynamic heating and an aluminum fin assembly. The aluminum sabot, composed of three 120 degree sections, is assembled around the subprojectile. A steel bourrelet, containing three shear cuts, is screwed to the sabot forward face. A nylon obturator and polypropylene seal is assembled around the sabot, and a silicone rubber seal is applied over the rear face of the sabot. An M13 Tracer is assembled to the fin and is held in place by a threaded plug and disc assembly. The projectile is crimped to an M148A1B1 Cartridge Case, which holds approximately 13 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:

During projectile flight, the tracer burns for a minimum of 2.5 seconds. The sabot discards upon leaving the gun tube by aerodynamic and centrifugal forces. The projectile is fin-stabilized in flight. In order that only minimal spin is imparted to the projectile when the obturator engages the gun tube rifling, the plas-

tic seal under the obturator reduces the coefficient of friction, producing approximately 80 percent slippage. The core penetrates the target solely by kinetic energy.

Tabulated Data:NOTE

Classified tabulated data has not been included in this manual.

## Complete round:

Type -----	APFSDS-T
Weight -----	37.8 lb
Length -----	35.75 in.
Cannon used with -----	M68

## Projectile:

Subprojectile material -----	Depleted uranium
Sabot -----	Aluminum
Color -----	Black w/white markings

## Components:

Cartridge case -----	M148A1B1
Propellant -----	M30
Primer -----	M120
Tracer -----	M13

Temperature Limits:

## Firing:

Lower limit -----	-35°F (-37.2°C)
Upper limit -----	+125°F (+52.0°C)

## Storage:

Lower limit -----	-70°F (-57.0°C)
Upper limit -----	+160°F (+71.1°C)

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

\*Packing Box:  
   Weight ----- 140 lb  
   Dimensions ----- 47-7/16 x 13-  
                   5/16 x 7-1/16 in.  
   Volume ----- 3.4 cu ft

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

**Shipping and Storage Data:**

UNO serial number ----- 0328  
 Storage class/SCG ----- (08) 1.2C  
 DOT shipping class ----- B  
 DOT designation ----- AMMUNITION  
                           FOR CANNON  
                           WITH SOLID  
                           PROJECTILES  
 DODAC ----- 1315-C523  
 Drawing number ----- 9329513

**Limitations:**

Projectile is not to be disposed of by burning or detonation.

The M774 is a full service round which may only be fired during war emergency. All peace time firings are prohibited except at times of NRC license and host nation agreement.

**NOTE**

Loss or unauthorized firings of the M774 must be reported to HQ, AMCCOM within 24 hours of the discovery. Telephone reports should be followed with a written report to:

Commander  
 USA AMCCOM  
 ATTN: AMSMC-SF  
 Radiological Protection Officer (RPO)  
 Rock Island, IL 61229-6000  
 Autovon: 793-2969/296412965/ 2966  
 Commercial: (309) 782-2969/2964/  
 2965/2966  
 Non-duty hours, call Staff Duty Oficer:  
 Autovon: 793-1110  
 Commercial: (309) 782-1110

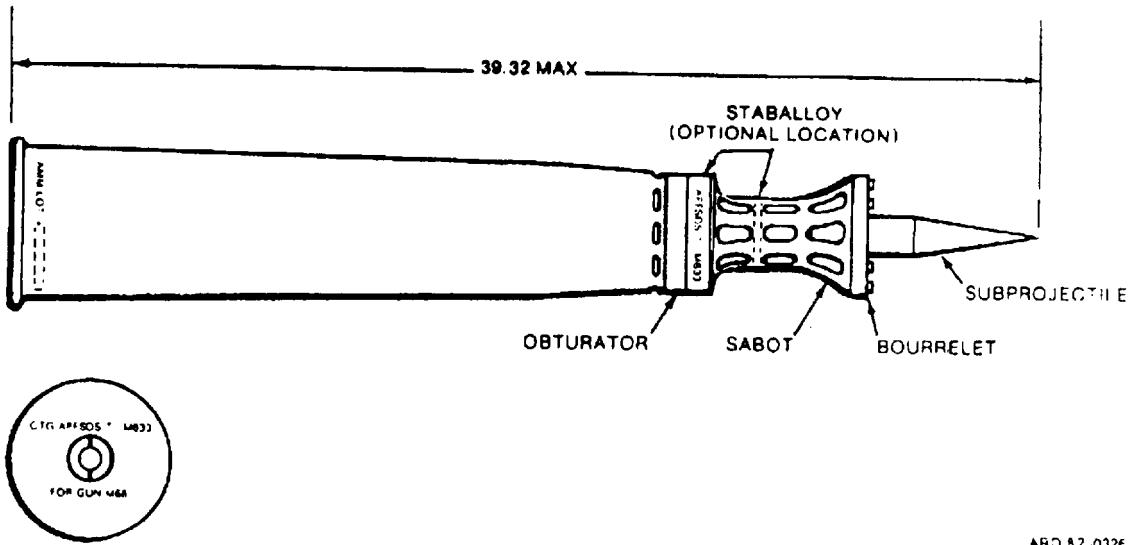
All transmissions regarding incidents of this nature must be classified at least CONFIDENTIAL.

The possession of the source material (Depleted Uranium) is licensed to HQ, AMCCOM, in accordance with Federal Law, Title 10, Code of Federal Regulations. The AMCCOM Commander (RPO) is responsible for the license compliance and personally accountable for the source material. Violations of this law may result in a personal fine or imprisonment. Failure to report a non-compliance is also punishable under Federal Law.

**References:**

SB 700-20  
 AMC-P 700-3-3  
 TM 9-1300-251-20  
 TM 9-1300-251-34  
 TM 9-1300-250  
 TM 9-2350-253-10  
 TM 9-2350-255-10-1  
 TM 9-2350-257-10-3

## CARTRIDGE, 105-MILLIMETER: APFSDS-T, M833

Type Classification:

TC Std 7 Apr 83 by DA Letter.

Use:

This cartridge is an armor-piercing anti-tank cartridge and is intended for use on 105-mm guns M68 cannon, against armored targets.

Description:

The projectile consists of a subprojectile and sabot. The subprojectile consists of a monolithic staballoy (depleted uranium) core, and is fitted with an aluminum windshield with steel tip to eliminate aerodynamic heating and an aluminum fin assembly. The aluminum sabot is composed of three 120 degree sections, which transfer momentum to the subprojectile through a series of mating buttress grooves. The sabot is an adaptation of the M736/M774 technology differing in design by the use of gussets in the sabot segments to retain strength and rigidity and reduce the weight. A steel hourrelet, containing three shear cuts, is screwed to the sabot forward face. A two piece nylon obturator and polypropylene seal is assembled around the sabot, and a silicone rubber seal is applied over the rear face of the sabot. An M13 Tracer is assembled to the fin and is held in place by a threaded plug and disc assembly. The projectile is crimped to an M148A1B1 Cartridge Case, which holds approximately 12.8 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

During projectile flight, the tracer burns for a minimum of 2.5 seconds. The sabot discards upon leaving the gun tube by aerodynamic and centrifugal forces. The projectile is fin stabilized in flight. In order that only minimal spin is imparted to the projectile when the obturator engages the gun tube rifling, the plastic seal under the obturator reduces the coefficient of friction, producing approximately 80 percent slippage. The core penetrates the target solely by kinetic energy.

Tabulated Data:NOTE

Classified tabulated data has not been included in this manual.

Complete round:

Type -----	APFSDS-T
Weight -----	38.2 lb (17.3 kg)
Length -----	39.32 in
Cannon used with -----	M68

Projectile:

Sabot -----	Aluminum
-------------	----------

Subprojectile:

Body material -----	Depleted uranium
Color-----	Black w/white markings

Components:

Cartridge case -----	M148A1B1
Propellant -----	M30
Primer -----	M120
Tracer -----	M13

**Temperature Limits:**

## Firing:

Lower limit ----- -35°F (-37.2°C)  
 Upper limit ----- +125°F  
 (+52.0°C)

## Storage:

Lower limit ----- -50°F (-46°C)  
 Upper limit ----- +145°F  
 (+62.8°C)

## \*Packing:

Alternate -----	1 round per fiber container, 2 containers per wooden box
Standard -----	1 round per metal container, 30 containers to a pallet

## \*Packing Box:

Weight -----	124 lb
Dimensions -----	48-3/4 x 14-1/16 x 8-9/16 in.
Volume -----	3.3 cu ft

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

**Metal Container:**

Weight -----	0.671b
Dimensions -----	45.67 x 7.13 x 7.13 in.
Volume -----	0.9 cu ft

**Shipping & Storage Data:**

UNO serial number -----	0328
Storage class/SCG -----	(08) 1.2
DOT shipping class -----	B
DOT designation -----	AMMUNITON FOR CANNON WITH SOLID PROJECTILES
DODAC -----	1315-C524
Drawing number -----	9342932

**Limitations:**

Projectile is not to be disposed of by burning or detonation.

The XM833 is a full service round which may only be fired during war emergency. All peacetime firings are prohibited except at times of NRC license and host nation agreement.

Firing the M833 at ammunition temperatures above +125°F (+52.0°C) may result in excessive chamber pressures. Firing the M833 at ammunition temperatures below -35°F (-37.2°C) may result in weapon damage.

**NOTE**

Loss or unauthorized firings of the M833 must be reported to HQ, AMCCOM RPO within 24 hours of the discovery.

Telephone reports should be followed with a written report to:

Commander  
USA AMCCOM  
ATTN: AMSMC-SF  
Radiological Protection Officer (RPO)  
Rock Island, IL 61229-6000  
Autovon: 793-2969/2964/2965/2966  
Commercial: (309) 782-2969/2964/  
2965/2966

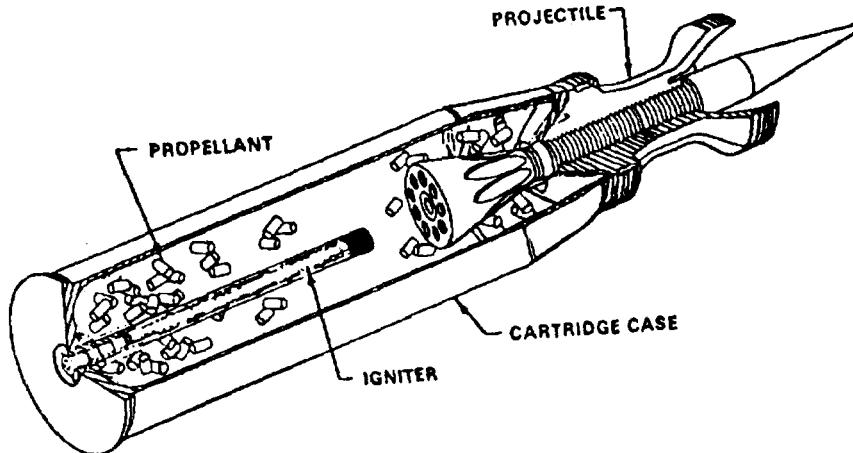
Non-duty hours, call Staff Duty Officer:  
Autovon: 793-1110  
Commercial: (309) 782-1110

All transmissions regarding incidents of this nature must be classified at least CONFIDENTIAL. The possession of the source material (Depleted Uranium) is licensed to HQ, AMCCOM, in accordance with Federal Law, Title 10, Code of Federal Regulations. The AMCCOM Commander (Radiological Protection Officer) is responsible for the license compliance and personally accountable for the source material. Violations of this law may result in a personal fine or imprisonment. Failure to report a non-compliance is also punishable under Federal Law.

**References:**

SB 700-20  
AMC-P 700-3-3  
TM 9-1300-250  
TM 9-1300-251-20  
TM 9-1300-251-34  
TM 9-2350-255-10-1  
TM 9-2350-257-10-3

**CARTRIDGE, 105-MILLIMETER: TPCSDS-T, DM128 (PATRONE, 105-MILLIMETER, DM128)**



ARD 2765

**Type-Classification:**

STD-15 July 86

**Use:**

This cartridge is a kinetic energy, target practice round for use in the 105-mm, M68 cannon. It is designed to provide duplication of the service rounds (M735, M774 and M833) characteristics at reduced maximum ranges to allow practice firings on short-range proving grounds and training areas. This cartridge was developed and is produced by West Germany and procured by the United States on a limited basis.

**Description:**

The projectile consists of a subprojectile and sabot. The subprojectile is made up of a one piece steel core with an aluminum tail cone assembly which is assembled to the sabot by means of threads. The tail cone has nine holes and in conjunction with the cone provides stabilization. The tail cone assembly also contains a tracer. The aluminum sabot is comprised of three 120 degree noninterchangeable segments with internal screw threads which match those on the outer diameter of the subprojectile. The sabot has a silicon rubber seal at the rear to prevent gas leakage. The projectile is crimped to a DM60 brass cartridge case, which holds approximately 13.2 pounds of LV-1900B propellant, and is fitted with a DM82A1 electric primer. A gun tube wear-reducing titanium-dioxide liner

is assembled to the interior wall of the cartridge case.

**Functioning:**

The DM128 is loaded and fired from the 105-mm tank gun in the normal manner. Upon initiation of the electric primer in the breech of the weapon, the resulting flash ignites the propelling charge generating gases which drive the projectile from the gun and ignites the tracer. The rear seal of the sabot prevents gas leakage between the sabot segments and the driving forces (gases) propelling the subprojectile downbore. Upon leaving the gun, aerodynamic forces cause the sabot to separate from the subprojectile allowing the subprojectile to continue to target while the sabot segments fall quickly to earth. The tail cone segment of the subprojectile, due to the nine hole arrangement, causes aerodynamic slowing of the subprojectile to limit its range to 7500 m.

**Tabulated Data:**

Complete round:

Type	-----	Fixed, TPCSDS-T
Weight	-----	36.6 lb (16.6 kg)
Length	-----	36.4 in. (923.6 mm)
Cannon used with	-----	M68
Assembly drawing	-----	1300705
Color	-----	Blue w/white markings on projectile

**Temperature Limits:**

## Firing:

Lower limit -----	-25°F (-31.6°C)
Upper limit -----	+125°F (+51.7°C)

## Storage:

Lower limit -----	-35°F (-37.2°C)
Upper limit -----	+125°F (+51.7°C)

**Performance:**

Chamber pressure ----- 64,000 psi  
@70°F

**Packaging:**

Inner pack drawing -----	8140-48-1050K- 85040
Outer pack drawing -----	8140-58-1050K- 85041
*Packing -----	1 round per fiber container; 2 containers per wooden box, 12 boxes per pallet.

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

**Packing Box:**

Weight -----	130 lb
Dimensions -----	46.94 in. x 14.37 in. x 10.83 in.
Cube -----	4.23 cu ft

**Skipping and Storage Data:**

DOD hazard class (subject to change) -----	(08) 1.2
Storage compatibility group (subject to change) -----	C
DOT shipping class (subject to change) -----	B
DOT designation -----	AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC -----	1315-C533

**WARNING**

**DO NOT FIRE OVER THE  
HEADS OF FRIENDLY  
TROOPS, UNLESS  
TROOPS HAVE ADEQUATE  
COVER. TROOPS MAY BE  
STRUCK BY THE DIS-**

**CARDED SABOT.****CAUTION**

EVEN THOUGH THIS IS A  
TARGET PRACTICE ROUND,  
THE CORE CAN CAUSE  
DAMAGE AND PENETRATE  
LIGHTLY ARMORED  
VEHICLES.

**NOTE**

The identification markings  
found on each cartridge, fiber  
container, and wooden box are  
in German. The following is the  
German marking with the  
English translation:

**GERMAN MARKING**

Wooden Box: 1315-12-306-9245-CP43 (C533)  
2 PATRONE, UEBUNG, 105MM  
X 617, DM128  
Treibkafiggesccho Bnarchbildung  
-T  
[ ] Kg [ ] m3 GEF [ ]  
LOS [ ]

## Fiber Container: C533

PATRONE, UEBUNG,  
105MM X 617 DM128  
Treibkafiggesccho  
Bnarchbildung  
-T

LOS [ ]

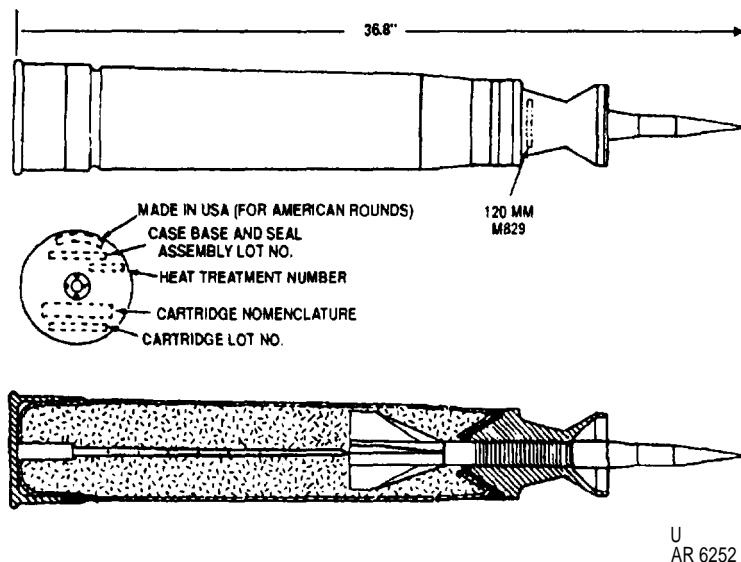
Cartridge: 105K LOS [ ]  
UEBT DM128 105k DM128 LOS [ ]

**GERMAN**

PATRONE, UEBUNG  
Treibkafiggesccho Bnarchbildung  
-T  
LOS  
GEF

**ENGLISH (Meaning)**

TARGET PRACTICE ROUND  
Sabot Simulation  
Tracer  
Lot  
Loader

**CARTRIDGE, 120-MILLIMETER: APFSDS-T, M829****Type Classification:**

STD - Dec 84.

**Use:**

This cartridge is a kinetic energy, armor-piercing antitank round intended for use with the 120-mm smooth bore M256 cannon.

**Description:**

The M829 is the United States design developed 120-mm APFSDS-T cartridge. The complete round contains a propulsion system consisting of a metal cartridge case base with combustible sidewall, granular propellant within a containment device to prevent spillage, and M125 primer. The projectile consists of the subprojectile and aluminum sabot. The DU penetrator is a one-piece design which is assembled into the sabot by means of grooves. There is a six-bladed aluminum fin with tracer assembly fitted to the rear of the subprojectile and a windshield fitted to the front. The aluminum sabot is composed of four 90 degree non-interchangeable segments with internal grooves matching those on the outer diameter of the subprojectile. The sabot has a silicone rubber seal at the rear to prevent leakage of gas.

**Functioning:**

The M829 is loaded and fired from the 120-mm tank gun in the normal manner. Upon initiation of the electric primer in the breech of the weapon, the resulting flash ignites the propel-

ling charge and combustible case generating gases which drive the projectile from the gun and ignite the tracer. The rear seal of the sabot prevents gas leakage between the sabot segments and the driving forces (gas) propelling the subprojectile down-bore. Upon leaving the gun, aerodynamic forces cause the sabot to separate from the subprojectile allowing the subprojectile to continue on a true course to target while the sabot segments fall quickly to earth. Target penetration is affected strictly by the high kinetic energy of the subprojectile's high density core when it impacts.

**Tabulated Data:**

Complete round:

Type	-----	Fixed, APFSDS-T
Weight	-----	41.2 lb
Length	-----	36.8 in.
Assembly drawing	-----	12525600
Color	-----	Black w/white markings

**Temperature Limits:**

\*Firing:

Lower limit	-----	-50°F (-46°C)
Upper limit	-----	+145°F (+63°C)

\*Storage:

Lower limit	-----	-50°F (-46°C)
Upper limit	-----	+145°F (+63°C)

\*NOTE: The M829 maybe fired at these temperatures; however, performance degradation may occur.

**Performance:**

Chamber pressure ----- 73.950 psi  
                           @70°F  
                           5100 bars  
                           @21°C  
 Velocity (nominal) ----- 5510 ft/sec

**Packaging (metal container):**

Packing and marking  
     drawing ----- 12630717  
 Dimensions ----- 44.5 x 7.75 x  
                           7.75 in.  
 Cube ----- 1.5 cu ft  
 Weight (w/cartridge) ----- 63.2 lb  
 Total explosive weight ----- 17.95 lb  
 \*\* Packing ----- 1 round per  
                           metal container;  
                           30 metal con-  
                           tainers per  
                           pallet.

**\*\*NOTE:**

- \* See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.
- \* M8Z9 ammunition will be stored with other ammunition except SCGG (pyrotechnics and incendiaries).

**Shipping and Storage Data:**

UNO serial number ----- 0328  
 Quantity-distance class ----- (08) 1.2  
 Storage compatibility group -- C  
 Field storage category ----- A  
 DOT shipping class ----- B  
 DOT designation ----- AMMUNITION  
                           FOR CANNON  
                           WITH SOLID  
                           PROJECTILES

DODAC ----- 1315-C786  
 Drawing number ----- 12525600

**Limitations:**

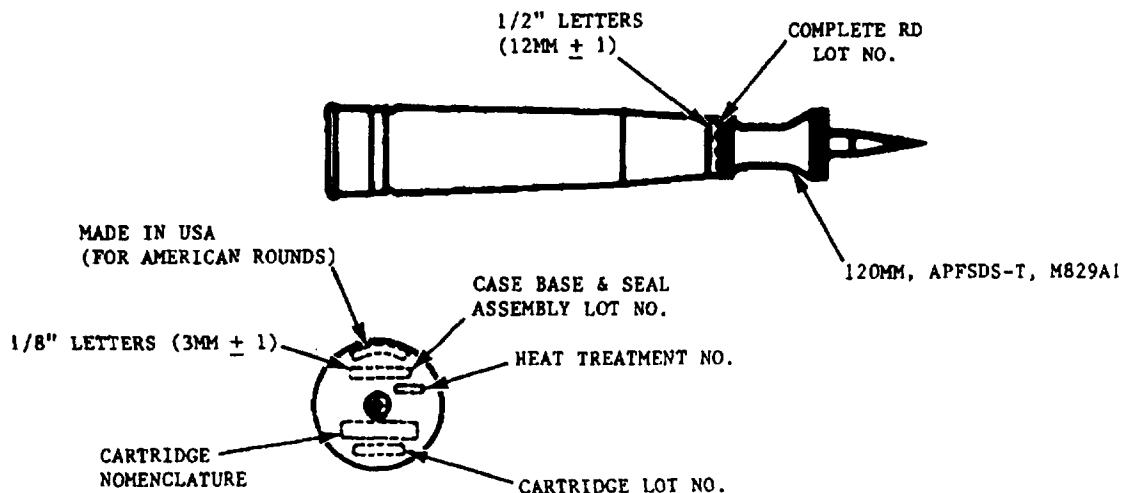
Projectile is not to be disposed of by burning or detonation.

The M829 is a full service round which may only be fired during war emergency. All peace-time firings are prohibited except on ranges which are NRC (Nuclear Regulator Commission) approved and/or have host nation agreement. The M829 will not be fired over the heads of friendly troops, unless troops are protected by adequate cover. Troops may be struck by the discarded sabot.

**NOTE**

Loss or unauthorized firings of the M829 must be reported to HQ, AMCCOM RPO within 24 hours of the discovery. Telephone reports should be followed by a written report to:

Commander  
 AMCCOM  
 ATTN: AMSMC-SF  
 Radiological Protection Officer (RPO)  
 Rock Island, IL 61229-6000  
 AV 793-2965/2966/2969/2964  
 Commercial(309)782-2965/2966/2969/  
 2964  
 Non-duty hours, call Staff Duty  
 Officer: AV 793-1110,  
 Commercial (309) 782-1110

**CARTRIDGE, 120-MILLIMETER: APFSDS-T, M829A1**

AR 4021

**Type Classification:**

STD, Classified.

**Use:**

This cartridge is a kinetic energy, armor piercing antitank round intended for use with the 120-mm smooth bore M256 cannon.

**Description:**

The M829A1 is a U.S. design developed 120-mm APFSDS-T cartridge. The complete round contains a propulsion system consisting of a metal cartridge case base with combustible sidewall, granular propellant within a containment device to prevent spillage, and M129 primer, while the projectile consists of the subprojectile and aluminum sabot. The depleted uranium penetrator is a one-piece design which is assembled into the sabot by means of butress grooves. There is a six bladed aluminum fin with tracer assembly fitted to the rear of the subprojectile and a windshield and tip fitted to the front. The aluminum sabot is composed of three 120 degree noninterchangeable segments with internal grooves matching those on the outer surface of the penetrator. The sabot has a silicone rubber seal at the rear to prevent leakage of propellant gases.

**Functioning:**

The M829A1 is loaded and fired from the M256, 120-mm in the normal manner.

Initiation of the electric primer ignites the propelling charge and combustible case, generating gases which drive the projectile from the gun and ignite the tracer. The silicone seal at the rear of the sabot prevents gas leakage between the sabot segments and the driving forces (gas) propelling the subprojectile down-bore. Upon leaving the gun, aerodynamic forces cause the sabot to separate from the subprojectile allowing the subprojectile to continue on a true course to target while the sabot segments fall quickly to earth. Target penetration is effected strictly by the high kinetic energy of the subprojectile impacting the target.

**Tabulated Data:**

Complete round:

Type -----	Fixed, APFSDS-T
Weight -----	46.22 lb (20.97 kg)
Length -----	38.75 in. (98.43 cm)
Assembly drawing -----	12527400
Color -----	Black w/white markings

**Temperature Limits:**

Firing:

Lower limit -----	-25°F (-32°C)
Upper limit -----	+120°F (+49°C)

Storage:

Lower limit -----	-50°F (-46°C)
Upper limit -----	+145°F (+63°C)

### **Performance:**

Chamber pressure ----- 96000 psi  
(661,920 kPa) @  
120°F and  
82650 psi @  
70°F

Velocity (nominal) ----- 5150 ft/sec

#### \*Packaging:

Packing and marking drawing -----	12526435
Weight (w/cartridge) -----	67.44 lb (30.59 kg)
Total explosive weight -----	17.5 lb
Dimensions -----	44.5 x 7.75 x 7.75 in.
Cube -----	1.55 cu ft (0.04 cu m)
*Packing -----	1 round per light weight metal contain- er; 30 contain- ers per pallet

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

**Shipping and Storage Data:**

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

DODAC ----- 1315-C380

### **Limitations:**

Projectiles are not to be disposed of by burning or detonation.

The M829A1 is a full-service round which may only be fired during war emergency. All peace-time firings are prohibited except at locations having a Nuclear Regulatory (NRC) license and host nation agreement.

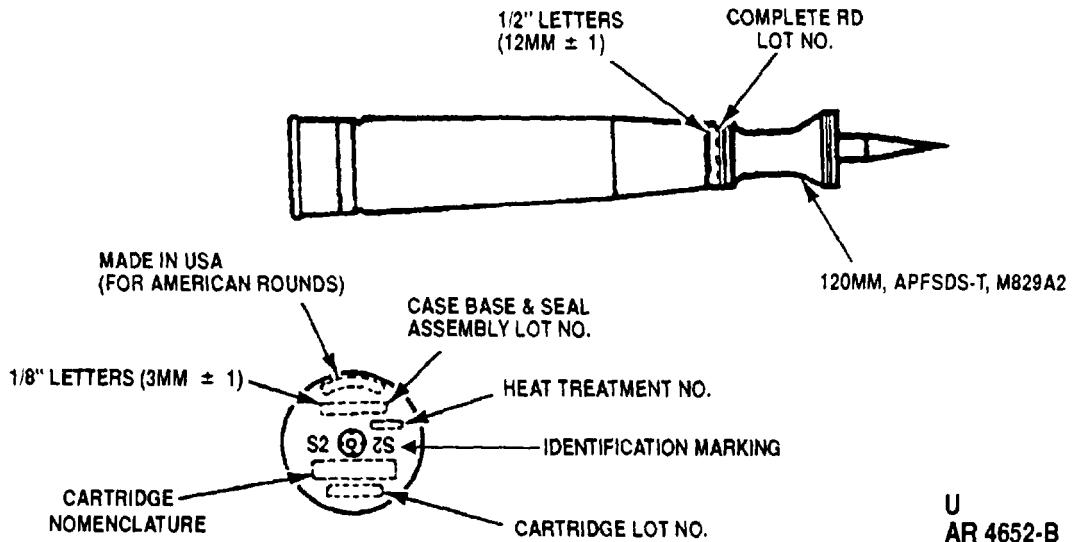
## **WARNING**

**THE DAMAGED CARTRIDGE  
SHALL BE PLACED IN A  
CONTAINER AND SHALL BE  
RETURNED IN A SEALED  
CONTAINER TO THE APPRO-  
PRIATE ASP FOR DISPOSITION.**

## NOTE

Loss or unauthorized firing of the M829A1 must be reported to the HQ, AMCCOM RPO within 24 hours of the discovery Telephone reports should be followed by a written report to:

Commander,  
AMCCOM  
ATTN: AMSMC-SF  
Radiological Protection Officer (RPO)  
Rock Island, IL 61229-6000  
AV 793-2965/2966/2969/2964  
Commercial (309) 782-2965/2966/2969/  
2964  
Non-duty hours, call Staff Duty  
Officer: AV 793-1110  
Commercial (309) 782-1110

**CARTRIDGE, 120 MILLIMETER: APFSDS-T, M829A2****Type Classification:**

STD - 29 Sep 92.

**Use:**

The M829A2 cartridge is a kinetic energy, armor-piercing, fin-stabilized, discarding sabot, fixed round with tracer (APFSDS-T). This anti-tank round is intended for use in the M256 smooth bore gun and is designed to provide terminal effectiveness over the M829A1 cartridge.

**Description:**

The M829A2 is a U.S. design developed 120mm APFSDS-T cartridge. The complete round contains a propulsion/ignition system and an inert projectile which is similar to the M829A1. The propulsion/ignition system consists of a combustible cartridge case with a metal cartridge case base, granular and stick propellant, and an M129 electric primer. The subprojectile assembly consists of a depleted uranium penetrator, with windshield and windshield tip fitted to the front, and a six-bladed

aluminum fin and tracer assembly fitted to the rear. The projectile consists of the subprojectile combined with a sabot, an obturator and a silicone seal. The sabot is composed of three 120 degree noninterchangeable segments with internal grooves matching those on the outer surface of the penetrator. The sabot has a silicone rubber seal at the rear to prevent leakage of propellant gases. A nylon obturator is used to prevent propellant gases from leaking around the outside of the sabot.

**Functioning:**

The M829A2 is loaded and fired from the M256, 120mm in the normal manner. Initiation of the electric primer ignites the propelling charge and combustible case, generating gases which drive the projectile from the gun and ignite the tracer. The silicone seal at the rear of the sabot prevents gas leakage between the sabot segments and the driving forces (gas) propelling the subprojectile downbore. Upon leaving the gun, aerodynamic forces cause the sabot to separate from the subprojectile allowing the subprojectile to continue on a true

course to target while the sabot segments fall quickly to earth. Target penetration is effected strictly by the high kinetic energy of the subprojectile impacting the target.

#### Tabulated Data:

##### M829A2 Cartridge.

Complete round:

Type -----	Fixed, APFSDS-T
Weight -----	4.88 lb (20.36 kg)
Length -----	38.74 in. (984 mm)
Assembly drawing -----	12944255 Black w/white markings
Temperature limits:	
Firing:	
Lower limit -----	-25°F (-32°C)
Upper limit -----	+120°F (+49°C)
Storage:	
Lower limit -----	-45°F (-43°C)
Upper limit -----	+145°F (+63°C)
Performance:	
Chamber pressure -----	84000 psi @ 70°F 5800 bars @ 21°C
Velocity (normal)-----	5512 ft/sec (-1680 m/sec)
Packaging (metal container):	
Packing and marking drawing -----	12944283
Dimensions -----	7.75 x 7.75 x 44.5 in.
Cube -----	1.55 cu ft
Total weight (w/ cartridge) -----	66.1 lb (29.98 kg)
Total explosive weight -----	16-20 lb (7-9 kg)
*Packing -----	One round per metal container; 30 metal containers per pallet

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

#### Shipping and Storage Data:

UNO serial number -----	0328
DOD hazard class -----	(08) 1.2
Storage compatibility group -----	C
Field storage category -----	A
DOT shipping class -----	B
DOT designation -----	AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC -----	TBD

#### Limitations:

Projectiles are not to be disposed of by burning or detonation.

The M829A2 is a full-service round which may only be fired during war emergency. All peace-time firings are prohibited except at locations having a Nuclear Regulatory (NRC) license and host nation agreement.

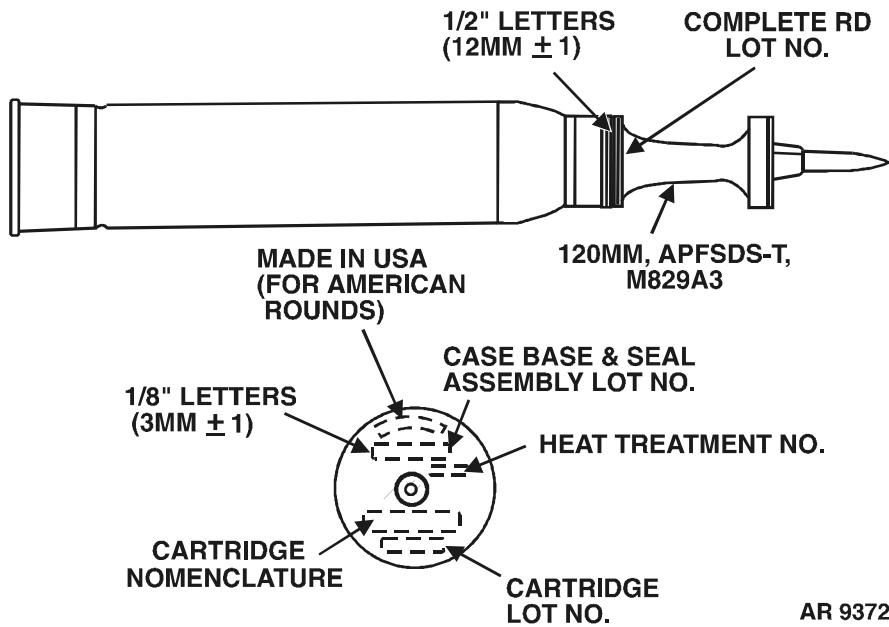
#### **WARNING**

**IF THE CARTRIDGE IS DAMAGED TO THE POINT WHERE THE INTERNAL PROJECTILE COMPONENTS ARE VISIBLE, THE ITEM SHALL BE TREATED AS CONFIDENTIAL, THE DAMAGED CARTRIDGE SHALL BE PLACED IN A CONTAINER OR OTHERWISE COVERED TO PREVENT EXPOSURE. THE CARTRIDGE SHALL BE RETURNED IN A SEALED CONTAINER (AS A CLASSIFIED ITEM) TO THE APPROPRIATE ASP FOR DISPOSITION. SHOULD IT BE DETERMINED THAT THE CLASSIFIED COMPONENTS WERE OBSERVED BY ANYONE WITHOUT A CLEARANCE, THE INDIVIDUAL(S) MUST BE DEBRIEFED AS SOON AS POSSIBLE.**

#### **NOTE**

Loss or unauthorized firing of the M829A2 must be reported to the HQ, AMCCOM RPO within 24 hours of the discovery. Report to:

Commander, AMCCOM, ATTN: AMSMC-SF, Radiological Protection officer (RPO), Rock Island, IL 61299-6000, DSN 793-2964/2965/2966, Commercial (309) 782-2964/2965/2966. During non-duty hours call staff duty officer: DSN 793-1110, Commercial (309) 782-1110.

**CARTRIDGE, 120 MILLIMETER: APFSDS-T, M829A3****Type Classification:**

TC - STD (Feb 2003).

**Use:**

The M829A3 cartridge is a Kinetic Energy (KE), armor piercing, fin stabilized, discarding sabot, fixed round with tracer (APFSDS-T). This antitank round is intended for use in the M256 smooth bore gun and is designed to provide terminal effectiveness over the M829A2 cartridge.

**Description:**

The M829A3 is a U.S. design/developed 120mm: APFSDS-T cartridge. The complete round contains a propulsion/ignition system and inert projectile which is similar to the M829A2. The propulsion/ignition system consists of combustible cartridge case with a metal cartridge case base, the RPD-380 propellant consisting of 19-perforated stick, 7-perforated stick, and 43 perforated hexagonal stick, and M123A1 electric primer containing black powder base charge. The subprojectile assembly consists of depleted uranium (DU) penetrator with steel windshield fitted to the front and a six bladed aluminum fin and tracer assembly fitted to the

rear. The projectile consists of the subprojectile combined with a composite material sabot, nylon obturator, rear retaining ring and a molded JRTV seal. The sabot is composed of three 120 degree non-interchangeable segments with internal grooves matching those on the outer surface of the penetrator. The sabot has a silicone rubber (JRTV) seal at the rear to prevent leakage of propellant gases and a front ring to prevent sabot splitting upon muzzle exit. A nylon obturator is used to prevent propellant gases from leaking around the outside of the sabot.

**Functioning:**

The M829A3 is loaded and fired from the M256, 120mm in the normal manner. Initiation of the electric primer ignites the propelling charge and combustible case, generating gases which drive the projectile from the gun and ignite the tracer. The silicone seal at the rear of the sabot prevents gas leakage between the sabot segments and the driving forces (gas) propelling the subprojectile downbore. Upon leaving the gun, aerodynamic forces cause the sabot to separate from the subprojectile allowing the subprojectile to continue on a true course to target while the sabot segments fall quickly to earth. Target penetration is effected strictly by the high kinetic energy of the subprojectile impacting the target.

**Tabulated Data:**

## Complete Round:

Type.....	Fixed, APFSDS-T
Weight.....	49.12 lb (22.28 kg)
Length.....	38.74 in. (984 mm)
Assembly drawing .....	12990772
Color .....	Black w/white markings

## Components:

Propellant .....	RPD-380 19-perforated stick, 7-perforated stick and 43 perforated hexagonal stick
Primer.....	M123A1 electric primer
Tracer .....	Tracer, plug and disc assembly, PN 12525133

**Performance:**

Breach pressure .....	6010 bars
Chamber pressure .....	5660 bars
Velocity (normal).....	1555 m/sec

**Temperature Limits:**

## Firing:

Lower limit.....	-25°F (-32°C)
Upper limit .....	+120°F (+49°C)

## Storage:

Lower limit.....	-45°F (-43°C)
Upper limit .....	+145°F (+63°C)

**Packing Data:**

## Packaging (Metal Container):

Container.....	12990755
Packing and marking drawing No. ....	12990737
Packing material.....	12990738
Dimensions .....	7.75 x 7.75 x 44.5 in.
Cube .....	1.55 cu ft
Total weight (with cartridge)...	72 lb (33 kg)
Total explosive weight .....	17-20 lb (7.7-9.1 kg)
Packing.....	One round per metal container, 30 metal containers per pallet

**Shipping and Storage Data:**

DOD hazard class.....	(08) 1.3
Storage compatibility group.....	C
Field storage category .....	A
UN serial number .....	0328
DOT shipping class .....	B
DOT designation .....	Cartridges for Weapons, Inert Projectile
DODAC.....	1315-CA26
NSN.....	1315-01-489-1143

**Limitations:**

Projectiles are not to be disposed of by burning or detonation.

The M829A3 is a full-service round which may only be fired during war emergency. All peace-time firings are prohibited except at locations having a Nuclear Regulatory (NRC) license and host nation agreement.

**WARNING**

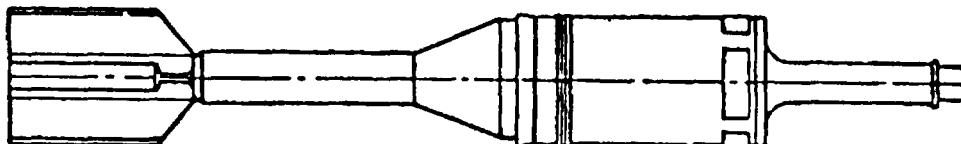
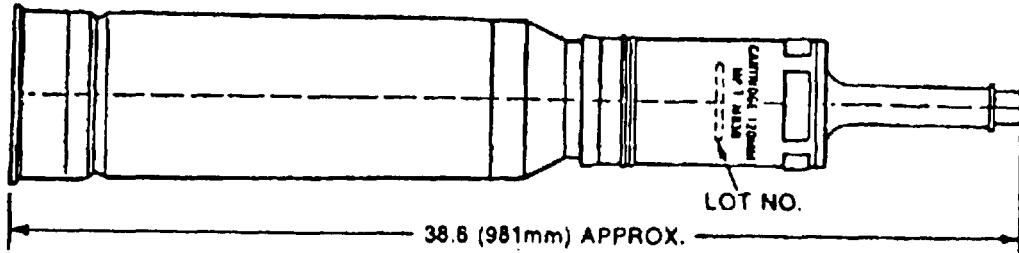
**IF THE CARTRIDGE IS DAMAGED TO THE POINT WHERE THE INTERNAL PROJECTILE COMPONENTS ARE VISIBLE, THE ITEM SHALL BE TREATED AS CONFIDENTIAL. THE DAMAGED CARTRIDGE SHALL BE PLACED IN A CONTAINER OR OTHERWISE COVERED TO PREVENT EXPOSURE. THE CARTRIDGE SHALL BE RETURNED IN A SEALED CONTAINER (AS A CLASSIFIED ITEM) TO THE APPROPRIATE ASP FOR DISPOSITION. SHOULD IT BE DETERMINED THAT THE CLASSIFIED COMPONENTS WERE OBSERVED BY ANYONE WITHOUT A CLEARANCE, THE INDIVIDUAL(S) MUST BE DEBRIEFED AS SOON AS POSSIBLE.**

**NOTE**

Loss or unauthorized firing of the M829A3 must be reported to the HQ, U.S. Army Joint Munitions Command, Safety/Radioactive Waste Office within 24 hours of the discovery. Report to:

Commander, U.S. Army Joint Munitions Command, ATTN: AMSJM-SF, Safety/Radioactive Waste Office, Rock Island, IL 61299-6000; DSN 793-2113/0338/2969, Commercial 309-782-2113/0338/2969. Non-duty hours call staff duty officer: DSN 793-1110, Commercial 309-782-1110.

## CARTRIDGE, 120-MILLIMETER: HEAT-MP-T, M830



ARD 83-0667-A

**Type Classification:**

December 1984.

**Use:**

This cartridge is a high explosive multipurpose cartridge which has antitank and antipersonnel capabilities. The cartridge is fired from the 120-mm smooth bore M256 cannon.

**Description:**

The M830 HEAT-MP-T, 120-mm cartridge is a direct translation of the German DM12A1 round with the exception that a United States design fuze system and explosive (Composition A3, Type 11) is used.

The 120-mm HEAT-MP-T M830 is a high explosive round having both antitank and antipersonnel capabilities. The round consists of a steel body loaded with explosives surrounding a copper shaped charge liner and wave shaper. The projectile embodies a steel spike with a shoulder and nose switching mechanism for full frontal area functioning and graze impact which initiates a base detonating fuze. The fuze is located at the rear of the projectile body. The projectile body has a copper obturator, boom and fin assembly for flight stabilization. The fin contains a tracer for projectile to target visual tracking.

The propellant system utilizes a metal cartridge case base with a rubber obturator at the stub case mouth, M123A1 Primer, and a combustible wall which encapsulates stick propellant within six containment devices to prevent spillage should breakage or separation occur.

The weight of the complete cartridge is approximately 53.4 pounds (24.2 kg) with the approximate weight of the projectile being 30 pounds (13.1 kg).

**Functioning:**

The M830 is loaded and fired in the normal manner from the 120-mm M256 smooth bore tank gun. When the electric primer in the breech of the weapon is initiated, the resulting flash ignites the propelling charge and combustible case. This generates gases which drive the projectile from the gun and ignite the tracer element. Upon impact, one of the fuze sensors is initiated. The fuze then detonates the high explosive-shaped charge which collapses the cone assembly creating a high velocity focused shock wave and a jet of metal particles that penetrate the target. Antipersonnel capability results from fragmentation of the projectile body sidewall.

**Tabulated Data:**

Complete round:

Type -----	Fixed, High Explosive Antitank Multipurpose w/Tracer
Weight -----	53.4 lb (24.2 kg)
Length -----	38.6 in. (981 cm)
Assembly drawing -----	12526622
Color -----	Black w/yellow markings

**Temperature Limits:**

Firing:  
 Lower limit ----- -50°F (-46.0°C)  
 Upper limit ----- +145°F  
 (+63.0°C)

Storage:  
 Lower limit ----- -50°F (-46.0°C)  
 Upper limit ----- +145°F  
 (+63.0°C)

**Performance:**

Chamber pressure (peak) ----- @69,600 psi  
 Velocity (nominal) ----- 3740 ft/sec

**Packaging:**

Inner pack drawing ----- 12561229-1  
 Outer pack drawing ----- 9386833  
 Weight ----- 23 lb  
 Cube ----- 1.5 cu ft

\*Packing ----- 1 round per  
 metal container,  
 30 metal con-  
 tainers per  
 pallet

**Packing, Metal Container:**

Weight -----  
 Dimensions ----- 44.5 in. x 7.75  
 in. x 7.75 in.  
 Cube ----- 1.5 cu ft

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

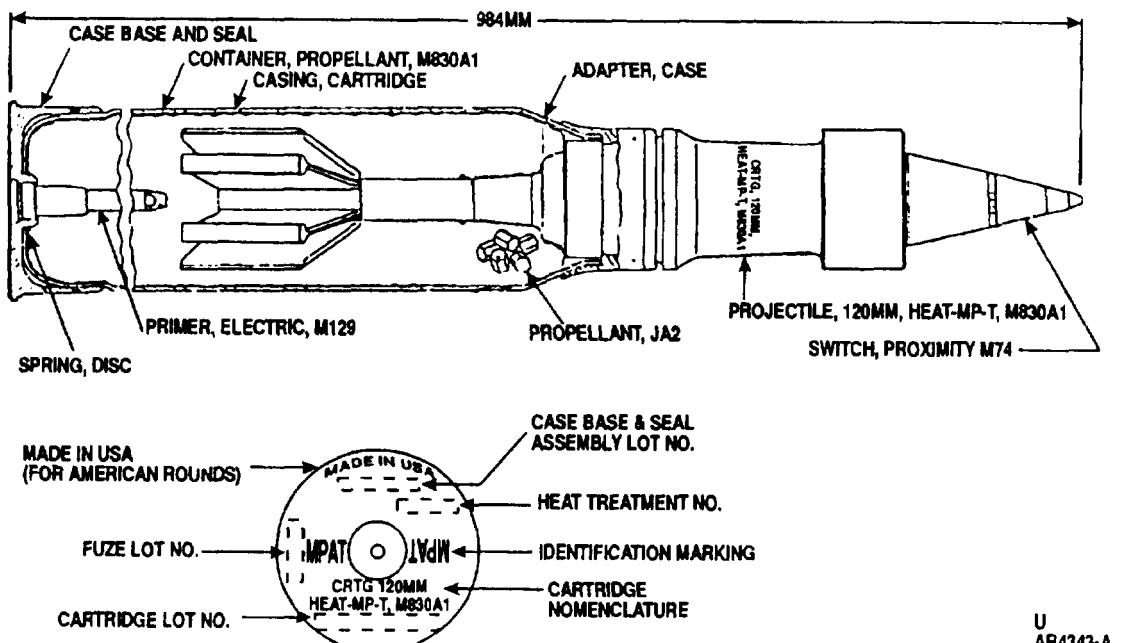
**Shipping and Storage Data:**

UNO serial number ----- 0321  
 DOD hazard class ----- (08) 1.2  
 Storage compatibility group -- E  
 DOT shipping class ----- A  
 DOT designation ----- AMMUNITION  
 FOR CANNON  
 WITH  
 EXPLOSIVE  
 PROJECTILES  
 DODAC ----- 1315-C787

**Limitations:**

The M830 will not be fired over the heads of friendly troops, unless troops have adequate protection. M830 may prematurely detonate downrange.

## CARTRIDGE, 120-MILLIMETER: HEAT-MP-T, M830A1

Type Classification:

STD -29 Sep 92.

Used:

This cartridge is a high explosive antitank and air defense multipurpose, tactical service round with tracer. The M830A1 is used in the 120-mm smooth bore M256 cannon.

Description:

The cartridge; 120-mm, HEAT-MP-T, M830A1 is a high explosive antitank, multipurpose, tactical service round with tracer. The M830A1 is used in the 120-mm, M256 smooth bore tank cannon and is a fin-stabilized round with a discarding sabot. The baseline design contains a propulsion system consisting of a metal case base, a combustible cartridge case, case adapter, nineteen perforated hexagonal JA-2 propellant, a propellant containment device (cloth bag), and an M129 primer (all are currently used on the M829A1). The projectile consists of a subcaliber projectile and three piece

aluminum sabot. The subcaliber projectile combines a fusing system and a chemical energy warhead (Composition A3 Type II). The three segment sabot is secured to the warhead body by a nylon obturator and a steel retaining ring. The fusing system includes: M774 base element, flexible communication circuit, Frontal Impact Switch Assembly (FISA) and M74 Proximity Switch. The conical nose of the projectile consists of the FISA coupled to the warhead body and the M74 Proximity Switch coupled to the FISA. The FISA is a secondary switch which closes upon impact against ground target. The M74 Proximity Switch (primary switch) contains two parallel "switches," either of which, when closed, will complete the M774 firing circuit. One switch closes upon direct impact with a target. The other is an electronic switch (a transistor) which "closes" when the proximity switch senses the presence of an air target. For all modes, a flexible electrical cable provides a path between the switches and M774 base element. In any of the functioning modes of the M830A1 fusing system, the J1 connector of the M774 fuze is returned to "ground potential" which completes the fuze firing circuit.

The M774 base element is a dual environment safe and arm (S&A) device. The M774 receives an electric firing pulse from either the FISA or the proximity switch which then triggers the base element electronics to fire the M69 electric detonator. The M69 detonator is contained in the rotor which provides a physical separation of the M69 detonator from the fuze electronics until the subprojectile has traveled a safe distance downrange. The first safety feature of the mechanical S&A lock consists of three leafs and a spring, oriented so as to release the rotor upon forward acceleration. The second safety feature is a drag weight which senses the decelerating force/drag of the projectile as it leaves the muzzle. As the drag weight senses drag, it moves out of the way of the rotor allowing the rotor to rotate to the armed position as designed.

Once the M774 base element is armed and receives an electrical firing pulse to trigger the detonator, the detonator, lead, booster, and warhead explosives initiate in sequence destroying the target. The explosive train located in front of the base element consists of the lead cup, booster, and Comp A3 explosive. The warhead explosive is contained in the body with a shaped copper liner, in front of the booster. The liner provides the penetration capability for the system.

An aluminum fin assembly with tracer is attached to the aft end of the subprojectile by way of an aluminum fin adapter. The fin has beveled leading edges and T-tabs on the outside diameter to increase the effective fin area. Spin, which is induced by a twist in the fin blade, provides the subcaliber projectile with greater in-flight stability and accuracy.

### **Functioning:**

The operational characteristics of the M830A1 test cartridges is basically the same as that which is utilized for all HEAT-T tank ammunition. After setting the proximity sensor to the designated target and cambering the cartridge, a voltage is applied to the primer. As current flows through the primer, the igniter charge is initiated which, in turn, initiates the benite strands. The burning benite, which is evenly distributed within the primer body initiates the propellant charge. The expanding gases generated by the burning propellant expel the projectile into the gun barrel leaving only the metal case base and primer body behind. During the propellant burn, the tracer element in the fin assembly is ignited which provides the projectile with tracking visibility. The silicone rubber seal and obturator band at the base of the projectile prevent blow-by of propellant gas during travel in the barrel. The obturating band and retaining ring also

function to maintain projectile inbore centering and integrity.

Upon muzzle exit, the air resistance against the front of the sabot breaks the retaining ring and when the obturating band around the sabot breaks, the sabot falls away in three pieces leaving only the subprojectile to travel to the target. The fin assembly with six equally spaced fins, imparts spin to the subprojectile, thereby stabilizing its flight aerodynamics.

The acceleration of the projectile in the gun tube allows the release mechanism to release the rotor from the first safe position. As the projectile travels downbore, the acceleration forces decrease until the rotor can overcome the forces and start its rotation to the armed position. The inbore acceleration of the fuze allows the setback voltage generator to charge up the firing capacitor. As the projectile leaves the gun muzzle, the drag weight senses the increased drag forces and moves out of the rotor's way, allowing it to arm.

Upon direct impact with a target or when the proximity switch senses the presence of an air target, a firing signal is sent to the M774 base element. The base element's firing capacitor provides the necessary current to initiate the M69 detonator, which initiates the lead, booster, and warhead explosives in sequence. A copper jet is formed by the detonation of the warhead. This copper jet provides the capacity to defeat the ground target.

### **Tabulated Data:**

Complete round:

Type -----	Fixed, High Explosive Antitank Antihelicopter multipurpose w/ tracer
Weight -----	50.1 lb (22.7 kg)
Length -----	38.74 in. (984 mm)
Assembly drawing -----	12912208

### **Temperature Limits:**

Firing:

Lower limit -----	-25°F (-32°C)
Upper limit -----	+125°F (+52°C)

Storage:

Lower limit -----	-50°F (-46.0°C)
Upper limit -----	+145°F (+63.0°C)

### **Performance:**

Chamber pressure (peak) -----	(66620 psi @ 49°C; 6700 bars @ 125°F)
Velocity (nominal) -----	4626 ft/sec (1410 m/sec)

**Packing (Metal Container):**

Packing and marking	
drawing -----	12912370
Dimensions -----	44.5 in. x 7.75 in. x 7.75 in.
Cube -----	1.5 cu ft
Total weight (with cartridge) -	72.1 lb
Total explosive weight -----	18.69 lb
*Packing -----	1 round per metal container, 30 metal con- tainers per pallet

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

**Shipping and Storage Data:**

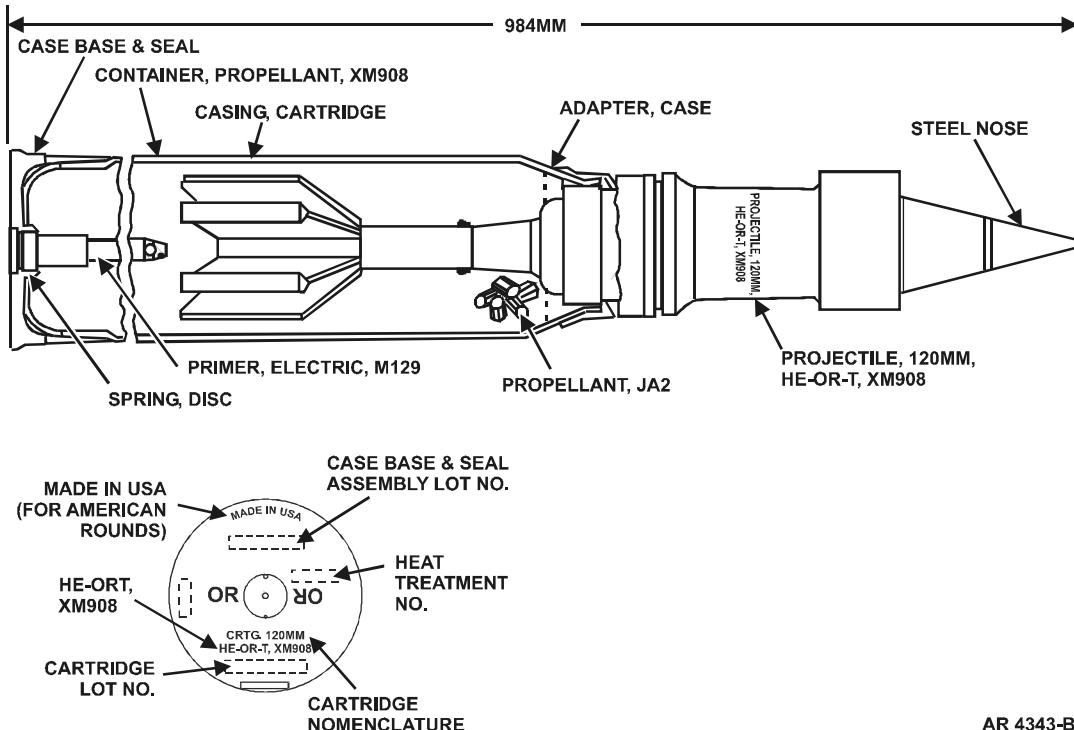
UNO serial number -----	0321
DOD hazard class -----	(08)1.2
Storage compatibility group --	E
Field storage category -----	A
DOT shipping class -----	A
DOT Designation -----	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC -----	1315-C791

**Limitations:**

The M830A1 is a full-service round which may only be fired during war emergency.

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## CARTRIDGE, 120 MILLIMETER, HE-OR-T, M908



AR 4343-B

**Type Classification:**

TC - STD, 7 Feb 2003. (M908)

Urgent fielding to the Eighth U.S. Army in Korea, 29 Aug 1997. (XM908)

**NOTE**

Ammunition marked with XM908 is identical to M908.

**Use:**

This cartridge is a high explosive, obstacle reduction, tactical service round with tracer. The M908 is used in the 120mm, smooth bore M256 cannon.

**Description:**

The Cartridge, 120mm, HE-OR-T, M908 is a high explosive, obstacle reduction, tactical service round with tracer. The M908 is used in the 120mm, M256 smooth bore tank and is a fin stabilized round with a discarding sabot. The baseline design contains a propulsion system consisting of a combustible cartridge case, case adaptor, nineteen-perforated hexagonal JA-2 propellant, a propellant containment device (cloth bag), and an M129 primer assembled to a

metal case base and seal assembly (all are currently used on the M829A1). The projectile consists of a subcaliber projectile and three piece aluminum sabot. The subcaliber projectile combines a fusing system and a chemical energy warhead (Composition A3 Type II). The three segment sabot is secured to the warhead body by a nylon obturator and a steel retaining ring. The fusing system includes: M774 base element, flexible communication circuit, and frontal impact switch assembly (FISA). The conical nose of the projectile consists of the FISA coupled to the warhead body and a steel nose coupled to the FISA, which closes upon impact with a ground target. A flexible electrical cable carries the signal of FISA closure to the M774 base element. An inertial switch in the M774 base element act as a backup to the FISA. Either switch will delay the function of the warhead beyond the point of impact with the target. This delayed functioning is ideal for the reduction of concrete ground targets.

The M774 base element is a dual environment safe and arm (S&A) device. The M774 receives an electric firing pulse from the FISA which then triggers the base element electronics to fire the M69 electric detonator. The M69 detonator is contained in the rotor which provides a physical separation of the M69 detonator from the fuze electronics until the subprojectile has traveled a safe distance downrange. The first safety feature of the mechanical

S&A lock consists of three leafs and a spring, originated so as to release the rotor upon forward acceleration. The second safety feature is a drag weight which senses the decelerating force/drag of the projectile as it leaves the muzzle. As the drag weight senses drag, it moves out of the way of the rotor allowing the rotor to rotate to the armed position as designed.

Once the M774 base element is armed and receives an electrical firing pulse to trigger the detonator, the detonator, lead, booster, and warhead explosives initiate in sequence destroying the target. The explosive train located in front of the base element consists of the lead cup, booster, and Comp A3 explosive. The warhead explosive is contained in the body with a shaped copper liner, in front of the booster. The liner provides the penetration capability for the system.

An aluminum fin assembly with tracer is attached to the aft end of the subprojectile by way of an aluminum fin adaptor. The fin has beveled leading edges and T-tabs on the outside diameter to increase the effective fin area. Spin, which is induced by a twist in the fin blade, provides the subcaliber projectile with greater in-flight stability and accuracy.

### **Functioning:**

The operational characteristics of the M908 cartridges is basically the same as that which is utilized for all HEAT-T tank ammunition. After the chambering the cartridge, a voltage is applied to the primer. As current flows through the primer, the igniter charge is initiated which in turn initiates the benite strands. The burning benite, which is evenly distributed within the primer body, initiates the propellant charge. The expanding gases generated by the burning propellant expel the projectile into the gun barrel leaving only the metal case base and primer body behind. During the propellant burn, the tracer element in the fin assembly ignited which provides the projectile with tracking visibility. The silicone rubber seal and obturator band at the base of the projectile prevent blow-by of propelling gas during travel in the barrel. The obturating band and retaining ring also function to maintain projectile in-bore entering and integrity.

Upon muzzle exit, the air resistance against the front of the sabot breaks the retaining ring and when the obturating band around the sabot breaks, the sabot falls away in three pieces leaving only the subprojectile to travel to the target. The fin assembly with six equally spaced fins, imparts spin to the subprojectile, thereby stabilizing its flight aerodynamics.

The accelerating of the projectile in the gun tube allows the release mechanism to release the rotor from the first safe position. As the projectile travels downbore the acceleration forces decrease until the rotor can overcome the forces and start its rotation to the armed position. The inbore acceleration of the fuze allows the setback voltage generator to charge up the firing capacitor. As the projectile leave the gun muzzle, the drag weight senses the increased drag forces and moves out of the rotor's way, allowing it to arm.

Upon direct impact with a target, a firing signal is sent to the M774 base element. The base element's firing capacitor provides the necessary current to initiate the M609 detonator, which initiates the lead, booster, and warhead explosives in sequence.

### **Tabulated Data:**

Complete round:

Type.....	Fixed, High Explosive Obstacle Reduction w/tracer
Weight .....	50.1 lb (22.7 kg)
Length .....	38.74 in. (984mm)
Assembly drawing.....	12984600

### **Temperature limits:**

Firing:

Lower limit .....	-25°F (-32°C)
Upper limit .....	+120°F (+49°C)

Storage:

Lower limit .....	-50°F (-46.0°C)
Upper limit .....	+145°F (+63°C)

Performance:

Chamber pressure (peak) .....	66620 psi @ 49°C (6700 bars @ 125°F
Velocity (nominal).....	4626 ft/sec (1410 m/sec)

Projectile weight as fired

(approx) .....	24.4 lb, 11.1 kg
----------------	------------------

**Packaging (Metal Container):**

Packing and marking  
Drawing.....12984589  
Dimensions .....44.5 x 7.75 x 7.75  
in.  
  
Cube.....1.5 cu ft  
Total weight (with  
cartridge) .....72.1 lb  
Total explosive weight.....20.19 lb  
Packing .....1 round per metal  
container;  
30 metal contain-  
ers per pallet

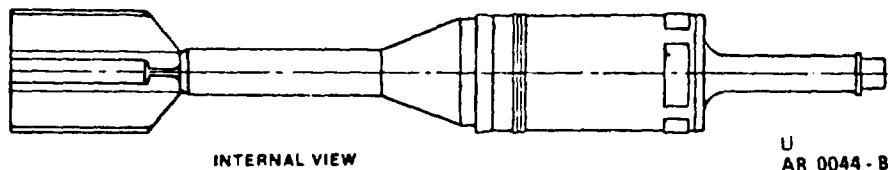
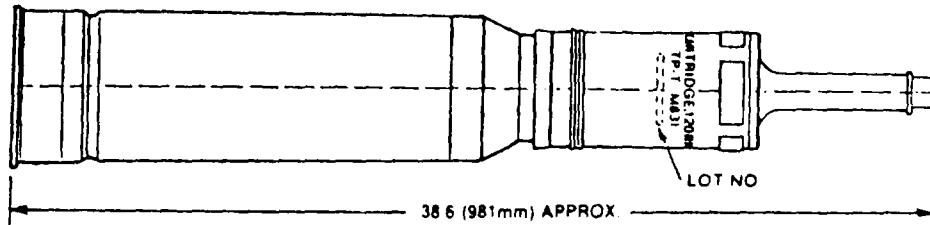
**Shipping and Storage Data:**

DOD hazard class/Division ..... (08) 1.2  
Storage compatibility  
group..... E  
Field storage category ..... A  
DOT hazard class..... 1.2E  
DOT/UN Proper Shipping  
Name ..... CARTRIDGES  
FOR WEAP-  
ONS  
DODAC ..... 1315-CA05  
NSN ..... 1315-01-444-  
6506

**Limitations:**

The M908 is not an anti-tank/armor and anti-helicopter round. It is authorized for use in 120mm gun M256.

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**CARTRIDGE, 120-MILLIMETER: TP-T, M831****Type Classification:**

STD - Dec 84.

**Use:**

This cartridge is a target practice round to simulate the ballistics of the M830 High Explosive Antitank Multipurpose with Tracer ammunition. The cartridge is fired from the 120-mm smooth bore M256 cannon.

**Description:**

The M831 cartridge external appearance is identical to that of the M830 HEAT-MP-T service round. Internally the round does not contain any explosives, shaped charge liner base fuze or nose cap. The round consists of a steel body with aluminum spike and plastic obturator, in addition to a fin and boom assembly with tracer. The complete round propellant system comprises a stub metal case with combustible sidewall and M123 primer. The propellant is a single perforated stick propellant both bagged and unbagged with additional segments fitted over each fin.

**Functioning:**

The M831 is loaded and fired in the normal manner from the 120-mm M256 smooth bore tank gun. When the electric primer in the breech of the weapon is initiated, the resulting flash ignites the propelling charge and combustible case. This generates gases which drive the projectile from the gun and ignites the tracer element. The flight characteristics simulate those of the service round, but does not result in an explosion or penetration upon target impact.

**Tabulated Data:**

Complete round:

Type -----	Fixed, target practice
Weight -----	53.4 lb (24.2 kg)
Length -----	38.6 in. (981 mm)
Assembly drawing -----	12527100
Color -----	Blue w/white markings

**Temperature Limits:**

Firing:

Lower limit -----	-50°F (-46.0°C)
Upper limit -----	+145°F (+63.0°C)

Storage:

Lower limit -----	-50°F (-46.0°C)
Upper limit -----	+145°F (+63.0°C)

**Performance:**

Chamber pressure (peak) ----- 73,950 psi @ 70°F

Velocity (nominal) ----- 3740 ft/sec

**Packaging:**

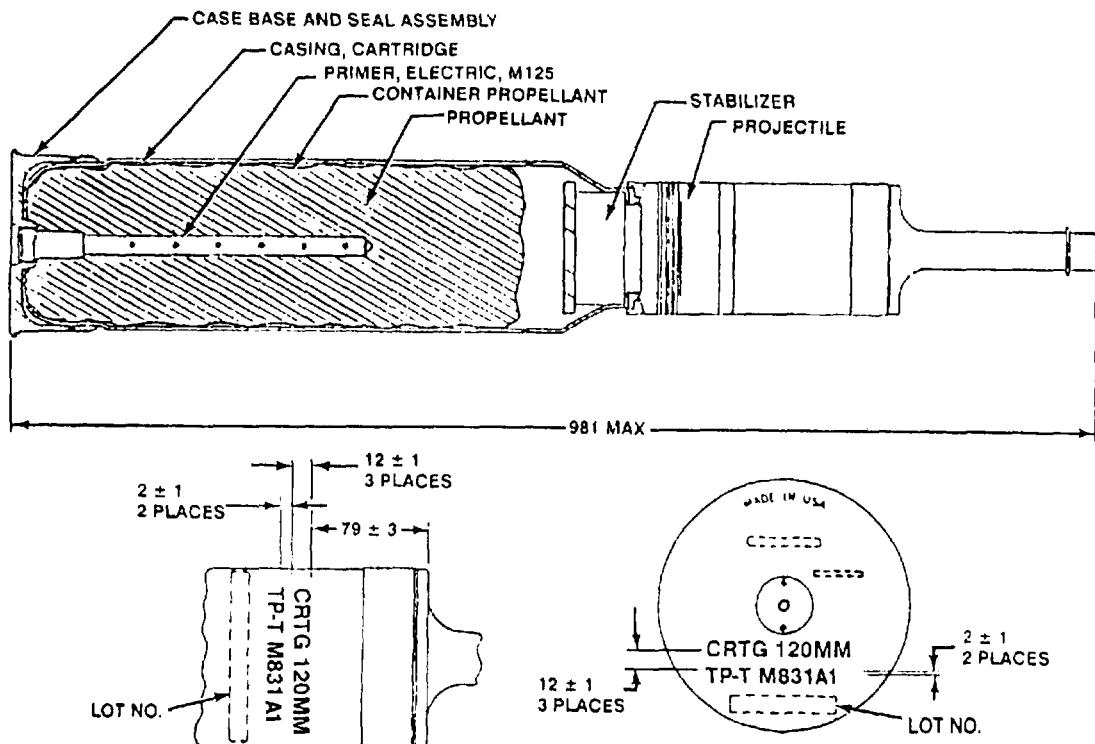
Inner pack drawing ----- 12527220  
Outer pack drawing ----- 12527240  
Weight:----- 36 lb  
Cube ----- 2.4 cu ft  
\*Packing ----- 1 round per  
fiber container;  
1 container per  
wooden box; 20  
boxes per pallet  
  
\*Packing box:  
Weight ----- 89 lb  
Dimensions ----- 45.6 in. x 9.02  
in. x 10.24 in.  
Cube ----- 2.4 cu ft

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

**Shipping and Storage Data:**

UNO serial number ----- 0328  
DOD hazard class ----- (08) 1.2  
Storage compatibility group -- C  
DOT shipping class ----- B  
DOT designation ----- AMMUNITION  
FOR CANNON  
WITH EMPTY  
PROJECTILES  
DODAC ----- 1315-C784

## CARTRIDGE, 120-MILLIMETER: TP-T, M831A1

U  
AR 4709-A**Type Classification:**

STD - April 23, 1993.

**Use:**

The M831A1 cartridge is a fixed 120-mm target practice round with tracer (TP-T) which simulates the ballistics of the High Explosive Antitank Multipurpose with tracer (HEAT-MP-T) M830 cartridge. The M831A1 cartridge with inert projectile is intended for use in the 120-mm smooth bore M256 cannon.

**Description:**

The external appearance of the M831A1 cartridge is similar to the M831 training round as well as the M830 service round. The M831A1 round consists of an inert projectile composed of a steel spike, aluminum body, ring, stabilizer and nylon obturating band. The fin and boom on the present M831 have been replaced by a stabilizer with six equally spaced slots which impart spin to the M831A1 projectile. The combustible cartridge case, com-

tible case cap, case base and seal assembly are the same components used on the presently fielded M830 and M831 cartridges. The internal propulsion system for the M831A1 consists of M125 primer, M14 propellant, and tracer.

**Functioning:**

The M831A1 is loaded and fired in the normal manner from the 120-mm M256 smooth bore tank gun. Initiation of the electric primer ignites the propelling charge and combustible case, generating gases which drive the projectile from the gun and ignite the tracer. The silicone rubber seal and nylon obturating band as well as the case base and seal assembly prevent gas leakage during the projectile travel in the barrel. The obturating band and bourrelet also function to maintain projectile inbore centering and integrity. The stabilizer provides spin for flight aerodynamics. The flight characteristics simulate those of the service round, but do not result in an explosion or penetration upon target impact.

### **Tabulated Data:**

Complete round:

### Temperature Limits:

Firing:

Lower limit ----- -25°F (-32°C)  
Upper limit ----- +125°F (+52°C)

## -PF-

### Storage:

Lower limit ----- -50°F (-46.0°C)  
 Upper limit ----- +145°F  
 (+63.0°C)

### Performance:

Chamber pressure ----- 55,000 psi @  
70°F 73,000 psi  
@ 145°F

Velocity (nominal) ----- 1140 m/sec  
(3740 ft/sec)

### Packaging:

Packing and marking  
drawing (metal container) -- 12521674

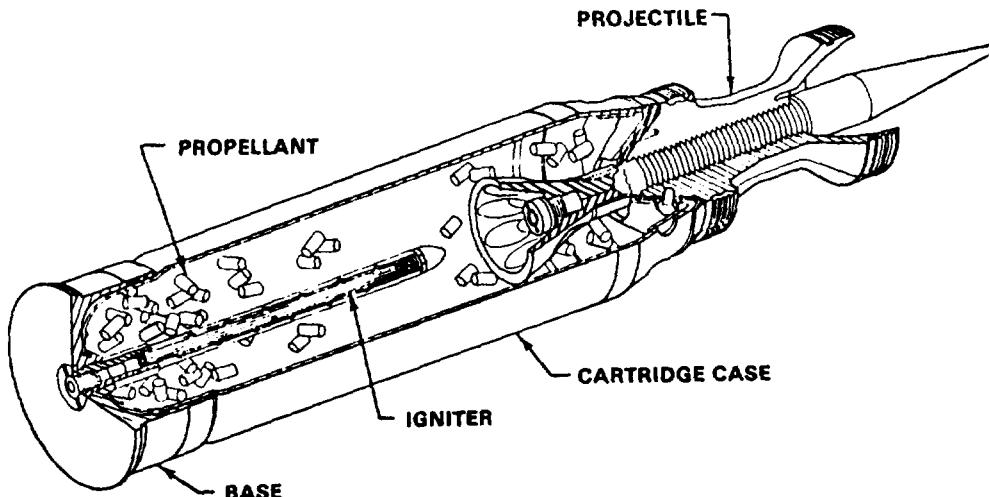
Dimensions -----	44.5 x 7.75 x 7.75 in.
Cube -----	1.5 cu ft
Total weight (with cartridge) -	73 lb
Total explosive weight -----	15.5 lb
*Packing -----	1 round per metal container; 30 metal con- tainers per pal- let

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

#### **Shipping and Storage Data:**

DOD hazard class ----- 1.3  
Storage compatibility group -- C  
Field storage category ----- A  
DOT shipping class ----- B  
DOT designation ----- AMMUNITION  
FOR CANNON  
WITH EMPTY  
PROJECTILE  
UNO serial number ----- 0417  
DODAC ----- 1315-C784

## CARTRIDGE, 120-MILLIMETER: TPCSDS-T, M865

U  
AR 0668-AType Classification:

STD June 84.

Use:

This cartridge is a kinetic energy, target practice round for use with the 120-mm smooth bore M256 cannon. It is designed to simulate the service round characteristics at reduced maximum ranges to allow practice firings on short range proving grounds and training areas.

Description:

The cartridge, 120-mm: TPCSDS-T, M865 contains a propulsion system consisting of a stub metal case with combustible sidewall, granular propellant, and electric M125 primer, while the projectile consists of subprojectile and aluminum sabot. The core is a one-piece steel design with a tail cone assembly which is assembled into the sabot by means of threads. The tail cone contains nine holes, or six slots, which in conjunction with the conical shape provide stabilization. Reduced range is achieved by the aerodynamic blocking effect of the holes, or slots. The tail cone assembly also contains a tracer. The aluminum sabot is composed of three 120° noninterchangeable segments with internal screw threads matching those on the outer diameter of the subprojectile. The sabot has a silicone rubber seal at the rear to prevent gas leakage.

The weight of the complete cartridge is approximately 19.0 kg (41.9 lb) and the weight of the subprojectile is approximately 3.2 kg (7.1 lb).

Functioning:

The M865 is loaded and fired from the 120-mm tank gun in the normal manner. Upon initiation of the electric primer in the breech of the weapon, the resulting flash ignites the propelling charge and combustible case generating gases which drive the projectile from the gun and ignites the tracer. The rear seal of the sabot prevents gas leakage between the sabot segments and the driving forces (gases) propelling the subprojectile down bore. Upon leaving the gun, aerodynamic forces cause the sabot to separate from the subprojectile allowing the subprojectile to continue to target, while the sabot segments fall quickly to earth. The tail cone segment of the subprojectile, due to the nine hole (old design) or six slot arrangement, causes aerodynamic slowing of the subprojectile to limit its range to 8000 meters.

Tabulated Data:

Complete round:

Type	-----	Fixed, TPCSDS-T
Weight	-----	41.9 lb (19.0 kg)
Length	-----	34.7 in. max
Assembly drawing:		
Standard Sabot (old)	-----	12525000
1-Inch shorter sabot	-----	12525000
New Alliant F <sup>3</sup> design	-----	28251796
New Olin F <sup>3</sup> design	-----	700062
Color	-----	Blue w/white markings

**Temperature Limits:**

Firing:	
Lower limit -----	-50°F (-46.0°C)
Upper limit -----	+145°F (+63.0°C)
Storage:	
Lower limit -----	-50°F (-46.0°C)
Upper limit -----	+145°F (+63.0°C)

**Performance; Breech Pressure @ 21°C\***

Standard sabot (with LKL propellant) -----	4800 bars
Short sabot (with LKL propellant) -----	4600 bars
Alliant (short sabot, with LKL propellant) -----	4600 bars
Olin (short sabot, with M14 propellant) -----	4950 bars

"NOTE: Expected average breech pressure values at 8.9 cm from rear face of tube.

**Packaging (Wooden Box):**

Inner pack drawing -----	12527220
Outer pack drawing -----	12527240
Dimensions -----	45.6 in. x 9.02 in. x 10.24 in.
Weight (with cartridge) -----	77.9 lb
Cube -----	2.4 cu ft
Explosive weight (Propellant) -----	19.03 lb
**Packing -----	1 round per fiber container; 1 container per wooden box, 20 boxes per pallet.

**Packaging (Metal Container):**

Packing and Marking:	
Standard sabot -----	12561273
Short Cabot -----	12912175
Alliant F <sup>3</sup> design -----	12913175
Olin F <sup>3</sup> design -----	12913175
Dimensions -----	44.5 in. x 7.75 in. x 7.75 in.
Cube -----	1.55 cu ft
Total weight (with cartridge) -	63.2 lb
Total explosive weight -----	19.03 lb (LKL propellant) 16.28 lb (M14 propellant)
**Packing -----	1 round per metal container, 30 metal containers per pallet

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

**Shipping and Storage Data:**

UNO serial number -----	0328
DOD hazard class -----	1.3 (Wood Box) (08) 1.2 (Metal Can)
Storage compatibility group --	C
DOT shipping class -----	B
DOT designation -----	AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC -----	13315-C785

**WARNING**

**DO NOT FIRE OVER THE HEADS OF FRIENDLY TROOPS, UNLESS TROOPS HAVE ADEQUATE COVER. TROOPS MAY BE STRUCK BY THE DISCARDED SABOT.**

**CAUTION**

EVEN THOUGH THIS IS A TARGET PRACTICE ROUND, THE CORE CAN CAUSE DAMAGE AND PENETRATE ARMORED VEHICLES.

**Differences Between NSN's:**

1315-01-165-6488

9 hole cone

Standard sabot

Marking located on sabot midsection (3 lines of 12-mm letters)

Sabot with nylon holding ring on bourrelet (see Fig. 2)

Wood box/fiber container

1315-01-242-4796

9 hole cone

Standard sabot

Marking located on sabot midsection (3 lines of 12-mm letters)

Sabot with nylon holding ring on bourreleate.

Metal Container (PA116)

**Differences Between NSN's: (cont.)****1315-01-288-5545\***

6 hole cone

1-inch shorter sabot

Marking located on front bourrelet or with reduced letter height (6.35-mm) and two lines on sabot midsection

Sabot without nylon holding ring bourrelet

Metal container (PA116)

**Markings:** Typical markings for the projectile are shown in figure 1. A difference in location and size (fig. 2) will distinguish the M865 with the slotted cone and reduced sabot size, NSN 1315-01-288-5545 from the 9 hole cone and standard length sabot as follows:

**1315-01-288-5545\***

6 slot cone (Alliant)

1-inch shorter sabot

Marking located on front bourrelet or with reduced letter height (6.35-mm) and two lines on sabot midsection

The case cover is glued to the rear of the sabot as opposed to being attached by screws.

Eliminated the inner ring and access holes in case cover.

Metal container (PA116)

**1315-01-288-5545\***

6 slot cone (Olin)

1-inch shorter sabot

Marking located on front bourrelet or with reduced letter height (6.35-mm) and two lines on sabot midsection

The propulsion system uses M14 propellant rather than LKL propellant used in the current M865. Eliminated the inner ring, subprojectile break groove and access holes in case cover.

Metal container (PA116)

\*NOTE: Cartridges of this NSN must be replaced in metal containers of the same lot number due to the shortened sabot requiring a different internal container support.

a. Marking for 9 hole cone/standard sabot: 1/2-inch letters (12-mm  $\pm$  1) in 3 lines on sabot midsection.

b. Marking for 6 cone/reduced length sabot: 1/4-inch letters (6-mm  $\pm$  1) in 2 lines on sabot midsection or bourrelet.

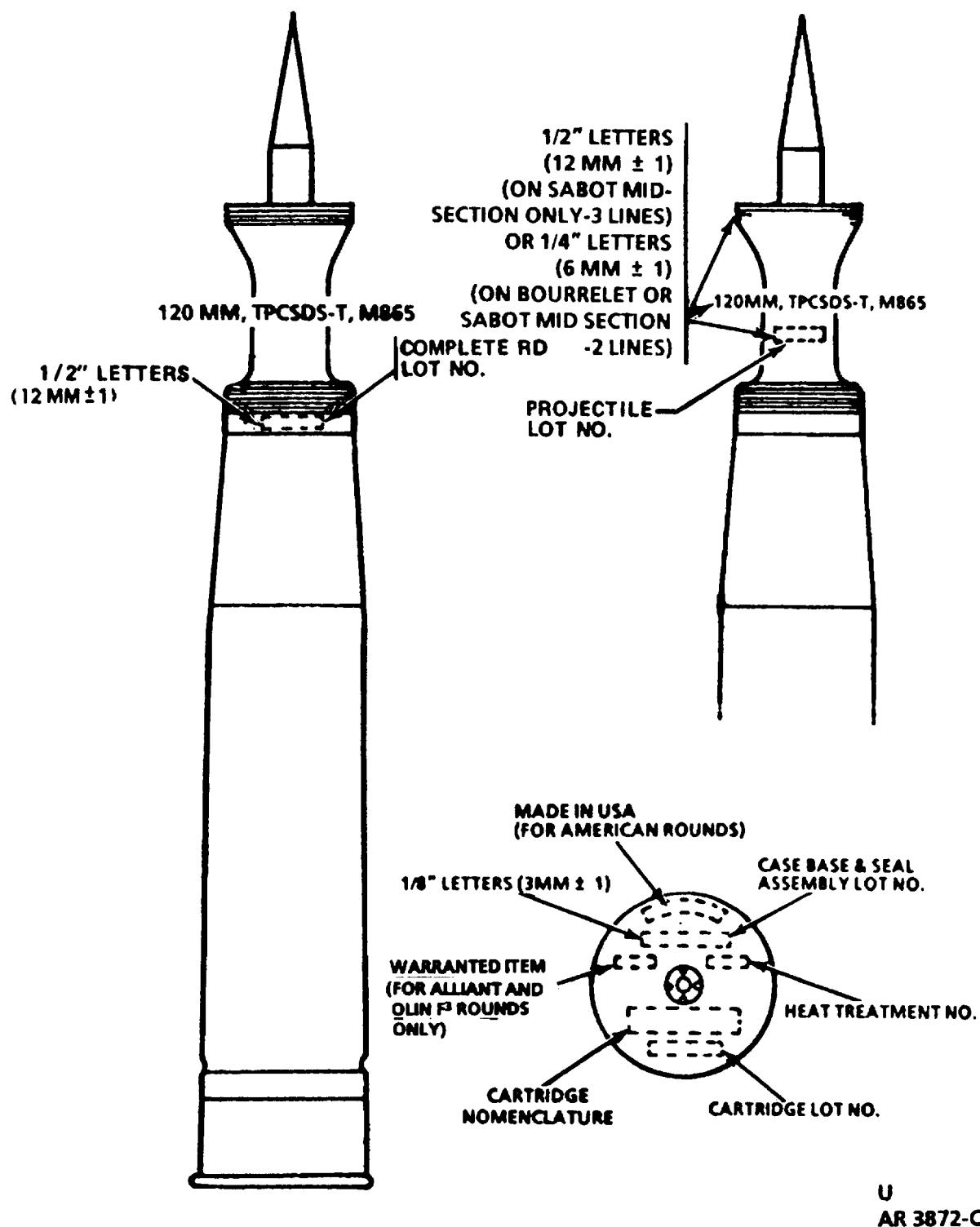


Figure 1. Typical marking for 120-mm gun cartridges, M865

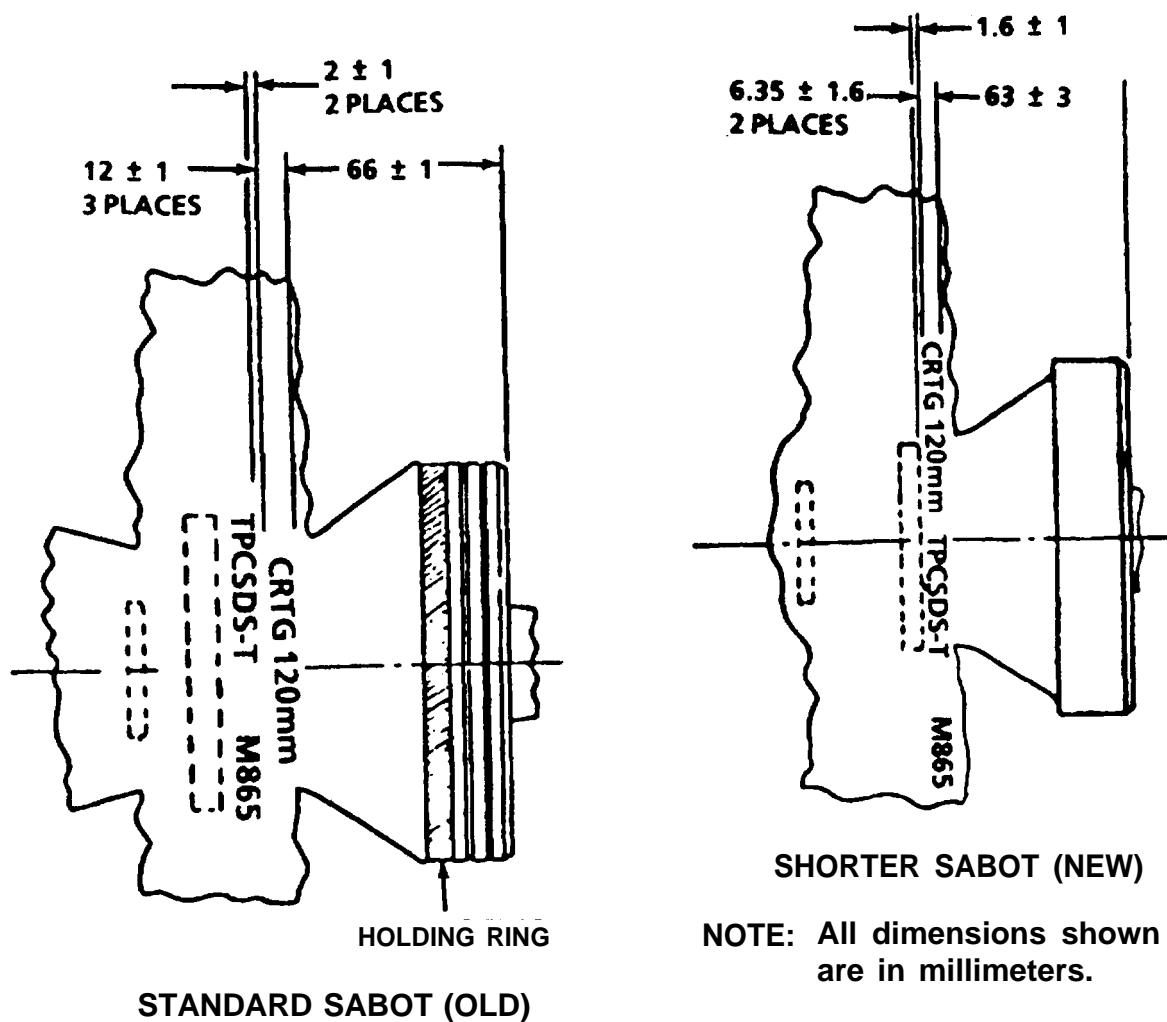


Figure 2. Differences between standard and shorter sabot for 120mm gun cartridge, M865.

Army-Authorized Ammunition for Guns. The authorization with the introduction of the slotted cone/reduced length sabot M865 (including the Alliant F<sup>3</sup> design round and the Olin F<sup>3</sup> design round) does not change, but it should be noted that cartridges with NSN 1315-01-288-5545 must be replaced in metal containers of the same lot number due to the shortened sabot requiring a different internal container support.

Repair Parts List. The introduction of the slotted cone/reduced length sabot M865 will require the addition of a second container for specific use with these rounds (NSN 1315-01-288-5545). The Repair Parts List for TM 9-

NOTE: All dimensions shown  
are in millimeters.

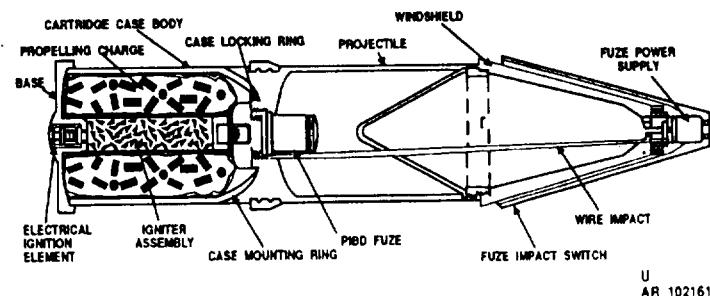
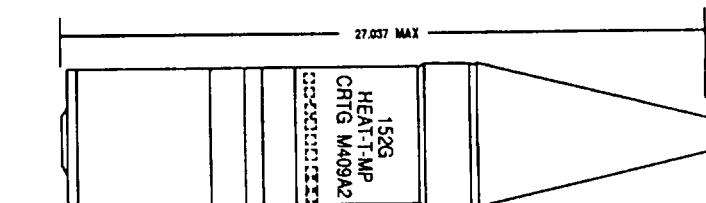
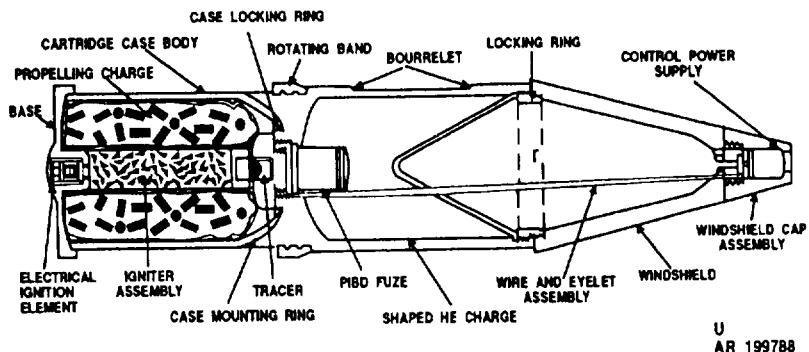
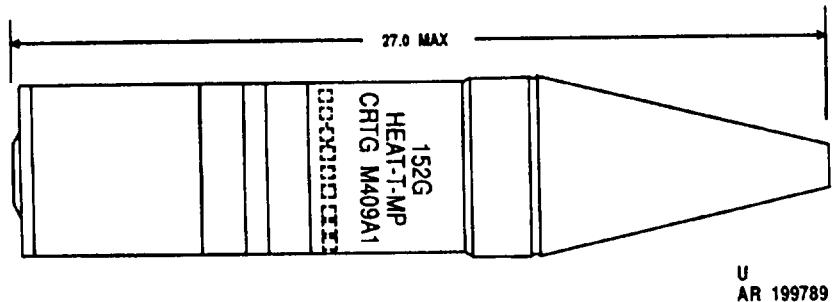
U  
AR 5092

1300-251-20 and TM 9-1300-251-34 should be annotated respectively as follows:

SMR code -----	XB000
Part number -----	12913178
Federal supply code for mfg ---	19200
Description -----	Container Ammunition Metal PA 116 for cartridge, 120-mm, TPCSDS-T, M865 each
Unit of measure -----	
Quantity incorporated in unit -----	1

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## CARTRIDGE, 152-MILLIMETER: HEAT-T-M, M409A2, M409A1 AND M409

**Type Classification:**

M409A2 ----- Std DA Letter 1976  
 M409A1 ----- Std AMCTC 8865  
 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 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 M4WIA2, 50.5 lb
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 lb

Components: M409A2 M409A1 M409

Cartridge case	M205	M205	M157
Propelling charge	M189	M189	M189
Primer	M 9 1	Electric	M 9 1
Tracer	M13	M13	M13
Fuze	M539A1	PIBD-M539	XM539E1

Performance:

Maximum range -----	9900 yd (9000 m)
Muzzle velocity -----	2240 fps (683 reps)

**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 cartridge per 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 DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

UNO serial number ----- 0006  
 DOD hazard 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.

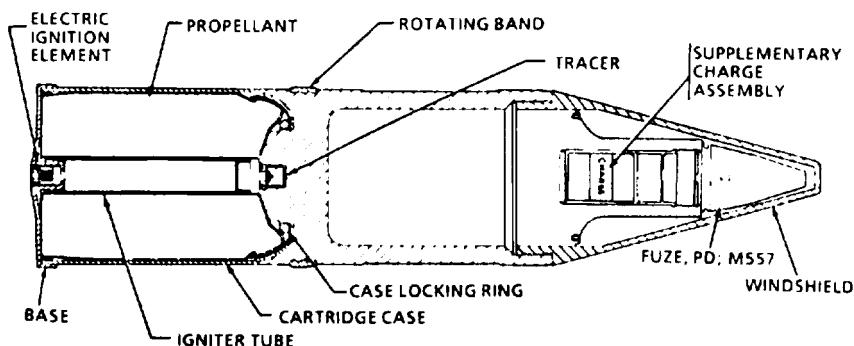
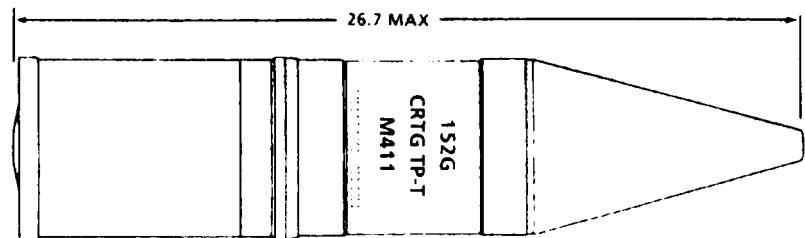
**Limitations:**

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

**References:**

SB 700-20  
 AMC-P 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**

ARD 84-1610

**Type Classification:**

C&amp;T, AMCTC 9103 dtd 1972.

**Use:**

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

**Description:**

The M411 cartridge has an M557 PD fuze and a supplementary charge for spotting purposes in the aluminum spike; otherwise, the projectile is hollow. A tracer is in the base of the projectile for observation of the trajectory. The hollow projectile is secured to a cartridge case of combustible material. The case is filled with bagged propellant and equipped with an electrical ignition element.

**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. This cartridge has a functioning fuze and spotting charge.

**Tabulated Data:**

Complete round:

Type -----	Target Practice
Weight -----	48.8 lb
Length -----	26.7 in.
Cannon used with -----	M81 series, M162

Projectile:

Body material -----	Steel
Color -----	Blue w/white markings and yellow band
Filler and weight -----	TNT 0.30 lb

Components:

Cartridge case -----	XM157
Propelling charge -----	M189
Primer -----	M91
Tracer -----	M13
Fuze -----	M557

**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:  
 M411 ----- 1 round per  
 fiber container;  
 1 container per  
 wooden box

\*Packing Box:  
 Weight ----- 97.5 1b  
 Dimensions ----- 10-15/32 x  
 10-15/32 x  
 36-1/8 in.  
 Cube ----- 2.0 cu ft

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

**Shipping and Storage Data:**

UNO serial number ----- 0321  
 DOD hazard class ----- (12) 1.2  
 Storage compatibility ----- E

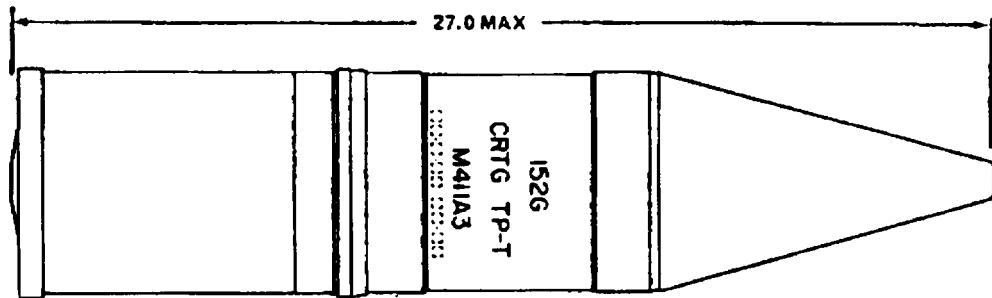
DOT shipping class ----- A  
 DOT designation ----- AMMUNITION  
 FOR CANNON  
 WITH  
 EXPLOSIVE  
 PROJECTILE  
 DODAC ----- 1320-D380  
 Drawing number ----- 9210425

**Limitations:**

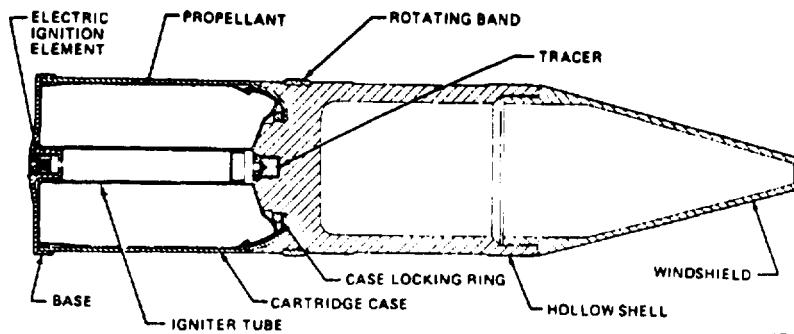
None.

**References:**

SB 700-20  
 AMC-P 700-3-3  
 TM 9-2350-230-12  
 TM 9-2350-232-10  
 TM 9-1300-251-20

**CARTRIDGE, 152-MILLIMETER: TP-T, M411A3, M411A2, AND M411A1**

AR100783



AR100782

**Type Classification:**

M411A3 ---- Std AMCTC 9103 dtd 1972.  
 M411A2 ---- Std AMCTC 9103 dtd 1972.  
 M411A1 ---- 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.

**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 non-functioning.

**Tabulated Data:**

Complete round:

Type ----- Target Practice

Weight:

M411A3 -----	48.8 lb
M411A2 -----	49.8 lb
M411A1 -----	49.8 lb

Length:

M411A3 .....	27.0 in.
--------------	----------

M411A2 .....	27.1 in.
--------------	----------

M411A1 .....	26.9 in.
--------------	----------

Cannon used with ----- M81 series.  
 M162

**Tabulated Data: (cont.)**

Projectile:	
Body material -----	Steel
Color -----	Blue w/white marking and yellow band
Filler and weight:	
M411A3 -----	N/A
M411A2 -----	N/A
M411A1 -----	N/A
Components:	
Cartridge case:	
M411A3 -----	M205
M411A2 -----	M157
M411A1 -----	M157
Propelling charge -----	M189
Primer:	
M411A3 -----	N/A
M411A2 -----	M91
M411A1 -----	M91
Tracer: -----	M13
Fuze:	
M411A3 -----	N/A
M411A2 -----	N/A
M411A1 -----	N/A
Performance:	
Maximum range -----	9000 m
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 hr/day)

*Packing:	
M411A1, M411A2 -----	1 round per fiber container; 1 container per wooden box
M411A3 -----	1 round per 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 DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

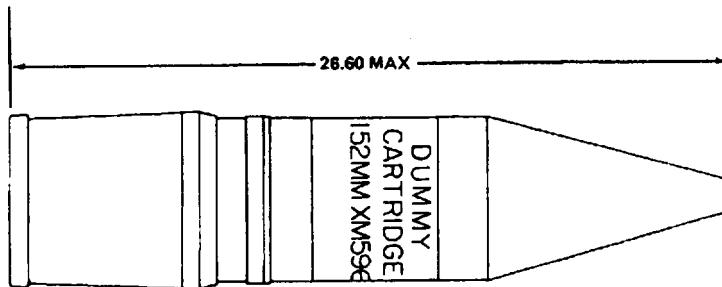
UNO serial number -----	0242
DOD hazard class -----	1.3
Storage compatibility -----	C
DOT shipping class -----	B
DOT designation -----	AMMUNITION FOR CANNON WITH INERT LOADED PROJECTILE. (M411): AM-MUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC -----	1320-D383 (M411A3, M411A2, and M411A1)
Drawing number -----	9266944, (M411A3); 9242430, (M411A2); 9233376. (M411A1)

**Limitations:**

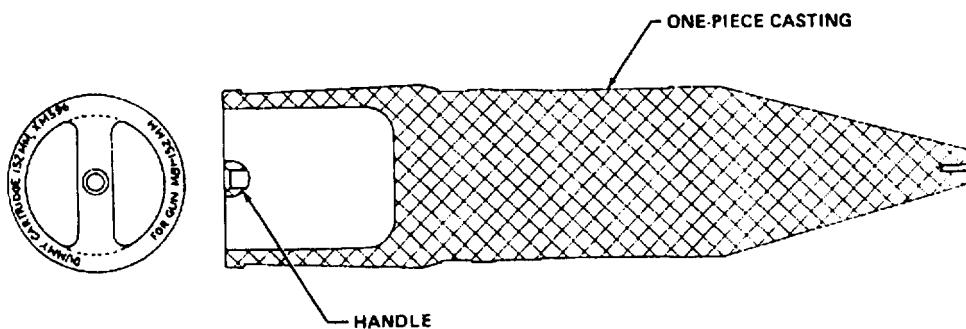
None.

**References:**

- SB 700-20
- AMC-P 700-3-3
- TM 9-2350-230-12
- TM 9-2350-232-10
- 'TM 9-1300-251-20

**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 lb
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 lb
Dimensions	-----	29-7/8 x 8-1/8 x 8-29/32 in.
Cube	-----	1.3 cu ft

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

**Shipping and Storage Data:**

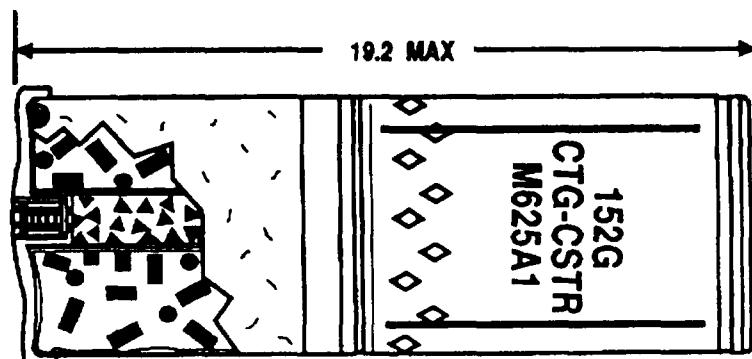
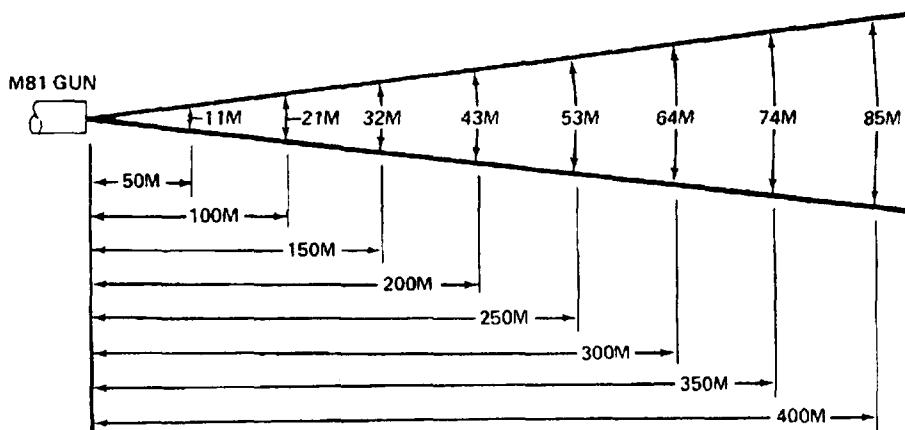
UNO serial number ----- N/A  
DOD hazard class ----- N/A  
Storage compatibility ----- N/A  
DOT shipping class ----- C  
DOT designation ----- NON-  
                                  EXPLOSIVE  
                                  AMMUNITION  
DODAC ----- 1320-D500  
Drawing number ----- 8430306

**Limitations:**

None.

**References:**

SB 700-20  
AMC-P 700-3-3  
                          TM 9-2350-230-12  
TM 9-2350-232-10  
TM 9-1300-251-20

**CARTRIDGE, 152-MILLIMETER: CANISTER, M625A1 AND M625**U  
AR 199793

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, inert 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 lb
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 weight -----	Flechettes- 10,000, 15.2 lb

Components: M625A1    M625

Cartridge case -----	M205	M157
Propelling charge -----	M189	M189
Primer -----	Electrical	M91

## Performance:

Maximum effective range --	400 m
Muzzle velocity -----	2,260 fp

**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 cartridge per fiber container;  
1 container per wooden box

**\*Packing Box:**

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

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

**Shipping and Storage Data:**

UNO serial number -----	0242
DOD hazard class -----	1.3
Storage compatibility -----	E
DOT shipping class -----	B
DOT designation -----	AMMUNITION FOR CANNON WITH SOLID PROJECTILE DODAC ----- 1320-D390 Drawing number ----- 9219469, (M625); 9257471, (M625A1)

**Operational Characteristics:**

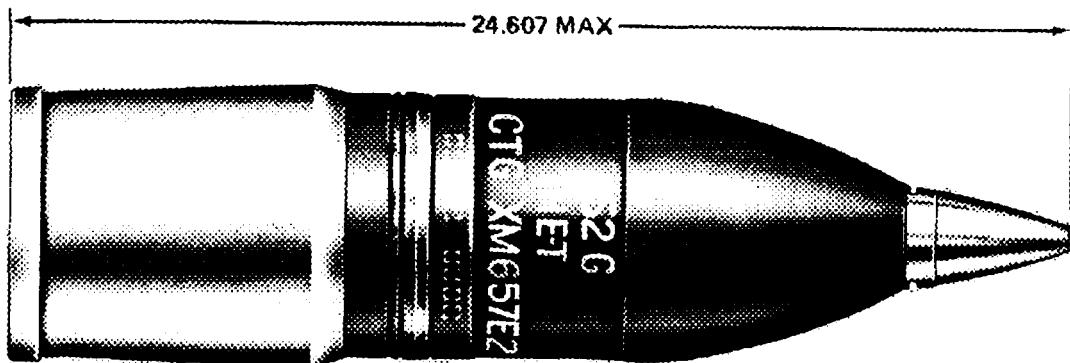
Because they are flammable, unprotected cartridge cases, those from which barrier bags have been removed can be ignited accidentally by burning cigarettes, smoldering residue, embers, open flame, etc. Do not remove ballistic protective cover until round is removed from stowage rack for firing. Do not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

**Limitations:**

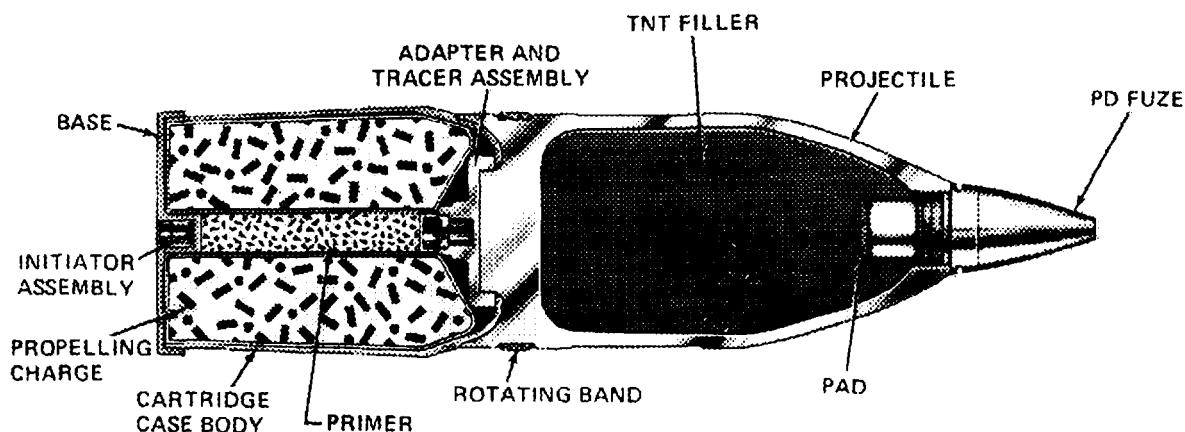
Overhead firing of canister cartridge is prohibited. Do not use probe adapter when firing rounds assembled with Cartridge Case M205.

**References:**

SB 700-20
AMC-P 700-3-3
TM 9-2350-230-12
TM 9-2350-232-10
TM 9-1300-251-20

**CARTRIDGE, 152-MILLIMETER: HE-T, M657**

AR199791



AR199790

**Type Classification:**

C&amp;T AMCTC 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 gilding 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 lb
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 lb

Components:

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

Performance:

Maximum Range -----	9000 m
Muzzle velocity -----	2240 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 cartridge per fiber container; 1 container per wooden box

\*Packing Box:

Weight -----	97.5 1b
--------------	---------

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

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

**Shipping and Storage Data:**

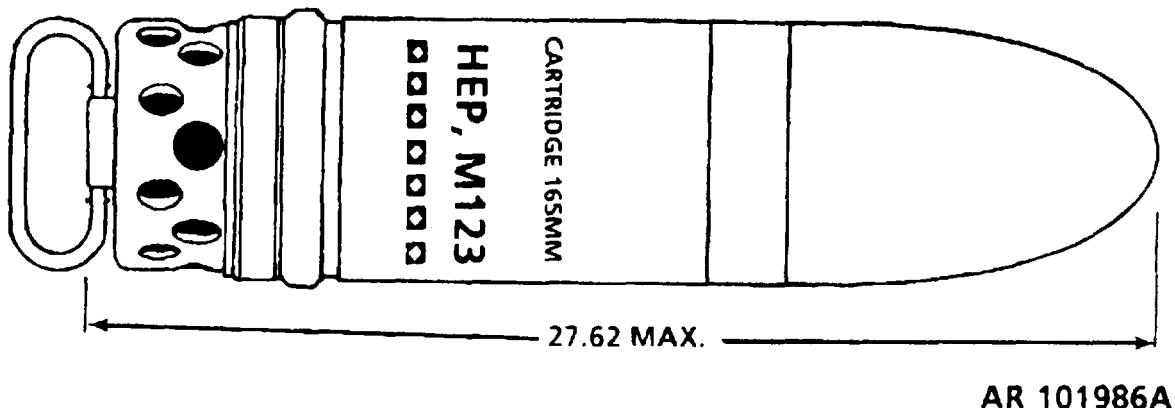
UNO serial number -----	0321
DOD hazard class -----	(12) 1.2
Storage compatibility -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC -----	1320-D592
Drawing number -----	9223763

**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:**

- SB 700-20
- AMC-P 700-3-3
- TM 9-2350-230-12
- TM 9-2350-232-10
- TM 9-1300-251-20

**CARTRIDGE, 165-MILLIMETER: 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 Composition 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. Upon 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 is loaded with a filler of Composition A3.

**Tabulated Data:**

Complete round:

Type -----	HEP
Weight -----	67.60 lb
Length -----	27.62 in.
Cannon used with -----	M135

**Tabulated Data: (cont.)****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 m)
Muzzle velocity -----	850 fps (259.08 reps)

**Temperature Limits:****Firing:**

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

**Storage:**

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

\*Packing ----- 1 round per fiber container:  
1 container per wooden box

\*Packing box:  
Weight w/ctg ----- 94.0 lb  
Dimensions ----- 34-13/16 x 8-3/4 x 9-13/16 in.  
cube ----- 1.7 cu ft

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

**Shipping and Storage Data:**

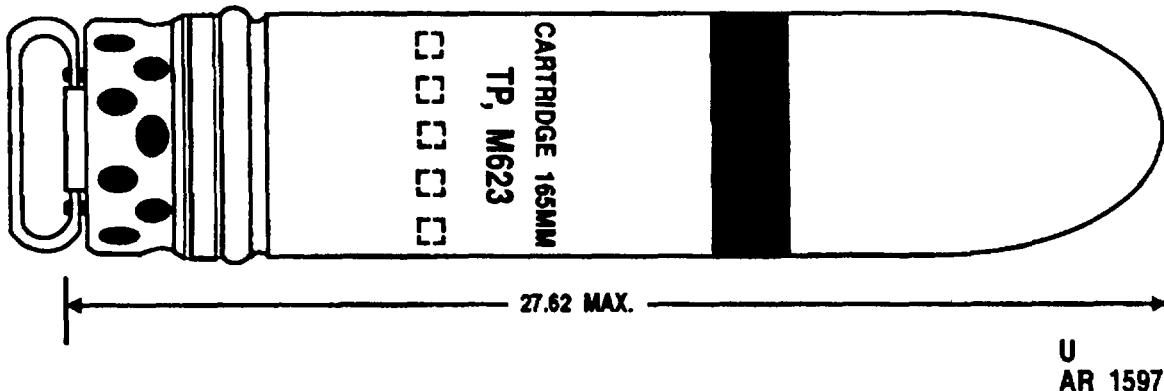
UNO serial number -----	0167
DOD hazard class -----	1.1
Storage compatibility group --	F
DOT shipping class -----	A
DOT designation -----	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC -----	1320-D570
Drawing number -----	8845043

**Limitations:**

Functional reliability will be degraded when impacting soft targets such as marshy, sandy, clay, mud, or snow covered terrain.

**References:**

TM 9-2350-222 -10-1
TM 9-2350 -222-10-2
TM 9-2350-222-10-3
AMC-P 700-3-3
SB 700-20

**CARTRIDGE, 165-MILLIMETER: TP, M623****Type Classification:**

Std AMCTC 8415 dtd July 1971.

**Use:**

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

**Description:**

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

**Functioning:**

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

the weapon with the projectile. The cartridge is spin stabilized in flight.

**Tabulated Data:****Complete round:**

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

**Projectile:**

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

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

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

**Ballistics:**

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

**Temperature Limits:**

## Firing:

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

## Storage:

Lower limit ----- -80°F (-62.2°C)  
 (for period not  
 more than 3  
 days)

Upper limit ----- +160°F  
 (+71.1°C) (for  
 period not more  
 than 4 hr/day)

## \*Packing -----

1 round per  
 fiber container;  
 1 container per  
 wooden box

## \*Packing Box:

Weight w/cartridge ----- 94.0 lb

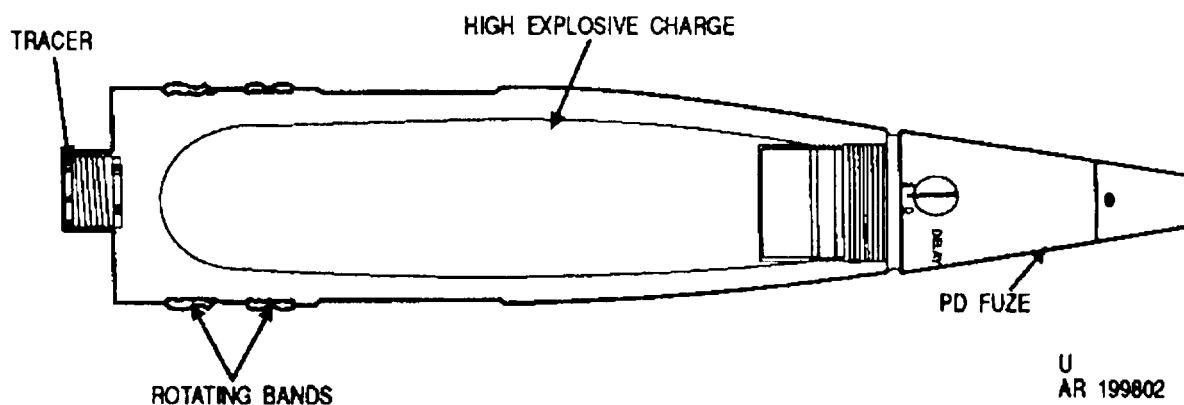
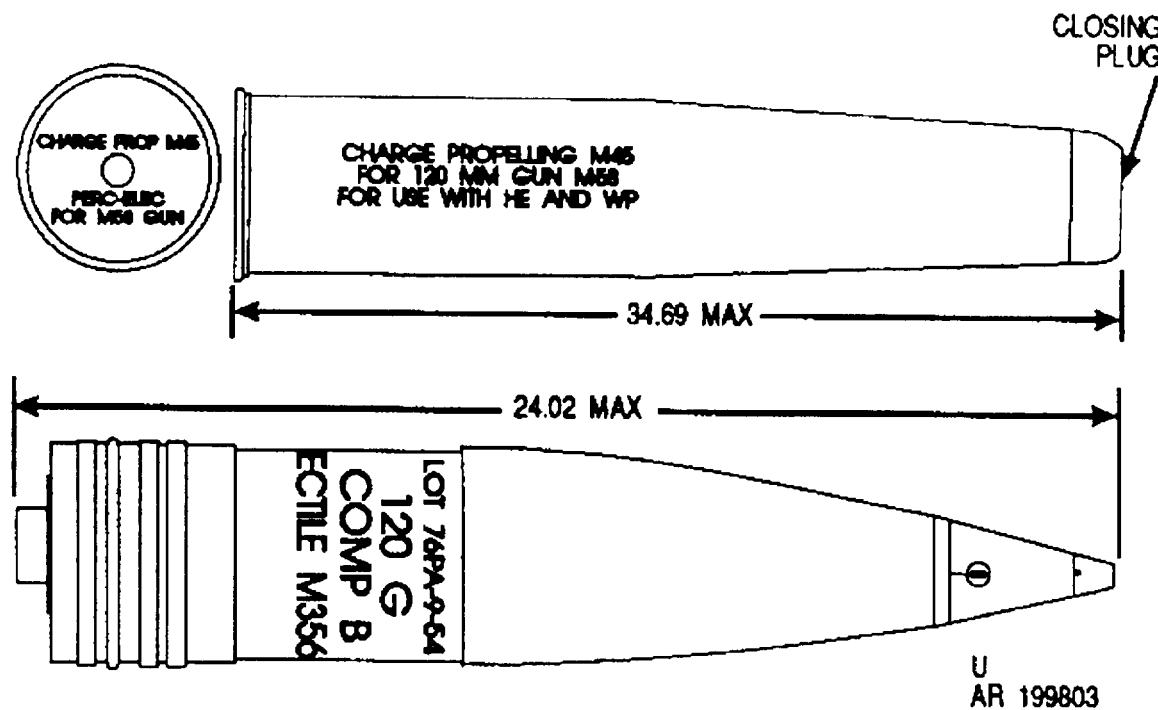
Dimensions ----- 30-1/16 x  
 7-3/8 x  
 7-7/16 in.

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

**Shipping and Storage Data:**

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

## PROJECTILE, 120-MILIMETER: HE-T, M356 (T15E3)

**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:**

<b>Projectile w/fuze:</b>	
Type -----	HE-T
Weight -----	50.41 lb
Length -----	24.02 in.
Cannon used with -----	M58
Body material -----	Steel
Color -----	Olive drab w/yellow marking
Filler and weight -----	Composition B, 7.84 lb
Propelling charge assembly weight -----	38.75 lb
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, M572
Performance:	
Maximum range -----	18,206 m (19,910 yd)
Muzzle Velocity -----	760 mps (2,500 fps)

### **Temperature Limits:**

Firing:	
Lower limit -----	-40°F (-40°C)
Upper limit -----	+ 125°F (+52°C)
Storage:	
Lower limit -----	-80°F (-62.2°C) (for period not more than 3 days)
Upper limit -----	+ 160°F (+ 71.1°C)(for period not more than 4 hr/day)
*Packing -----	Projectile and propelling charge in separate fiber containers; 2 fiber containers (1 round) per wooden box

*Packing Box:	
Weight -----	142.65 lb
Dimensions -----	41 x 10-27/32 x 15-9/16 in.
Cube -----	3.9 cu ft.

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

### **Shipping and Storage Data:**

UNO serial number -----	0321
DOD hazard class -----	(18) 1.2
Storage compatibility group --	E
DOT shipping class -----	A
DOT designation -----	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC -----	1315-CS00
Drawing number -----	8822495

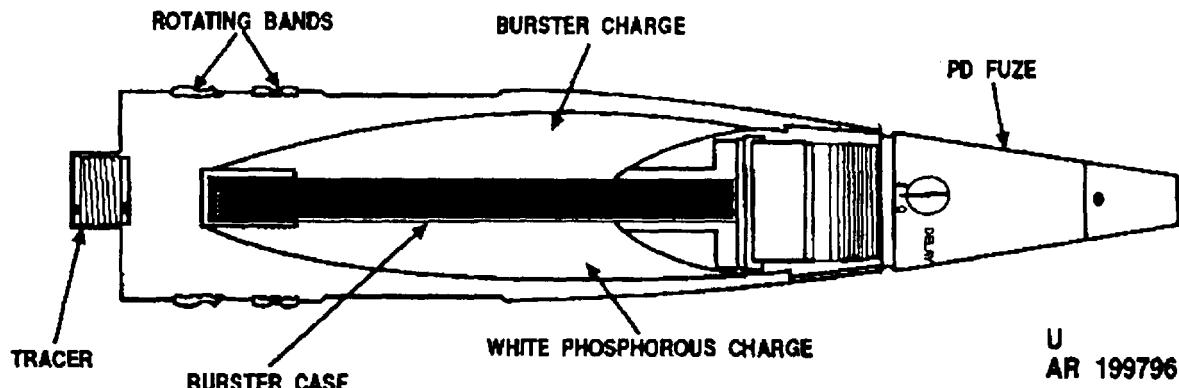
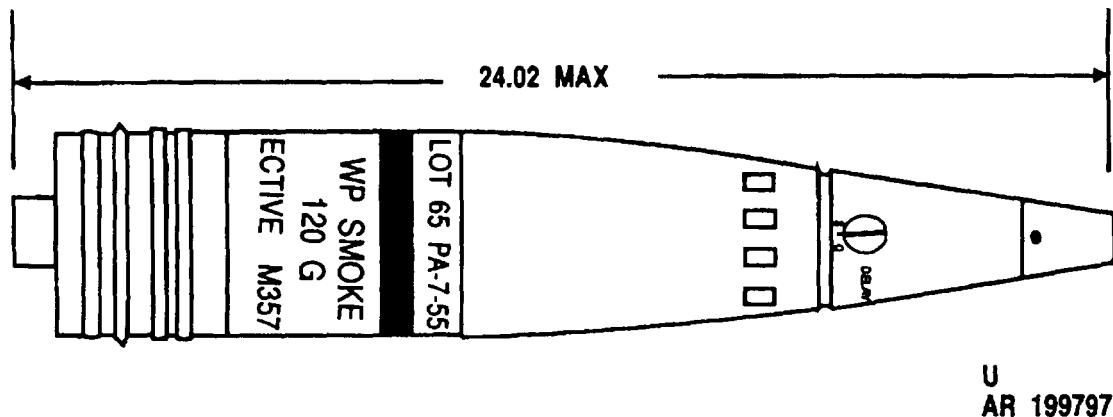
### **Limitations:**

None.

### **References:**

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

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

**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 forged steel body fuzed with a point-detonating (PD) fuze. Assembled to the projectile are two gilding metal rotating bands forward of the base. A boss containing a tracer is threaded into the base. A burster casing is press-fitted into 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 lb  
 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 phosphorous (WP) 7.5 lb

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,  
                   M520 series,  
                   M564, M572

Performance:  
 Maximum range ----- 18,206 m  
                   (19,910 yd)  
 Muzzle velocity ----- 760 mps (2,500  
                   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 ----- + 125°F (+52°C)

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

\*Packing Box:  
 Weight ----- 142.65 lb  
 Dimensions ----- 41 x 10-27/32 x  
                   15-9/16 in.  
 Cube ----- 3.9 cu ft

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

**Shipping and Storage Data:**

UNO serial number ----- 0245  
 DOD hazard class ----- (12) 1.2  
 Storage class/SCG ----- H  
 DOT shipping class ----- A  
 DOT designation ----- AMMUNITION  
                   FOR CANNON  
                   WITH  
                   EXPLOSIVE  
                   PROJECTILE  
 DODAC ----- I315-C806  
 Drawing number ----- 8826688

**Limitations:**

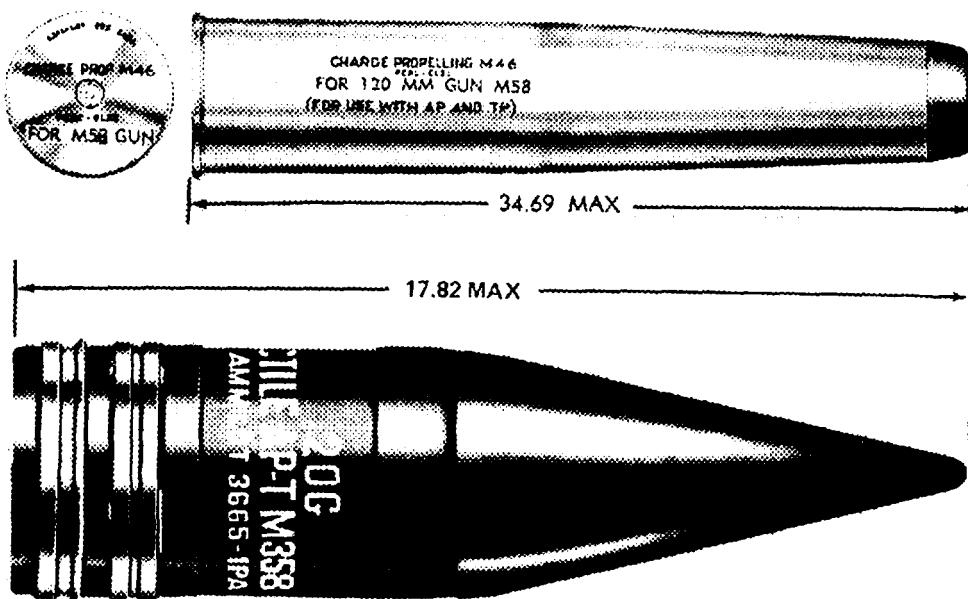
Since the burster in the ammunition is loaded with tetrytol, it should not be stored or fired at temperatures exceeding +125°F.

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 resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

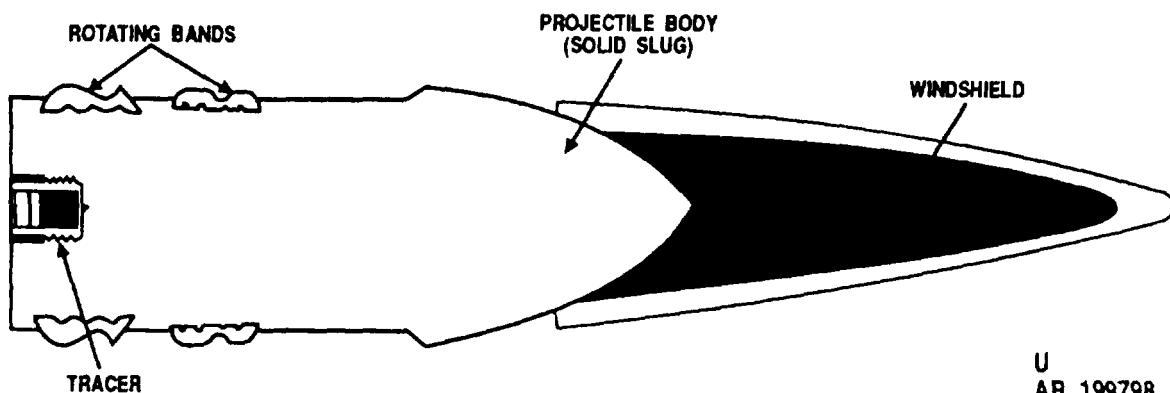
**References:**

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

## PROJECTILE, 120-MILLIMETER: AP-T, M358



AR 199799

U  
AR 199798Type 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 ogive 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. Upon 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 lb
Length -----	17.82 in.
Cannon used with -----	M58

**Projectile:**

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

**Components:**

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

**Performance:**

Maximum range -----	23,683 m (25,290 yd)
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 hr/day)
*Packing -----	Projectile and propelling charge assembly in separate fiber containers; 2 fiber containers (1 round) per wooden box
*Packing Box:	
Weight -----	152.011>
Dimensions -----	41 x 10-27/32 x 15-9/16 in.
Cube -----	3.9 cu ft

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

**Shipping and Storage Data:**

UNO serial number -----	0242
DOD hazard class -----	1.3
Storage compatibility -----	C
DOT shipping class -----	B
DOT designation -----	AMMUNITION FOR CANNON WITH SOLID PROJECTILE
DODAC -----	1315 -C802
Drawing number -----	7548465

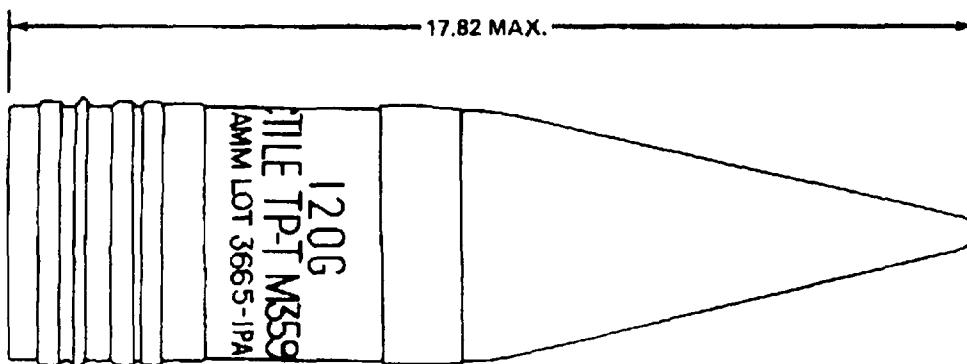
**Limitations:**

None.

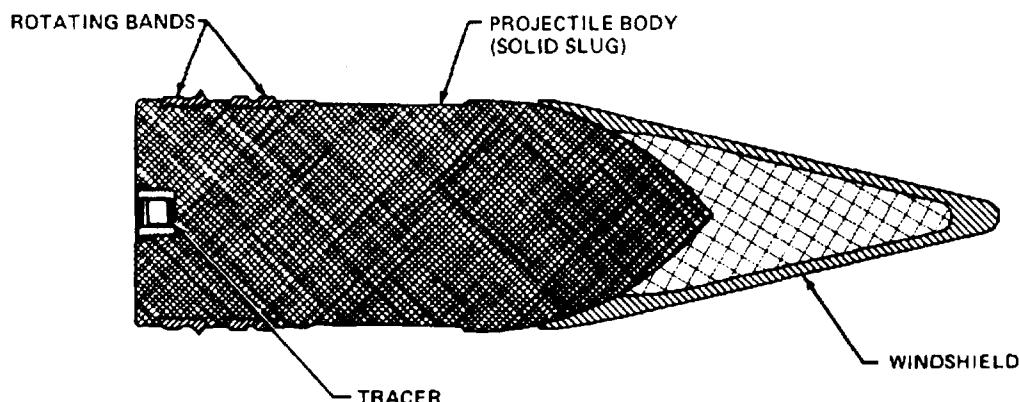
**References:**

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

## PROJECTILE 1209 MILLIMETERS: TP-T, M359E2 (T14E7)



AR199795



AR199794

Type Classificatin:

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 lb  
 Length ----- 17.82 in.  
 Cannon used with ----- M58  
 Body material ----- Low-strength carbon steel  
 Color ----- Blue w/white marking

## Components:

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

## Performance:

Maximum range ----- 23683 m  
 (25,290 yd)  
 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 hr/day)

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

\*Packing Box:  
 Weight ----- 152.0 lb  
 Dimensions ----- 41 x 10.27/32 x 15-9/16 in.  
 Cube ----- 3.9 cu ft

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

**Shipping and Storage Data:**

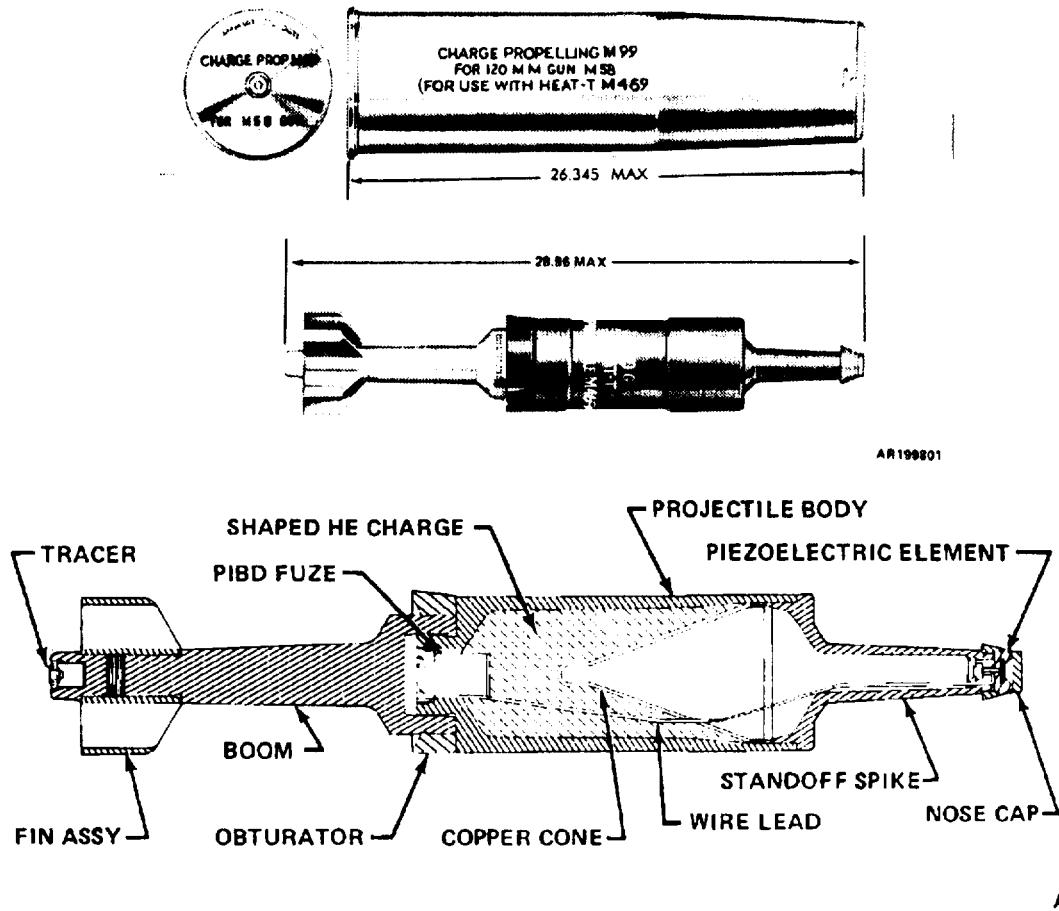
UNO serial number ----- 0242  
 DOD hazard class ----- 1.3  
 Storage compatibility ----- C  
 DOT shipping class ----- B  
 DOT designation ----- AMMUNITION FOR CANNON WITH SOLID PROJECTILE  
 DODAC ----- 1315-C804  
 Drawing number ----- 7548465

**Limitations:**

None.

**References:**

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

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

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 distance 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 bore and ignite the tracer. The tracer provides a visible and trace for approximately three seconds or to 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:

Type ----- HEAT-T  
 Weight ----- 31.11 lb  
 Length ----- 28.96 in.  
 Cannon used with ----- M58

## Projectile:

Body material ----- Steel  
 Color ----- Black w/yellow marking  
 Filler and weight ----- Comp B, 4.51 lb

## Components:

Propelling charge assembly- M99 (T42E1)  
 Cartridge case ----- Mill  
 Propellant ----- M6 (221b)  
 Primer ----- M96, percussion  
 Tracer ----- M13 series  
 Fuze ----- PIBD-M509A1

## Performance:

Maximum range ----- 23,683 m  
 (25,290 yd)  
 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 hr/day)

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

\*Packing Box:  
 Weight ----- 115 lb  
 Dimensions ----- 35-1/2 x 10-27/32 x 15-3/16 in.  
 Cube ----- 3.4 cu ft

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

**Shipping and Storage Data:**

UNO serial number ----- 0006  
 DOD hazard class ----- 1.1  
 Storage compatibility ----- E  
 DOT shipping class ----- A  
 DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE  
 DODAC ----- 1315-C807  
 Drawing number ----- 8840529

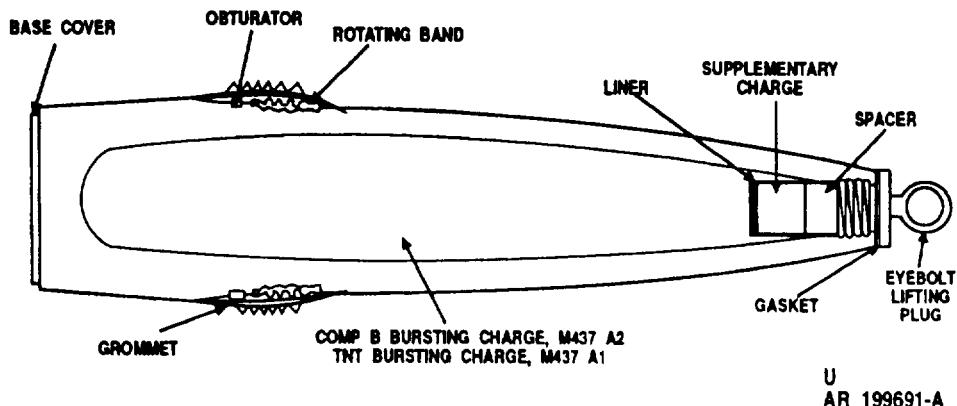
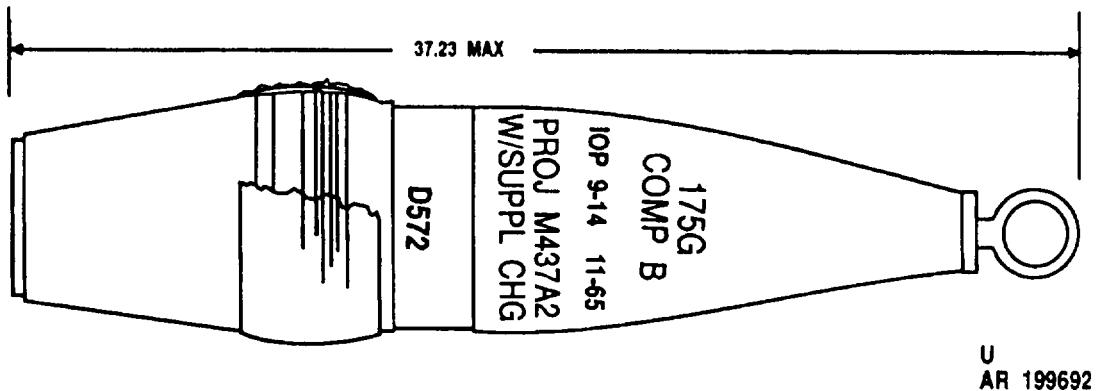
**Limitations:**

None.

**References:**

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

## PROJECTILES, 175-MILLIMETER: HE, M437A2 AND M437A1



**Type Classification:**

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

**Use:**

These 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 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/U 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 (-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 ----- 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 DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

#### **Shipping and Storage Data:**

UNO serial number ----- 0168  
DOD hazard class ----- (21) 1.1  
Storage compatibility group -- D  
DOT shipping class ----- A  
DOT designation ----- EXPLOSIVE  
PROJECTILE  
DODAC ----- 1320-D572  
(M437A2,  
M437A1) w/sup-  
plementary  
charge; 1320-  
D591 (M437A1,  
M437A2 w/o  
supplementary  
charge)  
Assembly drawing number --- 8837902

#### **Ballistics: (M113 and M113A1 Cannons)**

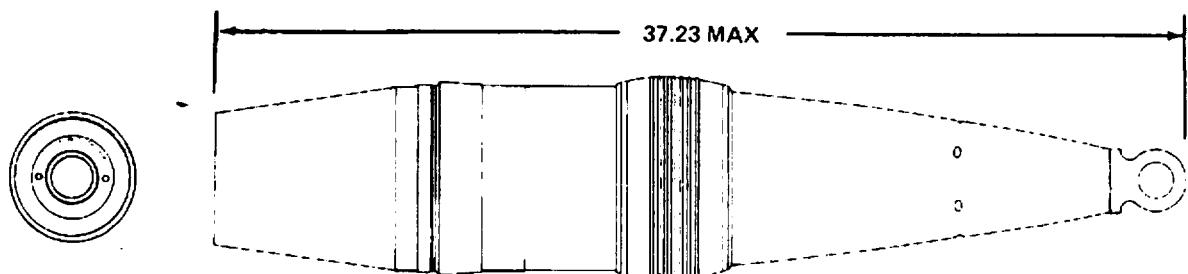
Charge	Muzzle Velocity (fps)	Maximum Range (yd)	Maximum Range (m)	Chamber Pressure (psi)
*1	1675	16,515	15,100	10,100
2	2310	24,200	22,100	20,200
3	3000	35,800	32,700	45,700

\*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.

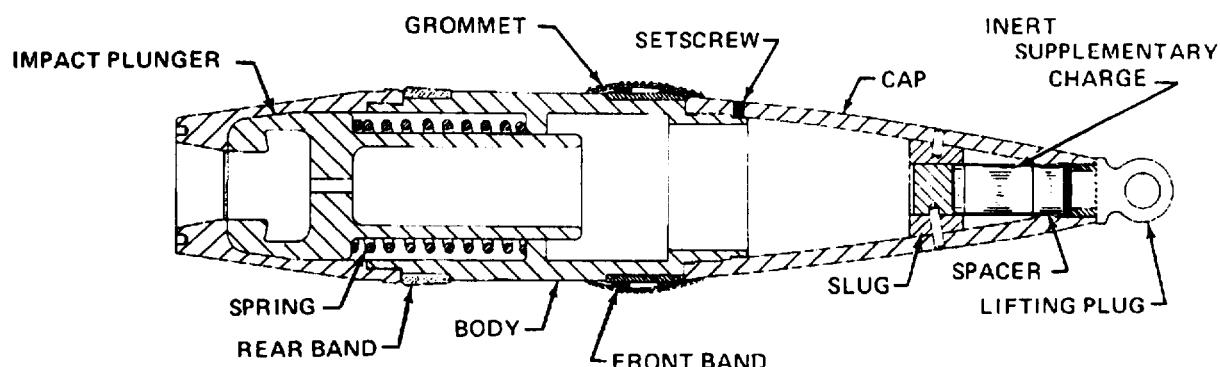
#### **References:**

AMC-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

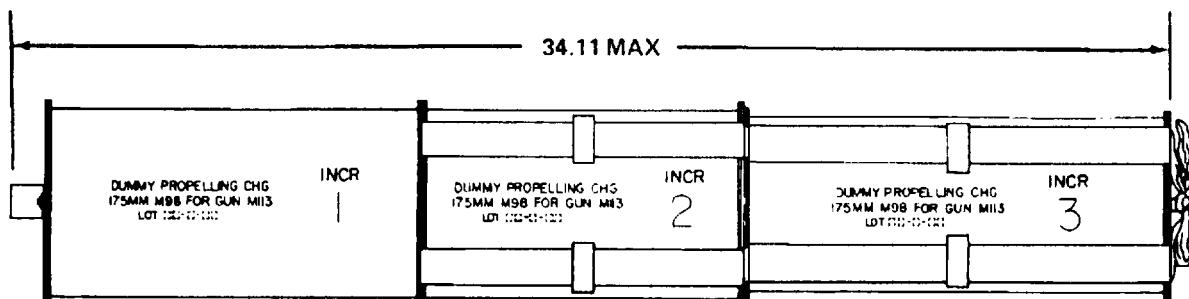
**PROJECTILE, 175-MILLIMETER: DUMMY, M458 WITH CHARGE, PROPELLING:  
DUMMY M98**



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 lb
M98 -----	57 lb
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 drawing number:	
M458 -----	11.5656
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 containers in wooden box

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

*Packing Box:	
Weight -----	114 lb
Dimensions -----	55 x 9- 13/16 x 8-7/32 in.
Cube -----	3.45 cu ft

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

Shipping and Storage Data:

UNO serial number -----	N/A
DOD hazard class -----	N/A
Storage compatibility group --	N/A
DOT shipping class -----	N/A
DOT designation -----	AMMUNITION NON-EXPLO- SIVE

DODAC:	
M458 -----	1320-D709
M98 -----	1320-D535

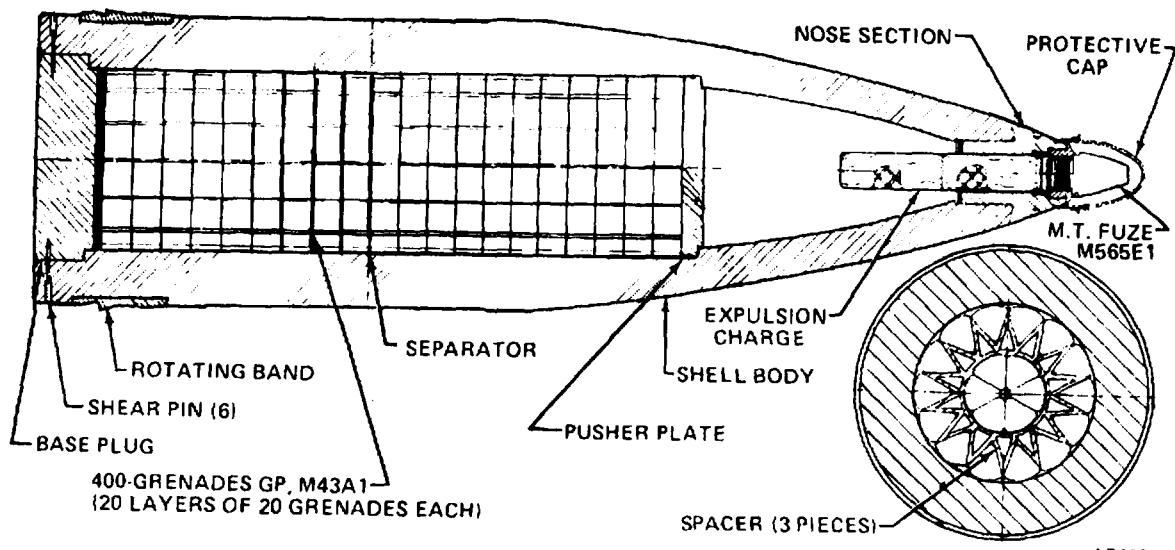
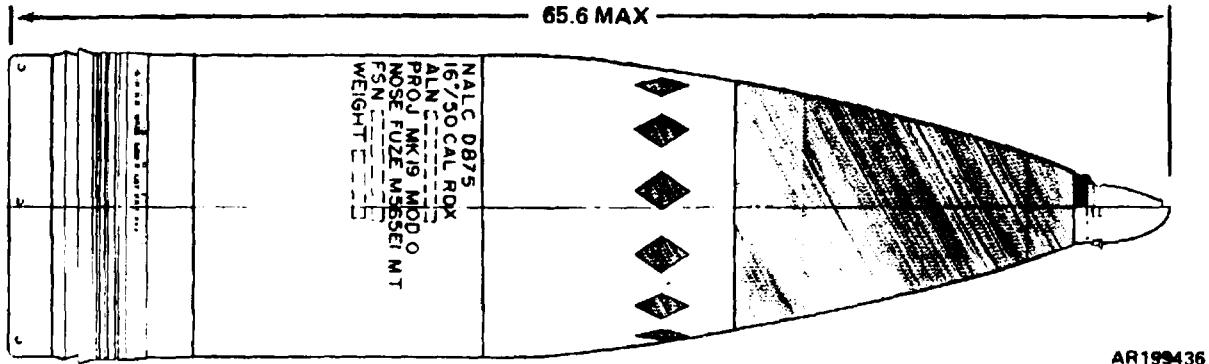
Ballistics:

Not Applicable.

References:

SB 700-20  
AMC-P 700-3-3  
TM 9-2300-216-10

# **PROJECTILE, 16-INCH: HE, MK19 MOD 0**



## 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 expulsion charge. The expulsion charge consists of 400 grams of M9 mortar propellant. The MT fuze and shims are shipped 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 breech block 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 lb
Length -----	65.6 in.
Cannon used with -----	Naval Rifle, 16-inch/50

## Projectile:

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

Filler and weight -----	Explosive Comp A5, 19 lb
-------------------------	-----------------------------

Fuze -----	MT, M565E1
------------	------------

## Propelling charge:

Type -----	SPD
------------	-----

## Weight:

Service -----	660 lb
Reduced -----	315 lb
Primer -----	Standard, 16-in.

## Performance:

Maximum range -----	36,576 m (40,000 yd)
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 2 projectiles -----	MK 3 MOD 0
Pallet adapter -----	MK 88 MOD 0

## \*Pallet:

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

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

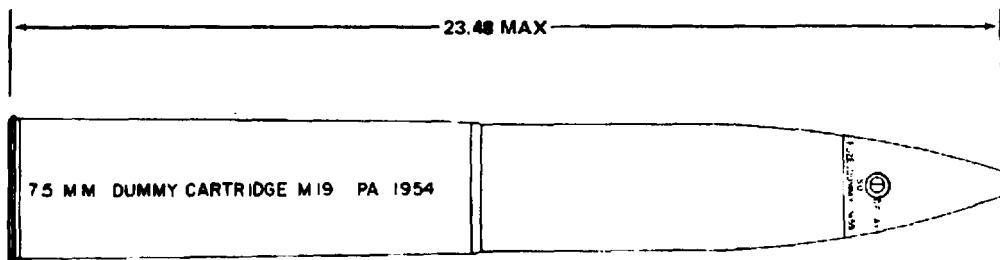
**Shipping and Storage Data:**

UNO serial number -----	0169
DOD hazard class -----	(18) 1.2
Storage compatibility group --	D
DOT shipping class -----	A
DOT designation -----	EXPLOSIVE PROJECTILE
DODAC -----	1320-D875
Drawing number -----	9235148

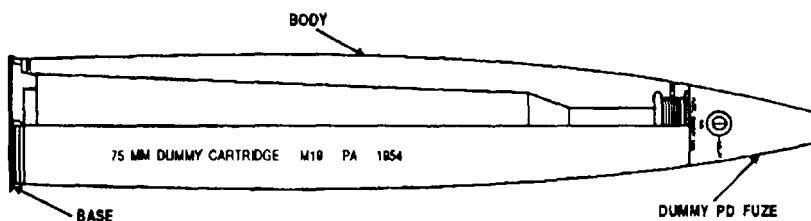
## **CHAPTER 3**

### **AMMUNITION FOR HOWITZERS**

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**CARTRIDGE, 75-MILLIMETER: DUMMY, M19 OR M19B1**

AR199745

U  
AR 199744**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 lb
Length -----	23.48 in.
Cannon used with -----	M1A1

## Projectile:

## Body material:

M19-----	Iron
M19B1 -----	Bronze

## 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 lb  
Dimensions ----- 28-11/16 x  
9-11/16 x  
6-15/32 in.  
Cube ----- 1.04 cu ft

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

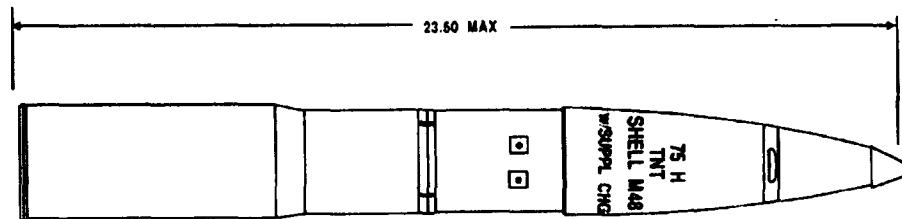
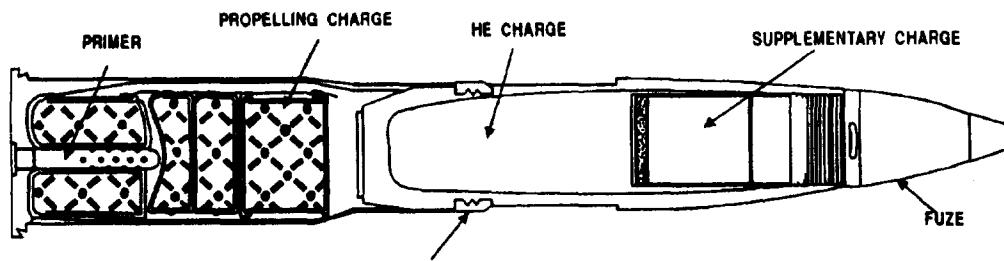
**Shipping and Storage Data:**

DOT desiccation ----- DRILL  
CARTRIDGES  
INERT  
DODAC ----- 1315-C033  
Drawing number ----- 72-3-8

**References:**

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

## CARTRIDGE, 75-MILLIMETER HE, M48

U  
AR 199747U  
AR 199746Type 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 lb
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 lb

**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:**

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

**Storage:**

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

**\*Packing -----**

	1 round per fiber container; 2 fiber contain- ers per wooden box
--	--

**\*Packing Box:**

Weight -----	53.0 lb
Dimensions -----	27-15/16 x 9-5/8 x 6-11/32 in.
Cube -----	1.01 cu ft

**\*NOTE:** See DOD Consolidated Ammunition Catalog 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-C027 - w/PD fuze, 1315-C028 - w/o fuze
UNO serial number -----	0321
UNO proper shipping name ---	Cartridges for weapons
Drawing number -----	75-1-59

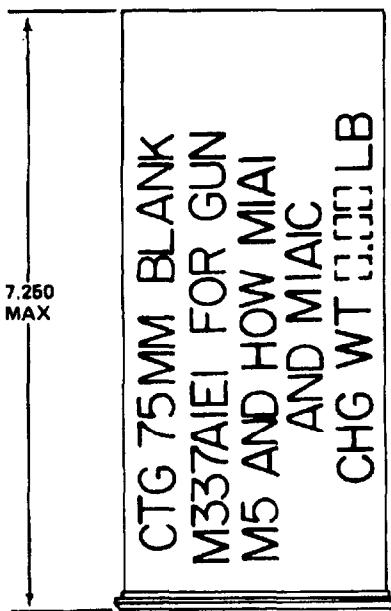
#### **Operational Characteristic**

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:**

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

## CARTRIDGE, 75-MILLIMETER: BLANK, M337A2 (M337A1E1), M337A1 AND M337



AR199867

Type Classification:

Std AMCTC 4371 dtd 1966 (M337A2)  
CON MSR 11756003 (M337A1) Std OTCM  
36841 dtd 1958 (M337)

Use:

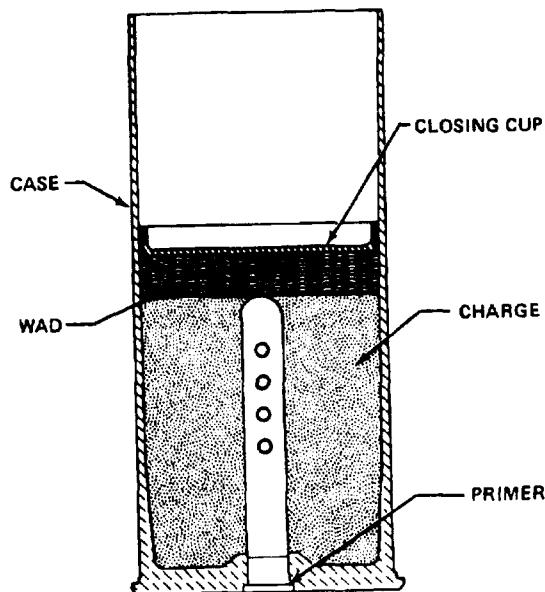
These cartridges are provided for saluting and simulated firing.

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.



AR199866

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 lb
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 (modified)
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 hr/day)
*Packing -----	1 round per fiber container; 15 containers per wooden box
*Packing Box:	
Weight -----	74 lb
Dimensions-----	22-13/16 x 13- 7/18 x 10- 17/32 in.
Cube-----	1.9 cu ft

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

**Shipping and Storage Data:**

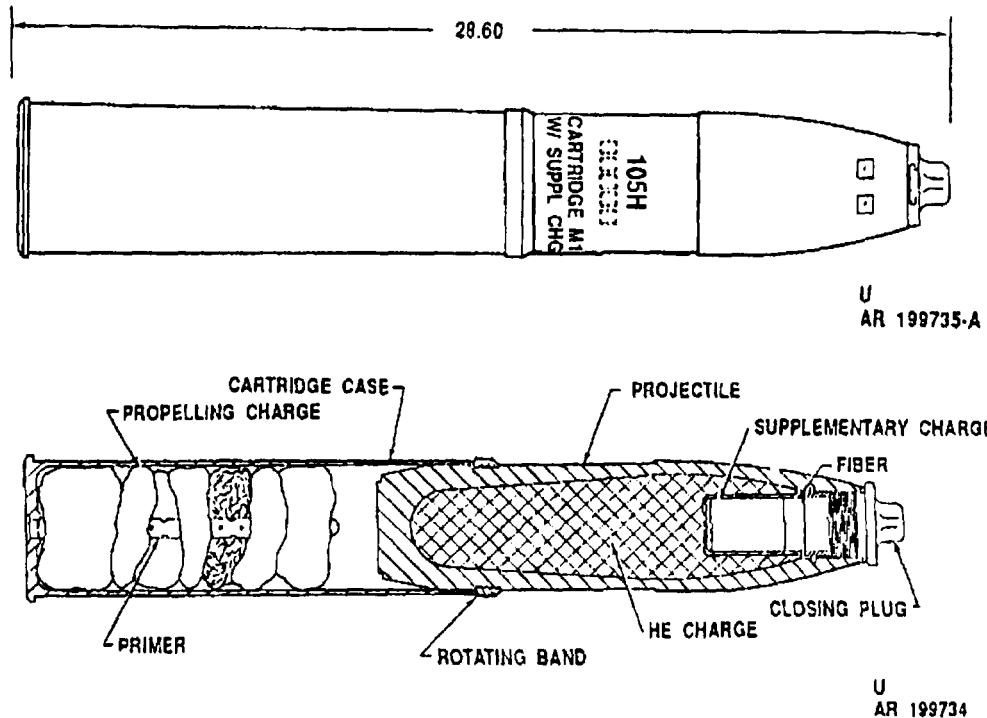
Quantity-distance class -----	4
Storage compatibility	
group-----	E
DOT shipping class-----	B
DOT description-----	AMMUNITION FOR CANNON WITHOUT PROJECTILES
DODAC -----	1315-C025
UNO serial number -----	0327
UNO proper shipping name ---	Cartridges for weapons, blank
Drawing number -----	7549273

**Limitations:**

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

**References:**

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

**CARTRIDGE, 105-MILLIMETER: HE, M1****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 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 28.60 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/yellow 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 Zone:

Loaded Shell W/Suppl Charge (without fuze)	up to & Over Incl	Zones	Marking
Pounds	lb		
29.90	30.60	1	<input checked="" type="checkbox"/>
30.50	31.20	2	<input type="checkbox"/> <input checked="" type="checkbox"/>
31.10	31.80	3	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>

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

Components:

Incre- ment No.	Prop & Type	Comp	Web in. approx	Size	Wt. oz. Approx
1	M1, Type H	0.014		8.6 Single Perf	
2	M1, Type II	0.014		1.4 Single Perf	
3	M1, Type I	0.026		2.5 Multi Perf	
4	M1, Type I	0.026		3.8 Multi Perf	
5	M1, Type I	0.026		5.8 Multi Perf	
6	M1, Type I	0.026		8.8 Multi Perf	
7	M1, Type I	0.026		14.3 Multi Perf	

Weight, Total Incre-  
ments 1-7 ----- 2.83 lb

Percussion primer assembly:

	M28A2	M28B2
Primer Black powder	M61	M61
	Cl 1, Spec MIL-P-223 (Note B)	Cl 1, Spec MIL-P-223 (Note B)
Weight (lb) (primer) (BP)	0.00014 0.043	0.00014 0.043
Body	Brass, Type 1	Steel. Type 2

Fuzes ----- PD: M557 M78,  
Series; M739  
Series; MTSQ:  
M582 Series;  
M564; prox:  
M513 series,  
M728, M732  
series, ET:  
M767

**Performance:**

Using M52, M52A1 and M101/M101A1 howitzers:

Muzzle Charge (fps)	Velocity (mps)	Maximum (m)	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 m  
(12,330 yd)  
Muzzle velocity ----- 472.4 mps  
(1550 fps)

Using M102 and M108 howitzers:

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

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

**Temperature Limits:****Firing:**

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

**Storage:**

Lower limit----- -80°F (for peri-  
ods not exceed-  
ing 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 DOD Consolidated Ammunition  
Catalog 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  
PROJECTILES  
Drawing number ----- 9211611  
(shipped with-  
out fuze)  
DODAC ----- 1315-C444,  
(when cartridge  
is shipped with  
either a PD or  
MTSQ fuze)  
DODAC ----- 1315-C445  
UNO serial number ----- 0321  
UNO proper shipping name --- Cartridges for  
weapons

**Limitations:**

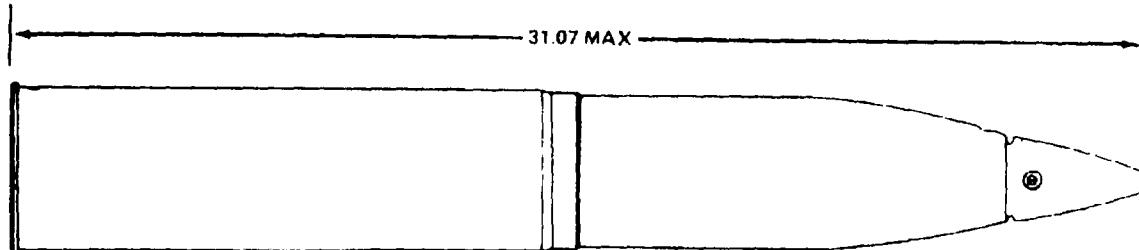
For proximity mode, VT M513 proximity  
fuzes are limited to Zones 2 through 6. Zone 7  
in combat emergency only. For Impact Action,  
Zones 4 through 6 only.

VT Fuze M728, for proximity or impact  
action, Zones 1 through 6. Zone 7 for proximity  
action only in a combat emergency.

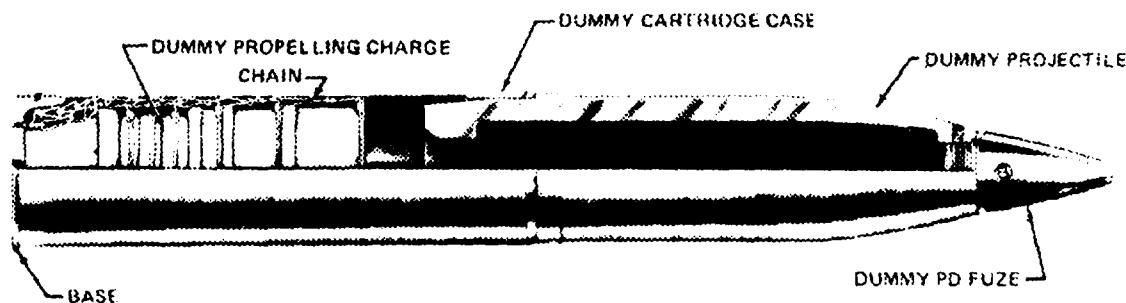
**References:**

SB 700-20  
AMC-P 700-3-3  
TM 9-1015-203-12  
TM 9-1015-234-10  
TM 9-1300-251-20

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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 lb
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 cast- ing
---------------------	--

Color:  
 Old ----- Black or blue  
           w/white markings  
 New ----- Bronze w/white markings  
 Faze ----- 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 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

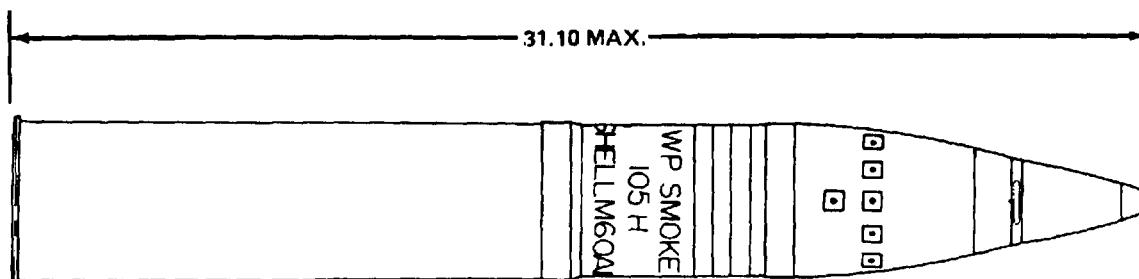
\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

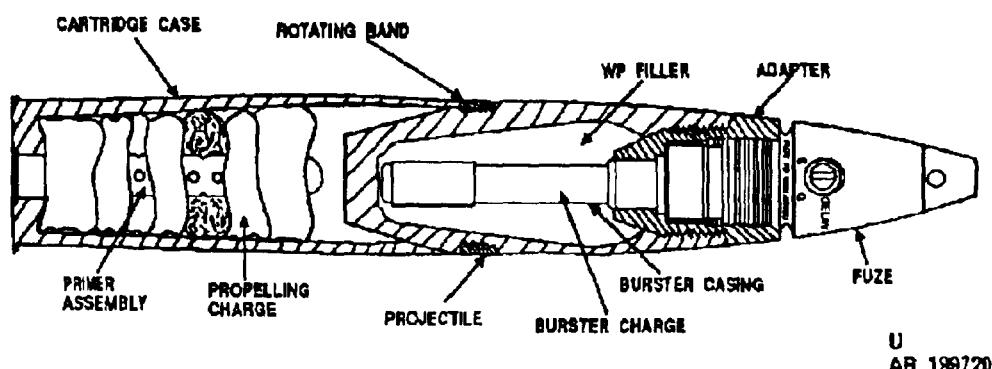
DOT designation ----- DRILL  
 CARTRIDGE  
 INERT  
 DODAC ----- 1315-C458  
 Drawing number ----- 72-3-78

**References:**

SB 700-20  
 AMC-P 700-3-3  
 TM 9-1015-203-12  
 TM 9-1015-234-10  
 TM 9-1300-251-20

**CARTRIDGE, 105-MILLIMETER: SMOKE, WP, M60 SERIES**

AR199721

U  
AR 199720**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 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 incre-

ments. 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:**

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 Between Models:

Model	Burster Casing Material	Burster Model No.	Burster Expl Comp	Burster Fuze
M60	Steel	M5	Tetrytol	PD M557
M60A1	High strength aluminum	M53	Comp B	PD M557, MTSQ M564, M582, ET M767
M60A2	High strength (XM53E1) aluminum	M53A1	Comp B5	PD M557, MTSQ M564, M582, ET M767

### 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)

Zone	Over	Up to & Incl	Marking
3	31.1	31.8	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
4	31.7	32.4	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
5	32.3	33.0	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
6	32.9	33.8	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Fuze ----- PD, M557 or M739

#### Cartridge case: Model Matl Wt (1b) (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 & Type	Comp	Web in.Approx	Size Approx	Wt oz	Perf Approx
1	M1,Type II		0.014	8.6	Single	
2	M1,Type II		0.014	1.4	Single	
3	M1,Type I		0.026	2.5	Multi	
4	M1,Type I		0.026	3.8	Multi	
5	M1,Type I		0.026	5.8	Multi	
6	M1,Type I		0.026	8.8	Multi	
7	M1,Type I		0.026	14.3	Multi	

#### Weight, Total Increments 1-7 ----- 2.83 lb

#### Percussion Primer Assembly:

	M28A2	M28B2
Primer	M61	M61
Black powder	C1 1,Spec MIL-P-223 (Note B)	C1 1,Spec MIL-P-223 (Note B)

**Percussion Primer Assembly: (cont)**

	<b>M28A2</b>	<b>M28B2</b>
Weight (lb) (primer)	0.00014	0.00014
(BP)	0.043	0.043
Body	Brass, Type 1 Steel, Type 2	

**Performance:**

For M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle Velocity (mps)	Velocity (fps)	Maximum (m)	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 m

(12,330 yd)

Muzzle velocity ----- 472 mps (1550  
fps)

For M102 and M108 howitzers:

Charge	Muzzle Velocity (mps)	Velocity (fps)	Maximum (m)	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 m  
(12,590 yd)Muzzle velocity ----- 494 mps (1621  
fps)**Temperature Limits:**

Firing:	<u>M60</u>	<u>M60A1</u>	<u>M60A2(E3)</u>
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

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

**Shipping and Storage Data:**

Quantity-distance class -----	(12) 1.2
Storage compatibility group ---	H
DOT shipping class -----	C
DOT designation -----	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC -----	1315-C454
UNO serial number -----	0245
UNO proper shipping name ---	Ammunition smoke white phosphorus
Drawing number -----	9216521

**Limitations:**

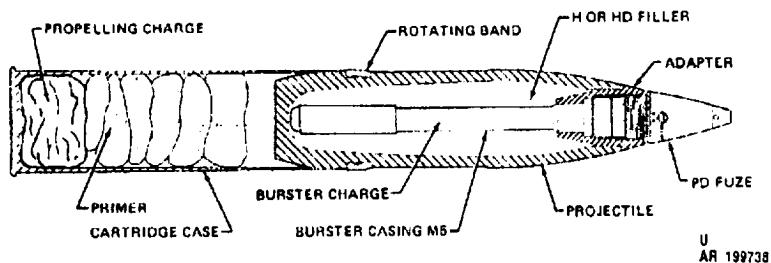
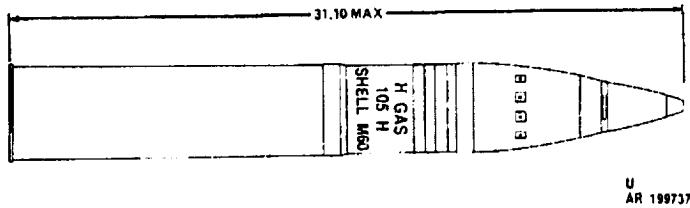
All models: this cartridge should be stored or transported at temperatures below the melting point (+111.4°F) of the WP filler, because of possible cavitation in the filler from melting and resolidification in the projectile cavity. If this is not practicable, the cartridge should be transported or stored with the nose end up to prevent cavitation.

For M60 only: the burster casing in this cartridge contains tetrytol and should not be transported, stored or fired at temperatures exceeding +125°F.

**References:**

SB 700-20  
AMC-P 700-3-3  
TM 9-1015-203-12  
TM 9-1015-234-10  
TM 9-1300-251-20

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**CARTRIDGE, 105-MILLIMETER AGENT, H OR HD, M60****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. 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 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, M51A5,

**WEIGHT ZONES**  
**LOADED SHELL W/BURSTER CHARGE**  
**W/O FUZE**

Zone	Over lb	Up to & Incl	Marking
2	30.5	31.2	<input type="checkbox"/> <input checked="" type="checkbox"/>
3	31.1	31.8	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
4	31.7	32.4	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>

Propelling charge:

Cartridge case	M14 series
Propellant	M67, 2.825 lb
Primer	M28A2, or M28B2

Performance:

For M52, M52A1 and M101/M101A1 howitzers:

Charge (mps)	Muz- zle (fps)	Velo- city (fps)	Maxi- mum (m)	Range and (yd)	Eleva- tion (mil)	An- gle (deg)
1	198.1	650	3,510	3,840	782	44.0
2	216.4	710	4,110	4,495	780	43.9
3	237.7	780	4,860	5,315	774	43.6
4	266.7	875	5,950	6,505	784	44.1
5	310.9	1,020	7,650	8,370	771	43.4
6	376.4	1,235	9,380	10,260	779	43.8
7	472.4	1,550	11,270	12,330	783	44.0

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

For M102 and M108 howitzers:

Charge (mps)	Muz- zle (fps)	Velo- city (fps)	Maxi- mum (m)	Range and (yd)	Eleva- tion (mil)	An- gle (deg)
1	205	673	3,700	4,040	689.6	38.7
2	223	732	4,300	4,700	694.1	39.0
3	247	810	5,200	5,690	742.7	41.7
4	278	912	6,300	6,890	687.2	38.6
5	325	1,066	8,100	8,500	702.0	39.5
6	393	1,289	9,600	10,500	734.2	41.3
7	494	1,621	11,500	12,590	728.4	40.9

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

\*NOTE: Renovated or newly manufactured projectiles will be marked with one colored dark green band and, if burstered, one yellow band.

**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 DOD Consolidated Ammunition Catalog 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-C442
UNO serial number	0020
UNO proper shipping name	Ammunition, toxic
Drawing Number	75-1-109

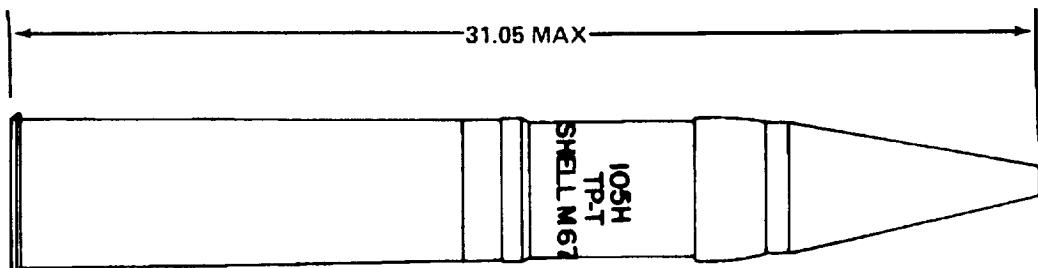
**Limitations:**

The burster in this ammunition is loaded with tetrytol and may not be stored or fired at temperatures exceeding + 125°F.

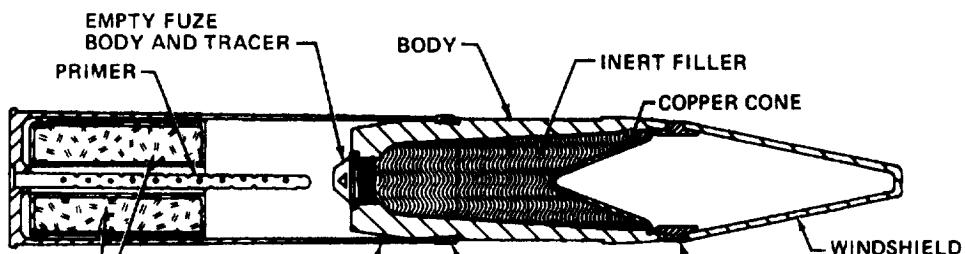
**References:**

AMC-P 700-3-3  
SB 700-20  
TM 9-1015-203-12  
TM 9-1015-234-10  
TM 9-1300-251-20

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**CARTRIDGE, 105-MILLIMETER TP-T, M67**

U  
AR 199715

**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 incre-

ment. 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 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 peri- ods not exceed- ing 3 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	120 lb
Dimensions	37-1/4 x 11- 15/16 x 7-19/32 in.
Cube	2.0 cu ft

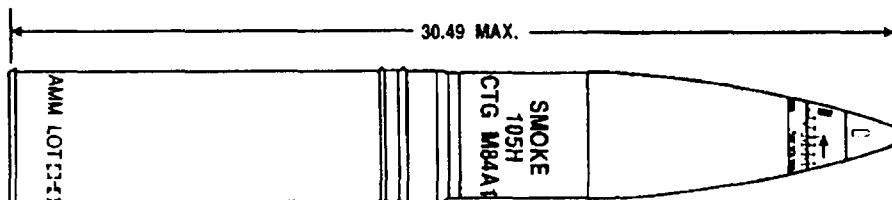
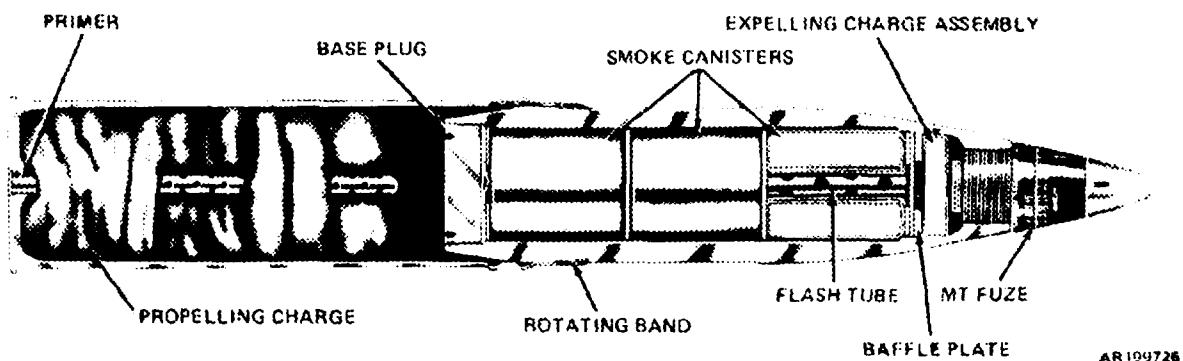
\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

Quantity-distance class	(08) 1.2
Storage compatibility group	C
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITH INERT- LOADED PROJECTILES
DODAC	1315-C457
UNO serial number	0328
UNO proper shipping name	Cartridges for weapons, inert projectile
Drawing number	75-1-491/75-1- 191

**References:**

- AMC-P 700-3-3
- SB 700-20
- TM 9-1015-203-12
- TM 9-1015-234-10
- TM 9-1300-251-20

**CARTRIDGE, 105-MILLIMETER: SMOKE HC, BE, M84 SERIES**U  
AR 199727**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, gilding 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 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 M84B1, HC or other colored smoke. 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 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 expan-

sion 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 Between Models:

	M84	<u>M84B1</u>	<u>M84A1</u>
Body forging	Transom below Fuze Thd	Transom below Fuze Thd	No transom Fuze Thd
Expelling charge	BP in cloth bag	BP plastic cup encased	BP in plastic cylinder
Nose Thd	1.7 x 14 TPI	1.7x 14 TPI	2 x 12 TPI
Fuze	MTSQ M501 M501A1	MTSQ M501 M501A1	MTSQ, M577, M548; MT, M565; ET, M762
Spacers	Chipboard	Chipboard	Aluminum
Filler	Chipboard	Chipboard	Felt
Colors available	HC, red, yellow, green	HC, red, yellow, green	HC, red, yellow, green

#### Tabulated Data:

Complete round:	Type	Smoke, HC
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

<u>Chg Wt in Oz Approx</u>	<u>Type</u>	<u>Web Approx</u>
8.6	II	0.014
1.4	II	0.014
22.5	I	0.026
3.8	I	0.026
5.8	I	0.026
8.8	I	0.026
14.3	I	0.026

Primer ----- M28B2, M28A2

#### Performance:

Using M52, M52A1 and M101/M101Al howitzers:

Charge	Muzzle Velocity (fps)	Maximum range (reps)	range (yd)
1	650	198.1	3510
2	710	216.4	4110
3	780	237.7	4860
4	875	266.7	5950
5	1020	310.9	7650
6	1235	376.4	9380
7	1550	472.4	11,270

Maximum range ----- 11,270 m  
(12,330 yd)

Muzzle velocity ----- 472.4 mps  
(1550 fps)

Using M102 and M108 howitzers:

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

Maximum range ----- 11,500 m  
(12,590 yd)

Muzzle velocity ----- 494 mps  
(1621 fps)

**Temperature Limits:****Firing:**

Lower limit-----	-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 7-19/32 in.

**\*NOTE:** See DOD Consolidated Ammunition Catalog 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 PROJECTILES

**\*\*DODAC:**

HC -----	1315-C452
Red -----	1315-C453
Yellow -----	1315-C455
Green -----	1315-C452
UNO serial number -----	0015
UNO proper shipping name ---	Ammunition, smoke
Drawing number -----	9223421-1

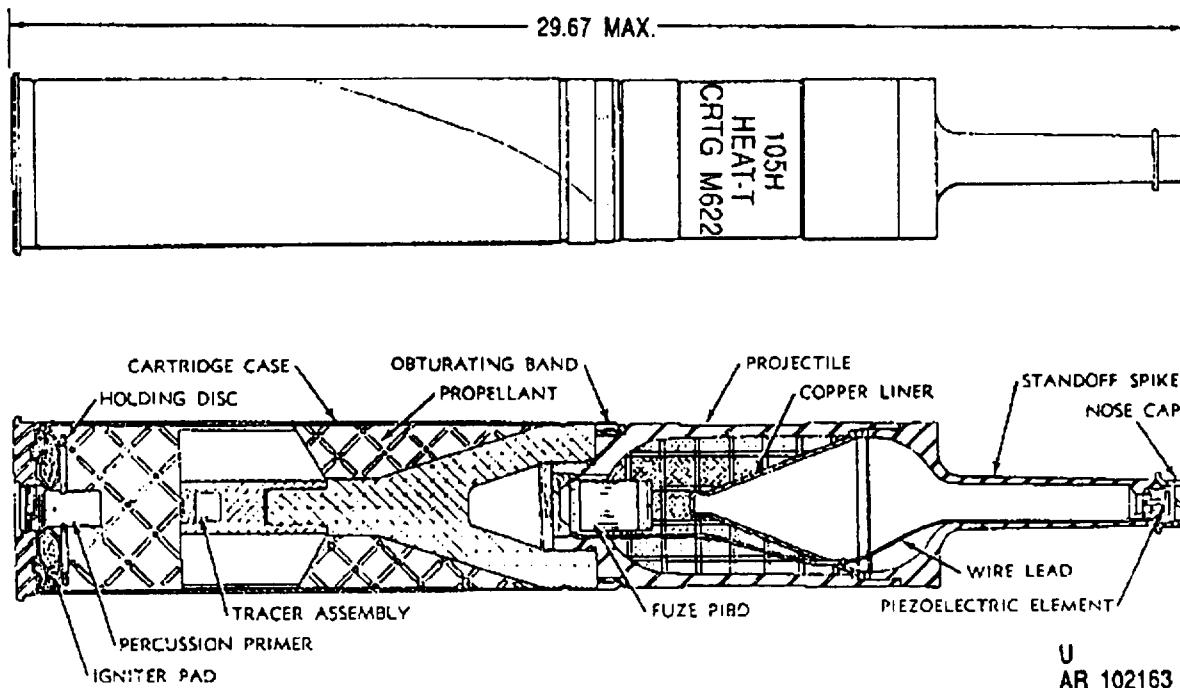
**\*\*NOTE:** Some M84A1 are issued w/o fuse  
(DODAC - 1315-C479)

**References:**

SB 700-20
AMC-P 700-3-3
TM 9-1015-203-12
TM 9-1015-234-10
TM 9-1300-251-20

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## CARTRIDGE, 105-MILLIMETER: HEAT-T, M662

**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 tin and boom assembly threaded to the rear. The loading of the projectile 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 percus-

sion primer, an igniter pad and 57 ounces 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 of propellant gas which propels the projectile out of the weapon tube. The projectile is tin 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,

**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 -----	45°F (+62.8°C)

**Storage:**

Lower limit -----	-80°F (62.2°C) (for periods not exceeding 3 days)
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 DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

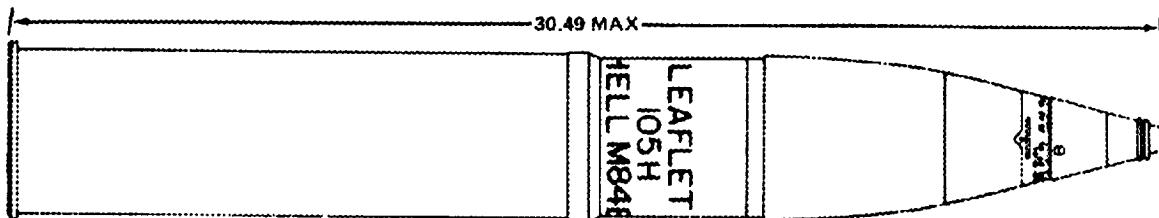
#### **Shipping and Storage Data:**

Quantity-distance class -----	(12) 1.2
Storage compatibility group ---	E
DOT shipping class -----	A
DOT designation -----	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC -----	1315-C472
Drawing number -----	9282517

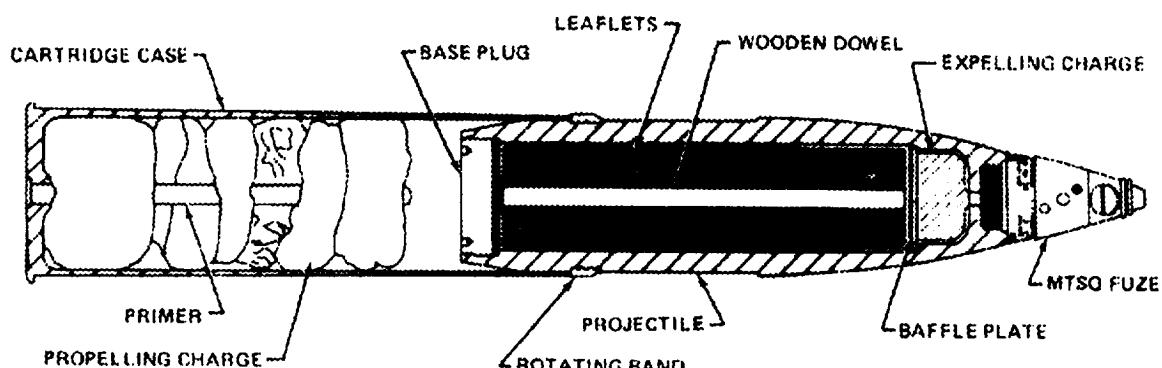
#### **References:**

AMC-P 700-3-3

## CARTRIDGE, 105-MILLIMETER: LEAFLET, M84B1



AR199708



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 for civilians.

**Description**

The projectile body consists of a hollow steel forging with a boattail base, a streamlined ogive, gilding metal rotating band, and steel base lug 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 func-

tions 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 lb
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 M501A1

##### Propelling charge:

Cartridge case .....	M14B1, M14B4
Model .....	M67

##### Components:

Incre- ment No.	Prop & Type	Comp	Web size in. approx	Wt oz approx	Perf
1	M1, Type II		0.014	8.6	Single
2	M1, Type II		0.014	1.4	Single
3	M1, Type I		0.026	2.5	Multi
4	M1, Type I		0.026	3.8	Multi
5	M1, Type I		0.026	5.8	Multi
6	M1, Type I		0.026	8.8	Multi
7	M1, Type I		0.026	14.3	Multi

Weight, Total Increments 1-7    2.83 lb  
Primer .....

#### Performance:

Maximum range .....	9943 yd
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 lb
Dimensions .....	37-1/4 x 11-15/16 x 7-19/32 in.
Cube .....	2.0 cu ft

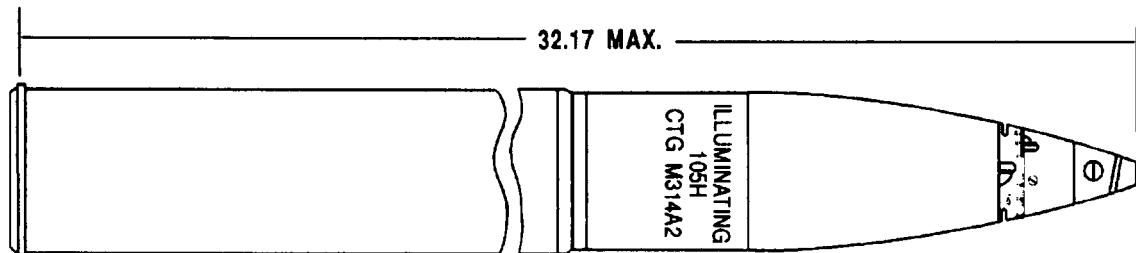
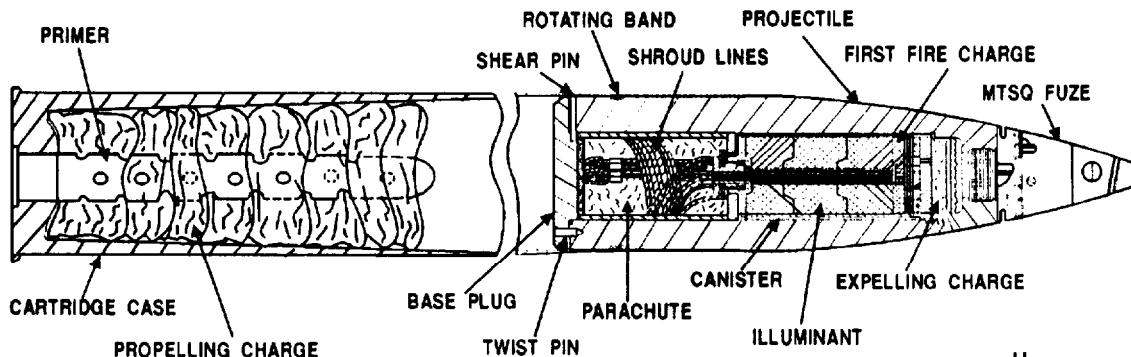
\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

#### 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-C450
UNO serial number .....	0321
UNO proper shipping name .....	Cartridges for weapons
Drawing number .....	9219187

#### References:

- SB 700-20
- AMC-P 700-3-3
- TM 9-1015-203-12
- TM 9-1015-234-10
- TM 9-1300-251-20

**CARTRIDGE, 105-MILLIMETER ILLUMINATING, M314, M314A2, M314A2B1**U  
AR 199729U  
AR 199728**Type Classification:**

C &amp; T AMCTC 7467, dtd 1970.

**Use:**

This cartridge is intended for illuminating a designated target area.

**Description:**

The projectile is a hollow steel forging with a streamlined ogive, gilding metal rotating band, and pinned base plug. The projectile is assembled with an MTSQ fuze threaded into the nose of the projectile. The projectile cavity contains the expelling charge, illuminating canister, and parachute assembly. The expelling charge consists of 0.11 lb of black powder contained in a cloth bag. The illuminating canister contains the illuminant and 0.15 lb of first-fire composition. The parachute assembly is attached to the illuminating canister body. The base plug is inserted into the opening at the base of the projectile and held in place by three shear pins and three twist pins. The complete projectile is free-fitted to a cartridge case. The cartridge case contains a percussion primer

assembly and seven individually bagged and numbered propelling charge increments. The base of the cartridge case is drilled and the primer assembly is pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing black powder. The seven numbered increments bags are tied together, in numerical order, with acrylic cord. These are assembled into the cartridge case, around the primer flash tube, with Increment 1 at the base of the cartridge case and Increment 7 toward the mouth of the cartridge case.

**Functioning:**

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

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

#### Tabulated Data:

Complete round:

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

Projectile:

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

Propelling charge:

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

Performance:

Using M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle (fps)	Velocity (mps)	Maximum (m)	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 m (12,330 yd)
Muzzle velocity -----	472.4 mps (1550 fps)

Using M102 and M108 howitzers:

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

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

#### Temperature Limits:

Firing:

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

Storage:

Lower limit -----	-80°F (for peri- ods not exceed- ing 3 days) (-63°C)
-------------------	---

Upper limit -----	+160°F (for periods not exceeding 4 hr/day) (+71.1°C)
-------------------	---

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

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

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

#### Shipping and Storage Data:

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

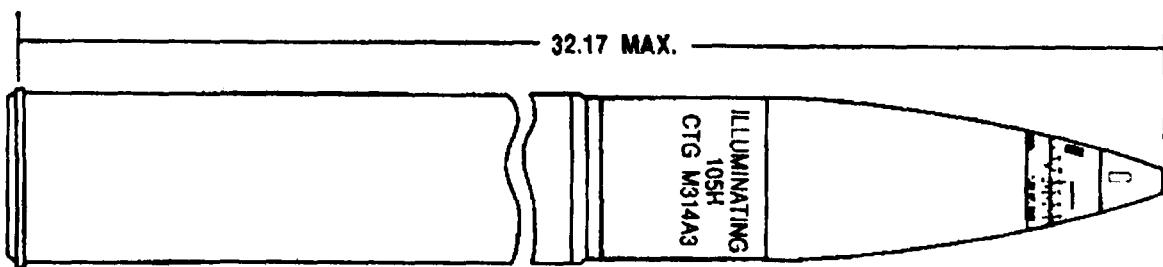
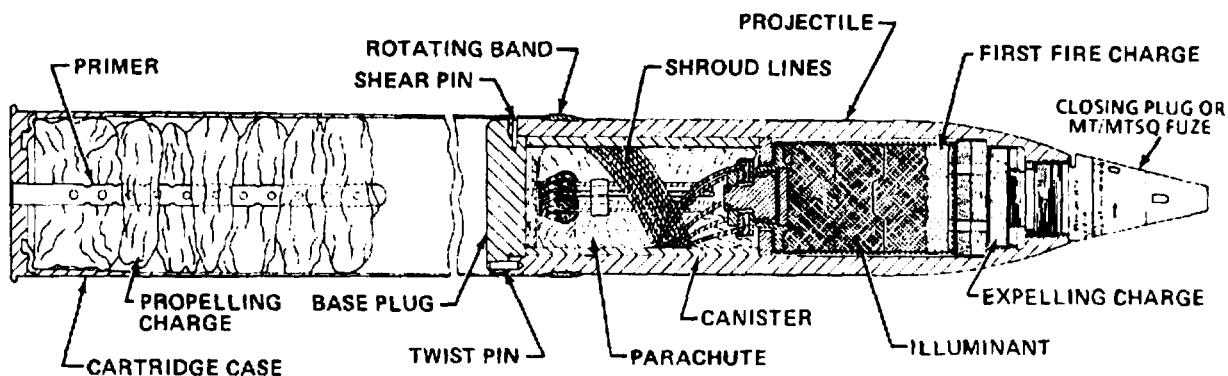
**Limitations:**

The M501/M501A1 fuze is not dropsafe. Dropping or rough handling of a projectile assembled with fuze MTSQ M501/M501A1 can and has resulted in fuze functioning and explosion of projectile base plate and contents.

**References:**

SB 700-20  
AMC-P 700-3-3  
TM 9-1015-203-12  
TM 9-1015-234-10  
TM 9-1300-251-20  
TM 9-1300-251-34

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**CARTRIDGE, 105-MILLIMETER: ILLUMINATING, M314A3**U  
AR 199731

AR 199730-A

**Type Classification:**

Std AMCTC 7467, dtd 1970.

**Use:**

This cartridge is intended for signaling 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 or MTSQ 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 open-

ing 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 repels 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. 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 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	White w/black markings
Expelling charge	Black powder, 0.18 lb
Filler and weight	Illum, 1.97 lb
Fuze	MT. M565 or 548, MTSQ, M577A1, ET M762

##### **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:**

	<u>M28A2</u>	<u>M28B2</u>
Primer	M61, 0.00014 lb	M61, 0.00014 lb
Black Powder	Cl 1, MIL-P-223 (Note B), 0.043 lb	Cl 1, MIL-P-223 (Note B), 0.043 lb
Body	Brass, Type 1	Steel, Type 2

#### **Performance:**

##### **Using M52 M52A1 and M101/M101A1**

Charge	Muzzle Velocity (fps)	Maximum Range (reps)	Maximum Range (m)	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 m  
(12,330 yd)  
Muzzle velocity ----- 472.4 mps  
(1550 fps)

##### **Using M102 and M108 howitzers:**

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

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

#### **Temperature Limits:**

##### **Firing:**

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

Cube ----- 2 cu ft

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

Alternate with M577 A1 Fuze

\*Packing ..... 1 round in fiber  
..... container; 1  
..... container in  
..... metal container

\*Metal Container:

Weight..... 67.5 lb  
Dimensions..... 44-1/2 x 6-7/8 x  
..... 6-7/8 in.  
Cube..... 1.2 cu ft

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

**Shipping and Storage Data:**

Storage class/SCG ..... (08) 1.2G  
DOT shipping class..... A

DOT designation ..... AMMUNITION  
..... FOR CANNON  
..... WITH ILLUMI-  
..... NATING  
..... PROJECTILES  
\*\*DODAC..... 1315-C449  
UNO serial number ..... 0171  
UNO proper shipping name ..... Ammunition,  
..... illuminating  
Drawing number..... 9206821

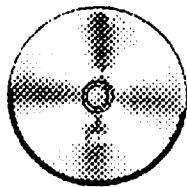
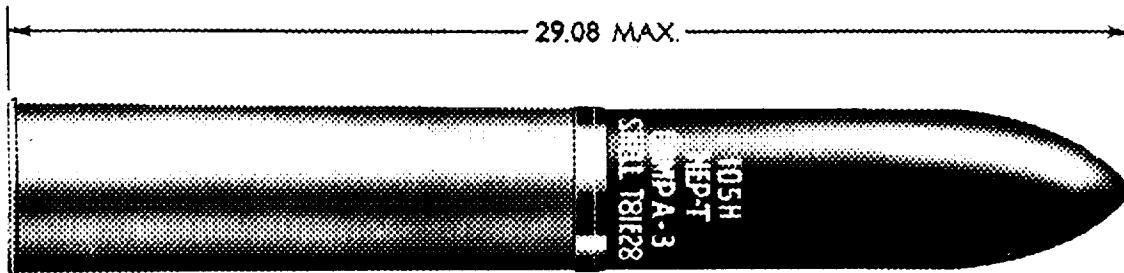
\*\*NOTE: Some M314A3 are issued w/o fuze  
(DODAC-1315-C542).

**References:**

SB 700-20  
AMC-P 700-3-3  
TM 9-1015-203-12  
TM 9-1015-234-10  
TM 9-1300-251-20&P  
TM 9-1300-251-34&P

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## CARTRIDGE, 105-MILLIMETER: HEP, HEP-T, M327 (T81E28)



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 propels 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 materiel -----	Steel
Color -----	Olive drab w/yellow 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 yd; 8,685 m
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 hr/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

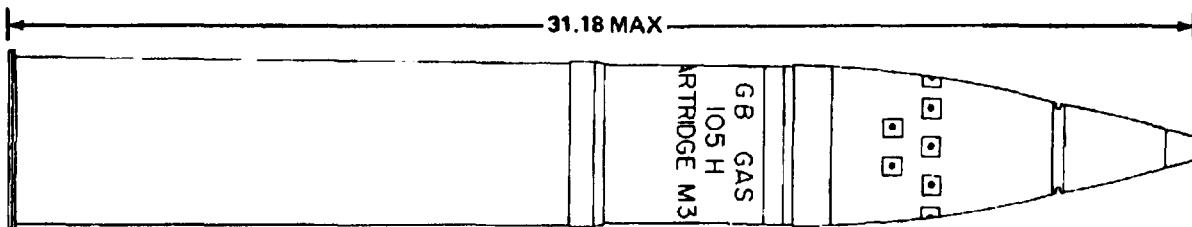
**\*NOTE:** See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

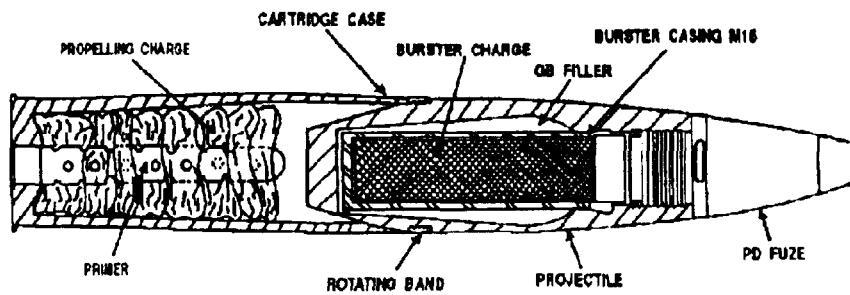
Quantity-distance class ..... 1.1  
 Storage compatibility group ..... E  
 DOT shipping class ..... A  
 DOT designation ..... AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES  
 DODAC ..... 1315-C448  
 UNO serial number ..... 0006  
 UNO proper shipping name ..... Cartridges for weapons  
 Drawing number ..... 75-1-362

**References:**

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

**CARTRIDGE, 105-MILLIMETRE: AGENT, GB, M360**

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 AND  
W/O BURSTER CHARGE**

Zone	Over	Up to and Incl	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 (m)	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 m  
(12,330 yd)

Muzzle velocity ----- 472.4 mps (1550 fps)

Using M102 and M108 howitzers:

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

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

\*NOTE: Renovated or newly manufactured projectiles will be marked with one green band and, if burstered, one yellow band.

**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
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## \*Packing Box:

Weight	-----	117 lb
Dimensions	-----	37-1/4 x 11-5/16 x 7-19/32 in.
Cube	-----	2 cu ft

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

**Shipping and Storage Data:**

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
UNO serial number	-----	0020
UNO proper shipping name	-----	Ammunition, toxic
Drawing number	-----	75-1-363

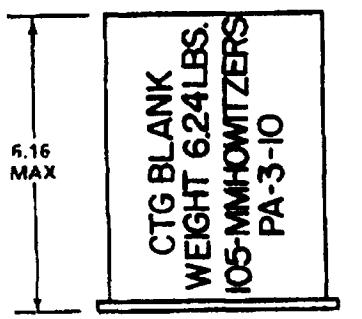
**Limitations:**

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.

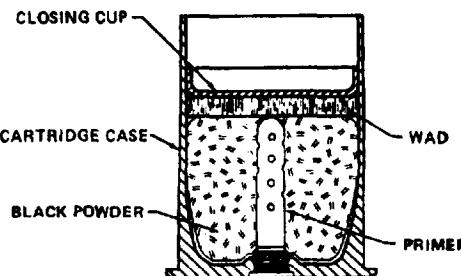
**References:**

SB 700-20  
AMC-P 700-3-3  
TM 9-1015-203-12  
TM 9-1015-234-10  
TM 9-1300-251-20

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**CARTRIDGE, 105-MILLIMETER BLANK, M395**

AR 199713-A



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 .....	6.16 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)

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°C)

*Packing .....	1 round in fiber container; 10 containers in wooden box
----------------	---

\*Packing Box:  
 Weight ..... 96.0 lb  
 Dimensions ..... 29-1/4 x 12-1/16  
                   x 9-13/32 in.  
 Cube ..... 1.9 cu ft

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

**Shipping and Storage Data:**

Quantity-distance class .....	1.3
Storage compatibility group .....	C
DOT shipping class .....	A
DOT designation .....	AMMUNITION FOR CANNON WITHOUT PROJECTILES

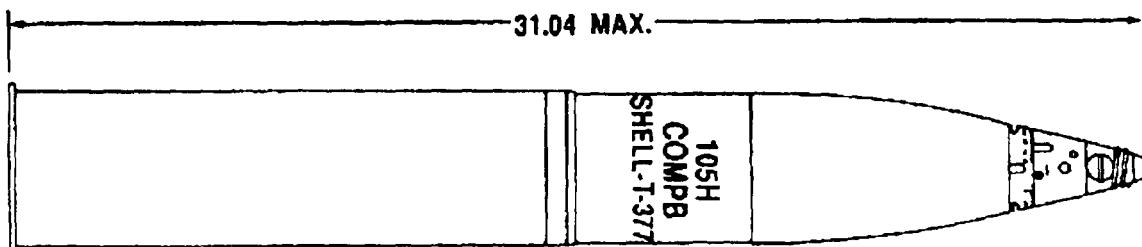
DODAC .....	1315-C440
UNO serial number .....	0327
UNO proper shipping name .....	Cartridges for weapons, blank
Drawing number .....	7549251

**Limitations:**

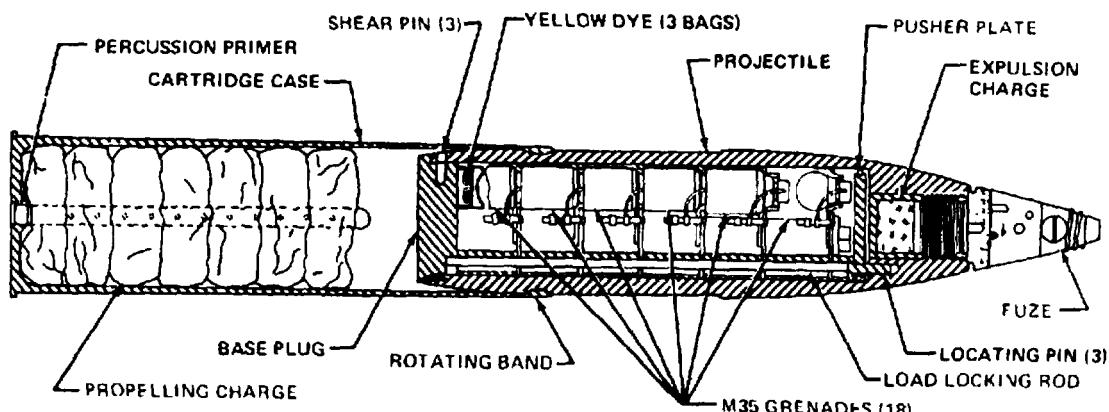
Closure debris from blank ammunition can be expelled a distance of 300 feet forward of the weapon muzzle.

**References:**

SB 700-20  
 AMC-P 700-3-3  
 TM 9-1015-203-12  
 TM 9-1015-234-10  
 TM 9-1300-251-20

**CARTRIDGE, 105-MILLIMETER: HE, M413 (T377E1)**

AR 199434

**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 submissive which explodes on impact.

**Tabulated Data:**

Complete round:

Type -----	HE
Weight -----	42.0 lb
Length -----	31.04 in.
Cannon used with -----	M2A1, M2A2, and M49

Projectile:

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

Filler and weight:

Number of grenades, M35 --	18
Explosive, Comp B, each grenade -----	28 grams
Explosive, Comp B, each projectile -----	1.1 lb
Fuze -----	MTSQ, M554 (Modified)

Cartridge Case:

Model	Mat'l	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
------------	-----

Components:

Incre- ment	Prop & Type	Comp	Web in.	Size Approx	Wt Oz Approx	Perf
1	M1, Type II	0.014	8.6	Single		
2	M1, Type II	0.014	1.4	Single		
3	M1, Type I	0.026	2.5	Multi		
4	M1, Type I	0.026	3.8	Multi		
5	M1, Type I	0.026	5.8	Multi		
6	M1, Type I	0.026	8.8	Multi		
7	M1, Type I	0.026	14.3	Multi		

Weight, Total Increments 1-7- 2.83 lb

Percussion mimer 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)	0.00014 0.043	0.00014 0.043
Body	Brass, Type 1	Steel, Type 2

**Performance:**

Using M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle fps	Velocity mps	Maximum m	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 m,  
12,330 ydMuzzle velocity ----- 472.4 mps,  
1550 fps

Using M102 and M108 howitzers:

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

Maximum range ----- 11,500 m  
(12,590 yd)Muzzle velocity ----- 494 mps  
(1621 fps)**Temperature Limits:**

Firing:

Lower limit ----- -40°F  
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 lb  
Dimensions ----- 37-1/4 x 11-  
15/16 x 7-19/32  
in.  
Cube ----- 2.0 cu ft\*NOTE: See DOD Consolidated Ammunition  
Catalog for complete packing data including  
NSN's.

**Shipping and Storage Data**

Hazard class/division and Storage  
Compatibility Group ----- (18) 1.2E

■ DOT class ----- Class A  
Explosive  
DOT marking ----- AMMUNITION  
FOR CANNON  
WITH  
EXPLOSIVE  
PROJECTILES

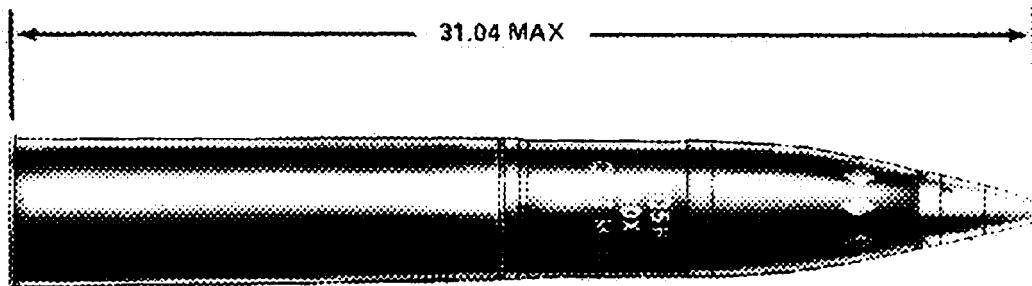
DODAC ----- 1315-C469  
Cartridge drawing number ---- XP97090  
Packing drawing number ----- 7549072

**References:**

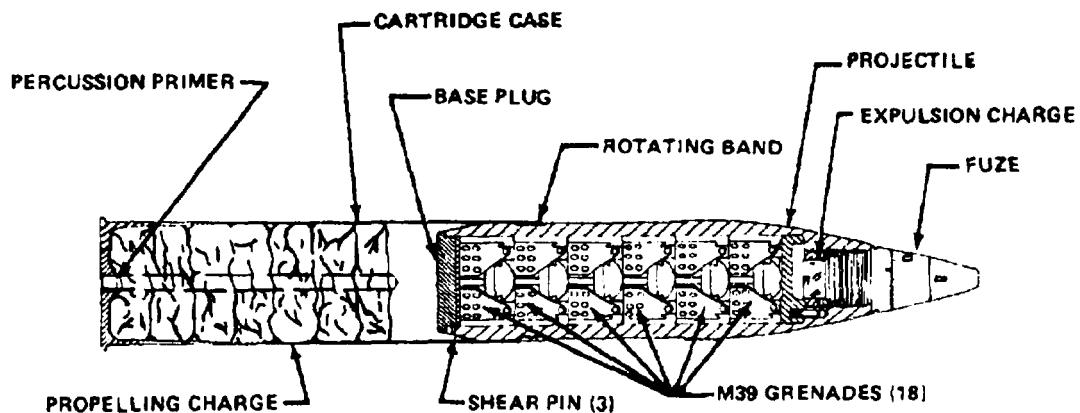
SB 700-20  
AMC-P700-3-3  
TM 9-1015-203-12  
TM 9-1015-234-10  
TM 9-1300-251-20  
TM 9-1300-251-34

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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 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 M39 grenade is an airburst submissive which 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 lb
Length -----	31.04 in.
Cannon used with -----	M2A1, M2A2, M49, M103, M137, and M137E1

Projectile:

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

Filler and weight:

Number of grenades, 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 (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
-------------	-----

Components:

Incre- ment	Prop	Comp	Web	Size	Wt Oz	Perf.
No.	& Type		in.	approx	approx	
1	M1, Type II		0.014	8.6	Single	
2	M1, Type II		0.014	1.4	Single	
3	M1, Type I		0.026	2.5	Multi	
4	M1, Type I		0.026	3.8	Multi	
5	M1, Type I		0.026	5.8	Multi	
6	M1, Type I		0.026	8.8	Multi	
7	M1, Type I		0.026	14.3	Multi	

Weight, Total

Increments 1-7 ----- 2.83 lb

Percussion primer assembly:

	M28A2	M28B2
Primer	M6I	M6I
Black powder	Cl 1, Spec MIL-P-223	Cl 1, Spec MIL-P-223

	(Note B)	(Note B)
Weight (lb) (primer)	0.00014	0.00014
(BP)	0.043	0.043
Body	Brass, Steel, Type 1	Type 2

Performance:

Using M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle (fps)	Velocity (mps)	Maximum (m)	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 m,  
12,330 ydMuzzle velocity ----- 472.4 m,  
1550 fps

Using M102 and M108 howitzers:

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

Maximum range ----- 11,500 m,  
12,590 yd

Muzzle velocity ----- 494 m, 1621 fps

**Temperature Limits:**

Firing:

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

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 lb  
 Dimensions ----- 37-1/4 x 11-  
                       15/16 x 7-19/32  
                       in.  
 Cube ----- 2.0 cu ft

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

Shipping and Storage Data:

Hazard class/division and Storage  
 Compatibility Group ----- (18) 1.2E  
 DOT class ----- Class A  
                       Explosive  
 DOT marking ----- AMMUNITION  
                       FOR CANNON  
                       WITH  
                       EXPLOSIVE  
                       PROJECTILES

DODAC ----- 1315-C462  
 UNO serial number ----- 0321  
 UNO proper shipping name --- Cartridges for  
                       weapons  
 Cartridge drawing number ---- 8864930  
 Packing drawing number ---- 7549072

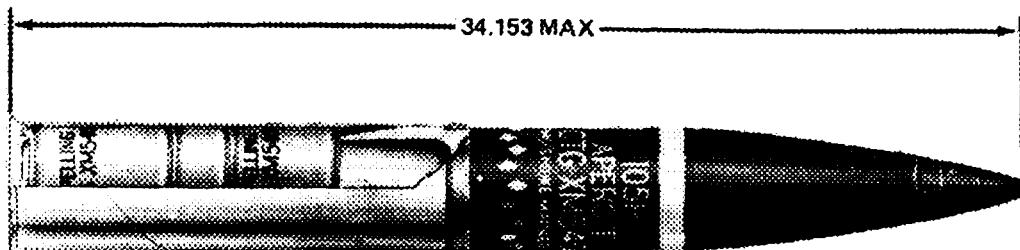
**Limitations:**

Expect a higher submunition dud rate  
 when fired at charges 6 and 7 for Cannons  
 M103, M137 and L28A1.

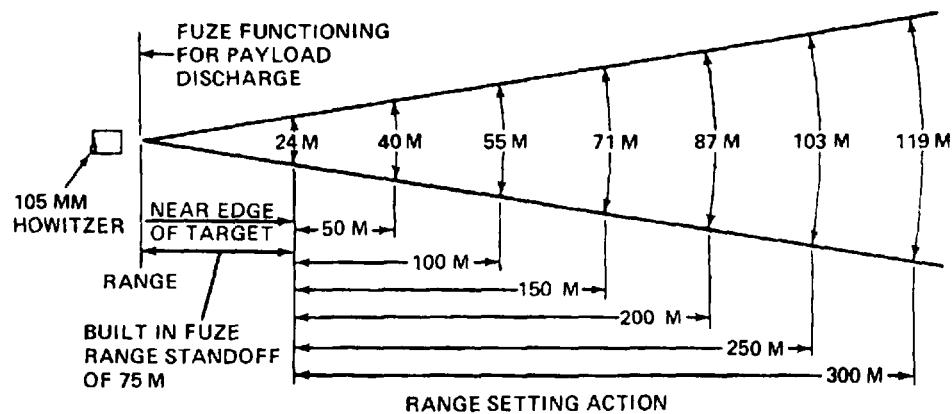
**References:**

SB 700-20  
 AMC-P700-3-3  
 TM 9-1015-203-12  
 TM 9-1015-234-10  
 TM 9-1300-251-20  
 TM 9-1300-251-34

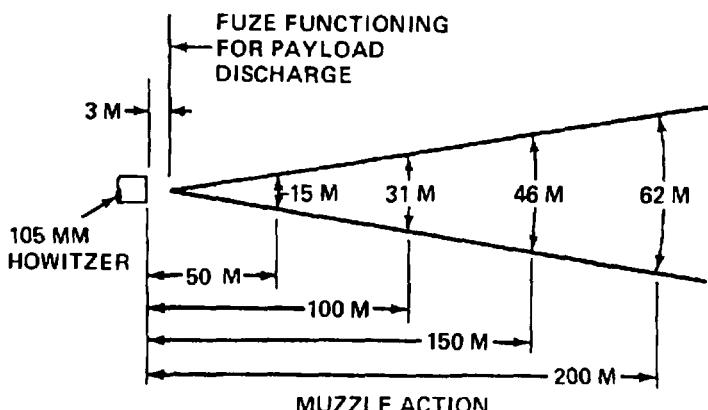
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**CARTRIDGE, 105-MILLIMETER: APERS-T, M546**

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 inflight 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 lb
Length -----	34.153 in. (max)
Cannon (weapon) used with	M2A1, M2A2, (M101, M101A1), M137 (M102) (L20A1 (M119)

##### Projectile:

Body material -----	Aluminum/ Steel
Color -----	Olive drab w/yellow band, 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, 0.019 Web. 27.4 oz propellant M30A1, multi perforation, type I, 0.039 Web. Charge, Propelling for Ctg. APERS M546
Primer -----	M90
Benite strands -----	380+/-grains
Percussion primer drawing -	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:

Charge	Muzzle (fps)	Velocity (mps)	Maximum (m)	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 -----	-40°F (-40°C)
Upper limit -----	+125°F (+52.0°C)

**Storage:**

Lower limit -----	-80°F (for peri- ods 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 DOD Consolidated Ammunition Catalog 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
UNO serial number -----	0321
UNO proper shipping name ---	Cartridges for weapons
Drawing number -----	9211669

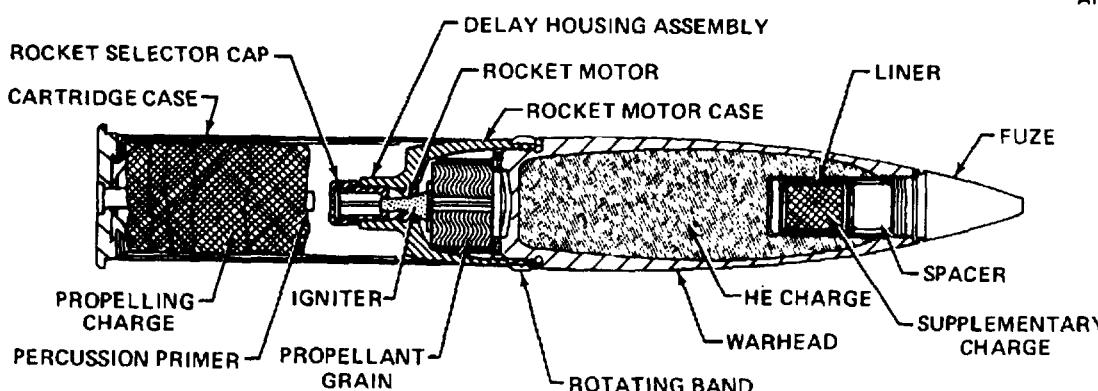
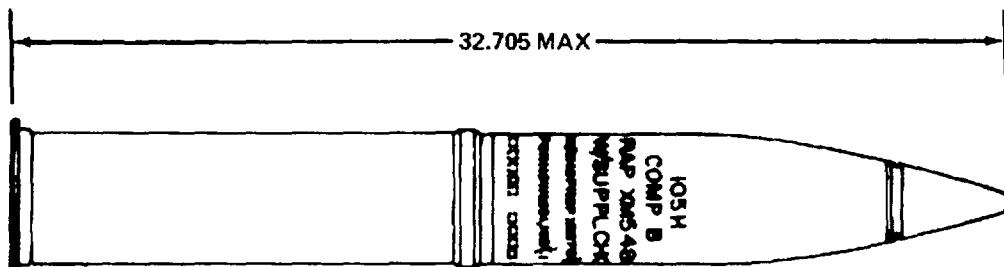
**Limitations:**

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:**

- SB 700-20
- AMC-P 700-3-3
- TM 9-1015-203-12
- TM 9-1015-234-10
- TM 9-1300-251-20

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**CARTRIDGE, 105-MILLIMETER: HERA, M548**

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 fuse 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 mark- ings
Filler and weight .....	Comp B, 5.2 lb
Fuzes .....	Prox M728, PD, M739, M557 MTSQ M564, MTSQ M582, and ET M767

##### **Propelling charge:**

Cartridge case: M14 .....	Brass, 5.9 lb (approx)
M14B1 .....	Steel, down, 5.4 lb (approx)
H14B4 .....	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 forg- ing
Rocket propellant grain .....	XM33 propel-  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 .....	16,404 yd (15,000 m)
Muzzle velocity .....	548.64 mps (1,800 fps)

**Temperature Limits:**

Firing  
 Lower limit ----- -40°F (-40°C)  
 Upper limit ----- + 145°F (+63C°)

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 DOD Consolidated Ammunition  
 Catalog 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 ----- AMMO FOR  
 CANNON  
 WITH  
 EXPLOSIVE  
 PROJECTILE  
 DODAC ----- 1315-C463  
 UNO serial number ----- 0321  
 UNO proper shipping name --- Cartridges for  
 weapons  
 Drawing number ----- 9212376

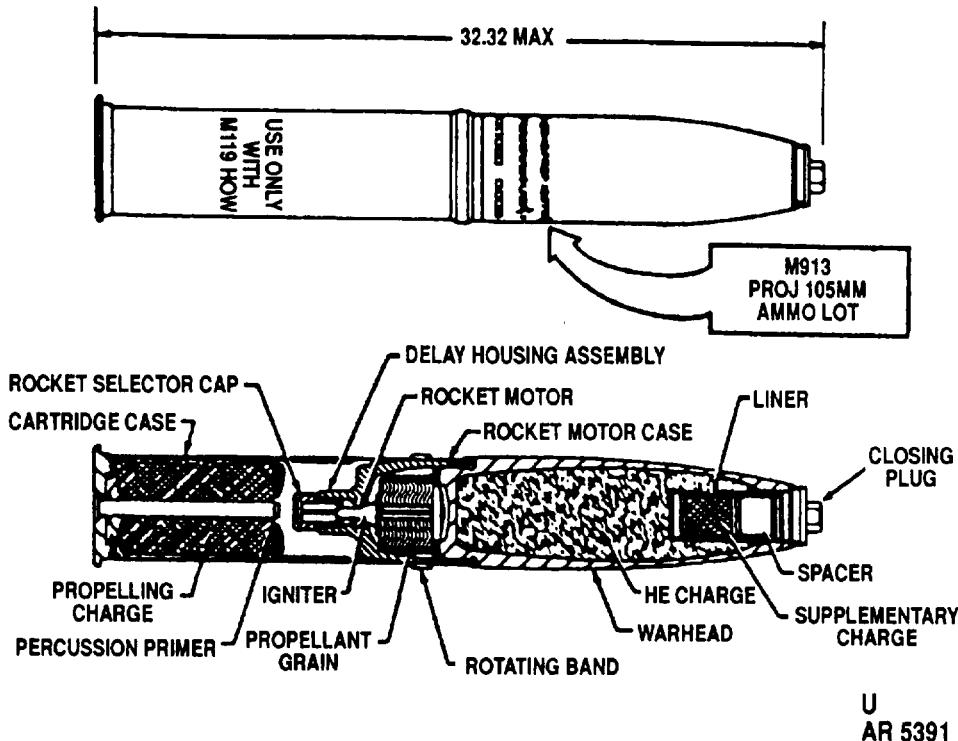
**Limitations:**

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.

**Reference:**

SB 700-20  
 AMC-P700-3-3  
 TM 9-1015-203-12  
 TM 9-1015-234-10  
 TM 9-1300-251-20

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**CARTRIDGE, 105-MILLIMETER: HERA, M913**U  
AR 5391**Type Classification:**

Std AMCTC dtd 1990.

**Use:**

This cartridge is a high explosive, rocket-assisted round with extended range capability used for fragmentation, blast and mining 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 TNT having a deep cavity and supplementary charge. The rocket motor body contains the rocket grain and delay ignition system, contained at the rear of the body. The delay ignition system is fitted with a cap. A copper rotating band is welded to the rocket motor body. The body is threaded to the warhead to complete the projectile assembly. The cartridge case contains a primer and a single bag propelling charge with a flash reducer. 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 black powder.

**Functioning:**

Rocket "OFF-MODE" — If the projectile is unfuzed, the closing plug is removed and a fuze is 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 black powder in the flash tube. The flash tube provides for uniform ignition of the propelling charge producing a rapid expansion of the propelling 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 cap on the delay igniter is removed. The cartridge is loaded into the weapon. Upon firing, the burning propellant gases initiate the delay ignition system. Approximately 16 seconds later (the projectile has left the tube and is traveling down-range), the delay 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 -----	32.3 in.
Cannon (weapon) used with -----	M119
Projectile:	
Body material -----	High carbon steel forging
Color -----	Forest green w/yellow mark- ings
Filler and weight -----	TNT, 5.8 lb
Fuzes -----	PD M739 Prox M732E2, ET M767, MTSQ M582
Suppl charge -----	Dwg No. 8797090

##### Propelling charge:

Cartridge case: M14B4 -----	Steel, 3 pc spiral wrap, 4.7 lb (approx)
Propelling charge-----	M229, 4.25 lb
Percussion primer assembly-----	M28B2
Primer -----	Dwg No. 8838130
Black powder -----	300 grains
Motor body -----	Steel alloy forg- ing

##### Pyrotechnic Delay Assembly:

No. Increments	Weight	Composition
7	1025 mg (ea)	Delay
1	290 mg	Igniter
1	300 mg	Flash

#### Delay Composition:

Constituent	Parts by Weight
Potassium Perchlorate -----	14.5 ± 0.25
Tungsten -----	45.0 ± 5.0
Vinyl Alcohol-Acetate	
Resins (solids) -----	1.0 ± 0.1
Barium Chromate -----	40.5 ± 5.0

#### Igniter Composition:

Constituent	Parts by Weight
Diatomaceous Earth -----	10.0 ± 1.0
Zirconium -----	65.0 ± 1.0
Iron Oxide -----	25.0 ± 1.0
Vinyl Alcohol-Acetate	
Resins (solids) -----	2.0 ± 0.1

#### Flash composition:

Constituent	Parts by Weight
Zirconium -----	58.0 ± 1.0
Chromium Oxide -----	16.0 ± 1.0
Molybdenum Trioxide -----	25.0 ± 1.0
Vinyl Alcohol-Acetate	
Resins (solids) -----	1.0 ± 0.1

#### Rocket propellant:

Grain -----	HTPB
Weight -----	2.2 lb

#### Temperature Limits:

Firing:	
Lower limit -----	-50°F (-45.5°C)
Upper limit -----	145°F (63°C)
Storage:	
Lower limit -----	-65°F (-53.8°C)
Upper limit -----	160°F (71.1°C)

#### Performance with the M19 Howitzer:

Maximum range -----	19.5 km
Muzzle velocity -----	625 mps (2100 fps)
Chamber pressure at 70°F -----	45000 psi
Chamber pressure at 145°F -----	54000 psi

**\*Packaging:**

Packing----- 1 round in fiber container; 1 container in metal container

Metal container:  
 Total weight ----- 54.5 lb  
 Dimensions----- 44-1/2 x 6-7/8 x 6-7/8 in.  
 Cube----- 1.2 cu ft

- alternate packing -

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

**Shipping and Storage Data:**

DOD hazard class ----- 1.1  
 DOD Storage Compatibility Group ----- E  
 DOT shipping class----- CLASS A EXPLOSIVE  
 DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE

DODAC ----- 1315-C546  
 UNO serial number ----- 0321  
 UNO proper shipping name --- Cartridges for weapons  
 Drawing number ----- 9390990

**Limitations:**

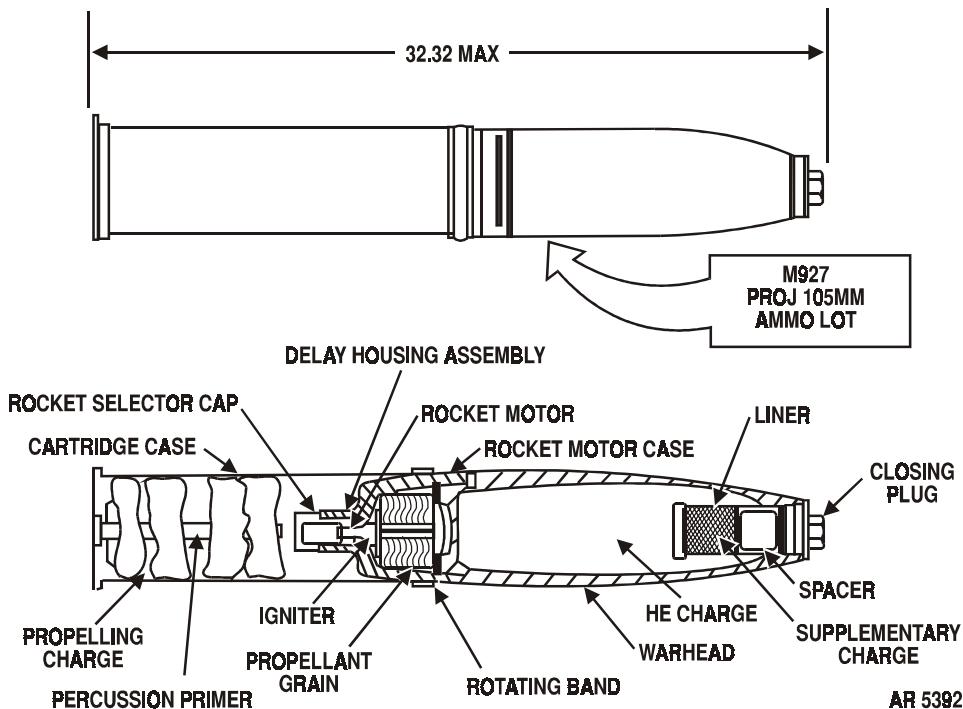
To Be Determined.

**References:**

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

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## CARTRIDGE, 105 MILLIMETER: HERA, M927

**Type Classification:**

Std AMCTC dtd Oct 94.

**Use:**

This cartridge is a high explosive, rocket-assisted round with extended range capability used for fragmentation, blast and mining 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 TNT having a deep cavity and supplementary charge. The rocket motor body contains the rocket grain and delay ignition system, contained at the rear of the body. The delay ignition system is fitted with a cap. A copper rotating band is welded to the rocket motor body. The body is threaded to the warhead to complete the projectile assembly. The cartridge case contains a primer and seven 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 black powder.

**Functioning:**

Rocket "OFF-MODE" - If the projectile is unfuzed, the closing plug is removed and a fuze is 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 black powder in the flash tube. The flash tube provides for uniform ignition of the propelling charge producing a rapid expansion of the propelling 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 cap on the delay igniter is removed. The cartridge is loaded into the weapon. Upon firing, the burning propellant gases initiate the delay ignition system. Approximately 16 seconds later (the projectile has left the tube and is traveling down-range), the delay 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.....	37.2 lb
Length.....	32.3 in.
Cannon (weapon) used with.....	M119, M101A1, M102

Projectile:

Warhead body material.....	High fragmentation (HF1) steel forging
Color.....	Olive drab w/yellow markings
Filler and weight.....	TNT, 5.8 lb
Fuzes.....	PD M557, M739 SER, PROX M732A2, MTSQ M582 SER, ET M767
Supplemental charge .....	Dwg No. 8797090
Rocket grain .....	HTPB Base2.2 lb
Rocket motor body .....	Steel alloy forging

Propelling charge:

Cartridge Case:	
M14B1.....	Steel, Dwg No. 7548025
M14B4.....	Steel, 3 pc spiral wrap, Dwg. No. 8595386
Propelling charge .....	M67, 2.83 lb
Percussion primer assembly..	M28B2

Primer .....	Dwg No. 8838130
Black powder .....	300 grains

#### Pyrotechnic Delay Assembly:

No.	Increments	Weight	Composition
7		1000 mg (ea)	Delay
1		275 mg	Igniter
1		300 mg	Flash

#### Delay Composition:

Constituent	Parts by Weight
Potassium Perchlorate .....	$14.5 \pm 0.25$
Tungsten .....	$50.0 \pm 5.0$
Vinyl Alcohol-Acetate	
Resins (solids).....	$1.0 \pm 0.1$
Barium Chromate .....	$35.5 \pm 5.0$

#### Igniter Composition:

Constituent	Parts by Weight
Diatomaceous Earth .....	$10.0 \pm 1.0$
Zirconium.....	$65.0 \pm 1.0$
Iron Oxide .....	$25.0 \pm 1.0$
Vinyl Alcohol-Acetate	
Resins (solids).....	$1.0 \pm 0.1$

#### Flash composition:

Constituent	Parts by Weight
Zirconium.....	$58.0 \pm 1.0$
Chromium Oxide.....	$16.0 \pm 1.0$
Molybdenum Trioxide.....	$25.0 \pm 1.0$
Vinyl Alcohol-Acetate	
Resins (solids).....	$1.0 \pm 0.1$

#### Temperature Limits:

Firing:	
Lower limit.....	-50°F (- 45.5°C)
Upper limit .....	145°F (63°C)
Storage:	
Lower limit.....	-65°F (- 53.8°C)
Upper limit .....	160°F (71.1°C)

**Performance at 70°F Using M102 Howitzer:**

## Charge 7:

Maximum range .....	11,760 m, 13,067 yd
Muzzle velocity .....	1,604 FPS, 486 MPS

## Charge 7R:

Maximum range .....	16,620 m, 18,467 yd
Muzzle velocity .....	1,604 FPS, 486 MPS

**\*Packaging:**

Packing .....	1 round in fiber container; 1 container in metal container
Fiber container .....	PA111, Dwg No. 12624495
Metal container .....	PA117, Dwg No. 9378166
Total weight .....	66.1 lb
Dimensions .....	44-1/2 x 6-7/8 x 6-7/8 in.
Cube.....	1.2 cu ft

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

**Shipping and Storage Data:**

UNO serial number.....	0321
DOD hazard class .....	1.2
DOD storage compatibility group.....	E

DOT shipping class .....	CLASS A EXPLOSIVE CARTRIDGES FOR WEAP- ONS WITH EXPLOSIVE PROJECTILE
DODAC.....	1315-C544
Drawing number.....	9391033

**Limitations:**

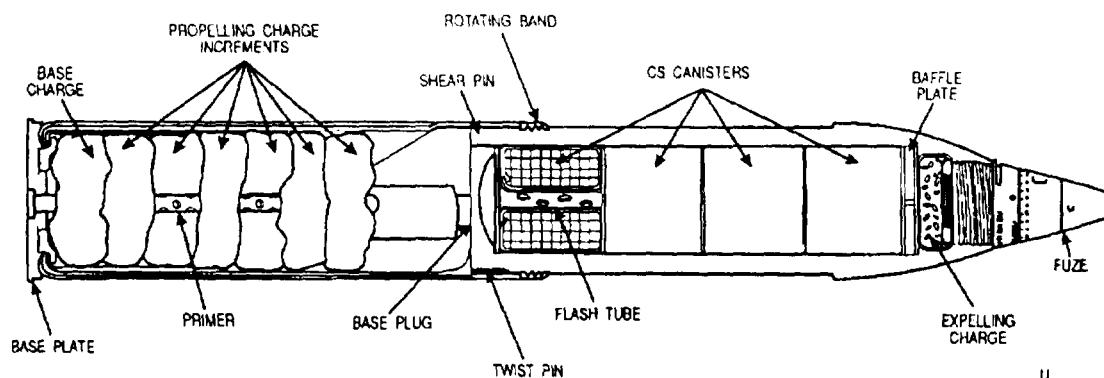
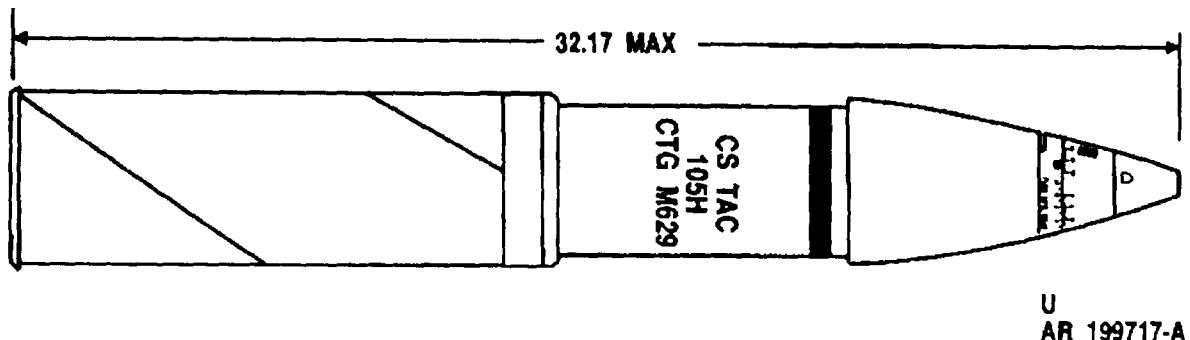
Firing restricted to zone 7 "ROCKET-ON" and zone 7 "ROCKET-OFF" modes. In accordance with AR 385-63, the following is recommended:

- a. Do not fire overhead of unprotected troops during training.
- b. For "ROCKET-ON" Mode: The safety zone is no shorter than the "ROCKET-OFF" range at the same elevation.
- c. For "ROCKET-OFF" Mode: The safety zone beyond the target is no shorter than the "ROCKET-ON" range at the same elevation (however, 5000 meters beyond target is advised).

**References:**

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

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**CARTRIDGE, 105-MILLIMETER: TACTICAL CS, M629****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 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 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 inclement 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 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 (fps)	Velocity (mps)	Maximum (m)	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 m  
(12,330 yd)

Muzzle velocity ----- 472.4 mps (1550  
fps)

Using M102 and M108 howitzers:

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

Maximum range ----- 11,500 m  
(12,590 yd)

Muzzle velocity ----- 494 mps  
(1621 fps)

#### **Temperature Limits:**

##### Firing:

Lower limit -----	-40°F (-40°C)
Upper limit -----	+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 1b

Dimensions ----- 37-1/4 x 11-  
 15/16 x 7-19/32  
 in.  
 Cube ----- 2.0 cu ft

\*NOTE: See DOD Consolidated Ammunition Catalog 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 PER-  
 MIT NO. 5208

DODAC ----- 1315-C468  
 UNO serial number ----- 0018  
 UNO proper shipping name --- Ammunition,  
 tear-producing  
 Drawing number ----- 9220225

Limitations:

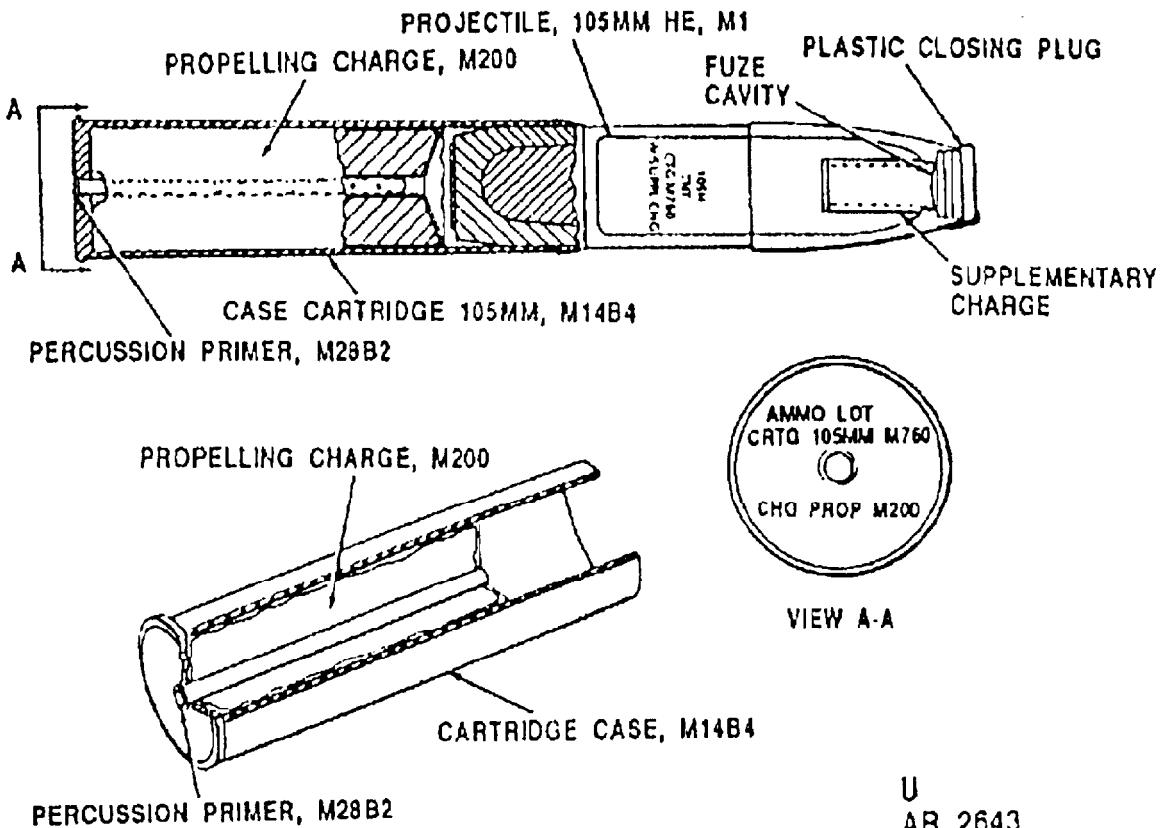
Do not fire this cartridge with the fuze set on the "S" shipping mark as issued, because fuze functioning after approximately 2 seconds may be anticipated. Do not attempt to reset the fuze until just before firing. Fuze reset for firing, but not fired, should be reset on the "S" setting.

References

SB 700-20  
 AMC-P 700-3-3  
 TM 9-1015-203-12  
 TM 9-1015-234-10  
 TM 9-1300-251-20

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## CARTRIDGE, 105-MILLIMETER: HE, M760

Type Classification:

Std, MSR 09786043.

Use:

This cartridge is a high explosive round initially developed for use with the Howitzer, Light Towed, 105mm: Soft Recoil, M204. Currently, the M760 Cartridge is only authorized for use with the Howitzer, Light, Towed, 105mm: M119.

Description:

The projectile of this cartridge consists of hollow steel forging and is similar to the projectile in the M1 cartridge. The projectile is loaded with approximately 4.6 lb (2.1 kg) of Type 1 TNT only. "Composition B" cannot be loaded with cartridge M760 as it is too sensitive for use with propelling charge M200. The pro-

pelling charge M200 is a single bag charge consisting of 4.25 lb (1.93 kg) of M30 propellant. The bag charge has a hole through the center for fitting around the primer in the cartridge case. The M200 propelling charge is for extended range firing (Charge 8) for 105mm, Howitzer M119 use only.

The cartridge case used is the M14B4 (3-piece spiral-wrapped steel). The mouth of the case can expand slightly by uncoiling. This makes it easier to insert the projectile in the mouth of the case. However, if the loader is not careful to grasp the projectile at its center of balance, the lip of the mouth of the cartridge may protrude enough to catch on the lip of the lower extractor recess, making it impossible to chamber the round. The cartridge case may be manually rotated and seated with no adverse effect on the ammunition. The primer used is the M28B2 percussion primer (300 grains of black powder).

**Functioning:**

The weapon firing pin strikes the percussion primer of the cartridge case igniting the black powder of the primer tube which ignites the propelling charge. The pressure build-up from propellant burning propels the projectile. As the projectile is propelled through the weapon tube, the rotating band engages with the rifling, imparting spin to stabilize the projectile. 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 supplementary charge, and the supplementary charge detonates the high explosive projectile filler resulting in projectile fragmentation and blast.

**Tabulated Data:**

## M760 Cartridge:

## Complete round:

Type .....	HE. TNT loaded
Weight -----	39.92 lb (18.11 kg)
Length -----	28.60 in. (72.64 cm)
Cannon (weapon) used with -----	Howitzer, light, towed, 105mm: M119

## Projectile:

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

## Filler:

Type -----	TNT
Weight -----	4.6 lb (2.1 kg)

## Propelling charge:

Model -----	M200
Type -----	Single base bag
Propellant -----	M30 (triple base)
Weight .....	4.25 lb (1.93 kg)

## Primer:

Model -----	M28B2
Type -----	Percussion
Filler and weight -----	Black powder. 300 grains
Fuze -----	PD:M739/ M739A1: MTSQ: M582 series, Prox: M732

**Temperature Limits:**

## Firing:

Lower limit -----	-65°F (-54°C)
Upper limit -----	+ 145°F (+63°C)

## Storage:

Lower limit -----	-65 °F (-54°C)
Upper limit -----	+ 160°F (+71°C)

## Performance:

Maximum range -----	14.000m (45,932 ft) at 70°F (21°C)
Muzzle velocity -----	2020 ft/sec (616 reps) at 70°F (21°C)

Chamber pressure -----	41,000 psi 282,695 kPa at 70°F (21°C) 54,000 psi 372,330 kPa at 145°F (63°C)
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## \*Packaging:

Container -----	7549072
Weight -----	120 lb (54 kg)
Dimensions -----	37-1/4 x 11-15/16 x 7-19/32 in. (94.62 x 30.33 x 19.28 cm)
Cube .....	2 ft (0.61 m)

\*NOTE: See DOD Consolidated Ammunition Catalog 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 W/EXPLOSIVE PROJECTILE
Drawing number -----	9289185
UNO serial number -----	0321
UNO shipping name -----	Cartridges for
DODAC .....	1315-C473

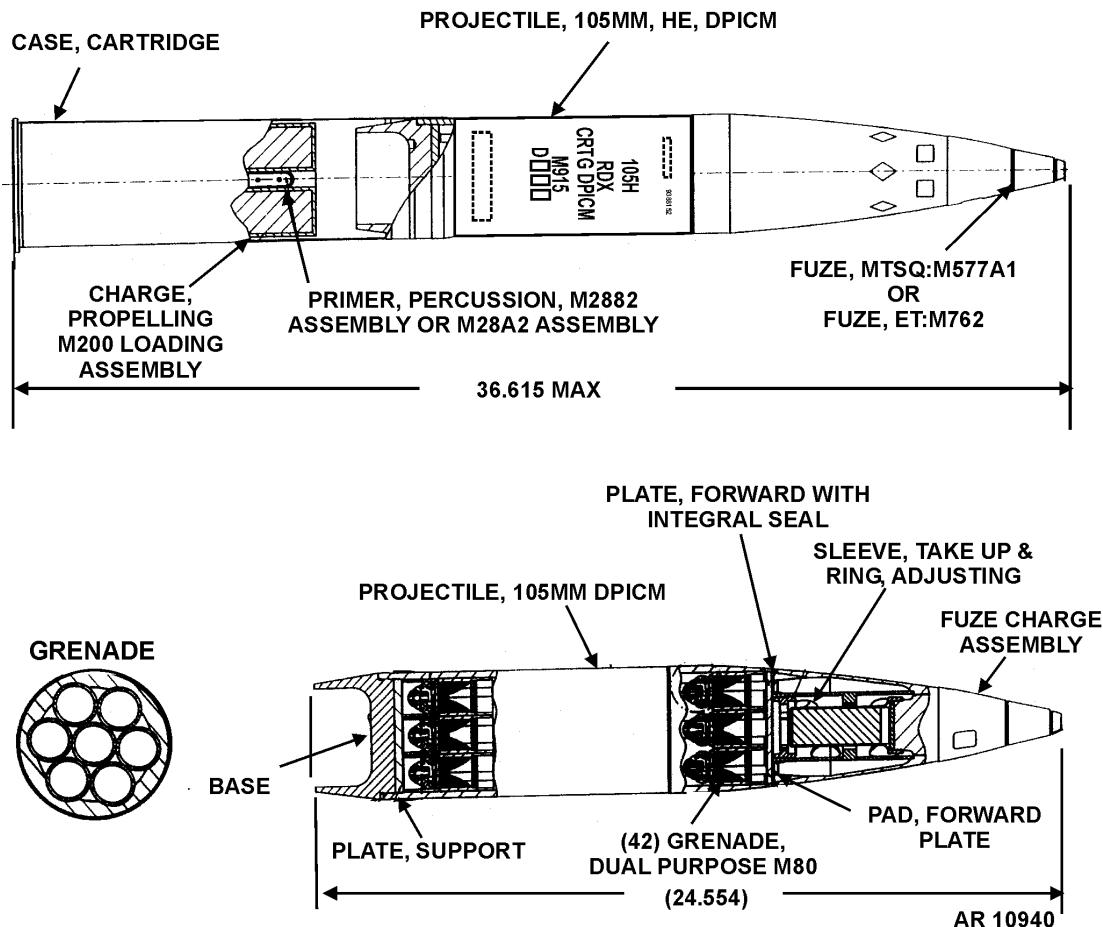
**Limitations:**

This cartridge M760 can only be fired in the Howitzer, light, towed, 105mm: M119.

**References:**

SB 700-20  
AMC-P 700-3-3  
TM 9-1015-252-10

## CARTRIDGE, 105MM: HE, M915



### TYPE CLASSIFICATION:

Std MSR (TBD).

### USE:

This cartridge is used by light artillery divisions to provide a concentration of (dual purpose) light armor defeating and antipersonnel grenades.

### DESCRIPTION:

The projectile has a steel body and removable base plug. A copper rotating band is welded to the body. The projectile contains six rows of M80 grenades, having seven grenades per row. The M80 has a shaped main charge and the M234 grenade fuze. Each grenade fuze contains a primary mechanical arming assembly and an electronic self-destruct feature. The self-destruct feature contains a small reserve

battery and an electro-explosive device (EED). An M762 ET or M577A1 MTSQ Fuze is installed in the projectile nose. The cartridge case has drawn steel or brass construction, and contains the primer assembly and propelling charge.

### FUNCTIONING:

Before loading, fuze functioning time is set. When the weapon is fired, the percussion cap ignites the primer, which ignites the propelling charge. The resulting gas pressure drives the projectile downrange. When the fuze functions, the pressure created will shear the threads of the projectile base plug and drive the grenades into the airstream. The safing mechanisms are quickly dislodged. The slide will move to the armed position, and the reserve battery will activate. Being armed, the grenade can detonate upon impact. Otherwise, when the battery has been activated for approximately three minutes, the grenade will detonate in the self-destruct mode.

TABULATED DATA:

Complete Round:	
Type .....	HE, DPICM
Weight.....	43.7 lb
Length.....	36.6 in.
Weapon used with.....	M119A2
Projectile:	
Weight.....	3.7 lb
Length.....	24.5 in.
Body material.....	Forged steel
Color .....	Olive drab w/yellow markings
Filler and Weight:	
Number of grenades, M80 .....	42
Explosive, Comp PAX-2A:	
Each grenade .....	15.9 g
Each projectile.....	668 g (1.47 lb)
Primary detonator .....	M55
Electro-explosive device	
battery .....	Lithium, reserve
Fuze .....	M762 ET, M577A1 MTSQ
Integral expelling charge,	
M10 propellant.....	45g
Cartridge case.....	M217A1/M217B1
Loaded weight .....	10.0 lb
Length.....	14.6 in.
Material.....	Brass, or deep drawn steel
Propelling charge .....	M200
Type .....	Single bag, zone 8
M30 propellant.....	4.25 lb
Percussion Primer:	
Assembly .....	M28A2/M28B2
Black powder.....	300 grains
Primer .....	M61

PERFORMANCE:

Maximum range .....	14.1 km
Muzzle velocity .....	640 mps
Chamber pressure at 70°F .....	39,000 psi
Chamber pressure at 145°F .....	46,000 psi

TEMPERATURE LIMITS:

Firing:	
Lower limit .....	-50°F (-45°C)
Upper limit.....	+145°F (+63°C)
Storage:	
Lower limit .....	-65°F (-53.8°C)
Upper limit.....	+160°F (+71.1°C)

DRAWINGS:

M80 .....	938810
M915 .....	9388099

UNIT OF ISSUE:

Packing.....	1 round in fiber container, 1 container in metal container
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\*PACKING DATA:

## Metal Container:

Total weight.....	70.2 lb
Dimensions.....	44-1/2 x 6-7/8 x 6-7/8 in.
Cube .....	1.2 cu ft

\*See DOD Consolidated Ammunition Catalog for complete packing data including NSNs.

SHIPPING AND STORAGE DATA:

DOD hazard class/division .....	(18) 1.2
DOD storage compatibility group .....	E
UN identification number .....	0321
Proper shipping name .....	CARTRIDGES FOR WEAPONS
DODAC w/M762.....	1315-CA11
DODAC w/M577A1 .....	1315-CA12

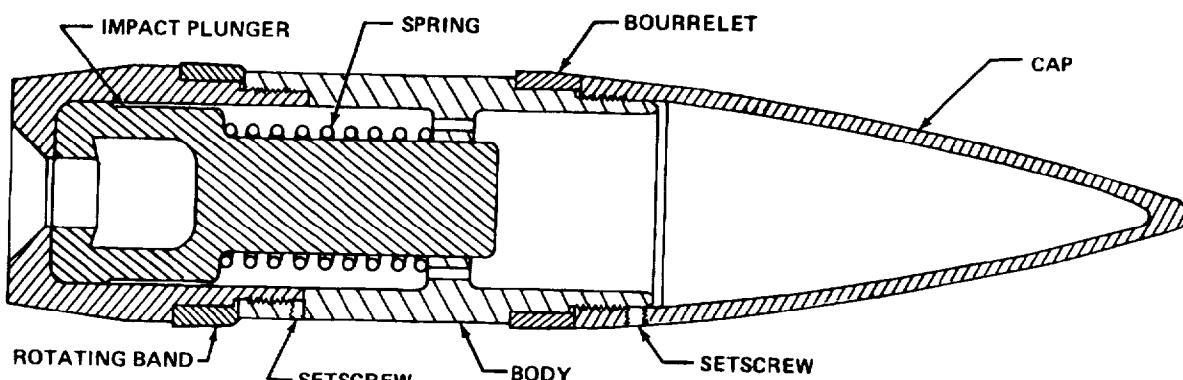
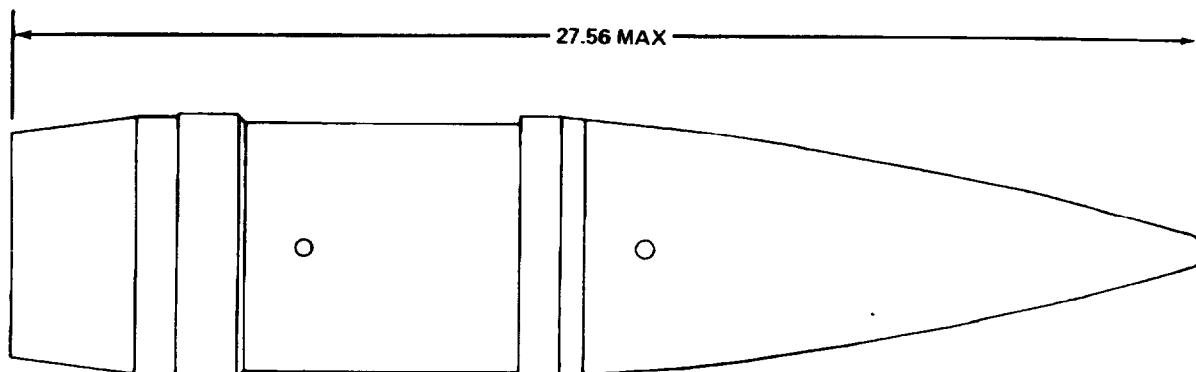
LIMITATIONS:

To be determined.

REFERENCES:

SC1305/30-IL
SB 700-20
DARCOM-P 700-3-3
TM 9-1015-252-10
TM 9-1300-251-20&P
TM 9-1300-251-34&P

PROJECTILE, 155-MILLIMETER: DUMMY, M7 AND M7B1 WITH CHARGE, PROPELLING:  
DUMMY, M2



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 hand (to simulate a bourrelet) and a bronze rear hand (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:

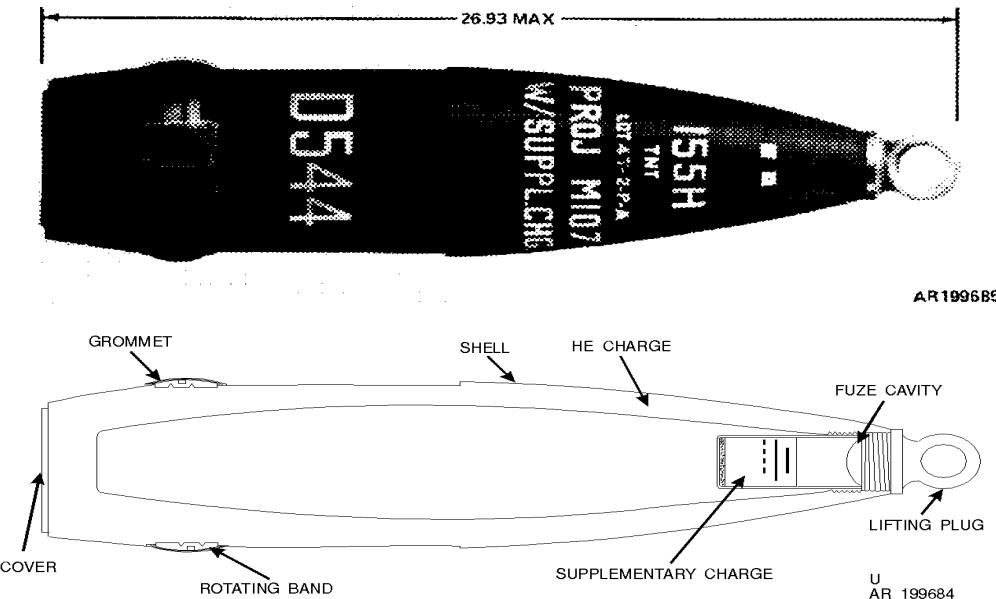
M7 projectiles are to be used for training with gun cannons only. However, M7B1 projectiles are also suitable for loading in howitzers. Both projectiles are identical except that the M7 cap is made of bronze and the M7B1 cap is made of malleable iron.

Tabulated Data:

Complete round:	Inert	for complete packing data including NSNs.
Type -----		Shipping and Storage Data.
Cannon used with -----	Howitzers M1, M1A1,M45,M126, M126A1,M185, M199,M284 Guns M2, M2A1, M46	Quantity-distance class ----- 00 Storage compatibility group ----- N/A DOT shipping class ----- 00 DOT designation ----- PROJECTILE NON-EXPLOSIVE
Projectile:		DODAC: Dummy Projectile ----- 1320-D553 Dummy Propelling Charge ----- 1320-D539
Body material -----	Cast steel	Assembly Dwg No: Dummy Projectile ----- 72-1-69
Weight-----	95 lb	Dummy Propelling Charge ----- 72-2-54
Length -----	27.56 in.	Limitations:
Color:		References
Old mfg -----	Blue or black w/white markings	SB 700-2 AMC-P 700-3-3
New mfg -----	Bronze w/white markings	
Propelling charge:		
Weight -----	7.371	
Length -----	11.0 in.	
Primer -----	Expend M82 or MK2A4 depending on weapon used with	
Fuze -----	None	
*Packing-----	1 projectile in wooden crate; 2 propelling charges M2 per metal con- tainer M13A2	
*Crate:		
Weight -----	106 lb	
Dimensions -----	33-3/8 x 10-1/8 x 10-1/8 in.	
Cube -----	1.98 cu ft	

\*NOTE: See DOD Consolidated Ammunition Catalog

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



### Type Classification:

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

### Use

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

### Description:

The projectile is a hollow steel shell filled with 14.6 pounds of TNT or 15.4 pounds of Composition B. The shape is ogival with a 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 fuzes may be used with this projectile. 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.

**Tabulated Data:**

Zone	Weight Zones Loaded Projectile (w/o fuze, w/o plug)		
	Over	Up to & Incl	Marking
2	90.0	91.3	□ • □ •
3	91.1	92.4	□ • □ •
4	92.0	93.7	• □ • □ •
5	93.3	94.6	• □ • □ • □ •

**Complete round:**

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

**Projectile:**

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

**Filler and weight:**

TNT ----- 14.6 lb  
 Comp B ----- 15.4 lb

**Primers:**

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

**Temperature Limits:**

Firing:  
 Lower limit ----- -65°F  
 Upper limit ----- +145°F  
 Storage:  
 Lower limit ----- -80°F (for periods not more than 3 days)

Upper limit ----- + 160°F (for periods not more than 4 hr/day)  
 \*Packing ----- 8 projectiles on pallet  
 \*Pallet:  
 Weight ----- 797 lb  
 Dimensions ----- 27-1/8 x 13-5/8 x 32 in.  
 Cube ----- 6.8 cu ft

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

**Shipping and Storage Data:**

Quantity-distance class ----- (18) 1.1  
 Storage compatibility group -- D  
 DOT shipping class ----- A  
 DOT designation ..... EXPLOSIVE  
 PROJECTILES  
 DODAC:  
 Deep cavity ----- 1320-D544  
 Normal cavity ----- 1320-D571  
 Assembly Dwg No.  
 Deep cavity ----- 9216352  
 UNO serial number ----- 0168  
 UNO proper shipping name --- Projectiles

**Ballistics:**

Cannon M1, M1A1, M45:			
Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
1, M3, green bag	207.3	3900	774.4
2, M3, green bag	234.7	4800	698.6
3, M3, green bag	268.2	6100	729.2
4, M3, green bag	310.9	7800	749.6
5, M3, green bag	371.9	9700	760.7
3, M4A1, white bag	274.3	6300	702.7
4, M4A1, white bag	316.4	8000	729.9
5, M4A1, white bag	374.6	9700	720.6
6, M4A1, white bag	463.3	12000	759.8
7, M4A1, white bag	563.9	14600	740.8

**Ballistics: (cont.)****Cannon M126/M126A1:**

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

**Cannon M126/M126A1:**

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

**Cannon M185:**

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	211.8	4000	673.6
2, M3A1, green bag	237.7	5000	722.4
3, M3A1, green bag	277.4	6500	690.4
4, M3A1, green bag	318.5	8300	760.9

5, M3A1, green bag	374.9	9800	717.2
3, M4A2, white bag	292.6	7200	734.9
4, M4A2, white bag	336.8	8900	736.8
5, M4A2, white bag	393.2	10300	756.1
6, M4A2, white bag	475.5	12400	758.4
7, M4A2, white bag	565.4	14800	760.3
8, M119/M119A1	684.3	18100	781.5

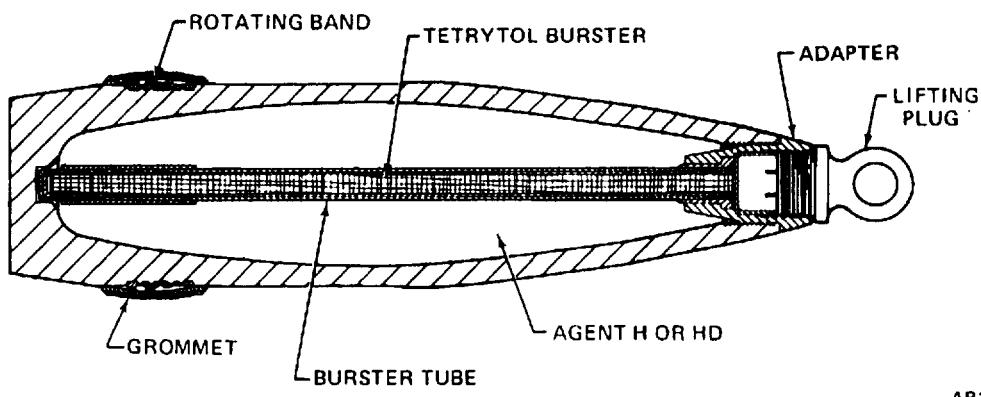
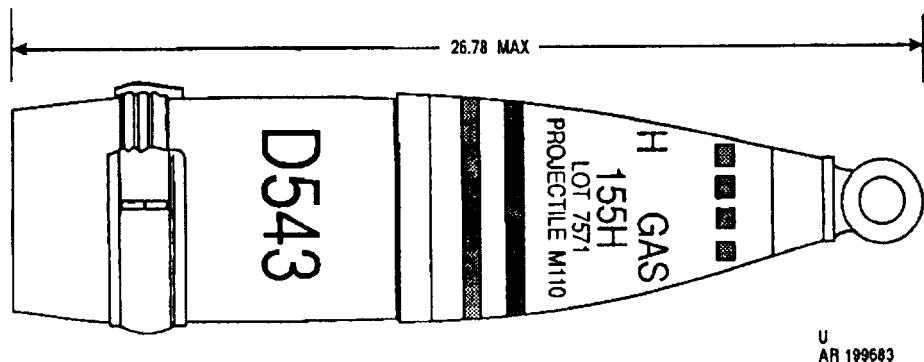
**Cannon M199:**

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

**References:**

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

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**PROJECTILE, 155-MILLIMETER: AGENT H/HD, M110**

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 base and is protected by a grommet to be removed before loading the projectile in the weapon. A PD fuze is normally used with the projectile. The ballistics are the same as the HE, M107 projectile.

**Functioning:**

When the weapon is fired, the burning propellant generates rapidly expanding gases to pro-

pel 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 Lifting Plug And Grommet					
Over	Up to & Including	lb	lb	Marking	H
Zone	H	H	H		
2	90.0		91.3	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	91.1		92.4	<input checked="" type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>
4	92.2		93.5	<input checked="" type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>

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 mark- ings, 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, M582 series, ET M767

\*NOTE: Renovated or newly manufactured (Post 1976) projectiles will be marked with one colored green marking and, if burstered, one yellow band,

**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 DOD Consolidated Ammunition Catalog 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
UNO serial number .....	0020
UNO proper shipping name ---	Ammunition, toxic
Assembly Dwg. No.....	75-14-317

**Ballistics:****Cannon M1, M1A1, M45:**

Charge	Muzzle Velocity (mps)	Max Range (m)	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

**Cannon M126/M126A1:**

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	207.3	3900	729.2
2, M3A1, green bag	236.2	4900	710.1
3, M3A1, green bag	275.8	6500	739.3
4, M3A1, green bag	317.0	8200	744.1
5, M3A1, green bag	374.9	9800	743.2
3, M4A2, white bag	269.7	6200	700.7
4, M4A2, white bag	313.9	8000	700.8
5, M4A2, white bag	373.4	9800	778.8
6, M4A2, white bag	461.8	12000	746.2
7, M4A2, white bag	562.4	14600	772.5

**Cannon M185:**

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

**Cannon M199:**

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	212.8	4000	673.6

2, M3A1, green bag	239.8	5000	722.4
3, M3A1, green bag	280.8	6500	690.4
4, M3A1, green bag	322.9	8300	760.9
5, M3A1, green bag	380.1	9800	717.2
3, M4A2, white bag	296.5	7200	734.9
4, M4A2, white bag	340.9	8900	736.8
5, M4A2, white bag	398.0	10300	756.1
6, M4A2, white bag	482.0	12400	758.4
7, M4A2, white bag	574.3	14800	760.3
8, M119/ M119A1	684.3	18100	781.5

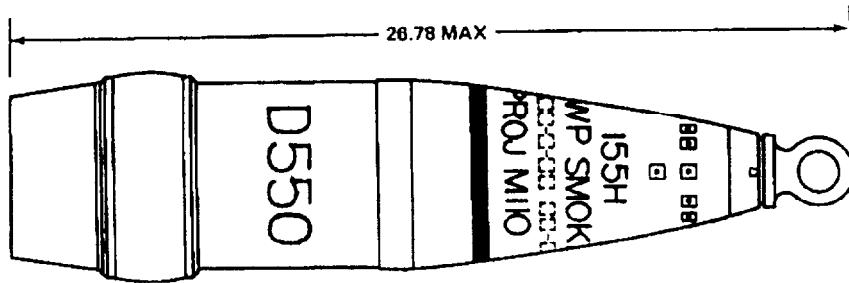
**Limitations:**

This ammunition is not to be fired or stored at temperatures higher than 125°F because of the tetrytol burster.

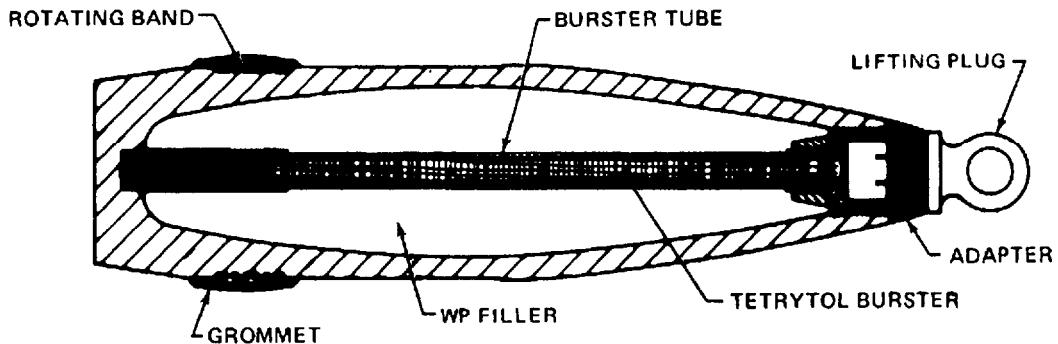
**References:**

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

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**PROJECTILE, 155-MILLIMETER: SMOKE, WP, M110 AND M110E1**

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 M110E1 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 lb 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 PD fuze is normally used with these projectiles. Except for the WP contents, these projectiles are exactly the same as the projectile H/HD. 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 ----- Smok WP  
 Weight w/lifting plug ----- 98.49 lb nomi-

Length w/lifting  
 plug ----- 26.78 in. max  
 Cannon used with ----- M1, M1A1,  
 M1A2, M45,  
 M126, M126A1,  
 M185, M199

Filler weight ----- 15.6 lb 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:  
 M739, MTSQ:  
 M564, M582,  
 ET: M767

**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 DOD Consolidated Ammunition Catalog 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 -----	EXPLOSIVE PROJECTILES
DODAC -----	1320 -D550
UNO serial number -----	0245
UNO proper shipping name ---	Ammunition smoke, white phosphorus
Assembly Dwg. No. -----	9210424

**Ballistics:**

Cannon M1, M1A1, M45:

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

Cannon M126/M126A1:

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	207.3	3900	729.2
2, M3A1, green bag	236.2	4900	710.1

**Cannon M126/M126A1:**

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

**Cannon M199:**

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

**Limitations:**

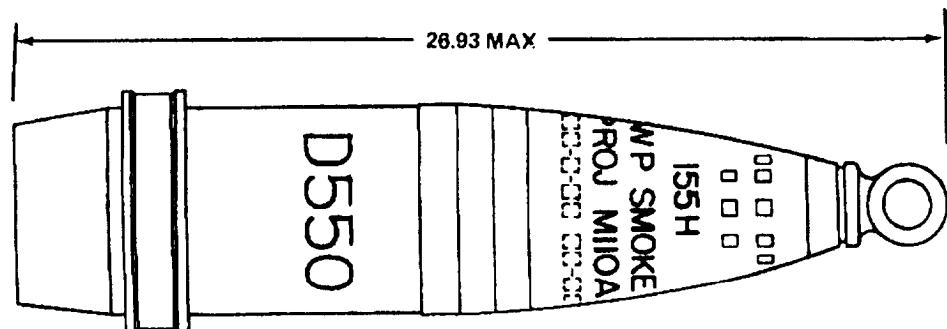
This ammunition is not to be fired or stored at temperatures above +125°F because of the tetrytol burster. When temperatures are above 111°F, the WP in the ammunition will melt and become liquid. If the temperature drops, it will solidify. If the WP solidifies in munitions stacked on their sides, the ballistics of the rounds will be changed; therefore, it is required that the WP munitions will be stacked in an upright position at all times.

**References:**

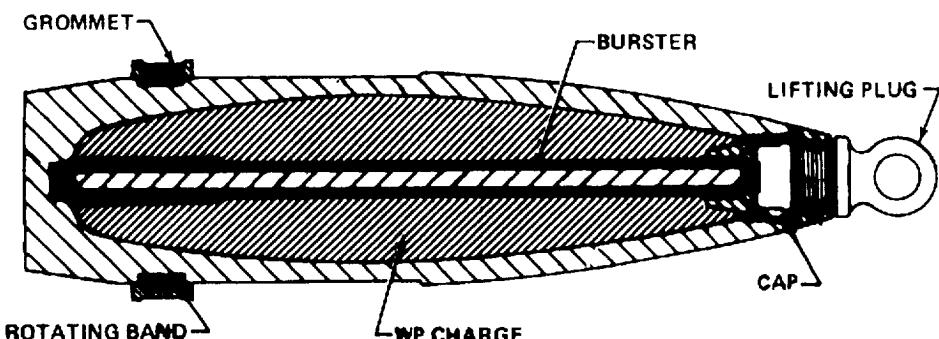
- AMC-P 700-3-3
- SB 700-20
- TM 9-1025 -200-12&P
- TM 9-1025-211-10
- TM 9-1300-251-20
- TM 9-2350-311-10
- TM 9-2350-314-10

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## PROJECTILE, 155-MILLIMETER: SMOKE WP, M110A1 (M110E2) 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. The M110A2 has an aluminum plug which seals the base of the tube. The M110A1 (the earlier model) has a plastic plug sealing the base of the tube. The tube is secured in the projectile well by a threaded cap assembled below the fuze well cup. For shipment and handling, a lift-

ing 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 MTSQ 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:**

The M110A1 and M110A2 projectiles both contain a comp B5 burster providing greater high temperature tolerance than the tetrytol bursters used in previous models of the M110 series WP projectiles. The M110A2 contains a burster tube assembly with an aluminum plug sealing the base of the tube while the M110A1 contains a plastic plug,

**Tabulated Data:**

WEIGHT ZONES Loaded Projectile Without Fuze, Lifting Plug And Grommet Over Up To & Incl				
Zone	Pounds	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 lug	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, M195 cannon)
Fuze	PD:M557, M739, MTSQ M564, M582, ET: M767

**Temperature Limits:**

Firing:	
Lower limit	-65°F (-53.8°C)
Upper limit	+ 145°F (+63°C)

Storage:	
Lower limit	-80°F (-64.5°C) (for not more than 3 days)
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 DOD Consolidated Ammunition Catalog 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	EXPLOSIVE PROJECTILES
DODAC	1320 -D550
UNO serial number	0245
UNO proper shipping name	Ammunition, smoke, white phosphorus
Assembly Dwg. No.	9217030

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
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

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

**Cannon M126/M126A1:**

Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)
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 (m)	Elevation (mil)
1, M3A1, green bag	211.8	4000	673.6
2, M3A1, green bag	237.7	5000	722.4
3, M3A1, green bag	277.4	6500	690.4
4, M3A1, green bag	318.5	8300	760.9
5, M3A1, green bag	374.9	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 (m)	Elevation (mil)
1, M3A1, green bag	212.8	4000	673.6
2, M3A1, green bag	239.8	5000	722.4
3, M3A1, green bag	280.8	6500	690.4
4, M3A1, green bag	322.9	8300	760.9
5, M3A1, green bag	380.1	9800	717.2
3, M4A2, white bag	296.5	7200	734.9
4, M4A2, white bag	340.9	8900	736.8
5, M4A2, white bag	398.0	10300	756.1
6, M4A2, white bag	482.0	12400	758.4
7, M4A2, white bag	574.3	14800	760.3
8, M119/ M119A1	684.3	18100	781.5

**Limitations:**

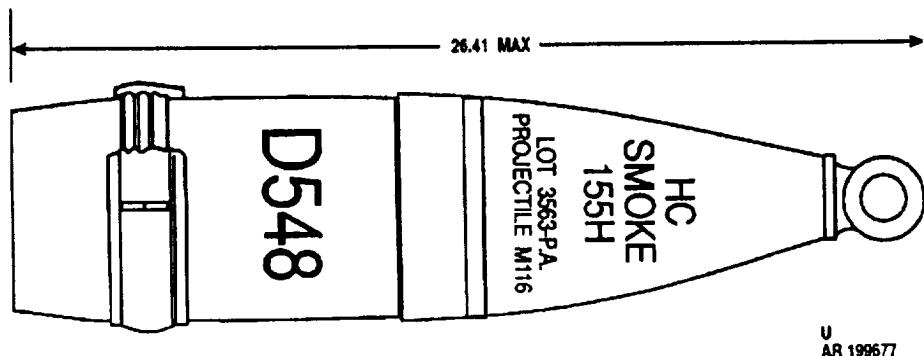
When temperatures are above 111 degrees F, the WP in the ammunition will melt and become liquid. If the temperature drops, it will solidify. If the WP solidifies in munitions stacked on their sides, the ballistics of the rounds will be changed; therefore, it is required that the WP munitions will be stacked in an upright position at all times.

**References:**

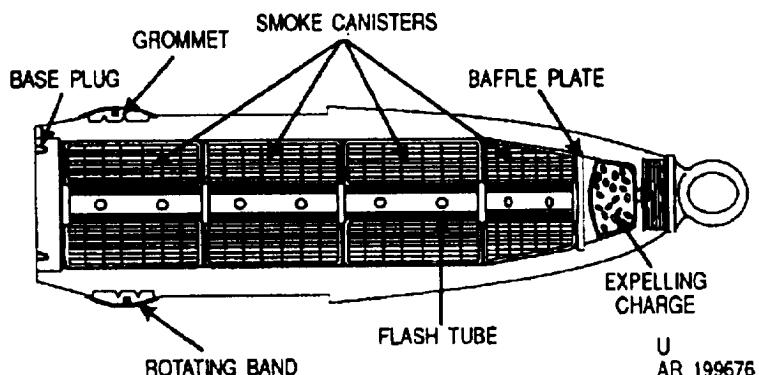
- AMC-P 700-3-3
- SB 700-20
- TM 9-1025-200-12&P
- TM 9-1300-251-20
- TM 9-2350-311-10
- TM 9-2350-314-10

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**PROJECTILE, 155-MILLIMETER: SMOKE BE, M116 AND M116B1, HC AND COLORED**



U AR 199677



U AR 199676

**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 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 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 Between Models:**

The expelling charge in Model M116B1 (0.34 lb of black powder) is contained in a polyethylene cup instead of in a cloth bag as in M116 (0.29 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		
	Over Pounds	Up To & Incl Pounds	Marking (Zone squares)
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 -----	MTSQ, M501 series

**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 projectiles on pallet
*Pallet:	Colored Smoke Weight Dimensions	HC Loaded
	727 lb	802 lb
	27-1/8 X	27-1/8X
	13-5/8 X	13-5/8X
	32 in.	32 in.
	6.8 cu ft	6.8 cu ft

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

**Shipping and Storage Data:**

Quantity-distance class -----	1.3
Storage compatibility group --	G
DOT shipping class -----	B
DOT decimation -----	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
UNO serial number -----	0016
UNO proper shipping name ---	Ammunition, smoke

**Ballistics:**

Cannon M1, M1A1, M45:

Charge	Muzzle Velocity (mps)	Max Range (m)	Elevation (mil)
1, M3, green bag	207.3	3900	774.4

**Cannon M1, M1A1, M45:**

Charge	Muzzle Velocity (mps)	Max Range (m)	Elevation (mil)
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 (m)	Elevation (mil)
1, M3A1, green bag	207.3	3900	729.2
2, M3A1, green bag	236.2	4900	710.1
3, M3A1, green bag	275.8	6500	739.3
4, M3A1, green bag	317.0	8200	744.1
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 (m)	Elevation (mil)
1, M3A1, green bag	211.8	4000	673.6

2, M3A1, green bag	237.7	5000	722.4
3, M3A1, green bag	277.4	6500	690.4
4, M3A1, green bag	318.5	8300	760.9
5, M3A1, green bag	374.9	9800	717.2
3, M4A2, white bag	292.6	7200	734.9
4, M4A2, white bag	336.8	8900	736.8
5, M4A2, white bag	393.2	10300	756.1
6, M4A2, white bag	475.5	12400	758.4
7, M4A2, white bag	565.4	14800	760.3
8, M119/M119A1	684.3	18100	781.5

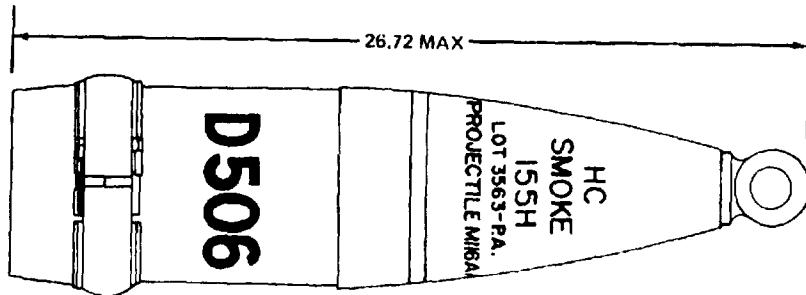
**Cannon M199:**

Charge	Muzzle Velocity (mps)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	211.8	4000	673.6
2, M3A1, green bag	239.8	5000	722.4
3, M3A1, green bag	280.8	6500	690.4
4, M3A1, green bag	322.9	8300	760.9
5, M3A1, green bag	380.1	9800	717.2
3, M4A2, white bag	296.5	7200	734.9
4, M4A2, white bag	340.9	8900	736.8
5, M4A2, white bag	398.0	10300	756.1
6, M4A2, white bag	482.0	12400	758.4
7, M4A2, white bag	574.3	14800	760.3
8, M119/M119A1	684.3	18100	781.5

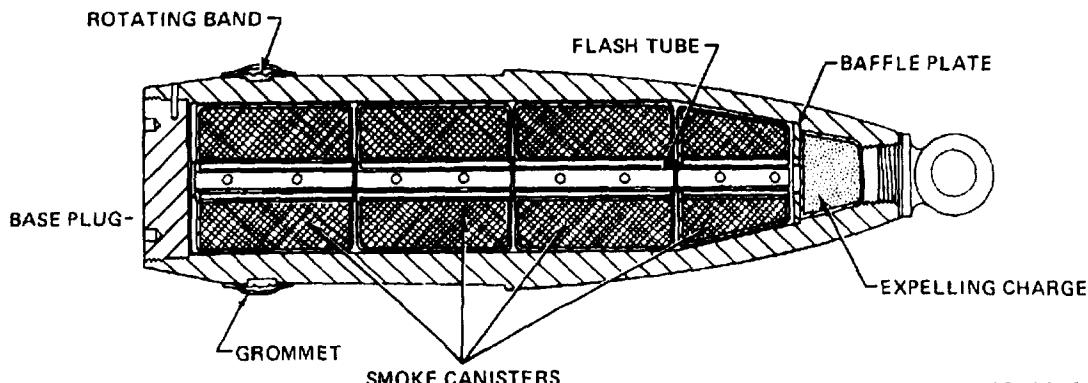
**References:**

- AMC-P 700-3-3  
SB 700-20  
TM 9-1025-200-12&P  
TM 9-1300-251-20  
TM 9-1300-251-34  
TM 9-2350-311-10  
TM 9-2350-314-10

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**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 plug 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 Between 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:**

Zone	WEIGHT ZONES Pounds				Marking
	Over	Up	To	& Incl	
1	88.9	90.2			■
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	■	■ ■ ■ ■ ■ ■ ■	

Complete round:

Type ----- Smoke, HC or

Weight with lifting plug ----- 97.0 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 3C'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;  
MTSO, M577;  
ET,M762

**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 ----- 814 lb

Dimensions ----- 27.1/8 x 13.5/8 x  
31-1/2 in.

Cube ----- 6.8 cu ft

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

**Shipping and Storage Data:**

Quantity-distance class ----- 1.3

Storage compatibility group -- G

DOT shipping class ----- B

DOT designation ----- SPECIAL  
FIREWORKS,  
HANDLE  
CAREFULLY,  
KEEP FIRE  
AWAY

DODAC:

HC M116A1 ..... 1320-D506

HC M116, M116B1 ..... 1320-D548

UNO serial number ----- 0016

UNO proper shipping name --- Ammunition,  
smoke

Assembly drawing number ---- 8885162

**Ballistics:**

Cannon M1, M1A1, M45:

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

**Cannon M126/M126A1:**

Charge	Muzzle Velocity (mps)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	207.3	3900	729.2
2, M3A1, green bag	236.2	4900	710.1
3, M3A1, green bag	275.8	6500	739.3
4, M3A1, green bag	317.0	8200	744.1
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 (m)	Elevation (mil)
1, M3A1, green bag	211.8	4000	673.6
2, M3A1, green bag	237.7	5000	722.4
3, M3A1, green bag	277.4	6500	690.4
4, M3A1, green bag	318.5	8300	760.9
5, M3A1, green bag	374.9	9800	717.2
3, M4A2, white bag	292.6	7200	734.9

4, M4A2, white bag	336.8	8900	736.8
5, M4A2, white bag	393.2	10300	756.1
6, M4A2, white bag	475.5	12400	758.4
7, M4A2, white bag	565.4	14800	760.3
8, M119/M119A1	684.3	18100	781.5

**Cannon M199:**

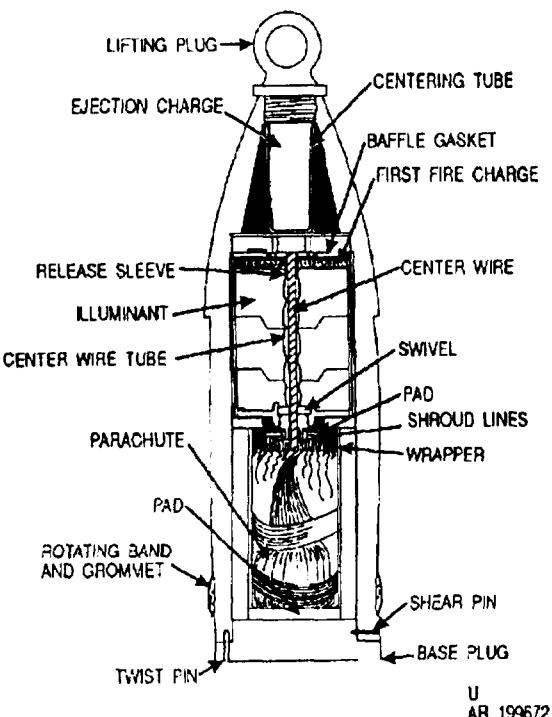
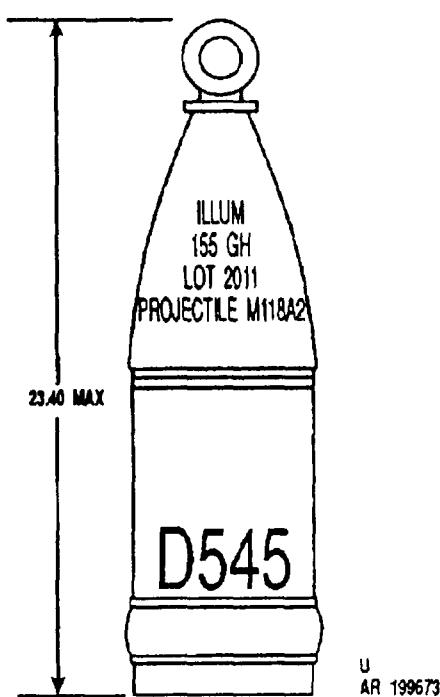
Charge	Muzzle Velocity (mps)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	211.8	4000	673.6
2, M3A1, green bag	239.8	5000	722.4
3, M3A1, green bag	280.8	6500	690.4
4, M3A1, green bag	322.9	8300	760.9
5, M3A1, green bag	380.1	9800	717.2
3, M4A2, white bag	296.5	7200	734.9
4, M4A2, white bag	340.9	8900	736.8
5, M4A2, white bag	398.0	10300	756.1
6, M4A2, white bag	482.0	12400	758.4
7, M4A2, white bag	574.3	14800	760.3
8, M119/M119A1	684.3	18100	781.5

**References:**

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

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## PROJECTILE, 155-MILLIMETER: ILLUMINATING, M118 SERIES

**Type Classification:**

Std CONT AMCTC 6558 dtd 1969.

**Use:**

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

**Description:**

The projectile is a hollow steel shell containing an illuminant canister, an ejection charge in the nose, and a parachute in the base. A threaded nose cavity is provided for an MTSQ fuze, and a lifting plug 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 imbedded in the forward end of the illuminant assembly behind a first fire charge. A rotating band encircles the projectile near the base and is protected by a grommet for shipment and handling.

**Functioning:**

When the weapon is fired, the burning propellant charge generates rapidly expanding gases to propel the projectile through the barrel to the velocity required to reach the function point. The rotating band engages the barrel rifling to 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 lb  
 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 manufactured w/white markings and a white band)  
 Filler and weight ----- Illuminum composition, 4.30 lb  
 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 lb  
 Dimensions ----- 29-1/8 X 14-5/8 x 28-1/2 in.  
 Cube ----- 7.0 cu ft

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

**Shipping and Storage Data:**

Quantity-distance class ----- 1.3  
 Storage compatibility group -- G  
 DOT shipping class ----- B

DOT designation ----- SPECIAL FIREWORKS, HANDLE CAREFULLY, KEEP FIRE AWAY  
 DODAC ----- 1320-D545  
 UNO serial number ----- 0254  
 UNO proper shipping name --- Ammunition, illuminating  
 Assembly Dwg No ----- 75-14-480

**Ballistics:**

Cannon M126/M126A1:

Charge	Muzzle Velocity m/sec	Max Range to Burst m	Elevation mil	Fuze Setting sec
1, M3 green bag	200	2600	793.2	20.4
2, M3 green bag	228	3600	782.9	25.2
3, M3 green bag	259	4700	770.1	29.6
4, M3 green bag	298	6100	761.7	34.5
5, M3 green bag	355	7800	743.3	39.4
3, M4A1, white bag	270	5100	769.6	31.1
4, M4A1, white bag	309	6500	765.8	36.1
5, M4A1, white bag	360	8000	796.4	42.5
6, M4A1, white bag	443	9700	758.8	46.1
7, M4A1, white bag	536	11600	763.0	51.9

Cannon M199:

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

**Cannon M199: (cont.)**

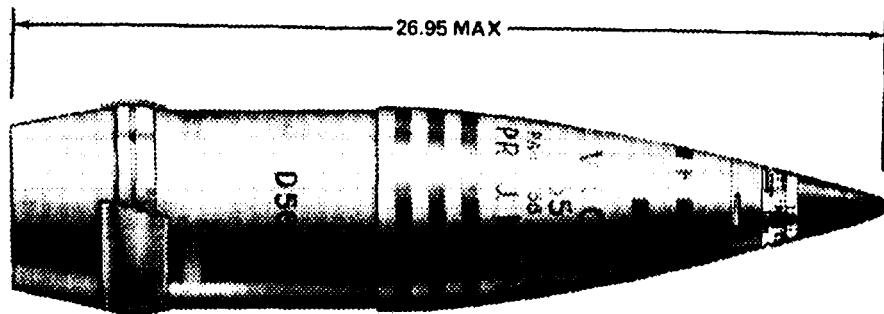
Charge	Muzzle Velocity (m/s)	Max Range (m)	Elevation (mil)			
3, M4A2, white bag	296.5	7200	734.9	6, M4A2, white bag	482.0	12400
4, M4A2, white bag	340.9	8900	736.8	7, M4A2, white bag	574.3	14800
5, M4A2, white bag	398.0	10300	756.1	8, M119/ M119A1	684.3	18100

**References:**

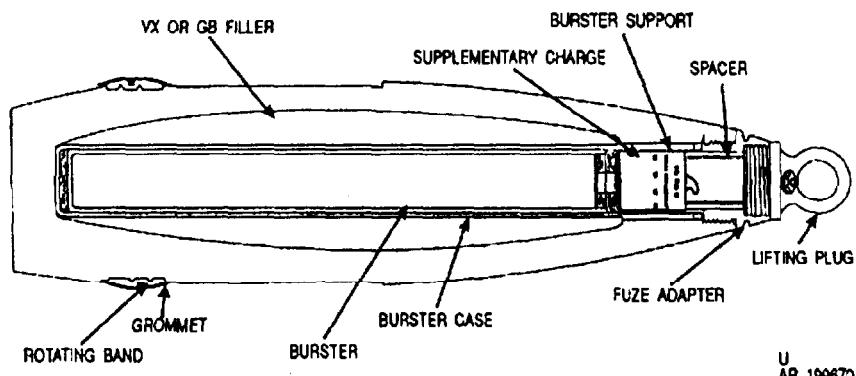
AMC-P 700-3-3  
 SB 700-20  
 TM 9-1025-200-12&P  
 TM 9-1300-251-20  
 TM 9-2350-311-10

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## PROJECTILE, 155-MILLIMETER: VX (Persistent) or GB (Non-Persistent): M121A1



AR 199671-A



U AR 199670

**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	26.93 in. max
Cannon used with	M1,M1A1, M45, M126, M126A1, M185, MI99
Body material	Steel

\*Color:

GB loading	Gray w/green markings and one green band (Later manufacture - three green bands).
VX loading	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, M732

"NOTE: Renovated or newly manufactured projectiles (Post 1976) will be marked with one green band and, if burstered, one yellow band.

**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 DOD Consolidated Ammunition Catalog for complete packing data inducting NSN's.

Quantity-distance class	(12) 1.2
Storage compatibility group	K
DOT shipping class	A
DOT designation	EXPLOSIVE PROJECTILES

DODAC:	
VX	1320-D568
GB	1320-D542
UNO serial number	0020
UNO proper shipping name	Ammunition, toxic
Assembly Dwg. No.:	
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 (m)	Range 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 M185:**

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

**Cannon M126/M126A1:**

Charge	Muzzle Velocity (mps)	Max Range (m)	Elevation (mil)
1, M3A1, green bag	207.3	3900	729.2
2, M3A1, green bag	236.2	4900	710.1
3, M3A1, green bag	275.8	6500	739.3
4, M3A1, green bag	317.0	8200	744.1
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 M199:**

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

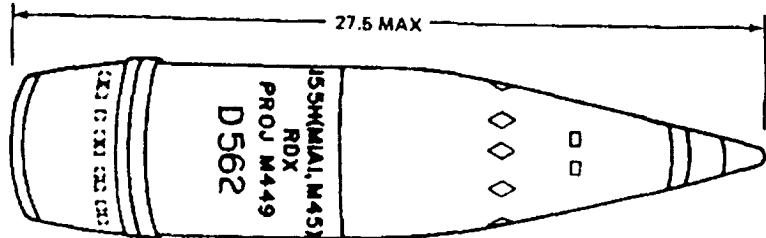
**Limitation:**

When contingency plans so require, these projectiles may be transported fully assembled with explosive components. Otherwise, assembly is prohibited except for storage and use.

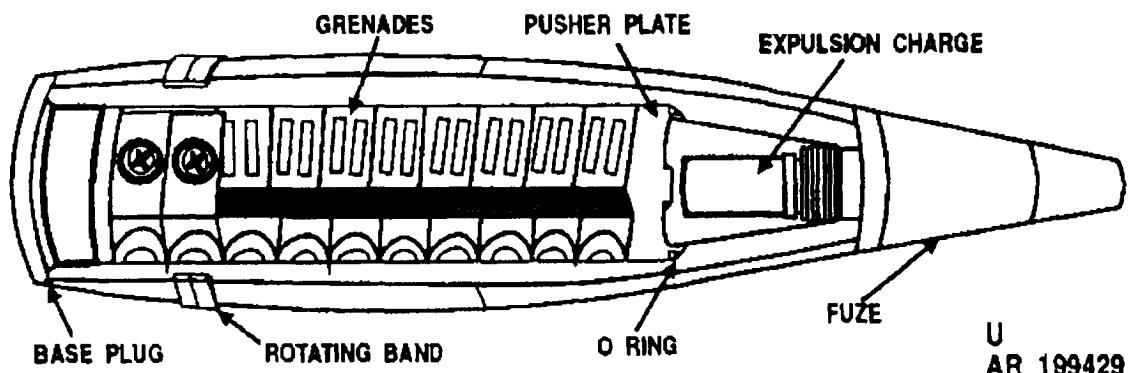
**References:**

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

## PROJECTILE, 155-MILLIMETER: IIE, M449 SERIES



AR 199430-A

**Type Classification:**

Std AMCTC 3982.

**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 predetermined time in flight, initiates the expulsion charge ejecting the entire grenade load from the time in flight, initiates the expulsion charge ejecting the entire grenade load from the rear of the projectile. Centrifugal force disperses the grenades from the projectile line-of-flight. The M43 grenade is an airburst 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  
 Weigh 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 gr  
 Explosive, Comp A5,  
 each projectile ----- 2.80 lb  
 Type of grenades:  
 ----- 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)  
 MI19/MI19A1 ----- Propellant M6,  
 20.5 lb (Zone 8)  
 Primer ----- M82, MK2A4 or  
 MK15  
 Fuze ----- MT, M565;  
 MTSO, M577;  
 ET, M762  
 Cannon used with ----- M1, M1A1,  
 M1A2, M45,  
 M126, M126E1,  
 M185 and M199

**Performance (full charge):**

Maximum range ----- 14,600 m  
 Muzzle velocity ----- 563.0 mps

**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 ----- 27-1/8 x 13-5/8 x  
 32.0 in.  
 Cube ----- 6.8 cu ft

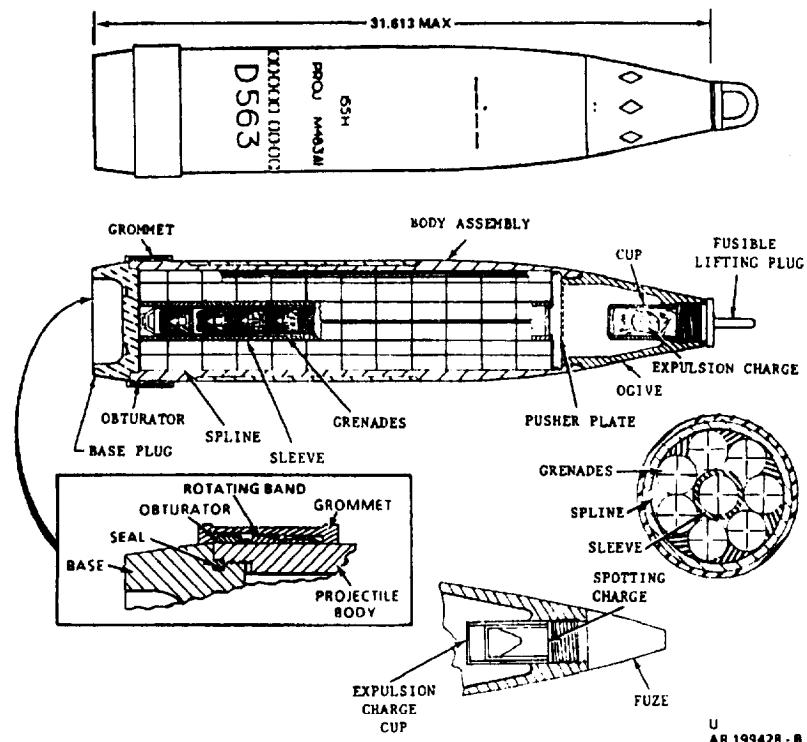
\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data**

Storage class/SCG ----- (18) 1.2  
 DOT shipping class ----- D  
 DOT designation ----- EXPLOSIVE PROJECTILES  
 DODAC:  
 M449 and M449E1 ----- 1320-D561  
 M449A1, M449E2 ----- 1320-D562  
 UNO serial number ----- 0169  
 UNO proper shipping name --- Projectiles  
 Projectile drawing number ----- 8875850  
 Packing drawing number ----- 7549275

**References:**

TM 9-1025-200-12&P  
 TM 9-1300-251-20  
 TM 9-1300-251-34  
 SB 700-20  
 AMC-P 700-3-3  
 TM 9-2350-311-10  
 TM 9-2350-314-10

**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 lifting plug may be the yellow fusible type or the universal type. 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. The expulsion charge can be a bagged expulsion charge assembly or the cylindrical plastic expulsion charge type. If desired, this

expulsion charge may be replaced by a spotting charge designated 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 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. 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.



Zone	Over lb	WEIGHT ZONES		Markings
		Loaded Projectile (w/o fuze, w/o plug)	Up to & Incl	
2	99.1 (41.3 kg)	100.3 (45.5 kg)		□ □
3	100.3 (45.5 kg)	101.3 (45.9 kg)		□ □ □
4	101.3 (45.9 kg)	102.6 (46.5 kg)		□ □ □ □
5	102.6 (46.5 kg)	103.6 (47 kg)		□ □ □ □ □
6	103.6 (47 kg)	104.8 (47.5 kg)		□ □ □ □ □ □

**Ballistics:**

Howitzer, Self-Propelled, M109 (M126A1 Cannon):

Charge	Muzzle velocity (mps)	Max Range (m)
1, M3A1, green bag	200	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/M109A2 (M185 Cannon):

Charge	Muzzle Velocity (m/s)	Max Range (m)
**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 bdg	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 Towed (M199 Cannon):

Charge	Muzzle Velocity (m/s)	Max Range (m)
<b>Propelling Charge-Green bag</b>		
	M3A1	M3
3G	261.9	257.9
4G	303.6	301.6
5G	358.1	356.1
<b>Propelling Charge - White bag</b>		
	M4A2	M4A1
3W	285.2	285.2
4W	326.5	324.5
5W	381.3	378.3
6W	460.7	455.7
7W	546.2	543.2

Charge	Muzzle velocity (m/s)	Max Range (m)
<b>Propelling Charge - M119/M119A1</b>		
8	655.8	17740

Propelling Charge - M119A2

7R	660.0	17740
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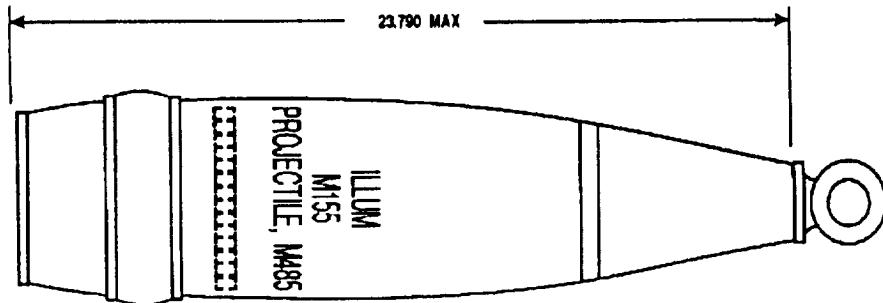
\*\*Firing below charge 3 may result in stickers when fired in M185 and M199 Cannons.

**References:**

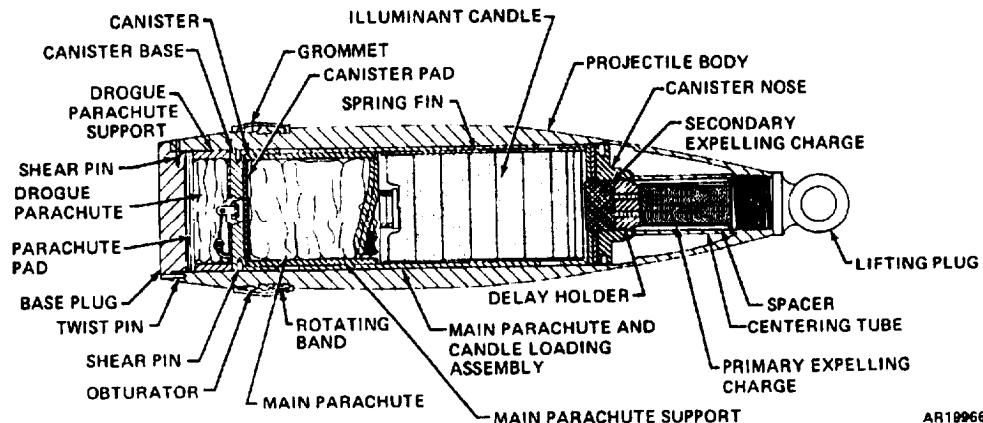
- TM 9-1300-251-20
- TM 9-1300-251-34
- TM 9-2350-311-10
- TM 9-2350-314-10

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## PROJECTILE, 155-MILLIMETER: ILLUMINATING, M485 SERIES



U  
AR 199669



AR199668

### Type Classification:

M485A2: Std AMCTC dtd 1970 M485A1:  
Std AMCTC dtd 1970 M485: C & T AMCTC dtd

### 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 gilding metal rotating band and a plas-

tic 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 reduces 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 fps and burns for 120 seconds producing approximately 1,000,000 candle-power.

#### Difference Between 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 lb 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; MTSQ, M577; ET, M762

#### Temperature Limits:

##### Firing and Storage:

Lower limit -----	-65°F (-53.8°C)
Upper limit -----	+145°F (+63°C)

*Packing -----	8 projectiles on pallet
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##### \*Pallet:

Weight -----	782 lb
Dimensions -----	27-1/8 x 13-5/8 x 32 in.
Cube -----	6.8 cu ft

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

#### Shipping and Storage Data:

Storage class/SCG -----	1.3 G
DOT class -----	B
DOT designation -----	SPECIAL FIREWORKS, HANDLE CAREFULLY, KEEP FIRE AWAY
DODAC -----	1320-D505
UNO serial number -----	0254
UNO proper shipping name ---	Ammunition, illuminating
Assembly Dwg No. -----	9214150

#### Ballistics:

Cannon M1A1:	Muzzle Velocity (mps)	Max Range toFunction (m)	Eleva- tion (mil)	Fuze Setting (sec)
Charge 1, M3, green bag	212	2788	796.5	19. 5
Charge 2, M9, 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 (m)	Eleva- tion (mil)	Fuze setting (sec)
1, M3A1, green bag	211.4	2949	931.0	24.5
2, M3A1, green bag	239.1	3923	924.6	29.2
3, M3A1, green bag	282.6	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 (m)	Eleva- tion (mil)	Fuze Setting (sec)
*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
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 (m)	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	7 8 1 . 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.

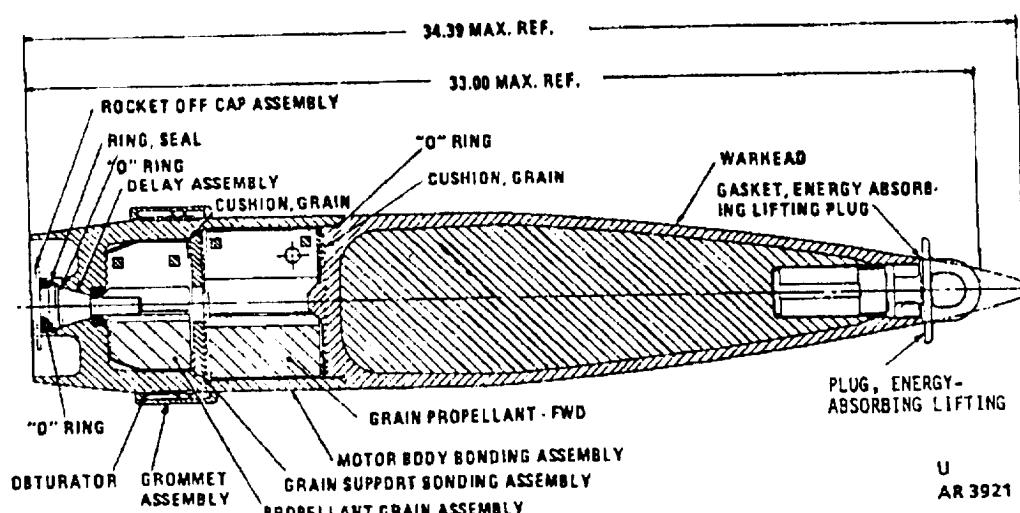
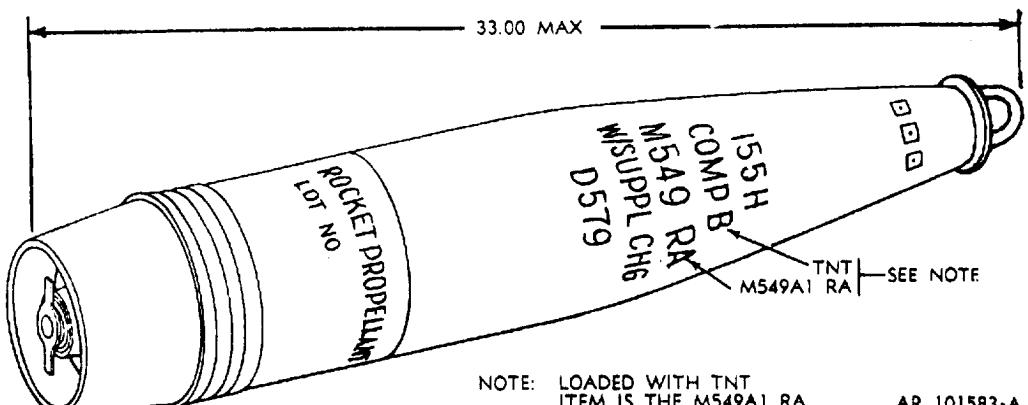
When firing the 155mm illuminating projectile at Zone 1 from the M114A1 howitzer, effective illumination times less than 90 seconds should be expected.

**References:**

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

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## PROJECTILES, 155-MILLIMETER: HERA, M549 AND M549A1

**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/A2/A3 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. A rotating hand 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 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 and rotating band form 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 burns for approximately three seconds. This additional thrust augments the velocity and consequently, the range of the projectile. If a PD or ET is used, the fuze detonates the supplementary charge and the supplementary charge detonates the warhead filler either on impact or at the preset time.

### Difference Between Models:

Model M549 is filled with Composition B; Model M549A1 is filled with TNT.

### Tabulated Data:

#### Complete round:

Type	HE, rocket assist
Weight w/fuze	96 lb (approx)
Length w/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)			
Zone	Over	Up to & Incl	Pounds
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 lb Supp Chg 0.30 lb
M549	TNT Comp B 16 lb Supp Chg 0.30 lb TNT
Propelling charge	M4 series at Charge 7 only
Propelling charge	M119A1, M119A2, M203 w/M549A1 projectile only
Primer	M82
Fuzes	See appendix A

### Temperature Limits:

Firing:	
Lower limit	-50°F (-45.5°C)
Upper limit	+145°F (+63°C)
Storage:	
Lower limit	-65°F (-53.8°C)
Upper limit	+160°F (+71.1°C) (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 DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

### Shipping and Storage Data:

	<u>M549</u>	<u>M549A1</u>
Storage class/ SCG	(18) 1.1D	(18) 1.1D
DOT shipping class	A	A
DOT designation-	EXPLOSIVE PROJECTILE	EXPLOSIVE PROJECTILE
DODAC	1320-D579	1320-D579
UNO serial number	0168	0168
UNO proper shipping name--	Projectiles	Projectiles
Assembly Dwg No.	9235999	9235999-1

**Ballistics:**

Howitzer	Propelling Charge	M4A2	Muzzle Velocity (m/s)	Maximum Range
M114A2		7	560.8	19,300
M109 (M109A1)	M4A2	7	560.8	19,300
M109A2)	M4A2		567.5	19,500
M109A3)	M119A1, A2	8,7	678.2	23,500
M198	M4A2 M119A1, A2	7 8,7	567.5 678.2	19,500 23,500
M203		8	826.0	30,100

**Limitations:**

M549 and M549A:

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 0.093 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.

M549:

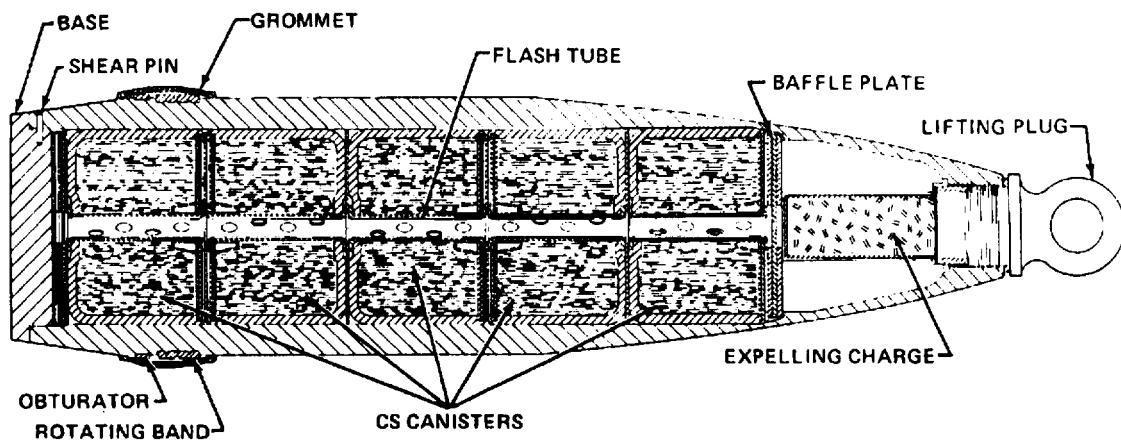
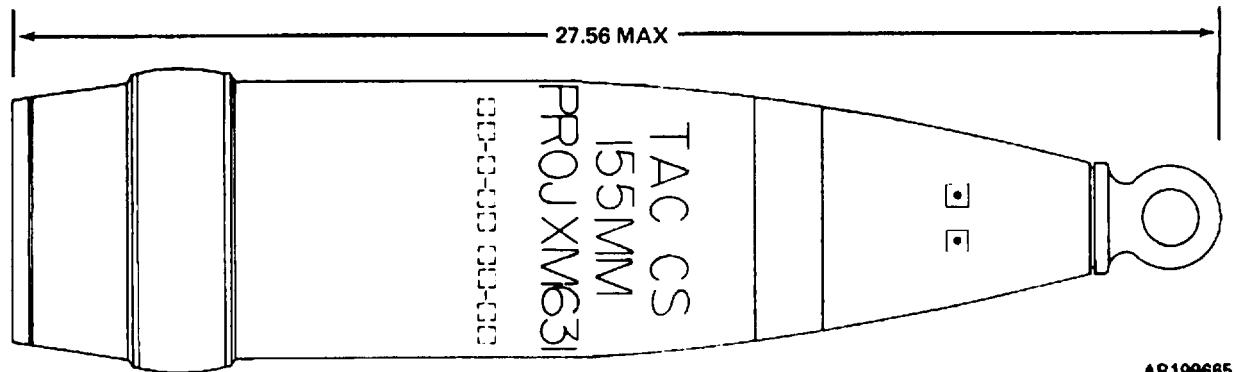
The M549 model cannot be fired with the M203 propelling charge.

**References:**

AMC-P 700-3-3  
TM 9-1300-251-34  
SB 700-20  
TM 9-1025-200-12&P  
TM 9-1300-251-20  
TM 9-1025-211-10  
TM 9-2350-311-10  
TM 9-2350-314-10  
TM 43-0001-28-4  
TM 43-0001-28-5  
TM 43-0001-28-6  
TM 43-0001-28-7  
TM 43-0001-28-8  
TM 43-0001-28-9  
TM 43-0001-28-10

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## PROJECTILE, 155-MILLIMETER: TACTICAL CS, XM631

**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.

**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 lifling plug	23.79 in.
Cannon used with	M1, M1A1, M45, M126, M126A1, M185
Projectile:	
Body material	Steel
Color	Gray wired 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 DOD Consolidated Ammunition Catalog 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  
 SPECIAL  
 PERMIT NO.  
 5208  
 DODAC ----- 1320-D581  
 Assembly Dwg. No. ----- 9220382

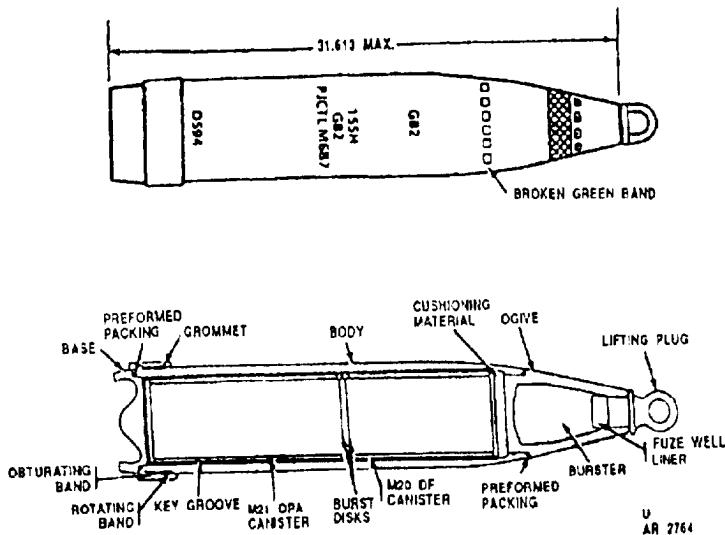
**Limitations:**

Do not fire with fuze set as issued. If impact detonation is intended instead of time functioning, set the fuze for 90 seconds.

**References:**

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

## PROJECTILE, 155-MILLIMETER: GB2, M687

**Type Classification:**

STD - MSR 01776009.

**Use:**

The projectile is used to produce a lethal effect on personnel.

**Description:**

The M687 projectile consists of a modified M483A1 steel projectile body, an aluminum closed bottom ogive, and a domed steel base. The closed bottom ogive contains the explosive burster (Comp-B/Oxamide), the projectile body is internally keyed to prevent relative spin of the canisters during launch and flight. The improved domed steel base allows firing with the M203/M203A1 propelling charge in the M198 howitzer.

The M687 projectile is stored and shipped with the M210PA (Isopropyl alcohol - Isopropylamine) canister installed, while the M20 DF (Methylphosphonic difluoride) canister is stored and shipped separately. The projectiles will be prepared for firing at a chemical ammunition supply point (CASP) in accordance with TM 3-1320-242-10, at which time a cover is removed from the broken green band marking. If a projectile is received at the firing site with the rubber marking cover on the projectile, assembly of the M20 canister has not been accomplished and the projectile is not to be fired.

**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 rotating band engages the barrel rifling and imparts spin to the projectile. Setback forces rupture the adjacent rupture discs allowing the DF and OPA to combine. In flight spin aids in mixing to form the agent GB.

On impact the PD fuze functions, initiating the burster charge which disseminates the GB.

**Tabulated Data:**

## Projectile w/fuze:

Type	AGENT GB2
Length	35.5 in.
Weight	93 lb
Burster	2.27 lb (Comp B/Oxamide)
Body material	Body/Base - steel Ogive - aluminum
Color	Gray, with dark green markings and 1/yellow band.

## Canister:

	M20 (DF)	M21(OPA)
Weight:	10.1 lb	14.5 lb
Length:	7.82 in.	13.87 in.
Diameter:	5.00 in.	5.00 in.

**Components:**

Cannon/Howitzer used with-----	M1A2 (M114A2), M185 (M109A2/A3) M199 (M198)
Primers-----	MK2A4 (M1A2) M82 (M185/M199)
Propelling charges -----	M3 Series M4 Series, M119 Series, M203 Series
Fuzes-----	PD, M557, M739/M739A1

**Temperature Limits:****Firing:**

Lower Limit -----	-13°F (-25°C)
Upper Limit -----	+125°F (+52°C)

**Storage:**

Lower Limit -----	-60°F (-51°C)
Upper Limit -----	+145°F (+62.8°C)

*Packaging -----	8 projectiles (stored horizontally in side loading pallet)
------------------	---

**\*Pallet:**

Weight -----	784 lb (356.8 kg)
Dimensions -----	36 x 32 x 25 in.
Cube -----	16.7 cu ft

*M20 (DF) Canister -----	1 ea canister per fiber container; 8 fiber containers per wooden box.
--------------------------	---

*M21 (OPA) Canister -----	1 ea canister per fiber container; 8 fiber containers per wooden box.
---------------------------	---

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

**Shipping and Storage Data:**

The following interim hazard data has been assigned to the projectile.

**Interim DOD Hazard Class/**

Division/Storage	
Compatibility Group -----	(12) 1.2L
Interim DOT hazard class-----	Class A
	Explosive
Interim DOT marking -----	EXPLOSIVE
	PROJECTILE
Interim DOT label -----	Explosive A

The following DOT markings apply to the M20

DF Canister:	
DOT hazard class: -----	Corrosive
	Material
DOT marking -----	CORROSIVE
	LIQUID, N.O.S.
	(METHYL-
	PHOSPHONIC
	DIFLUORIDE)
	UN 1760

The following DOT markings apply to the M21

**OPA Canister:**

DOT hazard class -----	Flammable
	Liquid
DOT marking-----	FLAMMABLE
	LIQUID N.O.S.
	(ISOPROPYL
	ALCOHOL-
	ISOPROPYLA-
	MINE) UN
	1993

**DODAC:**

M687 Projectile -----	1320-D594
M20 DF Canister -----	1320-D001
M21 OPA Canister -----	1320-D002
UNO serial number -----	0355
UNO proper shipping name ---	Articles, explosives

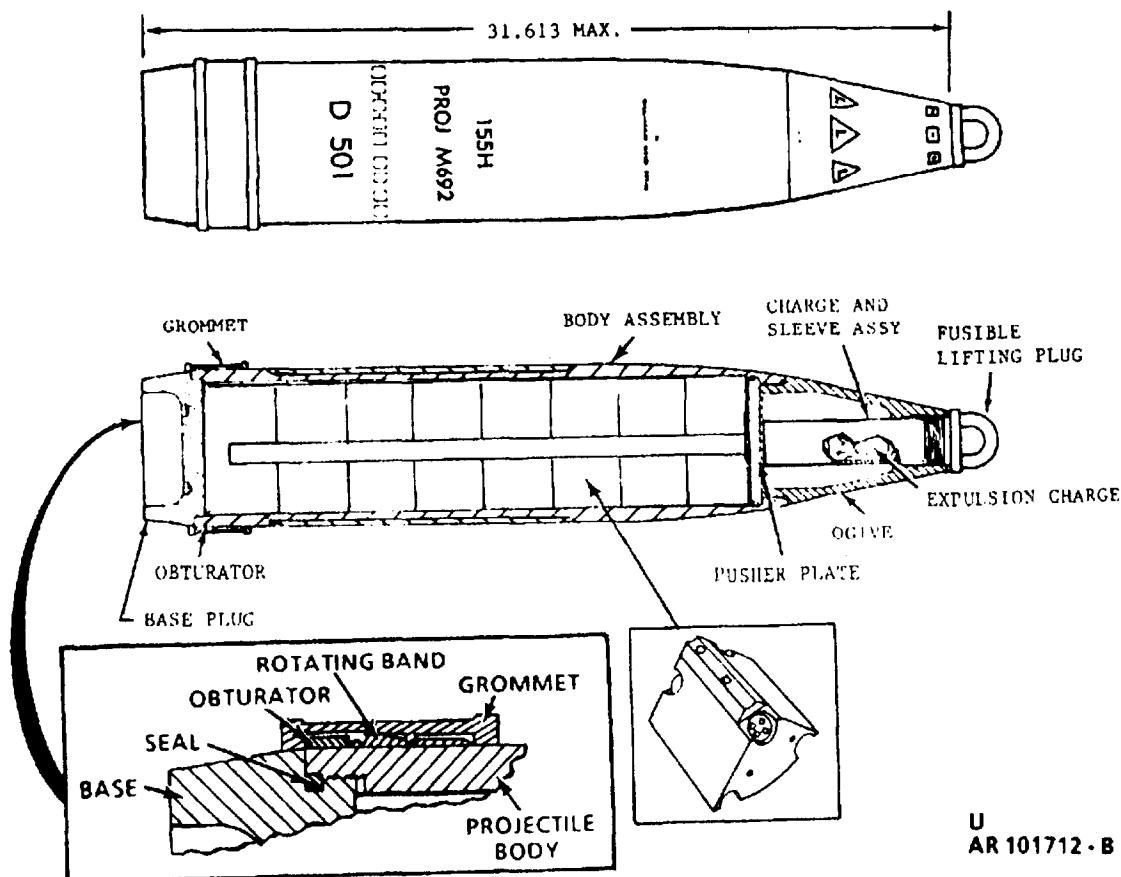
**Assembly drawing number:**

M687 w/o M20 -----	E15-12-330
M20 -----	D15-12-61
M21 -----	D15-12-62

**References:**

AMC-P 700-3-3	
SB 700-20	
TM 9-1025-200-12&P	
TM 9-1025-211-10	
TM 9-2350-311-10	
TM 9-2350-314-10	
FT 155-AN-1	
FT 155-ADD-K-1	

## PROJECTILE, 155-MILLIMETER: HE, M692

**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 lifting plug may be the yellow fusible type or the universal type. The plug must be replaced by a fuze before the projectile is loaded. The projectile contains a number of anti-personnel 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 expulsion charge can be a bagged expulsion charge assembly or the cylindrical plastic expulsion charge type. 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 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 lb (46.5 kg) without fuze
Length w/fuze -----	35.4 in. (88.9 cm)
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 g (0.75 oz)
Expulsion charge -----	M10 propellant, 51 g (1.80 oz)

**Components:**

Propelling charge M3A1 -----	Propellant M1, 5.0 lb (2.3 kg) (Zones 1-5)
Propelling charge M4A2 -----	Propellant M1, 13.5 lb (6.1 kg) (Zones 3-7)

**M119/M119A1 Special Single Zone (8)**  
for use with the M109A1, M198

Muzzle Velocity (mps)	Max Range (m)
650	17,740

Primer -----	M82
Fuze -----	MTSQ, M577; ET, M762

Cannon used with -----	M185, M199, M1A2, M126A1
------------------------	--------------------------------

**Performance (full charge):**

Maximum Range -----	14,586 m (47,854 ft)
Muzzle velocity -----	560.2 mps (1,837.9 ft/sec)

**Temperature Limits:****Firing:**

Lower limit -----	-25°F (-31.6°C)
Upper limit -----	+125°F (+52°C)

**Storage:**

Lower limit -----	-30°F (-31.1°C)
Upper limit -----	+165°F (+73.9°C)

*Packing -----	Pallet of 8 projectiles
----------------	-------------------------

**\*Pallet:**

Weight (loaded) -----	874 lb (396 kg)
Dimensions -----	39-3/8 x 29 x 14-1/2 in. (100.01 x 73.66 x 36.33 cm)

Cube ----- 9.7 cu ft  
(0.27 cu m)

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

**Shipping and Storage Data:**

Hazard class/division -----	1
Compatibility Group -----	(12) 1.2D
DOT class -----	Class A
Explosive -----	
DOT marking -----	EXPLOSIVE PROJECTILES
DODAC -----	1320-D501
UNO serial number -----	0169
UNO proper shipping name -----	Projectiles
Drawing number -----	9298315
Top packaging drawing number -----	8837839

**WEIGHT ZONES**  
Loaded Projectile (w/o fuze, w/o plug)

Zone	Over lb	Up To & Incl	Markings	
			1	2
2	99.1	100.4		
	(41.3 kg)	(45.5 kg)		
3	100.2	101.5		
	(45.5 kg)	(46.0 kg)		
4	101.9	102.8		
	(45.9 kg)	(46.6 kg)		
5	102.4	103.7		
	(46.4 kg)	(47 kg)		
6	103.5	104.8		
	(46.9 kg)	(47.5 kg)		

**Ballistics:**

Howitzer, Self-Propelled, M109:

Charge	Muzzle Velocity (m/s)	Max Range (m)
*1, M3A1, green bag	200.0	3640
*2, M3A1, green bag	225.0	4570
3, M3A1, green bag	254.0	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

## Howitzer, Self-Propelled, M109: (cont.)

Charge	Muzzle Velocity (m/s)	Max Range (m)
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/M109A2  
(M185 Cannon):

Charge	Muzzle Velocity (m/s)	Max Range (m)
*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 tired in M185 and M199 Cannons.

## Howitzer-M198 (M199 Cannon):

Charge	Muzzle Velocity (m/s)	Max Range (m)
Propelling Charge-Green Bag		
	M3A1	M3
3G	261.9	257.9
4G	303.6	301.6
5G	358.1	356.1

## 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
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## Propelling Charge-M119A2

7R	660.0	17740
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Howitzer, Towed, M114A2  
Firing Tables not compiled at this time

Weapons fired from:

M109, M109A1, M109A2, M114A2, M198

Weapon/Propelling Charge/Prmer/Combinations:

M109/M3A1, M4A2/M82  
M109A1/M3A1, M4A2, M119, M119A1,  
M119A2/M82  
M114A2/M3A1, M4A2/MK2A4, MK15  
M198/M3A1, M4A2, M119, M119A1/M119A2,  
M82

References:

TM 9-1300-251-20

TM 9-1300-251-34

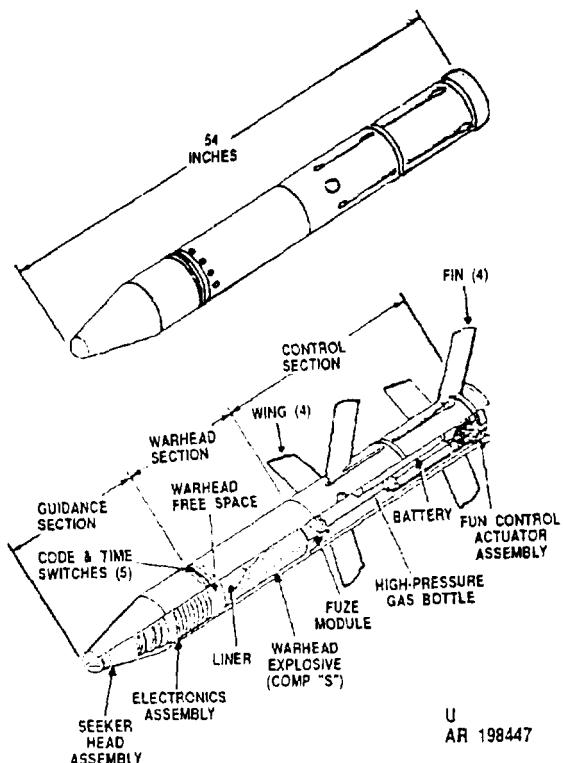
TM 9-2350-311-10

TM 9-2350-314-10

For classified data pertaining to this item refer to TM 43-0001-28-1(C).

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## PROJECTILE, 155-MILLIMETER: HEAT GUIDED, CANNON-LAUNCHED, M712



**Type Classification:**

Standard, MSR 11796005.

**Use:**

Cannon Launched Guided Projectile; M712, Copperhead, is a 155mm, separate loading, laser-guided, high-explosive, projectile. It is intended to be used against tanks, armored vehicles, and other moving or stationary hardened targets. The M712 projectile is designed for use with M109A1/A2/A3, M198, and M114A2 howitzers.

**Description:**

The M712 projectile consists of three main sections: a forward section (guidance section), a center section (warhead or payload section), and an aft section (control section).

The guidance section consists of two major assemblies: the seeker head assembly and the electronics assembly. The laser detector, decoding circuits, gyro, and all of the electronic circuits that stabilize and control the flight of the projectile to the target are contained in this section. Also, there are several components of the fusing system physically located in the guidance section. These include a dual section direct impact sensor (DIS)

located in the forward end of the seeker head assembly and six shock wave sensors (SWS) located strategically throughout the guidance section. Also, there are five screwdriver-set switches located in the forward bourrelet. These switches, identified as code and time switches, are set by the howitzer crew just prior to loading and firing the projectile.

The warhead section is classified as high explosive antitank warhead. The housing is a cylindrical steel shell with a cone-shaped liner located at the forward end and a fuze compartment located at the aft end. The explosive filler, consisting of 14.75 pounds of Composition B, is cast into the space between the liner and the fuze compartment. A cylindrical shaped fuze assembly (module) fits into the fuze compartment. The fuze module consists of a dual-channel safety and arming (S&A) device, two detonators, two explosive actuators, two explosive leads, and a single booster charge. Except for the booster, the fuze is a dual-channel redundant system where both channels are totally independent of one another and where initiation of either channel will cause normal functioning of the warhead explosive charge.

The control section contains a battery that provides electrical power, a high-pressure gas bottle that provides pneumatic power, four fins, four wings, and the mechanism to extend

and actuate these control surfaces during flight. The housing for the control section is a cylindrical steel shell. The forward end is designed to mate with the warhead section by means of an internal-fitting splice ring. The aft end is designed to receive a screw-on aft closure (base) with a rotating plastic obturator. The obturator is retained between the aft closure and the control section housing. It is designed to not only seal off propelling charge gases but the rotating feature of the obturator reduces the spin of the projectile to approximately 10 revolutions per second. This spin rate is sufficient to deploy the fins, but slow enough to allow the control surfaces to stabilize the projectile through the entire flight. The base of the M712 projectile is designed to receive an extractor device used to unload the projectile from the gun tube.

The projectile is shipped and stored in a sealed metal container. The container is a top-opening design which provides full environmental protection during normal handling and storage operations. Containerized projectiles are normally stored and transported on pallets designed to be compatible with standard Army storage and transporting facilities and equipment.

### **Functioning:**

The M712 projectile is designed for indirect firing operations only. However, the projectile trajectory can be programmed for either of two modes. In the ballistic mode, the projectile is fired on a high trajectory. Just past the apex of the trajectory, the projectile sees the target through reflected laser energy and steers on a steep path to the target. The second mode is the glide mode. The trajectory for the glide mode is generally flatter than the ballistic mode so that the projectile can fly under and out of cloud ceilings. In this mode, the guidance section applies different glide characteristics to the projectile control surfaces, allowing it to fly a relatively low flat trajectory. Either mode is selected by specific settings of the switches.

Except for the trajectory differences for the ballistic and glide modes, the projectile functions in the same manner for all firings. Before the projectile is loaded in the tube, the code and time switches located in the forward bourrelet are set to a five digit command originating from the Fire Direction Center. The five switch settings will program a time delay based on the duration of the flight, will set up the projectile for a ballistic or glide flight, and will key the projectile's code detector to match the pulse code of the laser designator used by the Forward Observer calling for the fire mission. When the round is fired, the setback and acceleration

forces initiate the mechanical arming portion of the fuze S&A. These forces also cause the fins to unlatch and a portion of the battery to activate. On leaving the tube, the fins snap out by centrifugal force, and lock in the extended position. After the time delay set in by the code and time switches has expired, the main portion of the battery will activate, providing electrical power to all of the electronic circuits in the projectile. At the approximate midpoint of the trajectory, the wings will be deployed and the roll control and guidance functions will take over the flight of the projectile. When the projectile receives and decodes the laser energy reflected from the target, the projectile will steer onto a gliding intercept course to the target. At the same time, the fuze will become electrically armed. When the projectile hits the target, either the direct impact sensors or the shock wave sensors will trigger the fuze detonators and the warhead will function.

### **Tabulated Data:**

Type	HEAT
Weight	138 lb
Length	54 in.
Weapon used with	M198, M109A1/A2/A3 M114A2 howitzers
Body material	Steel
Projective ogive (nose cone) material	Plastic
Color	Black w/yellow markings
Filler and weight	Comp, B 14.75 lb
Propelling charge	M3A1, M4A2, M119, M119A1, M119A2
Primer	M82
Container:	
Weight (without projectile)	67.5 lb
(with projectile)	205.5 lb)
Length	61 in.
Height	11.375 in.
Width	11 in.
Cube	4.4 cu ft
Color	Forest green w/yellow markings
Packaging:	
Quantity	6 projectiles per pallet
Pallet weight	1358 lb
Dimensions:	
Length	61 in.
Height	27.5 in.
Width	33 in.
Cube	32 cu ft

**Shipping and Storage Data:**

Quantity distance hazard  
**class** ----- class 1.1  
 Storage compatibility ----- Group D  
 DOT shipping class ----- Class A  
 DOT designation ----- EXPLOSIVE PROJECTILE  
 DODAC ----- 1320-D510  
 UNO serial number ----- 0168  
 UNO proper shipping name --- Projectiles  
 Assembly drawing number:  
 Projectile ----- 9305300  
 Container ----- 9300440

**Ballistics:**

Howitzer M109A1/A2/A3 and M198:

Propelling charge	Muzzle velocity (mps)	Maximum range (m)	Chamber pressure
M3A1			
Charge 4	257	5,200	9.46
Charge 5	313	6,700	14.50

## M4A2

Charge 4	278	5,800	6.60
Charge 5	323	7,000	10.00
Charge 6	396	8,500	15.90
Charge 7	468	9,900	27.50

## M119\*

<b>Charge 8</b>	<b>577</b>	<b>16,000</b>	<b>29.60</b>
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\*Not used with M109A1

**Limitations:**

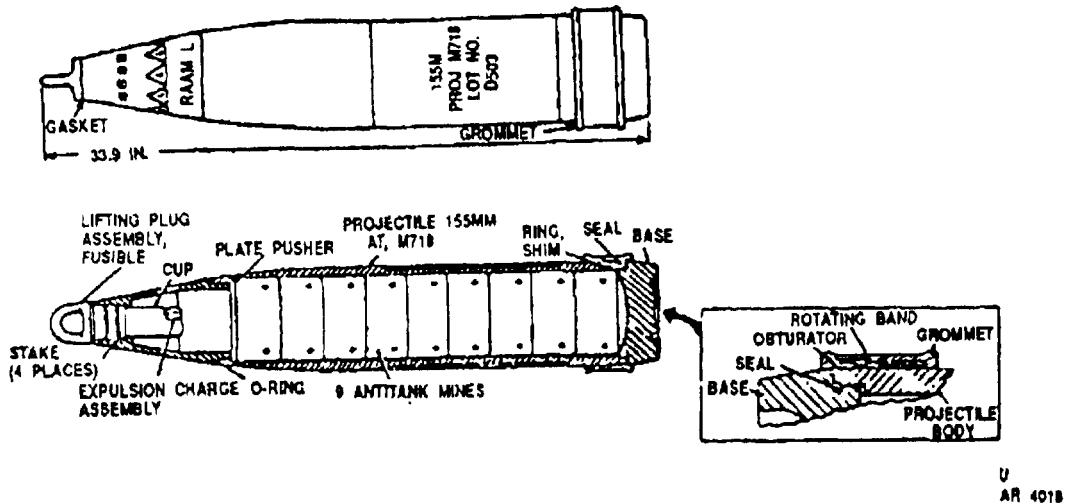
Maximum safe limit for a hot M712 projectile in a hot tube is 1 minute.

**References:**

TM 9-1300-251-20  
 TM 9-1300-251-34  
 TM 9-1025-211-10  
 TM 9-2350-311-10  
 TM 9-1025-200-12&P  
 TM 9-2350-314-10

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## PROJECTILE, 155-MILLIMETER AT, M718

**Type Classification:**

Standard with Logistic Control Code "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. The "L" means "Long" for long time until mine self-destructs (over 24 hours).

**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, the lifting plug may be the yellow fusible type or the universal type. 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 expulsion charge can be a bagged expulsion charge assembly or the cylindrical plastic expulsion charge type. 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 -----	Antitank (AT)
Weight -----	103 lb (47 kg) with fuze
Length (w/lifting plug) -----	33.9 in. (86.1 cm)
Body material -----	Forged steel
Color -----	Olive drab w/yellow markings
Marking drawing -----	9277852

## Filler and Weight:

Number of mines -----	9
Explosive -----	PBX 0280 (95% RDX, 5% Estane)
Explosive Wt/mine -----	1.26 lb (0.57 kg)
Expulsion charge -----	M10 Propellant (58.0 ± 1 gr)

Components:

Propelling Charges .....	M3A1, M4A2, M119, M119A1, M119A2
Primers .....	MK2A4, MK15,
Fuze .....	M82 MTSQ, M577; ET, M762

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 projectiles
<b>Pallet:</b>	
Weight (loaded) .....	882 lb (400 kg)
Dimensions .....	39-3/8 x 29-1/8 x 14-5/8 in. (100.01 x 73.98 x 37.15 cm )
Cube .....	9.7 cu ft (0.3 cu m)

**\*NOTE:** See DOD Consolidated Ammunition Catalog for complete packing data, including NSNs.

Shipping and Storage Data:

Storage class/SCG .....	1.1 D
DOT shipping class .....	Class A
DOT designation .....	EXPLOSIVE PROJECTILES
DODAC .....	1320-D503
UNO serial number .....	0168
UNO proper shipping name .....	Projectiles
Drawing numbers .....	9277852
Top packaging drawing number .....	8837839

WEIGHT ZONES

Zone	Over lb	Incl	Markings	Loaded Projectile (w/o fuze, w/o plug)	
				Up to &	
2	99.1 (45 kg)	100.4 (45.5 kg)		■	■
3	100.2 (45.5 kg)	101.5 (46 kg)		■	■ ■
4	101.1 (45.9 kg)	102.8 (46.6 kg)		■	■ ■ ■
5	102.4 (46.4 kg)	103.7 (47 kg)		■	■ ■ ■ ■
6	103.5 (46.9 kg)	104.8 (47.5 kg)		■	■ ■ ■ ■ ■

Ballistics:

Howitzer, Self-Propelling, M109A1, M109A2:

Firing Tables:

FT 155-AN-C. C1  
FT 155-Addendum N-1

Charge	Muzzle Velocity (mps)	Max Range (m)
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 lb	650.5	17500

Howitzer, Self-Propelled, M109:

Howitzer, Towed, M114A2:

Charge	Muzzle Velocity (mps)	Max Range (m)
--------	--------------------------	------------------

Propelling Charge - green bag M3A1

	M3A1	M3
3G	261.9	257.9
4G	303.6	301.6
5G	358.1	356.1

Propelling Charge - White Bag M4A2

	M4A2	M4A1
3W	285.2	285.2
4W	326.5	324.5
5W	381.3	378.3
6W	460.7	455.7
7W	546.2	543.2

Propelling Charge - M119/M119A1

8	655.8	17740
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Propelling Charge - M119A2

7R	660.0	17740
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Weapons fired from:

M109, M109A1, M109A2, M114A2, M198

Weapon/Propelling Charge/Primer/Combinations:

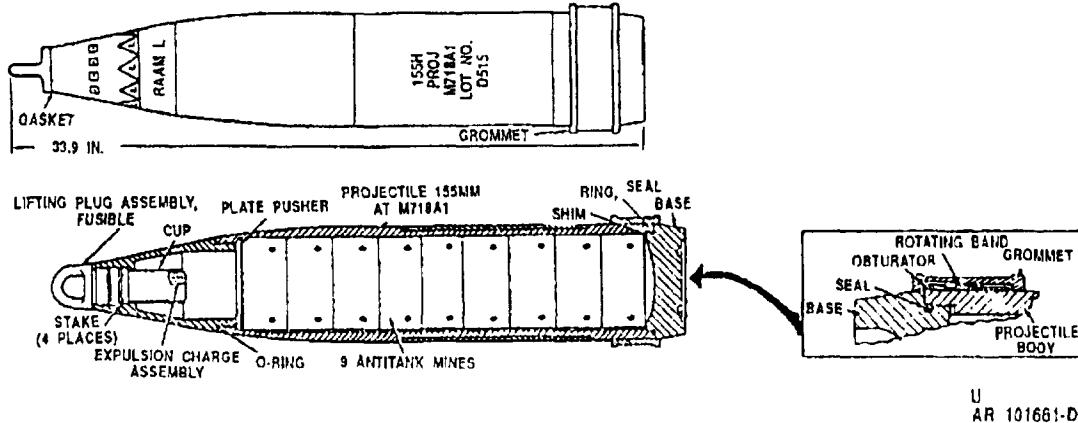
M109/M3A1, M4A2/M82, M109A1/M3A1, M4A2,  
M119, M119A1/M119A2/M82, M109A2/M3A1,  
M4A2, M119, M119A1/M82, M114A2/M3A1,  
M4A2/MK2A4, MK15, M119A2, M198/M3A1,  
M4A2, M119, M119A1/M119A2/M82

References:

TM 9-1300-251-20  
TM 9-1300-251-34  
TM 9-2350-311-10  
TM 9-2350-314-10

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## PROJECTILE, 155-MILLIMETER AT, M718A1

**Type Classification:**

Std, Logistics Control Code A MSR  
04866010,

**Use:**

These projectiles are used to deliver antitank mines in front of or upon enemy armored formations to deny/delay access to a particular area for a specific time period. The "L" means "Long" for long time until mine self-destructs (over 24 hours).

**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. The lifting plug may be the yellow fusible type or the universal type. Before firing, the lifting plugs must be replaced with M577 Series MTSQ fuzes. The projectiles contain a payload of antitank mines that are ejected during projectile flight by an expulsion charge. The expulsion charge can be a bagged expulsion charge, or the cylindrical plastic expulsion charge type. 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 func-

tions 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 instantly after coming to rest on the ground. When 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	Antitank (AT)
Weight	103 lb (47 kg) w/fuze
Length (w/lifting plug)	33.9 in. (86.1 cm)
Body material	Forged steel
Color	Olive drab w/yellow markings
Marking drawing	11786215

**Filler and Weight:**

Number of mines	9
Explosive	PBX 0280 (95% RDX, 5% Estane)
Explosive Wt/mine	1.26 lb (0.57 kg)
Expulsion charge	M10 propellant (58.0 ± 1 gr)

Components:

Propelling charges -----	M3A1, M4A2, M119, M119A1, M119A2
Primers-----	MK2A4, M82
Fuze -----	MTSQ, M577 Series; ET, M762

Temperature Limits:

<b>Firing:</b>	
Lower limit -----	-25°F (-32°C)
Upper limit -----	+145°F (+63°C)
<b>Storage:</b>	
Lower limit-----	-60°F (-51°C)
Upper limit-----	+160°F (+71°C)

Packing Data:<sup>\*</sup>

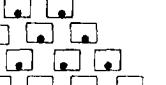
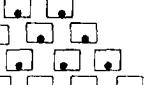
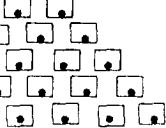
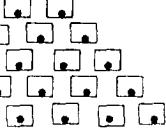
Packing-----	Pallet of 8 projectiles
<b>Pallet:</b>	
Weight (loaded) -----	882 lb (400 kg)
Dimensions -----	39-3/8 x 29-1/8 x 14-5/8 in. (100.01 x 73.98 x 37.15 cm)
<b>Cube</b> -----	9.7 cu ft (0.3 cu m)

\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data, including NSNs.

Shipping and Storage Data:

Storage Class/SCG -----	1.1D
DOT shipping class -----	Class A explosive
DOT designation -----	EXPLOSIVE PROJECTILES
DODAC -----	1320-D515
UNO serial number -----	0168
UNO proper shipping name ---	Projectiles
Drawing number -----	11786215
Top packaging drawing number -----	8837839

**WEIGHT ZONES**  
Loaded Projectile (w/o fuze, w/o plug)

Zone	Over lb	Up To & Incl lb	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	

Weapons Fired From:

M109, M109A1, M109A2, M109A3, M114A2,  
M198

Weapon/Propelling Charge/Primer Combinations:

Weapon	Propelling Charges	Primer
M109	M3A1, M4A2	M82
M109A1	M3A1, M4A2, M119	M82
M109A2/A3	M3A1, M4A2, M119, M119A1, M119A2	M82
M114A2	M3A1, M4A2	MK2A4
M198	M3A1, M4A2, M119, M119A1, M119A2	M82

Firing Tables:

M109/M114A2 - FT 155-AK-2 and FT 155ADD-P-1. M109A2/A3 and M198 - FT 155-AN-1 and FT 155ADD-N-1.

Ballistics:

Howitzer, Self-Propelled, M109A1, M109A2, M109A3:

Charge	Muzzle Velocity (mps)	Max Range (m)
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 lb	650.5	17500

**Ballistics:**

Howitzer, M198 (M199 Cannon):

Charge	Muzzle Velocity (mps)	Max Range (m)
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Propelling Charge - Green Bag M3A1

	M3A1	M3	
3G	261.9	257.9	5852
4G	303.6	301.6	7450
5G	358.1	356.1	9167

Propelling Charge - White Bag M4A2

	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
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Propelling Charge - M119A2

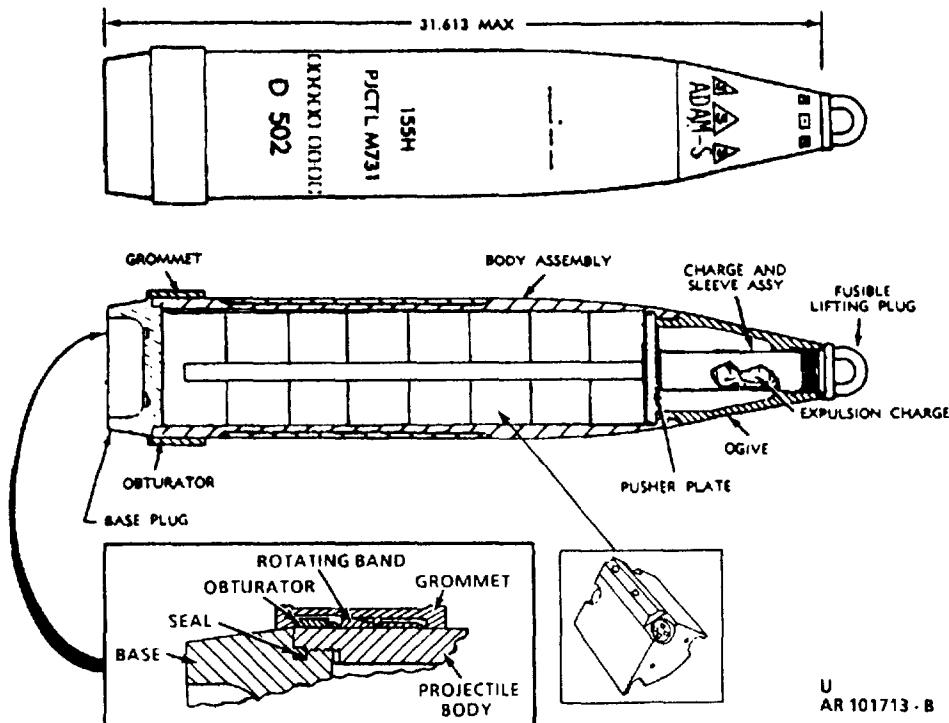
7R	660.0	17740
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**References:**

TM 9-1300-251-20  
 TM 9-1300-251-34  
 TM 9-2350-311-10  
 TM 9-1025-200-12&P  
 TM 9-1025-211-10  
 TM 9-2350-314-10

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## PROJECTILE, 155-MILLIMETER. HE, M731

**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 lifting plug may be the yellow fusible type or the universal type. 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 lug, 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 expulsion charge can be a bagged expulsion charge assembly or the cylindrical plastic expulsion charge type. The metal rotating band near the base of the projectile is pro-

tected 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 explosion 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 lb (46.5 kg) w/o fuze
Length w/fuze	35.4 in. (89.9 cm)
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 g (0.75 oz)
Expulsion charge	M10 propellant, 51 g (1.8 oz)
Components:	
Propelling charge	
M3A1	Propellant M1, 5.0 lb (2.3 kg) (Zones 1-5)
Propelling charge	
M4A2	Propellant M2, 13.5 lb (6.1 kg) (Zones 3-7)
M119/M119A1 Special Single Zone (8) for use with the M109A1 only.	
Muzzle Velocity (mps)	Max Range (m)
650	17,740
Primer	M82
Fuze	MTSQ, M577, ET M762
Cannon used with	M185, M199, M1A2, M126, M126A1
Performance (full charge):	
Maximum range	14,586 m (47,854 ft)
Muzzle velocity	560.2 mps (1,837.9 ft/sec)

#### **Temperature Limits:**

<b>Firing:</b>	
Lower limit	-25°F (-32°C)
Upper limit	+125°F (+52°C)
<b>Storage:</b>	
Lower limit	-30°F (-31.1°C)
Upper limit	+160°F (+71.1°C)
<b>*Packing</b>	Pallet of 8 projectiles
<b>*Pallet:</b>	
Weight (loaded)	874 lb (396 kg)
Dimensions	39-3/8 x 29 x 14-1/2 in. (100.01 x 73.66 x 36.83 cm)
Cube	9.7 cu ft (0.3 cu m)

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

**Shipping and Storage Data:**

Hazard class/division and Storage  
Compatibility Group ----- (12) 1.2D  
DOT class ----- Class A  
Explosive  
DOT marking ----- EXPLOSIVE  
PROJECTILES  
DODAC ----- 1320-D502  
UNO serial number ----- 0169  
UNO proper shipping name --- Projectiles  
Drawing number ----- 9298316  
Top packaging drawing ----- 8837839

## WEIGHT ZONES

### Loaded Projectile (w/o fuze, w/o plug)

Zone	Over lb	Up to & Incl	Markings
2	99.1 (45 kg)	100.4 (45.5 kg)	<input type="checkbox"/> <input checked="" type="checkbox"/>
3	100.2 (45.5 kg)	101.5 (46.0 kg)	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
4	101.1 (45.9 kg)	102.8 (46.6 kg)	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
5	102.4 (46.4 kg)	103.7 (47 kg)	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
6	103.5 (46.9 kg)	104.8 (47.5 kg)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>

## **Ballistics:**

## Howitzer, Self-Propelled, M109

Charge	Muzzle velocity (mps)	Max Range (m)
*1, M3A1, green bag	200	3640
*2, M3A1 green bag	225.0	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/M109A2  
(M185 Cannon):

<u>Charge</u>	Muzzle Velocity (mps)	Max Range (m)
*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 with M185 and M199 Cannons may result in stickers.

Howitzer - M198:

Charge	Muzzle Velocity (mps)	Max Range (m)
<u>Propelling Charge - Green Bag</u>		
3G	261.9	257.9
4G	303.6	301.6
5G	358.1	356.1
		5852
		7450
		9167

Propelling Charge - White Bag

	<u>M4A2</u>	<u>M4A1</u>	
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
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Propelling Charge - M119A2

7R	660.0	17740
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Howitzer, Towed, M114A2

Firing Tables not compiled at this time.

Weapons fired from:

M109, M109A1, M114A2, M198

Weapon/Propelling Charge/Primer/Combinations:

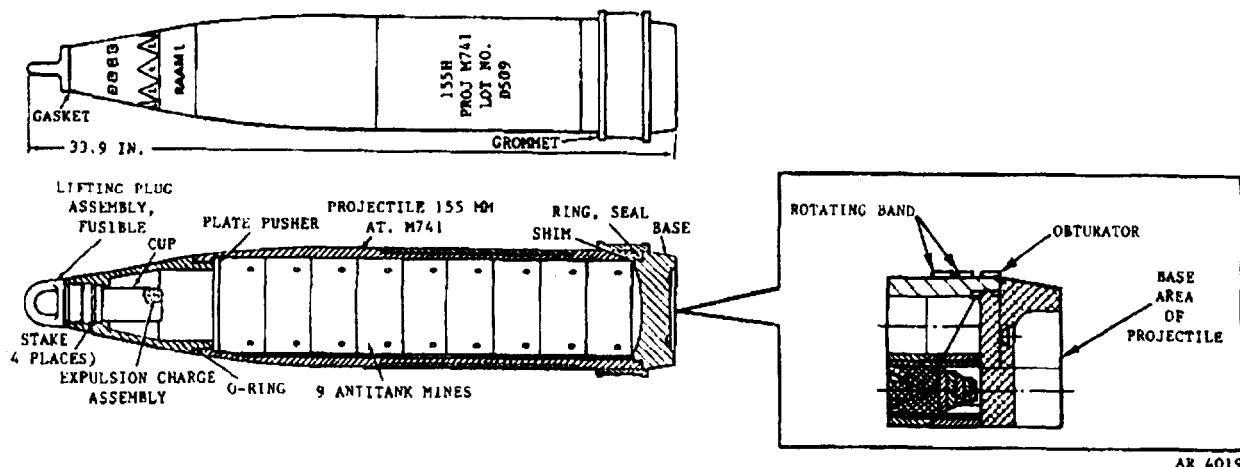
M109/M3A1, M4A2/M82  
M109A1/M3A1, M4A2 M119, M119A1,  
M119A2/M82  
M114A2/M3A1, M4A2/MK2A4, MK15  
M198/M3A1, M4A2, M119, M119A1/M119A2,  
M82

References:

- TM 9-1300-251-20
- TM 9-1300-251-34
- TM 9-2350-311-10
- TM 9-2350-314-10

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## PROJECTILE, 155 MILLIMETER: AT, M741

**Type Classification:**

Standard with Logistic Control Code "A," MSR 01786003, dtd 18 Jan 78.

**Use:**

These projectiles are used to deliver antitank mines in front of enemy armored forces to deny/delay access to a particular area for a specific time period. The "S" means "Short" for short time until mine self-destructs (under 24 hours).

**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. The lifting plug may be the yellow fusible type or the universal type. 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 expulsion charge can be a bagged expulsion charge assembly or the cylindrical plastic expulsion charge type. 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 func-

tions 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	Antitank (AT)
Weight	103 lb (47 kg) with fuze
Length with lifting plug	33.9 in. (86.1 cm)
Body material	Forged steel
Color	Olive drab w/yellow markings
Marking drawing	11786240

**Filler and Weight:**

Number of mines	9
Explosive	PBX 0280 (95% RDX, 5% Estane)
Explosive Wt/mine	1.26 lb (0.57 kg)
Expulsion charge	M110 Propellant (58.0 ± 1 gr)

**Components:**

Propelling charges -----	M3A1, M4A2, M119, M119A1, M119A2
Primers -----	MK2A4, MK15,
Fuze -----	M82 MTSQ, M577 Series, ET M762

**Temperature Limits:**Firing:

Lower limit ----- -25°F (-32 °C)  
 Upper limit ----- +145°F (+63°C)

Storage:

Lower limit ----- -60F (-51°C)  
 Upper limit ----- +160°F (+71°C)

\*Packing Data:

Packing -----	Pallet of 8 projectiles
Pallet:	
Weight (loaded) -----	882 lb (400 kg)
Dimensions -----	39-3/8 x 29-1/8 x 14-5/8 in. (100.01 x 73.98 x 37.15 cm)
Cube -----	9.7 cu ft (0.3 cu m)

\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSNs.

**Shipping and Storage Data:**

Storage class/SCG -----	1.1 D
DOT shipping class -----	Class A
DOT designation -----	EXPLOSIVE PROJECTILES
DODAC -----	1320-D509
UNO serial number -----	0168
UNO proper shipping name ---	Projectiles
Drawing number -----	9278014
Top packaging drawing number -----	8837839

**WEIGHT ZONES**  
Loaded Projectile (w/o fuze, w/o plug)

Zone	Over lb	Up To & Incl	Markings
2	99.1 (45 kg)	100.4 (45.5 kg)	<input type="checkbox"/> <input checked="" type="checkbox"/>
3	100.2 (45.5 kg)	101.5 (46 kg)	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
4	101.1 (45.9 kg)	102.8 (46.6 kg)	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
5	102.4 (46.4 kg)	103.7 (47 kg)	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
6	103.5 (46.9 kg)	104.8 (47.5 kg)	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

**Ballistics:**

Howitzer, Self-Propelled, M109A1, M109A2:

Firing Table:

FT 155-AN-1, C1  
FT 155-Addendum N-1

Charge	Muzzle Velocity (mps)	Max Range (m)
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 lb	650.5	17500

Weapons fired from:

M109, M109A1, M109A2, M114A2, M198

Weapon/Propelling Charge/Primer/Combinations:

M109/M3A1, M4A2/M82, M109A1/M3A1, M4A2,  
 M119, M119A1/M119A2/M82, M109A2/M3A1,  
 M4A2, M119, M119A1/M119A2/M82,  
 M114A2/M3A1, M4A2/MK2A4, MK15,  
 M198/M3A1, M4A2, M119, M119A1/  
 M119A2/M82

Howitzer - M198 (M199 Cannon):

Charge	Muzzle Velocity (mps)	Max Range (m)
--------	--------------------------	------------------

Propelling Charge - Green Bag

	M3A1	M3	
3G	261.9	257.9	5852
4G	303.6	301.6	7450
5G	358.1	356.1	9167

Charge	Muzzle Velocity (mps)	Max Range (m)
<u>Propelling Charge - White Bag</u>		
	<u>M4A2</u>	<u>M4A1</u>
3W	285.2	285.2
4W	326.5	324.5
5W	381.3	378.3
6W	460.7	459.7
7W	546.2	543.2
		7230
		8630
		10080
		12150
		14650

Propelling Charge - M119/M119A1

8	655.8	17740
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Propelling Charge - M119A2

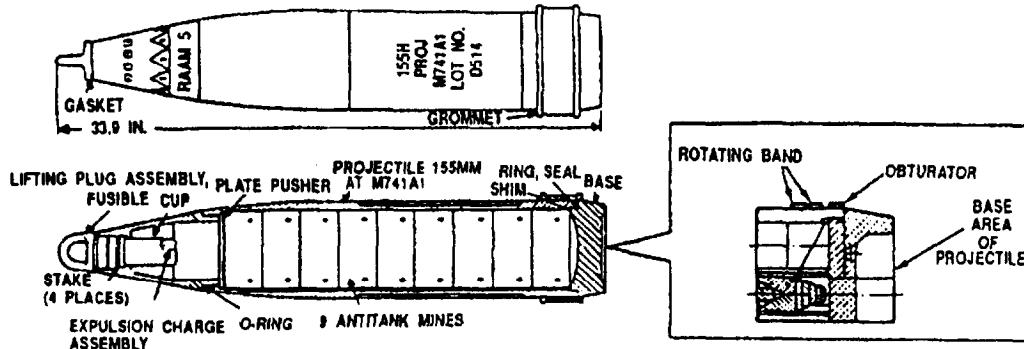
7R	660.0	17740
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References:

TM 9-1300-251-20  
TM 9-1300-251-34  
TM 9-2350-311-10  
TM 9-2350-314-10

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## PROJECTILE, 155-MILLIMETER: M741A1



AR 101662-E

**Type Classification:**

Std. logistics control code A MSR  
04866010.

**Use:**

These projectiles are used to deliver antitank mines in front of or on enemy armored formations to deny/delay access to a particular area for a specific time period. The "S" means "Short" for short time until mine self-destructs (under 24 hours).

**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. The lifting plug may be the yellow fusible type or the universal type. Before firing, the lifting plugs must be replaced with M577 Series MTSQ fuzes. The projectiles contain a payload of antitank mines that are ejected during projectile flight by an expulsion charge. The expulsion charge can be a bagged expulsion charge assembly or the cylindrical plastic charge type. 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 sub-

jected to the required set-back, rotational, and set-forward forces) are armed instantly after coming to rest on the ground. When 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	Antitank (AT)
Weight	103 lb (47 kg) with fuze
Length with lifting plug	33.9 in. (86.1 cm)
Body material	Forged steel
Color	Olive drab w/yellow markings
Marking drawing	9278014

**Filler and Weight:**

Number of mines	9
Explosive	PBX 0280 (95% RDX, 5% Estane)
Explosive wt/mine	1.26 lb (0.57 kg)
Expulsion charge	M10 Propellant (58.0 ± 1 gr)

**Components:**

Propelling Charges	M3A1, M4A2, M119, M119A1, M119A2
--------------------	--

Primers ----- MK2A4, MK15,  
M82  
Fuze ----- MTSQ, M577  
Series, ET  
M762

**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  
 projectiles

Pallet:  
 Weight (loaded) ----- 882 lb (400 kg)  
 Dimensions ----- 39-3/8 x 29-1/8 x  
 14-5/8 in.  
 (100.01 x 73.98  
 x 37.15 cm)  
 Cube ----- 9.7 cu ft  
 (0.3 cu m)

\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSNs.

**Shipping and Storage Data:**

Storage class/SCG ----- 1.1D  
 DOT shipping class ----- Class A explosive  
 DOT designation ----- EXPLOSIVE  
 PROJECTILES  
 DODAC ----- 1320-D514  
 Drawing number ----- 11786240  
 UNO serial number ----- 0168  
 UNO proper shipping name --- Projectiles  
 Top packaging drawing  
 number ----- 8837839

**WEIGHT ZONES**  
**Loaded projectile (w/o fuze, w/o plug)**

Zone	Pounds			Markings
	Over	Up to	& Inc	
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		■ ■ ■ ■ ■ ■

Weapons fired from:

M109, M109A1, M109A2, M109A3, M114A2,  
 M198.

**Weapon/Propelling Charge/Primer/Combinations:**

Propelling		
Weapon	Charges	Primer
M109	M3A1, M4A2	M82
M109A1	M3A1, M4A2, M119,	M82
	M119A1, M119A2	
M109A2/A3	M3A1, M4A2, M119,	M82
	M119A1, M119A2	
M114A2	M3A1, M4A2,	MK2A4
M198	M3A1, M4A2, M119	M82
	M119A1, M119A2	

**Firing Tables:**

M109/M114A2 - FT 155-AK-2 and FT 155ADD-P-1. M109A2/A3 and M198 - FT 155-AN-1 and FT 155ADD-N-1.

**Ballistics:**

Howitzer, Self-Propelled, M109A1, M109A2,  
 M109A3:

Charge	Muzzle Velocity (mps)	Max Range (m)
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 lb	650.5	17500

## Howitzer, M198 (M199 Cannon):

Charge	Muzzle Velocity (mps)	Max Range (m)
--------	--------------------------	------------------

Propelling Charge - Green Bag

	M3A1	M3	
3G	261.9	257.9	5852
4G	303.6	301.6	7450
5G	358.1	356.1	9167

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
---	-------	-------

Propelling Charge-M119A2

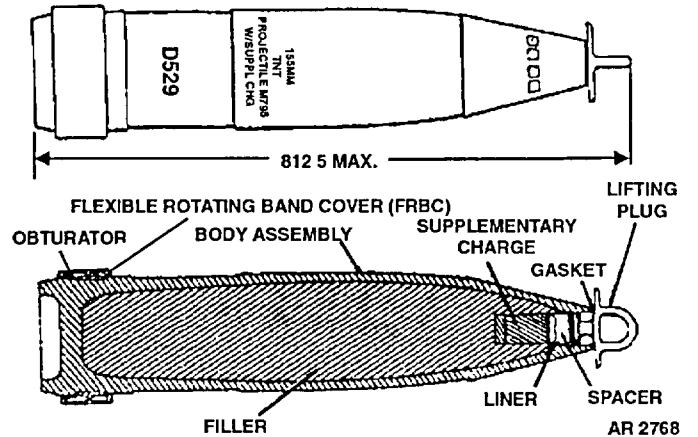
7R	660.0	17740
----	-------	-------

**References:**

TM 9-1300-251-20  
 TM 9-1300-251-34  
 TM 9-2350-311-10  
 TM 9-1025-200-12&P  
 TM 9-1025-211-10  
 TM 9-2350-314-10

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## PROJECTILE, 155-MILLIMETER: HE, M795

**Type Classification:**

STD MSR 07856004.

**Use:**

This projectile is part of the new family of ballistically similar 155mm Howitzer ammunition. It will eventually replace the 155mm HE M107 projectile. The M795 projectile will be utilized to provide conventional support fires for division/corps elements

**Description:**

The configuration of the M795 projectile will be similar to the M483A1 externally, except that it is two inches shorter. The M795 projectile consists of 23.8 pounds of TNT explosive loaded into a 78.1 pound body assembly. A gilding metal rotating band encircles the high fragmentation steel HF-1 body near its base. The obturator is plastic. The projectile is fitted with a protective lifting plug at the nose and a flexible rotating band cover which protects the rotating band during shipping and handling. The projectile uses impact, mechanical time, and short intrusion proximity fuzes. The M795 projectile has a supplementary charge which should not be removed since firing long intrusion proximity fuzes is not authorized. The projectiles have a lifting plug designed to protect the projectile nose 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 can not 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.

**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 behind 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. At the target, the warhead filler is detonated by the fuze. The fuze mode can be either impact, preset time, or proximity depending on fuze selection.

**Tabulated Data:**WEIGHT ZONES  
Loaded Projectile (w/o fuze, w/o plug)

Zone	Over		Up to & Incl		Marking
	kg	lb	kg	lb	
2	44.9	99.0	45.5	100.3	<input type="checkbox"/> <input checked="" type="checkbox"/>
3	45.4	100.1	46.0	101.4	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
4	45.8	101.0	46.6	102.7	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
5	46.4	102.3	47.0	103.6	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
6	46.9	103.4	47.5	104.7	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>

## Complete Round:

Type.....High explosive  
 Approx weight .....103.4 lb - 46.90 kg  
 Length.....33.2 in. (84.33 cm)  
 Cannons used.....M185, M199,  
 M1A2, M126A1

## Projectile:

Body material.....Steel, HF-1  
 Color .....Olive drab w/yellow markings  
 Filler and weight .....TNT 23.8 lb

## Components:

Propelling charge .....M3A1, M4A2,  
 M119A2, M203,  
 M203A1

\*Trilateral cartridges .....1, 2, 3

## Primer

M82.....for M185, M199,  
 M284 Cannons

Fuze (PD).....M557, M739  
 Series, MK399  
 MOD 1

(MTSQ).....M564, M582  
 Series

(Prox.).....M732

(ET).....M767

## Performance:

## Range:

Maximum .....22 to 24 kilometers  
 Minimum (indirect fire).....(M198 Howitzer)  
 1800 to 2800  
 meters at 200 mils  
 quadrant 2600 to  
 3600 meters at  
 high angle

## Propellant Muzzle Velocity (M185/M199 Cannon)

M3A1	863 to	263 to
(3 thru 5)	1178 fps	441 mps
M4A2	975 to	297 to
(3 thru 7)	1795 fps	547 mps
M119/A1/A2	2135 fps	651 mps
M203/A1	2630 fps	802 mps
Trilateral		
Cartridge 1		253 mps
(Zone 1-2)	830 fps	(Zone 2 only)
Trilateral		
Cartridge 2	938 to	288 to
(Zone 3-7)	2190 fps	668 mps

## Trilateral

Cartridge 3  
 (Zone 8) 2630 fps 802 mps

## Weapon/Ammunition Combinations for M795 Projectile:

<u>WEAPON</u>	<u>FUZES</u>	<u>PROP CHARGE</u>
M198, FH70, SP70	PD-M739 Series M557 MTSQ - M582 Series Prox - M732, ETM767	M3A1, M4A2, M119 Series, M203, *Trilateral Cartridge 1,2,3
M109A1/A2/ A3/A4	Same as above	M3A1, M4A2, M 119 Series, *Trilateral Cartridge 1 and 2
M109A5/A6	Same as above	M3A1, M4A2, M119 Series, M203A

\*NOTE: These Trilateral Cartridges provide a zoning solution for the Trilateral (Federal Republic of Germany, United Kingdom, and Italy) FH 70 and SP 70 Howitzers This zoning solution is designed to give velocity levels which are equivalent at appropriate zones to the United States propelling charges.

Temperature Limits:

## Firing.

Lower limit .....-50°F  
 Upper limit .....+145°F

## Storage:

Lower limit .....-65°F for periods of not more than 3 days  
 Upper limit .....+160°F for not more than 4 hours per day  
 \*Packing .....8 projectiles per pallet

Field Artillery Projectile Pallet (FAPP) Metal:  
 Weight w/projectile .....890 lb  
 Dimensions .....29.06 x 14.68 x 36 in.  
 Cube .....9.0 cubic feet

NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSNs

**Shipping and Storage Data**

Quantity-distance class ----- (18) 1.1  
Storage compatibility group --- D  
DOT shipping class ----- A  
DOT designation ----- EXPLOSIVE  
PROJECTILE  
DODAC ----- 1320-D529  
UNO serial number ----- 0168  
UNO proper shipping name --- Projectiles

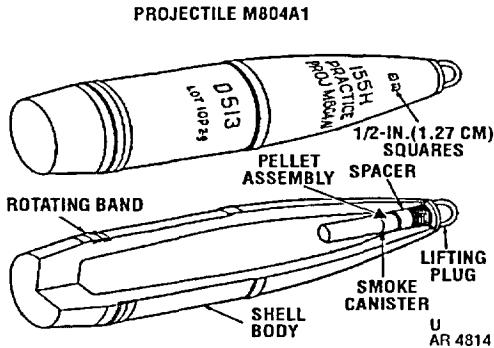
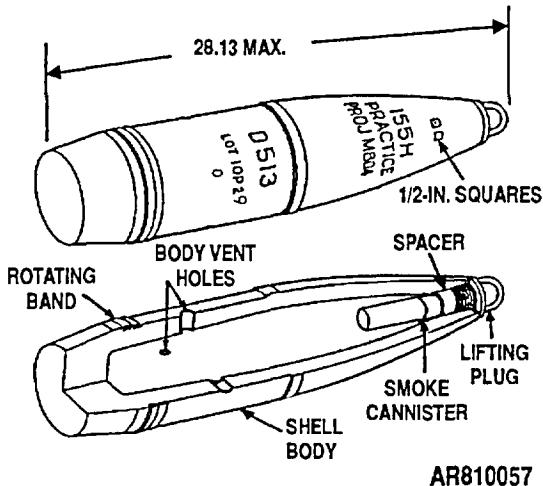
Assembly drawing  
number ----- 9312769

**References:**

TM 9-1025-200-12&P  
TM 9-1025-211-10  
TM 9-2350-311-10  
AMC-P 700-3-3  
SB 700-20

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## PROJECTILE, 155 MILLIMETER: PRACTICE, M804 AND M804A1

**Type Classification:**

M804: Standard MSR 01816002

M804A1. Standard: dtd December 91.

**Use:**

The 155mm, M804/M804A1 projectile is used in place of the M 107, HE projectile for training in indirect fire of 155mm howitzers. The M804/M804A1 projectile contains a smoke canister in the fuze well, which provides for a visual determination of functioning. It can be used in training at less cost than an M107 projectile, without the blast and fragmentation which accompany functioning of an M 107.

**Description:**

The M804/M804A1 is similar in weight and external configuration to the M107 HE projectile. The body of the projectile is a thick walled hollow steel shell, which contains no filler. A smoke canister, which has the same external appearance as a supplementary charge, is contained in the deep fuze cavity. A threaded lifting plug closes the fuze cavity at the nose of the projectile for handling and storage. A rotating band encircles the shell casing near the base and a steel base plate is welded over the base to prevent entry of propellant gases into the interior. The rotating band is protected during shipment and handling by a plastic grommet installed at the time of manufacture.

**Functioning:**

The projectile fitted with a PD, MTSQ, or PROX fuze is loaded into the weapon with propelling charge and primer. 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 flight stability. Fuze functioning detonates the smoke canister. The flash and smoke escape, producing a visual report. This enables the observer to spot the location of the projectile functioning.

**Difference Between Models:**

The smoke canister in the M804 is smaller (190g smoke composition) and is contained in an aluminum liner. The smoke canister in the M804A1 is larger (450g smoke composition) and is contained in a steel cup. In addition, the smoke canister in the M804A1 contains an explosive 20g pellet.

The body of the M804 contains four holes, 90 degrees apart, whereas the M804A1 doesn't have any.

For storage, handling, and transportation the M804A1 must have the cover support over the lifting plug to prevent the rub off action from the pallet cover.

**Tabulated Data:**

WEIGHT ZONES				
Loaded Projectile (w/o fuze, w/o plug)				
Pounds				
Up to &				
Zone	Over	Incl	Marking	
2	90.0	91.3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3	91.1	92.4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4	92.0	93.7	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5	93.3	94.6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Complete Round.

Type ..... Practice  
Length w/lifting plug ..... 28.13 in max  
Length w/o lifting plug ..... 23.80 in max  
Cannon used with ..... M1, M1A1,  
M1A2, M45,  
M126, M126A1,  
M185, M199,  
M284

Projectile. M804  
Body material ..... Forged steel  
Color ..... Blue w/white  
marking and  
brown band

Projectile M804A1  
Body material ..... Forged steel or cast  
iron  
Color ..... Blue w/white  
marking and yel-  
low band

Smoke Canister:  
M804.  
Length ..... 2.57 in.  
Diameter ..... 1.79 in.  
Weight ..... 0.43 lb  
Filler: weight ..... 190g  
(smoke comp)

M804A1:  
Length ..... 6.51 in.  
Diameter ..... 1.75 in. max  
Comp A5 ..... 20g  
Filler weight ..... 450g  
(smoke comp)

Canister Composition for M804 and M804A1:  
Zinc dust ..... 40%  
Potassium perchlorate ..... 20%  
Potassium nitrate ..... 20%  
Aluminum (Atomized) ..... 20%

**Pellet Assembly. M804A1**

Length ..... 0.53 in. max  
Diameter ..... 1.730 in max  
Explosive:  
Weight ..... 20g  
Marking (Black)

THIS END UP  
CANISTER, SMOKE'  
SW-522 SW-522 SW-522  
FOR ARTILLERY PROJECTILE

**Primers.**

For cannon:  
M45, M126, M 126A1,  
M199, M185, and M284....M82  
M1,M1A1, M1A2 ..... M198, M109,  
M109A1,  
M109A2,  
M109A3,  
M109A4,  
M109A5,  
M109A6,  
M114A1, M114A2

Propelling charges ..... M3 Series,  
M4 Series,  
M119 Series  
Fuzes ..... PD, M557,  
M739 Series,  
MTSQ, M564  
M582, PROX:  
M732,  
ET: M767

**Temperature Limits:**

Firing:  
Lower limit ..... -60°F (-51°C)

Upper limit ..... +145°F  
(+62.8°C)

Storage:  
Lower limit ..... -80°F (-62.2°C)  
(for periods not  
more than 3 days)

Upper limit ..... +160°F  
(+71.1°C) (for  
periods not more  
than 4 hr/day)

**Packing Data:**

*Packing -----	8 projectiles on pallet
*Pallet:	
Weight -----	780 lb
Dimensions-----	27-1/2 x 14-1/8 x 30-7/16 in.
Cube-----	6.8 cu ft

\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's. A cover support is necessary to protect the top of each M804A1 projectile while in the pallet. The cover supports are considered part of the pallet.

**Shipping and Storage Data:**

UNO serial number -----	0362
DOT hazard class/ division/SCG -----	1.4G
DOT class -----	Class C Explosives
DOT marking -----	CARTRIDGE, PRACTICE AMMUNITION
DOT label -----	EXPLOSIVE C
DODAC -----	1320-D513
UNO serial number -----	0362
UNO proper shipping name ---	Ammunition practice
M804 Assembly Dwg. No. -----	9331794
M804A1 Assembly Dwg. No. --	12913926

**Limitations:**

Charge 1 must not be fired in the M199 cannon because of stickers.

**Ballistics:****Cannon M1, M1A1, M45:**

Charge	Muzzle Velocity (mps)	Max Range (m)	Elevation (mi)
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

**Cannon M126/M126A1, M1A2:**

Charge	Muzzle Velocity (mps)	Max Range (m)	Elevation (mi)
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

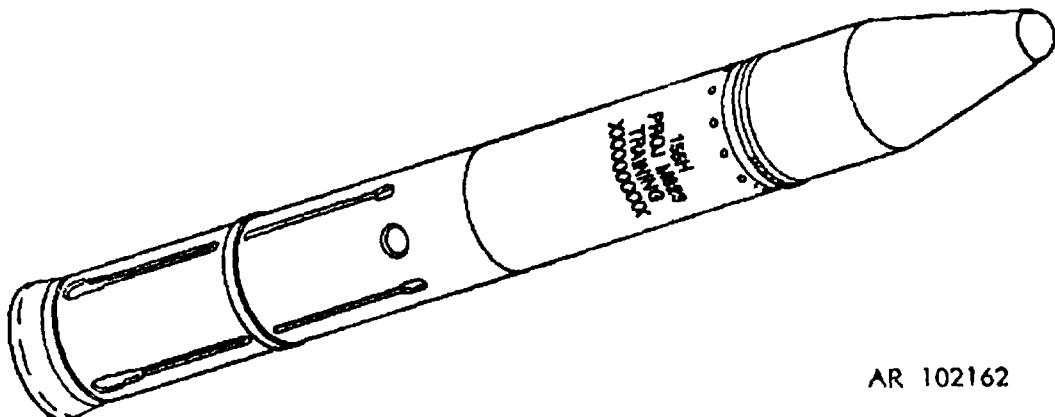
**Cannon M185:**

Charge	Muzzle Velocity (mps)	Max Range (m)	Elevation (mi)
1, M3A1, green bag	208	3900	719.6
2, M3A1 green bag	236	4900	735.1
3, M3A1, green bag	276	6500	725.8
4, M3A1 green bag	316	8100	719.3
5, M3A1 green bag	376	9900	724.0
3, M4A2, white bag	297	7300	700.3
4, M4A2 white bag	337	8800	770.5
5, M4A2 white bag	397	10300	728.7
6, M4A2 white bag	474	12200	726.6
7, M4A2, white bag	568	14700	756.8
8, M119 M119A1	684	18100	804.1
7, M119A2, red bag	686	18154	804.1

**Cannon M199:**

\* Firing at charge 2 may result in stickers occasionally.

Charge	Muzzle Velocity (mps)	Max Range (m)	Elevation (mi)	References:
*2, M3A1 green bag	236	4900	735.1	AMC-P 700-3-3 SB 700-20 TM 9-1025-200-12&P
3, M3A1, green bag	276	6500	725.8	TM 9-1300-251-20 TM 9-1300-251-34
4, M3A1 green bag	316	8100	719.3	TM 9-1025-211-10 TM 43-0001-28-4
5, M3A1 green bag	376	9900	724.0	TM 43-0001-28-5
3, M4A2, white bag	297	7300	700.3	TM 43-0001-28-6
4, M4A2 white bag	337	8800	770.5	TM 43-0001-28-7
5, M4A2 white bag	397	10300	728.7	TM 43-0001-28-8
6, M4A2 white bag	476	12254	726.6	TM 43-0001-28-9
7, M4A2, white bag	572	14808	756.8	TM 43-0001-28-10
8, M119 M119A1	688	18208	804.1	TM 9-2350-311-10
7, M119A2, red bag	690	18262	804.1	TM 9-2350-314-10

**PROJECTILE, 155 MILLIMETER: 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:

- a. The M712 projectile ogive (nose cone).
- b. The M712 closure plug modified for easy removal and reassembly in connection with obturator replacement.
- c. The plastic M712-type obturator.
- d. A one-piece body assembly with five 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.

Provisions have been made to replace the obturator (should it become damaged from repeated use) by removing the projectile aft clo-

sure. In addition, the plastic nose cone on the training projectile can be replaced if it becomes damaged or broken. The 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:

- a. The projectile is unpackaged and inspected.
- b. The code and time switches are set.
- c. The projectile is rammed into the howitzer tube.
- d. The projectile is extracted from the howitzer tube.
- e. The projectile is repacked.

This training round simulates the M712 in all artillery unit activities 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/A2IA3, M114A2, and the M1 98. These howitzers have the cannon tubes M185, M1A2, and M199, respectively.

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 the 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 a plying 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	138 lb
Length	54.0 in.
Outside diameter	6.1 in. (155mm)
Body material	Aluminum
Color	Bronze w/black markings

##### Weapon System Information:

<u>Weapon Type Cannon Tube</u>	
M109A1/A2/A3-SP-M185	
M198-Towed-M199	
M114A2-Towed-M1A2	

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	205.5 lb
w/o projectile	67.5 lb
Length	61 in.
Width	11 in.
Height	11.375 in.

Cube	4.4 cu ft
Color	Forest green w/white markings
Pallet (unit load with contained projectiles and dunnage)	1358 lb
Length	61 in.
Width	33 in.
Height	27.5 in.
Cube	32 cu ft
DOT designation	PROJECTILE - NON-EXPLOSIVE
DODAC	1320 - D511
Drawing No.	
Projectile	9329721
Extractor	9305465
Container	9300440

\*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 forest green with yellow markings.

The container for the M823 projectile is painted forest green with bronze patches and white markings.

See DOD Consolidated Ammunition Catalog for complete packing data including NSNs.

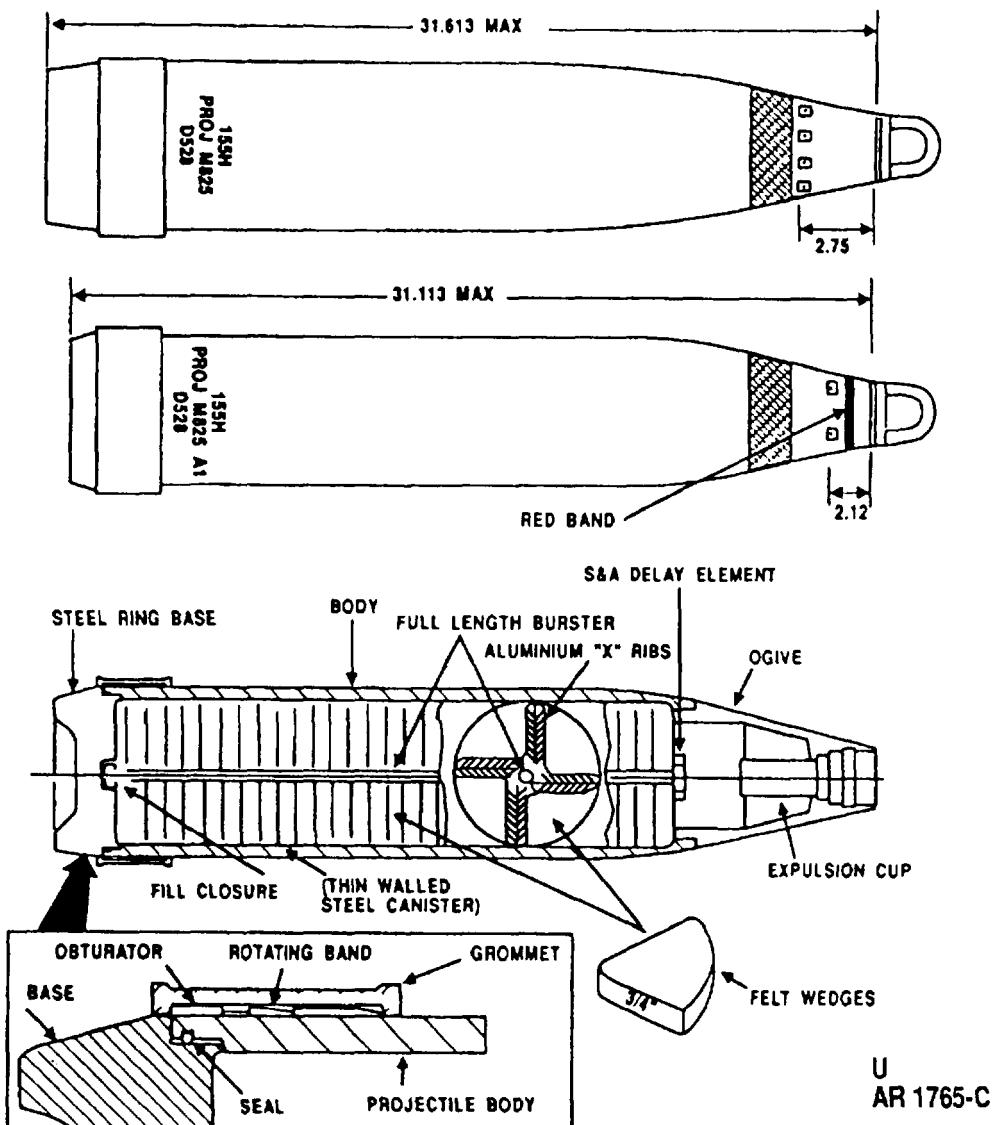
#### Limitations:

The M823 Training Projectile is not to be fired from a weapon. Such firing could be a hazard to personnel forward of the howitzer.

#### References:

- TM 9-1300-251-20
- TM 9-1300-251-34
- TM 9-2350-311-10
- TM 9-1025-211-10
- TM 9-1025-200-12&P

## PROJECTILE, 155 MILIMETER: SMOKE, WP, M825 AND M825A1



**Type Classification:**

M825: Std, MSR 01836014, dtd 1983.  
M825A1: Std

**Use:**

The M825/M825A1 smoke projectile is used by the artillery to produce screening smoke to obscure enemy vision or to screen maneuvering elements.

**Description:**

These projectiles are separate loading 155mm artillery projectiles which are used to produce a ground screening smoke of 5-10 minutes duration. The M825/M825A1 projectile con-

sists of a modified M483A1 projectile carrier consisting of an M483A1 ogive and expulsion charge in a modified M483A1 all steel body and a threaded steel ring base. A rotating band encircles the assembled projectile near the base. The projectile carries a payload of white phosphorus impregnated 3/4-inch felt wedges contained in a hermetically sealed steel canister (29 per quadrant, 116 per canister). A burster charge, 1/4-inch diameter (approximately 21 grams Composition A-5) runs the entire length of the canister in the 1/2-inch x 1/2-inch central cavity which was produced by off-setting the canister X ribs. A launch activated safe and arm (S&A) module from the MTSQ M577 Series or ET M762 fuze separates the forward end of the main charge from the heat sensitive pyrotechnic delay equipment.

**Difference Between Models:**

The M825A1 projectile contains an improved payload and a new base which have corrected the M825 flight instability.

The M825A1 base is made out of steel and has two wrench slots. The M825 base is made out of aluminum and has recesses for wrench.

For storage in the M109 series howitzer bustle rack, a provided spacer with solid top must be used.

**Function:**

When the weapon is fired, the flash from the primer ignites the propelling charge. The obturator and rotating band form a seal to prevent leakage of gas pressure past the projectile. The burning of the propelling charge generates rapidly expanding gases to propel the projectile through the barrel with the velocity required to reach the target. In-flight functioning of the mechanical time fuze ignites the expulsion charge causing ejection of the smoke payload. The 100 MS delay is activated by the burning expulsion charge and provides ample time for the canister to clear the projectile body before the main charge functions rupturing the canister and igniting the smoke payload. The multiple burning wedges fall to the target area and produce obscuring smoke (125-250 meters wide) lasting 5-10 minutes.

**Tabulated Data:****Projectile:**

Type -----	Smoke, WP
Weight -----	102.6 lb
Length w/fuze:	
M825 -----	35.4 in.
M825A1 -----	34.9 in.
Body material -----	Forged steel/aluminum
Color:	
M825 -----	Light green w/yellow band and light red markings
M825A1 -----	Similar to M825 and a red band near top of projectile
Filler and weight -----	116 felt submunitions saturated with 12.75 lb of white phosphorus
Burster -----	Composition A-5, 21.2 g
Expulsion charge -----	M10 propellant, 51 g

**Components:**

Propelling charges -----	M3 series, M4 series, M119, M119A1, M119A2, M203, and M203A1
Primer -----	Percussion, M82, (Percussion, MK2A4 for M114A2 weapon only)
Fuze -----	MTSQ M577 Series and ET M762
Weapon (cannon) used with-----	M114A2, (M1A2), M109 (M126A1), M109A1, M109A2, M109A3, M109A4 (M185), M109A5, M109A6 (M284) and M198 (M199)

**Temperature Limits:****Firing:**

Lower limit-----	-50°F (-46°C)
Upper limit-----	+145°F (+63°C)
Storage:	
Lower limit-----	-65°F (-53.8°C)
Upper limit-----	+165°F (+73.9°C)

M825 projectiles (manufactured Jan 85 - May 86) fired at temperatures above +110°F (+43°C) (WP liquified) have resulted in flight instability and short rounds. This instability does not occur below +110°F (+43°C) (WP solid). This restriction does not apply to M825A1 projectile.

\*Packaging ----- Eight projectiles on a pallet.

*Pallet:	
Weight -----	874 lb
Dimensions -----	39-3/8 x 29 x 14-1/2 in.
Cube -----	9.7 cu ft

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

A pallet insert is necessary to support the base of each M825A1 projectile while on the pallet. These inserts are considered part of the pallet.

**Shipping and Storage Data:**

Quantity-distance class ..... (02) 1.3  
 Storage compatibility group ... H  
 DOT shipping class ..... B  
 DOT designation ..... AMMUNITION  
     FOR CANNON  
     WITH SMOKE  
     PROJECTILES  
 DODAC ..... 1320-D528  
 UNO serial number ..... 0246  
 UNO proper shipping name ... Ammunition,  
     smoke, white  
     phosphorus  
 Drawing number ..... E15-12-259  
 Top packaging drawing  
     number ..... 8837839

**WEIGHT ZONES**

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

Zone	Pounds		
	Over	Up to	& Incl
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-Propelled, M109 (M126A1)\*\*  
 Howitzer, Towed, M114A2

Charge	Muzzle Velocity (mps)	Max Range (m)
*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	7060
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, M109A2/M109A3,  
M109A4\*\*\* (M185)

Charge	Muzzle Velocity (mps)	Max Range (m)
*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
7, M119A2, red bag	660.0	17740

Howitzer, Self-Propelled, M109A5, M109A6  
(M284)\*\*\*\*\*Firing below charge 3 may result in stickers  
when fired in M185 and M199 cannons (for  
M825 only).\*\*Firing tables for M825A1 are under prepara-  
tion . For the M825 use FT 155-ADD-S-O-Q\*\*\*Refer to FT 155-ADD-Q-O for corrections  
to FT 155-AN-1 for the M825/M825A1.

\*\*\*\*Firing Tables are under preparation.

Howitzer, Towed - M198 (M199 Cannon)

Charge	Muzzle velocity (mps)	Max Range (m)
--------	-----------------------	---------------

Propelling Charge - Green bag

	M3A1	M3
3G	261.9	257.9
4G	303.6	301.6
5G	358.1	356.1

Propelling Charge - White bag

	M4A2	M4A1
3W	285.2	285.2
4W	326.5	324.5
5W	381.3	378.3
6W	460.7	455.7
7W	546.2	543.2

Propelling Charge - M119/M119A1

8	655.8	17740
---	-------	-------

Propelling Charge - M119A2 - Red Bag

7	660.0	17740
---	-------	-------

Propelling Charge - M203 - Red Bag

8S	797.0	22400
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**Limitations:**

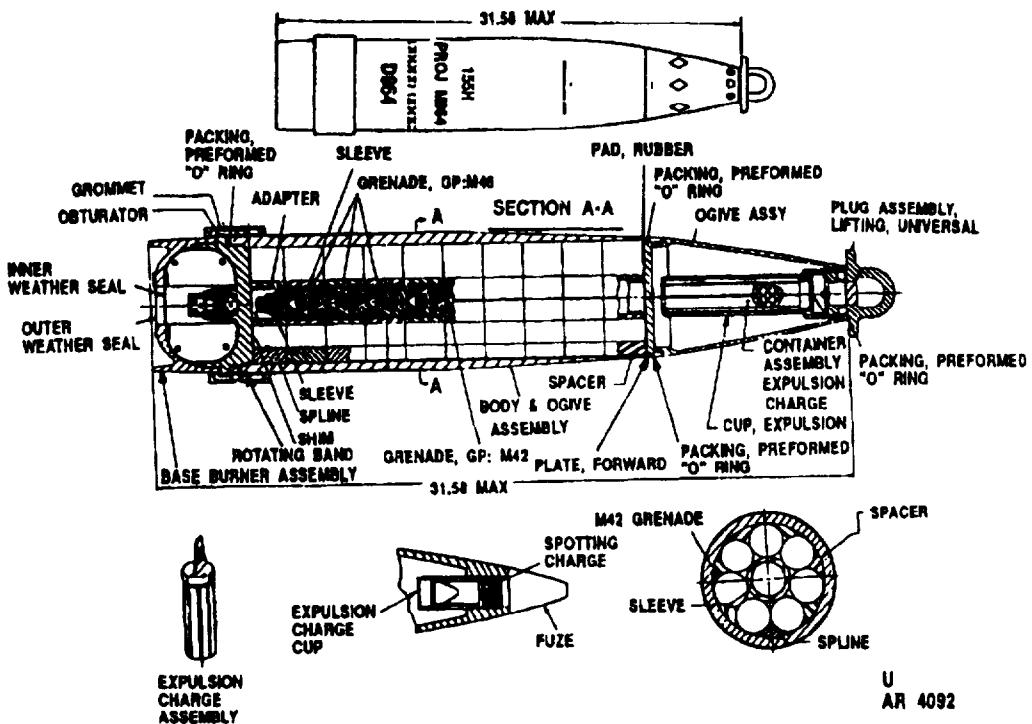
Firing the M825 projectile below charge 3 in the M185 or the M199 cannons may result in stickers. M825 projectiles are restricted to fire in below 950 mils elevation with the M203 propelling charge in the M199 cannon. Firing this combination at elevations exceeding 950 roils may result in short rounds. The restrictions imposed on the M825 do not apply to the M825A1. Do not remove the obturator band

from the M825/M825A1. Presence of the obturator is essential for proper firing.

**References:**

- TM 9-1300-251-20
- TM 9-1300-251-34
- TM 9-1025-220-12&P
- TM 9-1025-211-10
- TM 9-2350-311-10
- TM 9-2350-314-10

## PROJECTILE, 155MM: EXTENDED RANGE, DP, M864



Type Classification:

Standard: MSR 01886009

Use:

The M864 projectile is used to deliver dual purpose armor defeating and antipersonnel grenades at ranges beyond the capability of the M483A1 projectile or when the M483A1 is not available.

Description:

The Projectile, 155MM: HE, M864 is of the separate loading type. The fuze, propelling charge, and primer are handled and loaded separately. The projectile contains a total of the 72 dual-purpose grenades (48 each M42 and 24 each M46). A base burner assembly containing 2.6 pounds of HTPB-AP propellant is assembled to the base of the projectile body. This propellant is ignited by the propelling charge when the weapon is fired. The projectile is assembled with a universal lifting plug which is replaced by an MTSQ or ET fuze prior to loading the projectile in the weapon.

Functioning

When the primer is fired, the flash ignites the propelling charge producing gases which force the spin-stabilized projectile out of the gun. This also ignites the propellant in the base burner unit. The gases expelled from the base burner unit greatly reduce drag directly behind the base, thus increasing the projectile's range. 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 projectile as if it were a bulk-loaded HE projectile. The copper 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 setback load at the rear when fired. The fuze (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 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 ----- 102.0 lb  
 Length w/fuze ----- 36.23 in.  
 Body material ----- Forged steel  
 Color----- Olive drab w/yellow diamonds and markings  
 DODAC ----- 1320-D864  
 UNO serial number ----- 01  
 UNO proper shipping name----- Projectiles

## Filler and weight:

Number of grenades:  
 M42 ----- 48  
 M46 ----- 24  
 Explosive, Comp AS,  
 each grenade ----- 30.5 gm  
 Explosive, Comp A5,  
 each projectile ----- 4.81 lb  
 Expulsion charge ----- M10 propellant, 105 gm  
 Propellant, base burner ----- HTPB-AP propellant 2.6 lb  
 Net explosive content ----- 7.4 lb

## Components:

Propelling charges ----- M4 series, M119,  
 M119A1,M119A2  
 M203, M203A1  
 Primer ----- Percussion M82  
 (MK2A4 for  
 M114A2 weapon  
 only)  
 Fuze ----- MTSQ,M577  
 series ET, M762

Temperature Limits:

## Firing:

Lower limit ----- -60°F (-51°C)  
 Upper limit ----- 145°F (+62.5°C)

## Storage:

Lower limit ----- -60°F (-51°C)  
 Upper limit ----- +160°F (+71°C)

\*Packing ----- Pallet projectiles

## Pallet:

Weight (loaded) ----- 870 lb  
 Dimensions ----- 39-3/8x 29 x 14-1/2  
 in.  
 Cube ----- 9.7 cu ft

\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSNs.

Shipping and Storage Data:

Hazard class/division and  
 storage compatibility group ----- (18) 1.2D  
 DOT class----- Class A explosive  
 DOT marking ----- EXPLOSIVE PRO-  
 JECTILES  
 DODAC ----- 1320-D864  
 UNO serial number ----- 0168  
 UNO proper shipping name ----- Projectile  
 Drawing number ----- 9381131  
 Top packaging drawing  
 number ----- 8837839  
 DOT registration number ----- EX-8905282  
 (wood container)  
 EX-9206043  
 (metal container)

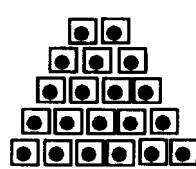
Shipping and Storage Data:

Charge,Spotting,Projectile

UNO serial number ----- 0060  
 Hazard class/division and  
 storage compatibility group -- 1.1D  
 DOT class----- Class A explosive  
 DOT marking ----- CLASS A SUP-  
 PLE-MENTARY  
 CHARGE  
 (EXPLOSIVE)-  
 HANDLE CARE-  
 FULLY  
 DODAC ----- 1320-D003  
 UNO serial number ----- 0060  
 Drawing number----- 9272016  
 Packaging drawing number ----- 9273539

**WEIGHT ZONES**  
 Loaded Projectile (w/o fuze, w/o plug)

Zone	Over	Up to & Incl	Pounds	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-Propelled, M109A2/A3  
 (M185 Cannon:)

Charge	Muzzle velocity (mps)	Max range (m)
7WB, M4A2	550	17180
8WB, M119A1	671	22000
7RB, M119A2	671	22000

## Howitzer, Towed, M198 (M199 Cannon):

Charge	Muzzle velocity (mps)	Max range (ml)
7WB, M4A2	550	17180
8WB, M119A1	671	22000
7RB, M119A2	671	22000
8R, M203	807	28180
8S, M203A1	807	28180

Howitzer, Self-Propelled M109A5/A6  
(M284 Cannon):

Charge	Muzzle velocity (mps)	Max range (m)
7WB, M4A2	546	17000
8WB, M119A1	664	21830
7RB, M119A2	664	21830
8R, M203	798	27740
8S, M203A1	798	27740

Limitations:

Do not fire the M864 if the obturator is missing or broken because it may result in a short round. If the band

is displaced and can be repositioned and remain in the groove, the projectile can be fired.

Do not fire the M864 projectile below charge 3. Firing below charge 3 may result in stickers.

The M864 will be fired with M203 series charge only in the M284 and M119 cannons. M203 series charge 8 is not equivalent to M119/M119A1 charge 8.

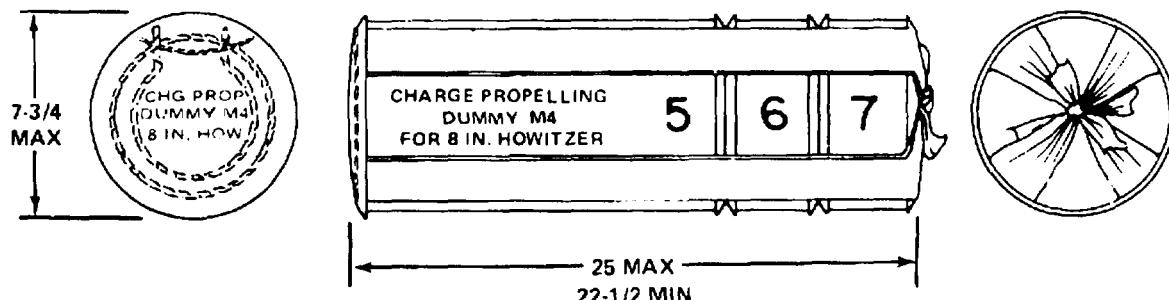
The M864 will be fired to achieve ranges beyond the capabilities of the M483A1 projectile or when the M483A1 is not available.

A 5000-meter safety zone is required short of the target because of the possibility of the base burner assembly nonignition.

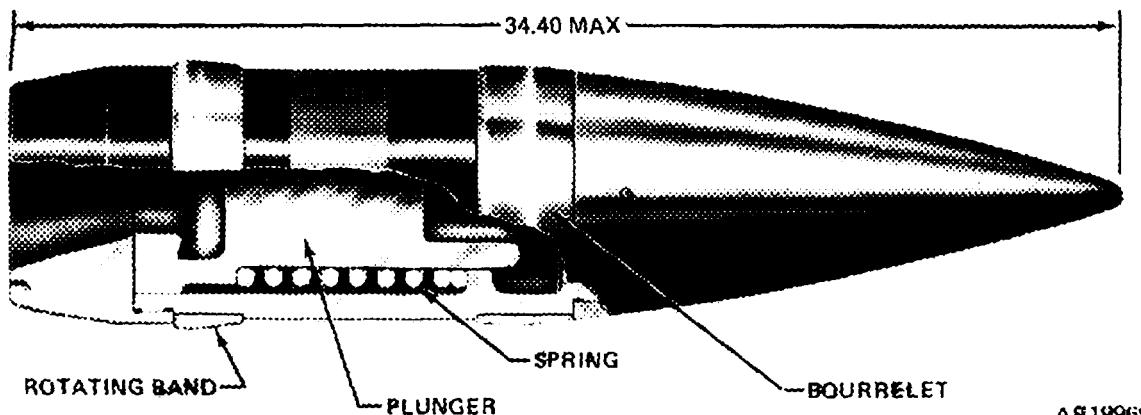
References:

- TM 9-1300-251-20
- TM 9-1300-251-34
- TM 9-1025-211-10
- TM 9-2350-311-10
- TM 9-2350-314-10
- TM 43-0001-28-6
- TM 43-0001-28-7
- TM 43-0001-28-8

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**PROJECTILE, 8-INCH: DUMMY, M14 WITH CHARGE, PROPELLED: 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 lb
Prop. Charge -----	30 lb
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 lb
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 lb
Dimensions -----	29-9/32 x 9-13/16 x 8-7/32 in.
Cube -----	1.6 cu ft

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

**Shipping and Storage Data:**

## DOT designation:

Dummy Projectile M14 -----	PROJECTILE NONEX. PLOSIVE
Dummy Charge M4 -----	DUMMY PROPELLING CHARGE

## DODAC:

M14 -----	1320-D679
M4 -----	1320-D677

## Assembly drawing number.:

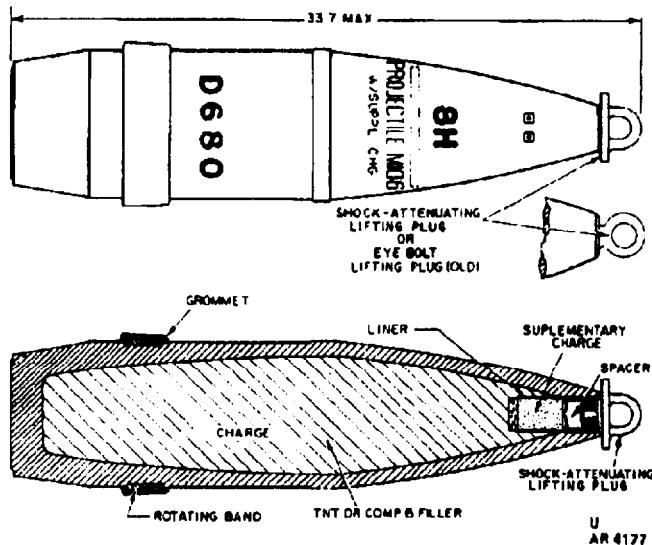
M14 -----	72-1-82
M4 -----	8863354

**Ballistics:**

Not applicable.

**References:**

TM 9-2300-216-10
SB 700-20
AMC-P 700-3-3

**PROJECTILE, 8-INCH: HE, M106****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 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 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 down-range. 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:**

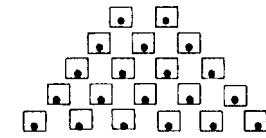
Projectile:

Type ----- HE

**WEIGHT ZONES**

Loaded Projectile (w/o fuze, w/o lifting plug)

Zone	Over Up To & Incl Pounds	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:**

	<b>Weapon</b>	<b>Model</b>	<b>Type</b>
	M115 towed	M110SP	M55SP
Cannon			
Tube	M2A1,M2	M2A2 (M2A1E1)	M47P
Prop Chg	M1, M2	M1, M2	M1, M2
Primer	MK2A4	M82, MK15	M82,MK15
Fuze, PD	M78, M557, M739, MK399	MOD 1	Same
Fuze, MTSQ	M564, M582	Same	Same
Fuze, Prox			M728, M732 series
Fuze, ET	M767	Same	Same

**Temperature Limits:**

**Firing:**  
 Lower limit ..... -40°F (-40°C)  
 Upper limit ..... +125°F (+52°C)

**Storage**  
 Lower limit ..... -80°F (-63°C)  
     for period of not  
     more than 3  
     days  
 Upper limit ..... +160°F  
     (+71.1°C) for  
     not more than  
     4 hr/day

\*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 DOD Consolidated Ammunition Catalog 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-D680  
 UNO serial number ..... 0168  
 UNO proper shipping name ... Projectiles  
 Drawing number ..... 9207909

**Ballistics - (M2,M2A1,M2A2 & M47 Cannons):**

<b>Charge</b>	<b>Muzzle Velocity (fps)</b>	<b>Maximum Range (m)</b>	<b>Chamber Pressure (psi)</b>
1, M1, green bag	820	5600	
2, M1, green bag	900	6600	
3, M1, green bag	1000	8000	
4, M1, green bag	1150	9700	
5, M1, green bag or M2,white bag	1380	11,600	
6, M2 white bag	1640	13,900	
7, M2, white bag	1950	16,800	

**Ballistics (XM201 Cannon):**

<b>Charge</b>	<b>Muzzle Velocity (fps)</b>	<b>Maximum Range (m)</b>	<b>Chamber Pressure (psi)</b>
1, M1, green bag	838	5946	
2, M1, green bag	920	7099	
3, M1, green bag	1016	8450	
4, M1, green bag	1161	10,435	
5, M1, green bag or M2, white bag	1390 1463	12,405 12,987	
6, M2, white bag	1705	15,203	
7, M2, white bag	1991	17,901	
8, XM188E2, white bag	2330	21,300	31,900

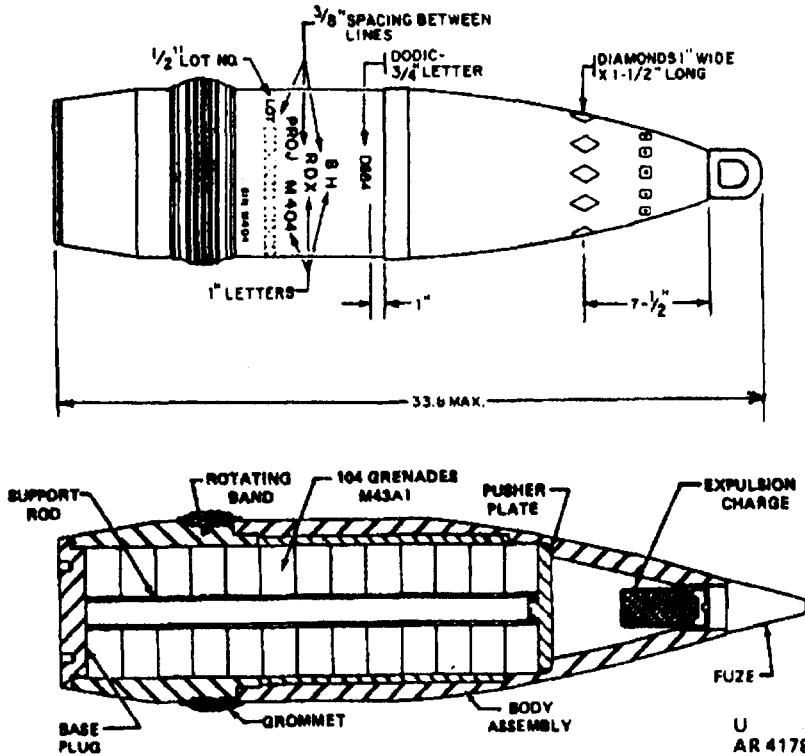
**Limitations:**

None

**References:**

TM 9-1300-206  
 SB 700-20  
 TM 9-1300-251-20  
 AMC-P 700-3-3  
 TM 9-1300-251-34  
 TM 9-1300-250

## PROJECTILE, 8-INCH: HE, M404

**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 usher 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 line-of-flight. The M43 grenade is an airburst submissive 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 lb
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 -----	104
Explosive, Comp A5, each grenade -----	21.25 g
Explosive, Comp A5, each projectile -----	4.87 lb
Expulsion charge -----	M10 propellant, 60 g

**Components:**

Propelling charge -----	M1 (Zones 1-5), 13.6 lb M1 pro- pellant; M2 (Zones 5-7), 28.5 lb M1 pro- pellant
Primer -----	M82, MK2A4, MK15
Fuze -----	MT, M565, MTSQ, M577 or ET, M762
Cannon used with -----	Refer to Appendix A
Performance (full charge):	
Maximum range -----	16,788 m
Muzzle velocity -----	587 m/sec (1950 ft/sec)

**Weapon System Information:**

	Weapon <b>M115 towed</b>	Model <b>M110SP</b>	Type <b>M55SP</b>
Cannon		M110A1/A2 2A2, M201A1	
Tube	M2A1, M2	(M2A1E1)	M47
Prop.	M1, M2	M1, M2	M1, M2
Chg.	MK2A4	M82	M82
Primer			

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

**Shipping and Storage Data:**

Hazard class/division and storage compatability group -----	(18) 1.2D
DOT class -----	Class A
	Explosive
DOT marking -----	EXPLOSIVE PROJECTILES
DODAC -----	1320-D684
UNO serial number -----	0169
UNO proper shipping name -----	Projectiles
Drawing number -----	8875941
Packing drawing number -----	7548346

**WEIGHT ZONE INFORMATION  
LOADED PROJECTILE  
(W/FUZE, W/O PLUG)**

Zone	Over Pounds	Up to & Incl	Marking
2	193.4	196.3	□ □
3	195.9	198.8	● ● ●
4	198.4	201.3	□ □ □ □
5	200.9	203.8	● □ □ □ □

**Ballistics:**

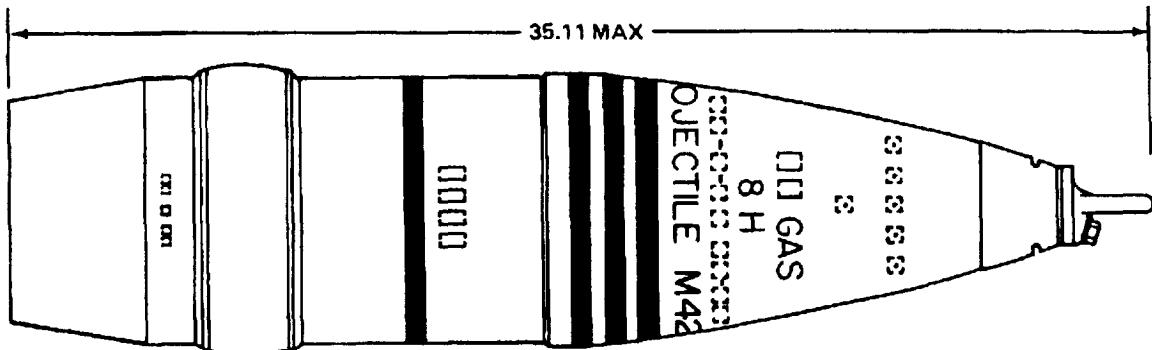
M2, M2A1, M2A2 & M47 Cannons:

Charge	Muzzle Velocity (fps)	Maximum Range (m)	Chamber Pressure (psi)
1, M1, green bag	820	5600	
2, M1, green bag	900	6600	
3, M1, green bag	1000	8000	
4, M1, green bag	1150	9700	
5, M1, green bag or M2, white bag	1380	11,600	
6, M2, white bag	1640	13,900	
7, M2, white bag	1950	16,800	

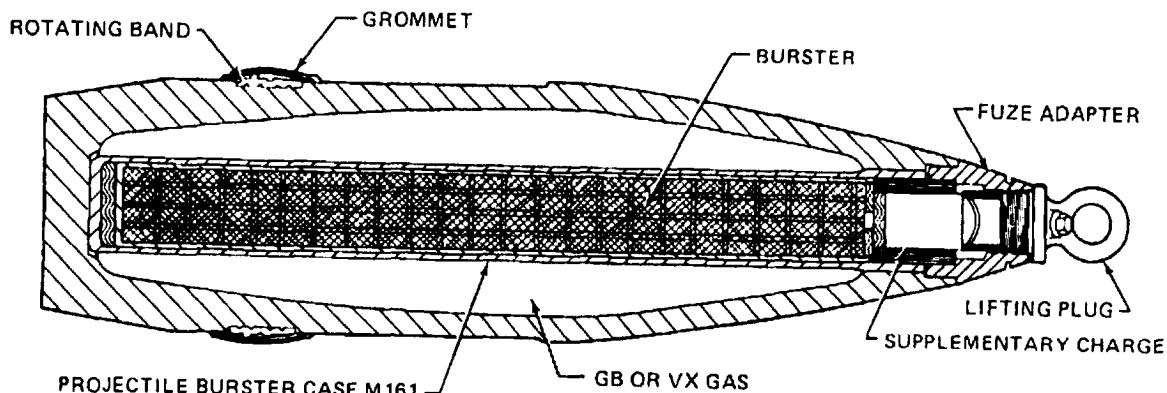
**References:**

AMC-P 700-3-3  
SB 700-20

TM 9-1300-251-20  
TM 9-2300-216-10  
TM 9-1300-251-34

**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

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 firing pin results in ignition of the propelling charge. The burning propellant generates rapidly expanding gases 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 fuse is employed, impact causes the fuse to detonate the supplementary charge and the supplementary charge detonates the burster tube. The burster ruptures the shell case, releasing the agent. The liquified agent expands to a gaseous

state by heating from the burster charge. If a proximity fuse 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.

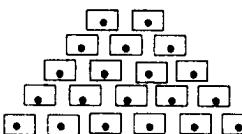
#### Tabulated Data:

Complete round:

Type ..... GB or VX

#### WEIGHT ZONE INFORMATION

Zone	Over Pounds	Up to & Incl Pounds	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:

w/Lifting plug ..... 35.11 in. max

w/o 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

Fuses .....

PD, M557,

M739, Prox

M728

\*NOTE: Renovated or newly manufactured projectiles (Post 1976) will be marked with one green band and, if burstered, one yellow band.

#### Temperature Limits:

Firing:

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

Storage:

Lower limit ..... -80°F (-62.2°C)  
for periods not to exceed 3 days

Upper limit .....	+160°F (+71.1°C) for not more than 4 hr/day
**Packing .....	6 projectiles on pallet
**Pallet:	
Weight .....	1253 lb
Dimensions .....	39-1/2 x 28-1/2 x 19-1/4 in.

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

#### Shipping and Storage Data:

Storage/SCG .....	(12) 1.2K
DOT shipping class .....	A
DOT designation .....	EXPLOSIVE PROJECTILE

DODAC:

    GB ..... 1320-D696

    VX ..... 1320-D695

UNO serial number .....

0020  
UNO proper shipping name --- Ammunition, toxic

Assembly drawing number:

    GB ..... 8860620-1

    VX ..... 8860620-2

#### Ballistics:

M2,M2A1,M2A2 & M47 Cannons:

Charge	Muzzle Velocity (fps)	Maximum Range (m)
1, M1, green bag	820	5600
2, M1, green bag	900	6600
3, M1, green bag	1000	8000
4, M1, green bag	1150	9700
5, M1, green bag or M2, white bag	1380	11,600
6, M2, white bag	1640	13,900
7, M2, white bag	1950	16,800

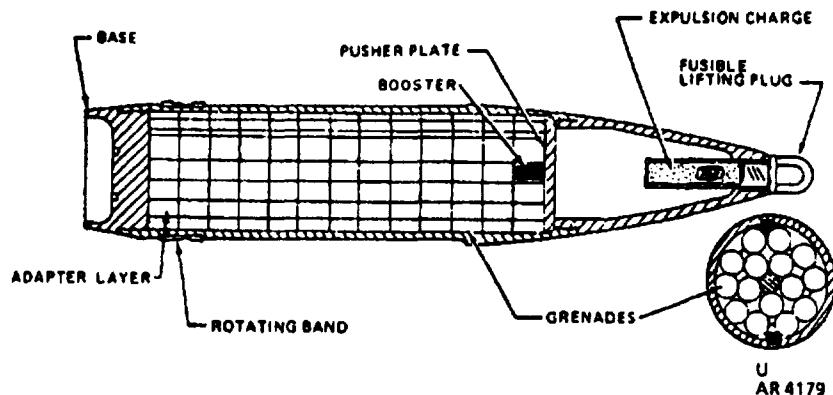
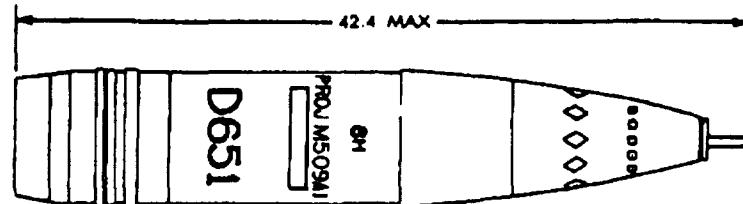
#### Limitations:

None

#### References:

- AMC-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

## PROJECTILE, 8-INCH: HE, M509A1

**Type Classification:**

STD, LCC-A

**Use:**

This projectile is used to deliver a concentration of antipersonnel/antimaterial grenades.

**Description:**

This Improved Conventional Munition (ICM) projectile is of the separate loading type. The fuze propelling charge, and primer are handled and loaded separately. The projectile is provided with a universal 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 12 layers of grenades with 15 grenades in each layer. The grenades are contained by a base threaded into the projectile. 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 groundburst 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 -----	207.7 lb
Len h:	
w/fuze -----	43.9 in.
w/Lifting plug -----	42.3 in.

**Material:**

Body	Forged steel
Ogive and base	Aluminum alloy
Color	Olive drab w/yellow diamonds and markings

**Filler and weight:**

Number of grenades, M42	180
Explosive, Comp A5, each grenade	30.5 g
Explosive, Comp A5, each projectile	12.1 lb
Expulsion charge	M10 propellant, 130 g
Spotting charge	Comp B, 45.5 g
Booster	Comp A5, 33 g

**Components:****Weapon System:**

Weapon: M110, M110A2 Howitzer  
 Cannon: M201, M201A1  
 Prop. Chg: M1, M2, M188A1  
 Primer: M82  
 Fuze, MTSQ: M577 series or ET: M762

**Temperature Limits:**

**Firing:**

Lower limit	-50°F (-46°C)
Upper limit	+145°F (+62.5°C)

**Storage:**

Lower limit	-50°F (-46°C)
Upper limit	+145°F (+62.5°C)

\***Packing** ----- Pallet of 6 projectiles

\***Pallet:**

Weight	1,316 lb
Dimensions	48-1/8 x 31-5/8 x 22-1/2 in.
Cube	19.8 cu ft

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

**Shipping and Storage Data:**

Hazard class/division and storage compatibility group (21) 1.ID  
 DOT class ----- Class A  
 Explosive  
 DOT marking ----- EXPLOSIVE PROJECTILES

DODAC	1320-D651
UNO serial number	0168
UNO proper shipping name	Projectile
Drawing number	9362612
Packaging drawing number	9229038
Grommet	9270723

**Shipping and Storage Data For Spotting, Projectile Charge:**

Hazard class/division and storage compatibility group	1.1D
DOT class	Class A
DOT marking	EXPLOSIVE SUPPLEMENTARY CHARGE (EXPLOSIVE) HANDLE CAREFULLY
DODAC	1320-D003
Drawing number	9272016
Packaging drawing number	9273539

**Ballistics:**

(w/M201 Cannon):

Chg/ Zone	Muzzle Vel. (fps)	Max. Range (m)	Chamber Pres. (psi)
M1/1	806	5,451	8,080
M1/2	879	6,335	9,480
M1/3	984	7,793	11,720
M1/4	1,133	9,661	16,010
M1/5	1,358	12,347	23,490
M2/5	1,432	12,347	14,500
M2/6	1,675	14,551	21,180
M2/7	1,950	17,410	31,030
M188A1/8	2,316.2	21,304	31,210
M188A1/9	2,510	23,431	39,040

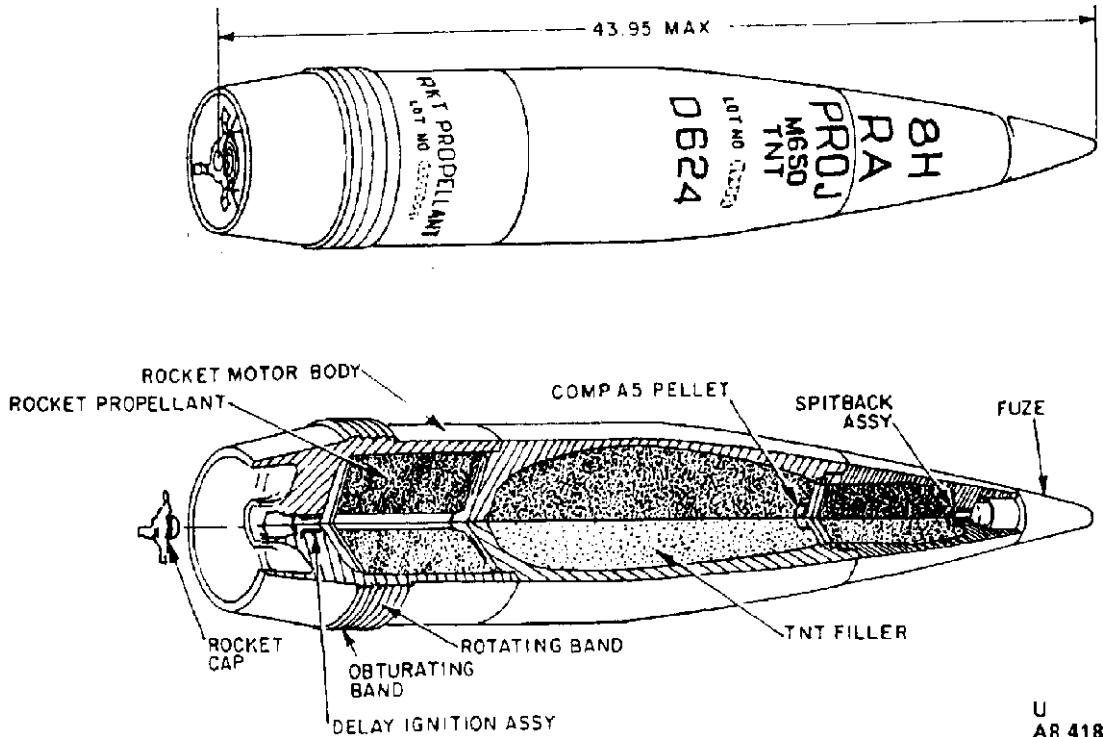
**Limitations:**

None.

**References:**

DOD Consolidated Ammunition Catalog,  
 Ammo-1-2-3  
 SB 700-20  
 AMC-P 700-3-3  
 TM 9-1300-250  
 TM 9-2350-304-10  
 TM 9-1300-251-20  
 TM 9-1300-251-34  
 TM 43-0001-28-2  
 TM 43-0001-28-4

## PROJECTILE, 8-INCH: HERA, M650

**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 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 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 set back. 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:

WEIGHT ZONES LOADED PROJECTILE W/O FUZE W/O GROMMET			
Zone	Over	Up to & Incl	Marking
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-1 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 series, MTSQ:M564,M582 VT:M732series,ET: M767

Rocket Motor:	
Body material -----	Alloy steel
Propellant grain-----	Solid propellant nitrocellulose base
Weight -----	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  
 Boron  
 Potassium  
 Nitrate Pellets  
 5.5 g

**Temperature Limits:**

Firing:  
 Lower limit ----- -50°F (-46°C)  
 Upper limit ----- +145°F (+63°C)

Storage:  
 Lower limit ----- -50°F (-46°C)  
 Upper limit ----- +145°F (+63°C)

\*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 DOD Consolidated Ammunition Catalog  
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  
PROJECTILES  
 DODAC ----- 1320-D624  
 UNO serial number ----- 0168  
 UNO proper shipping name ----- Projectiles  
 Assembly drawing number ----- 9280132 (Pallet)  
 9287994  
 (Projectiles)

**Limitations:**

None.

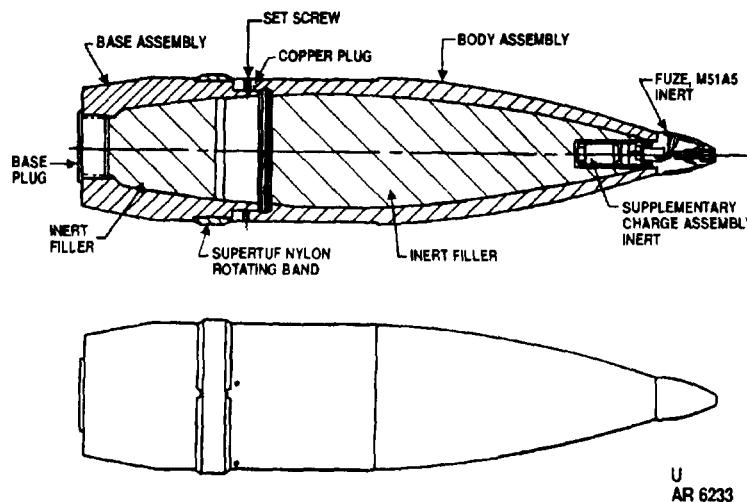
**References:**

TM 9-1300-251-20&P  
 TM 9-1300-251-34&P  
 AMC-P 700-3-3  
 EM 0007

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## PROJECTILE, 8-INCH: DUMMY, M845

**Type Classification:**

Std MSR 09806005,

**Use:**

The M845 projectile is designed to provide the operator/crew with an inert training projectile which can be used to develop and maintain operator/crew proficiency in the proper operation and maintenance of the loader rammer system on 8-inch, Self-Propelled, M110A2 Howitzers, in other than live fire situations. The M845 projectile is designed to provide training in handling, loading, and ramming and extraction of 8-inch ammunition; it is not to be fired.

**Description:**

The M845 simulates the standard 8-inch: HE, M106 projectile in exterior shape and weight. It consists of a steel ogive and body section which is threaded to a steel base and boat-tail section. The forward body/ogive section is filled with approximately 35 pounds of inert materiel to bring the projectile up to weight. This section contains a threaded fuze cavity at the nose end which is fitted with an inert supplementary charge and a lifting plug. The base-section is fitted with a replaceable plastic rotating band at its forward end and a threaded cut-

out to facilitate extraction from the breech at the base end. It is fitted with inert materiel to bring it to the required weight. The base section threads to the forward body section with a junction formed where the body meets the rotating band seat. Once the two sections are threaded together and firmly seated, their position is fixed by insertion of four brass inserts which are held in place by setscrews. The M845 is used with an inert M51 Series Fuze which threads into the fuze cavity after removal of the eyebolt lifting plug. The plastic rotating band is protected by a removable grommet during shipping and handling.

**Functioning:**

After the projectile is unpacked, the eyebolt lifting plug is removed and an inert M51 series fuze is installed. (The projectile is shipped one per wooden packing box. In addition to the projectile, the packing box includes one inert M51 Series Fuze and one Rotating Band Replacement Kit.) The protective grommet is removed and the projectile is loaded into the weapon chamber using normal power loading and ramming procedures. After the projectile has been successfully rammed, it then can be extracted using either the bell rammer from the muzzle of the weapon or the H4277 Extractor through the breech of the weapon.

NOTE

- Provided that the loader rammer is operating properly and the rotating band of the projectile has not exceeded its wear limit, the extraction force will be in excess of 2000 pounds. Wear limit for the rotating band is 100 rams after which it can be reversed and used for 100 additional rams. After the M845 has been rammed and extracted 200 times, the rotating band must be replaced.
- A separately issued rotating band kit (1320-01-112-2627) is available for requisition.
- Reasonable care should be used in handling the projectile to avoid damage to the rotating band. In extracting the projectile, the rammer tray and trough should be properly aligned. Improper alignment may result in the rear edge of the band catching at the junction of tray and trough and being nicked.

Tabulated Data:

Projectile:	
Type	Inert
Weight	200 lb (90.0 kg)
Length:	
w/o Lifting plug	31.43 in. (79.8 cm)
w/Lifting plug	34.35 in. (max) (87.2 cm)
w/M51 inert fuze	35.76 in. (90.8 cm)
Diameter:	
Rotating band OD	8.185 in. - 0.010 in. (20.8 cm)
Bourrelet	7.994 in. (max) (20.3 cm)
Body material	Steel
Color	Bronze w/black markings
Filler	Forward body section - Inert Type IV, Spec MIL-I-60350
Base	Inert, Type IV, Spec MIL-I- 60350
Supplementary charge	Inert, filler, 0.30 lb, Spec MIL-I-60350 (MU)
Grommet	Plastic w/metal liner
Cannon used	M201A1
Fuze and type	M51A5, inert

Temperature Limits:

Use:	
Upper limit	+125°F (+52°C)
Lower limit	-40°F (-40°C)
Storage:	
Upper limit	+160°F (+71.1°C) for not more than 4 hr/day
Lower limit	-80°F (-62.2°C) for periods of not more than 3 days (-62.2°C)

Packing Data:

*Packing	1 ea M845 projectile w/1 ea inert M51A5 series fuze packed in wooden packing box
Drawing number	9340709
Pallet:	
Packing weight	261 lb (117.4 kg)
Dimensions	40-9/16 x 16-1/4 x 18-7/8 in. (103.0 x 41.3 x 47.9 cm)
Cube	7.2 cu ft (0.22 cm)

\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSNs.

Shipping and Storage Data:

Quantity-distance class	N/A
Storage compatibility group	N/A
DOT shipping class	N/A
DOT designation	PROJECTILE, NONEXPLOSIVE
NSN-DODAC (M845 Proj.)	1320-D648
Drawing number	9335575
NSN (Rot. band replacement kit)	
Separate issue	1320-01-112- 2627
Drawing number	9340711
Ballistics	N/A

Limitations:

N/A

References:

SB 700-20  
AMC-P 700-3 3  
TM 9-1100-218-10  
TM 9-2350-304-10

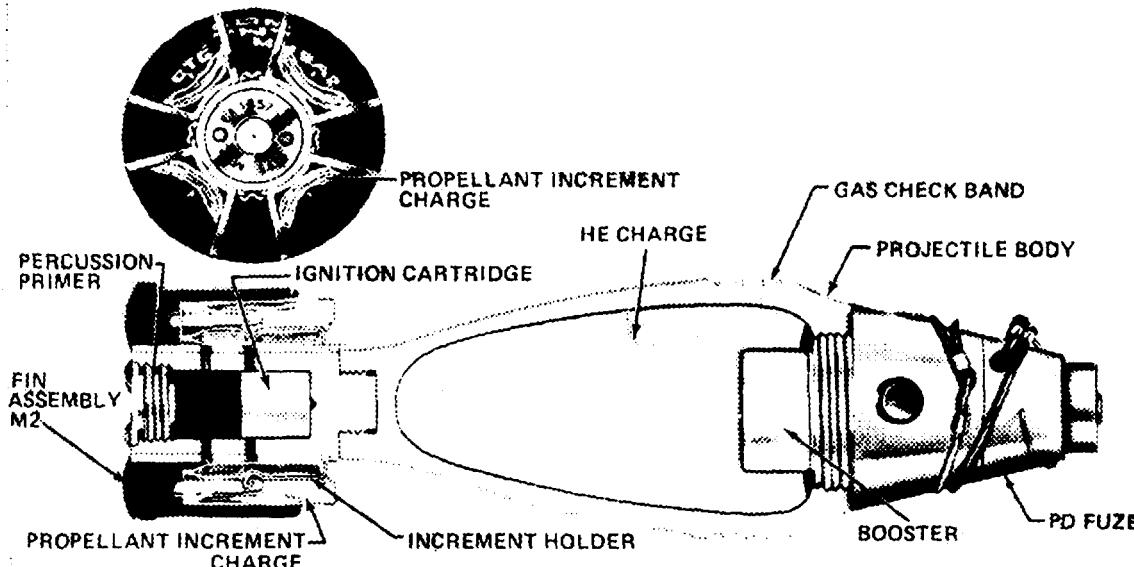
## **CHAPTER 4**

### **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 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-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 (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-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 lb
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 lb

## 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 (-40°C)
Upper limit -----	+125°F (+51.7°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 fiber container, 10 containers 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 DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

UNO serial number -----	0321
Quantity-distance class -----	(08) 1.2
Storage compatibility group -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH EXPLOSIVE PROJE- CTILES
DODAC -----	1310-B632
Drawing number -----	9207925

**Ballistics:**

Charge	Muzzle Velocity (fps)	Maximum Range	
		(yd)	(m)
0 *	189	332	303
1	292	784	716
2	377	1204	1101
3	449	1594	1458
4	518	1978	1809

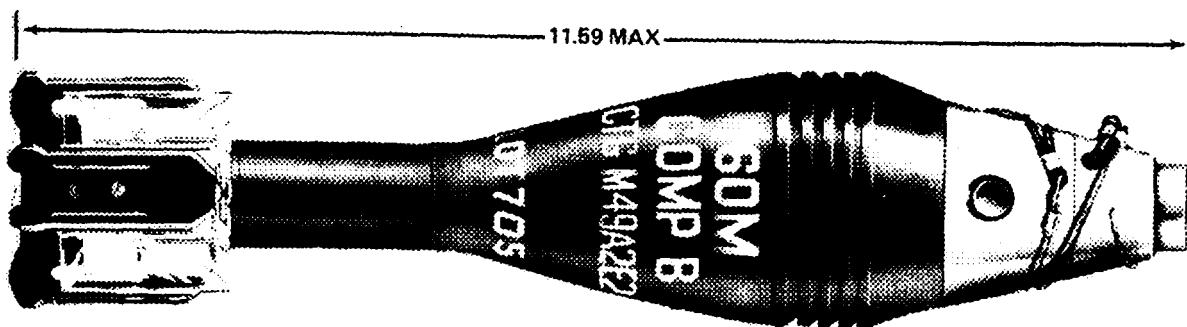
\*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 4 is the ignition cartridge and 4 increment charges.

**Limitations:**

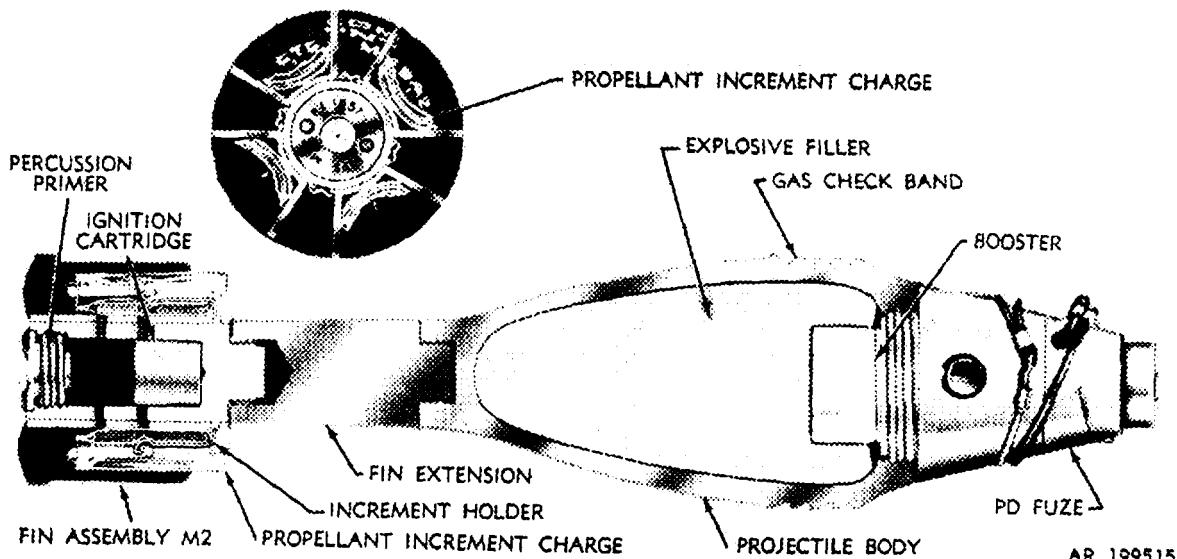
Although this cartridge is safe for firing at standard temperatures, excessive pressure may develop at Charge 4 below 0°F. Maximum allowable rate of fire: 30 rounds-per-minute for periods not exceeding one minute; 18 rounds-per-minute for periods not exceeding 4 minutes; 8 rounds-per-minute indefinitely.

**References:**

FM 23-90
TM 9-3071-1
TM 9-1015-215-10

**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 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 (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 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	3.25 lb
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 lb
Components:	
Ignition cartridge	M5A2
Propellant charge	M181
Percussion primer	M32
Fin assembly	M2 plus extension
Fuze	PD, M525 series; PD, M717; PD M935

**Temperature Limits:**

Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (-51.7°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	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 DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

UNO serial number	0321
Quantity-distance class	(08) 1.2
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1310-B632
Drawing number	9220179

**Ballistics:**

Charge	Muzzle Velocity (fps)	Maximum Range	
		(yd)	(m)
0*	169	280	256
1	247	700	639
2	373	1163	1069
3	450	1587	1452
4	520	1985	1814

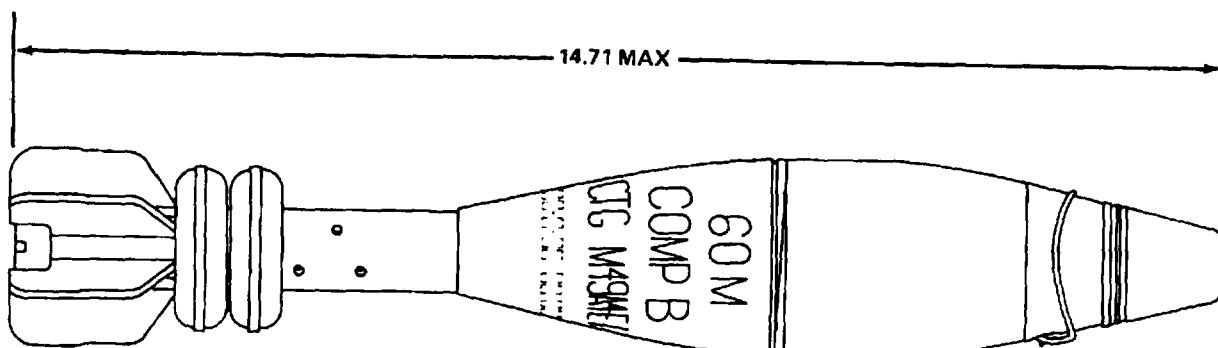
\*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 4 is the ignition cartridge and 4 increment charges.

**Limitations:**

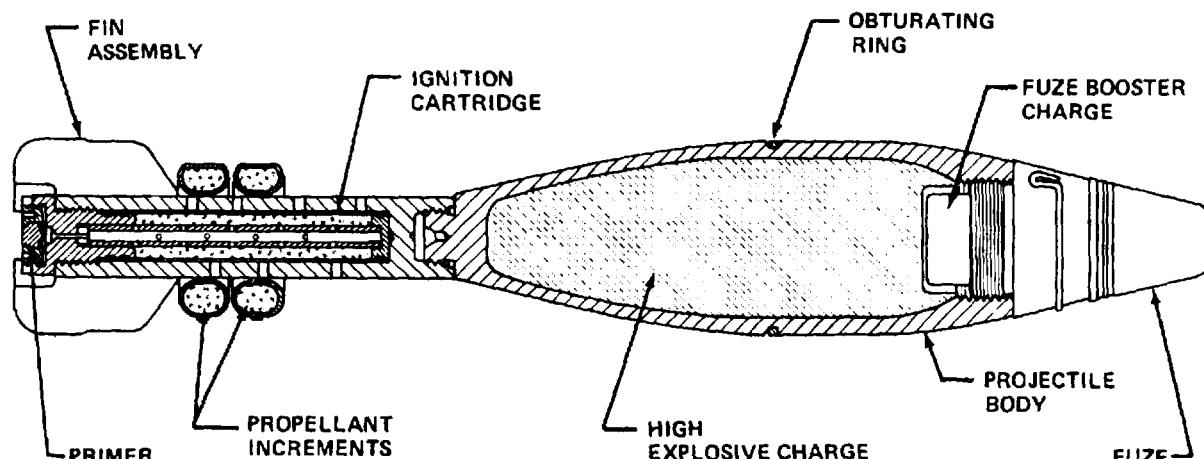
Excessive short rounds may occur when this round is fired at temperatures below 0°F. Maximum allowable rate of fire: 30 rounds-per-minute for periods not exceeding 1 minute; 18 rounds-per-minute for periods not exceeding 4 minutes; 8 rounds-per-minute indefinitely.

**References:**

- FM 23-90  
 TM 9-3071-1  
 TM 9-1015-215-10

**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.

**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 -----	M702
Propellant charge -----	M204
Percussion primer -----	M35
Fin assembly -----	M25
Fuze -----	PD, M935

**Temperature Limits:**

Firing:

Lower limit -----	-40°F (-40°C)
Upper limit -----	+125°F (+51.7°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 con-  
tainer; 8 con-  
tainers in  
metal box; 2  
metal boxes  
in wirebound  
box

\*Packing Box:  
Weight ----- 100 lb  
Dimensions -----  
Cube ----- 2.0 cu ft

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

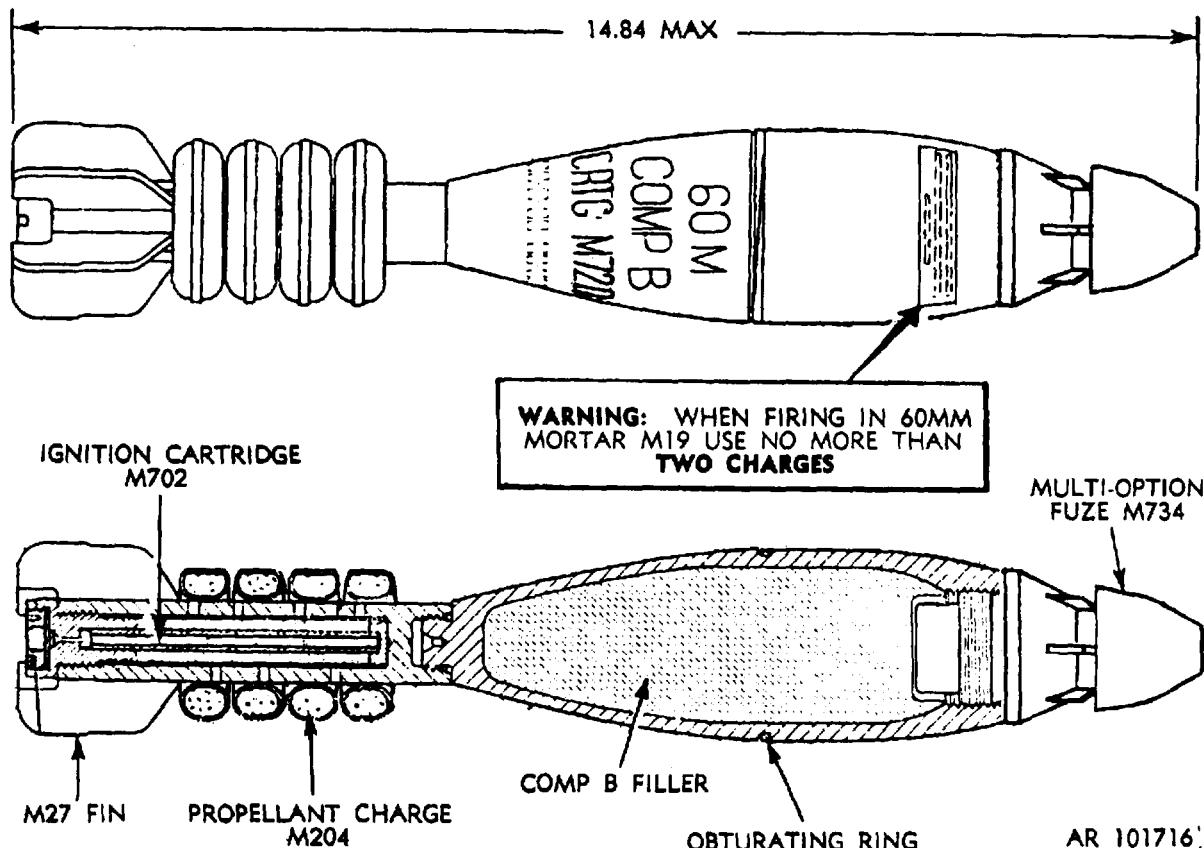
**Shipping and Storage Data:**

UNO serial number -----	0321
Quantity-distance class -----	(08) 1.2
Storage compatibility group -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH EXPLOSIVE PROJE- CTILES
DODAC -----	1310-
Drawing number -----	9241292

**References:**

FM 23-90  
TM 9-3071-1  
TM 9-1015-215-10

## CARTRIDGE, 60 MILLIMETER: HE, M720

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 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 expand 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	-----	14.84 in.
Cannon used with	-----	M19, M224

Projectile:  
 Body material ----- Alloy steel  
 Color ----- Olive drab  
 Filler and weight ----- 0.42 lb

Components:  
 Ignition cartridge ----- M702  
 Propellant charge ----- M204  
 Percussion primer ----- M35  
 Fin assembly ----- M27  
 Faze ----- Multi-Option  
 M734

**Temperature Limits:**

Firing:  
 Lower limit ----- -50°F (-45.6°C)  
 Upper limit ----- +145°F (+62.8°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 ----- 1 round in fiber container; 8 fiber containers in metal container; 2 metal containers in wire-bound 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 DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

UNO serial number ----- 0321  
 Quantity-distance class ----- (08) 1.2  
 Storage compatibility group ----- E  
 DOT shipping class ----- A  
 DOT marking ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE  
 DODAC ----- 1310-B642  
 Drawing number ----- 9275526

**Ballistics:**

Charge	Muzzle Velocity (fps)	Minimum Range (m)	Maximum Range (m)
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:**

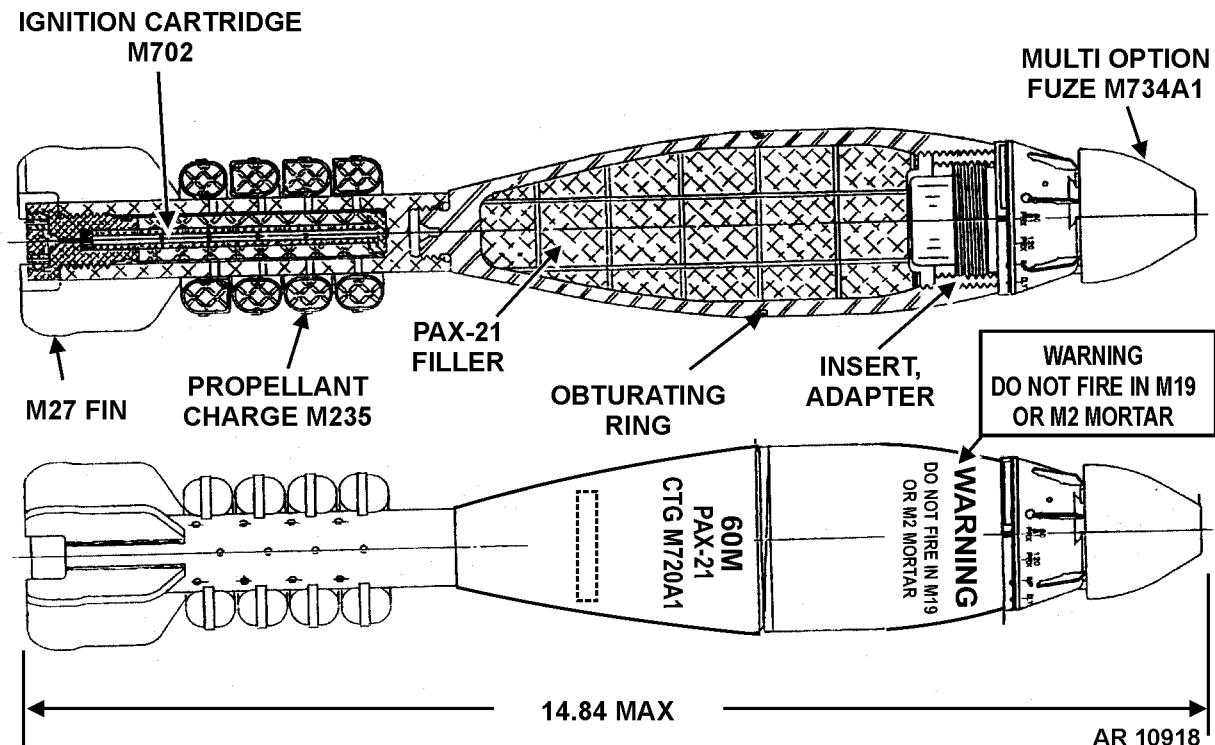
Do not tire the M720 cartridge in the M19 mortar above propellant charge 2.

Do not fire the M720 cartridge with charge greater than 1 in the hand held mode.

**References:**

FM 23-90  
 TM 9-1010-223-10  
 TM 9-1015-215-10  
 TM 9-1300-251-20  
 TM 9-1300-251-34  
 TM 9-3071-1

## CARTRIDGE, 60MM: HE, M720A1



### TYPE CLASSIFICATION:

Std - Nov 01.

### USE:

This cartridge is fired in the 60mm 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. In addition, it has been designed to comply with current Insensitive Munitions (IM) regulations.

### DESCRIPTION:

The complete round consists of a projectile body, a multi-option fuze, a fin assembly, four increments of propellant charge, an ignition cartridge and obturating ring. The projectile body is of alloy steel and is threaded internally at the nose to accept the fuze with plastic fuze adapter, and at the base to accept the fin assembly. The body is filled with PAX-21 high explosive. The cartridge and packaging components are designed to provide improved IM characteristics.

### 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 expand 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 .....	3.65 lb
Length w/fuze.....	14.84 in. (37.69 cm)
Cannon used with.....	M224

Projectile:

Body material .....	Alloy steel
Color.....	Olive drab
Filler and weight .....	PAX-21 0.79 lb

**Components:**

Ignition cartridge .....	M702
Propellant charge .....	M235
Percussion primer .....	M35
Fin assembly .....	M27
Fuze.....	M734A1 Multi-Option
DODAC.....	1310-BA16

**TEMPERATURE LIMITS:****Firing:**

Lower limit .....	-50°F (-45.6°C)
Upper limit.....	+145°F (+62.8°C)

**Storage:**

Lower limit .....	-60°F (-51.1°C)
Upper limit.....	+145°F (+62.8°C)

**DRAWINGS:**

Cartridge..... 12977145

**UNIT OF ISSUE:**

Packing .....	1 round in fiber container; 8 fiber containers in metal container; 2 metal containers in wirebound box
---------------	---

**\*PACKING DATA:****Packing Box:**

Weight .....	116 lb
Dimensions.....	14-15/16 x 13-3/16 x 20-3/16 in. (37.94 x 33.50 x 51.3 cm)
Cube .....	2.3 cu ft

\*See DOD Consolidated Ammunition Catalog for complete packing data including NSNs.

**SHIPPING AND STORAGE DATA:**

DOD hazard class/division .....	1.2.2
Storage compatibility group.....	E
Proper shipping name .....	CARTRIDGES FOR WEAPONS
UN identification number .....	0321

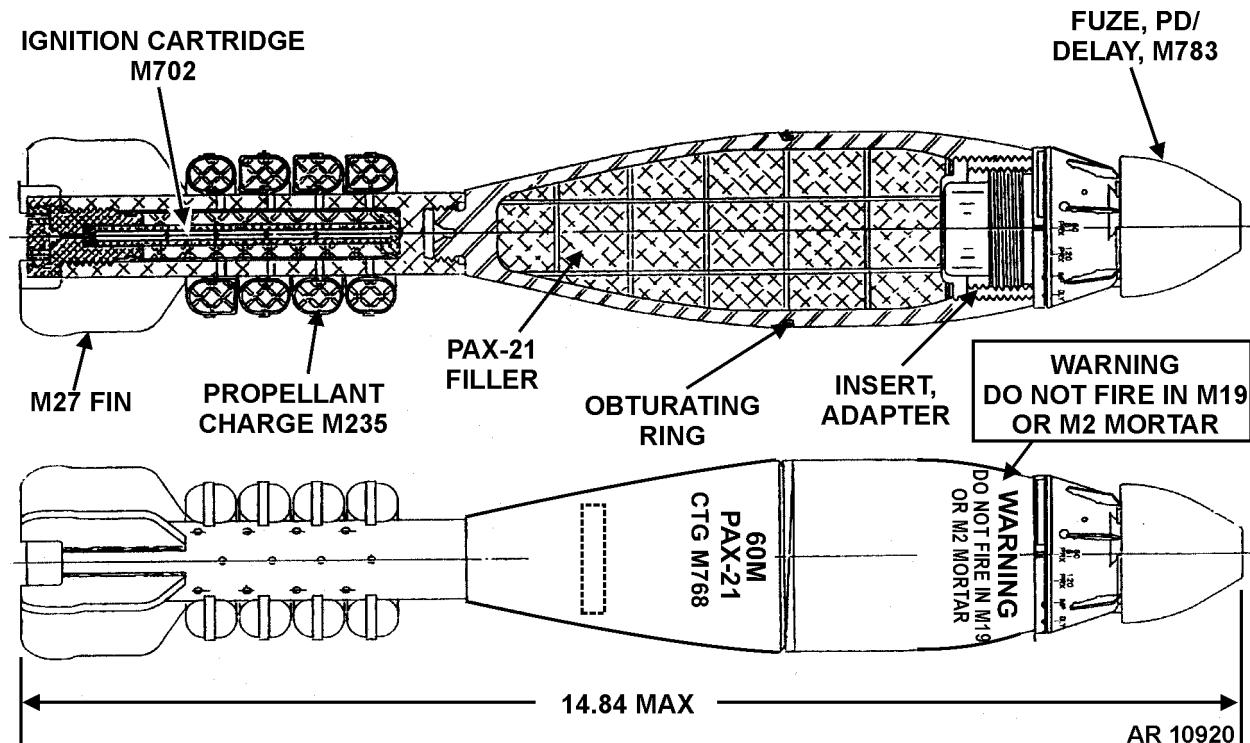
**LIMITATIONS:**

Do not fire the M720A1 cartridge in the M2 or M19 mortar.

**REFERENCES:**

- FM 23-90
- TM 9-1010-223-10
- TM 9-1300-251-20&P
- TM 9-1300-251-34&P

## CARTRIDGE, 60MM: HE, M768



### TYPE CLASSIFICATION:

Std - Nov 01.

### USE:

This cartridge is fired in the 60mm 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. In addition, it has been designed to comply with current Insensitive Munitions (IM) regulations.

### DESCRIPTION:

The complete round consists of a projectile body, a point detonating/delay fuze, a fin assembly, four increments of propellant charge, an ignition cartridge and obturating ring. The projectile body is of alloy steel and is threaded internally at the nose to accept the fuze and plastic fuze adapter, and at the base to accept the fin assembly. The body is filled with PAX-21 high explosive. The cartridge and packaging components are designed to provide improved IM characteristics.

### 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 expand 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 .....	3.65 lb
Length .....	14.84 in. (37.69 cm)

Cannon used with..... M224

#### Projectile:

Body material .....	Alloy steel
Color.....	Olive drab
Filler and weight .....	PAX-21 0.79 lb

**Components:**

Ignition cartridge .....	M702
Fin assembly .....	M27
Fuze.....	M783 PD/Delay
Propelling charge .....	M235
DODAC.....	1310-BA17

**PERFORMANCE:**

Maximum range .....	3490 m (11,450 ft)
---------------------	--------------------

**TEMPERATURE LIMITS:****Firing:**

Lower limit .....	-50°F (-45.6°C)
Upper limit.....	+145°F (+62.8°C)

**Storage:**

Lower limit .....	-50°F (-45.6°C)
Upper limit.....	+145°F (+62.8°C)

**DRAWINGS:**

Cartridge.....	12993658
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**UNIT OF ISSUE:**

Packing .....	1 cartridge per fiber container; 8 containers per metal box; 2 metal boxes per wire-bound box
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**\*PACKING DATA:****Packing Box:**

Weight .....	116 lb (50.80 kg)
Dimensions.....	14-15/16 x 13-3/16 x 20-3/16 in. (37.94 x 33.50 x 51.3 cm)
Cube .....	2.3 cu ft (0.07 cu m)

\*See DOD Consolidated Ammunition Catalog for complete packing data including NSNs.

**SHIPPING AND STORAGE DATA:**

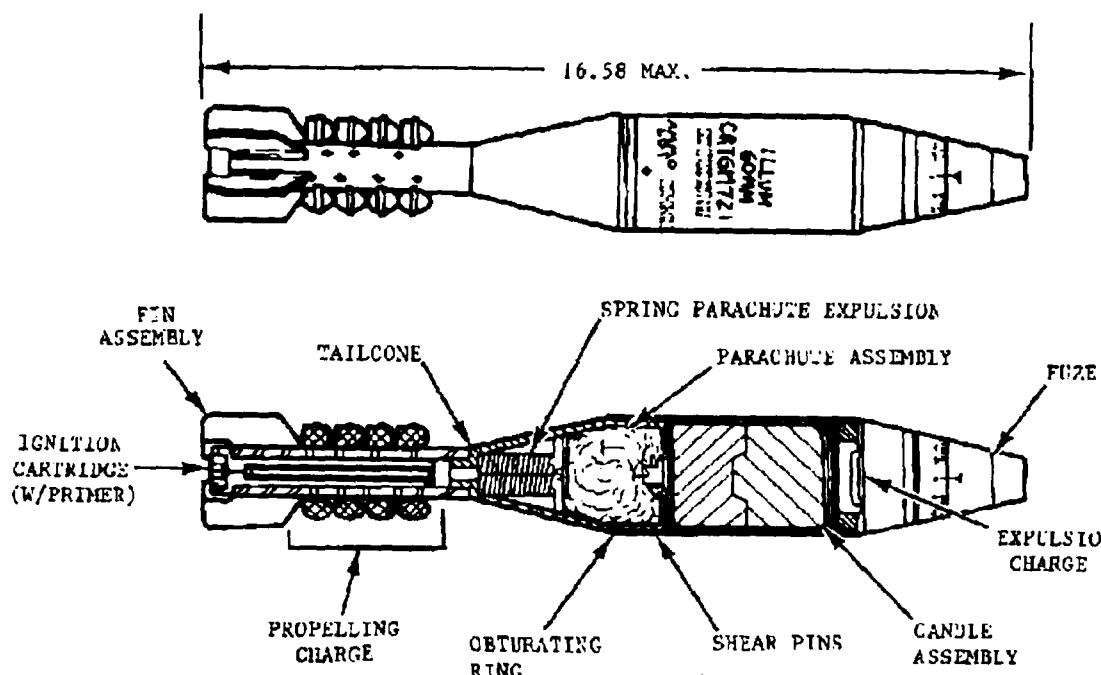
DOD hazard class/division .....	1.2.2
Storage compatibility group.....	E
Proper shipping name .....	CARTRIDGE FOR WEAPONS
UN identification number .....	0321

**LIMITATIONS:**

Do not fire the M768 cartridge in the M2 or M19 mortars.

**REFERENCES:**

AMC-P 700-3-3
TM 9-1010-223-10

**CARTRIDGE, 60 MILLIMETER: ILLUMINATING, M721**

AR 4022

**Type Classification:**

Std Sep '87

**Use:**

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

**Description:**

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

**Functioning:**

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

the parachute from the tail cone. The parachute opens, slowing the descent of the burning candle which illuminates the target.

**Tabulated Data:**

Complete Round:	
Type	Illumination
Weight	3.76 lb (1.71 kg)
Length	16.58 max.
Projectile:	
Material	
Color	White w/black markings
Filler	Illuminating

	Assembly
Components:	
Ignition cartridge	M702
Fin assembly	M27
Fuze	MTSQ, M776 (DM93)
Propelling charge	M204
Drawing number	9345338
Maximum range:	3490 m (11,450 ft)

**Temperature Limits:**

Firing:  
 Lower ----- -50°F (-45.6°C)  
 Upper ----- +145°F  
                  (+62.8°C)

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

**Shipping and Storage Data:**

UNO serial number ----- 0171  
 DOD hazard class ----- (08) 1.2  
 Storage compatibility group ----- G  
 DOT shipping class ----- A  
 DOT designation ----- AMMUNI-  
                  TION FOR  
                  CANNON  
                  WITH  
                  ILLUMINA-  
                  TING  
                  PROJEC-  
                  TILES

\*Packing ----- 1 cartridge per  
 fiber con-  
 tainer; 8 con-  
 tainers per  
 metal box; 2  
 metal boxes  
 per wirebound  
 box.

\*Packing Box:  
 Weight ----- 112 lb  
                  (50.80 kg)  
 Dimensions ----- 14-15/16 x  
                  13-3/16 x 20  
                  in. (37.94 x  
                  33.50 x 50.8  
                  cm)  
 Cube ----- 2.3 cu ft  
                  (0.07 cu m)

DODAC ----- 1310-B647

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

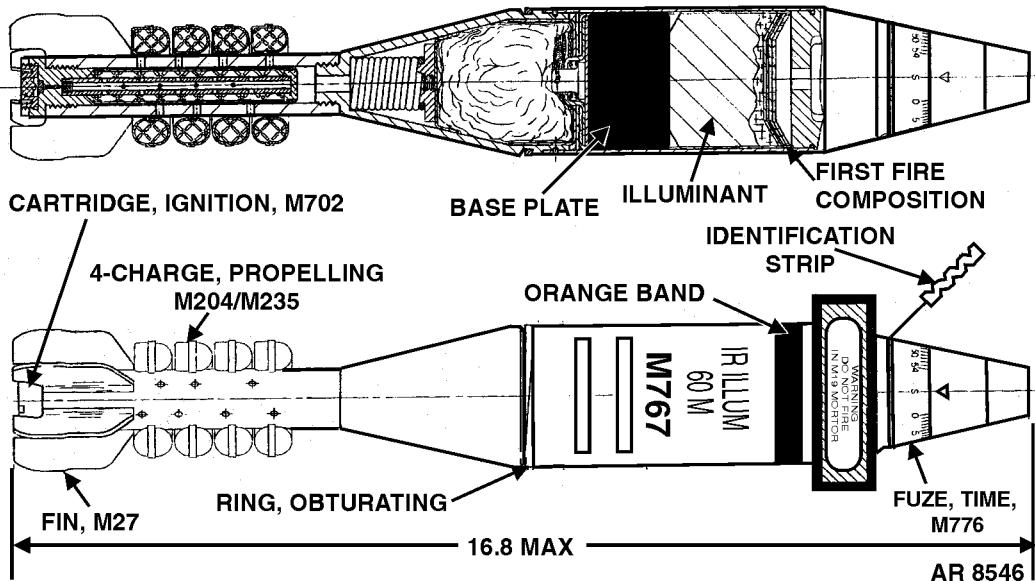
**Limitations:**

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

**References:**

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

## CARTRIDGE, 60 MILLIMETER: ILLUMINATING, IR, M767

**Type Classification:**

Std Sep 99

**Use:**

This cartridge is an infrared illumination round for the 60mm M224 mortar and is used with Night Vision Devices (NVD's) to reduce friendly force's exposure to the enemy.

**Description:**

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

**Functioning:**

Loaded fin-end first into the mortar barrel, the cartridge slides down the barrel and strikes the firing pin. The ignition cartridge functions and ignites the propelling charge. Combustion gases from the ignition cartridge and propelling charges propel the cartridge out of the barrel. At a pre-set time the fuze functions in flight.

The expulsion charge ignites and ejects the candle assembly. A spring ejects the parachute from the tail cone. The parachute opens, slowing the descent of the burning candle which illuminates the target.

**Tabulated Data:**

Complete Round:

Type ----- Infrared Illumination (IR)

Weight ----- 3.76 lb  
(1.71 kg)

Length ----- 16.58 max.

Projectile:

Material-----  
Color----- White w/black markings and orange band

Filler ----- Illuminating, Infrared (IR)

Candlepower----- 500 candle-power/sec max.

Components:		*Packing -----	1 cartridge per fiber container; 8 containers per metal box; 2 metal boxes per wirebound box.
Ignition cartridge -----	M702		
Fin assembly -----	M27		
Fuze -----	MTSQ, M776 (DM93)		
Propelling charge-----	M204/M235		
Drawing number -----	12972471		
Maximum range -----	3490 m (11,450 ft)		

**Temperature Limits:**

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

**Shipping and Storage Data:**

UNO serial number -----	0171
DOD hazard class -----	(08) 1.2
Storage compatibility group -----	G
DOT shipping class -----	A
DOT designation -----	AMMUNITION FOR CANNON WITH ILLUMI- NATING PRO- JECTILES

*Packing Box:	
Weight -----	112 lb (50.80 kg)
Dimensions -----	14-15/16 x 13-3/16 x 20 in. (37.94 x 33.50 x 50.8 cm)
Cube -----	2.3 cu ft (0.07cu m)
DODAC -----	1310-BA04

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

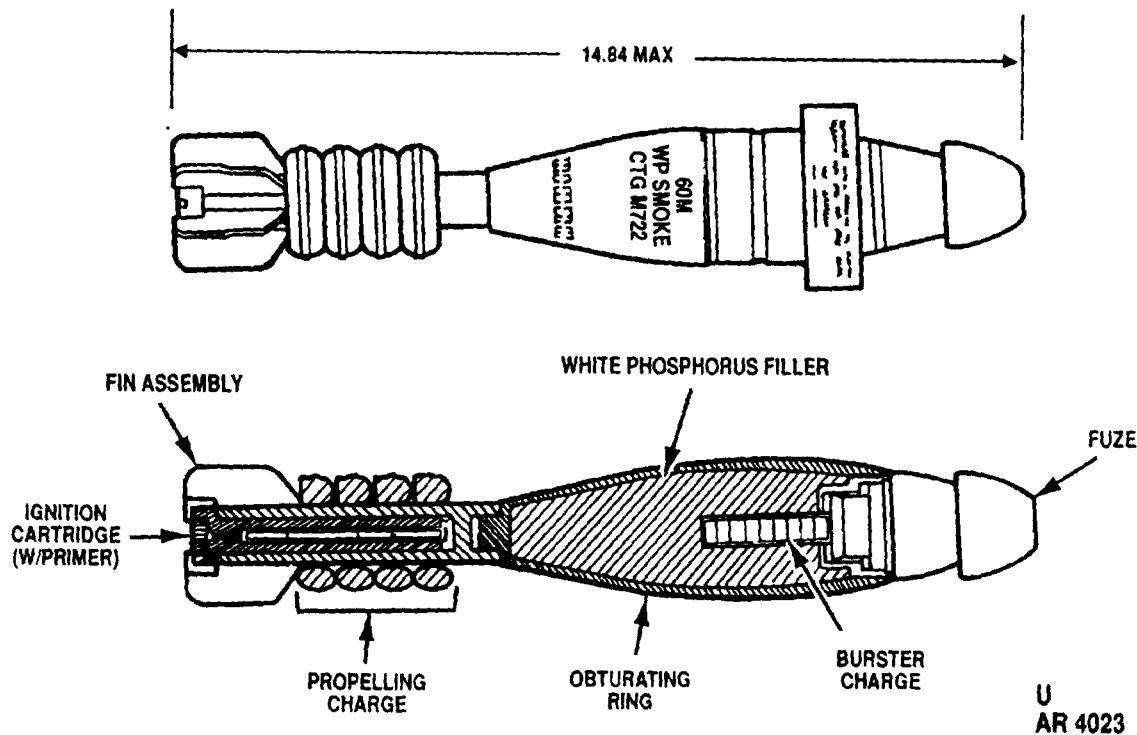
**Limitations:**

The M767 cartridge shall not be fired in the M2 or M19 mortar.

Do not fire below Charge 2.

**References:**

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

**CARTRIDGE, 60 MILLIMETER: SMOKE (W), M722****Type Classification:**

Std Oct '87

**Use:**

This cartridge is a smoke round for the 60mm M224 mortar and is used for spotting purposes.

**Description:**

The cartridge has a point-detonating fuze, a burster charge, white phosphorus (WP) filler, a thin walled shell, fin assembly, a four increment propelling charge, and an ignition cartridge.

**Functioning**

Loaded fin-end first into the mortar barrel, the cartridge slides down the barrel and strikes the firing pin. The ignition cartridge functions and ignites the propelling charge. Combustion gases from the ignition cartridge and propelling charges propel the cartridge out of the barrel. On impact, the fuze functions. The fuze initiates the burster charge. The burster charge ruptures shell and disperses the

WP filler. The WP produces smoke upon exposure to the air.

**Tabulated Data:****Complete Round:**

Type	Smoke
Weight	3.75 lb (1.70 kg)
Length	14.84 in. (37.69 cm) max.

**Projectile:**

Material	Steel
Color	Light green w/red markings and one yellow band
Filler	White phosphorus

**Components:**

Ignition cartridge	M702
Fin assembly	M27
Fuze	PD M745
Propelling charge	M204
Drawing number	12902791
Maximum range	3490 m

**Temperature Limits:**

Firing:  
 Lower ----- -50°F (-45.6°C)  
 Upper ----- 145°F  
 (+62.°C)

Storage:  
 Lower ----- -50°F (-45.5°C)  
 for a period of  
 not more than  
 3 days  
 +160°F  
 (+71.1°C)  
 for a period  
 of not more  
 than 4 hr/day

Upper -----

**Shipping and Storage Data:**

UNO serial number ----- 0246  
 DOD hazard class ----- 1.3  
 Storage compatibility group ----- H  
 DOT shipping class ----- B  
 DOT designation ----- AMMUNI-  
 TION FOR  
 CANNON  
 WITH  
 SMOKE  
 PROJEC-  
 TILES  
 1 cartridge  
 per fiber con-  
 tainer; 8 con-  
 tainers per  
 metal box; 2  
 metal boxes  
 per wirebound  
 box

\*Packing -----

\*Packing Box:  
 Weight ----- 112 lb  
 Dimensions ----- 14-15/16 x  
 13-3/16 x  
 17-3/4 in.  
 (37.94 x 33.50  
 x 45.09 cm)  
 Cube ----- 2.0 cu ft  
 (0.06 cu m)

DODAC ----- 1310-B646

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

**Limitations:**

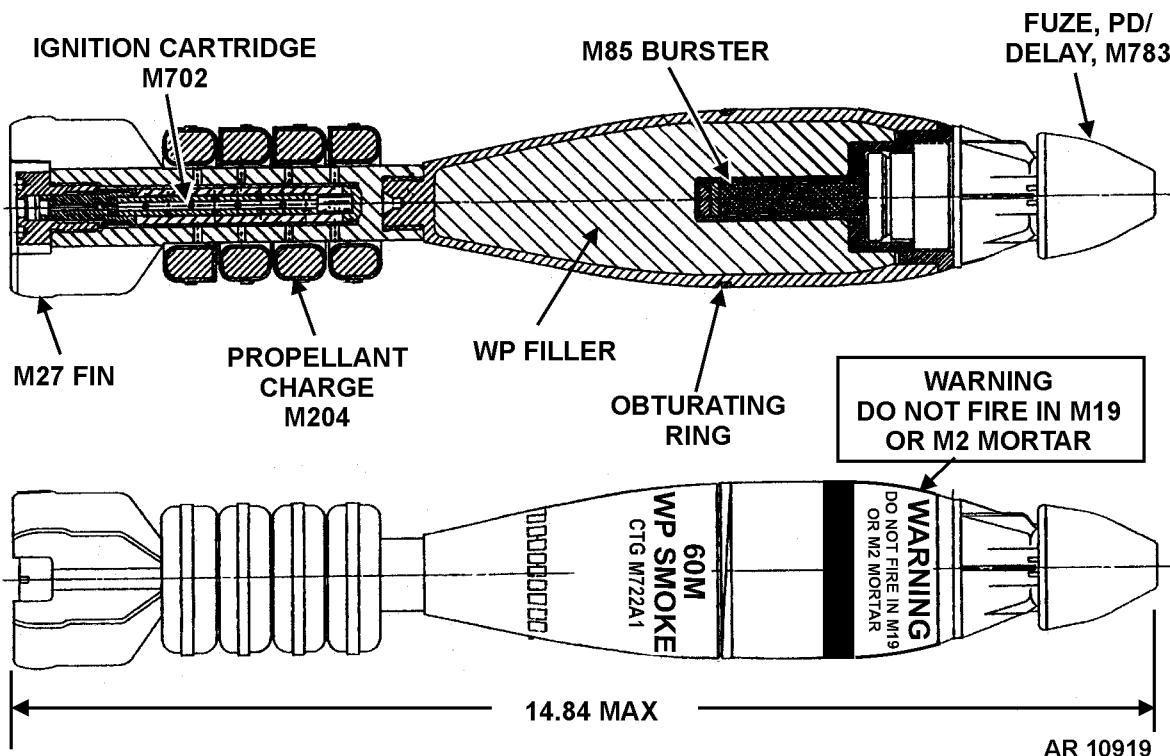
The M722 cartridge cannot be fired above Charge 2 in the M19 mortar.

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:**

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

## CARTRIDGE, 60MM: SMOKE (WP), M722A1



### TYPE CLASSIFICATION:

Std - Nov 01.

### USE:

This cartridge is fired in the 60mm M224 mortar in the Lightweight Company System and is used for spotting purposes.

### DESCRIPTION:

The complete round consists of a projectile body, a point detonating/delay fuze, a burster charge, a fin assembly, four increments of propellant charge, an ignition cartridge and obturating ring. The body is filled with White Phosphorus.

### FUNCTIONING:

Loaded fin-end first into the mortar barrel, the cartridge slides down the barrel and strikes the firing pin. The ignition cartridge functions and ignites the propelling charge. Combustion gases from the ignition cartridge and propelling charges propel the cartridge out of the barrel. On impact, the

fuze functions. The fuze initiates the burster charge. The burster charge ruptures shell and disperses the WP filler. The WP produces smoke upon exposure to the air.

### TABULATED DATA:

#### Complete Round:

Type .....	Smoke
Weight .....	3.79 lb (1.70 kg)
Length .....	14.84 in. (37.69 cm)
Cannon used with.....	M224

#### Projectile:

Material .....	Steel
Color.....	Light green w/red markings and one yellow band
Filler .....	White phosphorus

#### Components:

Ignition cartridge .....	M702
Fin assembly.....	M27
Fuze .....	PD/DLY M783
Propelling charge.....	M204
DODAC.....	1310-BA14

TEMPERATURE LIMITS:

## Firing:

Lower limit .....	-50°F (-45.6°C)
Upper limit.....	+145°F (+62.8°C)

## Storage:

Lower limit .....	-50°F (-45.6°C)
Upper limit .....	+145°F (+62.8°C)

DRAWINGS:

Cartridge..... 12982995

UNIT OF ISSUE:

Packing..... 1 cartridge per fiber container; 8 containers per metal box; 2 metal boxes per wire-bound box

\*PACKING DATA:

## Packing Box:

Weight.....	112 lb
Dimensions .....	14-15/16 x 13-3/16 x 17-3/4 in. (37.94 x 33.50 x 45.09 cm)
Cube.....	2.0 cu ft (0.06 cu m)

\*See DOD Consolidated Ammunition Catalog for complete packing data including NSNs.

SHIPPING AND STORAGE DATA:

DOD hazard class/division .....	1.2.2
Storage compatibility group.....	H
Proper shipping name .....	AMMUNITION SMOKE, WHITE PHOSPHORUS
UN identification number .....	0245

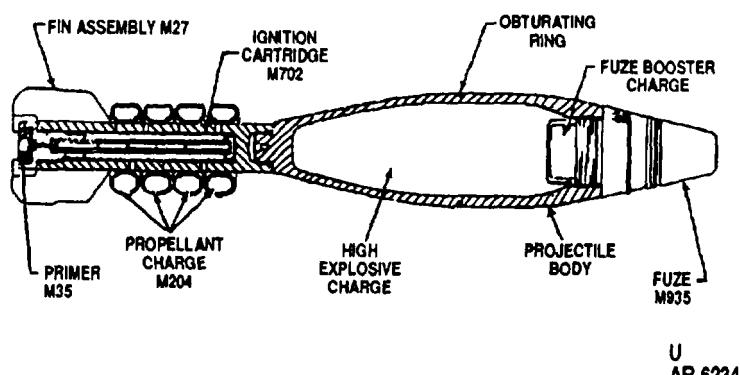
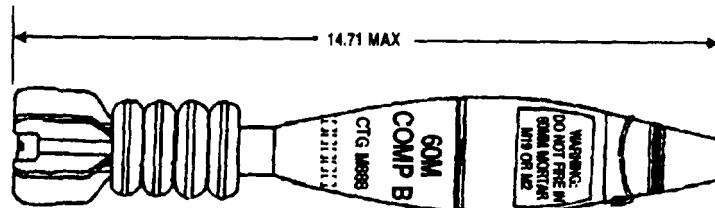
LIMITATIONS:

The M722A1 cartridge cannot be fired in the M2 or the M19 mortar.

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:

FM 23-90
TM 9-1010-223-10
TM 9-1300-251-20&P
TM 9-1300-251-34&P

**CARTRIDGE, 60 MILLIMETER: HE, M888****Type Classification:**

Std LCC-A-MSR 04836008.

**Use:**

This cartridge is fired in the 60mm M224 mortar in the Light-weight Company System. It 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, four 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 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.

**Tabulated data:****Complete round:**

Type	HE
Weight w/fuze	3.90 lb
Length w/fuze	14.71 in.
Cannon used	M224

**Projectile:**

Body material	Alloy steel
Color	Olive drab w/yellow markings
Filler and weight	Comp B, 0.79 lb

**Components:**

Ignition cartridge	M702
Propellant charge	M204
Percussion primer	M35
Fin assembly	M27
Fuze	PD, M935

**Temperature Limits:****Firing:**

Lower limit -----	-50°F (-45.6°C)
Upper limit -----	+145°F (+62.8°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 -----****\*Packing box:**

Weight -----	112 lb
Dimensions -----	14-15/16 x 13-3/16 in. x 17-3/4 in.
Cube -----	2.1 cu ft

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

**Shipping and Storage Data:**

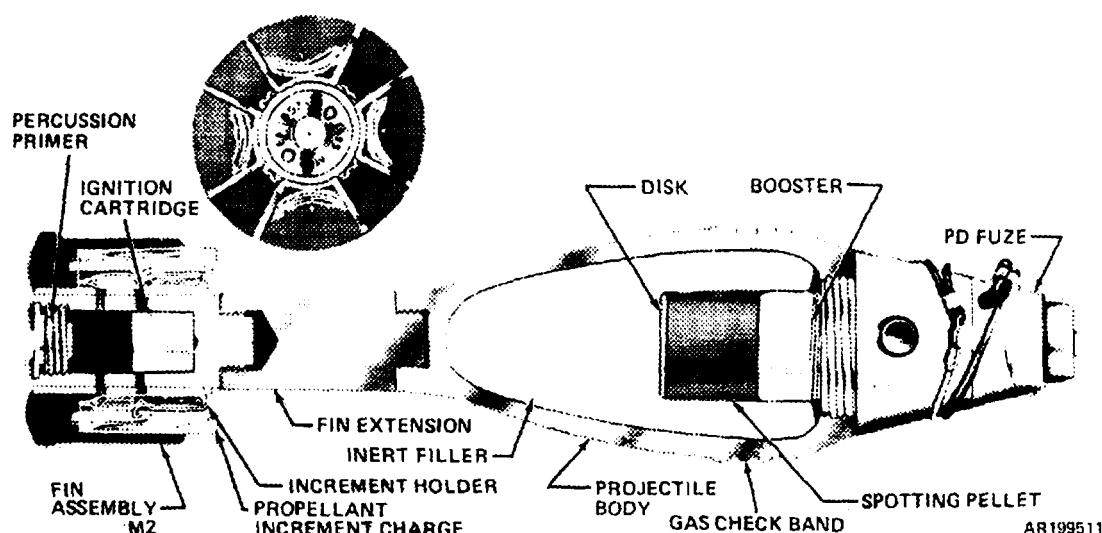
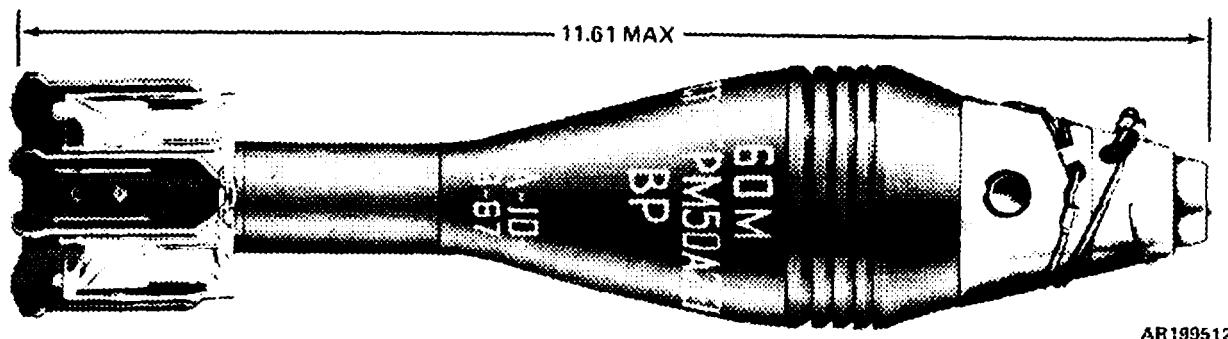
UNO serial number -----	0321
Quantity-distance class -----	(08) 1.2
Storage compatibility group ---	E
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH EXPLOSIVE PROJE- CTILES
DODAC -----	1310-B643
Drawing number -----	9354430

**Limitations:**

When firing in 60mm mortar M19 or M2 use no more than two (2) charges.

**References:**

FM 28-90
TM 9-3071-1
TM 9-1015-215-10

**CARTRIDGE, 60 MILLIMETER: TARGET PRACTICE, M50A3 (M50A2E1)****Type Classification:**

C & T AMCTC 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 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 (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 plas-

ter 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 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
Finassembly .....	M2 plus extension
Fuze .....	PD, M525 series; PD, M935

**Temperature Limits:**

Firing:

Lower limit .....	-40°F (-40°C)
Upper limit .....	+125°F (+51.7°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 .....

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

**Shipping and Storage Data:**

UNO serial number .....	0321
Quantity-distance class .....	(08) 1.2
Storage compatibility group .....	E
DOT shipping class .....	A
DOT designation .....	AMMUNITION FOR CANNON WITHEX-PLOSIVE PROJECTILES
DODAC .....	1310-B634
Drawing number .....	9220383

**Ballistics:**

Charge	Muzzle Velocity (fps)	<u>Maximum Range</u>	
		(yd)	(m)
1	247	700	639
2	373	1163	1069
3	450	1587	1452
4	520	1963	1814

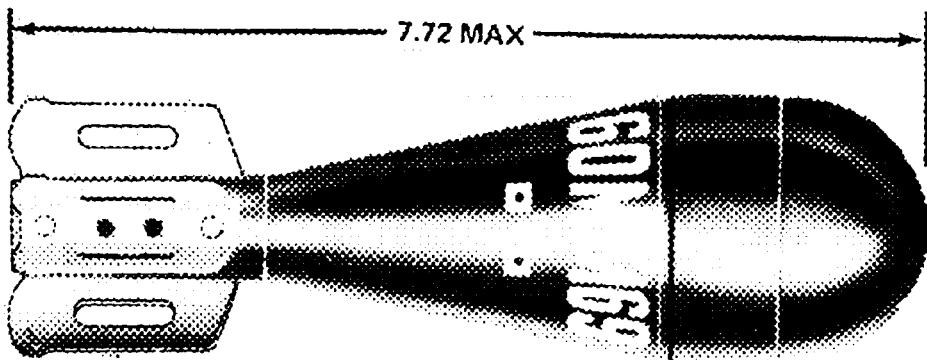
\*Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 4 is the ignition cartridge and 4 increment charges.

**Limitations:**

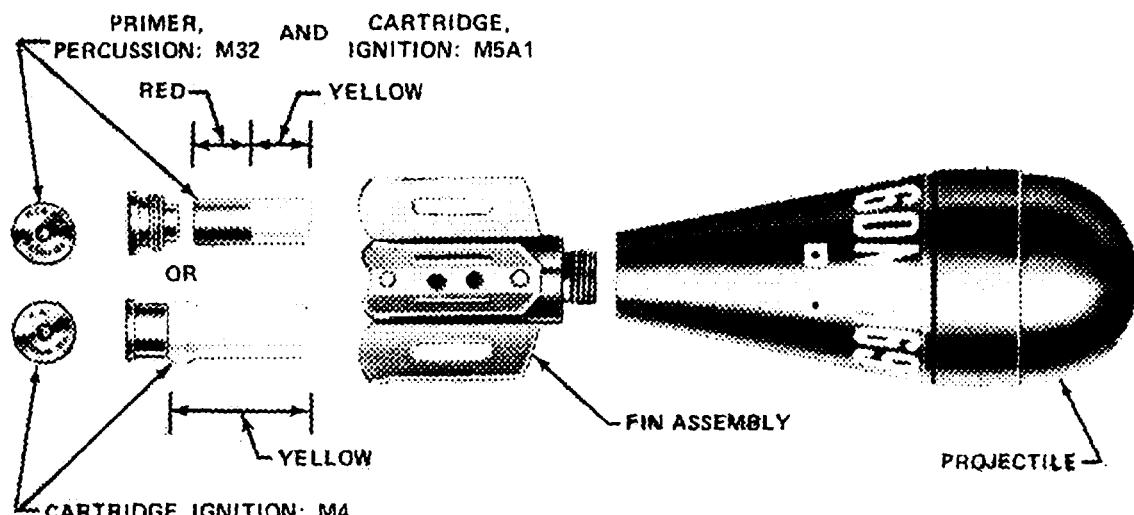
Excessive short rounds may occur when this round is fired at temperatures below 0°F. Maximum allowable rate of fire: 30 rounds-per-minute for periods not exceeding 1 minute; 18 rounds-per-minute for periods not exceeding 4 minutes; 8 rounds-per-minute indefinitely.

**References:**

- TM 9-3071-1  
TM 9-1015-215-10

**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 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:**

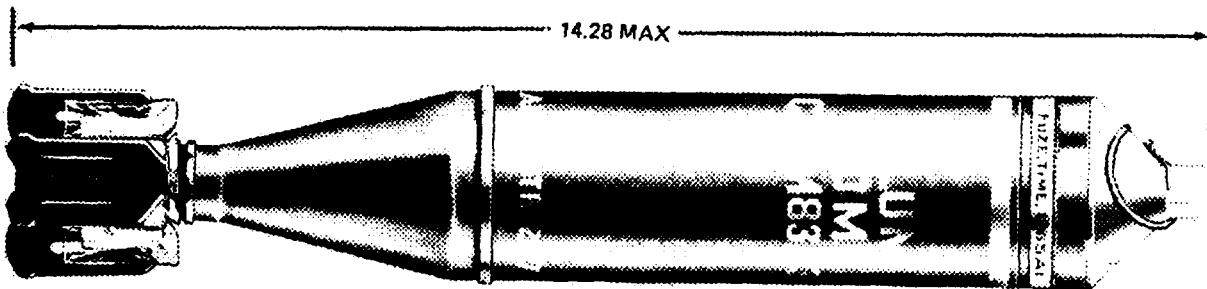
Complete round:

Type -----	Training
Weight assembled -----	4.43 lb
Length assembled -----	7.72 in.

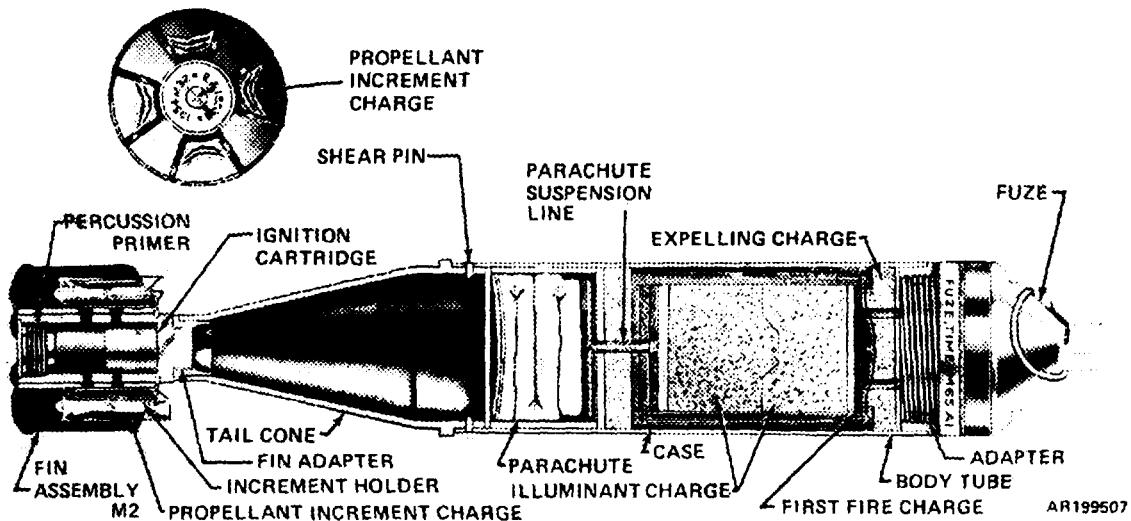
Projectile:

Body material -----	Cast iron
---------------------	-----------

Color:	<b>*Packing Box:</b>				
Old mfg -----	Black or blue w/white markings	Weight -----	65 lb		
New mfg -----	Bronze w/white markings	Dimensions -----	21-7/16 x 18- 5/16 x 7-27/32 in.		
Filler and weight -----	Inert	Cube -----	1.4 cu ft		
Components:		<b>*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.</b>			
Ignition cartridge -----	M5A1 or M4 (complete)				
Propellant charge -----	None				
Percussion primer -----	M32				
Fin assembly -----	M5 (or modified M2)				
Fuze -----	None				
<b>Temperature Limits:</b>					
Firing:					
Lower limit -----	-40°F (-40°C)				
Upper limit -----	+125°F (+51.7°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 -----	A training kit used in the field holds 10 training car- tridges and accessories				
<b>Shipping and Storage Data:</b>					
Quantity-distance class -----	N/A				
Storage compatibility group -----	N/A				
DOT shipping class -----	N/A				
DOT designation -----	AMMUNI- TION FOR CANNON WITH INERT PROJEC- TILES				
DODAC -----	1310-B629				
Drawing number -----	9222994				
<b>Ballistics:</b>					
Charge -----	0				
Muzzle velocity -----	46.4 mps (152.24 fps)				
Maximum range -----	193 m (211.14 yd)				
<b>Limitations:</b>					
This round is to be fired at Charge 0 only.					
<b>Reference:</b>					
TM 9-3071-1					
TM 9-1015-215-10					

**CARTRIDGE, 60 MILLIMETER: ILLUMINATING, M83A3, M83A2, AND M83A1**

AR199508



AR199507

**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 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:

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 (+51.7°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; 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 DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

#### Shipping and Storage Data:

UNO serial number -----	0171
Quantity-distance class -----	(08) 1.2
Storage compatibility group -----	G
DOT shipping class -----	A
DOT designation -----	AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES
DODAC -----	1310-B627
Drawing number -----	M83A3, 9207516 M83A2, 75-1-143

#### Ballistics:

Charge	Muzzle Velocity (fps)	Horizontal Range (yd)	Height of Burst (yd)	Elevation (m)	(deg/min)
2*	312	475	434	170	155
2	312	500	457	157	144
2	312	525	480	145	133
3	374	875	800	152	139
4	434	1100	1006	175	160
					45/15

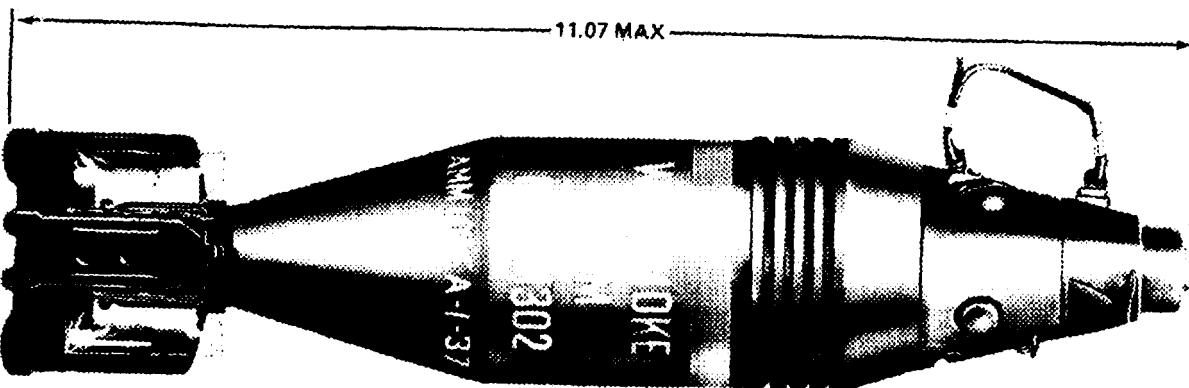
\*Charge 2 is the ignition cartridge and 2 increment charges; Charge 4 is the ignition cartridge and 4 increment charges.

#### Limitations:

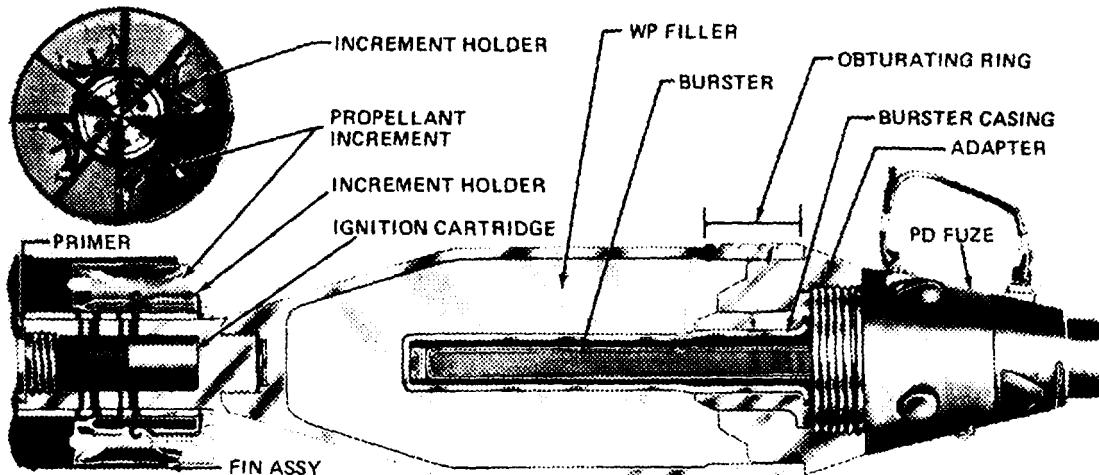
Firing this cartridge below Charge 2 will result in duds.

#### References:

AMC-P 700-3-3  
TM 9-1015-215-10  
TM 9-3071-1

**CARTRIDGE, 60 MILLIMETER: SMOKE, WP, M302**

AR199506



AB199506

**Type Classification:**

C&amp;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 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 burster assembly. One of two types of burster assem-

blies 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 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 lb
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 -----	-40°F (-40°C)
Upper limit -----	+125°F (+51.7°C)
Storage:	
Lower limit -----	-40°F (-40°C)
Upper limit -----	+145°F (+62.8°C)
*Packing -----	One round in fiber container; six containers in wooden box
*Packing Box:	
Weight -----	49.0 lb
Dimensions -----	15-3/8 x 13-11/16 x 8-15/32 in.
Cube -----	1.04 cu ft

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

**Shipping and Storage Data:**

UNO serial number -----	0245
Quantity-distance class -----	(12) 1.2
Storage compatibility group -----	H
DOT shipping class -----	A
DOT designation -----	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC -----	1310-B630
Drawing number -----	9205340

**Ballistics:**

Charge	Muzzle Velocity (fps)	Maximum Range	
		(yd)	(m)
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.

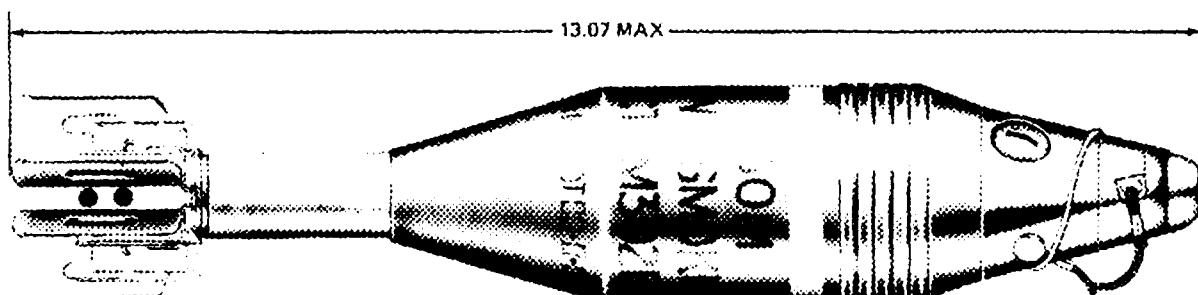
**Limitations:**

Excessive short rounds may occur when this round is fired at temperatures below 0°F.

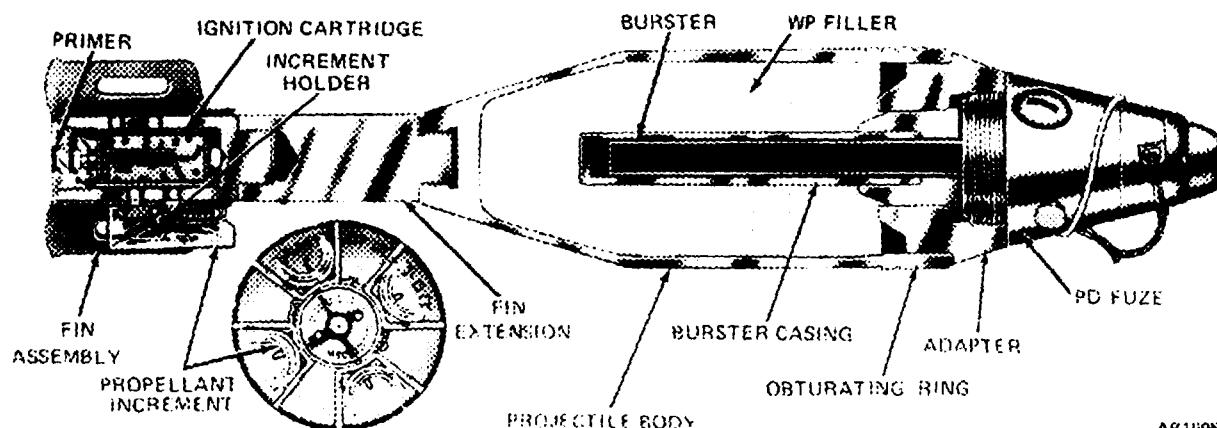
Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

**References:**

- AMC-P 700-3-3
- TM 9-1015-215-10
- TM 9-3071-1
- SB 700-20

**CARTRIDGE, 60 MILLIMETER: SMOKE, WP, M302A1 (M302E1) AND M302A2**

AR199504



AR199503

**Type Classification:**

C&amp;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 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 lb  
 Length w/fuze ----- 13.07 in.

Projectile:  
 Body material ----- Forged steel  
 Color ----- 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 ----- 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°F  
     (+51.7°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  
     fiber con-  
     tainer; nine  
     containers in  
     wooden box

\*Packing Box:  
 Weight ----- 56.6 lb  
 Dimensions ----- 17-3/4 x 10-7/8  
     x 11-27/32 in.  
 Cube ----- 1.3 cu ft

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

**Shipping and Storage Data:**

UNO serial number ----- 0245  
 Quantity-distance class ----- (12) 1.2  
 Storage compatibility group ----- H  
 DOT shipping class ----- A  
 DOT designation ----- AMMUNI-  
     TION FOR  
     CANNON  
     WITH  
     SMOKE  
     PROJEC -  
     TILES  
 DODAC ----- 1310-B630  
 Drawing number ----- 9215575

**Ballistics:**

Charge	Muzzle Velocity (fps)	Maximum Range (yd)	Range (m)
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 4 increment charges.

**Limitations:**

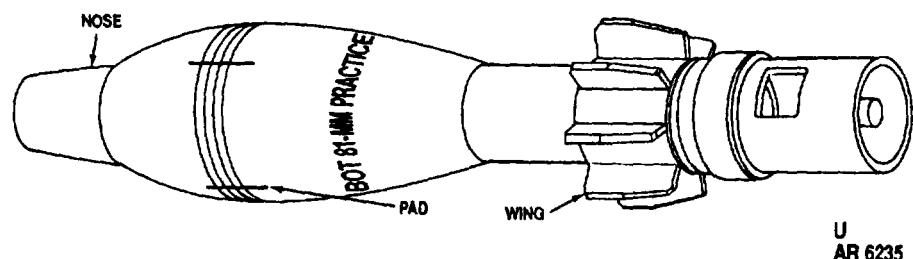
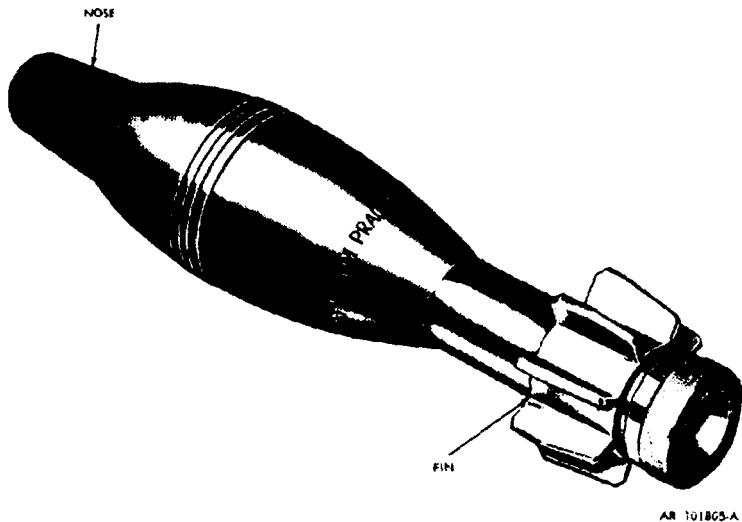
Excessive short rounds may occur when  
 this round is fired at temperatures below 0°F.  
 Maximum allowable rate of fire: 30 rounds-per  
 minute for periods not exceeding 1 minute; 18  
 rounds-per-minute for periods not exceeding 4  
 minutes; 8 rounds-per-minute indefinitely.

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 nor-  
 mal position in the nose of the projectile.  
 Erratic performance may occur if voids exist  
 inside of WP filler.

**References:**

AMC-P 700-3-3  
 TM 9-1015-215-10  
 TM 9-3071-1  
 SB 700-20

**CARTRIDGE, 60MM MORTAR TRAINING DEVICE: 60MM SABOT (INERT) M3 AND  
22MM SUBCALIBER PRACTICE CARTRIDGE M744, M745, M746 AND M747**



**Type Classification:**

LCCA, STD, MSR 06806010,

**Use:**

The cartridge is a training device for all 60mm mortars. The cartridge provides realistic mortar firing training at distances which correspond to range fire distances in the ratio of 1 to 10. The subcaliber device of the cartridge can be fired using standard mortar sighting, fire control equipment and a special firing table (Operators Manual TM 9-1310-249-12&P) in the same manner as standard service mortar ammunition.

**Description:**

The cartridge consists of a 60mm M3 sabot which is assembled with a 22mm subcaliber practice cartridge M744, M745, M746 or

M747. The 22mm subcaliber practice cartridges, M744 (Charge 1), M745 (Charge 2), M746 (Charge 3), and M747 (Charge 4) is comprised of a steel-bodied projectile which is assembled to a cartridge case containing a propelling and ejection charge. The projectile is flattened at the tip and contains a percussion piece assembly and smoke charge. A wingshaft assembly containing stabilizer fins (steel wrapped around the shaft) is press fitted into the body of the projectile. The propelling and ejection charges are contained in two separate chambers located in a 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.

The 60mm M3 sabot (INERT) is designed to fire the 22mm subcaliber practice cartridge. When not loaded with a 22mm practice cartridge, the sabot (INERT) may be used as a dummy round. The sabot is rugged and can be reloaded and fired again (up to 2,000 times) for training purposes. The sabot (aluminum alloy body) has similar bore-riding dimensions and configuration of a 60mm mortar cartridge. It contains an insert 22mm barrel (not rifled) placed longitudinally to receive the 22mm subcaliber cartridge which is loaded in the barrel just prior to firing. The shaft of the sabot has stabilizer fins (similar to fins of the service mortar cartridge) to guide the sabot as it travels up the mortar tube when fired.

### Functioning:

When the practice round (22mm subcaliber cartridge) is loaded into the sabot, the device is ready for firing. The protective plastic cap covering the percussion cap of the subcaliber cartridge must be removed prior to firing. The sabot with subcaliber cartridge is dropped into the mortar tube. The percussion cap strikes the firing pin of the mortar and is ignited. The percussion cap ignites an ejection charge in the jet-housing assembly. The gases emerge through the eight axial holes in the jet screw assembly initiating travel of the sabot and subcaliber cartridge up the mortar tube. Simultaneously the ejection charge ignites the subcaliber projectile propelling charge, also contained in the jet housing assembly. This propels the subcaliber projectile out of the cartridge case and through the barrel of the sabot. As the sabot leaves the muzzle of the mortar, the subcaliber projectile clears the barrel of the sabot. The sabot impacts the ground within 1 to 5 meters (depending upon charge fired) of the mortar tube, while the subcaliber projectile continues its flight down range to the target. On impact the projectile functions producing a yellow cloud of smoke and an audible sound.

### Tabulated Data:

#### 60mm Sabot M3:

Type -----	Practice
Weight -----	6.25 lb 2837.5 g (2.84 kg)
Length (overall) -----	16.181 in. 41.10 cm (411 mm)
Cannon used with -----	M2, M19, M224

Body material -----	Aluminum alloy/steel
---------------------	-------------------------

#### 22mm Subcaliber Practice Cartridge:

Type -----	Practice
Weight -----	1,097 lb, 497 g (0.497 kg)
Weight of projectile -----	0.662 lb, 300 g (0.300 kg)
Length with protective cap (overall) -----	9.697 in. 24.6 cm (246.3 mm)
Length without protective cap (overall) -----	9.618 in. 24.4 cm (244.3 mm)

#### Ejection Charge:

Weight:	
Charge 1	0.05 oz nominal (1.5 g) nominal
Charge 2	0.05 oz nominal (1.5 g) nominal
Charge 3	0.06 oz nominal (1.7 g) nominal
Charge 4	0.06 oz nominal (1.7 g) nominal

#### Propelling Charge:

Weight:	
Charge 1	0.0302 nominal (0.8 g) nominal
Charge 2	0.04 oz nominal (1.1 g) nominal
Charge 3	0.06 oz nominal (1.6 g) nominal
Charge 4	0.08 oz nominal (2.1 g) nominal

#### Ballistics:

Muzzle velocity:	
Charge 1	148 ft/sec (45 m/sec)
Charge 2	164 ft/sec (50 m/sec)
Charge 3	197 ft/sec (60 m/sec)
Charge 4	230 ft/sec (70 m/sec)

Maximum effective range:	
Charge 1	639 ft (195 m)
Charge 2	770 ft (235 m)
Charge 3	1082 ft (330 m)
Charge 4	1427 ft (435 m)

**Temperature Limits:****Firing:**

Lower Limit -----	-40°F (-40°C)
Upper Limit -----	+120°F (+48.9 °C)

**Storage:**

Lower Limit -----	-40°F (-0°C)
Upper Limit -----	+120°F (+48.9°C)

**Packing:**

60MM Sabot M3 -----	3 Sabots / wooden box
Box dimensions-----	21-1/16 x 14- 1/16 x 6 in. (53.47 x 35.72 x 15.24 cm )
Box weight -----	39 lb (17.706 kg )
Box cube -----	1.02 cu ft (28,886 cc)
22mm practice cartridge-----	1 cartridge /polystyrene compartment; 100 cartridges per wirebound box
Box dimensions -----	23 x 21-3/4 x 13-3/8 in. (58.42 x 55.25 x 33.97 cm)
Box weight -----	120 lb (54.33 kg)

Box cube -----	3.9 cu ft (110,448 cc)
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**Shipping & Storage Data:**

UNO serial number -----	0015
Quantity-distance class -----	(04) 1.2
Storage compatibility group -----	G
Dot shipping class -----	C
Dot designation -----	PRACTICE AMMUNI- TION EXPLOSIVE C

**Drawing Numbers:**

DODAC

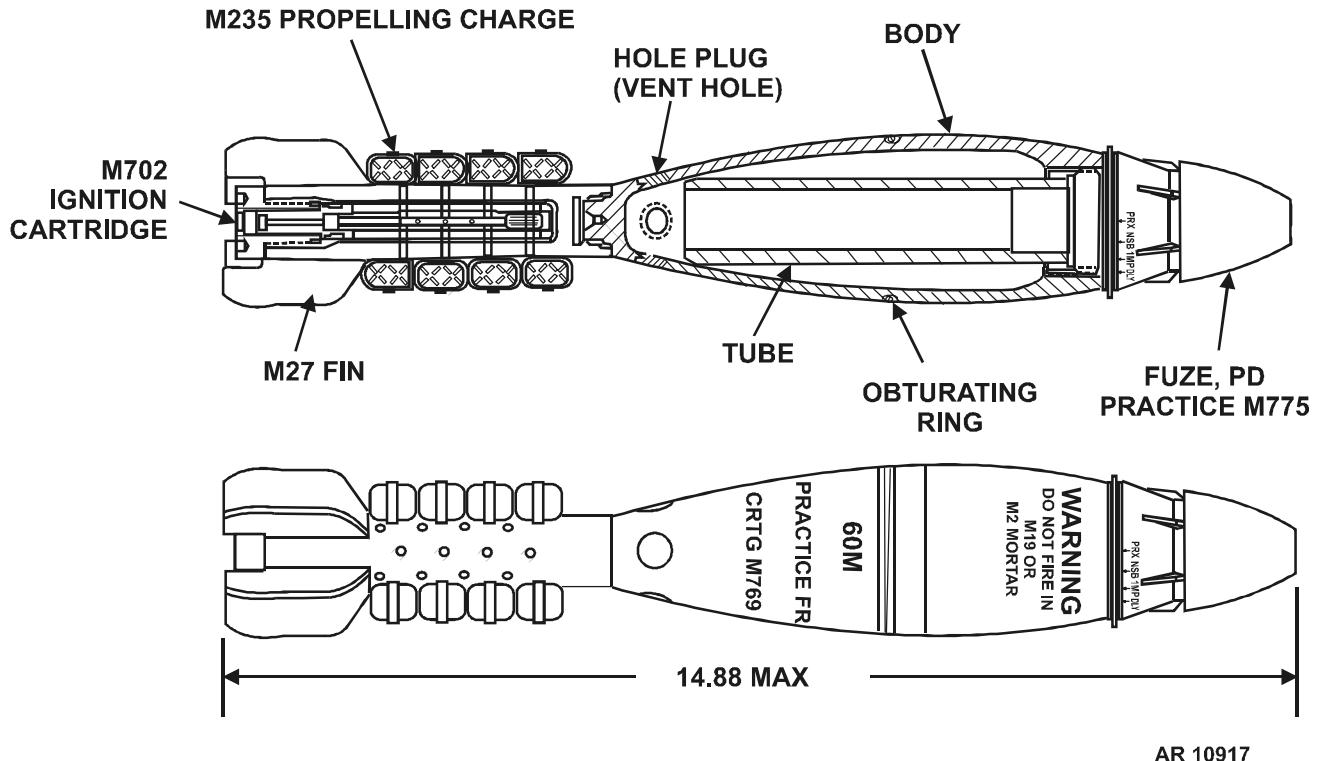
Sabot 60mm Practice M3-----	9328601-1310- B611
Cartridge Subcaliber 22mm Practice: Charge 1, M744-----	9287907-1305- A680
Charge 2, M745-----	9287908-1305- A681
Charge 3, M746-----	9287909-1305- A682
Charge 4, M747-----	9287910-1305- A683

**References:**

TM 9-1300-251-20  
TM 9-1310-249-12&P

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## CARTRIDGE, 60MM: FULL RANGE PRACTICE, M769



### TYPE CLASSIFICATION:

Std - Oct 01.

### USE:

This cartridge is a full range practice round, for use in the 60mm M224 mortar in the Lightweight Company System.

### DESCRIPTION:

The complete round consists of a hollow projectile body with vent tube and four vent holes, a PD practice fuze, a fin assembly, four increments of propellant charge, an ignition cartridge and obturating ring. The cartridge is similar in appearance to M720 and M720A1 HE cartridges.

### 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 expand 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. The fuze functions upon impact with the ground or target. A pyrotechnic smoke cartridge in the fuze produces a flash, audible sound and cloud of smoke, to simulate the HE function. Upon functioning, the plugs are expelled from the holes in the base of the projectile, allowing the smoke cloud to vent through the holes.

TABULATED DATA:

## Complete Round:

Type ..... Target Practice  
 Weight w/fuze ..... 3.75 lb  
 Length w/fuze ..... 14.88 in.  
                       (37.79 cm)  
 Cannon used with ..... M224

## Projectile:

Body material..... Steel  
 Color ..... Blue with white  
                       markings and brown  
                       band  
 Filler and weight ..... None (hollow  
                       body)

## Components:

Ignition cartridge ..... M702  
 Propellant charge ..... M235  
 Percussion primer ..... M35  
 Fin assembly ..... M27  
 Fuze ..... M775, PD,  
                       Practice  
 DODAC ..... 1310-BA15

TEMPERATURE LIMITS:

## Firing:

Lower limit ..... 0°F (-17.8°C)  
 Upper limit ..... +110°F (+43.3°C)

## Storage:

Lower limit ..... -50°F (-45.6°C)  
 Upper limit ..... +145°F (+62.8°C)

DRAWINGS:

Cartridge ..... 12993714

UNIT OF ISSUE:

Packing ..... One round in fiber  
 container; sixteen  
 containers per  
 wirebound box

\*PACKING DATA:

Packing Box:  
 Weight ..... 93.8 lb  
 Dimensions ..... 32-7/8x 12-1/2 x  
                       6-13/16 in.  
                       (83.50 x 31.75 x  
                       17.30 cm)  
 Cube ..... 1.62cu ft

\*See DOD Consolidated Ammunition Catalog for complete packing  
 data including NSNs.

SHIPPING AND STORAGE DATA:

DOD hazard class/division ..... 1.2.2  
 Storage compatibility group ..... G  
 Proper shipping name ..... AMMUNITION  
                       SMOKE  
 UN identification number ..... 0015

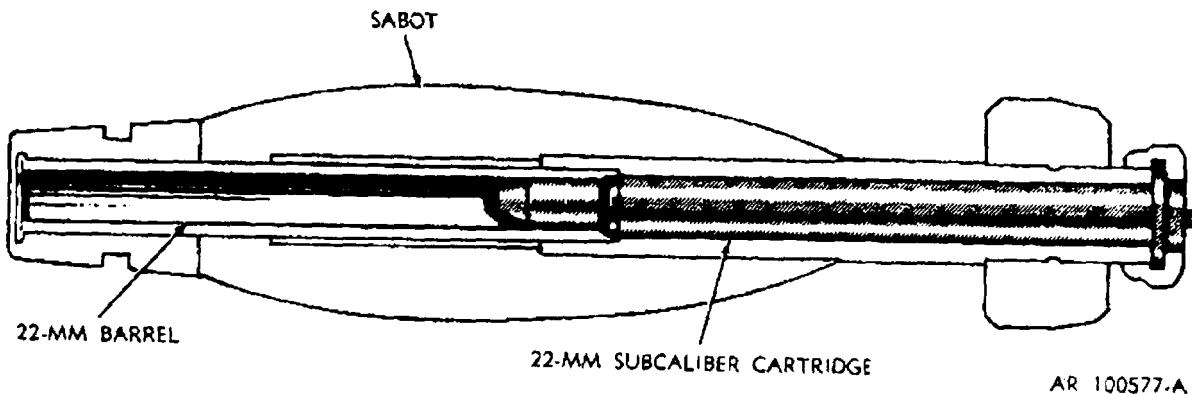
LIMITATIONS:

Do not fire the M769 cartridge in the M2 or M19 mortar.

REFERENCES:

FM 23-90  
 TM 9-1015-223-10  
 TM 9-1300-251-20&P  
 TM 9-1300-251-34&P

**CARTRIDGE, 81MM: MORTAR TRAINING DEVICE, 81MM SABOT (INERT) M1 AND  
22MM SUBCALIBER PRACTICE CARTRIDGE M744, M745, M746 AND M747**



**Type Classification:**

Std MSR 06756032.

The 81mm sabot (Inert) is a training device for all 81mm mortars.

**Description:**

The sabot is designed to fire a 22mm subcaliber 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 subcaliber practice cartridges provides realistic mortar firing training at distances which correspond to range firing distances in the ratio of 1 to 10. The subcaliber 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 subcaliber 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 to 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 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 Subcaliber 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 wing-shaft assembly press-fit into the projectile body contains the stabilizer fins (spring steel wrapped around the shaft) to stabilize flight. The wing-shaft 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 subcaliber 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 subcaliber 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 subcaliber cartridge up the mortar tube. Simultaneously the ejection charge ignites the subcaliber projectile propelling charge, also contained in the jet housing assembly. This propels the subcaliber projectile out of the cartridge case and through the barrel of the Sabot. As the sabot leaves the muzzle of the mortar, the subcaliber projectile clears the barrel of the sabot. The sabot impacts the ground within 1 to 5 yards (depending on charge fired) of the mortar tube, while the subcaliber projectile continues its flight down range.

#### Tabulated Data:

##### 81mm Sabot:

Type -----	Practice
Weight -----	8.5 lb
Length -----	15.618 in.
Cannon used with -----	M1, M29, M29A1
Body material -----	Aluminum/ steel

##### 22mm Subcaliber 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 -----	0.03 oz
Charge 2 -----	0.04 oz
Charge 3 -----	0.06 oz
Charge 4 -----	0.08 oz

#### Temperature Limits:

##### Firing:

Lower limit -----	-40°F (-40°C)
Upper limit -----	+120°F (+48.9°C)

##### Storage:

Lower limit -----	-40°F (-40°C)
Upper limit -----	+120°F (+48.9°C)

##### Packing:

81mm sabot -----	3 round per packing box
22mm practice cartridges -----	1 per poly- styrene com- partment; 100 cartridges per box

#### Packing Box:

Weight -----	50 lb
Dimensions -----	19 x 20 x 6-1/2 in.

##### Cartridges:

Weight -----	1201b
Dimensions -----	23 x 21-3/4 x 13-3/8 in.
Cube -----	3.9 cu ft

#### Shipping and Storage Data:

UNO serial number -----	0015
Quantity-distance class -----	(04) 1.2
Storage compatibility group -----	S
DOT shipping class -----	G
DOT designation -----	PRACTICE AMMUNI- TION EX- PLOSIVE C

##### Drawing Numbers:

DODAC

Sabot 81mm Practice M1 ----- 9287906-N/A\*

Cartridge Subcaliber 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 reusable item -  
DODAC not required

#### Ballistics:

##### Muzzle velocity:

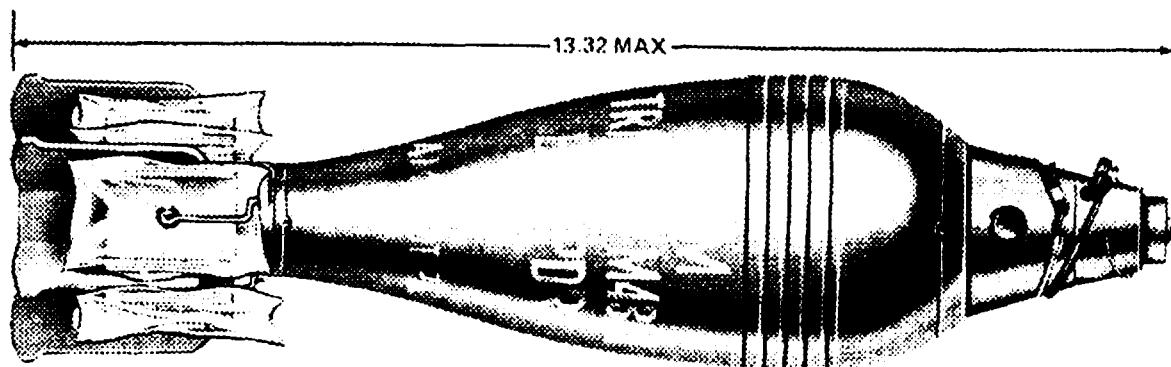
Charge 1 -----	148 ft/sec (45 m/sec)
Charge 2 -----	164 ft/sec (50 m/sec)
Charge 3 -----	197 ft/sec (60 m/sec)
Charge 4 -----	230 ft/sec (70 m/sec)

##### Maximum effective range:

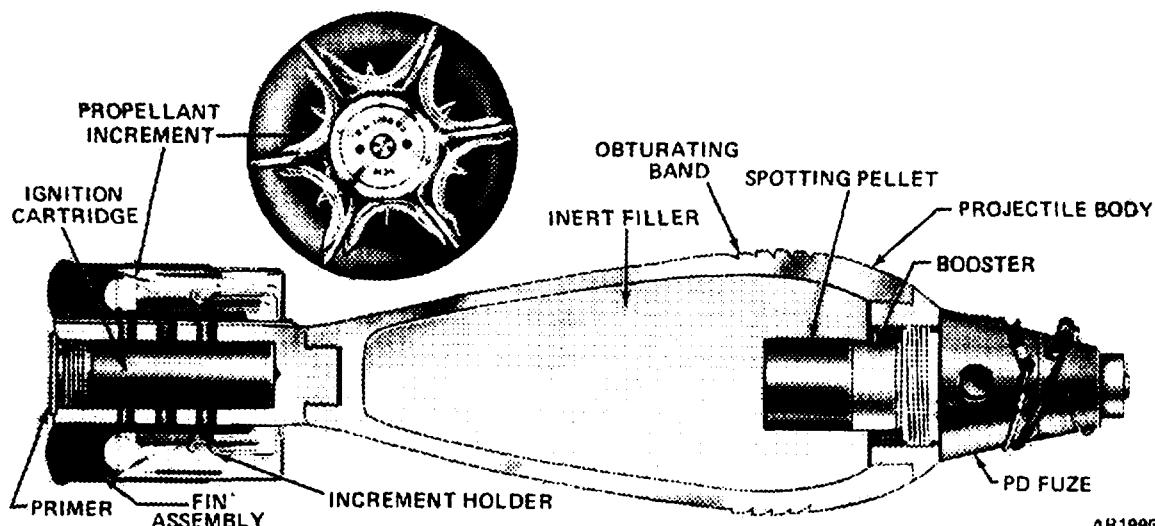
Charge 1 -----	639 ft (195 m)
Charge 2 -----	770 ft (235 m)
Charge 3 -----	1082 ft (330 m)
Charge 4 -----	1427 ft (435 m)

#### References:

TM 9-1300-251-20  
TM 9-1315-249-12&P

**CARTRIDGE, 81 MILLIMETER: TARGET PRACTICE, M43A1**

AR199502



AR199501

**Type Classification:**

C&amp;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 charac-

teristics 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 tub; 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 fin-stabilized in flight. The PD fuze functions on impact, detonating the fuze booster charge and the spotting charge.

**Difference Between 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 lb
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 lb
Spotting charge -----	BP, 24.8± 1.5g

**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 hr/day)
*Packing -----	1 round in fiber container; 4 fiber containers in wooden box
*Packing box:	
Weight -----	49.8 lb

Dimensions -----	17-3/4 x 9-11/16 x 10-15/32 in.
cube -----	1.0 cu ft

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

**Shipping and Storage Data:**

UNO serial number -----	0321
Quantity-distance class -----	(08) 1.2
Storage compatibility group -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC -----	1315-C227
Drawing number -----	75-1-89

**Ballistics:**

Charge	Muzzle Velocity (fps)	Maximum Range (m)	Maximum Range (yd)
** 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

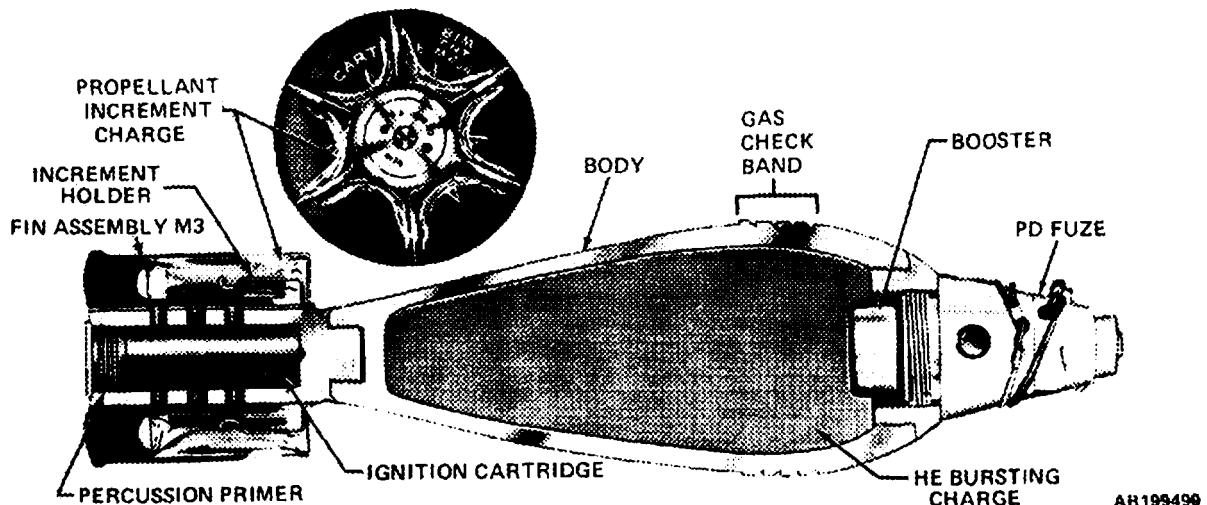
\*\*Charge 0 is the ignition cartridge only;  
Charge 1 is the ignition cartridge and one increment charge; Charge 8 is the ignition cartridge and eight increment charges.

**References:**

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

**CARTRIDGE, 81 MILLIMETER: HE, M43A1 AND M43A1B1**

AR199500



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, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer ignites the ignition cartridge, and the cartridge ignites the propellant charge. Rapidly expanding gases from the burning propellant expel the projectile from the tube and propel it to the target. The projectile is fin-stabilized in flight. The PD fuze functions on impact detonating the fuze 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:

Weight	HE 07.5 lb
Length	13.32 in.
Cannon used with	M1, M9, M2 9 A 1

## Projectile:

Body material	Forged steel
Color	Olive drab w/yellow markings
Filler and weight	Comp. B, 01.29 lb

## 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 hr/day)

\*Packing ----- 1 round in fiber containers; 4 containers in wooden box

## \*Packing box:

Weight	49.8 lb
Dimensions	17-3/4 x 9- 11/16 x 10- 15/32 in-

Cube	----- 1.0 cu ft
------	-----------------

\*NOTE: See DOD Consolidated Ammunition catalog for complete packing data including NSN'S.

**Shipping and Storage Data:**

UNO serial number	0321
Quantity-distance class	(08) 1,2
Storage compatibility group	E
Dot shipping class	A
DOT designation	AMMUNI- TION FOR CANNON WITH EXPLOSIVE PROJEC- TILES
DODAC	1315-C225
Drawing number	9218433

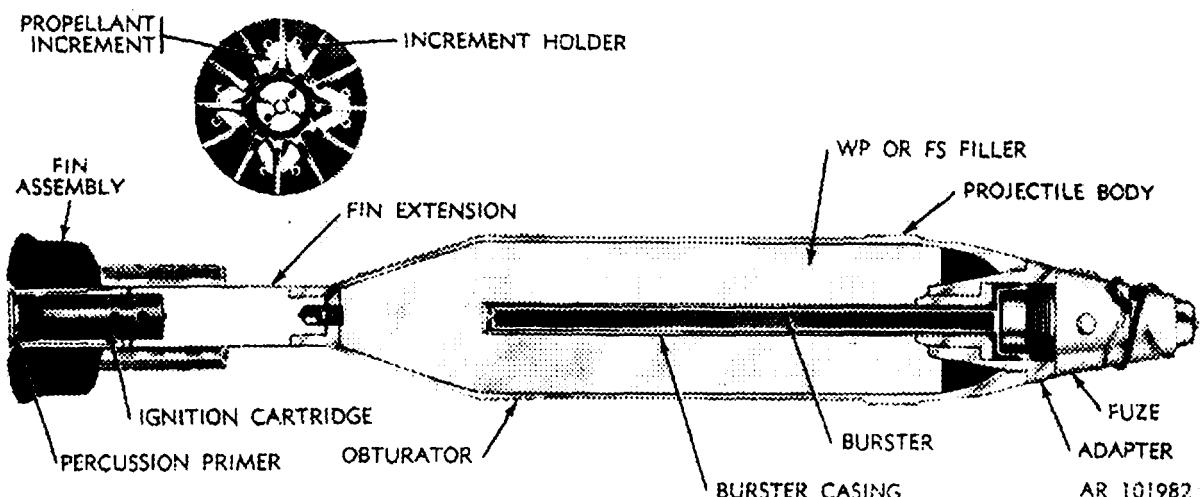
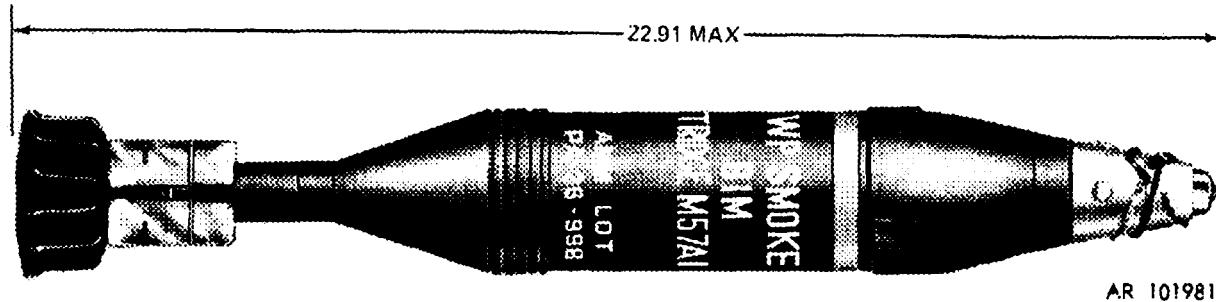
**Ballistics:**

Charge	Muzzle Velocity (fps)	Maximum (m)	Range (yd)
** 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:**

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

**CARTRIDGE, 81 MILLIMETER: SMOKE, WP, M57A1 AND M57****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 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 con- tainer; 2 con- tainers 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 DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

UNO serial number -----	0245
Quantity-distance class -----	(12) 1.2
Storage compatibility group -----	H
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH SMOKE PROJE- CTILES
DODAC -----	1315-C230
Drawing number -----	75-1-93

**Ballistics:**

Charge	Muzzle Velocity (fps)	Maximum Range (m)	Maximum Range (yd)
1 **	630	700	
2	1199	1300	
3	1646	1800	
4	2169	2872	

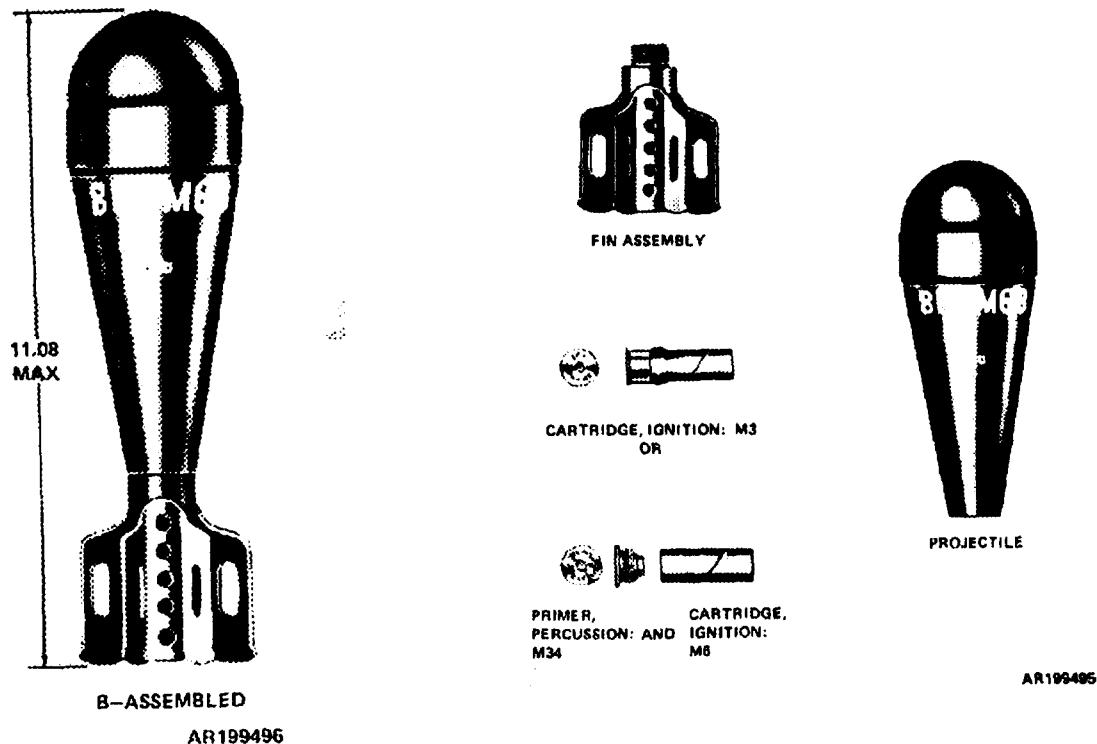
\*\*Charge 1 is the ignition cartridge and one increment charge; Charge 4 is the ignition cartridge and four increment charges.

**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:**

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

**CARTRIDGE, 81 MILLIMETER: TRAINING, M68****Type Classification:**

Std OTCM 36841 dtd 1958.

**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 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 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 projectile is fin-stabilized in flight. Since the projectile is inert, there is no detonation upon impact, and the cartridge may be recovered for reuse.

**Tabulated Data:****Complete Round:**

Type -----	Training
Weight, assembled -----	10.79 lb
Length, assembled -----	11.08 in.
Cannon used with -----	M1, M29, M29A1

**Projectile:**

Body material -----	Cast iron
Color -----	Black w/white markings
Filler and weight -----	Later manu- facture - no paint or bronze body)
Components:	Inert

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 hr/day)

\*Packing ----- A training kit used in the field holds ten training cartridges and accessories

\*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 DOD Consolidated Ammunition Catalog 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:**

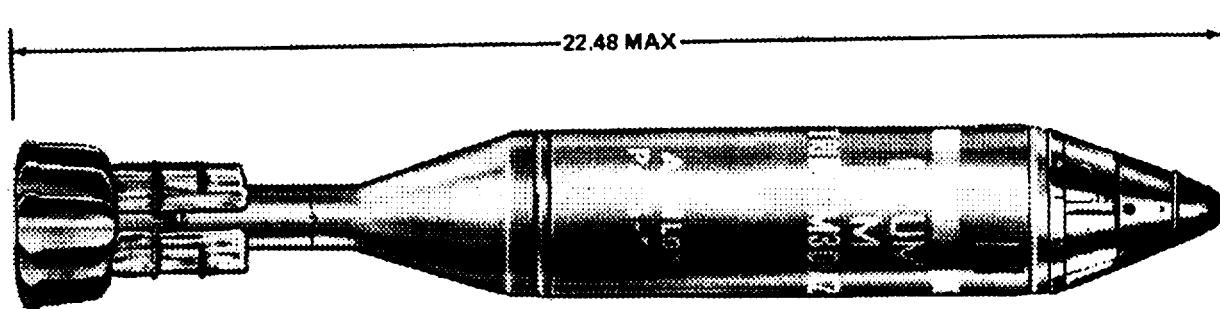
Charge ----- 0  
 Muzzle velocity ----- 173 fps  
 Maximum range ----- 284 m

**Limitations:**

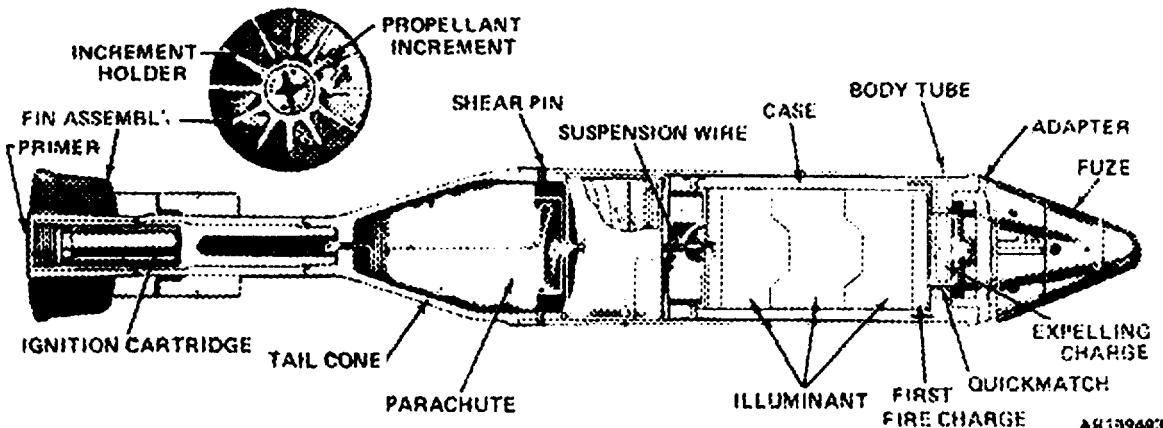
This round is to be fired at Charge 0 only.

**References:**

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

**CARTRIDGE, 81 MILLIMETER: ILLUMINATING, M301A2 AND M301A1**

AR199494



AR199493

**Type Classification:**

CONT MSR 11756003.

**Use:**

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

**Description:**

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

tained in a boxboard case and attached to the parachute with a 30-inch suspension line.

**Functioning:**

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer ignites the ignition cartridge, and the cartridge ignites the propellant charge. Rapidly expanding gases from the burning propellant expel the projectile from the tube and propel it to the desired height. The projectile is fin-stabilized in flight. Functioning of the time fuze detonates the expelling charge and ignites the first-fire charge by means of a length of quickmatch. The expelling charge separates the cone from the tube allowing the illuminant candle and parachute to fall free. The first-fire charge ignites the illuminant, and the parachute deploys to support the burning candle. Burning time is at least 60 seconds with a minimum of 500,000 candlepower.

**Difference Between Models:**

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

**Tabulated Data:**

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

**Temperature Limits:**

Firing:	
Lower limit -----	-40°F (-40°C)
Upper limit -----	+125°F (+52.0°C)
Storage:	
Lower limit -----	-80°F (for period not more than 3 days) (-62.2°C)
Upper limit -----	+160°F (for period not more than 4 hr/day) (+71.1°C)
*Packing -----	One round in jungle wrapped fiber or metal con- tainer; three fiber/metal containers in wooden box

*Packing Box:	
Weight -----	53.6 lb
Dimensions -----	30-9/16 x 13- 15/16 x 6- 25/32 in.
Cube -----	1.9 cu ft

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

**Shipping and Storage Data:**

UNO serial number -----	0171
Quantity-distance class -----	(08) 1.2
Storage compatibility group -----	G
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH ILLUMINA- TING PROJEC- TILES
DODAC -----	1315-C226
Drawing number -----	8865058

**Ballistics:**

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

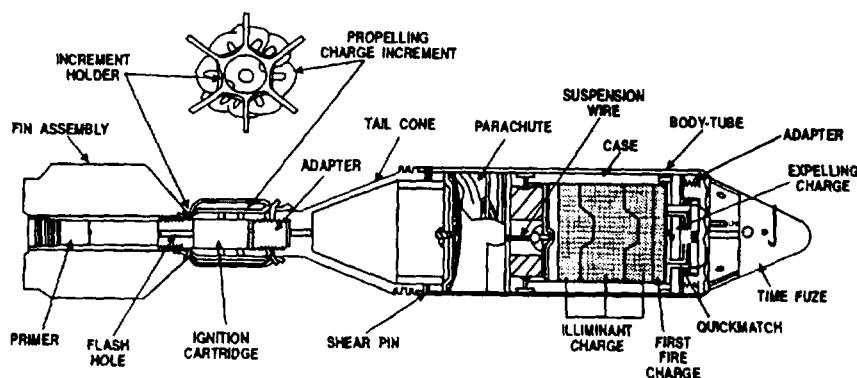
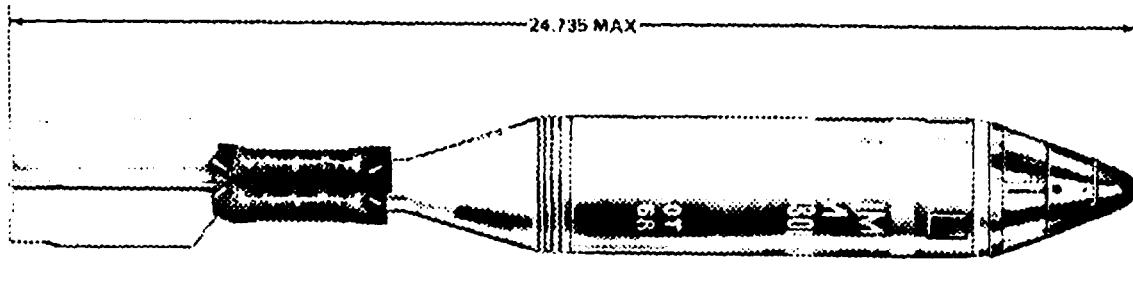
\*Charge 2 is the ignition cartridge and two increment charges; Charge 4 is the ignition charge and four increment charges.

**Limitations:**

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

**References:**

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

**CARTRIDGE, 81 MILLIMETER: ILLUMINATING, M301A3****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. The 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 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 also separates the cone 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, M252

**Projectile:**

Body material -----	Steel tube
Color-----	White w/black markings
Filler and weight -----	Illuminating, 1.37 lb

**Components:**

Ignition cartridge -----	M66A1
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 DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

UNO serial number -----	0171
Quantity-distance class -----	(08) 1.2
Storage compatibility group -----	G
DOT shipping class -----	A
DOT designation -----	AMMUNI- TIONFOR CANNON WITH ILLUMINA- TING PROJE- CTILES
DODAC -----	1315-C226
Drawing number -----	9220705

**Ballistics:**

Charge	Fuze Setting (sec)	Horizontal Range (m)	Height of burst (m)	Elevation (mi.)
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

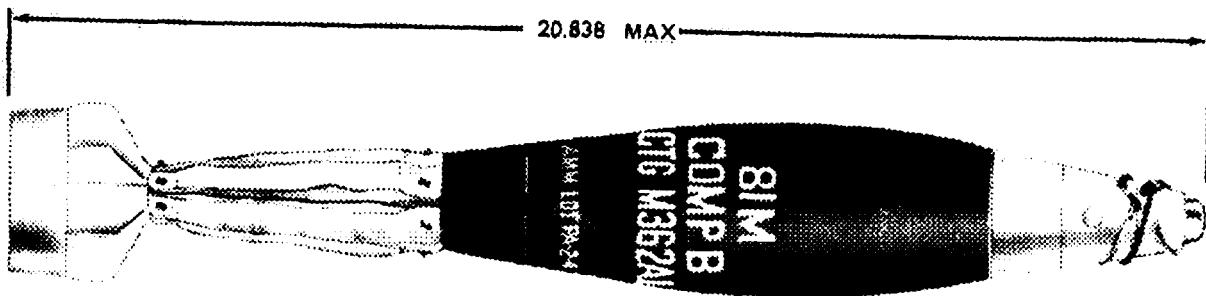
\*Charge 3 is the ignition cartridge and three increment charges; Charge 8 is the ignition cartridge and eight increment charges.

**Limitations:**

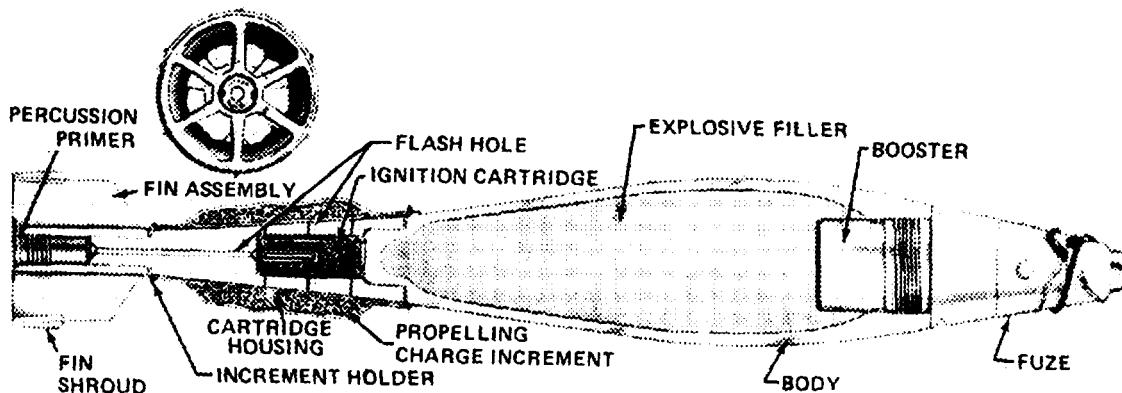
Firing with less than three propellant increment charges (Charge 3) is not authorized. Exposure of the propelling charge to moisture can produce short rounds.

**References:**

AMC-P 700-3-3  
SB 700-20  
TM 9-1300-251-20  
TM 9-7031-1

**CARTRIDGE, 81 MILLIMETER: HE, M362A1 AND M362**

AR199480



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 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 lb
Length, w/fuze	20.838 in. (max)
Cannon used with	M1, M29, M29A1, M252
Projectile:	
Body material	M362 <sup>1</sup> , 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, M71A1
Fin assembly	M141
Fuze	PD, M524 series; PD, M526 series; 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 in fiber con- tainer 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 DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

UNO serial number	0321
Quantity-distance class	(08) 1.2
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNI- TION FOR CANNON WITH EXPLOSIVE PROJEC- TILES
DODAC	1315-C222, 1315-C223
Drawing number	M362A1, 8838144 M362, 7549034

**Ballistics:**

Charge	Muzzle Velocity (fps)	Maximum Range (m)	Range (yd)
0*	181	297	324
1	298	777	849
2	397	1301	1430
3	480	1791	1951
4	554	2246	2450
5**	620	1657	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,

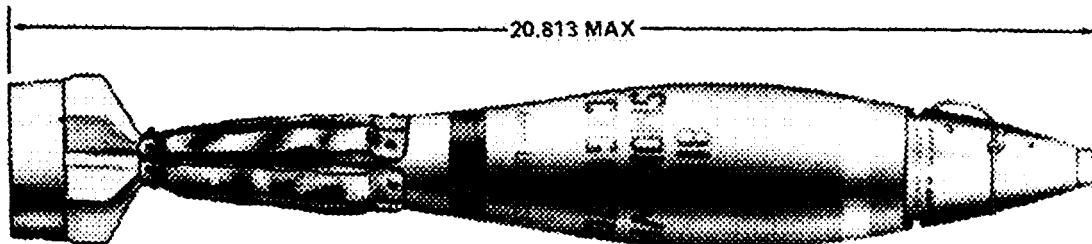
\*\*Charge 5 is the maximum authorized for firing in Mortar M1.

**Limitations:**

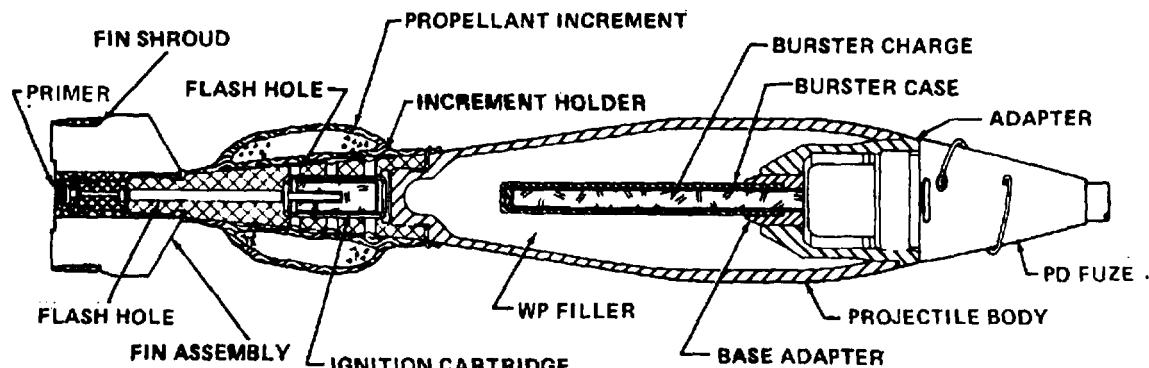
See above chart.

**References:**

TM 9-1300-251-20  
TM 9-7031-1

**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 tin 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 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, M252

<b>Projectile:</b>	
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
Burster charge -----	RDX, 0.025 lb
<b>Components:</b>	
Booster assembly -----	M47
Ignition cartridge -----	M66
Propellant charge -----	M5
Percussion primer -----	M71E1
Fin assembly -----	M141
Fuze -----	PD,M524A4 PD,M526 series

**Temperature Limits:**

<b>Firing:</b>	
Lower limit -----	-40°F(-40°C)
Upper limit -----	+125°F (+52.0°C)
<b>Storage:</b>	
Lower limit -----	-80°F (for period not more than 3 days) (-62.2°C)
Upper limit -----	+160°F (for period not more than 4hr/day) (+71.1°C)
*Packing -----	One round in fiber container; three fiber containers in wooden box
*Packing Box:	
Weight -----	51.0 lb
Dimensions -----	25-11/16 x 13-9116x6-11132 in.
Cube -----	1.4 cu ft

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

**Shipping and Storage Data:**

UNO serial number -----	0245
Quantity-distance class -----	(12) 1.2
Storage compatibility group -----	H
DOT shipping class -----	A
DOT designation -----	AMMUNI-TIONFOR CANNON WITH SMOKE PROJECTILES
DODAC -----	1315-C234
Drawing number -----	8848900

**Ballistics:**

Charge	Muzzle Velocity (fps)	Maximum Range (m)	Range (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.

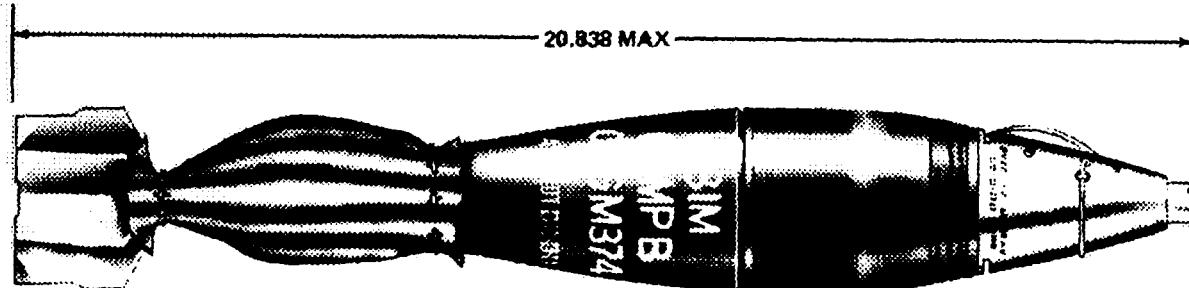
\*\*\*Charge 5 is the maximum authorized for firing in mortar M1.

**Limitations:**

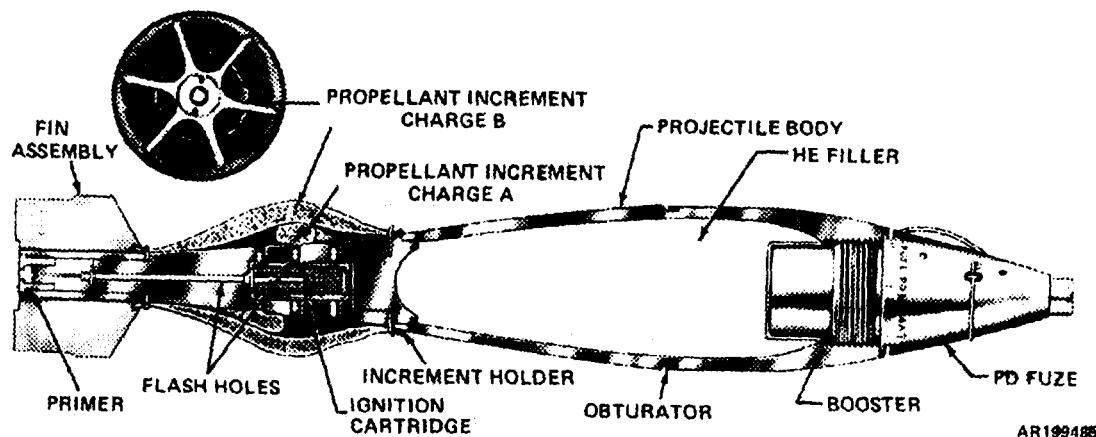
Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP tiller.

**References:**

- AMC-P 700-3-3
- TM 9-1015-215-10
- TM 9-3071-1
- SB 700-20

**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 canted 5 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 tin 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, 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:**

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 w/igni- tion cartridge M66A1; M170 w/ignition car- tridge 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 con- tainer in junc- gle wrap, one round per plastic con- tainer in barrier bag; three contain- ers 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 DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

#### Shipping and Storage Data:

UNO serial number -----	0321
Quantity-distance class -----	(08) 1.2
Storage compatibility group -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH EXPLOSIVE PROJE- CTILES
DODAC -----	1315-C236, 1315-C256
Drawing number:	
With fuze -----	8881026
Without fuze -----	9225283

**Ballistics:**

Charge	Muzzle Velocity (fps)	Maximum Range (m)	Range (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.

**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.

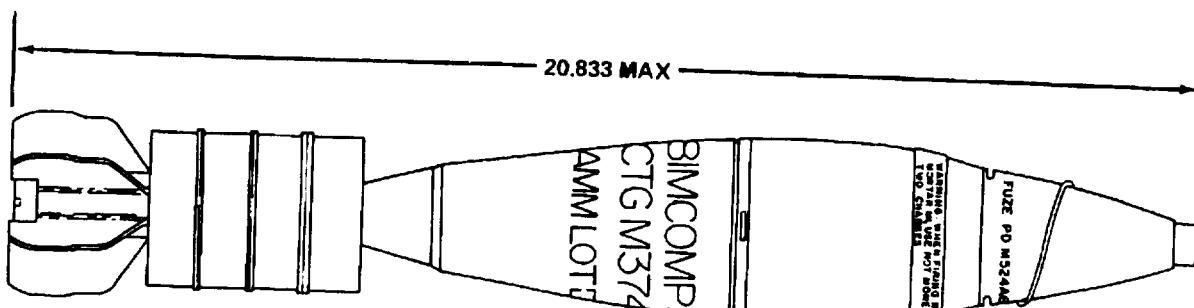
Occasional short rounds will occur when firing at Charge 3 or below.

Rounds assembled with Fuze, PD, M524A1, M52A2, M524A3, M524A4 are for USMC/USN use only.

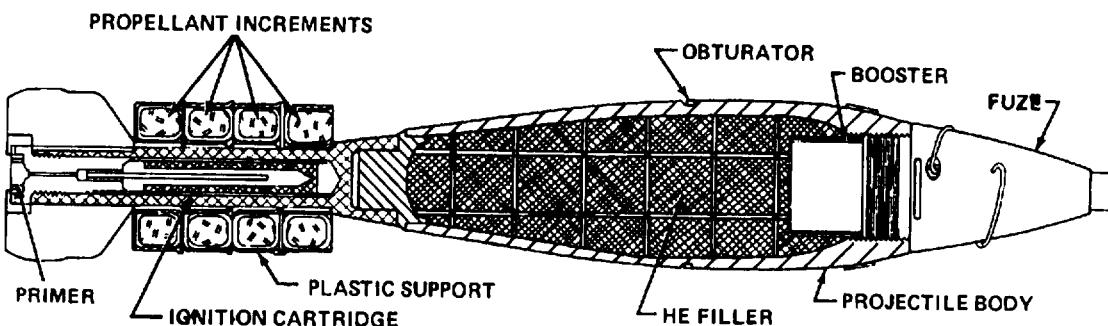
**References:**

TM 9-3071-1  
 TM 9-1300-251-20

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**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 nitro-

cellulose 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 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 w/Fuze, PD M524A6)
Cannon used with -----	M1, M29, M29A1, M252
Projectile:	
Body material -----	Steel alloy
Color -----	Olive drab w/yellow markings
Filler and weight -----	Comp B, 2.10 lb
Fuze -----	PD, M567; PD, M524A6 (Alternate)
Fin assembly -----	M24
Propelling charge -----	M205
Propellant -----	M10
Ignition cartridge -----	M299
Primer-----	Perc, M35
<b>Temperature Limits:</b>	
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 con- tainer in jun- gle 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 DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

#### **Shipping and Storage Data:**

UNO serial number -----	0321
Quantity-distance class -----	(08) 1.2
Storage compatibility group -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC -----	1315-C256
Drawing number -----	P9241291

#### **Ballistics:**

Charge	Muzzle Velocity (fps)	Maximum Range (m)	Range (yd)
0**	215	454	504
1	438	1633	1814
2	608	2866	3184
3	750	4013	4459
4	879	4800	5333

\*\*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.

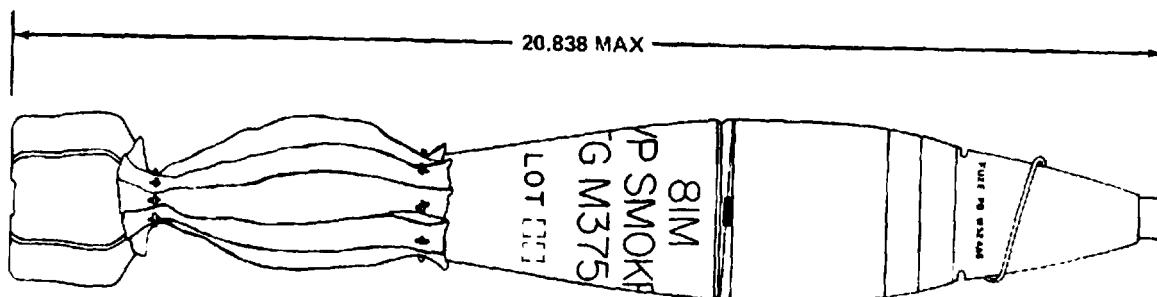
Maximum range ----- 5,333 yd  
Muzzle velocity ----- 879 fps

#### **Limitations:**

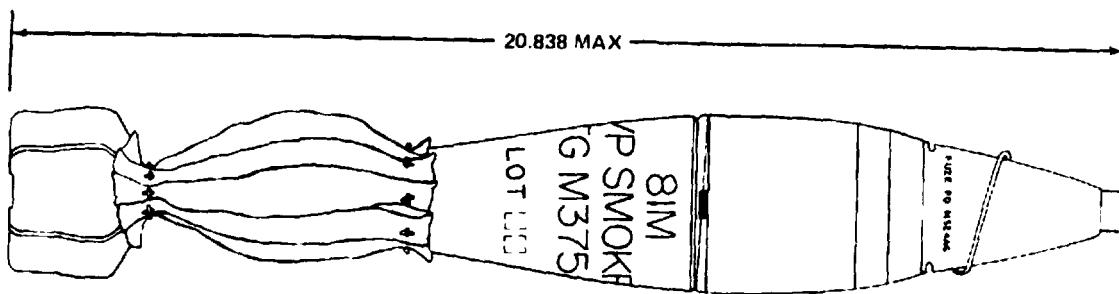
Firing with more than two propellant increments (Charge 2) is not authorized in Mortar M1.

#### **References:**

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

**CARTRIDGE, 81 MILLIMETER: SMOKE, WP, M375A2 AND M375A1**

AR199474



AR199474

**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 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.  
 Cannon used with ----- M1, M29,  
                           M29A1, M252

**Projectile:**

Body material ----- Forged steel,  
                           or cast pearl-  
                           itic 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 ----- Percussion,  
                           M71A1 or  
                           M71A2

**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 ----- 1 round per  
                           fiber con-  
                           tainer in junc-  
                           gle wrap, or  
                           1 round per  
                           plastic con-  
                           tainer 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 DOD Consolidated Ammunition Catalog for complete packing data including NSN's

**Shipping and Storage Data:**

UNO serial number -----	0246
Quantity-distance class -----	1.3
Storage compatibility group -----	H
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH SMOKE PROJEC- TILES
DODAC -----	1315-C276
Drawing number -----	9240953 (M375A2) 9251985 (M375A1)

**Ballistics:**

Charge	Muzzle Velocity (fps)	Maximum Range	
		(m)	(yd)
0**	210	403	422
1	341	1001	1095
2	433	1529	1674
3	505	1988	2175
4	577	2475	2710
5	656	2995	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.

Maximum range ----- 4932 yd  
                           (4508.22 m)  
 Muzzle velocity ----- 856 fps  
                           (260.9 reps)

**Limitations:**

Increment A is used as Charge 1 and will be one of the increments assemble 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 W). 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.

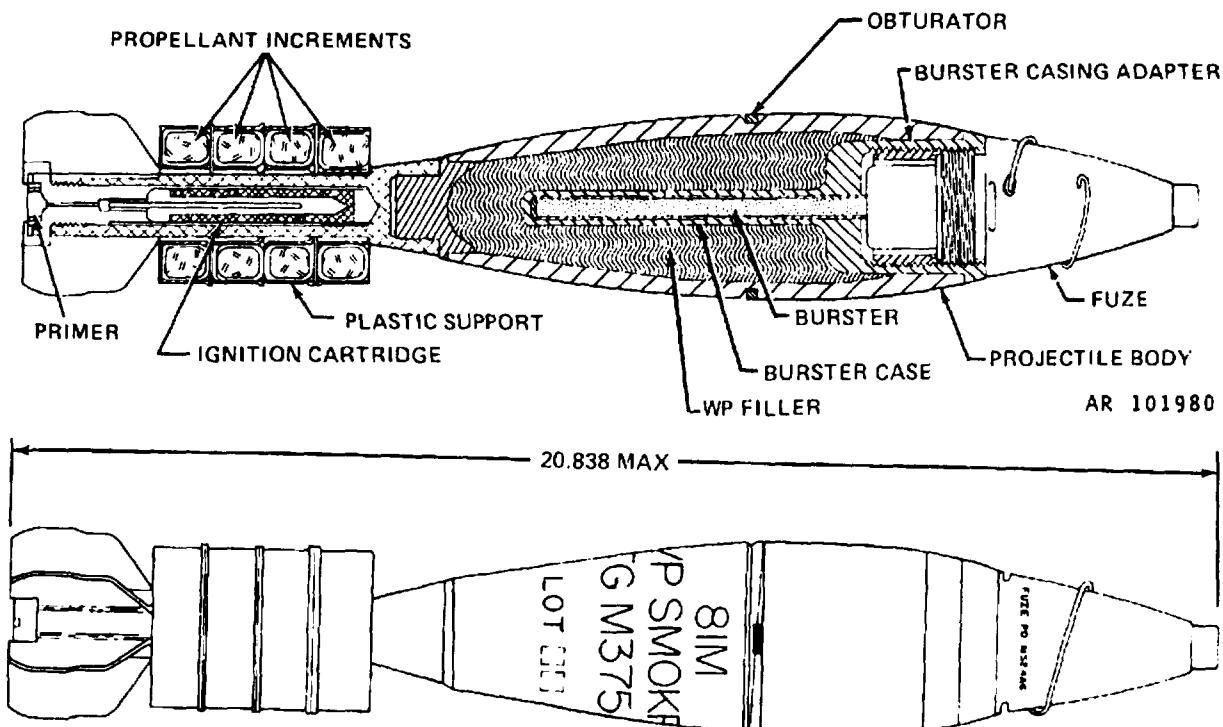
Rounds assembled with Fuze, PD, M524A1, M524A2, M524A3 or M524A4 are for USMC/USN use only.

**References:**

AMC-P 700-3-3  
TM 9-1015-215-10  
TM 9-3071-1  
SB 700-20

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## CARTRIDGE, 81 MILLIMETER: SMOKE, WP, M375A3



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 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, M29A1, M252
Projectile:	
Body material -----	Forged steel, or cast pearl- itic 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 -----	Percussion, M35

**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 con- tainer in junc- gle 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 DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

UNO serial number -----	0246
Quantity-distance class -----	(12) 1.2
Storage compatibility group -----	H
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH SMOKE PROJEC- TILES
DODAC -----	1315-C276
Drawing number -----	9294735 (M375A3)

**Ballistics:**

Charge	Muzzle Velocity (fps)	Maximum (m)	Range (yd)
0*	215	454	504
1	438	1633	1814
2	608	2866	3184
3	750	4013	4459
4	879	4800	5333

\*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.

Maximum range ----- 5,333 yd  
Muzzle velocity ----- 879 fps

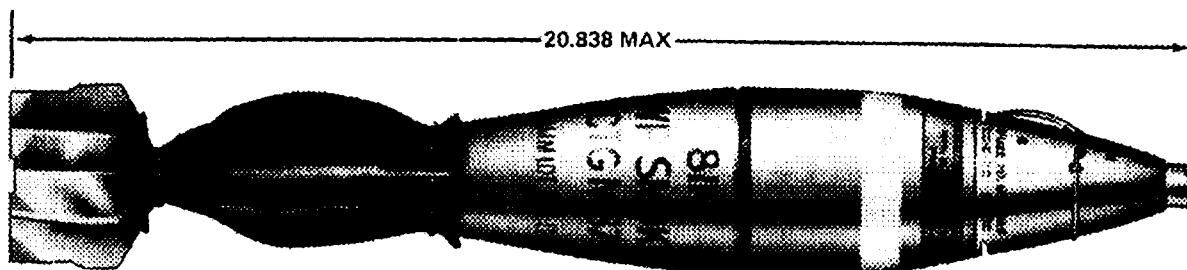
**Limitations:**

Firing with more than two propellant increments (Charge 2) is not authorized in Mortar M1.

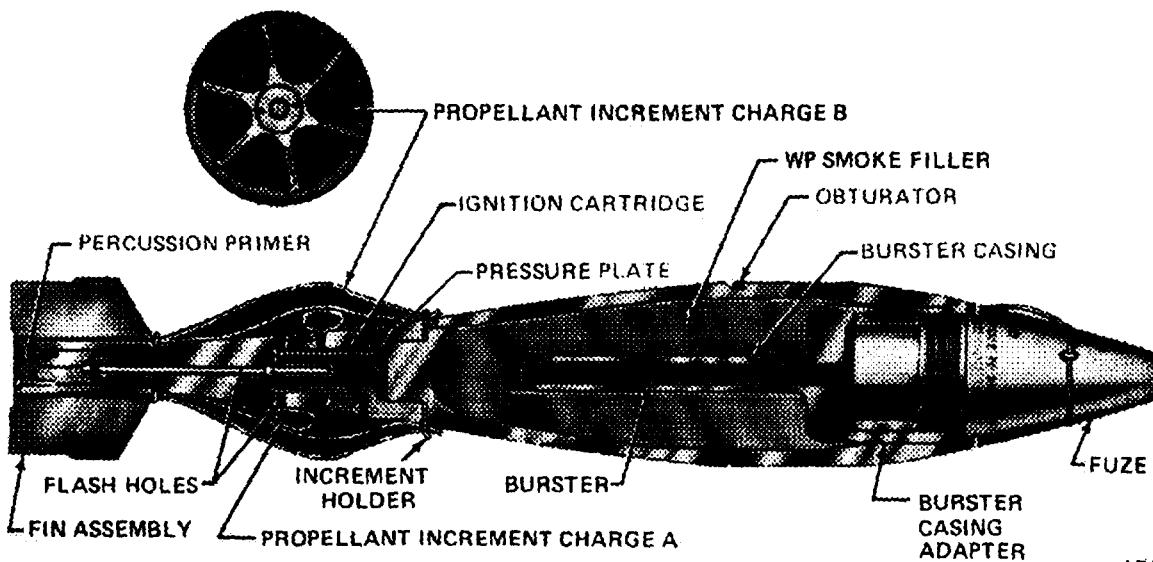
Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space inner-  
mal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

**References:**

- AMC-P 700-3-3
- TM 9-1015-215-10
- TM 9-3071-1
- SB 700-20

**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 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 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, 252

##### 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 -----	Percussion, M71A2

#### **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 ----- 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 DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

#### **Shipping and Storage Data:**

UNO serial number -----	0245
Quantity-distance class -----	(12) 1.2
Storage compatibility group -----	H
DOT shipping class -----	A
DOT designation -----	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC -----	1315-C276
Drawing number -----	8885264

#### **Ballistics:**

Charge	Muzzle Velocity (fps)	Maximum Range (m)	Range (yd)
0 *	210	403	422
1	341	1001	1095
2	433	1529	1674
3	505	1988	2175
4	577	2475	2710
5	656	2995	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.

Maximum range ----- 4932 yd

(45 08.23 m)

Muzzle velocity ----- 856 fps  
(260.9 mps)

#### **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.

**Limitations: cont.**

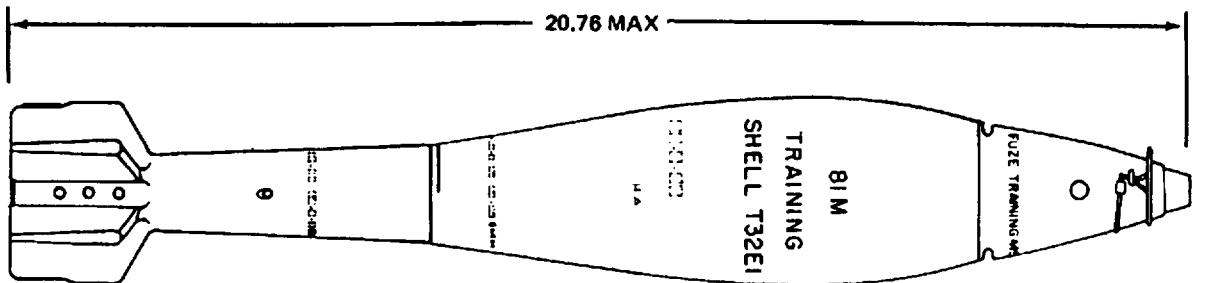
Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

Rounds assembled with Fuze, PD, M524A1, M524A2, M524A3 or M524A4 are for USMC/USN use only.

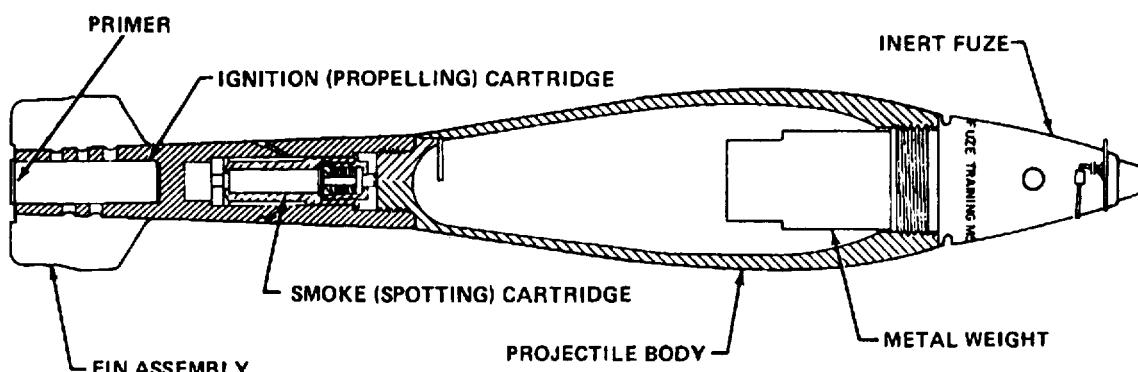
**References:**

SB 700-20  
AMC-P 700-3-3  
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 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 fir-

ing 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 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 -----	172m (188.7yd)
Muzzle velocity -----	41.3 mps (135 fps)
 <b>Temperature Limits:</b>	
 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 training cartridge, 3 fin assemblies, 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 DOD Consolidated Ammunition Catalog 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 -----	AMMUNI- TION FOR CANNON WITH SMOKE PROJEC- TILES
DODAC -----	1315-C228
Drawing No. -----	P87815

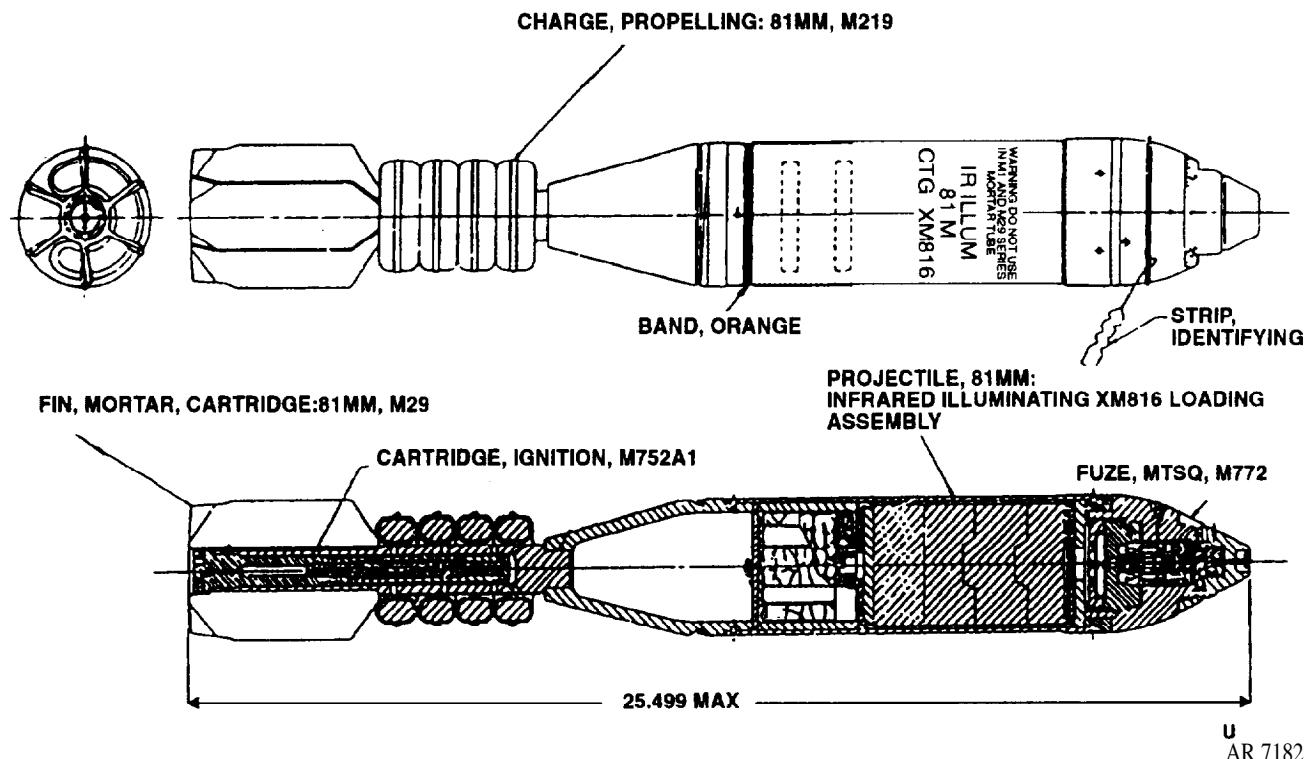
**Limitations:**

This round is to be fired at Charge 0 only.

**References:**

SB 700-20  
AMC-P 700-3-3

CARTRIDGE, 81 MILLIMETER: ILLUMINATING, INFRARED (IR), MS16  
W/FUZE, MECHANICAL TIME SUPERQUICK, M776



Type Classification:

(To be assigned).

Use:

This cartridge is an Infrared (IR) Illuminating round developed for use in the I-81MM M252 Mortar System to take advantage of the night vision device and reduce friendly forces exposure to the enemy.

Description:

The complete round consists of an MTSQ fuze with an expulsion charge, a body tube and tail cone assembly containing an Infrared (IR) illuminant charge and a parachute assembly. The ignition cartridge with integral percussion primer is assembled to the end of the fin assembly. The propellant charge is contained in four horse-shoe type propellant increments which are assembled around the fin assembly shaft.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin at the bottom of the tube.

The percussion primer initiates the charge in the ignition cartridge. The charge in the ignition flashes through the holes in the shaft of the fin assembly and ignites the propelling charge. The gases from the burning propellant expand and propel the cartridge out of the mortar tube. The projectile is fin-stabilized in flight. Functioning of the time fuze detonates the expelling charge and the expelling charge separates the cone from the tube allowing the illuminant candle and parachute to fall freely. The parachute deploys to support the burning candle.

Tabulated Data:

Complete round:  
 Type ----- Illum. (Infrared)  
 Weight ----- 9.25 lbs.  
 Length ----- 25.49 in.  
 Assembly dwg No. ----- 12953389

Projectile:  
 Body material ----- Steel, (Tube)  
 Color ----- White w/black markings and one orange band  
 Filler and weight----- Infrared/2.99 Kg  
 Illumination burn time----- 60 Sec. min.

Components:  
 Ignition cartridge ----- M752A1  
 Propellant charge ----- M219  
 fin Assembly ----- M29  
 Fuze ----- Mechanical Time  
                             Super Quick,  
                             M772

Limitation:

Cartridge cannot be fired at charge 0 (ignition cartridge only). Cartridge cannot be fired in the M1 and the M29 Series Mortar.

Temperature Limits:

Firing:  
 Lower limit ----- -50°F  
 Upper limit ----- +145°F

## Storage:

Lower limit ----- -60°F out  
 Upper limit ----- +160°F

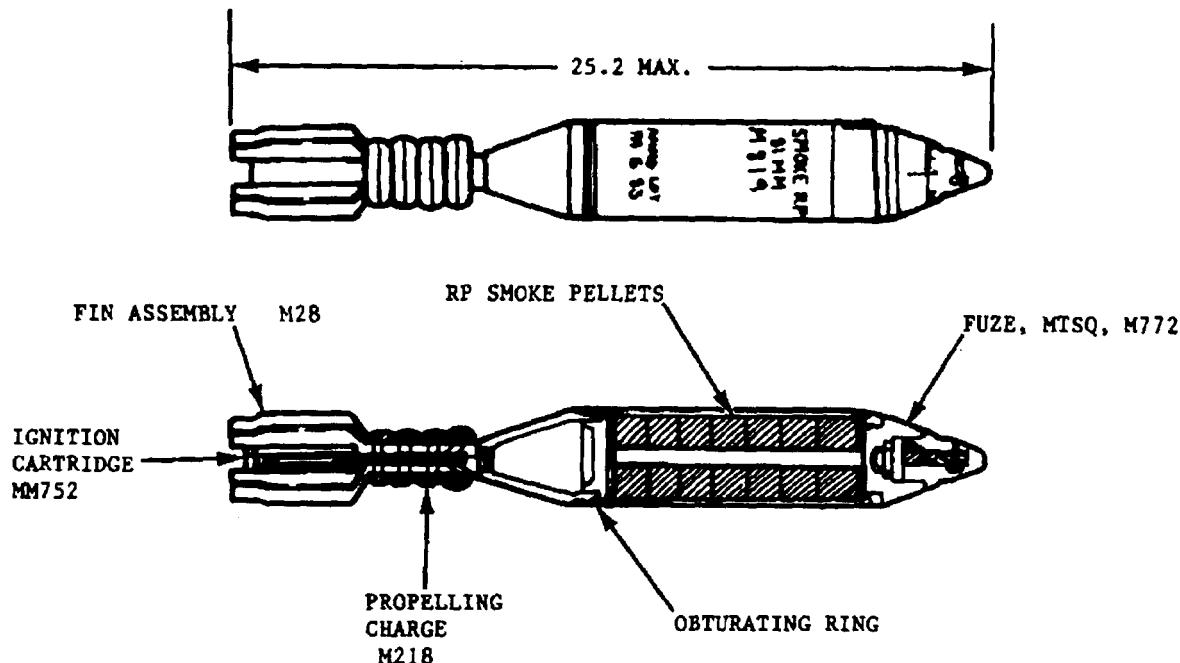
## Packing:

Pack ----- One round per fiber container and three fiber containers per metal can

## Shipping and Storage Data:

Fiber container (PA114) -----	Dwg No. 9354333
Metal Can (PA157) -----	Dwg No. 12944510
Quantity-distance class -----	(08) 1.2
Storage compatibility group -----	G
DOT shipping class -----	A
DOT designation -----	Ammunition for cannon w/illuminating projectile
DODAC -----	1315-C484
UNO serial number -----	0171
NSN -----	1315-01-379- 1026

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

**CARTRIDGE, 81 MILLIMETER: SMOKE, RP, M819**

AR 4024

**Type Classification:**

Std Dec '86.

**Use:**

This cartridge is a smoke screen round developed for use in the M252 improved 81mm mortar system. A three round volley is used to develop the basic smoke screen.

**Description:**

The complete round consists of a MTSQ fuze with an expulsion charge, a projectile containing red phosphorus smoke pellets, a propelling charge comprised of four horse-shoe type propellant increments, a fin assembly, and an ignition cartridge with integral percussion primer.

**Functioning:**

After setting the fuze with appropriate functioning time, the cartridge is loaded into the mortar tube. The cartridge slides down the mortar tube until it reaches the firing pin in the base cap. The firing pin strikes the plunger of the percussion primer. The primer element functions and initiates the charge in the ignition cartridge. The charge in the ignition car-

tridge flashes through the holes in the fin assembly and ignites the propelling charge (horse-shoe increments). The base end of the mortar tube is pressured by the hot gases generated from the burning propellant. The pressurized gas expands and propels the cartridge. The cartridge leaves the mortar tube and travels towards the target. Upon a pre-set time, the fuze functions to expel and ignite the red phosphorus smoke pellets in flight. The burning pellets produce a cloud of dense smoke after hitting the ground. A three round volley is required to develop the basic smoke screen.

**Tabulated Data:****Complete Round:**

Type -----	Smoke, RP
Weight -----	10.7 lb (4.9 kg)
Length -----	25.5 in. (64.8 cm)

**Projectile:**

Body material -----	Steel
Color -----	Green w/black markings and brown band
Filler -----	Red phosphorus 2.6 lb (1.2 kg)

**Components:**

Fuze -----	MTSQ, M772
Propelling charge -----	M218
Ignition cartridge -----	M752
Fin assembly -----	M28
Maximum range -----	5000 m (16,404 ft)
Muzzle velocity -----	915 ft/sec (279 mps)

**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: ----- 1 round in wax-treated fiber container, 3 containers in wood box.

**\*Packing Box:**

Weight -----	66 lb (29.94 kg)
Dimensions -----	30-15/16 x 13-13/16 x 6-11/16 in. (78.58 x 33.50 x 16.99 cm)

Cube -----	1.65 cu ft (0.05 cu m)
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**\*NOTE:** See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

UNO serial number -----	0016
Quantity-distance class -----	(04) 1.3
Storage compatibility group -----	G
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH SMOKE PROJECTILE
DODAC -----	1315-C870
Drawing number -----	9327839

**Limitations:**

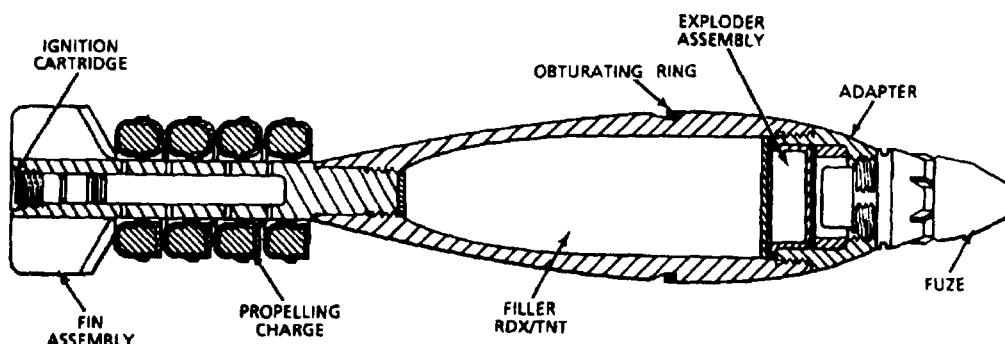
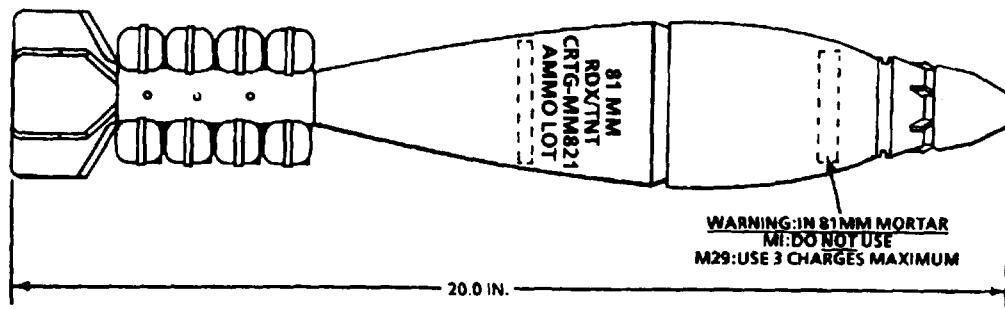
Cartridge cannot be fired at Charge 0 (ignition cartridge only).

Cartridge cannot be fired in the M1 mortar or above Charge 3 in the M29 mortar.

**References:**

AMC-P 700-3-3  
SB 700-20

## CARTRIDGE, 81 MILLIMETER: HE, M821



AID 2536

**Type Classification:**

Std DA Ltr 7/84.

**Use:**

This cartridge is a high explosive round developed for use in the M252 improved 81mm mortar system. It is intended for use against personnel and light materiel targets.

**Description:**

The complete round consists of a fuze, propellant charge, fin assembly, ignition cartridge, and shell body. The shell body made of Ductile Cast Iron, is loaded with a RDX/TNT filler. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propelling charge is contained in four horse-shoe felt-fiber containers and assembled around the fin assembly shaft.

**Functioning:**

When the cartridge is dropped down the mortar tube, the firing pin at the bottom of the tube initiates the percussion primer and charge in the ignition cartridge. The charge in the ignition cartridge flashes through the holes in the

shaft of the fin assembly and ignites the propelling charge. The gases from the burning propellant expand and propel the cartridge out of the mortar tube. The fuze functions proximity, near surface, on impact, or delay depending on the fuze setting and detonates the projectile.

**Tabulated Data:**

## Complete Round:

Type	HE
Weight	8.96 lb
Length	20.1 in.
Assembly drawing number	9354443

## Projectile:

Body material	Ductile cast iron
Color	Olive drab w/yellow markings
Filler and weight	RDX/TNT, 1.6 lb

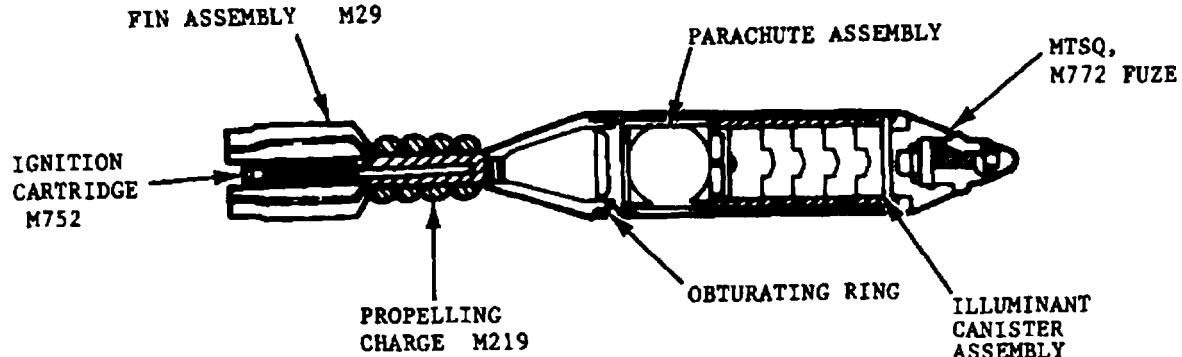
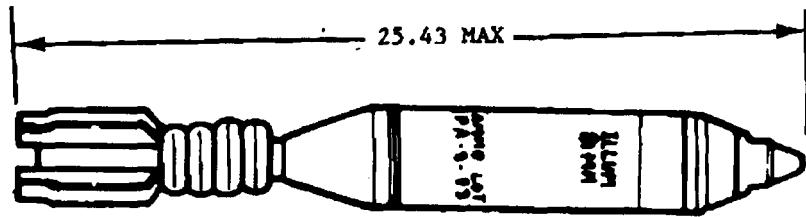
## Components:

Ignition cartridge	L33A1
Propellant charge MK5	4 increments (M205 propellant containers w/UK ball propellant)

Fuze -----	Multi-option,	Box -----	C374MK2,
Fin assembly -----	TV180		steel box Dwg.
<b><u>Temperature Limits:</u></b>			
Firing:			
Lower limit -----	-50°F	SV547A	
Upper limit -----	+145°F	(British)	
Storage:			
Lower limit -----	-60°F (for period not more than 3 days)	UNO serial number -----	0321
Upper limit -----	+160°F (for period not more than 4 hr/day)	Quantity-distance class -----	(08) 1.2
*Packing -----	1 round per plastic container, 3 containers per metal box	Storage compatibility group -----	E
Ammo container -----	Dwg GD/ 030P/100954 (British)	DOT shipping class -----	A
		DOT designation -----	AMMUNI- TION FOR CANNON WITH EXPLO- SIVE PROJEC- TILES
		DODAC-----	1315-C868

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

**Shipping and Storage Data:**

**CARTRIDGE, 81 MILLIMETER: ILLUMINATING, M853A1**

AR 4025

**Type Classification:**

Std Dec '86.

**Use:**

This cartridge is an illuminating round developed for use in the M252 improved 81mm mortar system and is used for illuminating a desired point or area.

**Description:**

The complete round consists of a time fuze with an expulsion charge, a projectile containing an illuminant canister and parachute assembly, a propelling charge comprised of four horse-shoe type propellant increments, a fin assembly, and an ignition cartridge with integral percussion primer.

**Functioning:**

After setting the fuze to appropriate time, the cartridge is loaded into the mortar tube. The cartridge slides down the mortar tube until it reaches the firing pin in the base cap. The firing pin strikes the plunger of the percussion primer. The primer element functions and initiates the charge in the ignition cartridge. The charge in the ignition cartridge flashes through the holes in the fin assembly and ignites the pro-

pelling charge (horse-shoe increments). The base end of the mortar tube is pressurized by the hot gases generated from the burning propellant. The pressurized gas expands and propels the cartridge. The cartridge leaves the mortar tube and travels towards the target. Upon a pre-set time, the fuze functions to expel and ignite the illuminant canister assembly. The parachute deploys to slow the descent of the illuminant canister assembly. The burning candle provides a minimum of 600,000 candle power illumination for at least 60 seconds.

**Tabulated Data:**

## Complete Round:

Type -----	Illuminating
Weight -----	8.8 lb (4 kg)
Length -----	25.3 in. (64.3 cm)

## Projectile:

Body Material -----	Aluminum
Filler -----	White w/black markings Illuminant, 1.4 lb (0.6 kg)

## Components:

Fuze -----	MTSQ, M772
propelling charge -----	M219
Ignition cartridge -----	M752
Fin assembly -----	M29

Maximum range -----	5000m (16,404 ft) (burst)
Muzzle velocity -----	1020 ft/sec (311 mps)
<b><u>Temperature Limits:</u></b>	
Firing:	
Lower limit -----	-50°F (-45.5°C)
Upper limit -----	+145°F (+63°C)
Storage:	
Lower limit -----	-60°F (-51.1C)
Upper limit -----	+160°F (+71.1°C)
*Packing: -----	1 round in wax-treated fiber con- tainer, 3 con- tainers in wood box
<b><u>*Packing Box:</u></b>	
Weight -----	60 lb (27.2 kg)
Dimensions -----	30-15/16 x 13- 13/16 x 6-11/ 16 in. (76.6 x 35.1 x 17 cm)
Cube -----	1.65 cu ft (0.05 cu)

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

#### **Shipping and Storage Data:**

UNO serial number -----	0171
Quantity-distance class -----	(04) 1.2
Storage compatibility group -----	G
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH ILLUMINA- TING PROJECTILE
DODAC -----	1315-C871
Drawing number -----	9152621

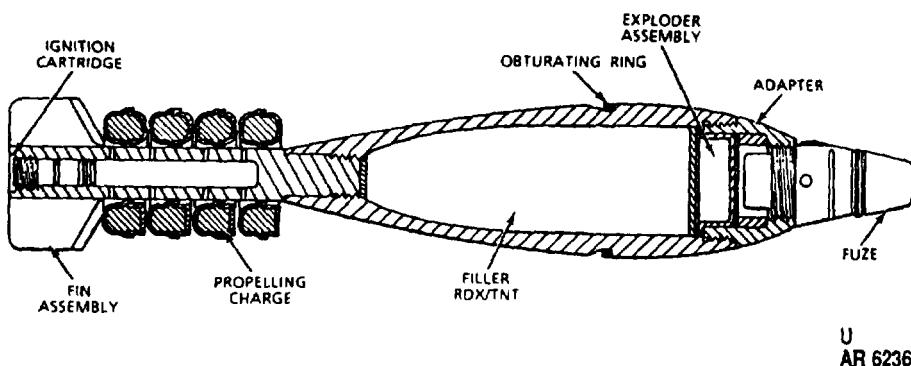
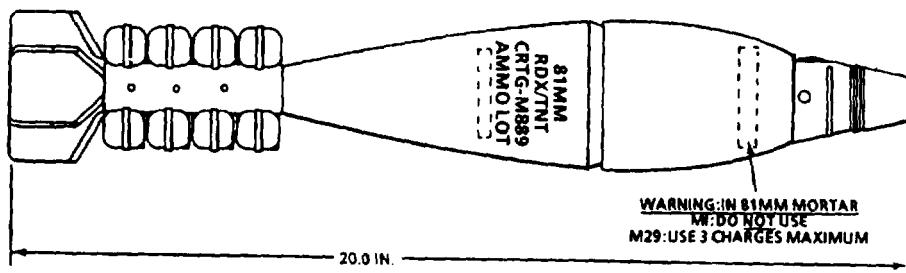
#### **Limitations:**

Cartridge cannot be fired at Charge 0 (ignition cartridge only).

Cartridge can not be fired in the M1 mortar or above Charge 3 in the M29 mortar.

#### **References:**

AMC-P 700-3-3  
S B 7 0 0 - 2 0

**CARTRIDGE, 81 MILLIMETER: HE, M889****Type Classification:**

Std - DA Ltr 7/84.

**Use:**

This cartridge is a high explosive round developed for use in the M252 improved 81mm mortar system. It is intended for use against personnel and light materiel targets.

**Description:**

The complete round consists of a fuze, propellant charge, fin assembly, ignition cartridge, and shell body. The shell body, made of ductile cast iron, is loaded with a RDX/TNT filler. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propelling charge is contained in four horse-shoe felt-fiber containers and assembled around the fin assembly shaft.

**Functioning:**

When the cartridge is dropped down the mortar tube, the firing pin at the bottom of the tube initiates the percussion primer and charge in the ignition cartridge. The charge in the ignition cartridge flashes through the holes in the

shaft of the fin assembly and ignites the propelling charge. The gases from the burning propellant expand and propel the cartridge out of the mortar tube. The fuze functions on impact and detonates the projectile.

**Tabulated Data:****Complete Round:**

Type	HE
Weight	8.96 lb
Length	20.0 in.
Assembly drawing number	9354444

**Projectile:**

Body material	Ductile cast iron
Color	Olive drab w/yellow markings
Filler and weight	RDX/TNT, 1.6 lb

**Components:**

Ignition cartridge	L33A1
Propellant charge MK5	4 increments (M205 propellant containers with UK ball propellant)

Fuze ----- PD, M935  
 Fin assembly ----- TV180

**Temperature Limits:**

Firing:  
 Lower limit ----- -50°F  
 Upper limit ----- +145°F

Storage:  
 Lower limit ----- -60°F (for period not more than 3 days)  
 Upper limit ----- +160°F (for period not more than 4 hr/day)

\*Packing ----- 1 round per plastic container, 3 containers per metal box

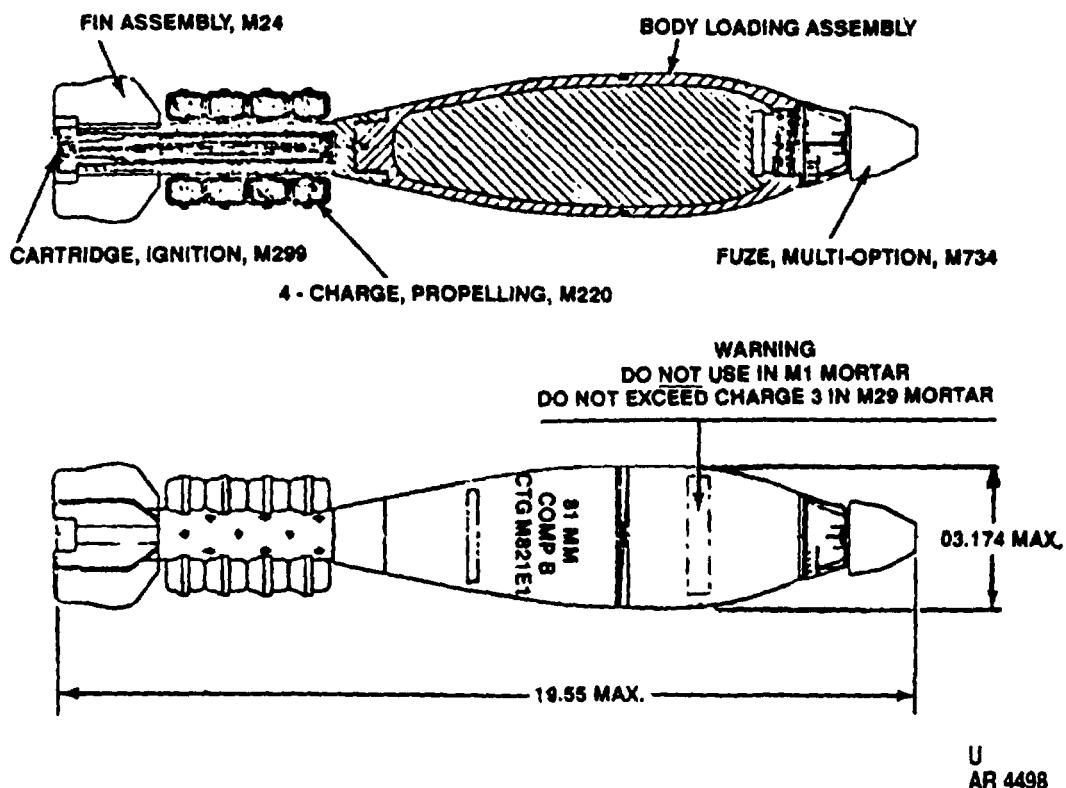
Ammo container ----- Dwg.  
 GD/030P/1009  
 54 (British)

Box ----- C374 MK2,  
 steel box Dwg.  
 SV547A  
 (British)

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

**Shipping and Storage Data:**

UNO serial number ----- 0321  
 Quantity-distance class ----- (08) 1.2  
 Storage compatibility group ----- E  
 DOT shipping class ----- A  
 DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES  
 DODAC ----- 1315-C869

**CARTRIDGE, 81 MILLIMETER: HE, M821A1 WITH FUZE, MULTI-OPTION, M734****Type Classification:**

TBD

**Use:**

This cartridge is a high explosive round developed for use in the M252 improved 81mm mortar system. It is intended for use against personnel and material providing both blast and fragmentation effect.

**Description:**

The complete round consists of a fuze, four increment charges, fin assembly, ignition cartridge, and shell body. The shell body, made of forged steel material, is loaded with a Composition B (RDX/TNT) filler. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propellant charge is contained in four horseshoe felt-fiber containers and assembled around the fin assembly shaft.

lant charge is contained in four horseshoe felt-fiber containers and assembled around the fin assembly shaft.

**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 it to the target. The projectile is fin-stabilized in flight. Functioning of the fuze detonates the high explosive charge. The projectile bursts on the target, producing near optimum blast and fragmentation effect. The fuze functions proximity near surface, on impact, or delay depending on the fuze setting and detonates the projectile.

**Difference Between Models:**

The M821A1 cartridge is produced using the Americanized TDP based on the M821 cartridge.

**Tabulated Data:**

## Complete Round:

Type -----	HE
Weight -----	9.22 lb
Length -----	19.55 in.

## Projectile:

Body material -----	Forged steel
Color -----	Olive drab w/yellow markings
Filler and weight -----	Comp B, 2.05 lb

## Components:

Ignition cartridge -----	M299
Propellant charge -----	M220
Primer -----	M55
Fuze -----	Percussion Multi-Option, M734
Fin assembly -----	M24

**Temperature Limits:**

## Firing:

Lower limit -----	-50°F
Upper limit -----	+145°F

## Storage:

Lower limit -----	-60°F
Upper limit -----	+160°F

Packing -----	1 round per wax treated fiber con- tainer; 3 con- tainers in wirebound box
Weight -----	42 lb
Dimensions -----	23-11/16 x 13-3/8 x 5-5/16 in.
Cube -----	cu ft

**Shipping and Storage Data:**

Quantity-distance class -----	(08) 1.2
Storage compatibility group -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC-----	1315-C868
NSN-----	1315-01-285- 6416
Drawing number -----	12630672

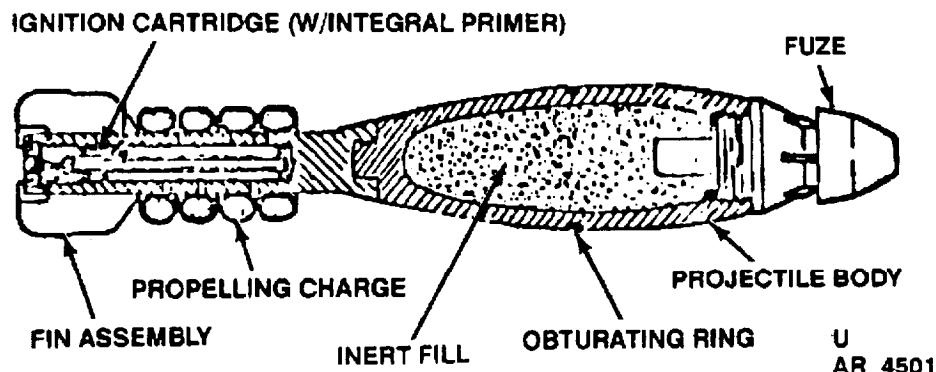
**Limitations:**

Cartridge can not be fired in the M1 mortar or above Charge 3 in the M29 Mortar.

**References:**

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

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

Type Classification:

TBD

Use:

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

Description:

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

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer ignites the ignition cartridge which ignites the propellant charge. Gases from the burning propellant expel the projectile from the mortar tube and propel it to the target. The projectile is fin-stabilized in flight. The acceleration arms the fuze. The cartridge travels down-range and impacts the target. The fuze

functions on impact. A pyrotechnic smoke charge in the fuze produces a flash, an audible sound, and a smoke cloud.

Tabulated Data:

## Complete Round:

Type	Practice (full range)
Weight	9.40 lb
Length	19.55 in.

## Projectile:

Body material	Steel
Color	Blue w/white markings and 1 brown band
Filler and weight	Hydrocal (inert), 2.05 lb

## Components:

Ignition cartridge	M299 (with integral primer)
Propellant charge	M220
Fuze	PD, M751
Fin assembly	M24
Maximum range	5700 m
Maximum muzzle velocity	305 mps

Temperature Limit

Firing:  
 Lower limit ----- 0°F  
 Upper limit ----- +110°F

Storage:  
 Lower limit ----- -45°F  
 Upper limit ----- +145°F

Packing ----- 1 cartridge per  
 wax treated fiber  
 container; 3 con-  
 tainers in metal  
 box  
 x lb  
 25-1/16 x 13-  
 13/16x 6-11/16  
 in.  
 1.34 cu ft

Weight -----  
 Dimensions -----  
 Cube -----

Shipping and Storage Data:

UNO serial number ----- 0328  
 Quantity-distance class ----- (08) 1.2  
 Storage compatibility group ----- C  
 DOT shipping class ----- C

DOT designation ----- AMMUNITION  
 FOR CANNON  
 WITH INERT  
 LOADED PRO-  
 JECTILE  
 DODAC ----- 1315-C875  
 NSN----- 1315-01-200-  
 4223  
 Drawing number ----- 9381430

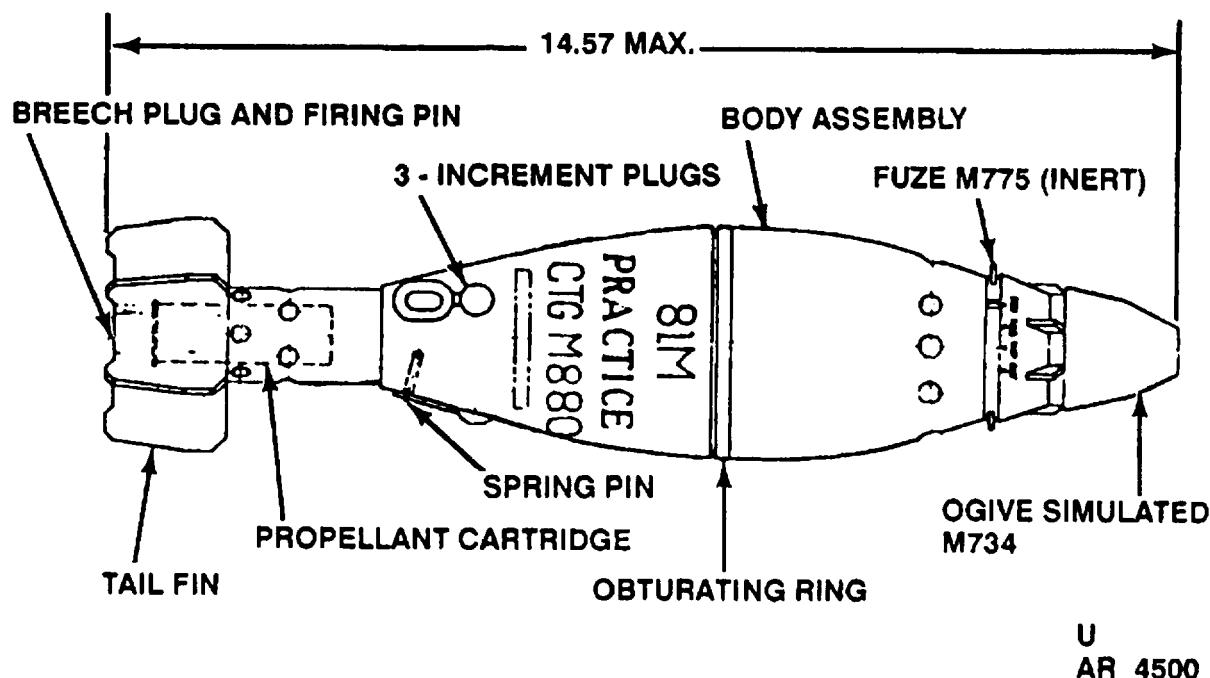
Limitations:

None.

References:

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

**CARTRIDGE, 81 MILLIMETER: TARGET PRACTICE (SR), M880 WITH FUZE,  
PD, M751**



**Type Classification:**

Std

**Use:**

This cartridge is a short range (SR) training round for use in the M252 improved 81mm mortar system.

**Description:**

This cartridge consists of a PD (practice) fuze, hollow projectile body with vent holes, fin assembly, three plastic plugs (simulations of propellant charge increments), obturating ring and ignition cartridge with percussion primer.

**Functioning:**

When the cartridge is loaded, it slides down the mortar tube until the primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer ignites the ignition charge and the gases generated by the ignition cartridge propel the cartridge out of the barrel. The distance of the cartridge traveling downrange depends on the number of plas-

tic plugs removed (before firing) and the amount of gas allowed to escape from the barrel through the projectile body. The fuze functions on impact with the ground or target. A pyrotechnic smoke cartridge in the fuze produces a flash, an audible sound, and a cloud of smoke (simulation of the HE cartridge function).

**Tabulated Data:**

Complete Round:

Type -----	Practice (short range)
Weight -----	6.84 lb
Length -----	14.5 in.

Projectile:

Body material -----	Steel
Color -----	Blue w/white markings and 1 brown band
Filler -----	None (hollow body)
Fuze -----	PD, M775 (practice)
Maximum range -----	490 m (538 yd)
Maximum muzzle velocity -----	73 mps

**Temperature Limits:**

## Firing:

Lower limit ----- 0°F  
 Upper limit ----- +110°F

## Storage:

Lower limit ----- -45°F  
 Upper limit ----- +145°F

## Packing -----

1 cartridge  
 per fiber con-  
 tainer; 8 con-  
 tainers per  
 wireboundbox

## Weight -----

77 lb  
 (34.47 kg)

## Dimensions -----

19-1/2 x 16 x  
 9-1/8 in.

## Cube -----

x cu ft

**Shipping and Storage Data:**

UNO serial number ----- 0012

Quantity-distance class ----- 1.4

Storage compatibility group ----- S

DOT shipping class ----- C  
 DOT designation ----- AMMUNI-  
 TION FOR  
 CANNON  
 WITH INERT  
 PROJECTILE  
 DODAC ----- 1315-C876  
 NSN-----1315-01-216-  
 7071  
 Drawing number ----- 9381430

**Limitations:**

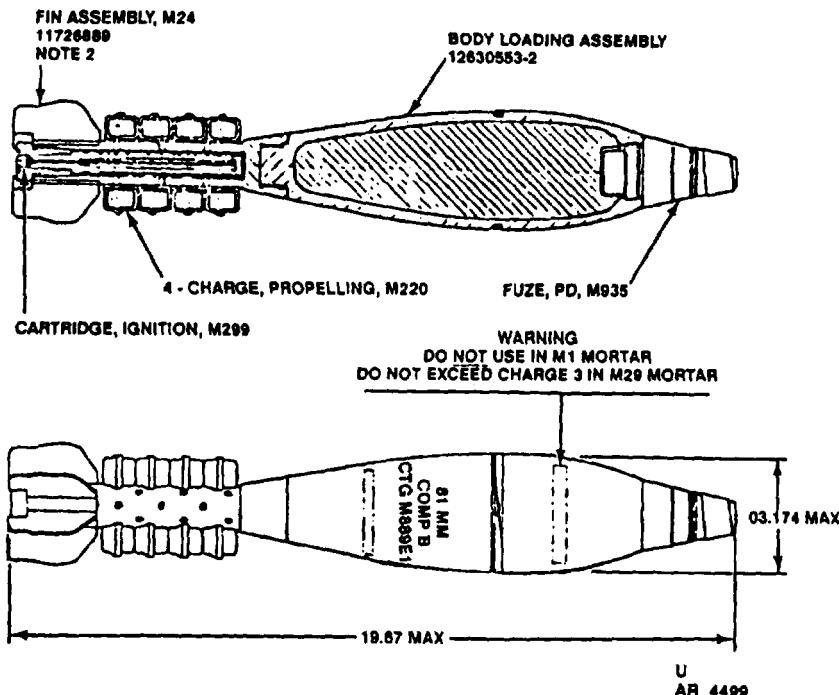
None.

**NOTE:** After the round functions it can be retrieved and refurbished as indicated in TM 9-1315-252-12&P.

**References:**

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

## CARTRIDGE, 81 MILLIMETER: HE, M889A1 WITH FUZE, PD, M935

**Type Classification:**

TBD

**Use:**

This cartridge is a high explosive round developed for use in the M252 Improved 81mm mortar system. It is intended for use against personnel and material, providing both blast and fragmentation effect.

**Description:**

The complete round consists of a fuze, increment charges, fin assembly, ignition cartridge, and shell body. The shell body, made of forged steel material, is loaded with a Composition B (RDX/TNT) filler. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propellant charge is contained in four horseshoe felt-fiber containers and assembled around the fin assembly shaft.

**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 high explosive charge. The projectile bursts on the target, producing near optimum blast and fragmentation effect. The fuze functions either superquick or delay action (0.05 sec) depending on the fuze setting and detonates the projectile.

**Tabulated Data:**

Complete Round:	H E
Type	HE
Weight	9.22 lb
Length	19.67 in.
Projectile:	
Body material	Forged steel
Color	Olive drab w/yellow markings
Filler and weight	Comp B, 2.05 lb
Components:	
Ignition cartridge	M299
Propelling charge	M220
Primer	Percussion, M35
Fuze	Point detonating, M935

Fin assembly ----- M24

**Temperature Limits:**

Firing:  
 Lower limit ----- -50°F  
 Upper limit ----- +145°F

Storage:  
 Lower limit ----- -60°F  
 Upper limit ----- +160°F

Packing ----- 1 round per  
 wax treated  
 fiber con-  
 tainer; 3 con-  
 tainers in  
 wirebound box  
 41 lb

Weight -----

Dimensions ----- 23-11/16 x  
 13-3/8 x  
 5-5/16 in.

Cube ----- cu ft

**Shipping and Storage Data:**

Quantity-distance class ----- 1.2 (08)  
 Storage compatibility group ----- E  
 DOT shipping class ----- A

DOT designation ----- AMMUNI-  
 TION FOR  
 CANNON  
 WITH  
 EXPLOSIVE  
 PROJECTILE

DODAC ----- 1315-C869  
 NSN ----- 1315-01-286-  
 1385

Drawing number----- 12630535

**Limitations:**

Cartridge can not be fired in the M1 mor-  
 tar or above Charge 3 in the M29 mortar.

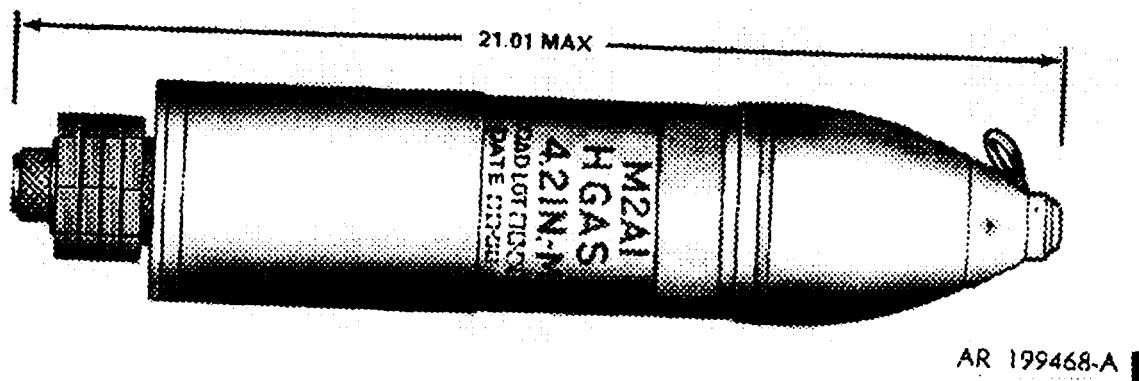
**Difference Between Models:**

The M889A1 cartridge is produced using  
 the Americanized TDP based on the M889 car-  
 tridge.

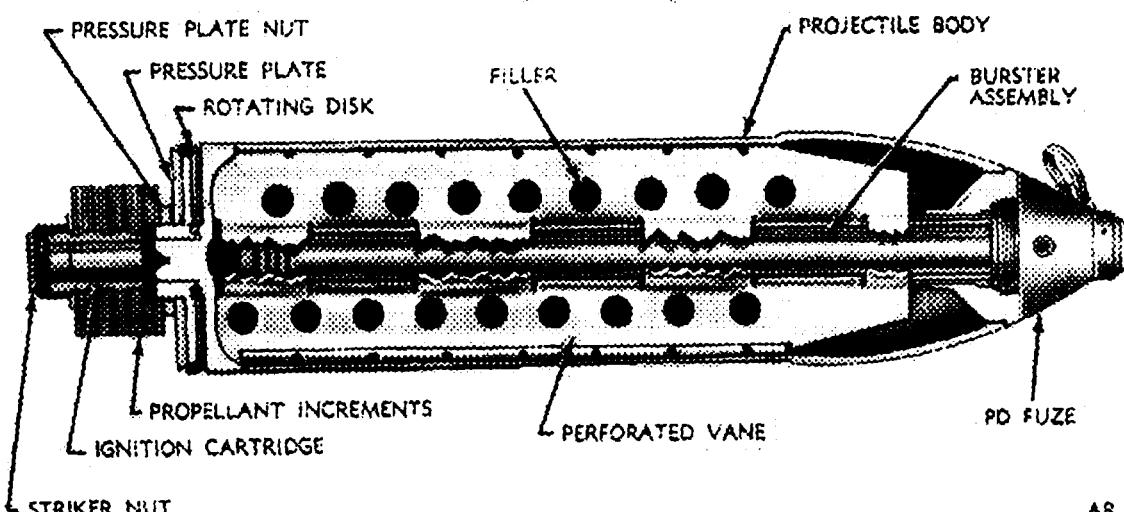
**References:**

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

## 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 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 m)
Muzzle velocity -----	839 fps (255.8 mps)

\*NOTE: See separate data sheets.

\*\*NOTE: Renovated or newly manufactured projectile. (Post 1976) will be marked with one green band and, if burstered, one yellow band.

**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  
4hr/day)

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

\*\*\*Packing Box:  
Weight ----- 75.0 lb  
Dimensions ----- 27-1/16 x 11-  
1/16 ft  
Cube ----- 1.3 cu ft

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

**Shipping and Storage Data:**

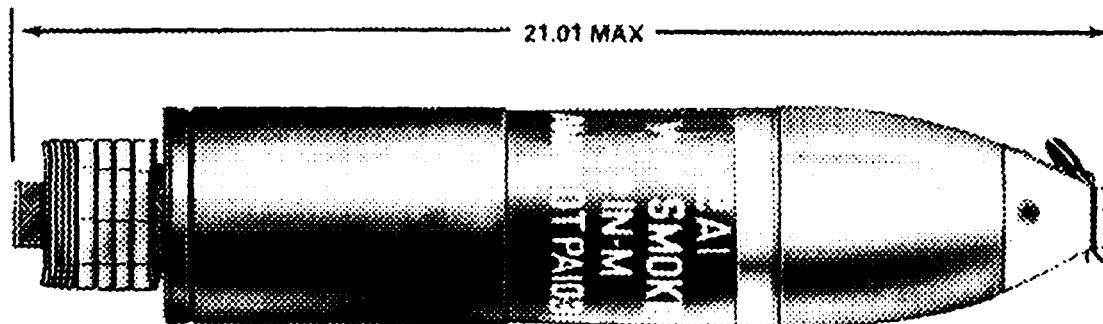
UNO serial number -----	0020
Quantity-distance class -----	(12) 1.2
Storage compatibility group -----	K
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH GAS PROJEC- TILES
D O D A C -----	CNB, CNS, CNS-1315- C701 H, HD, HT-1315-C703
Drawing number -----	75-1-284

**Limitations:**

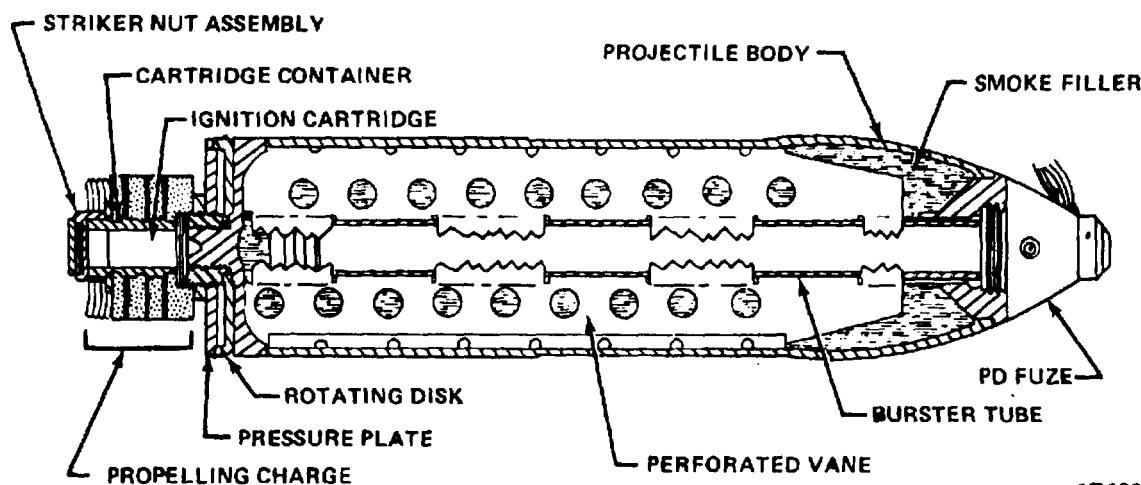
Short rounds may occur when Cartridge M2A1 is fired with fewer than seven increments.

**References:**

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

**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 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 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 -----	4879yd (4,460 m)
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 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 lb
Dimensions -----	27-1/6 x 11-1/8 x 7-7/32 in.
Cube -----	1.3 cu ft

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

**Shipping and Storage Data:**

UNO serial number -----	0245
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

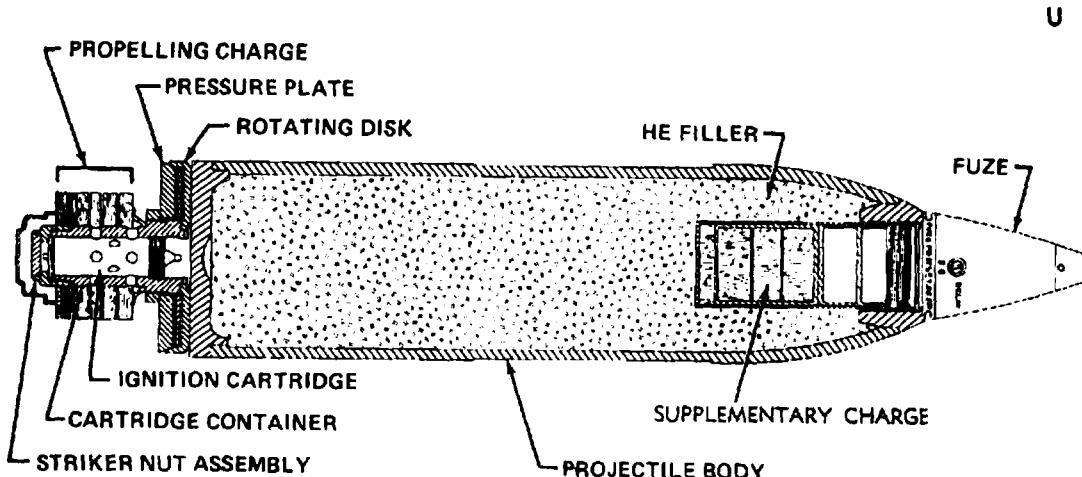
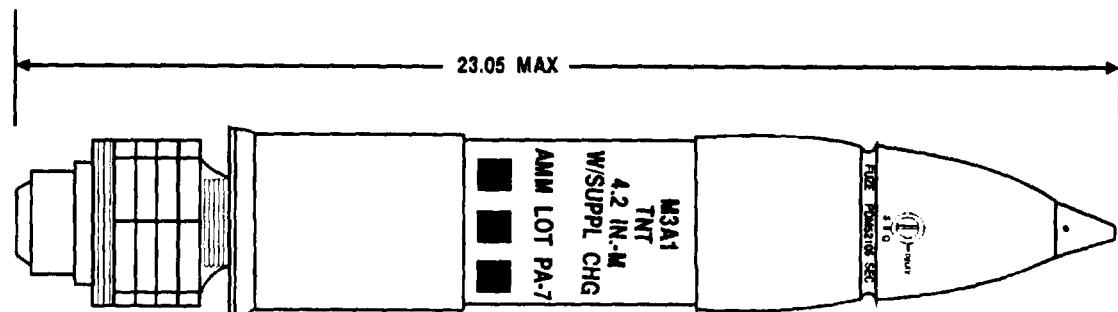
**Limitations:**

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 internal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

**References:**

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

**CARTRIDGE, 4.2-INCH: HE, M3A1 & M3**

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 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

## Performance (full charge):

Maximum range ----- 5043 yd  
     (4,610 m)  
 Muzzle velocity ----- 845 fps (258  
     reps)

\*NOTE: See separate data sheets.

**Temperature Limits:**

## Firing:

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

## Storage:

Lower limit ----- -80°F (-62.2°C)  
     (for period  
     not more than  
     3 days)

Upper limit ----- +160°F  
     (+71.1°C)  
     (for period  
     not more than  
     4 hr/day)  
 \*\*Packing ----- 1 round in  
     fiber con-  
     tainer; 2 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 DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

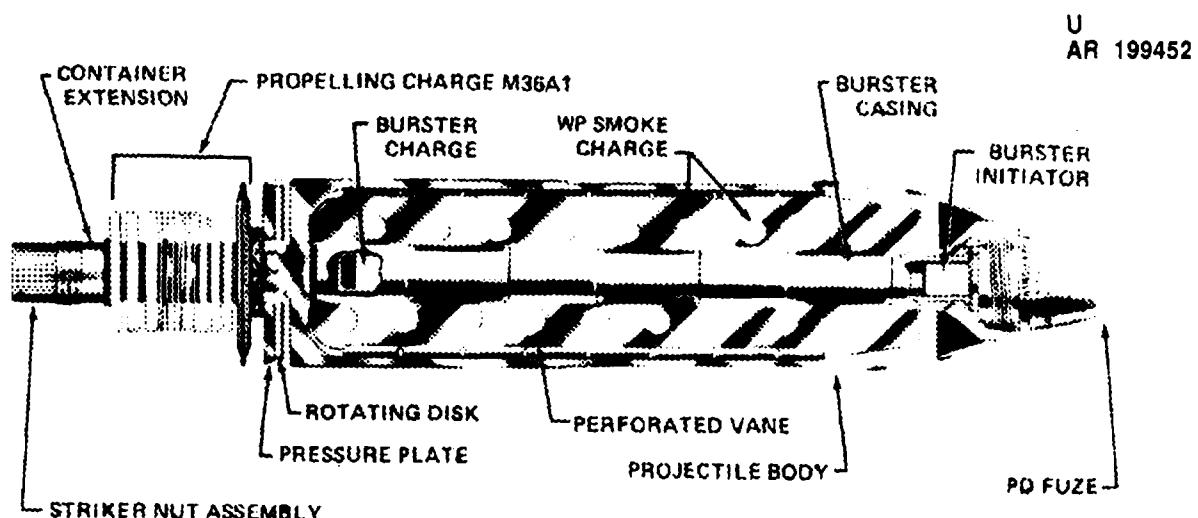
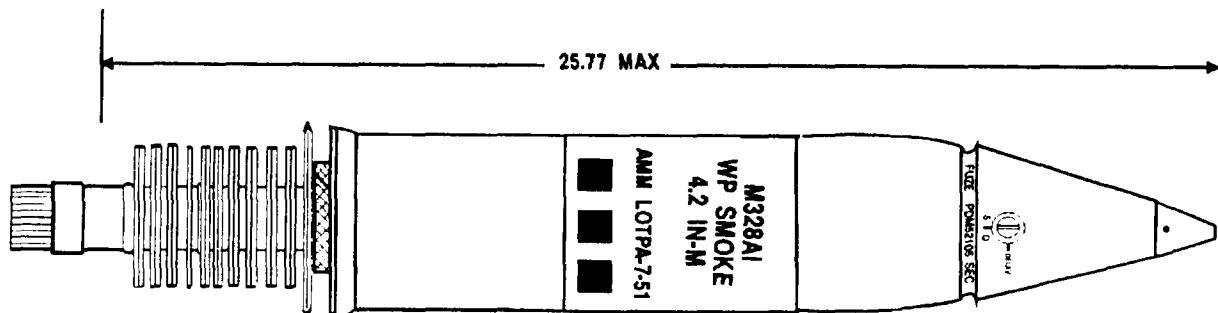
UNO serial number -----	0006
Quantity-distance Class -----	1.1
Storage compatibility group -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNI- TIONFOR CANNON WITH EXPLOSIVE PROJEC- TILES
DODAC -----	1315-C704
Drawing number -----	75-l-285

**Limitations:**

Minimum charge for firing cartridge M3A1 with a proximity fuze is 10 increments.

**References:**

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

**CARTRIDGE, 4.2-INCH: SMOKE, WP, M328A1 AND M328****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 WP filler. White phosphorous ignites on contact with the air, producing a dense white smoke with some incendiary effect.

**Difference 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:**

	<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)

\*NOTE: See separate data sheets.

**Performance (full charge):**

Maximum range -----	6,180 yd (5,650 m)
Muzzle velocity -----	981 fps (299 reps)

**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; 1 con- tainer 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 DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

UNO serial number -----	0245
Quantity-distance class -----	(12) 1.2
Storage compatibility group -----	H
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH SMOKE PROJE- CTILES
DODAC -----	1315-C708
Drawing number -----	8797829

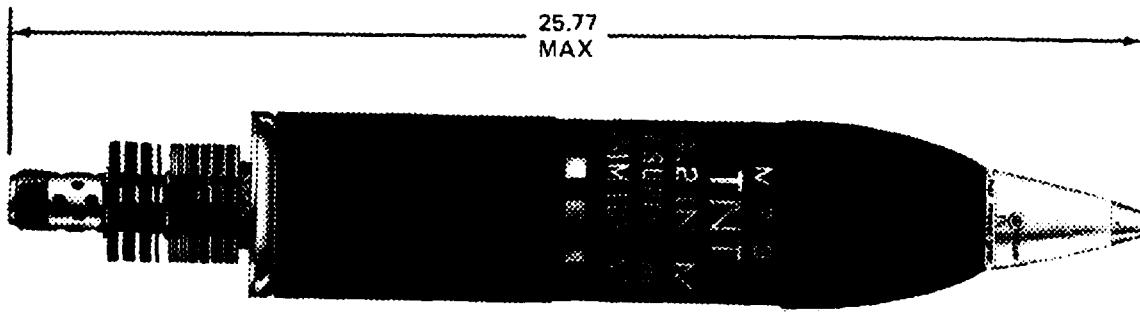
**Limitations:**

Short rounds may occur when firing with fewer than 10 increments.

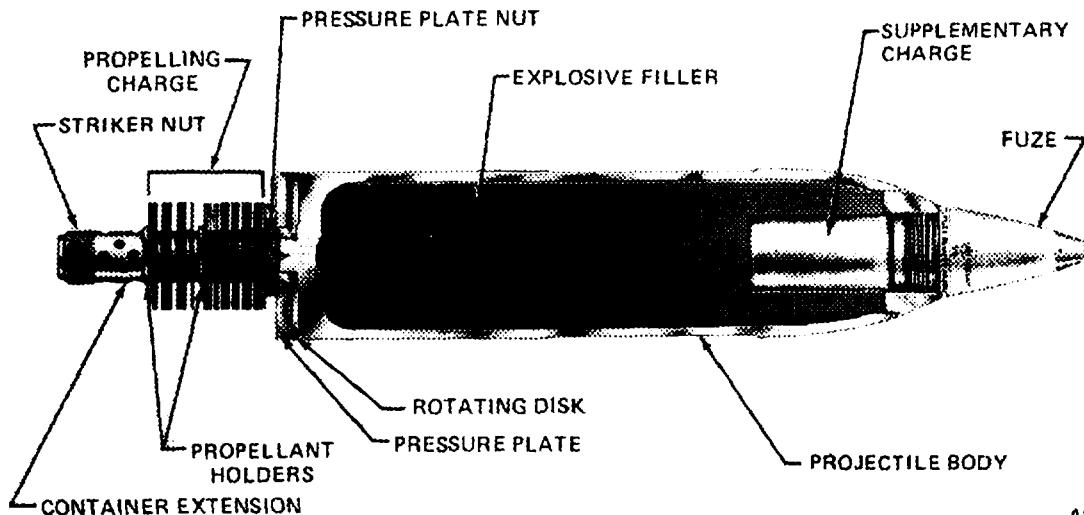
Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

**References:**

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

**CARTRIDGE, 4.2-INCH: HE, M329 AND M329B1**

AR199448



AR199447

**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 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. 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:**

The 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

\*NOTE: See separate data sheets.

Performance (full charge)

Maximum range -----	5929 yd (5420 m)
Muzzle velocity -----	964 fps (294 mps)

**Temperature Limits:**

Firing:

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

Storage:

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

\*\*Packing ----- 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 DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Storage and Shipping Data:**

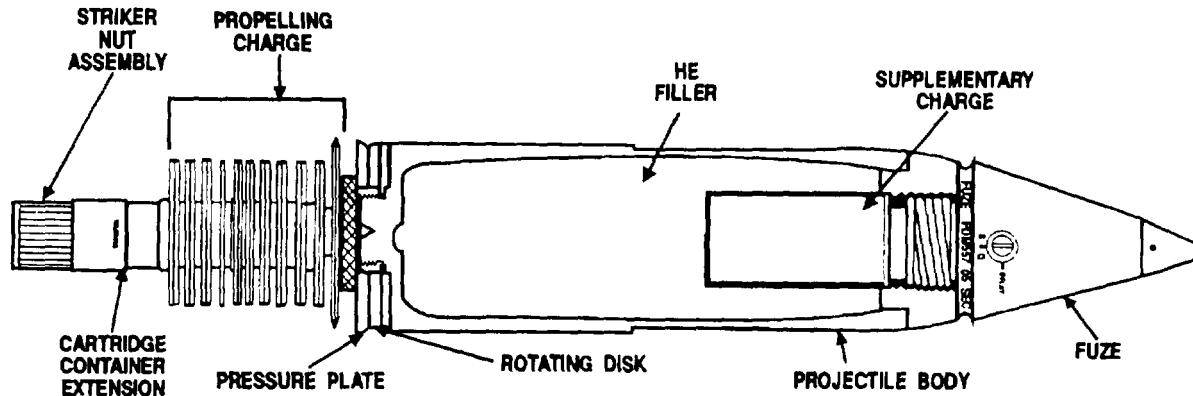
UNO serial number -----	0006
Quantity-distance class -----	1.1
Storage compatibility group -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNITIONFOR CANNON WITH EXPLOSIVE PROJEC- TILES
DODAC -----	1315-C704 w/fuze
DODAC -----	1315-C705 w/o fuze
Drawing number -----	(M329),  8863682 (M329B1)

**Limitations:**

Short rounds may occur when firing with less than seven increments. Minimum charge for firing with a proximity fuze is 10 increments.

**References:**

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

**CARTRIDGE, 4.2-INCH: HE, M329A1**

U  
AR 199449

**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 optimum fragmentation and blast effect.

**Tabulated Data:****Complete Round:**

Type -----	HE
Weight -----	27.07 lb
Length -----	25.79 in. (65.51 cm)
Cannon used with -----	M2, M30

**Projectile:**

Body material -----	Steel tube
Color -----	Olive drab w/white markings
Filler and weight -----	TNT, 7.08 lb (3.21 kg)
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 -----	6180 yd (5650 m)
Muzzle velocity -----	981 fps (299 mps)

**Temperature Limits:**

**Firing:**

Lower limit -----	-41°F (40°C)
Upper limit -----	+125°F (+52°C)

**Storage:**

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

**\*\*Packing -----**

1 round in  
fiber con-  
tainer; 2 fiber  
containers in  
wooden box

**\*\*Packing Box:**

Weight ----- 76 lb  
(34.47 kg)

Dimensions -----	31-5/16 x 11- 13/16 x 7-3/8 in. (79.53 x 30 x 18.73 cm)
Cube -----	1.6 cu ft (0.05 cu m)

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

**Shipping and Storage Data:**

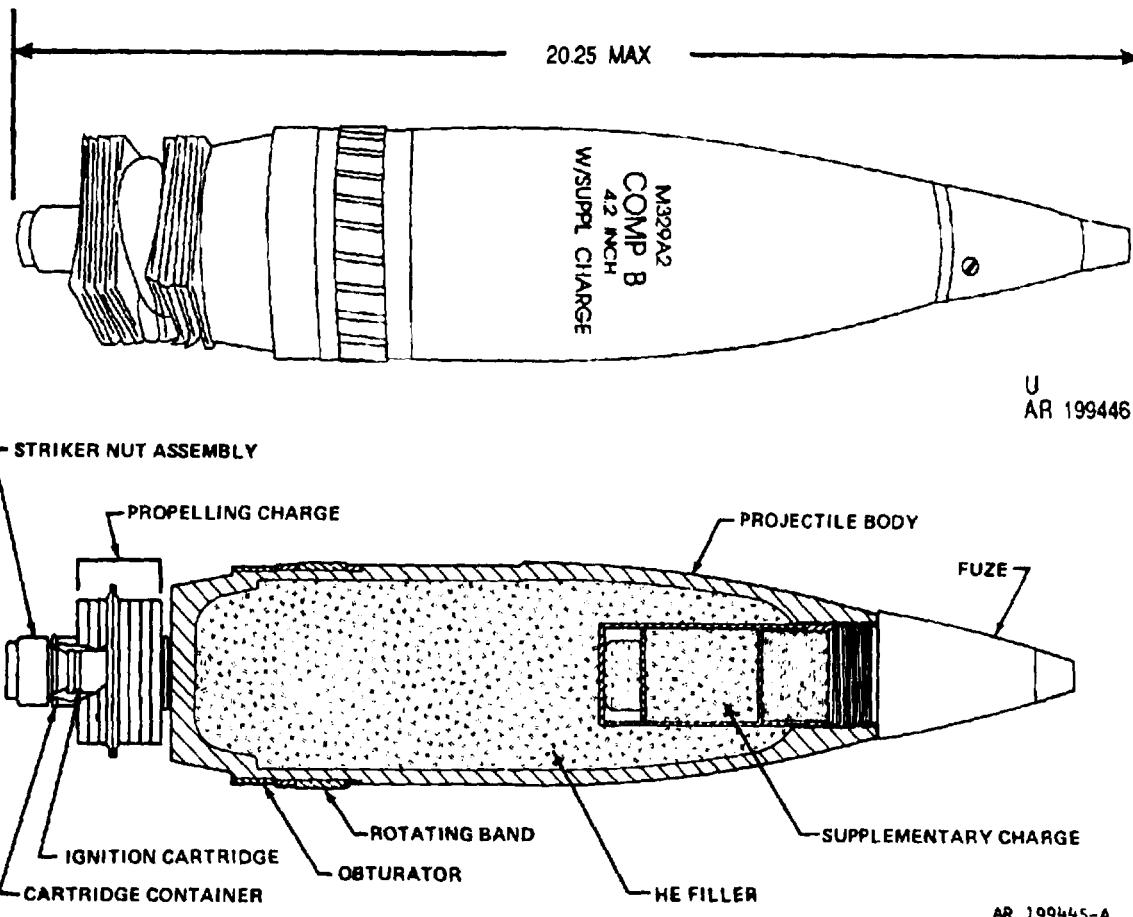
UNO serial number -----	0006
Quantity-distance class -----	1.1
Storage compatibility group -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH EXPLOSIVE PROJE- CTILES
DODAC -----	1315-C704 w/fuze
DODAC -----	1315-C705 w/o fuze
Drawing number -----	5863685

**Limitations:**

Short rounds may occur when firing with fewer than 10 increments. Minimum charge for firing with a proximity fuze is 10 increments. The Point Detonating Fuze: M739 series with the M329 series cartridges were not qualified during acceptance test. At the present time, the fuze M557 is the only PD fuze authorized for use with the M329 series cartridge.

**References:**

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

**CARTRIDGE, 4.2-INCH: HE, M329A2****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 fuse. 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 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 (9.98 kg)
Length	20.25 in. (51.44 cm)
Cannon used with	M2, M30
Projectile:	
Body material	Forged steel
Color	Olive drab w/yellow markings
Filler and weight	Comp B, 5.75 lb (2.61 kg)

#### Components:

Ignition cartridge	M2A2*
Propelling charge	M36A2*
Fuzes	PD, M557; MTSQ, M564

#### Performance (full charge):

Maximum range	6600 m (21,653.54 ft)
Muzzle velocity	308 mps (1010.50 fps)

\*NOTE: See separate data sheets.

### Temperature Limits:

#### Firing:

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

#### Storage:

Lower limit	-65°F (for period not more than 3 days) (-53.89°C)
Upper limit	+160°F (for period not more than 4 hr/day) (71.11°C)

** Packing	1 round in fiber con- tainer; 2 con- tainers in wooden box
** Packing Box:	
Weight	63 lb (28.58 kg)
Dimensions	25-3/4 x 11-11/16 x 6-3/8 in. (60.33 x 29.69 x 16.19 cm)
Cube	1.4 cu ft (0.04 cu m)

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

### Shipping and Storage Data:

UNO serial number	0006
Quantity-distance class	1.1
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNI- TION FOR CANNON WITH EXPLOSIVE PROJE- CTILES
DODAC	1315-C704 w/fuze
DODAC	1315-C697 w/o fuze
Drawing number	9235654

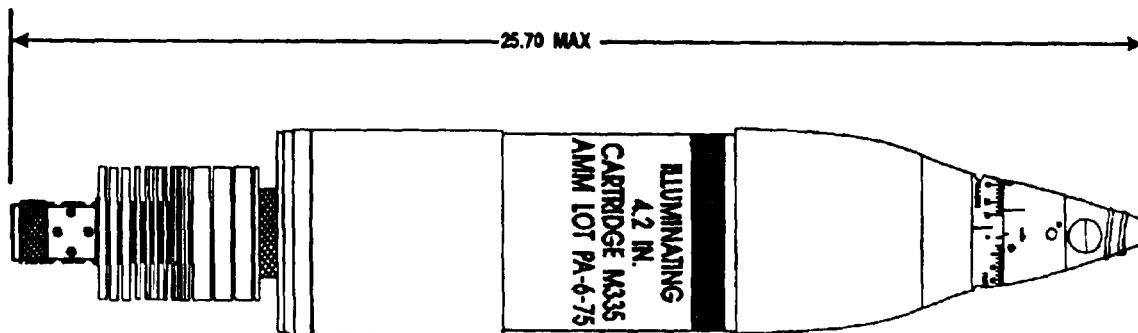
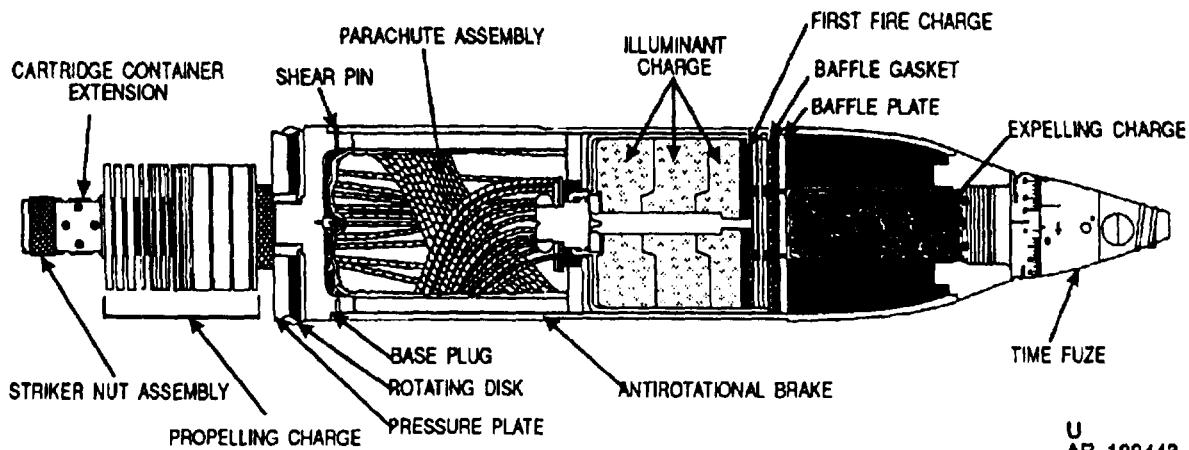
### Limitations:

Excessive short rounds may occur when this round is fired at temperatures below 0°F.

The supplementary charge must be removed from the nose cavity before attempting to install a long-intrusion proximity fuze. The Point Detonating Fuze: M739 series with the M329 series cartridges were not qualified during acceptance test. At the present time, the fuze M557 is the only PD fuze authorized for use with the M329 series cartridges.

### References:

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

**CARTRIDGE, 4.2-INCH: ILLUMINATING, M335A1 AND M335**U  
AR 199444U  
AR 199443**Type Classification:**

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

**Use:**

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

**Description:**

The complete round consists of a projectile body with a detachable base plug, an MTSQ fuze, an illuminant assembly attached to a parachute assembly, and a tail assembly. The steel tube body is designed to accommodate an expelling charge immediately below the fuze, and the base plug is attached with four equally spaced shear pins. The illuminant assembly consists of a first-fire charge and an illuminant charge, contained in a canister fitted with 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 approximate 70 seconds at 500,000 candlepower for the M335A1, and 60 seconds for the M335.

#### **Difference Between Models:**

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

#### **Tabulated Data:**

##### **Complete Round:**

Type	Illuminating
Weight	26.00 lb
Length	25.70 in.

Cannon used with M2, M30

##### **Projectile:**

Body material	Steel
Color	White w/black markings
Filler and weight	Illuminat <sup>n</sup> , 3.31 lb
Expelling charge	BP 0.18 lb

##### **Components:**

	M335	M335A1
Ignition cartridge	M2*	M2A1*
Propelling charge	M36*	M36 A 1 *
Fuse	MTSQ, MT, M 5 0 1	M 5 6 2

##### **Performance (full charge):**

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

\*NOTE: See separate data sheets.

#### **Temperature Limits:**

##### **Firing:**

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

#### **Storage:**

Lower limit	-80°F (-62.2°C) (for period not more than 3 days)
Upper limit	+160°F (+71.1°F) (for period not more than 4 hr/day)
** Packing	1 round in fiber container; 2 containers in wood box

#### **\*\*Packing Box:**

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

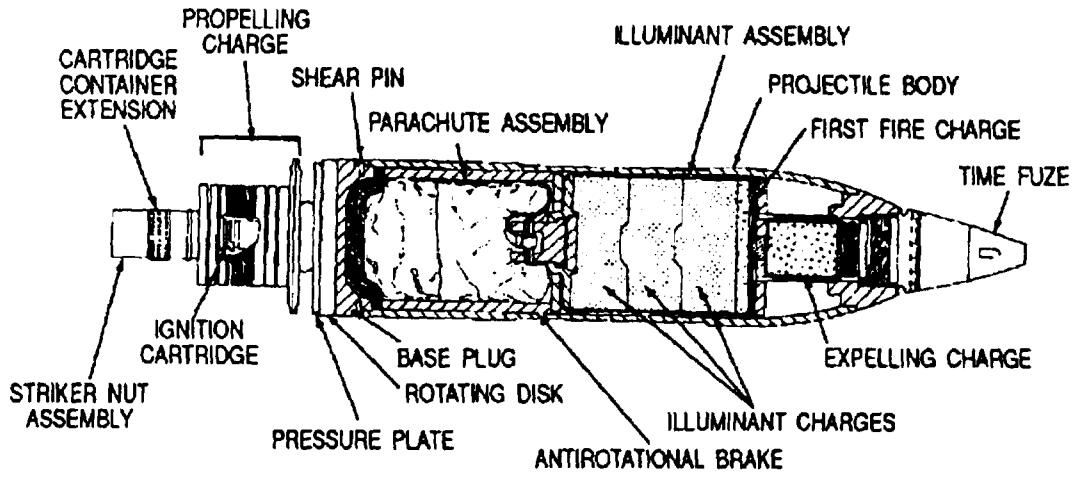
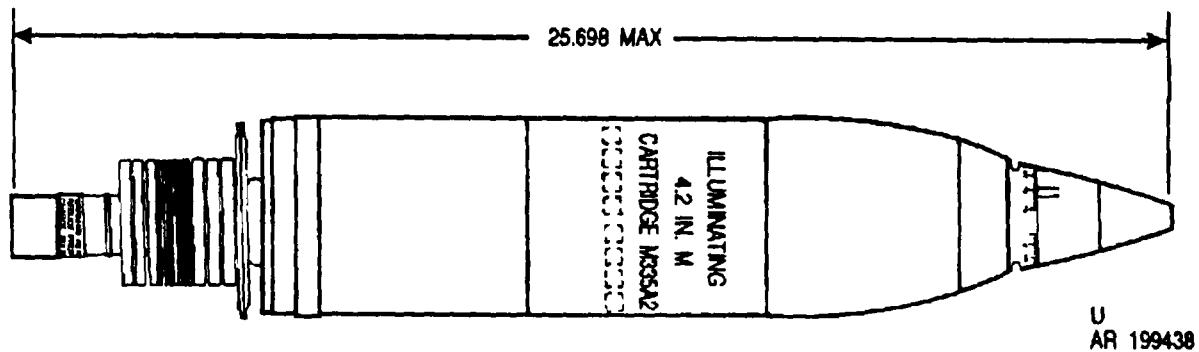
\*\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

#### **Shipping and Storage Data:**

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

#### **References:**

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

**CARTRIDGE, 4.2-INCH: ILLUMINATING: M335A2****Type Classification:**

Std AMCTC 3881 dtd 1965

**Use:**

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

**Description:**

The complete round consists of a projectile body with a detachable base plug, 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 para-

chute 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 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 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; MTSQ M577

##### Performance (full charge):

Maximum range -----	6006 yd (5490 m)
Muzzle velocity -----	1001 fps (305.1 rps)

\*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 periods not more than 3 days)
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Upper limit -----	+160°F (+71.1°C) (for period not more than 4 hr/day)
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\*\*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

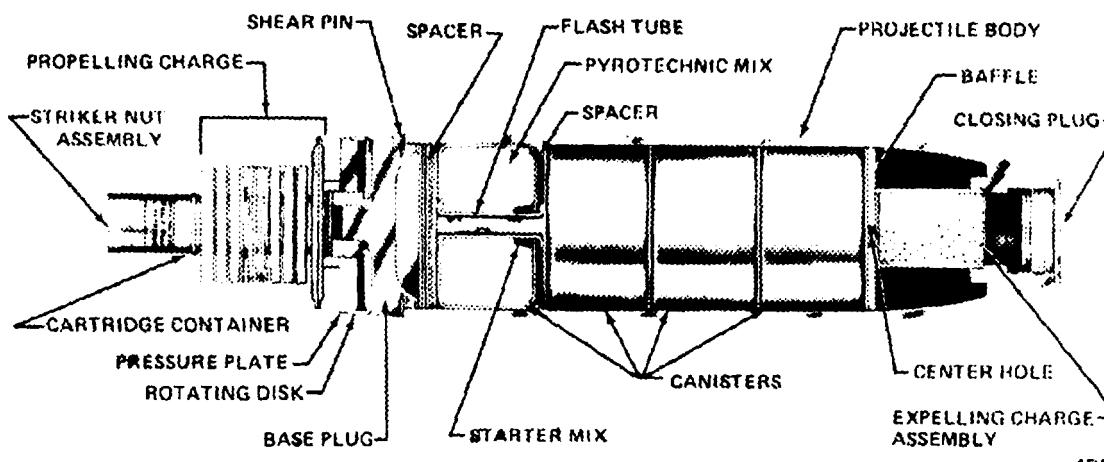
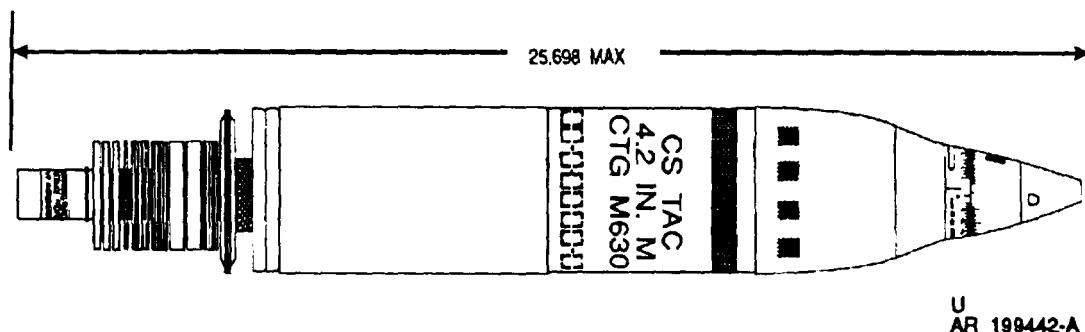
\*\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

#### Shipping and Storage Data:

UNO serial number -----	0171
Quantity-distance class -----	1.2 (08)
Storage compatibility group -----	G
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH ILLUMINA- TING PROJE- CTILES
DODAC -----	1315-C706
Drawing number -----	8886595

#### References:

TM 9-1015-215-10
TM 9-1015-215-20&P
TM 9-1015-215-30
TM 9-1300-251-20
TM 9-1300-251-34

**CARTRIDGE, 4.2-INCH: TACTICAL CS, M630****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 expel-

ling 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 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 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
Performance(full charge):	
Maximum range -----	6180 yd (5,650 m)
Muzzle velocity -----	981 fps (299 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 7-31/8 in.  
Cube ----- 1.6 cu ft

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

#### **Shipping and Storage Data:**

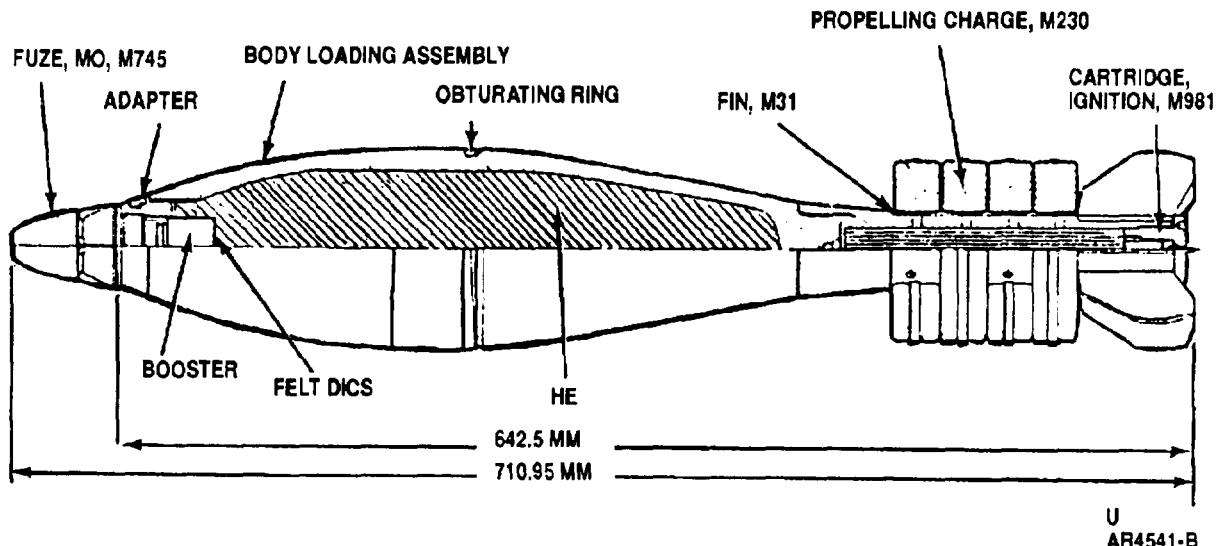
UNO serial number -----	0018
Quantity-distance class -----	1.2 (12)
Storage compatibility group -----	G
DOT shipping class -----	A
DOT designation -----	AMMUNITIONFOR CANNON WITH TACTICAL CS PROJECTIONS- CLASS B DOT SPECIAL PERMIT NO 5208
DODAC -----	1315-C710
Drawing number -----	9220299

#### **Limitations:**

Firing with less than 10 increments of propellant can result in short rounds.

#### **References:**

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

**CARTRIDGE, 120 MILLIMETER: HE, M933 WITH FUZE, PD: M745****Type Classification:**

TC - Std (May 92).

**Use:**

This cartridge is a high explosive round developed for use in the M120 and M121 120mm mortar system. It is intended for use against personnel and materiel targets, providing for fragmentation and blast effects.

**Description:**

The complete round consists of a fuze, propellant charge, fin assembly, ignition cartridge, and shell body. The shell body made of wrought carbon steel, is loaded with Composition B filler. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propellant charge is contained in four horseshoe-shaped felt fiber containers assembled around the fin assembly shaft.

**Functioning:**

When the cartridge is dropped down the mortar tube, the firing pin at the bottom of the tube initiates the percussion primer and charge

in the ignition cartridge. The charge in the ignition cartridge flashes through the holes in the shaft of the fin assembly and ignites the propellant charge. The gases from the burning propellant expand and propel the cartridge out of the mortar tube. The fuze functions on point-detonating and detonates the projectile.

**Tabulated Data:**

Complete Round:

Type -----	HE
Weight -----	31.2 lb
Length -----	27.99 in. (710.95 mm)
Assembly drawing number ---	12577504

Projectile:

Body material -----	Wrought carbon steel
Color -----	Olive drab w/yellow markings
Filler and weight -----	Comp B, 6.59 lb (2.99 kg)

Components:

Ignition cartridge -----	M981
Propellant charge -----	M230
Fin assembly -----	M31
Fuze -----	PD, M745

**Temperature Limits:**

## Firing:

Lower limit -----	-50°F (-45.6°C)
Upper limit -----	+145°F (+62.8°C)

## Storage:

Lower limit -----	-60°F (-51.1°C)
Upper limit -----	+160°F (+71.1°C)

## \*Packing -----

1 round per  
fiber con-  
tainer w/2  
containers  
per metal  
container

Fiber container:  
Drawing number -----

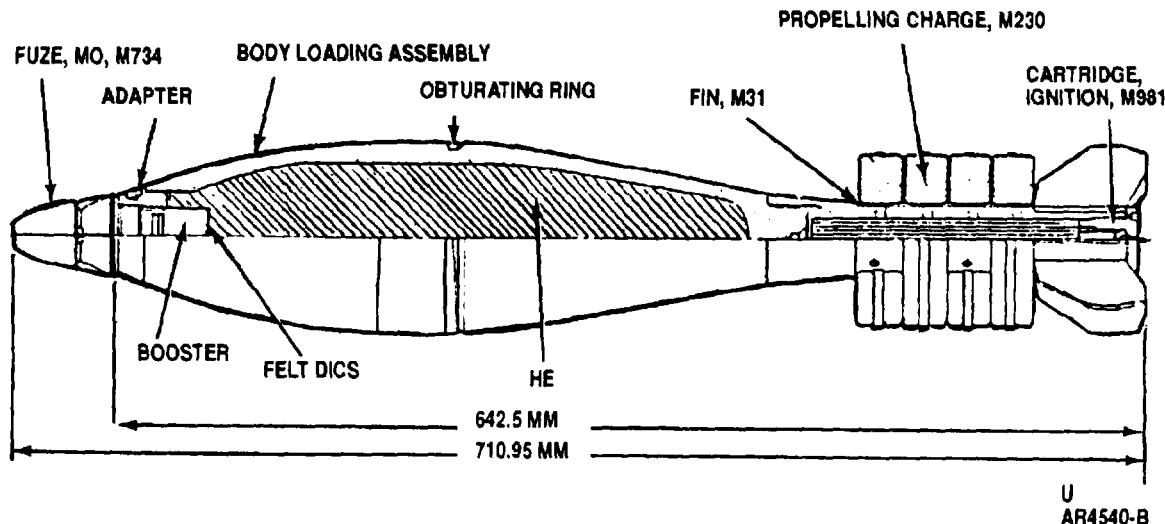
12577551

Metal container:  
Drawing number ----- 12577570

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

**Shipping and Storage Data:**

UNO serial number -----	0005
Quantity-distance class -----	1.1
Storage compatibility group -----	F
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC -----	1315-C623

**CARTRIDGE, 120 MILLIMETER: HE, M934 WITH FUZE, MULTI-OPTION: M734****Type Classification:**

TC - Std (May 92).

**Use:**

This cartridge is a high explosive round developed for use in the M120 and M121 120mm mortar system. It is intended for use against personnel and materiel targets, providing for fragmentation and blast effects.

**Description:**

The complete round consists of a fuze, propellant charge, fin assembly ignition cartridge, and shell body. The shell body made of wrought carbon steel is loaded with Composition B filler. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propellant charge is contained in four horseshoe-shaped felt fiber containers and assembled around the fin assembly shaft.

**Functioning:**

When the cartridge is dropped down the mortar tube, the tiring pin at the bottom of the tube initiates the percussion primer and charge in the ignition cartridge. The charge in the igni-

tion cartridge flashes through the holes in the shaft of the fin assembly and ignites the propellant charge. The gases from the burning propellant expand and propel the cartridge out of the mortar tube. The fuze functions on (proximity, near surface, on impact, or delay, depending on the fuze setting) and detonates the projectile.

**Tabulated Data:****Complete Round:**

Type -----	HE
Weight -----	31.2 lb
Length -----	27.99 in. (710.95 mm)
Assembly drawing number -----	12577501

**Projectile:**

Body material -----	Wrought carbon steel
Color -----	Olive drab w/yellow markings
Filler and weight -----	Comp B, 6.59 lb (2.99 kg)

**Components:**

Ignition cartridge -----	M981
Propellant charge -----	M230
Fin assembly -----	M31
Fuze -----	Multi-option, M734

Temperature Limits:

## Firing:

Lower limit -----	-50°F (-45.6°C)
Upper limit -----	+145°F (+62.8°C)

## Storage:

Lower limit -----	-60°F (-51.1°C)
Upper limit -----	+160°F (+71.1°C)

\*Packing ----- 1 round per  
fiber con-  
tainer w/2  
fiber contain-  
ers per metal  
container

Fiber container:  
Drawing number ----- 12577551

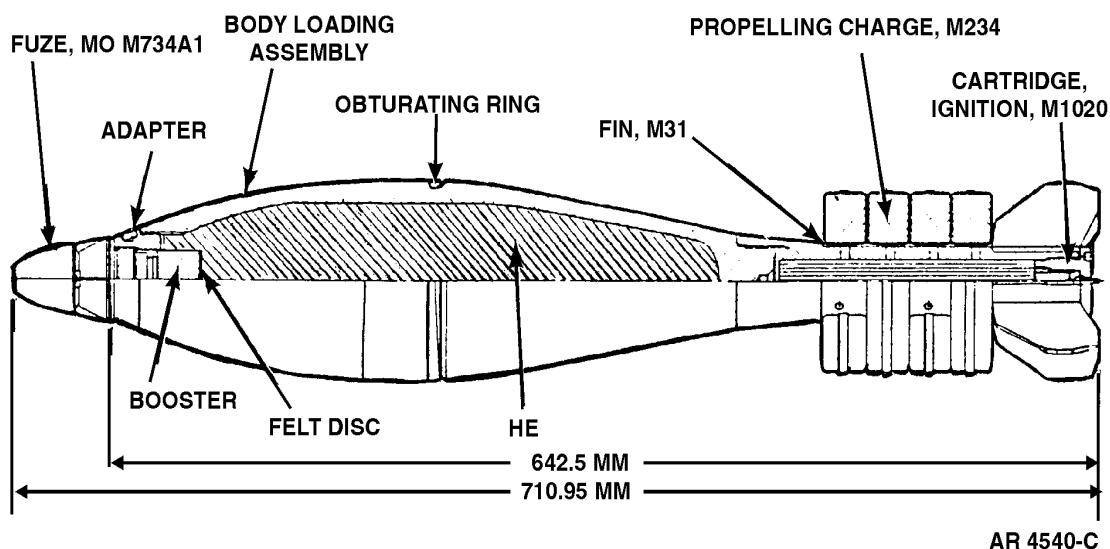
Metal container:  
Drawing number ----- 12577570

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

Shipping and Storage Data:

UNO serial number -----	0005
Quantity-distance class -----	1.1
Storage compatibility group -----	F
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC -----	1315-C379

## CARTRIDGE, 120MM: HE, M934A1 WITH FUZE, MULTI-OPTION: M734A1



### TYPE CLASSIFICATION:

Standard Jun 96.

### USE:

This cartridge is a high explosive round developed for use in the M120 and M121 120mm Mortar System. It is intended for use against personnel and materiel targets providing both fragmentation and blast effects.

### DESCRIPTION:

The complete round consists of a fuze, propellant charge, fin assembly ignition cartridge, and shell body. The shell body, made of wrought carbon steel, is loaded with Composition B filler. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propellant charge is contained in four horseshoe-shaped felt fiber containers and assembled around the fin assembly shaft.

### FUNCTIONING:

When the cartridge is dropped down the mortar tube, the firing pin at the bottom of the tube initiates the percussion primer and charge in the ignition cartridge. The charge in the ignition cartridge flashes through the holes in the shaft of the fin assembly and ignites the propelling charge. The gases from the burning propellant expand and propel the cartridge out of the mortar tube. The fuze functions on proximity, on impact, or delay, depending on the fuze setting, and detonates the projectile.

### TABULATED DATA:

#### Complete Round:

Type .....	HE
Weight .....	31.2 lb
Length .....	27.99 in. (710.95 mm)

#### Projectile:

Body material .....	Wrought carbon steel
Color.....	Olive drab w/yellow markings

Filler and weight .....	Comp B, 6.59 lb (2.99 kg)
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#### Components:

Ignition cartridge .....	M1020
Propellant charge.....	M234
Fin assembly.....	M31
Fuze .....	Multi-option, M734A1
DODAC .....	1315-CA04

### TEMPERATURE LIMITS:

#### Firing:

Lower limit.....	-50°F (-45.6°C)
Upper limit .....	+145°F (+62.8°C)

#### Storage:

Lower limit.....	-60°F (-51.1°C)
Upper limit .....	+160°F (+71.1°C)

**DRAWINGS:**

Cartridge.....	12977141
Fiber container.....	12577551
Metal container.....	12577570

**UNIT OF ISSUE:**

*Packing: .....	1 round per fiber container; 2 fiber containers per metal container
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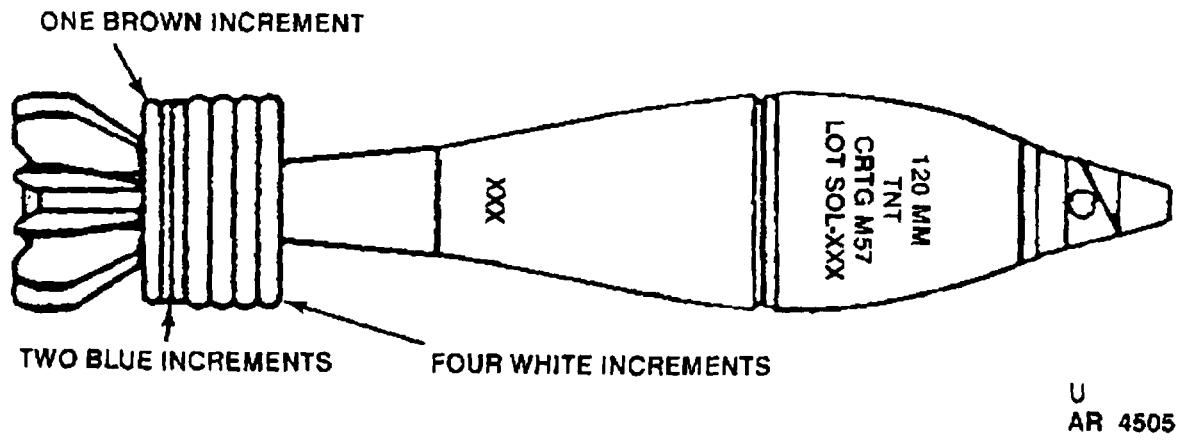
\*See DOD Consolidated Ammunition Catalog for complete packing data including NSNs.

**SHIPPING AND STORAGE DATA:**

DOD hazard class/division .....	1.1
Storage compatibility group.....	E
DOT shipping class.....	A
Proper shipping name .....	CARTRIDGES FOR WEAPONS
UN identification number .....	0006

**REFERENCES:**

TM 9-1300-251-20&P

**CARTRIDGE, 120 MILLIMETER: HE, M57 WITH FUZE, POINT-DETONATING: M935****Type Classification:**

(To be assigned).

**Use:**

This cartridge is a TNT round developed for use in the M120 120mm mortar system only. It is intended for use against personnel and light materiel targets.

**Description:**

The complete round consists of a fuze, propellant charge, fin assembly ignition cartridge, and shell body. The shell body, made of high fragmentation steel, is loaded with TNT filler. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propellant charge is contained in one brown increment, two blue increments, and four white increments assembled around the fin assembly shaft.

**Functioning:**

When the cartridge is dropped down the mortar tube, the firing pin at the bottom of the tube initiates the percussion primer and charge in the ignition cartridge. The charge in the igni-

tion cartridge flashes through the holes in the shaft of the fin assembly and ignites the propelling charge. The gases from the burning propellant expand and propel the cartridge out of the mortar tube. The fuze, PD, M935 functions either superquick, or on delay, 0.05 seconds depending on the fuze.

**Tabulated Data:**

## Complete Round:

Type -----	HE
Weight -----	28.65 lb (13 kg)

Length -----	26.18 in. (665 mm)
--------------	-----------------------

Assembly drawing number ---	512-0057-05
-----------------------------	-------------

## Projectile:

Body material -----	High fragmentation steel
---------------------	--------------------------

Color -----	Olive drab w/white markings
-------------	--------------------------------

Filler and weight -----	TNT, 4.63 lb (2100 g)
-------------------------	--------------------------

## Components:

Ignition cartridge -----	N/A
--------------------------	-----

Fin assembly -----	N/A
--------------------	-----

Fuze -----	PD, M935
------------	----------

Propellant charge, max. ----- 1 brown increment, 2 blue increments, 4 white increments

**Temperature Limits:**

Firing:

Lower limit -----	-28°F (-33.3°C)
Upper limit -----	+145°F (+62.8°C)

Storage:

Lower limit -----	-50°F (-45.6°C)
Upper limit -----	+145°F (+62.8°C)

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

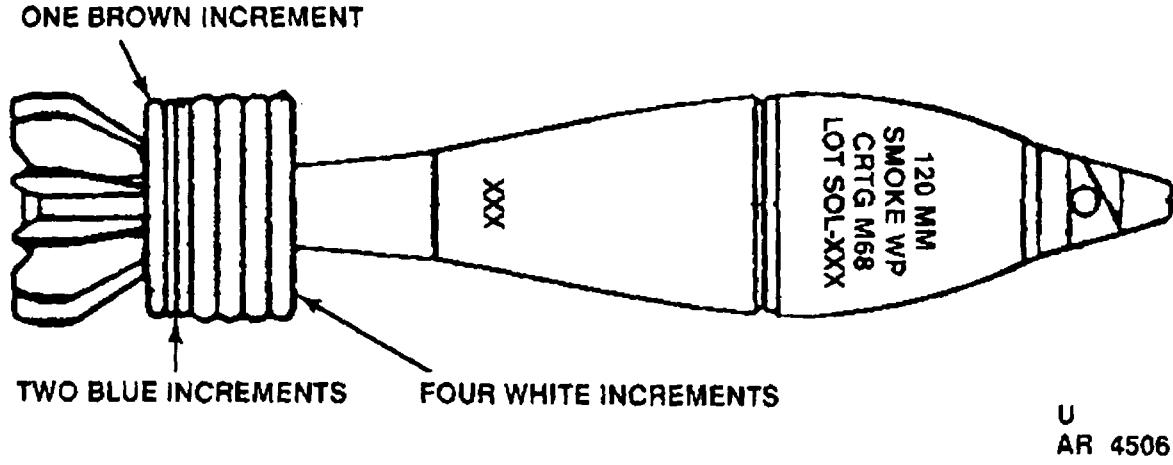
Ammo container:  
Drawing number ----- 512-3007-01  
Box:  
Drawing number ----- 512-5015-00

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

**Shipping and Storage Data:**

UNO serial number -----	0321
Quantity-distance class -----	(08) 1.2
Storage compatibility group -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC -----	1315-C788

**CARTRIDGE, 120 MILLIMETER: SMOKE (WP), M68 WITH FUZE,  
POINT-DETONATING: M935**



**Type Classification:**

(To be assigned).

**Use:**

This cartridge is used against personnel and materiel as incendiary device and to produce a screening. This cartridge is for use in the M120 120mm mortar system only.

**Description:**

The complete round consists of a fuze, three types of propellant increment, fin assembly, ignition cartridges and shell body. The shell body, made of steel, is loaded with white phosphorus (WP) filler. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propellant charge is contained in one brown increment, two blue increments and four white increments and is assembled around the fin assembly shaft.

**Functioning:**

When the cartridge is dropped down the mortar tube, the firing pin at the bottom of the tube initiates the percussion primer and charge in the ignition cartridge. The charge in the ignition cartridge flashes through the holes in the shaft of the fin assembly and ignites the propel-

ling charge. The gases from the burning propellant expand and propel the cartridge out of the mortar tube. The fuze, point-detonating (PD), M935 functions either superquick, or on delay 0.05 seconds.

**Tabulated Data:**

Complete Round:

Type -----	Smoke
Weight -----	28.65 lb (13 kg)
Length -----	26.18 in. (665 mm)
Assembly drawing number ---	512-0068-03
Projectile:	
Body material -----	Steel
Color -----	Light green w/black markings
Filler and weight -----	WP, 4.47 lb (2030 g)

Components:

Ignition cartridge -----	N/A
Fin assemble -----	N/A
Fuze -----	PD, M935
Propellant charge, max -----	1 brown increment, 2 blue increments, 4 white increments

**Temperature Limits:**

Firing:  
 Lower limit ----- -28°F (-33.3°C)  
 Upper limit ----- +145°F  
 (+62.8°C)

Storage:  
 Lower limit ----- -50°F (-45.6°C)  
 Upper limit ----- +145°F  
 (+62.8°C)

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

Ammo container:  
 Drawing number ----- 512-3007-01

Box:  
 Drawing number ----- 512-5015-00

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

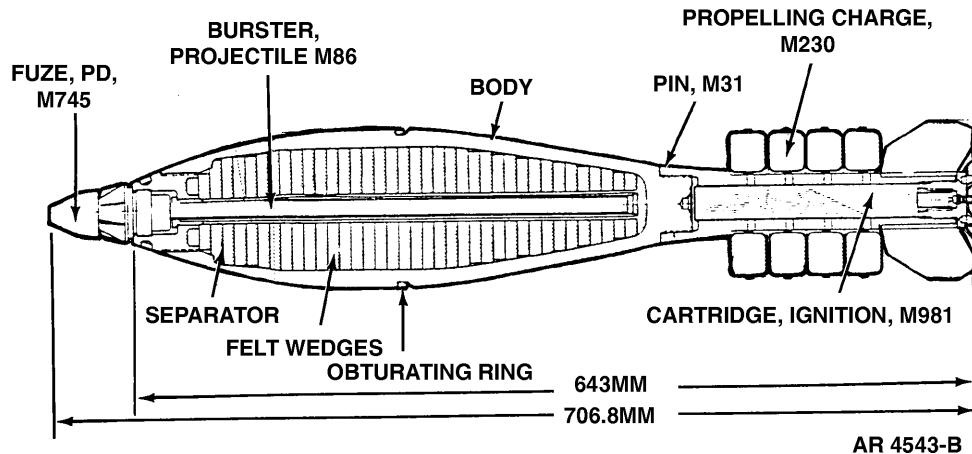
**Shipping and Storage Data:**

UNO serial number ----- 0245  
 Quantity-distance class ----- (04)1.2  
 Storage compatibility group ----- H  
 DOT shipping class ----- A  
 DOT designation ----- AMMUNI-  
 TIONFOR  
 CANNON  
 WITH  
 SMOKE  
 PROJECTILE  
 DODAC ----- 1315-C789

**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 nor-  
 mal position in the nose of the cartridge.  
 Erratic performance may occur if voids exist  
 inside of WP filler.

**CARTRIDGE, 120 MILLIMETER: SMOKE (W) XM929 WITH FUZE,  
POINT-DETONATING: M745**



Type Classification:

TC - LRP (8 May 92)

Use:

This cartridge is a smoke, white phosphorous (WP) round developed for use in the M120 and M121 120mm mortar system. It is intended for use as an incendiary device and to produce a screen.

Description:

The complete round consists of a fuze, propellant charge, fin assembly, ignition cartridge, and shell body. The shell body, made of wrought carbon steel, is loaded with WP filler. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propellant charge is contained in four horse-shoe-shaped felt fiber containers and assembled around the fin assembly shaft.

Functioning:

When the cartridge is dropped down the mortar tube, the firing pin at the bottom of the tube initiates the percussion primer and charge in the ignition cartridge. The charge in the ignition flashes through the holes in the shaft of the fin assembly

and ignites the propelling charge. The gases from the burning propellant expand and propel the cartridge out of the mortar tube. The fuze functions on point-detonating and the booster ignites the burster charge in the center part of the projectile body. The burster charge fragments the projectile body and disperses 144 felt wedges impregnated with WP, which burns immediately on contact with air. The wedges burn for approximately 2 minutes, creating a smoke that is twice as effective as the 4.2-inch, M328A1.

Tabulated Data:

Complete Round:

Type .....	.Smoke (WP)
Weight .....	31.2 lb
Length .....	27.85 in. (706.8 mm)

Assembly dwg no ... 12577502

Projectile:

Body material .....	Wrought carbon steel
Color .....	Light green w/yellow band and light red markings.
Filler and weight...	WP felt wedges, 5.28 lb (2400 g)

**Components:**

Ignition cartridge . M981  
Propellant charge . M230  
Fin assembly . . . . . M31  
Fuze . . . . . Point-detonating, M745  
Burster . . . . . M86

**Temperature Limits:**

**Firing:**

Lower limit . . . . . -50°F (-45.6°C)  
Upper limit . . . . . +145°F (+62.8°C)

**Storage:**

Lower limit . . . . . -60°F (-51.1°C)  
Upper limit . . . . . +160°F (-71.1°C)

\*Packing . . . . . 1 round per fiber container; 2 fiber containers per metal container

**Fiber container:**

Drawing number . 12577551

**Metal container:**

Drawing number . . 12577570

**\*NOTE:** See DOD Consolidated Ammunition Catalog for complete packing data including NSNs.

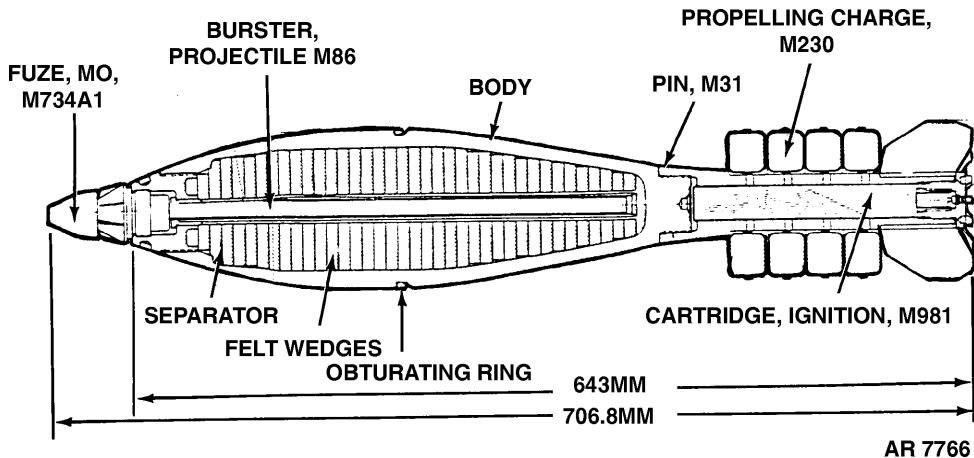
**Shipping and Storage Data:**

UNO serial number . . . . . 0245  
Quantity-distance class . . . (08) 1.2  
Storage compatibility group H  
DOT shipping class . . . . . A  
DOT designation . . . . . AMMUNITION FOR CANNON WITH SMOKE PROJECTILE  
DODAC . . . . . 1315-C624

**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 cartridge. Erratic performance may occur if voids exist inside of WP filler.

**CARTRIDGE, 120 MILLIMETER: SMOKE (W), M929 WITH FUZE,  
MULTI-OPTION: M734A1**



Type Classification:

TC- STD

Use:

This cartridge is a smoke, white phosphorous (WP) round developed for use in the M120 and M121 120mm mortar system. It is intended for use as an incendiary device and to produce a screen.

Description:

The complete round consists of a fuze, propellant charge, fin assembly, ignition cartridge and shell body. The shell body, made of wrought carbon steel is loaded with WP filler. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propellant charge is contained in four horse-shoe-shaped felt fiber containers and assembled around the fin assembly shaft.

Functioning:

When the cartridge is dropped down the mortar tube, the firing pin at the bottom of the tube initiates the percussion primer and charge in the ignition cartridge. The charge in the ignition flashes through the holes in the shaft of the fin assembly

and ignites the propelling charge. The gases from the burning propellant expand and propel the cartridge out of the mortar tube. The fuze functions on proximity burst and the booster ignites the burster charge in the center part of the projectile body. The burster charge fragments the projectile body and disperses 144 felt wedges impregnated with WP, which burns immediately on contact with air. The wedges burn for approximately 2 minutes, creating a smoke that is twice as effective as the 4.2-inch, M328A1.

Tabulated Data:

Complete Round:

Type .....	.Smoke (WP)
Weight .....	31.2 lb
Length .....	27.85 in. (706.8 mm)

Assembly dwg no ... n/a

Projectile:

Body material .....	Wrought carbon steel
Color .....	Light green w/yellow band and light red markings.

Filler and weight... WP felt wedges, 5.28 lb  
(2400 g)

**Components:**

Ignition cartridge . M981  
Propellant charge . M230  
Fin assembly . . . . . M31  
Fuze . . . . . Multi-option, M734A1  
Burster . . . . . M86

**Temperature Limits:**

Firing:

Lower limit . . . . . -50°F (-45.6°C)  
Upper limit . . . . . +145°F (+62.8°C)

Storage:

Lower limit . . . . . -60°F (-51.1°C)  
Upper limit . . . . . +160°F (-71.1°C)

\*Packing . . . . . 1 round per fiber container; 2 fiber containers per metal container

Fiber container:

Drawing number . 12577551

Metal container:

Drawing number . . 12577570

\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSNs.

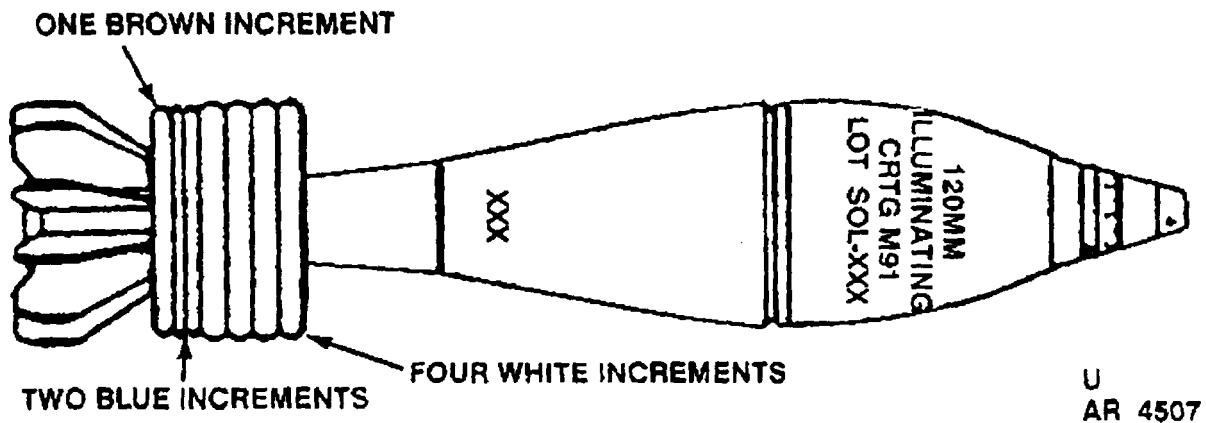
**Shipping and Storage Data:**

UNO serial number . . . . . 0245  
Quantity-distance class . . . (08) 1.2  
Storage compatibility group H  
DOT shipping class . . . . . A  
DOT designation . . . . . AMMUNITION FOR CANNON WITH SMOKE PROJECTILE  
DODAC . . . . . 1315-CA03

**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 cartridge. Erratic performance may occur if voids exist inside of WP filler.

**CARTRIDGE, 120 MILLIMETER: ILLUMINATING, M91 WITH FUZE,  
MECHANICAL TIME SUPERQUICK: M776**



**Type Classification:**

(To be assigned).

**Use:**

This cartridge is used for illuminating a desired point or area. This cartridge is for &e in the M120 120mm mortar system only.

**Description:**

The complete round consists of a steel body and tail cone assembly an illuminant candle and parachute assembly a time fuze with a built-in expelling charge, a fin assembly 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 fin assembly, and is attached to the body tube with eight equally spaced shear pins. The illuminant assembly consisting of a first-fire charge and an illuminant charge, is contained in an aluminum case and attached to the parachute with a fiberglass suspension line.

**Functioning:**

When the cartridge is dropped down the mortar tube, the firing pin at the bottom of the

tube initiates the percussion primer and charge in the ignition cartridge. The charge in the ignition cartridge flashes through the holes in the shaft of the fin assembly and ignites the propelling charge. The gases from the burning propellant expand and propel the cartridge out of the mortar tube. The fuze functions at a height of burst according to its time setting expelling and igniting the candle which is deployed on a parachute and provides illumination for 50 seconds.

**Tabulated Data:**

**Complete Round:**

Type -----	Illuminating
Weight -----	27 lb (12.250 kg)
Length -----	26.18 in. (665 mm)
Assembly drawing number ---	512-0068-03

**Projectile:**

Body material -----	Steel
Color -----	White w/black markings
Filler and weight -----	Illuminant, 2.65 lb, (1200 g)
Expelling charge -----	BP 0.03 lb (15 g)

**Components:**

Ignition cartridge -----	N/A
Fin Assembly -----	N/A
Fuze -----	MTSQ, M776
Propellant charge max-----	1 brown increment, 2 blue increments, 4 white increments
Candlepower -----	1,000,000 candle power/sec
Burning time-----	50 sec

**Temperature Limits:**

<b>Firing</b>	
Lower limit -----	-28°F (-33.3°C)
Upper Limit -----	+145°F (+62.8°C)
<b>Storage:</b>	
Lower limit -----	-50°F (-45.6°C)
Upper limit -----	+145°F (+62.8°C)

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

Ammo container:  
Drawing number ----- 512-3007-01

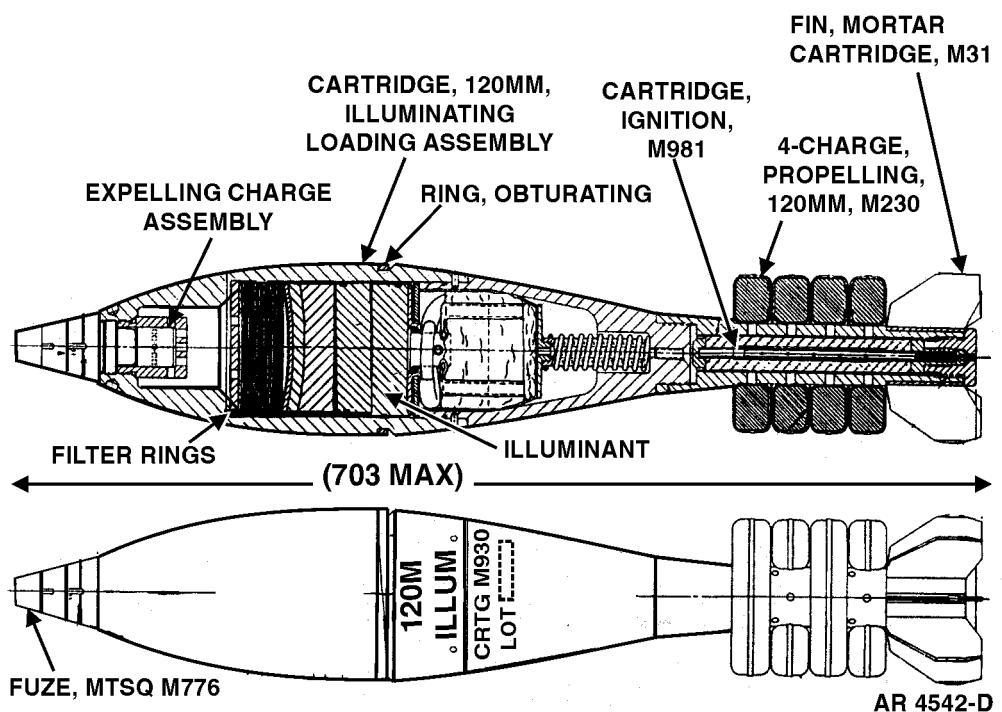
Box:  
Drawing number ----- 512-5015-00

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

**Shipping and storage Data:**

UNO serial number -----	0254
Quantity distance class -----	(02) 1.3
Storage compatibility group -----	G
DOT shipping cams -----	A
DOT designation-----	AMMUNI-- TION FOR CANNON WITH ILLUMINA- TING PRO- JECTILE
DODAC -----	1315-C790

## CARTRIDGE, 120MM: ILLUMINATING, M930 WITH FUZE, MECHANICAL TIME SUPER-QUICK: M776



### TYPE CLASSIFICATION:

TC - STD (3 Mar 03).

### USE:

This cartridge is an illuminant round developed for use in the M120 and M121 120mm mortar system. It is intended for use in illuminating a desired point or area.

### DESCRIPTION:

The complete round consists of a fuze, propellant charge, fin assembly, ignition cartridge, body tube, tail cone assembly, illuminant candle, and parachute assembly. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propellant charge is contained in four horseshoe-shaped felt fiber containers and assembled around the fin assembly shaft.

### FUNCTIONING:

When the cartridge is dropped down the mortar tube, the firing pin at the bottom of the tube initiates the percussion primer and charge in the ignition cartridge. The charge in the ignition cartridge flashes through the holes in the shaft of

the fin assembly and ignites the propelling charge. The gases from the burning propellant expand and propel the cartridge out of the mortar tube. The fuze functions depending on the fuze setting and ignites the expulsion charge, ignites the first-fire candle, and ejects the candle assembly. A spring ejects the parachute from the tail cone. Parachute assembly opens and deploys. The candle assembly provides illumination for 50 seconds.

### TABULATED DATA:

#### Complete Round:

Type .....	Illuminating
Weight .....	31.2 lb
Length .....	27.85 in. (703 mm)

#### Projectile:

Body material .....	Wrought carbon steel
Color.....	White w/black markings
Filler and weight .....	Illuminant, 2.65 lb, (1200 g)
Candlepower.....	1,000,000 candle-power/sec

**Components:**

Ignition cartridge .....	M981
Propellant charge .....	M230
Fin assembly .....	M31
Fuze.....	MTSQ, M776

**TEMPERATURE LIMITS:**

**Firing:**

Lower limit .....	-50 °F (-45.6°C)
Upper limit.....	+145°F (+62.8°C)

**Storage:**

Lower limit .....	-60°F (-51.1°C)
Upper limit.....	+160°F (+71.1°C)

**DRAWINGS:**

Assembly .....	12577503
Fiber container.....	12577551
Metal container.....	12577570

**UNIT OF ISSUE:**

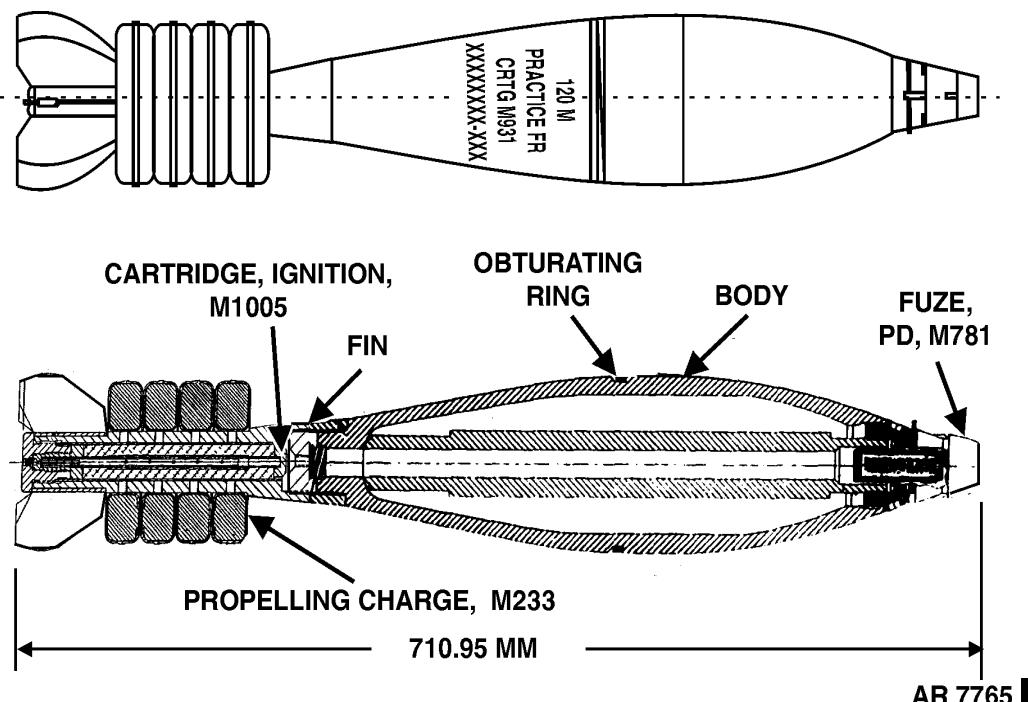
*Packing.....	1 round per fiber container; 2 containers per metal container
---------------	---

\*See DOD Consolidated Ammunition Catalog for complete packing data including NSNs.

**SHIPPING AND STORAGE DATA:**

DOD hazard class/division .....	(08) 1.2.1
Storage compatibility group.....	G
DOT shipping class.....	B
Proper shipping name .....	AMMUNITION ILLUMINATING
DODAC .....	1315-C625
NSN .....	1315-01-343-1942

## CARTRIDGE, 120MM: FULL RANGE PRACTICE, M931 WITH FUZE, PD, M781



### TYPE CLASSIFICATION:

Standard Jan 98.

### USE:

This cartridge is a full-range practice round for use in the 120mm, M120 and M121 Battalion Mortar Systems.

### DESCRIPTION:

The cartridge consists of a point detonating (PD) (practice) fuze, a hollow projectile body with vent tube and base plug, a fin assembly, an obturating fuze ring, four propellant increments and an ignition cartridge. The cartridge is similar in appearance to the M933 and M934 HE cartridges. The cartridge is also ballistically similar to the HE cartridges and produces a similar signature (flash and/or smoke and audible sound) upon impact.

### FUNCTIONING:

When the cartridge is loaded into the mortar tube, it slides down the tube until the primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer ignites the ignition cartridge which, in turn, ignites

the propelling increments. The gases generated propel the cartridge out of the barrel and the cartridge travels down-range. The fuze functions on impact with the ground or target. A pyrotechnic smoke cartridge in the fuze produces a flash, an audible sound and a cloud of smoke (simulation of the HE cartridge function). Upon functioning, the plug at the base of the vent tube is pushed to the bottom of the fin assembly, allowing the smoke cloud to vent through the vent holes in the fin boom.

### TABULATED DATA:

#### Complete Round:

Type .....	Target practice
Weight .....	31.2 lb
Length .....	27.99 in. (710.95 mm)

#### Projectile:

Body material .....	Steel
Color .....	Blue w/white markings
Filler .....	None (hollow body)

#### Components:

Fuze .....	PD (practice), M781
Ignition cartridge .....	M1005
DODAC .....	1315-CA09

TEMPERATURE LIMITS:

Firing:

Lower limit ..... 0°F (-17.6°C)  
Upper limit ..... +110°F (+43°C)

Storage:

Lower limit ..... -45°F (-43°C)  
Upper limit ..... +145°F (+62.8°C)

DRAWINGS:

Cartridge..... 12957039

UNIT OF ISSUE:

Packing ..... One round per fiber  
container, two con-  
tainers per wire bound  
box

PACKING DATA:

Packing Box:

Weight ..... 88 lb  
Dimensions ..... 33.4 x 11.9 x 6.5 in.  
Cube ..... 1.5 cu ft

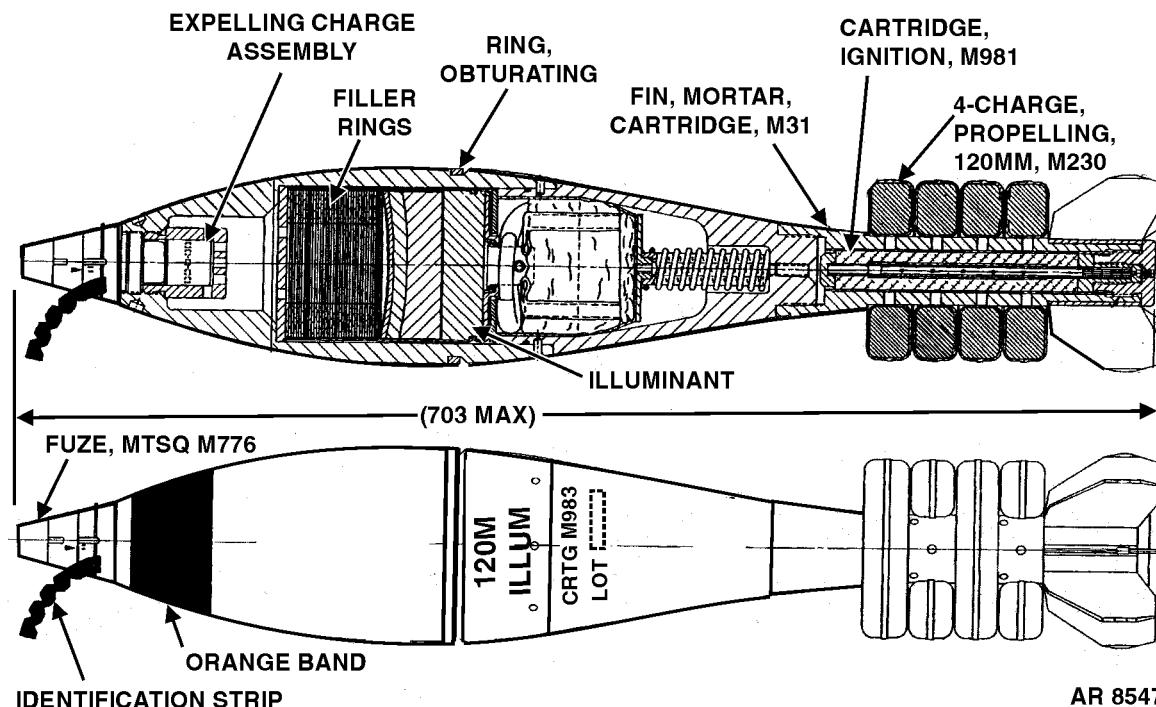
SHIPPING AND STORAGE DATA:

DOD hazard class/division ..... 1.2  
Storage compatibility group ..... G  
DOT shipping class ..... C  
Proper shipping name ..... AMMUNITION  
SMOKE  
UN identification number ..... 0015

REFERENCES:

AMC-P 700-3-3  
SB 700-20  
TM 9-1010-223-10  
TM 9-1300-251-20&P

**CARTRIDGE, 120 MILLIMETER: ILLUMINATING, IR, M983 WITH FUZE, MECHANICAL TIME  
SUPERQUICK: M776**



AR 8547

**Type Classification:**

TC - STD (5 Apr 00).

**Use:**

This cartridge is an infrared illuminant round developed for use in the M120 and M121 120mm mortar system. It is intended for use with Night Vision Devices (NVD's) to reduce friendly force's exposure to the enemy.

**Description:**

The complete round consists of a fuze, propellant charge, fin assembly, ignition cartridge, body tube, tail cone assembly, illuminant candle, and parachute assembly. The ignition cartridge has a percussion primer and is assembled to the end of the fin assembly. The propellant charge is contained in four horseshoe-shaped felt fiber containers and assembled around the fin assembly shaft.

**Functioning:**

When the cartridge is dropped down the mortar tube, the firing pin at the bottom of the tube initiates the percussion primer and charge in the ignition cartridge. The charge in the ignition cartridge flashes through the holes in the shaft of the fin assembly and ignites the propelling charge. The gases from the burning propellant

expand and propel the cartridge out of the mortar tube. The fuze functions depending on the fuze setting and ignites the expulsion charge, ignites the first-fire candle, and ejects the candle assembly. A spring ejects the parachute from the tail cone. Parachute assembly opens and deploys. The candle assembly provides illumination for 50 seconds.

**Tabulated Data:**

Complete Round:

Type -----	Infrared Illuminating
Weight -----	31.2 lb
Length -----	27.85 in. (703 mm)
Assembly drawing number -----	12967862

Projectile:

Body material -----	Wrought carbon steel
Color -----	White w/black markings and orange band
Filler and weight -----	Illuminant, Infrared (IR) 2.65 lb, (1200 g)

Candlepower -----	500
	candlepower/ sec max
Components	
Ignition cartridge -----	M981
Propellant charge -----	M230
Fin assembly -----	M31
Fuze -----	MTSQ, M776

**Temperature limits:**

Firing:	
Lower limit-----	-50 °F (-45.6°C)
Upper limit-----	+145°F (+62.8°C)
Storage:	
Lower limit-----	-60°F (-51.1°C)
Upper limit-----	+160°F (+71.1°C)

\*Packing:----- 1 round per fiber container;  
2 containers per metal container

Fiber container:	
Drawing number-----	12577551
Metal Container:	
Drawing number-----	12577570

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

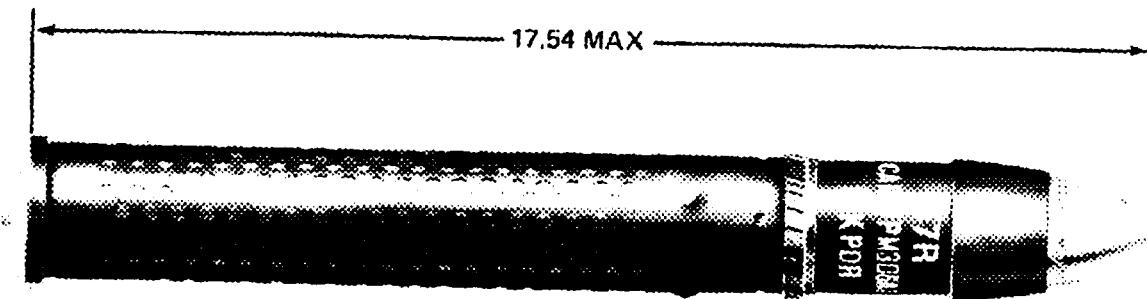
**Shipping and Storage Data:**

UNO serial number -----	0171
Quantity-distance class -----	(08) 1.2
Storage compatibility group -----	G
DOT shipping class -----	B
DOT designation -----	AMMUNITION ILLUMINAT- ING
DODAC -----	1315-CA07
NSN-----	1315-01-446- 2904

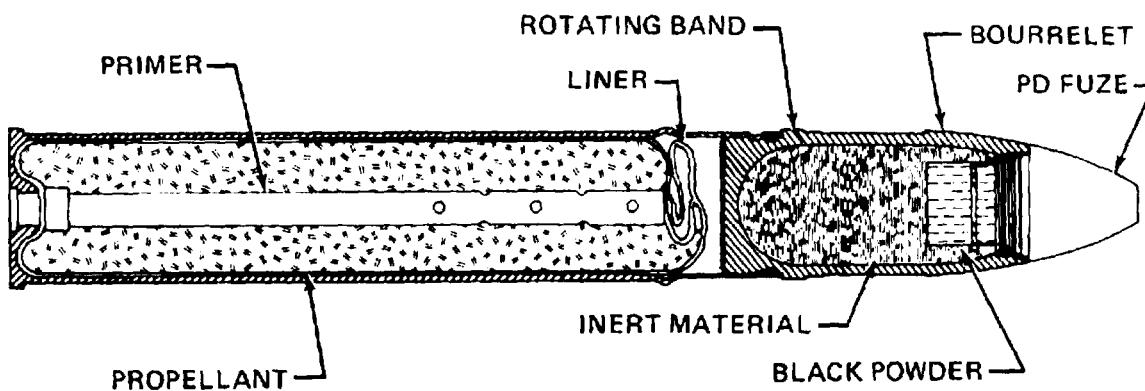
## **CHAPTER 5**

### **AMMUNITION FOR RECOILLESS RIFLES**

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**CARTRIDGE 57-MILLIMETER: TP M306A1**

AR199769



AR199768

**Type Classification:**

Cont OTCM 37119 dtd 1959.

**Used:**

This cartridge is used in 57mm 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 percussion 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 pre-engraved 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 breech-block. 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 lb
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 mater- ial, 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 m
Muzzle velocity -----	1200 fps

**Temperature Limits:****Firing:**

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

**Storage:**

Lower limit -----	80°F (for <sup>not</sup> more than 3 days)
Upper limit -----	+160°F (for not more than 4 hr/day)
*Packing -----	1 round in fiber con- tainer; 4 con- tainers in wooden box

**\*Packing Box:**

Weight -----	39.0 lb
Dimensions -----	22-1/8 x 7-5/8 x 8-1/2 in.
Cube -----	0.82 cu ft

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

**Shipping and Storage Data:**

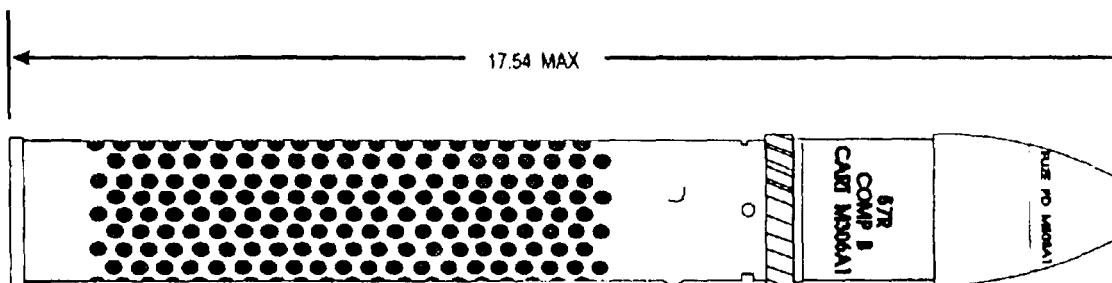
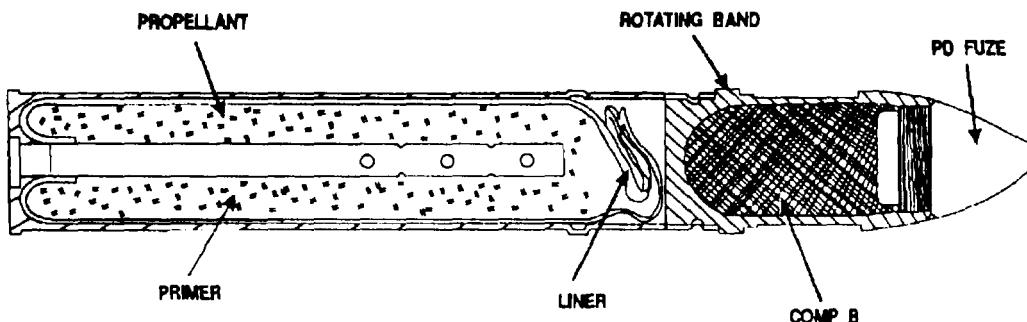
UNO serial number -----	0328
Quantity-distance class -----	(08) 1.2
Storage compatibility group -----	C
DOT shipping class -----	B
DOT designation -----	AMMUNI- TION FOR CANNON WITH SOLID PROJEC- TILES
DODAC -----	1310-B588
Drawing number -----	751252

**Limitations:**

Because M60 primers rupture occasionally, gun bores must be inspected for fragments after each firing.

**References:**

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

**CARTRIDGE, 57-MILLIMETER: HE, M306A1 AND M306**U  
AR 199777U  
AR 199776**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 fuzed 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 lb
Length -----	17.54 in.
Cannon used with -----	M18, M18A1

## Projectile:

Body material -----	Forged steel
Color -----	Olive drab w/yellow 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 m
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 hr/day)

*Packing -----	1 round in fiber con- tainer; 6 fiber container in wooden box
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*Packing Box: Weight -----	51 lb
-------------------------------	-------

Dimensions -----	21-1/2 x 10-7/16 x 8-3/16 in.
Cube -----	1.1 cu ft

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

**Shipping and Storage Data:**

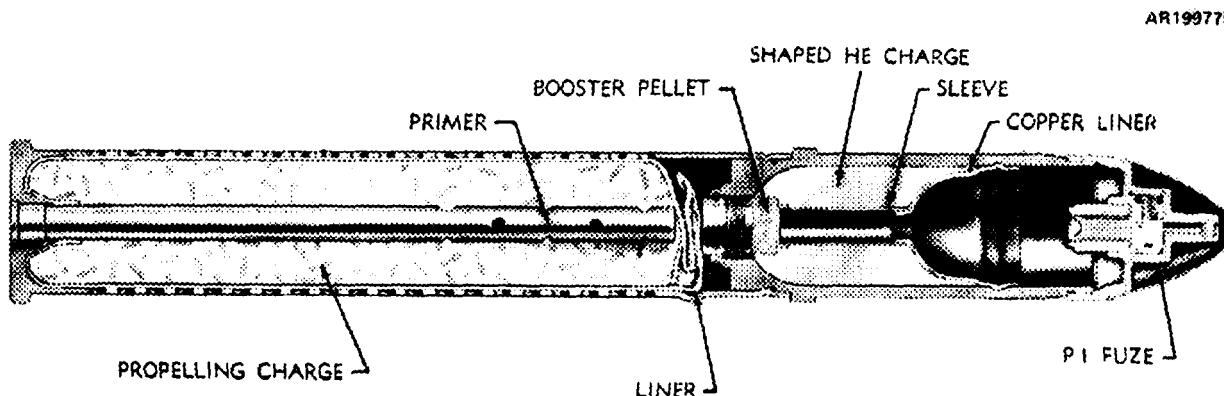
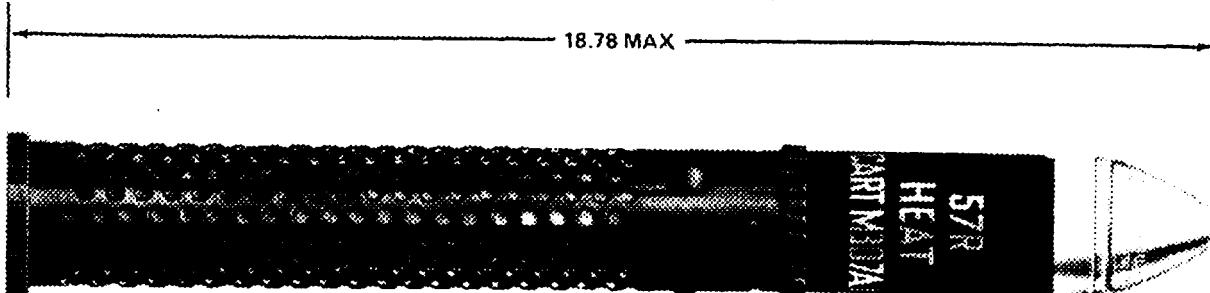
UNO serial number -----	0321
Quantity -distance class -----	(08) 1.2
Storage compatibility -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNI - TION FOR CANNON WITH EX- PLOSIVE PROJE- TILE
DODAC -----	1310-B586
Drawing number -----	9215030

**Limitations:**

Because M60 primers rupture occasionally, gun bores must be inspected for fragments after each firing.

**Reference=**

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

**CARTRIDGE, 57-MILLIMETER: HEAT, M307A1 AND M307****Type Classification:**

Cont OTCM 37119 dtd 1959.

**Use:**

This cartridge is employed against armored targets and used with 57mm 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 paper-lined Cartridge Case M30 and Percussion Primer M46.

**Tabulated Data:**

Complete round:

Type -----	HEAT
Weight -----	5.43 lb
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 lb
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 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 hr/day)

**\*Packing -----**

1 round per  
fiber con-  
tainer; 6 fiber  
containers in  
wooden box.

**\*Packing Box:**

Weight -----	51.51 lb
Dimensions -----	23 x 10-7/16 x 8-11/32 in.
Cube -----	1.2 cu ft

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

**Shipping and Storage Data:**

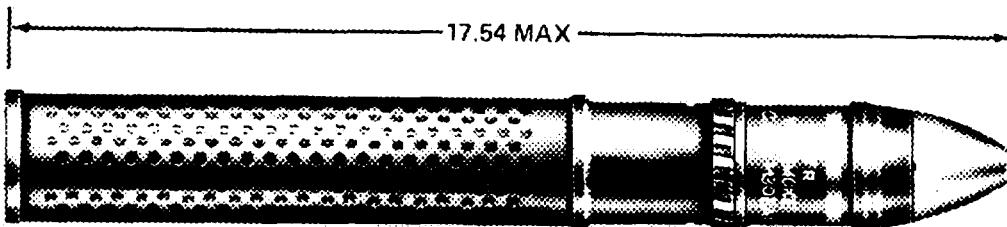
UNO serial number -----	0006
Quantity-distance class -----	1.1
Storage compatibility -----	E
DOT shipping class -----	A
DOT designa -----	AMMUNI- TIONFOR CANNON WITH EX- PLOSIVE PROJEC- TILES
D O D A C -----	1310-B587
Drawing number -----	75-1-215

**Limitations:**

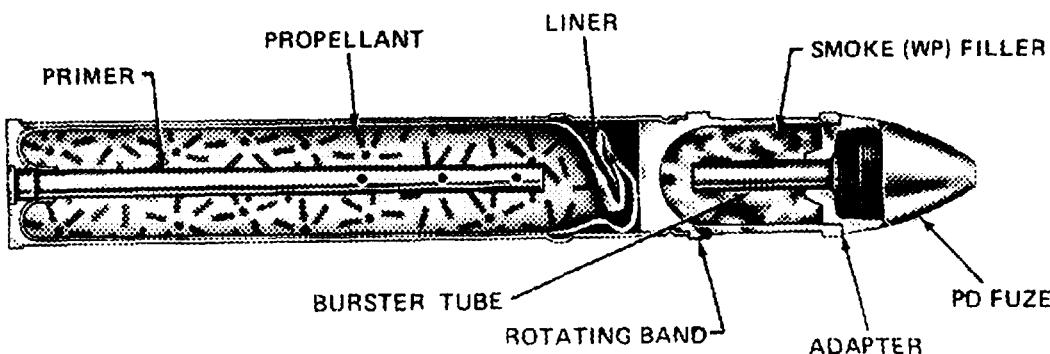
Because M60 primers rupture occasionally, gun bores must be inspected for fragments after each firing.

**References:**

SB 700-20  
AMC-P 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 57mm 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 pre-engraved 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 burning 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 lb
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 hr/day)

*Packing: -----	1 round in fiber container; 6 containers in wooden box
*Packing Box: -----	
Weight -----	51.0 lb
Dimensions -----	21-9/16 x 10-7/16 x 8-3/16 in.
Cube -----	1.1 cu ft

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

**Shipping and Storage Data:**

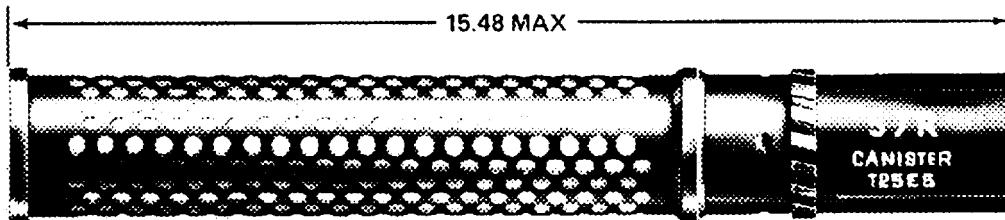
UNO serial number -----	0245
Quantity-distance -----	(12) 1.2
Storage compatibility group -----	H
DOT shipping class -----	A
DOT designation -----	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC -----	1310-B590
Drawing number -----	9215427

**Limitations:**

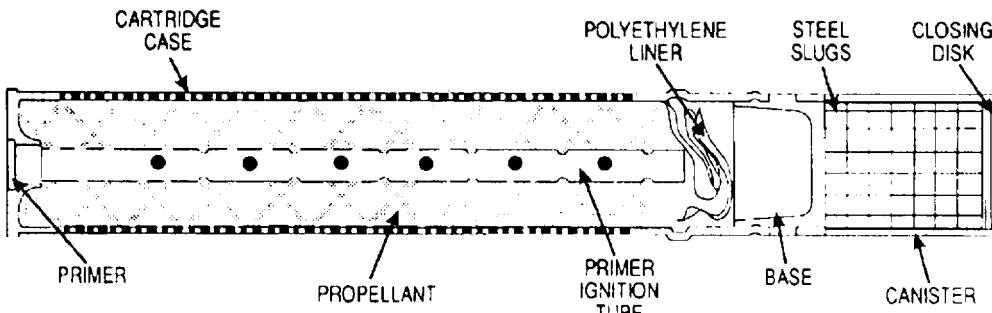
Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

**References:**

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

**CARTRIDGE, 57-MILLIMETER CANISTER, T25E5**

AR199771

U  
AR 199770**Type Classification:**

LP AMCTC 7875 dtd 1970.

**Use:**

This canister cartridge is fired from 57mm 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 slits extending from the nose to within 1/4 inch of a pre-engraved rotat-

ing 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 black powder 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. 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. 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 lb
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 lb

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 hr/day)

\*Packing: ----- 1 round in fiber container; 6 containers in wooden box

\*Packing Box:  
 Weight ----- 49.0 lb  
 Dimensions ----- 19-5/8 x 10-1/2 x 8-13/32 in.  
 Cube ----- 1.0 cu ft

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

**Shipping and Storage Data:**

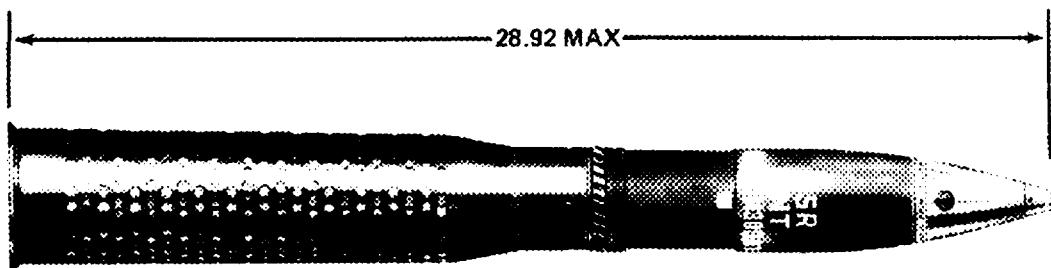
UNO serial number -----	0328
Quantity-distance class -----	(08) 1.2
Storage compatibility group -----	C
DOT shipping class -----	B
DOT designation -----	AMMUNITION FOR CANNON WITH SOLID PROJECTILE
DODAC -----	1310-B585
Drawing number -----	9215708

**Limitations:**

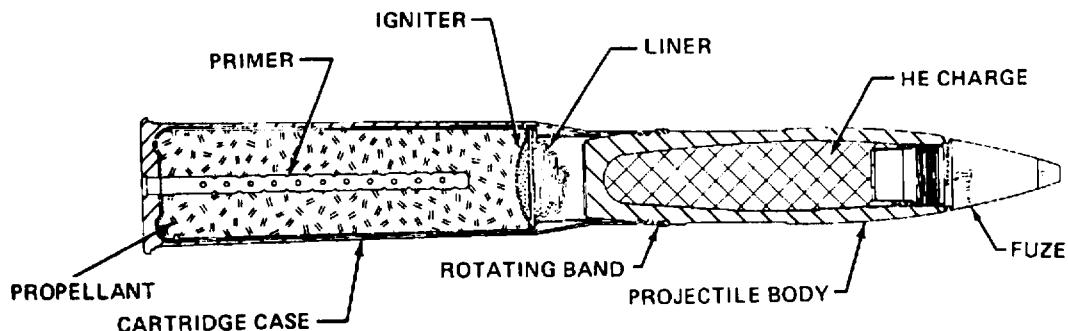
Canister may not be fired overhead of friendly troops.

**References:**

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

**CARTRIDGE, 75-MILLIMETER: HE, M309A1 AND M309**

AR199767



AR199766

**Type Classification:**

Cont OTCM 37119 dtd 1958.

**Use:**

This cartridge is fired from 75mm recoilless 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 ogive 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 black powder ignites the propelling charge. The burning propellant generates rapidly expanding gases to propel the projectile through the rifle barrel and to the target. Recoil is eliminated because some gas pressure escapes through the perforated cartridge case, and is controlled by apertures in the rifle breech-block. 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 lb
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 lb  
 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 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 hr/day)

\*Packing ----- 1 cartridge in  
 fiber container; 2 containers in  
 wooden box

\*Packing Box:  
 Weight ----- 73.0 lb  
 Dimensions ----- 34-1/4 x  
                   11-5/16  
                   x 7-9/32 in.  
 Cube ----- 1.64 cu ft

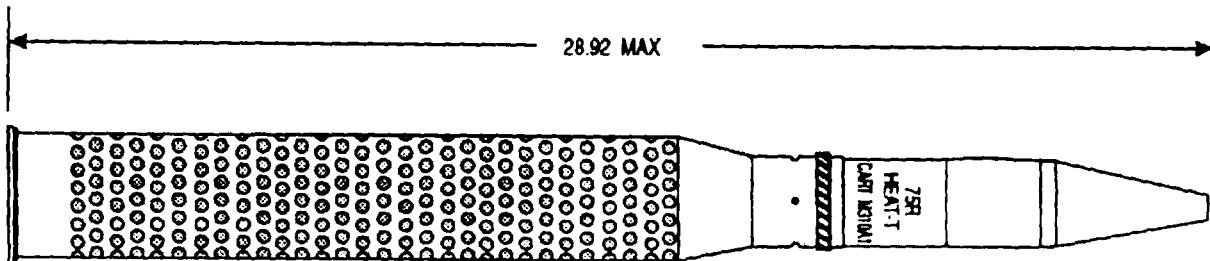
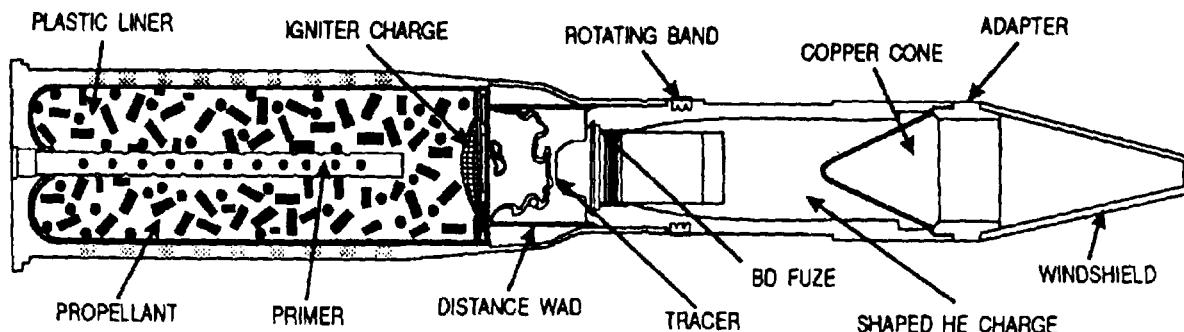
\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

UNO serial number -----	0321
Quantity-distance class -----	(08)1.2
Storage compatibility group -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH EX- PLOSIVE PROJECT- ILES
DODAC -----	1315-C051
Drawing number -----	75-1-221

**References:**

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

**CARTRIDGE, 75-MILLIMETER: HEAT-T M310A1 AND M310**U  
AR 199763U  
AR 199762**Type Classification:****Use:**

This cartridge is fired in 75mm 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 Composition 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 stand-off 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 breech-block of the rifle. The propelling charge also ignites the tracer in the BD 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 lb
Length -----	28.92 in.
Cannon used with -----	M20

Projectile:

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

Filler and weight:

M310A1 -----	Comp B, 1.0 lb
M310 -----	50/50 pentolite, 0.89 lb

Components:

Cartridge case:	
M310A1 -----	M31A1
M310 -----	M31
Propelling charge -----	M10
Primer -----	M47B2 or M47
Tracer -----	M5
Fuze -----	BD, M91A1

Performance:

Maximum range -----	6575 m
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)
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Upper limit -----	+160°F (for not more than 4 hr/day)
*Packing: -----	1 cartridge in fiber con- tainer; 2 con- tainers in wooden box

*Packing Box:	
Weight -----	73.0 lb
Dimensions -----	34-1/4 x 11-5/16 x 7-9/32 in.
Cube -----	1.64 cu ft

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

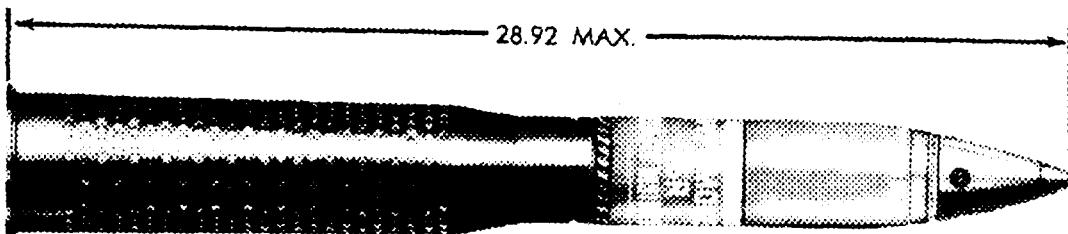
**Shipping and Storage Data:**

UNO serial number -----	0006
Quantity-distance class -----	1.1
Storage compatibility group -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH EX- PLOSIVE PROJE- CTILES

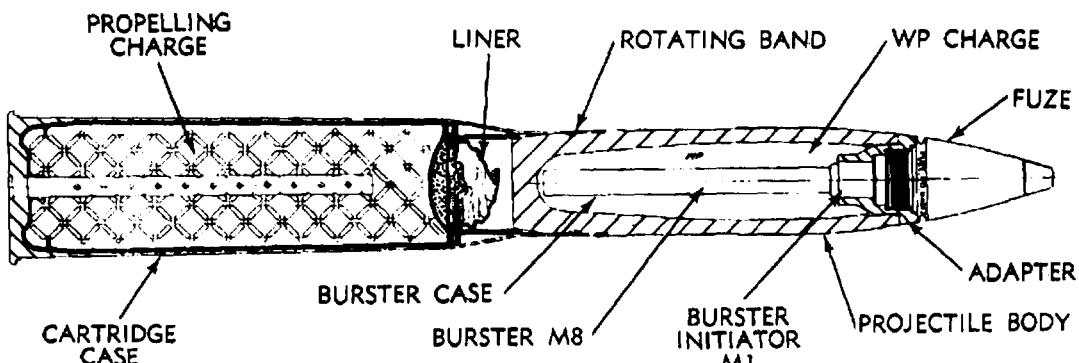
DODAC -----	1315-C052
Drawing number -----	75-1-222

**References:**

SB 700-20
AMC-P 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 75mm 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 phosphorous. 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 lb
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 lb
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 hr/day)

\* Packing ----- 1 cartridge in fiber container; 2 containers in wooden box

\*Packing Box:  
    Weight ----- 73.0 lb  
    Dimensions ----- 34-1/4 x 11-15/16 x 7-9/32 in.  
    Cube ----- 1.64 cu ft

\*NOTE: See DOD Consolidated Ammunition Catalog 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-C056
Drawing number-----	75-1-225

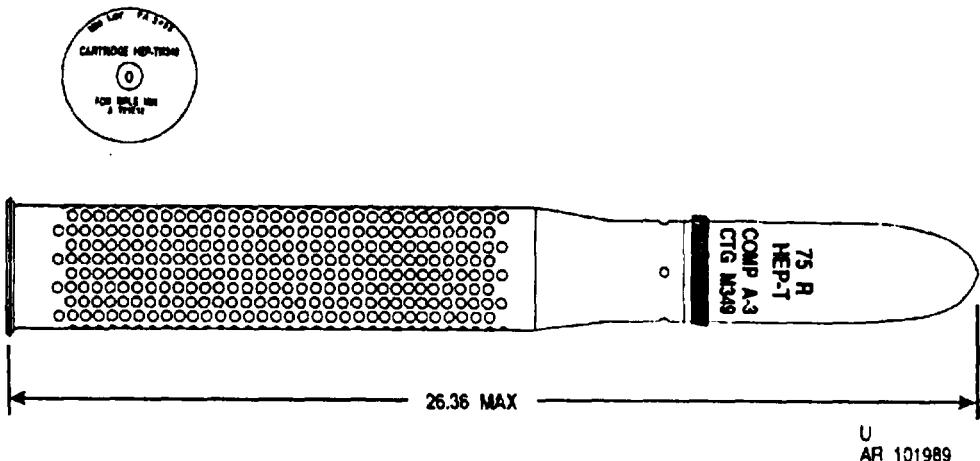
**Limitations:**

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:**

- B 700-20
- MC-P 700-3-3
- M 9-1300-251-20

## CARTRIDGE, 75-MILLIMETER: HEP-T, M349

**Type Classification:**

OBS MSR 11756003.

**Use:**

This cartridge is designed for use against armored targets light materiel and personnel.

**Description:**

The complete round consists of a thin steel projectile with an internally threaded base, assembled to a perforated steel cartridge case. The projectile contains a filler of 2.55 pounds of Composition A3 and employs a base-detonating fuze. The cartridge case contains a propelling charge of single-perforated propellant, and an igniter charge, both of which are sealed in a double rayon/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 which ignites the propellant. The propellant creates gases that force the projectile out of the tube and propel it to the target. The tracer is also ignited and burns during the early stages of flight. On impact, the functioning of the fuze detonates the explosive.

**Tabulated Data:**

## Complete round:

Type -----	HEP-T
Weight -----	16.52 lb
Length -----	26.36 in.

Cannon used with -----	M20 + T21E12
Projectile:	
Explosive filler -----	2.55 lb Comp A 3
Body materiel -----	Steel
Color -----	Olive drab w/yellow 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 m
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 periods of not more than 4 hr/day)

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

<sup>a</sup> Packing box:

Weight filled ----- 95 lb  
 Dimensions OD ----- 32 x 11-5/16 x  
                       7-9/32 in.  
 Cube ----- 1.52 cu ft

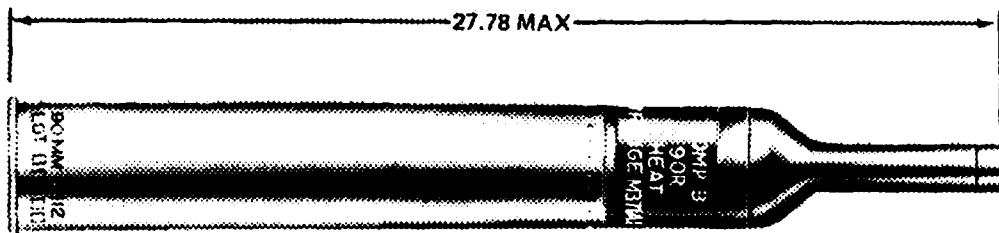
\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

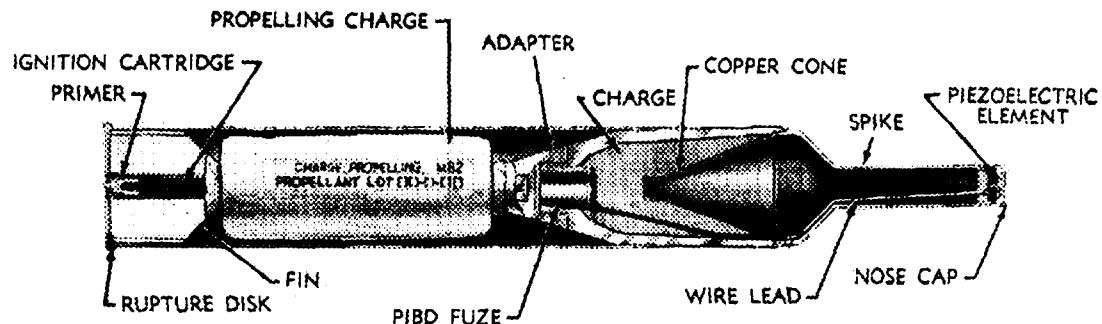
UNO serial number -----	0006
Quantity-distance class -----	1.1
Storage compatibility group -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC -----	1315-C053
Drawing number -----	75-1-32

**References:**

AMC-P 700-3-3

**CARTRIDGE, 90-MILLIMETER: HEAT M371A1**

AR199769

**Type Classification:**

Std AMCTC 4265 dtd 1966.

**Use:**

This cartridge is used in 90mm 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 detonating 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 breech-block. 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 lb  
 Length ..... 27.78 in.  
 Cannon used with ..... M67

## Projectile:

Body material ..... Steel and aluminum  
 Color:  
 Old mfg. ..... Olive drab w/yellow markings  
 New mfg. ..... Black w/yellow markings  
 Filler and weight ..... Comp B, 1.72 lb

## Components:

Cartridge case ..... M112  
 Propelling charge ..... M82  
 Primer:  
 M371A1 ..... M92A1  
 M371 ..... M78  
 Fuze ..... PIBD,  
                   M530A1,  
                   M530

## Performance:

Maximum range ..... 400 m  
 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 hr/day)

\* Packing ..... 1 round in fiber container; 1 container in wooden box

\*Packing Box:  
 Weight ..... 42 lb  
 Dimensions ..... 32-15/16 x 9-7/8 x 6-3/8 in.  
 Cube ..... 1.3 cu ft

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

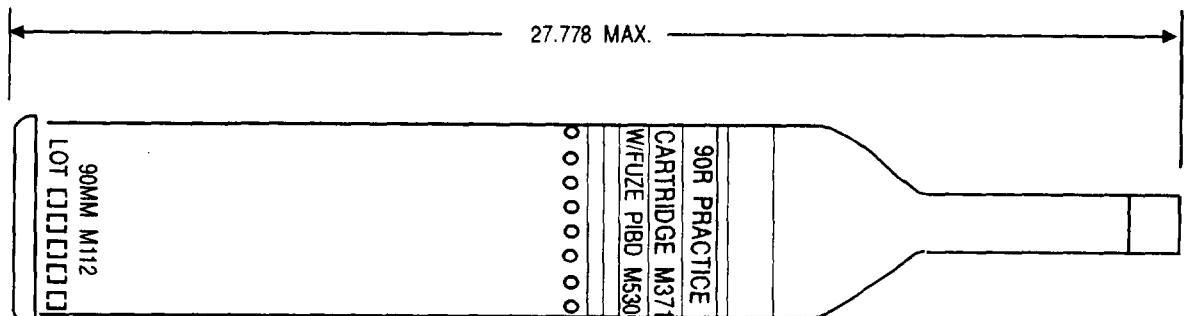
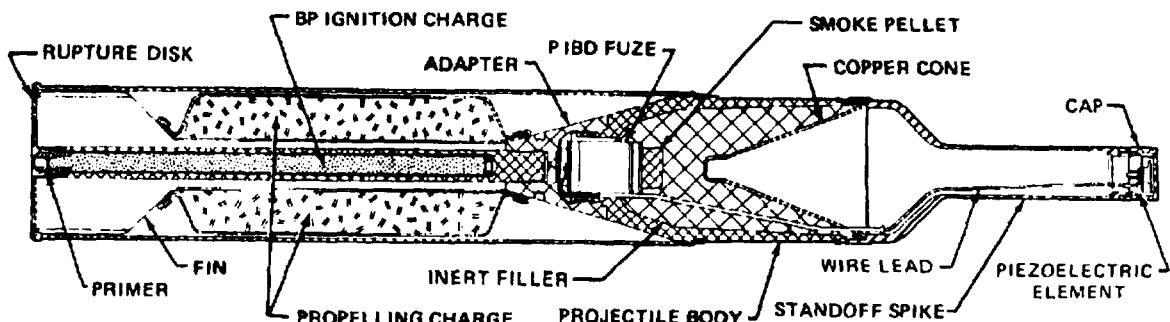
**Shipping and Storage Data:**

UNO serial number	0321
Quantity-distance class	(12) 1.2
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1315-C282
Drawing number	8863468

**References:**

SB 700-20  
 AMC-P 700-3-3  
 TM 9-1015-223-12  
 TM 9-1300-251-20

## CARTRIDGE, 90-MILLIMETER: PRACTICE, M371

U  
AR 199757

AR199756

**Type Classification:**

Std OTCM 37136 dtd 1959.

**Use:**

This cartridge is used to train personnel armed with the 90mm recoilless rifles in handling and use of HEAT rounds.

**Description:**

The cartridge resembles 90mm 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 lb
Length .....	27.778 in.
Cannon used with .....	M67

Projectile:

Body material .....	Aluminum alloy
Color .....	Blue or black w/white markings

Filler and weight-----	Inert E, 1.79 lb Pellet Box 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 hr/day)
* Packing -----	1 round in fiber container; 2 containers in wooden box

*Packing Box:	
Weight -----	47 lb
Dimensions -----	32-15/16 x 9-7/8 x 6-3/8 in.
Cube -----	1.3 cu ft

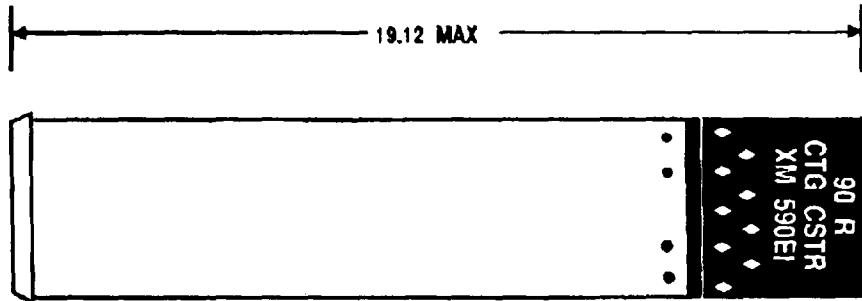
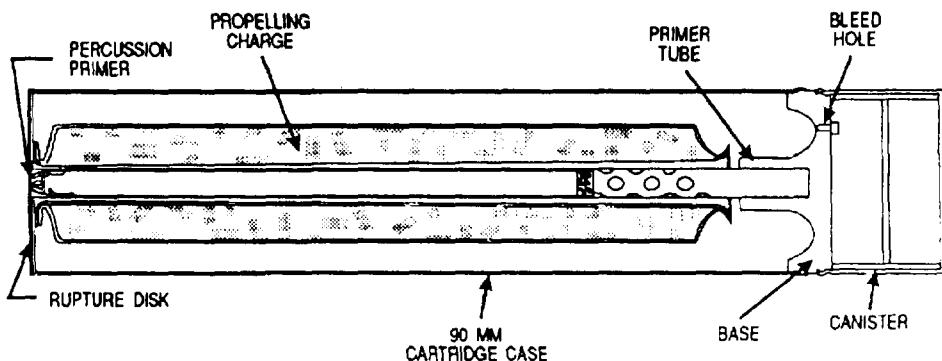
\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

UNO serial number-----	0321
Quantity-distance class -----	(08) 1.2
Storage compatibility group -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC -----	1315-C283
Drawing number -----	8865243

**References:**

SB 700-20  
AMC-P 700-3-3  
TM 9-1015-223-12  
TM 9-1300-251-20

**CARTRIDGE, 90-MILLIMETER CANISTER, ANTI PERSONNEL, M590 (XM590E1)**U  
AR 199761U  
AR 199760**Type Classification:**

Std AMCTC 8601 dtd 1971.

**Use:**

This cartridge is used in 90mm 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 unperforated 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 canister. The cartridge case is filled with double-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 barrel. Recoil is minimized by blowout of the rupture disk in the base and controlled pressure release through apertures in the breech-block. At 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	Canister anti-personnel
Weight	6.79 lb
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 lb
<b>Components:</b>	
Cartridge case -----	M112
Propelling charge -----	M178
Primer -----	M92A1
<b>Performance:</b>	
Effective range -----	200 m
Muzzle velocity -----	1200 fps
<b><u>Temperature Limits:</u></b>	
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 -----	1 round in fiber container; 6 containers in wirebound box
<b>*Packing Box:</b>	
Weight -----	58 lb
Dimensions -----	22-5/8 x 13-1/2 x 10-1/16 in.

Cube ----- 1.8 cu ft  
**\*NOTE:** See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

#### **Shipping and Storage Data:**

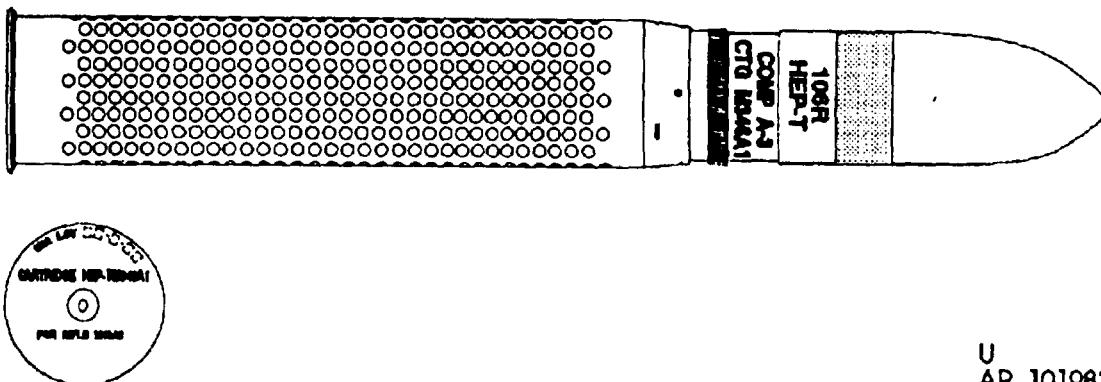
UNO serial number -----	0328
Quantity-distance class -----	(08) 1.2
Storage compatibility group -----	C
DOT shipping class -----	B
DOT designation -----	AMMUNI- TION FOR CANNON WITH SOLID PROJEC- TILES
DODAC -----	1315-C410
Drawing number -----	9214567

#### **Limitations:**

Canister may not be fired overhead of friendly troops.

#### **References:**

SB 700-20
AMC-P 700-3-3
TM 9-1015-223-12
TM 9-1300-251-20

**CARTRIDGE, 106-MILLIMETER: HEP-T, M346A1****Type Classification:**

Std OTCM 37119, dtd 1959.

**Use:**

This cartridge is intended for use against armored targets and is also effective against personnel and light materiel.

**Description:**

The projectile is a thin-walled steel cylinder with a short ogive and flat base. There are two indexing buttons, spaced 180° apart on the forward bourrelet. A pre-engraved rotating band encircles the projectile just forward of the base. The base is fitted with a base-detonating fuze with integral tracer. The projectile body is loaded with 7.72 pounds of Composition A3. The perforated steel cartridge case, crimped to the projectile contains a propelling charge in a rayon and plastic liner. A percussion primer is press fitted to the base.

**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 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 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 6,870 m
Muzzle velocity -----	1,635 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 hr/day)

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

Weight ----- 95 lb  
Dimensions ----- 27-5/8 x 3-7/16  
                  x 4-13/16 in.  
Cube ----- 1.52 cu ft

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

**Shipping and Storage Data:**

UNO serial number ----- 0005  
Quantity-distance class ----- 1.1

Storage compatibility group ----- F

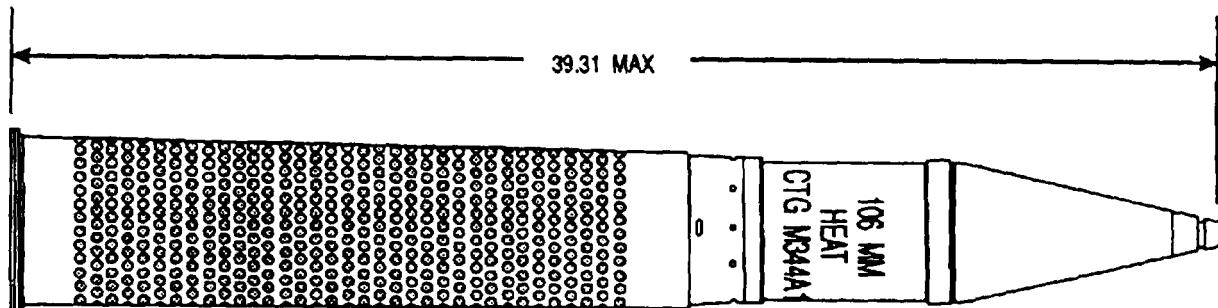
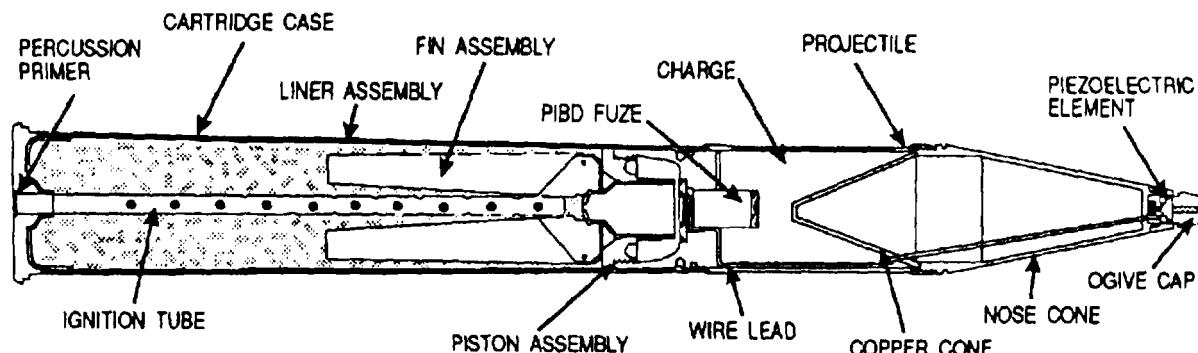
DOT shipping class ----- A

DOT designation ----- AMMUNI-  
TION FOR  
CANNON  
WITH  
EXPLOSIVE  
PROJECTILE

DODAC ----- 1315-C651  
Drawing number ----- 8837335

**References:**

AMC-P 700-3-3

**CARTRIDGE, 106-MILLIMETER: HEAT, M344A1 AND M344**U  
AR 199753U  
AR 199752**Type Classification:**

Std OTCM 3711959 dtd 1958.

## Use:

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 escape of propellant gases to the rear through openings in the breech-block. 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 M1O, 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/yel- low 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 -----	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
Upper limit -----	+160°F (for periods not more than 3 days)

*Packing -----	1 round in fiber con- tainer; 2 con- tainers in wooden box
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*Packing box:	
Weight -----	120 lb
Dimensions -----	45-1/15 x 12-5/8 x 7-11/16 in.
Cube -----	2.5 cu ft

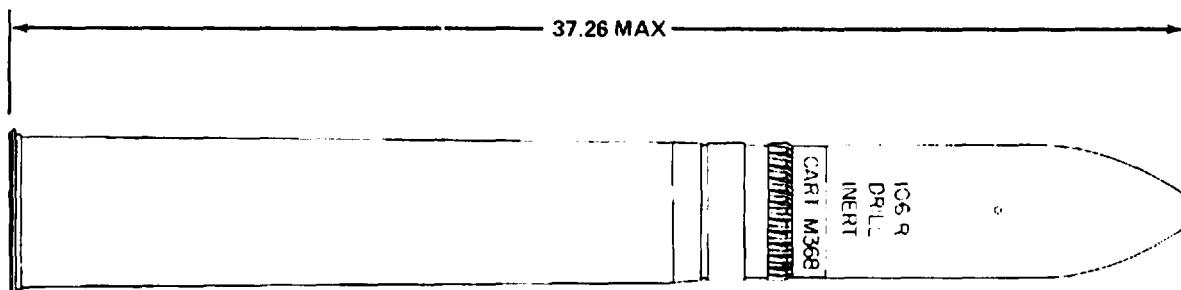
\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

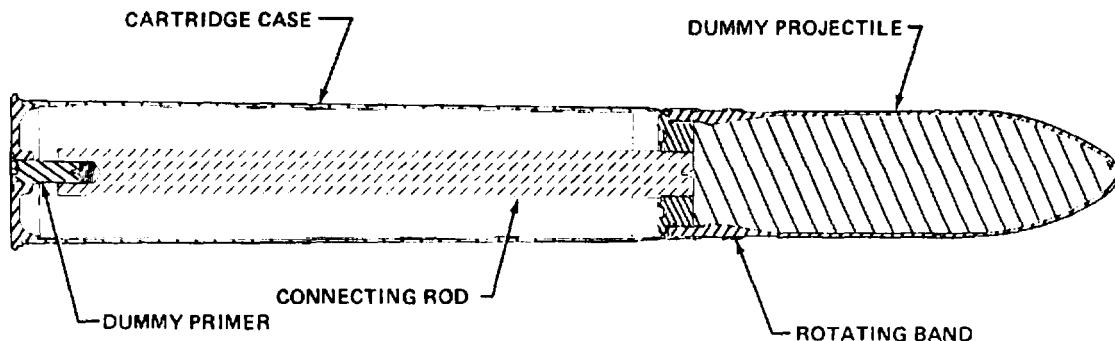
UNO serial number -----	0321
Quantity-distance class -----	(12) 1.2
Storage compatibility group -----	E
DOT shipping class -----	A
DOT designation -----	AMMUNI- TION FOR CANNON WITH EXPLOSIVE PROJEC- TILES
DODAC -----	1315-C650
Drawing number -----	7549097 (M344A1); 75- 1-319 (M344)

**References:**

SB 700-20	
AMC-P 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 106mm recoilless rifles.

**Description:**

The cartridge simulates HEP-T Cartridge M346Al, 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 pre-engraved 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 lb
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 lb
Cartridge case	-----	M94B1
Primer	-----	Dummy

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

\*Packing Box:

Weight ----- 127.6 lb  
Dimensions ----- 44-5/8 x  
12-13/16  
x 7-31/32 in.  
Cube ----- 2.6 cu ft

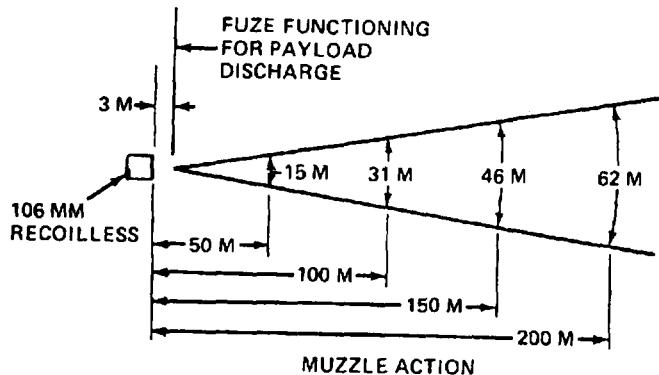
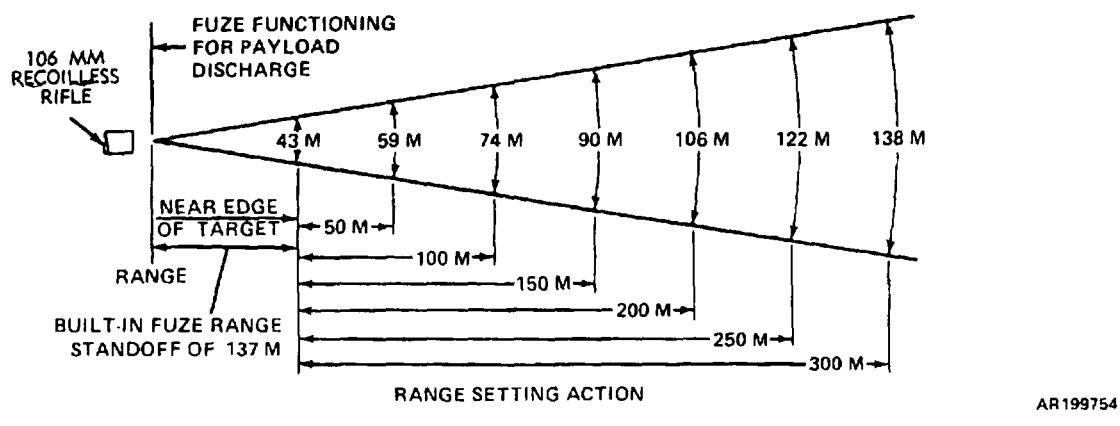
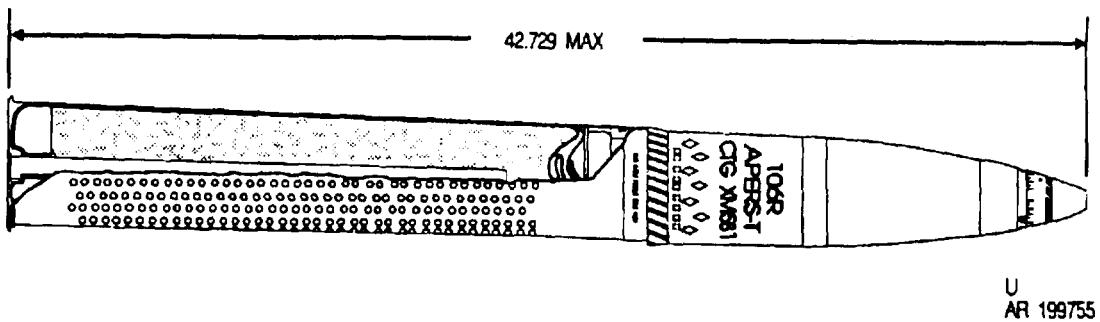
\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

DOT designation ----- AMMUNI-  
TION NON-  
EXPLOSIVE  
DODAC ----- 1315-C654  
Drawing number ----- 8596153

**References:**

SB 700-20  
AMC-P 700-3-3  
TM 9-1000-205-12  
TM 9-1300-251-20

**CARTRIDGE, 106-MILLIMETER: APERS-T, M581****Type Classification:**

Std AMCTC 8416 dtd 1971.

**Use:**

This cartridge is fired from 106mm 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 grain 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 bourrelet 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 breech-block. 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 .....	Antipersonnel
Weight .....	41.29 lb
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 lb
Expelling charge .....	M9, 1.23 oz flake propel- lant
Yellow dye .....	11 grams
Detonators .....	(4) M86 (XM86); (1) XM87 with relay M7

#### Components:

Cartridge case .....	M94B1
Propelling charge .....	M26
Primer .....	M57
Tracer .....	M13

### 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 fiber container; 2 containers in wooden box
Weight .....
Dimensions .....
Cube .....

#### \* Packing box:

134 lb
49-5/8 x 13 x
8-1/4 in.
2.9 cu ft

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

### Shipping and Storage Data:

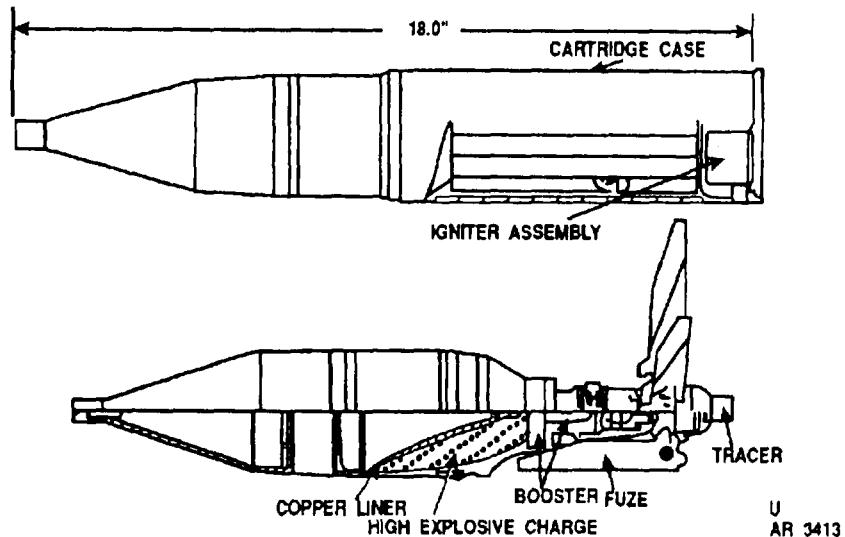
UNO serial number .....	0321
Quantity-distance class .....	(12) 1.2
Storage compatibility group .....	E
DOT shipping class .....	A
DOT designation .....	AMMUNI- TION FOR CANNON WITH EXPLOSIVE PROJE- CILES
DODAC .....	1315-C660
Drawing number .....	9210603

### Limitations:

Firing overhead of exposed friendly troops is prohibited.

### References:

- SB 700-20
- AMC-P 700-3-3
- TM 9-1000-205-12
- TM 9-1300-251-20

**CARTRIDGE, 84-MILLIMETER: M136 (AT4) AND LAUNCHER****Type Classification:**

M136 - STD

**Use:**

The AT4 is issued as a complete round of ammunition. It is factory loaded with one 84mm HEAT round and a disposable launcher.

**Description:**

The AT4 consists of a fiberglass reinforced launching tube fitted with a firing mechanism, sight, carrying sling, and protective covers. The recoilless design is superior to rocket-type weapons for this application. The fin-stabilized cartridge contains the projectile (warhead) and case assembly. The warhead is a shaped charge HEAT projectile with 84mm full caliber fuzing action. Detonation of the Octol explosive charge is achieved with a piezoelectric impact fuze sensitive to impact angles as shallow as ten degrees.

**Functioning:**

The trigger is pressed releasing the firing rod. The firing rod strikes a pin and ignites the percussion cap which ignites the propellant load. Pressure builds up in the launcher from burning propellant, the plastic baseplate breaks and gages exit rearward to balance the launcher recoil. Burning propellant expels the projectile from the launcher. The round hits the target and the shock is transmitted to the piezoelectric base detonating fuze. The fuze train detonates the charge which collapses the copper liner into a finger-shaped jet. The jet is preceded by extremely hot, high velocity gases

which melt a hole in the target layer diode to the electric detonator, thus initiating the fuze. The fuze explosive train detonates the shaped charge which collapses the copper liner into a finger-shaped plasma jet. The high velocity jet, at tremendous pressure, melts a hole and penetrates the target. Almost simultaneously the body and standoff cone are blasted into small fragments.

**Tabulated Data:**

## AT4 System:

Model .....	M136
Weight .....	15 lb (6.8 kg)
Length.....	40 in.
Color .....	(No. 34087 per Fed Spec 595A, C6) Dime Drab
Code .....	Yellow on a one (1) inch wide black band
Arming distance (min) .....	15-25 m (49.21-82.02 ft)

## Tactical Projectile:

Length, as fired .....	18.19 in. (462mm)
Weight, as fired .....	3.97 lb (1.80 kg)
Body material .....	Aluminum
Caliber .....	84mm (3.35 in.)

Color .....	Black w/yellow marking
Explosive Charge:	
Shaped charge .....	0.97 lb (440g)
Type .....	70/30 Octol

Booster:		Cube -----	37.7 cu ft (1.07 cu m)
Explosive -----	16.4 g		
Type -----	Composition A5		
Cartridge case:			<b><u>Shipping and Storage Data:</u></b>
Igniter -----	15.0 g (0.53 oz)	Storage class/SCG (Q-D) -----	1.1 E
Propellant -----	0.78 lb (355 g)	DOT shipping class -----	A
Type (dble base) -----	AK13204	DOT designation -----	ROCKET AMMUNI-TION WITH EXPLOSIVE PROJECTILE
Configuration -----	Strips		
Number strips -----	200		
Other:		Field storage -----	Group F
Electronic detonator -----	1.57 g (0.06 oz)	DODAC -----	1315-C995
Percussion cap -----	0.13 g (0.005 oz)	Drawings: 84mm HEAT Round AT4 -----	13229923 (FFV Sweden)/ 28201800 (Honeywell U.S.)
Fuze:		84mm HEAT Shell -----	13229942 (FFV Sweden)/ 28201817 (Honeywell U.S.)
Type -----	Point Initiating, Base Detonating (Piezoelectric)	Box, Packed, Marked -----	13230240 (FFV Sweden)/ 28202869 (Honeywell U.S.)
Weight -----	0.93 lb (420g)		
Packing:			
Each AT4 -----	Sealed in plastic barrier		
AT4's per wood container ---	5 ea		
Gross weight -----	113 lb (51.26 kg)		
Dimensions -----	44.37 x 35.43 x 8.35 in. (112.70 x 90 x 21.21 cm)		
Cube -----	7.8 cu ft (0.22 cu m)		
Pallet Load:			
Wood containers -----	4 ea		
Gross weight -----	553 lb (250.84 kg)		
Dimensions -----	44.49 x 35.63 x 40.98 in. (113 x 90.50 x 104.09 cm)		

**References:**

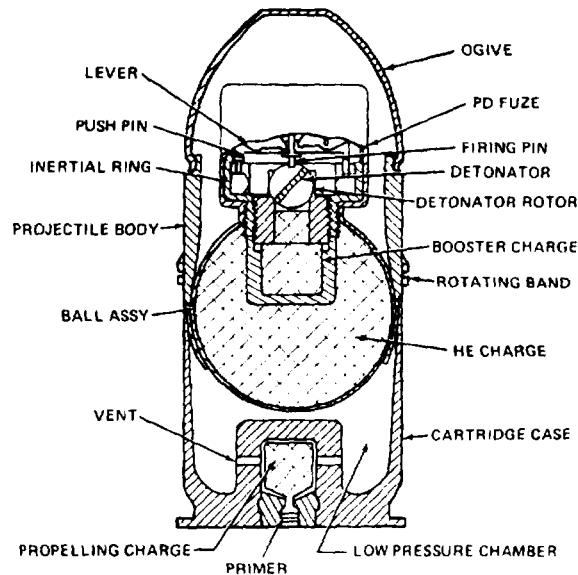
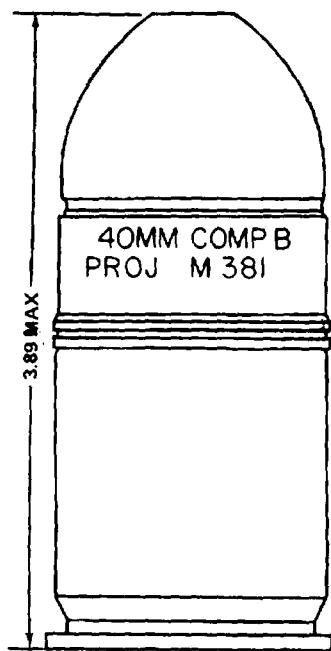
DOD Consolidated Ammunition Catalog,  
 Ammo 1-2-3  
 TM 9-1300-251-34  
 TM 9-1315-886-12  
 AMC-P 700-3-3

**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 40mm Grenade Launcher M79 or the M203 (attached to the M16 series 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 bichambered 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.

#### Tabulated Data:

Complete round:		per wooden box
Type -----	HE	
Weight -----	0.503 lb	
Length -----	3.89 in.	
Weapons used with -----	40mm Grenade Launchers M79 and M203 (attached to M16 series rifle)	
Projectile:		
Body material -----	Aluminum skirt and steel wire ball	
Color -----	Olive drab w/yellow markings & yellow Ogive	
Filler -----	Composition B, 32 g	
Fuze -----	PD, M552	
Propelling charge:		
Cartridge case -----	M118	
Propellant -----	M9, 330 mg	
Primer -----	Percussion, M42	
Performance:		
Maximum range -----	400 m	
Muzzle velocity -----	76 mps (250 fps)	

*Packing Box:		
Weight -----	54 lb (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 cu m)	

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

#### Shipping and Storage Data:

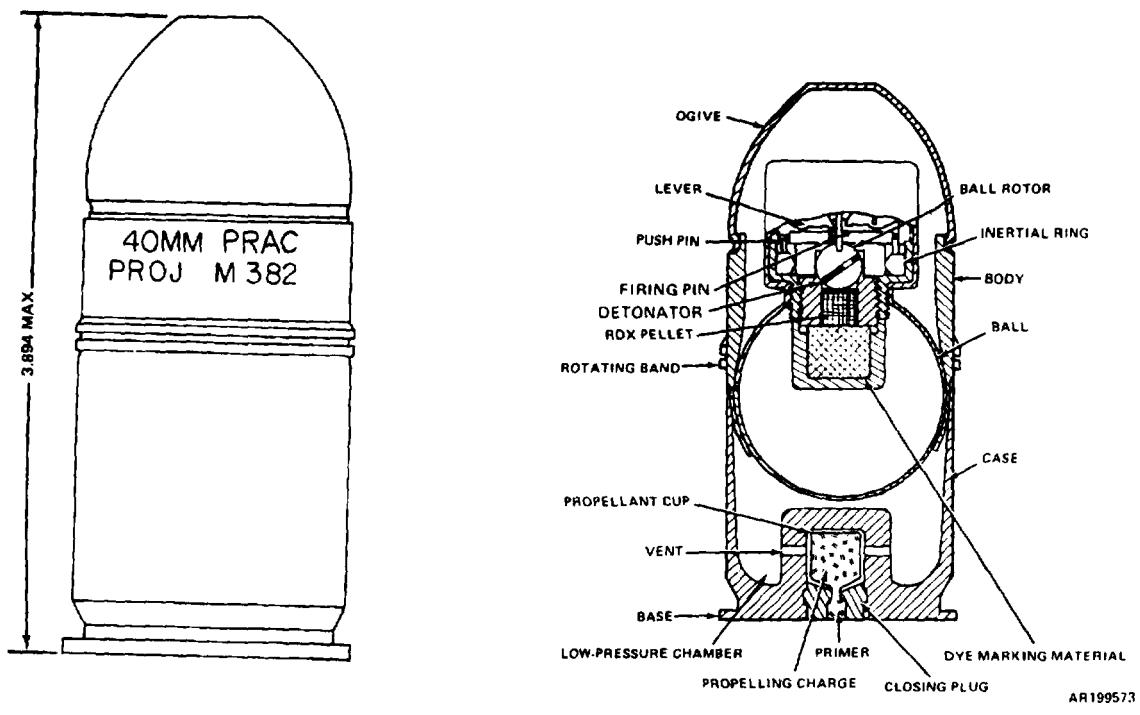
Hazard class/division and storage compatibility group -----	(04) 1.2 E
UNO serial number -----	0321
DOT class -----	Class A
DOT marking -----	Explosive AMMUNITION FOR CANNON W/ EXPLOSIVE PROJECTILES
DODAC -----	1310-B568
Cartridge drawing number -----	8835941
Packing drawing numbers -----	8835104, 8835105

#### Temperature Limits:

Firing:	
Lower limit -----	-45°F (-42.8°C)
Upper limit -----	+125°F (51.6°C)
Storage:	
Lower limit -----	-65°F (-53.6°C)

#### References:

- SB 700-20
- TM 9-1010-205-10
- TM 9-1010-221-10
- TM 9-1300-251-20
- TM 9-1300-251-34

**CARTRIDGE, 40-MILLIMETER: PRACTICE, M382**

AR199574

AR199573

**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 series 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 -----	0.50 lb
Length -----	3. 89 in.
Weapon used with -----	40mm Grenade Launchers M79, M203 (attached to M16 series rifle)

##### Projectile:

Body material -----	Aluminum skirt and steel ball
Color -----	Olive drab w/yellow markings
Filler and weight -----	Yellow dye, 4.54 g (inert)
Fuze -----	PD, M552
Propelling charge:	
Cartridge case -----	M118
Propellant -----	M9, 330 mg
Performance:	
Maximum range -----	400 m
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 lb (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 cu m)

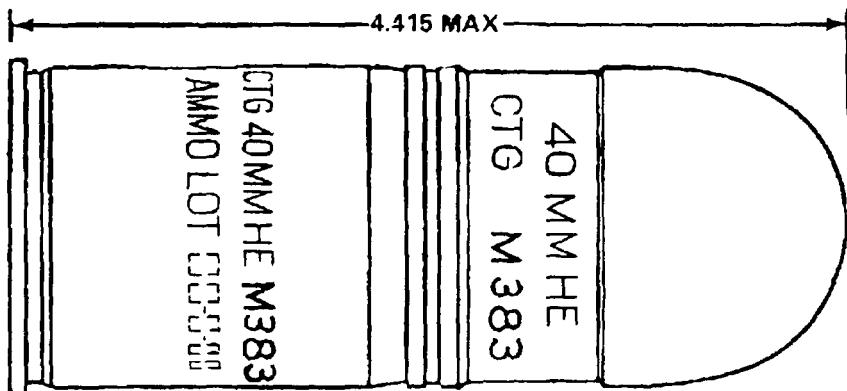
\*NOTE: See DOD consolidated Ammunition Catalog for complete packing data including NSN's.

#### Shipping and Storage Data:

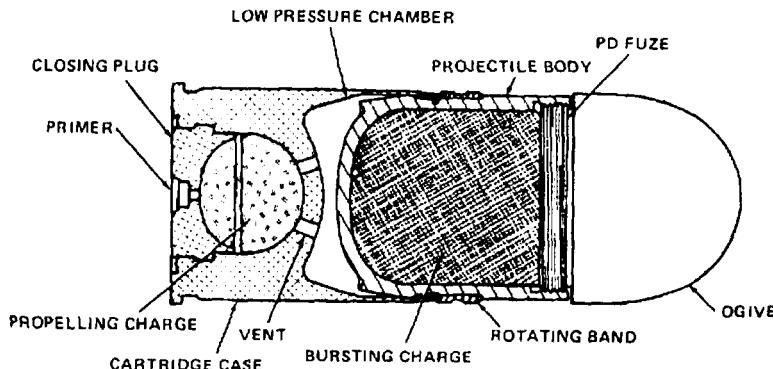
UNO serial number -----	0328
Hazard class/division and storage compatibility group --	(04) 1.2 C
DOT class -----	Class C Explosive
DOT marking -----	CAR-TRIDGES, PRACTICE AMMUNITION
DODAC -----	1310-B577
Cartridge drawing number -----	8844607
Packing drawing numbers -----	8835104, 8835105

#### References:

SB 700-20
TM 9-1010-205-10
TM 9-1010-221-10
TM 9-1300-251-20
TM 9-1300-251-34

**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 40mm grenade launchers and the U.S. Navy 40mm machine gun MK19 Mod 1, at ranges up to 2200 meters. The cartridge is issued completely assembled in linked belts of 50 rounds. Recrimped rounds can be fired in the MK19 MOD 3 GMG.

**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 car-

tridge 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 reps. 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:

NSN 1310-00-976-0907 -----	US Army Pack
NSN 1310-00-196-2654 -----	US Marine Corps Pack (Recrimped)
<b>Complete round:</b>	
Type -----	HE
Weight -----	0.75 lb
Length -----	4.415 in.
Weapons used with -----	M75, M129 40mm grenade launchers MK19 Mod 1, MK19 Mod 3, 40mm machine guns
<b>Projectile:</b>	
Body material -----	Blank and draw steel
Color -----	Olive drab w/yellow markings and yellow ogive
Filler and weight -----	RDX, Comp A5, 54.5 g
Fuze -----	PD, M533
<b>Propelling charge:</b>	
Cartridge case -----	M169
Propellant -----	M2, 4.64 g
Primer -----	Percussion, FED 215
<b>Performance:</b>	
Maximum range -----	2,200 m
Muzzle velocity -----	244 mps (795 fps)
Arming distance -----	18 to 36 m (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)

#### U.S. Army Pack:

*Packing -----	50 rounds in linked belt
*Packing box:	
Weight -----	53 lb
Dimensions -----	26-3/8 x 16-1/4 x 6-3/16 in.
Cube -----	1.5 cu ft
Packing drawing number -----	9251995

#### U.S. Marine Corps Pack:

*Packing -----	48 rounds in linked belt
*Packing box:	
Weight -----	59.5 lb
Dimensions -----	18-19/32 x 14-19/32 x 8-19/64 in.
Cube -----	1.3 cu ft
Packing drawing number -----	9362543

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

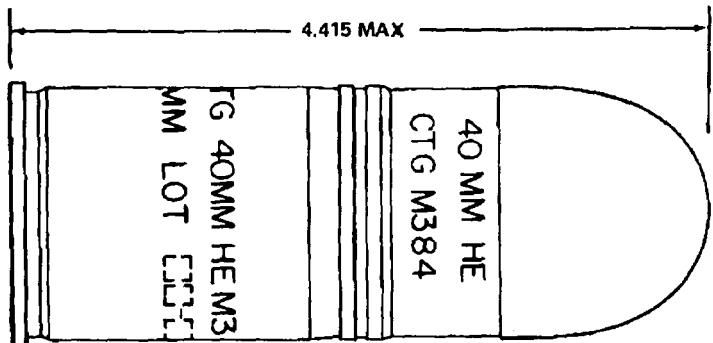
#### Shipping and Storage Data:

UNO serial number -----	0006
Hazard class/division and storage compatibility group--	1.1 E
DOT class -----	Class A Explosives)
DOT marking -----	AMMUNI- TION FOR CANNON W/EXPLO- SIVE PRO- JECTILES
DODAC -----	1310-B571
Cartridge drawing number -----	9241371
Packing drawing number -----	9251995

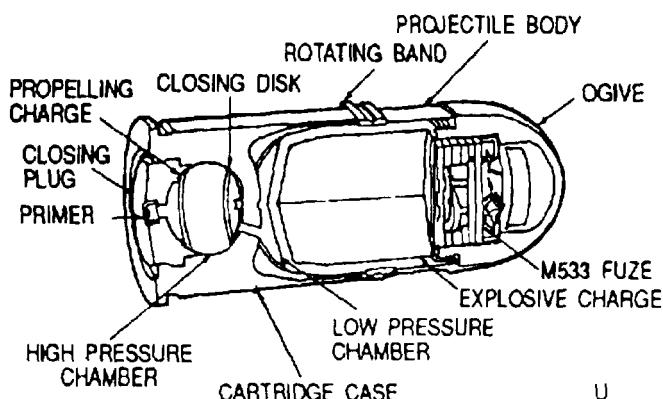
#### References:

- SB 700-20
- TM 9-1300-251-20
- TM 9-1010-230-10
- TM 9-1010-230-23&P
- TM 9-1300-251-34

## CARTRIDGE 40-MILLIMETER: HE, M384



AR199570

U  
AR 4947**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 40mm grenade launchers or the U.S. Navy 40mm 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 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 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 reps.

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 MK19 Mod 1, MK19 40mm machine gun
Projectile:	
Body material -----	Plate steel
Color -----	Olive drab w/yellow markings and yellow ogive
Filler and weight -----	Comp A5, 54.5 g
Fuze -----	PD, M533
Propelling charge:	
Cartridge case -----	M169
Propellant -----	M2, 4.64 g
Primer -----	Percussion, FED 215
Performance:	
Maximum range -----	2,200 m

Muzzle velocity -----	244 mps (795 fps)
Arming distance-----	18 to 36 m (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 lb
Dimensions -----	26-3/8 x 16-1/4 x 6-3/16 in.
Cube -----	1.5 cu ft

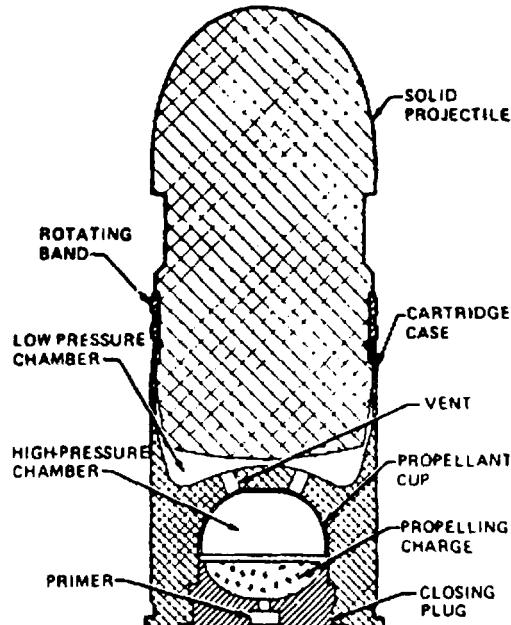
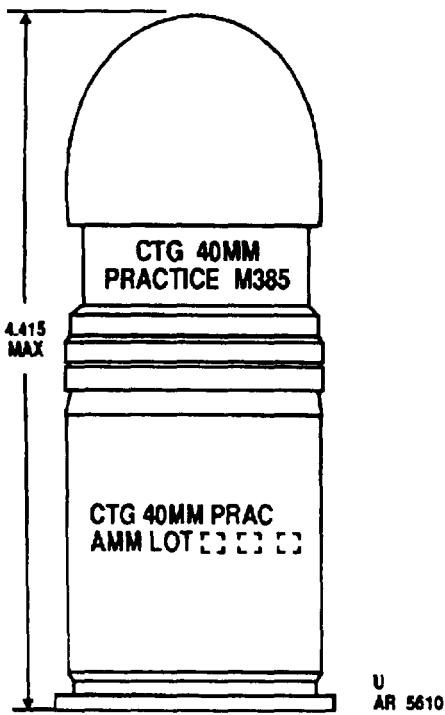
\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

#### **Shipping and Storage Data:**

UNO serial number -----	0006
Hazard class/division and storage compatibility group --	1.1 E
DOT class -----	Class A
DOT marking -----	Explosive AMMUNI- TION FOR EXPLOSIVE PROJECTILE
DODAC -----	1310-B470
Cartridge drawing number -----	8886397
Packing drawing number -----	9251995

#### **References:**

## CARTRIDGE, 40-MILLIMETER: PRACTICE, M385



AH199567

**Type Classification:**

Std AMCTC 2177 dtd 1964

**Use:**

This cartridge is fired from 40mm Grenade Launchers M75 and M129 and 40mm Machine Gun MK19, Mod 1 and Mod 3. 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:**

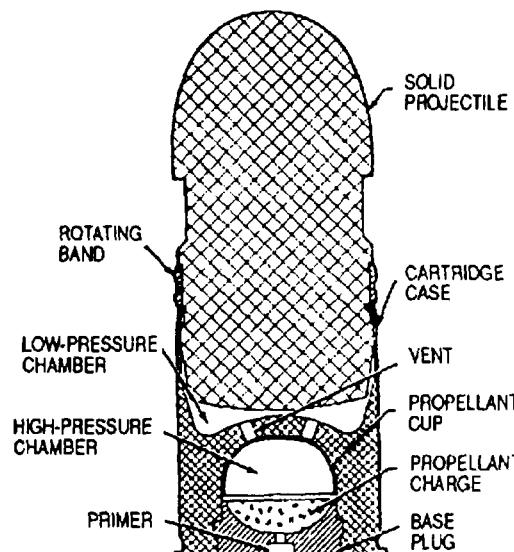
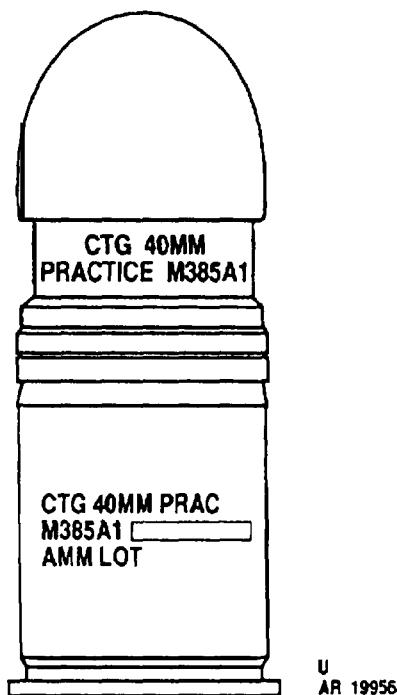
Complete round:

Type	Practice
Weight	350 g
Length	4.415 in.
Weapons used with	M75, M129 40mm Grenade Launchers MK19, Mod 1, MK19, Mod 3, 40mm machine guns

<b>Projectile:</b>		Dimensions -----	26-3/8 x 16-1/4
Body material -----	Bar alloy aluminum	x 6-3/16 in.	
Color -----	Blue w/black markings	Cube -----	1.5 cu ft
<b>Propelling charge:</b>		<b>*NOTE:</b> See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.	
Cartridge case -----	M169		
Propellant -----	M2, 4.2 g		
Primer -----	Percussion, FED 215		
<b>Performance:</b>		<b>Shipping and Storage Data:</b>	
Maximum range-----	2,200 m	UNO serial number -----	0328
Muzzle velocity -----	244 mps (795 fps)	Hazard class/division and storage compatibility group --	(04) 1.2 C
		DOT class -----	Class C
		DOT marking -----	Explosive CAR- TRIDGES, PRACTICE AMMUNI- TION
<b>Temperature Limits:</b>		DODAC -----	1310-B480
<b>Firing:</b>		Cartridge drawing number -----	8886326
Lower limit -----	-25°F (-31.5°C)	Packing drawing number -----	9251995
Upper limit -----	+110°F (+43°C)		
<b>Storage:</b>			
Lower limit -----	-30°F (-34°C)		
Upper limit -----	+145°F (+62.5°C)		
<b>*Packing -----</b>	50 rounds in linked belt		
<b>*Packing Box:</b>			
Weight -----	53 lb		

**References:**

- SB 700-20  
 TM 9-1010-230-10  
 TM 9-1010-230-23&P  
 TM 9-1300-251-20  
 TM 9-1300-251-34

**CARTRIDGE, 40-MILLIMETER: PRACTICE, M385A1**

U  
AR 199567-A

**Type Classification:**  
Std AMSR 12876002

**Use:**

This practice cartridge is fired from 40mm Grenade Launcher M75 and 40mm Grenade Machine Gun MK19 Mod 3. The cartridge is designed only for practice or for proof testing weapons. Not authorized for use in M129 Grenade Launcher.

**Description:**

This cartridge is a fixed round of ammunition. It differs from the M385 cartridge in that the ogive matches the shape of the M430 projectile ogive. 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. The case contains the propelling charge and percussion primer.

It is linked only with the M16A2 link, whereas the M385 is linked with either M16A1 or M16A2 links. 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:**

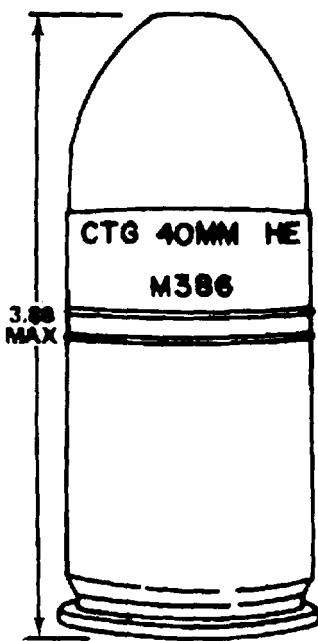
The weapon firing pin strikes the percussion primer to ignite the propelling charge. The expanding gases from the burning propellant are forced from the high-pressure chamber, through vent holes into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher 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 242 meters per second. Because it is inert, the projectile does not function upon impact with the target.

**Tabulated Data:**

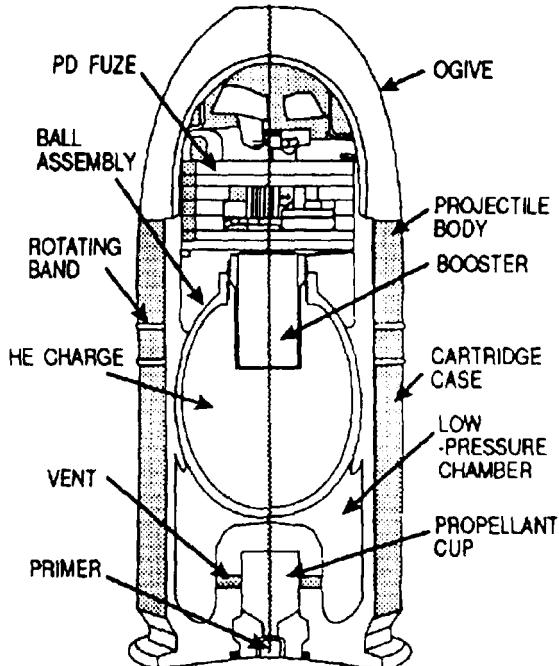
Complete round:

Type -----	Practice
Weight -----	0.77 lb (350 g)
Length -----	4.415 in. ( 11.214 cm)

Weapons used with -----	40mm Grenade Launcher MK19 Mod 3, 40mm machine gun	Cube -----	1.3 cu ft (0.04 cu m)	
Projectile:		Packing drawing number-----	9362543	
Body material -----	Bar alloy aluminum	NSN: 1310-01-316-9973		
Color -----	Blue w/black markings	Packing -----	32 rounds ln linked belt	
Propelling Charge:		Packing Box Metal PA-120:		
Cartridge case -----	M169	Weight -----	42 lb (18.14 kg)	
Propellant -----	M2, 4.2 g	Dimensions -----	18.76 x 10.39 x 6.36 in. (47.65 x 26.39 x 16.15 cm)	
Primer -----	Percussion, FED 25	Cube -----	0.72 cu ft (0.02 cu m)	
Performance:		Packing drawing number-----	12928042	
Maximum Range -----	2,200 m (7217.85 ft)	NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.		
Muzzle velocity -----	242 mps (795 fps)			
<b>Temperature Limits:</b>				
Firing:		<b>Shipping and Storage Data:</b>		
Lower limit -----	-25°F (-31.5°C)	UNO serial number -----	0338	
Upper limit -----	+110°F (+43°C)	Hazard class/division and storage compatibility group --	(04) 1.4 C	
Storage:		DOT class -----	Class C	
Lower limit -----	-30°F (-34°C)	DOT marking -----	Explosive CAR-TRIDGES, PRACTICE AMMUNITION	
Upper limit -----	+145°F (+62.5°C)	DODAC -----	1310-B576	
*NSN: 1310-01-159-3184				
Packing -----	48 rounds in linked belt	Cartridge drawing number -----	8886326	
Packing Box:		<b>References:</b>		
Weight -----	59.5 lb (26.99 kg)	DOD Consolidated Ammunition Catalog SB 700-20		
Dimensions -----	18-19/32 x 14-19/32 x 8-19/64 in. (47.23 x 37.07 x 21.07 cm)	TM 9-1010-230-10		
		TM 9-1010-230-23&P		
		TM 9-1300-251-20		
		TM 9-1300-251-34		

**CARTRIDGE, 40-MILLIMETER: HE, M386**

AR199566

U  
AR 199565**Type Classification:**

Con MSR 11756003

**Use:**

This cartridge is a high explosive round designed to inflict personnel casualties from ground burst effect and is fired from 40mm Grenade Launcher M79 and M203 (attached to the M16 series 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 bichambered 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 surround-

ing 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 exploding 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 inward 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 -----	0.50 lb
Length -----	3.89 in.
Weapons used with -----	M79, M203 40mm grenade launchers (attached to M16 series rifle)

##### Projectile:

Body material -----	Aluminum skirt and steel ball with explosive filler
Color -----	Olive drab w/yellow markings and yellow ogive
Filler -----	Composition B, 32 g
Fuze -----	PD, M551
Propelling charge:	
Cartridge case -----	M118
Propellant -----	M9, 330 mg
Primer-----	Percussion, M42, FED 100
Performance:	
Maximum range-----	400 m
Muzzle velocity -----	76 mps (250 fps)

#### Temperature Limits:

Firing:	
Lower limit -----	-45°F (-42.8°)

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 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

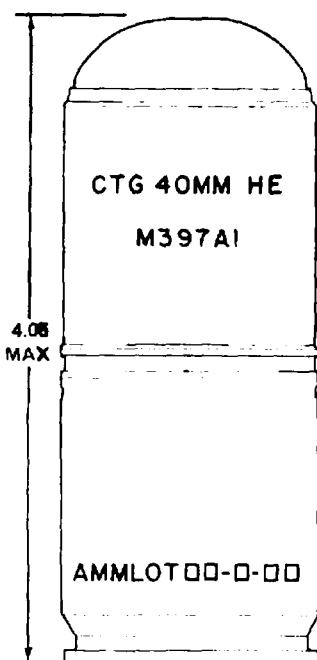
\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

#### Shipping and Storage Data:

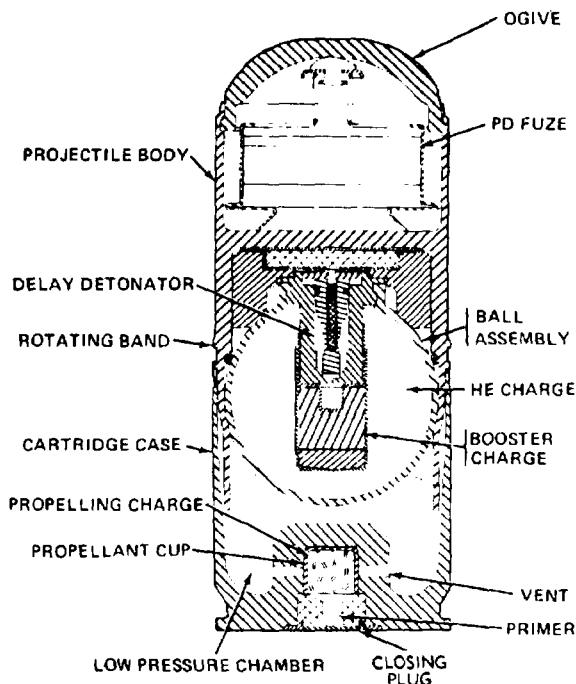
UNO serial number -----	0321
Hazard class/division and storage compatibility group --	(04) 1.2E
DOT class -----	Class A
DOT marking -----	Explosive AMMUNITION FOR CANNON W/EXPLOSIVE PROJECTILES
DODAC -----	1310-B574
Cartridge drawing number -----	8835951
Packing drawing number-----	8835948

#### References:

- SB 700-20
- TM 9-1010-205-10
- TM 9-1010-221-10
- TM 9-1300-251-20
- TM 9-1300-251-34

**CARTRIDGE, 40-MILLIMETER: HE, M397A1**

AR199562



AR199561

**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 40mm Grenade Launchers M79 and M203 (attached to the M16 series 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 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. 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 bellville 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 set-back 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 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 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 -----	0.51 lb
Length -----	4.05 in.
Weapons used with -----	M79, M203 40mm grenade launchers (attached to M16 series rifle)

##### Projectile:

Body material -----	Aluminum skirt with steel ball containing explosive filler
Color -----	Olive drab w/yellow markings and yellow ogive
Filler -----	OCTOL, 32 g
Fuze -----	PD, M536E1
Propelling charge:	
Cartridge case -----	M118
Propellant -----	M9, 330 mg
Primer -----	M42, FED 100

#### Performance:

Maximum range -----	400 m
Muzzle velocity -----	76 mps (250 fps)
Arming delay distance -----	14 to 27 m (45 to 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 per bandoleer; 12 bandoleers (72 rounds) per box
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##### \*Packing Box:

Weight -----	58 lb
Dimensions -----	17-3/4 x 14-1/8 x 11-15/32 in.
Cube -----	1.7 cu ft

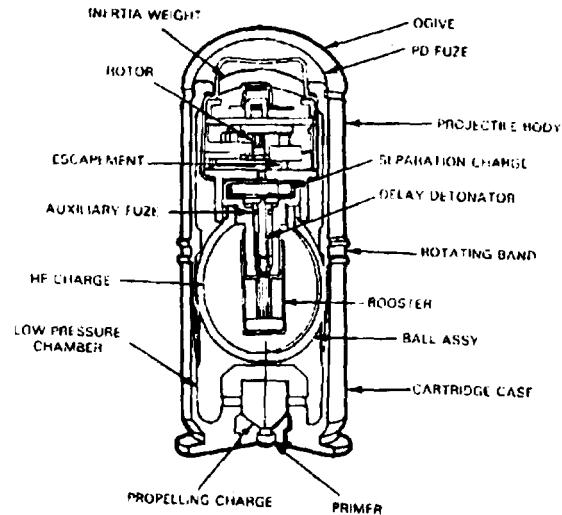
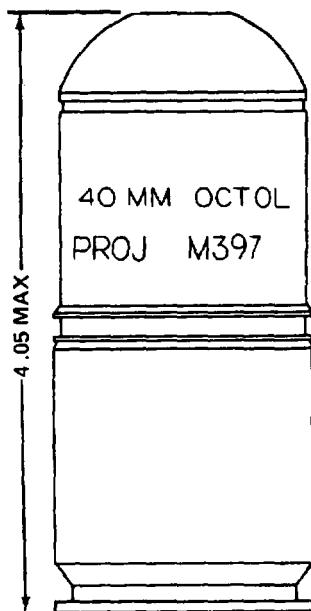
\*Note: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

#### Shipping and Storage Data:

UNO serial number -----	0006
Hazard class/division and storage compatibility group --	1.1 E
DOT class -----	Class A
DOT marking -----	Explosive AMMUNITION FOR CANNON W/ EXPLOSIVE PROJECTILES
DODAC -----	1310-B569
Cartridge drawing number -----	P9233158
Packing drawing number -----	882362

#### References:

- SB 700-20
- TM 9-1010-205-10
- TM 9-1010-221-10
- TM 9-1300-251-20
- TM 9-1300-251-34

**CARTRIDGE, 40-MILLIMETER: HE, M397**

ARD 85-255J

AR199564

**Type Classification:**

Std MSR 08746022

**Use:**

This cartridge is a high explosive round designed to inflict personnel casualties using air burst effect, and fired from 40mm Grenade Launchers M79 and M203 (attached to the M16 series 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 40mm grenade launchers (attached to M16 series rifle)

Projectile:

Body material -----	Aluminum skirt and steel ball containing explosive filler
---------------------	---

Color -----

Olive drab w/yellow marking and yellow ogive
--

Filler -----

OCTOL, 32 g
-------------

Fuze -----

PD, M536
----------

Propelling charge:

Cartridge case -----	M118
Propellant -----	M9, 330 mg
Primer -----	M42, FED 100

Performance:

Maximum range -----	400 m
Muzzle velocity -----	76 mps (250 fps)
Arming distance -----	14 to 27 m (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)
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Upper limit ----- +165°F (73.9°C)

\*Packing ----- 6 rounds packed in plastic bando-leer; 12 bandoleers (72 rounds) per box

\*Packing Box:

Weight -----	58 lb
Dimensions -----	17-3/4 x 14-1/8 x 11-15/32 in.
Cube -----	1.7 cu ft

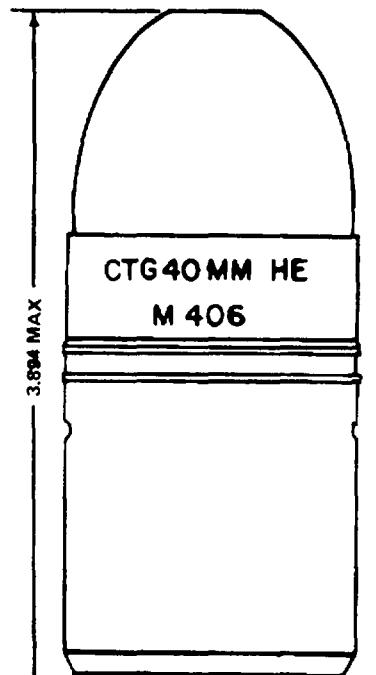
\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

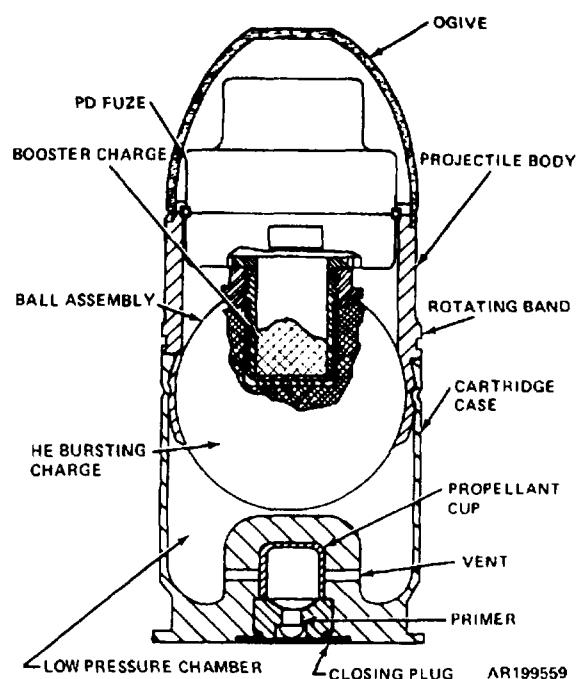
UNO serial number -----	0006
Hazard class/division and storage compatibility group --	1.1 E
DOT class -----	Class A Explosive
DOT marking -----	AMMUNITION FOR CANNON W/ EXPLOSIVE PROJECTILES
DODAC -----	1310-B569
Cartridge drawing number -----	8883461
Packing drawing number -----	8882362

**References:**

SB 700-20
TM 9-1010-205-10
TM 9-1010-221-10
TM 9-1300-251-20
TM 9-1300-251-34

**CARTRIDGE, 40-MILLIMETER: HE, M406**

AR199560



AR199559

**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 40mm Grenade Launchers M79 or M203 (attached to the M16 series 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 pressfitted 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 lb
Length -----	3.894 in.
Weapons used with -----	M79, M203 40mm grenade launchers (attached to M16 series rifle)
Projectile:	
Body material -----	Aluminum skirt with steel ball
Color -----	Olive drab w/yellow markings and yellow ogive
Filler and weight -----	Comp B, 32 g
Faze -----	PD, M551
Propelling charge:	
Cartridge case -----	M118
Propellant -----	M9, 330 mg
Primer -----	M42, FED 100
Performance:	
Maximum range -----	400 m
Muzzle velocity -----	76 mps (247 fps)
Arming distance -----	14 to 27 m

### Temperature Limits:

Firing:	Lower limit -----	-45°F (-42.8°C)
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Upper limit -----	+125°F (51.6°C)
Storage:	
Lower limit -----	-66°F (-53.8°C)
Upper limit -----	+165°F (73.9°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
Cube -----	1.7 cu ft

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

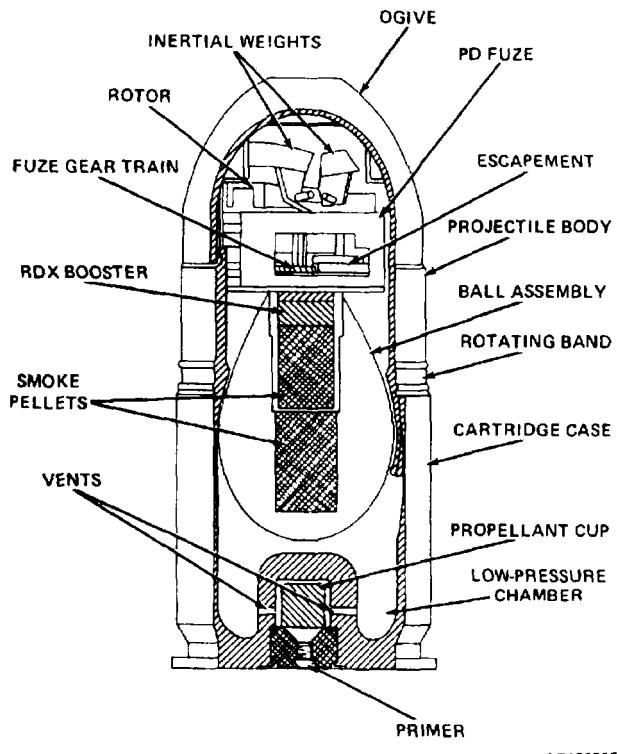
### Shipping and Storage Data:

UNO serial number -----	0321
Hazard class/division and storage compatibility group --	(04) 1.2 E
DOT class -----	Class A
DOT marking -----	Explosive AMMUNITION FOR CANNON W/ EXPLOSIVE PROJECTILES
DODAC -----	1310-B568
Cartridge drawing number -----	8835950
Packing drawing number -----	8835104, 8835105

### References:

- SC 700-20
- TM 9-1010-205-10
- TM 9-1010-221-10
- TM 9-1300-251-20
- TM 9-1300-251-34

## CARTRIDGE, 40-MILLIMETER: PRACTICE, M407A1



### 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 series 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 escape 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 ignited the two yellow smoke pellets, causing a puff of yellow smoke which simulates explosive impact.

#### **Tabulated Data:**

##### Complete round:

Type -----	Practice
Weight -----	0.50 lb
Length -----	3.894 in.
Weapons used with -----	M79, M203 40mm grenade launchers (attached to M16 series 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 m
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)
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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

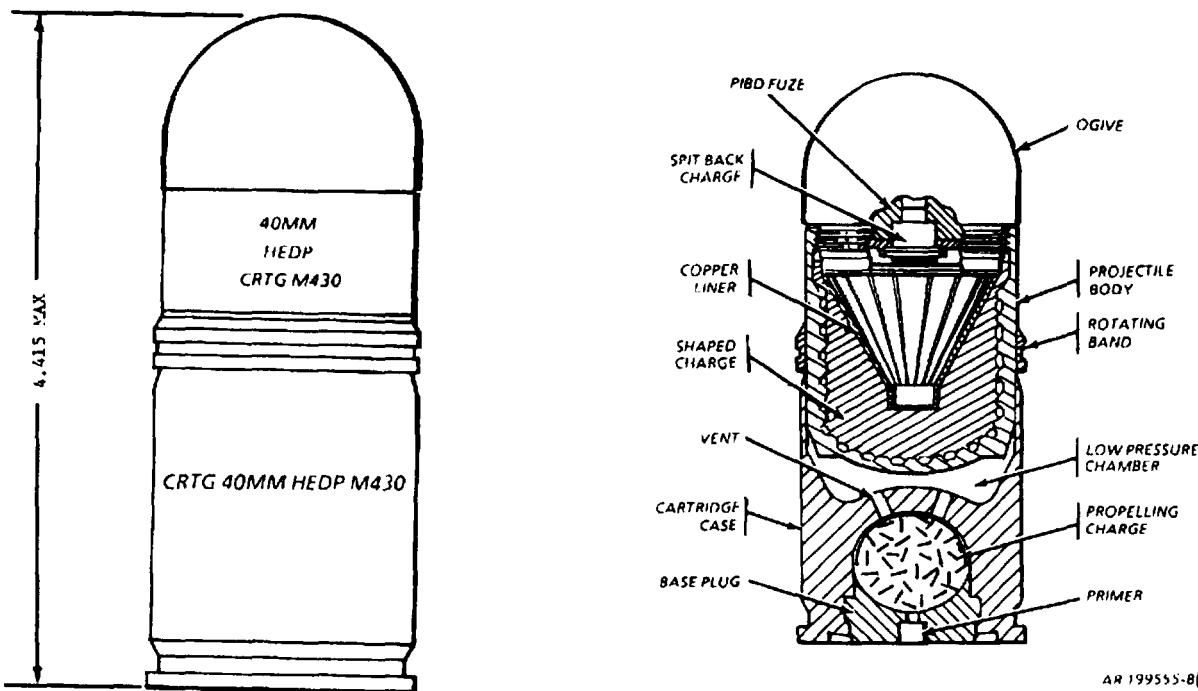
\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

#### **Shipping and Storage Data:**

UNO serial number -----	0328
Hazard class/division and storage compatibility group --	(04) 1.2 C
DOT class -----	Class C Explosive
DOT marking -----	C A R TRIDGES, PRACTICE AMMUNI- TION
DODAC -----	1310-B577
Cartridge drawing number -----	8835952
Packing drawing numbers -----	8835104, 8835105

#### **References:**

TM 9-1010-205-10
TM 9-1010-221-10
SB 700-20
TM 9-1300-251-20
TM 9-1300-251-34

**CARTRIDGE, 40-MILLIMETER: HEDP, M430, M430A1**

AR 199556-B

**Type Classification:**

Std AMCTC 8664 dtd 1971  
 Std LCC-A MSR 10926030 dtd  
 1992- M430A1

**Use:**

This cartridge is a high explosive, dual purpose, impact type round designed to penetrate two inches (three inches for the M430A1) of steel armor at 0 angle of obliquity and inflict personnel casualties in the target area. It is fired from 40mm Machine Gun MK19 Mod 3. Not authorized for use in M129 Grenade Launcher.

**Description:**

This cartridge is a fixed round of ammunition with an internally embossed steel projectile body containing a high explosive charge of Comp A5 and a copper liner. The liner in the M430A1 is slightly longer so there is less Comp A5. A PIID fuze, integral with the ogive and containing a spit-back charge, is threaded into the loaded body forming the complete projectile. An M169 Cartridge Case Assembly is crimped to the projectile. The case is a hollow, bichambered aluminum cylinder with vents connecting the chambers. The propellant chamber, which contains the propelling charge, is sealed at the rear by a base plug. A percussion primer is

crimped into the center opening in the base plug. The propellant chamber acts as a high-pressure chamber, and the forward 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 attaining a muzzle velocity of 241 meters per second. Prior to firing, the detonator in the fuze rotor is held out of line by the position of the setback pin against the rotor and gear assembly. Upon firing, setback force frees the rotor from the pin. The spin of the projectile causes the safety spring assembly to disengage from the rotor and gear assembly. The detonator then begins to move toward the armed position under the influence of centrifugal force on the eccentrically located rotor. The movement of the rotor and gear assembly is resisted by an escapement mechanism, providing the required time delay in the arming of the fuze. The deto-

nator reaches the armed position when the projectile has traveled a distance of 18 to 40 meters from the launcher. Upon impact with the target, the firing pin is driven into the detonator. The effect of the detonator initiates the spit-back charge producing a jet which in turn initiates the main charge. Detonation of the main charge provides both the armor piercing effect of the shaped charge and fragmentation of the steel body.

#### Tabulated Data:

##### M430:

NSN 1310-00-867-6609 -US Army Pack  
 NSN 1310-01-159-8043- M548 US Marine Corps Pack  
 NSN 1310-01-319-1541- PA 120 US Army Pack  
 NSN 1310-01-362-5296- PA 120 US Marine Corps Pack

##### M430A1:

NSN 1310-01-350-0247- M548 Pack  
 NSN 1310-01-354-8745- PA 120 US Army Pack  
 NSN 1310-01-362-5295- PA 120 US Marine Corps Pack

##### Complete round:

Type -----	HEDP
Weight -----	0.75 lb (340 g)
Length -----	4.415 in.
Weapons used with -----	MK19 Mod 1 and Mod 3 40mm Grenade Machine Gun

##### Projectile:

Body material -----	Blanked and drawn steel
Color -----	Olive drab w/yellow markings and yellow ogive
Filler and weight -----	Comp A5, 38 g (32 g - M430A1)
Fuze -----	PIBD, M549
Propelling charge:	
Cartridge case -----	M169
Propellant -----	M2, 4.2 g
Primer -----	Percussion, FED 215

#### Performance:

Maximum range -----	2,200 m
Muzzle velocity -----	241 mps (790 fps)
Arming distance -----	18 to 40 m (59 -131 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)

#### U.S. Army Pack:

*Packing -----	50 rounds in linked belt
<b>*Packing box:</b>	
Weight -----	53 lb
Dimensions -----	26-3/8 x 16-1/4 x 6-3/16 in.
cube -----	1.5 cu ft
Packing drawing number -----	9251995
Packing, PA 120 -----	32 rounds in linked belt

Packing Box:	
Weight -----	42 lb
Dimensions -----	18.76 x 10.39 x 6.36 in.
Cube -----	0.72 cu ft
Packing drawing number -----	12928042
PA -120 metal container -----	12564414

#### U.S. Marine Corps Pack:

*Packing -----	48 rounds in linked belt
<b>*Packing box:</b>	
Weight -----	59.5 lb
Dimensions -----	18-19/32 x 14-19/32 x 8-19/64 in.
Cube -----	1.3 cu ft
Packing drawing number -----	9362543
M548 metal container -----	7258943

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

**\*Shipping and Storage Data:**

UNO serial number ----- 0006  
Hazard class/division and storage comparability group - (04) 1.1E  
DOT class ----- Class A  
Explosive AMMUNI-  
TION FOR CANNON  
WITH EXPLOSIVE  
PROJEC-  
TILES  
DODAC ----- 1310-B542

Cartridge drawing number  
M430----- 9287851  
M430A1 cartridge drawing  
number----- 12926811

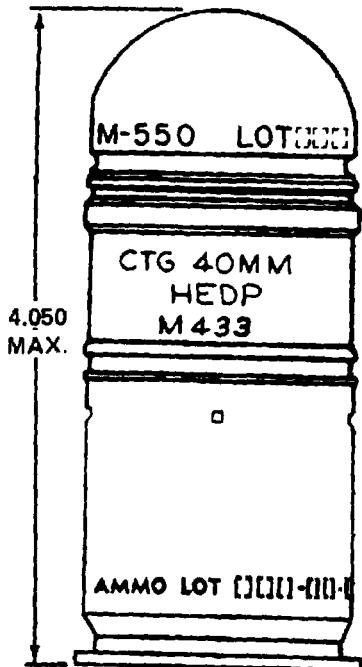
\*NOTE: See DOD Consolidated Ammunition Catalog for additional data.

**References:**

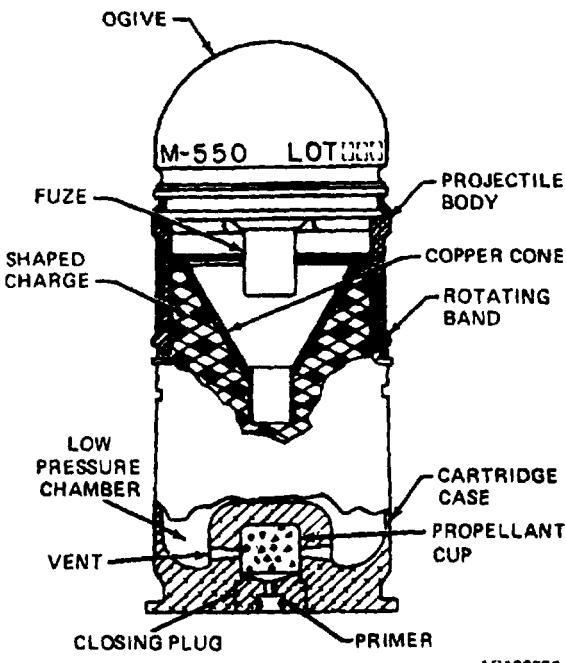
SB 700-20  
TM 9-1300-251-20  
TM 9-1300-251-34  
TM 9-1010-230-10  
TM 9-1010-230-23&P

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## 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 40mm Grenade Launchers M79 and M203 (attached to the M16 series 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 spit-back charge and copper cone liner 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 spit-back 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 -----	HEAP
Weight -----	0.507 lb
Length -----	4.05 in.
Weapons used with -----	M79, M203 40mm grenade launchers (attached to M16 series rifle)

##### Projectile:

Body material -----	Aluminum skirt with steel cup attached
Color -----	Olive drab w/white markings and yellow ogive
Filler and weight -----	Comp A5, 45 g
Fuze -----	PIBD, M550
Propelling charge:	
Cartridge case -----	M118
Propelling charge -----	M9, 330 mg
Primer -----	M42, FED 100
Performance:	
Maximum range -----	400 m
Muzzle velocity -----	76 mps (250 fps)
Arming distance -----	14 to 27 m (45 -90 ft)

#### **Temperature Limits:**

##### Firing:

Lower limit -----	-45°F (-42.8°C)
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Upper limit -----	+125°F (51.6°C)
<b>Storage:</b>	
Lower limit -----	-65°F (-53.8°C)
Upper limit -----	+165°F (73.9°C)
<b>*Packing -----</b>	
6 rounds in bandoleer; 12 bandoleers (72 rounds) per box	
<b>*Packing Box -----</b>	
Weight -----	53.5 lb
Dimensions -----	17-3/4 x 14-1/8 x 11-15/32 in.
Cube -----	1.7 cu ft

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

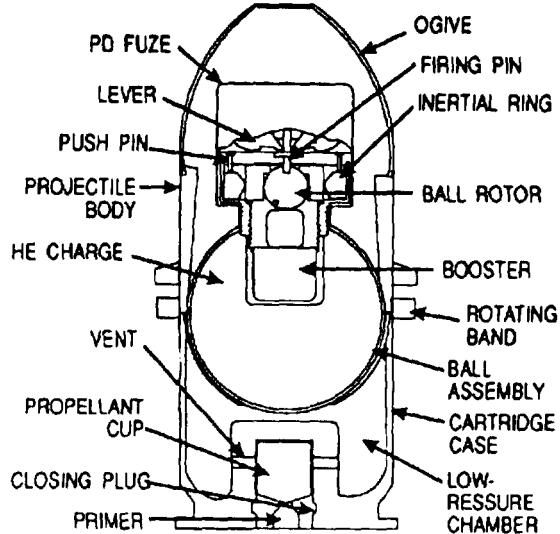
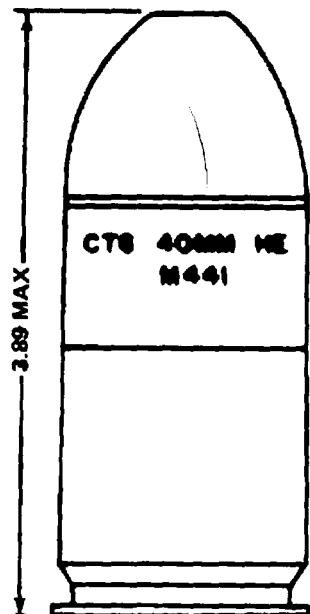
#### **Storage and Shipping Data:**

UNO serial number -----	0006
Hazard class/division and storage compatibility group --	(04) 1.1 E
DOT class -----	Class A Explosive
DOT marking -----	AMMUNITION FOR CANNON W/ EXPLOSIVE PROJECTILES
DODAC -----	1310-B546
Cartridge drawing number -----	8886371
Packing drawing number -----	8835104, 8835105

#### **References:**

- SB 700-20
- TM 9-1010-205-10
- TM 9-1010-221-10
- TM 9-1300-251-20
- TM 9-1300-251-34

## CARTRIDGE, 40-MILLIMETER: HE, M441



U  
AR 199551

AR199552

**Type Classification:**

Con MSR 11756003

**Use:**

This cartridge is a high explosive round designed to inflict personnel casualties using ground burst effect. It is fired from 40mm Grenade Launchers M79 and M203 (attached to the M16 series 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 to detonate the high explosive charge resulting in blast and fragmentation of the projectile body.

**Tabulated Data:**

Complete round:

Type ----- HE  
 Weight ----- 0.503 lb  
 Length ----- 3.89 in.  
 Weapons used with ----- M79, M203  
 40mm grenade launchers (attached to M16 series rifle)

Projectile:

Body material ----- Aluminum skirt with steel ball containing explosive filler  
 Color ----- Olive drab w/yellow markings and yellow ogive  
 Filler and weight ----- CompB, 32g  
 Faze ----- PD, M552  
 Propelling charge:  
 Cartridge case ----- M118  
 Propellant ----- M9, 330 mg  
 Primer ----- Percussion, M42  
 Performance:  
 Maximum range ----- 400 m  
 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.°C)

Upper limit ----- +165°F (73.9°C)  
 \*Packing ----- 6 rounds per bandoleer; 12 bandoleers (72 rounds) per box  
 \*Packing Box:  
 Weight ----- 53 lb  
 Dimensions ----- 17-3/4 x 14-1/8 x 11-15/32 in,  
 Cube ----- 1.7 cu ft

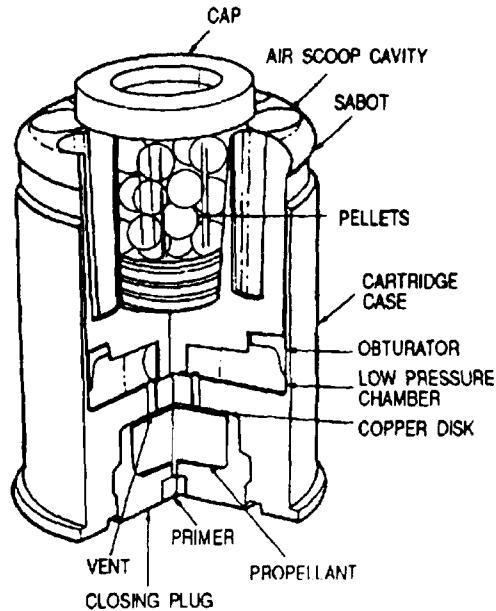
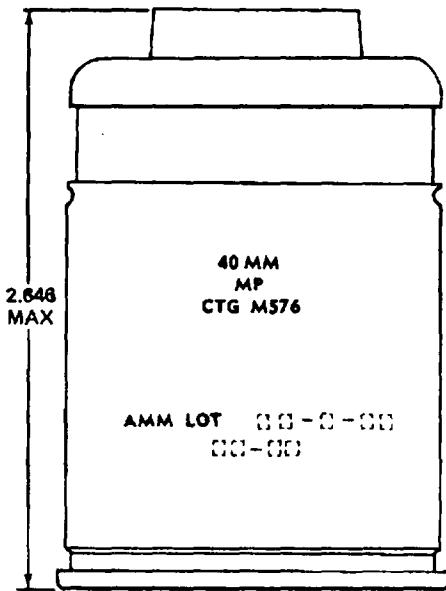
\*NOTE: See DOD Consolidated Ammunition catalog for complete packing data including NSN's.

**Storage and Shipping Data:**

UNO serial number -----	0321
Hazard class/division and storage compatibility group --	(04) 1.2 E
DOT class -----	Class A
DOT marking -----	Explosive AMMUNITIONFOR CANNON W/ EXPLOSIVE PROJECTILES
DODAC -----	1310-B575
Cartridge drawing number -----	9884459
Packing drawing number -----	8835105

**References:**

SB 700-20  
 TM 9-1010-205-10  
 TM 9-1010-221-10  
 TM 9-1300-251-20  
 TM 9-1300-251-34

**CARTRIDGE, 40-MILLIMETER: MULTIPLE PROJECTILE, M576**U  
AR 4949

AR199548

**Type Classification:**

Con MSR 11756003

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 40mm Grenade Launchers M79 and M203 (attached to the M16 series 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 snap on 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 bichambered 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 lb
Length -----	2.646 in.
Cannon used with -----	M79, M203, 40mm grenade launchers (attached to M16 series rifle)

Projectile:

Body material -----	Molded polyethylene plastic
Color -----	black w/white markings
Filler and weight -----	20 metal pellets, 24g

Propelling charge:

Cartridge case -----	M199
Propellant -----	M2, 186 mg
Primer -----	Percussion, 0.45 cal, Remington, No. 2-1/2

Performance:

Effective range -----	30 m
Muzzle velocity -----	269 mps (885 fps)

**Temperature Limits:**

Firing:

Lower limit -----	-45°F (-42.8°C)
Upper limit -----	+125°F (51.8°C)

Storage:

Lower limit -----	-65°F (-53.8°C)
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Upper limit -----	+165°F (73.9°C)
*Packing -----	6 rounds per bandoleer; 12 bandoleers (72 rounds) per wirebound wooden box

\*Packing Box:

Weight -----	34 lb
Dimensions -----	16-1/4 x 13-1/4 x 10-11/16 in.
cube -----	1.3 cu ft

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

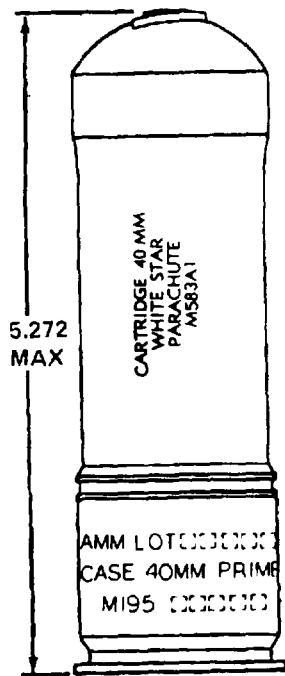
**Storage and Shipping Data:**

UNO serial number -----	0012
Hazard class/division and storage compatibility group-----	1.4 S
DOT class -----	Class C
DOT marking -----	Explosive SMALL ARMS AMMUNI- TION
DODAC -----	1310-B534
Cartridge drawing number -----	10542398
Packing drawing number -----	8835105

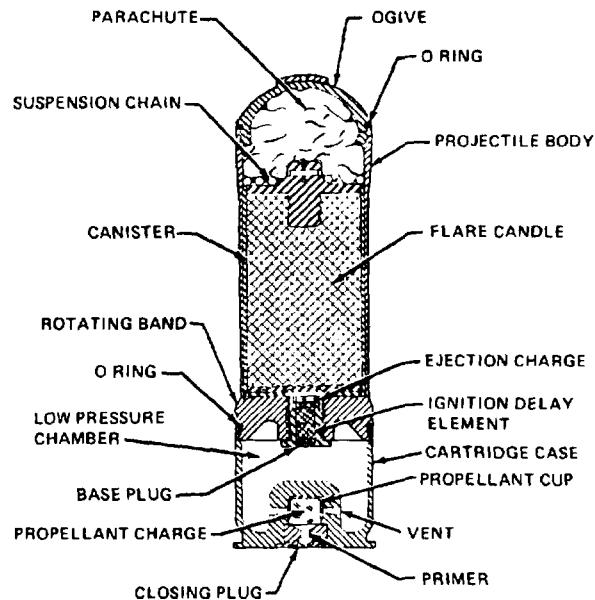
**References:**

SB 700-20
TM 9-1010-205-10
TM 9-1010-221-10
TM 9-1300-251-20
TM 9-1300-251-34

**CARTRIDGE, 40-MILLIMETER: PARACHUTE, WHITE STAR, M583A1;  
GREEN STAR, M661; AND RED STAR, M662**



AR199546



AR199545

**Type Classification:**

M583A1-Std LCC-A, AMCTC, 9096 dtd 1972  
M661-Std LCC-A, MSR 09766018  
M662-Std LCC-A, MSR 09766018

**Use:**

These cartridges are designed for illumination and signaling with less weight and bulk and greater accuracy than comparable handheld signals. They are fired from 40mm Grenade Launchers M79 and M203 (attached to the M16 series 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- to 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 sealed 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 feet per second. 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, green, rod star
Weight -----	0.49 lb
Length -----	5.272 in.
Weapons used with -----	M79, M203 40mm grenade launchers (attached to M16 series rifle)

#### Projectile:

Body material -----	Impact or bar alloy aluminum
Color -----	White w/black markings
Filler and weight -----	Illum comp: M583A1 -93 g M661 -86 g M662 -85 g
Average candlepower (rein): -----	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 m, (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° (-53.8°C)
Upper limit -----	+165°F (73.9°C)
Packing -----	22 rounds per metal box; 2 metal boxes (44 rounds) per wirebound wooden box

*Packing Box:	
Weight -----	45, 9 lb
Dimensions -----	14-5/8 x 12-13/16 x 9-1/8 in.
Cube -----	1.0 cu ft

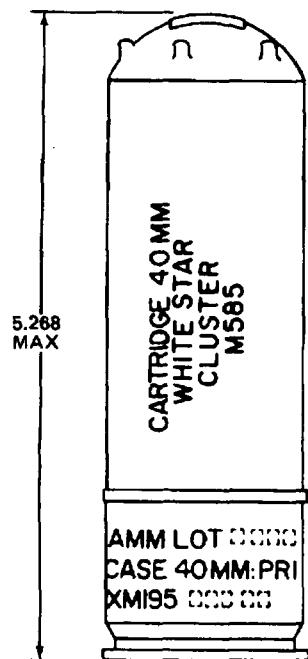
\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

### **Shipping and Storage Data:**

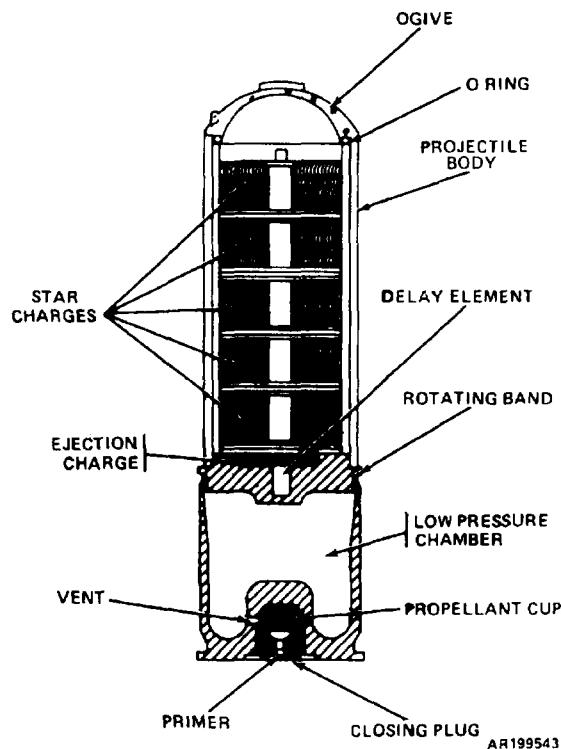
UNO serial number .....	0312
Hazard class/division and storage compatibility group --	1.4 G
DOT class .....	Class C
DOT marking -----	Explosive SIGNAL FLARES, HANDLE CAREFULLY -KEEP FIRE AWAY
DODAC -----	131 0-B535 (M583A1) 131 0-B504 (M661) 131 0-B505 (M662)
Cartridge drawing number -----	9243881
Packing drawing numbers -----	9209204, 9209205

### **References:**

SB 700-20	
TM 9-1010-205-10	
TM 9-1010-221-10	
TM 9-1300-251-20	
TM 9-1300-251-34	

**CARTRIDGE, 40-MILLIMETER: CLUSTER, WHITE STAR, M585**

AR199544



AR199543

**Type Classification:**

Con MSR 11756003

**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 40mm Grenade Launchers M79 and M203 (attached to the M16 series 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 bichambered 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 candle-power.

**Tabulated Data:**

Complete round:

Type -----	Cluster, white star
Weight -----	0.41 lb
Length -----	5.268 in,
Weapons used with -----	M79, M203 40-mm grenade launchers (attached to M16 series rifle)
Projectile:	
Body material -----	Impact or bar aluminum
Color -----	White w/black markings
Filler and weight -----	Illum, 85 g (each pellet 17g)
Propelling charge:	
Cartridge case -----	M195
Propellant -----	M9, 330 mg
Primer -----	percussion, M42
Performance:	
Burst height -----	167 m (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 lb  
Dimensions ----- 14-5/8x 12-13/16x 9-1/8 in,  
Cube ----- 1.0 cu ft

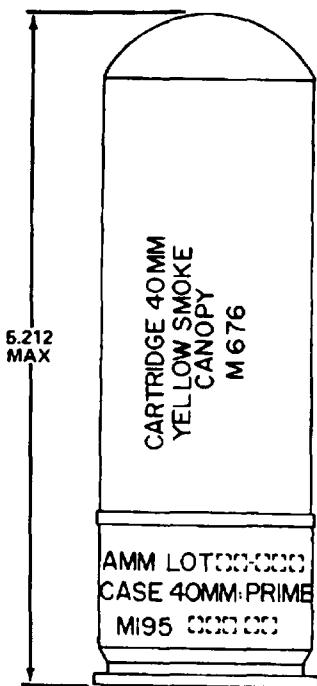
\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

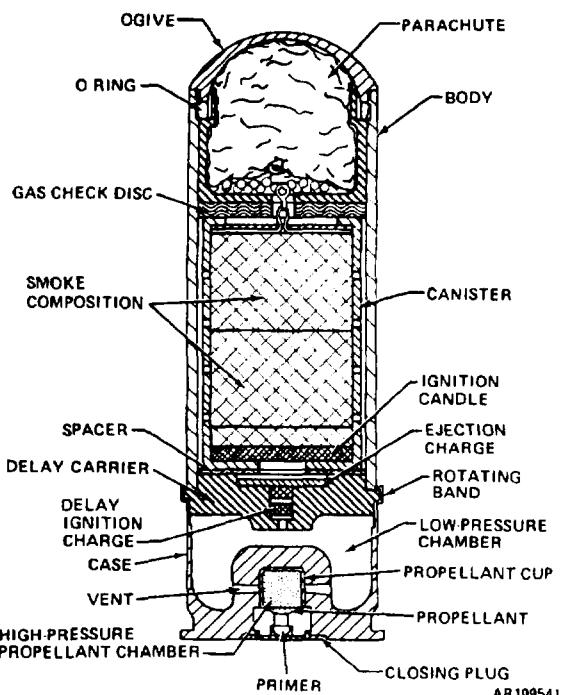
UNO serial number -----	0312
Hazard class/division and storage compatibility group --	1.4G
DOT class -----	Class C
DOT marking -----	Explosive SIGNAL FLARES, HANDLE CAREFULLY -KEEP FIRE AWAY
DODAC -----	1310-B536
Drawing number -----	9207987
Packing drawing numbers -----	9209204 9209205

**References:**

SB 700-20  
TM 9-1010-205-10  
TM 9-1010-221-10  
TM 9-1300-251.20  
TM 9-1300-251-34

**CARTRIDGE 40-MILLIMETER: CANOPY YELLOW SMOKE, M676**

AR199542

**Type Classification:**

Std LCC-A, MSR 09766018

**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 40mm Grenade Launchers M79 and M203 (attached to the M16 series 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 about 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	0.48 lb
Length	5.212 in.
Weapons used with	M79, M203 40mm grenade launchers (attached to M16 series rifle)
Projectile:	
Body material	Impact or bar aluminum alloy
Color	Light green w/black markings
Filler and weight	Yellow smoke composition 59 g
Propelling charge:	
Cartridge case	M195
Propellant	M9, 330 mg
Primer	Perc., M42
Performance:	
Burst height	91 m (QE=85°) (approx)
Muzzle velocity	76 imps (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 lb
Dimensions	-----	14-5/8 x 12-13/16 x 9-1/8 in.
Cube	-----	1.0 cu ft

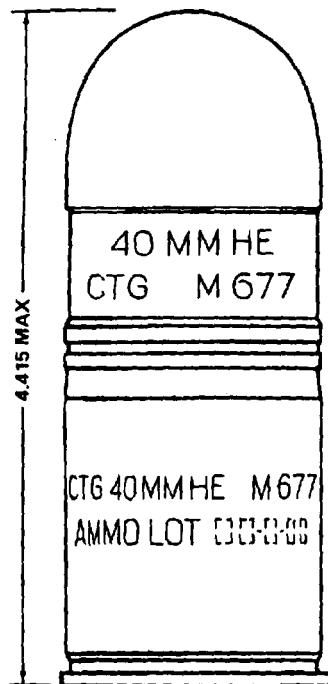
\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

#### **Storage and Storage Data:**

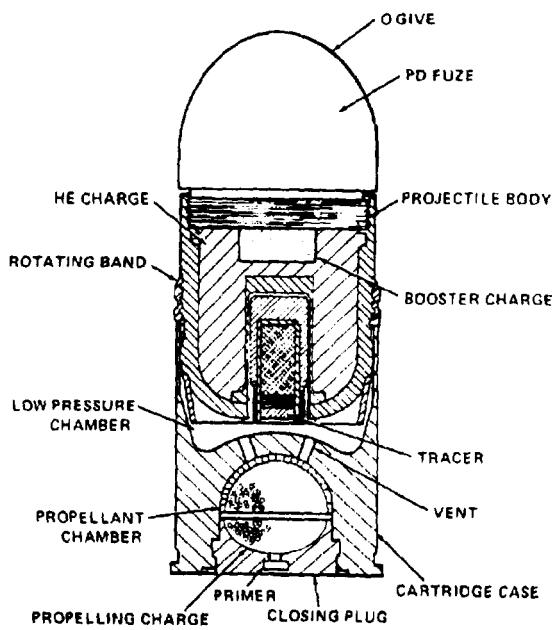
UNO serial number	-----	0197
Hazard class/division and storage compatibility group	-----	1.4 G
DOT class	-----	class c
DOT marking	-----	Explosive SMOKE SIGNALS, HANDLE CAREFULLY - KEEP FIRE AWAY
DODAC	-----	1310-B475
Drawing number	-----	9229370
Packing drawing number	-----	9209204, 9209205

#### **Reference:**

- SB 700-20
- TM 9-1010-205-10
- TM 9-1010-221-10
- TM 9-1300-251-20
- TM 9-1300-251-34

**CARTRIDGE, 40-MILLIMETER: HE-1; M677**

AR199540



AR199539

**Type Classification:**

Not type classified

**Used:**

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 40mm Grenade Launchers M75 and M129, and from 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 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 0.07 to 0.16 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 -----	0.75 lb
Length -----	4.415 in.
Cannon used with -----	M75, M129 40mm Grenade Launchers MK19 Mod 1 40mm machine gun

##### Projectile:

Body material -----	Plate steel
Color -----	Olive drab w/yellow markings and yellow ogive
Filler and weight -----	Cyclotol 70/30, 45 g

Fuze ----- PD, M533

##### Propelling charge:

Cartridge case -----	M169
Propellant -----	M2, 4.64 g
Primer -----	Percussion, FED 215

##### Performance:

Maximum range -----	2,200 m
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 lb  
Dimensions ----- 25-11/16 x  
16-1/4 x  
6-27/32 in.  
Cube ----- 1.7 cu ft

\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data in- eluding NSN's.

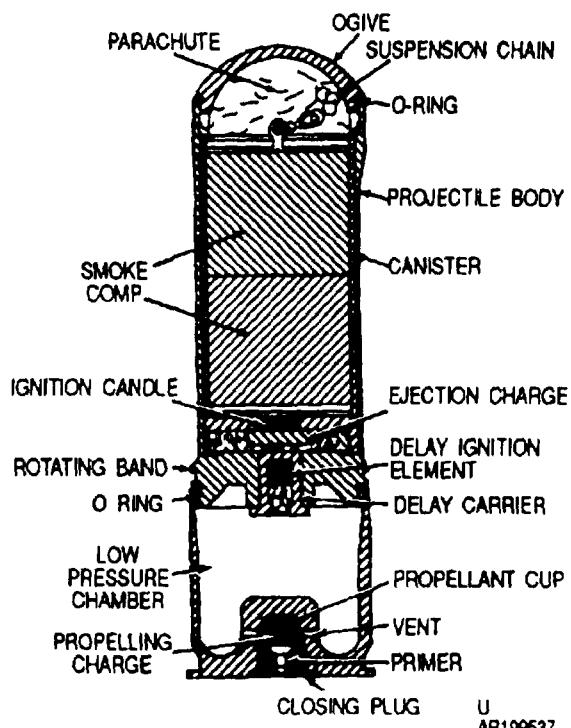
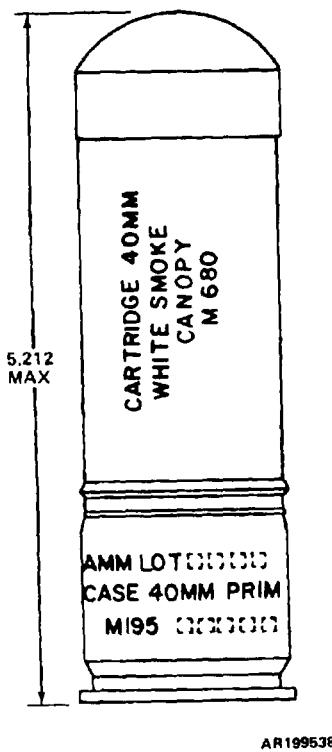
#### Shipping and Storage Data:

UNO serial number -----	0006
Hazard class/division and storage compatibility group --	1.1 E
DOT class -----	Class A
DOT marking -----	Explosive AMMUNI- TION FOR CANNON W/ EXPLOSIVE PROJE- TILES

DODAC:  
M383 and M677  
linked 3 to 1 ----- 1310-B529  
M384 and M677  
linked 3 to 1 ----- 1310-B527  
Drawing number ----- 9234424  
Packing drawing number ----- 9251995

#### References:

SB 700-20
TM 9-1300-251-20
TM 9-1300-251-34

**CARTRIDGE, 40-MILLIMETER: CANOPY WHITE SMOKE, M680****Type Classification:**

Std LCC-A, MSR 09766018

**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 40mm Grenade Launchers M79 and M203 (attached to the M16 series 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 76 mps and reaches a maximum burst height of 300 feet at 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 -----	0.48 lb
Length -----	5.212 in.
Weapons used with -----	M79, M203, 40mm grenade launchers (attached to M16 series rifle)

##### Projectile:

Body material -----	Impact or bar aluminum alloy
Color -----	Light green w/black markings
Filler and weight -----	White smoke composition, 59 g

##### Propelling charge:

Cartridge case -----	M195
Propellant -----	M9, 330 mg
Primer -----	Percussion, M42

##### Performance:

Burst height -----	91 m (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 wooden box
*Packing Box:	
Weight -----	45.9 lb
Dimensions -----	14-5/8 x 12-13/16 x 9-1/8 in.
Cube -----	1.0 cu ft

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

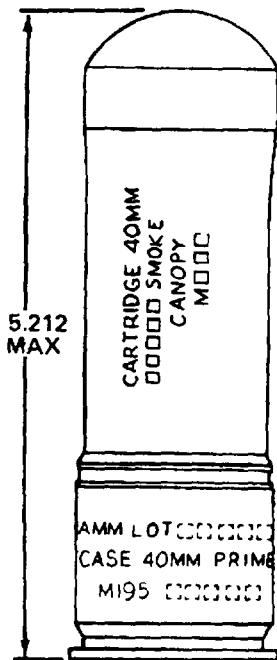
#### Shipping and Storage Data:

UNO serial number -----	0197
Hazard class/division and storage compatibility group --	1.4 G
DOT class -----	Class C
DOT marking -----	Explosive SMOKE SIGNALS HANDLE CAREFULLY - KEEP FIRE AWAY
DODAC -----	1310-B477
Drawing number -----	9235365
Packing drawing numbers -----	9209204, 9209205

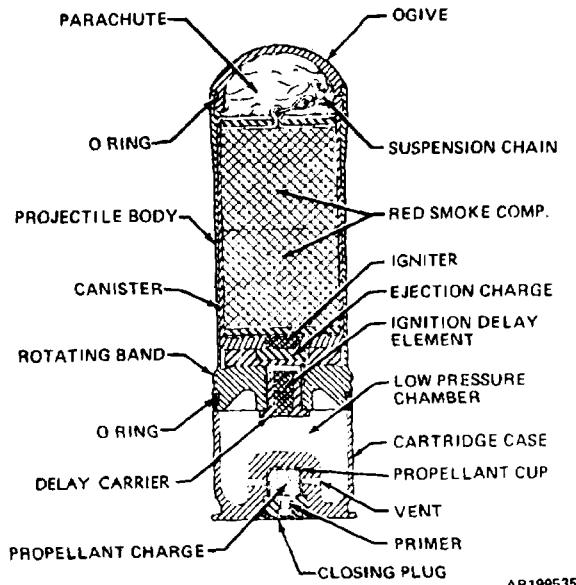
#### References:

SB 700-20	
TM 9-1010-205-10	
TM 9-1010-221-10	
TM 9-1300-251-20	
TM 9-1300-251-34	

## CARTRIDGE 40- MILLIMETER: CANOPY RED SMOKE M682



AR199536



### Type Classification:

Std LCC-A, MSR 09766018

### 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 40mm Grenade Launchers M79 and M203 (attached to the M16 series 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 raps 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 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" parachute.

#### **Tabulated Data:**

Complete round:	
Type -----	Canopy red s m o k e
Weight -----	0.48 lb
Length -----	5.212 in.
Weapons used with -----	M79 M203  40mm grenade launchers (attached to M16 series rifle)
Projectile:	
Body material -----	Impact or bar aluminum alloy
Color -----	Light green w/black markings
Filler and weight -----	Red smoke composition, 80 g
Propelling charge:	
Cartridge case -----	M195
Propellant -----	M9 330 mg
Primer -----	Perc., M42
Performance:	
Burst height -----	91 m (QE=85°)
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 boxes; 2 metal boxes (44 rounds) per wirebound wooden box

#### **\*Packing Box:**

Weight -----	45.9 lb
Dimensions .....	14-5/8 x 12-13/16 x 9-1/8 in.
Cube -----	1.0 cu ft

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

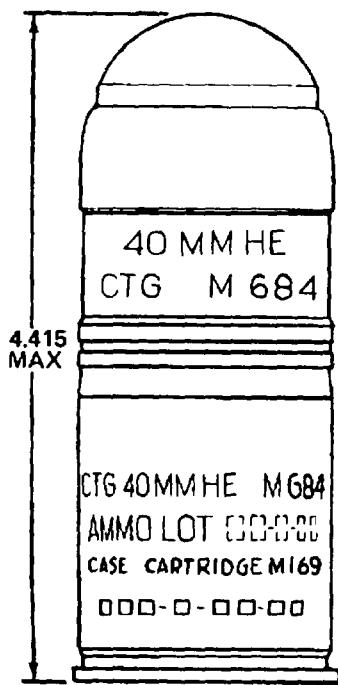
#### **Shipping and Storage Data:**

UNO serial number -----	0197
Hazard class/division and storage compatibility group --	1.4 G
DOT class -----	Class C
DOT marking .....	Explosive SMOKE SIGNALS HANDLE CAREFULLY - KEEP FIRE AWAY
DODAC -----	1310-B479
Drawing number -----	9235963
Packing drawing numbers -----	9209204 9209205

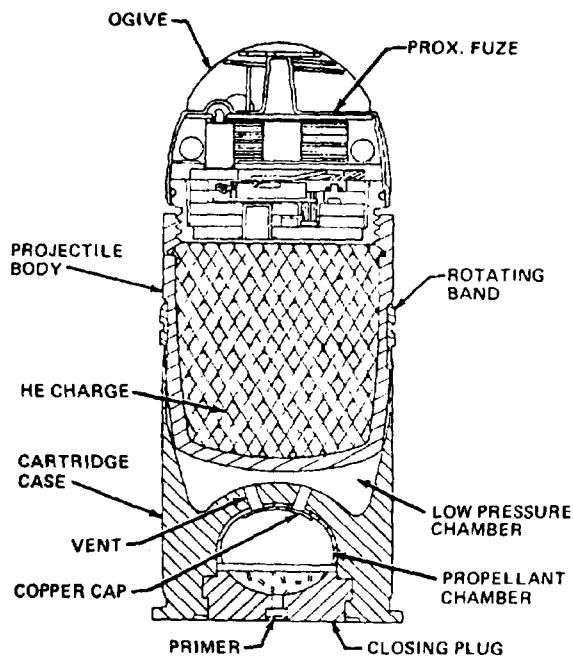
#### **References:**

- SB 700-20
- TM 9-1010-205-10
- TM 9-1010-221-10
- TM 9-1300-251-20
- TM 9-1300-251-34

## 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 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 nearby 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 circuit 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.

#### **Tabulated Data:**

##### Complete round:

Type -----	HE
Weight -----	0.74 lb
Length -----	4.415 in.
Weapons used with -----	M75, M125 40mm grenade launchers

##### Projectile:

Body material -----	Impact steel
Color -----	Olive drab w/yellow markings and translucent ogive
Filler and weight -----	Comp A5, 53 g
Fuze -----	Electronic proximity, M596

##### Propelling charge:

Cartridge case -----	M169
Propellant -----	M2, 4.64 g
Primer -----	Percussion, FED 215

##### Performance:

Maximum range -----	2,200 m
Muzzle velocity -----	244 mps (795 fps)
Arming distance -----	18 to 36 m (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 lb
Dimensions -----	25-11/16 x 16-1/4 x 6-27/32 in.
Cube -----	1.7 cu ft

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

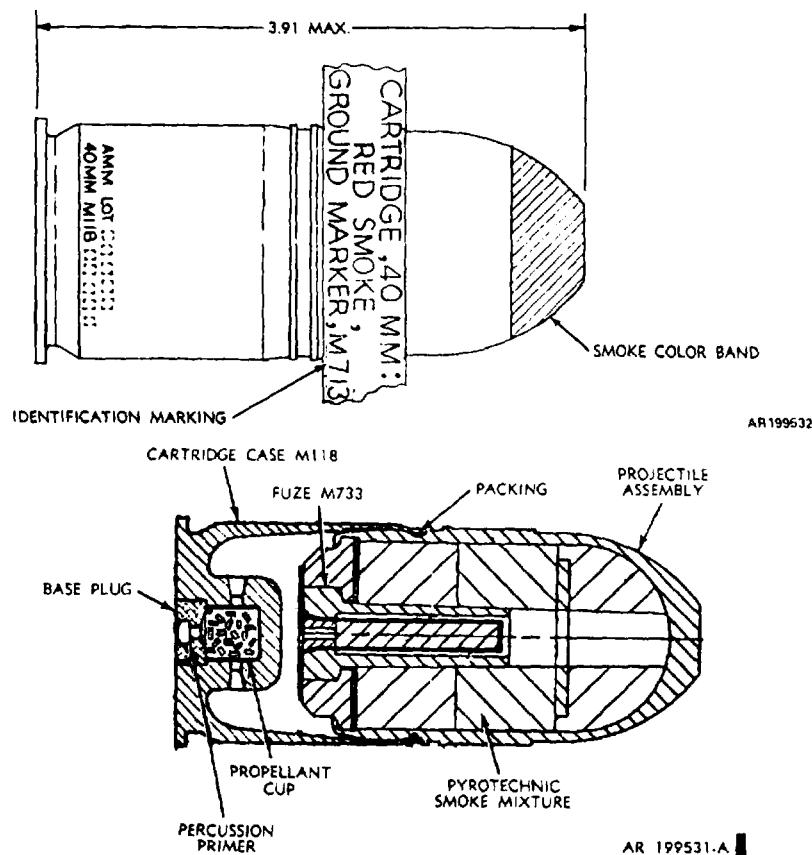
#### **Shipping and Storage Data:**

UNO serial number -----	0006
Hazard class/division and storage compatibility group --	(12) 1.1 E
Dot class -----	Class A Explosive
DOT marking -----	AMMUNITION FOR CANNON W/ EXPLOSIVE PROJECTILES
DODAC -----	1310-B573
Cartridge drawing number -----	9247850
Packing drawing number -----	9251995

#### **References:**

SB 700-20
TM 9-1300-251-20
TM 9-1300-251-34

**CARTRIDGE, 40-MILLIMETER: GROUND MARKER RED SMOKE M713; GREEN SMOKE, M715; AND YELLOW SMOKE, M716**



**Tape Classification:**

Std LCC-A, MSR 09766018

**Use:**

These cartridges are used to provide aerial identification and location of troops on the ground and are designed to be fired from 40mm Grenade Launchers M79 and M203 (attached to the M16 series 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 pro-

jectile 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. The difference among the models is the color of the smoke.

#### **Tabulated Data:**

##### Complete round:

Type -----	Ground marker smoke
Weight -----	0.49 lb
Length -----	3.91 in.
Weapons used with -----	M79 M203 40mm grenade launchers (attached to M16 series rifle).

##### Projectile:

Body material -----	Aluminum
Color -----	Light green w/black markings
Filler and weight -----	Smoke mixture, 75 g
Fuze -----	Impact pyrotechnic M733

##### Propelling charge:

Cartridge case -----	M118
Propellant -----	M9, 330 mg
Primer -----	Percussion, FED 100

##### Performance:

Maximum range -----	400 m
Muzzle velocity -----	76 mps (250 fp)

#### **Temperature Limits:**

##### Firing:

Lower limit -----	-45°F
Upper limit -----	+125°F

##### Storage:

Lower limit -----	-65°F
Upper limit -----	+165°F
*Packing -----	22 round per metal box; 2 metal boxes per wire-bound wooden box

##### \*Packing Box:

Weight -----	45.9 lb
Dimensions -----	14-5/8 x 12-13/16 x 9-1/8 in.
Cube -----	1.0 cu ft

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

#### **Shipping and Storage Data:**

UNO serial number -----	0197
Hazard class/division and storage compatibility group --	1.4 G
DOT class -----	Class C
DOT marking -----	Explosive SMOKE SIGNALS, HANDLE CAREFULLY - KEEP FIRE AWAY
DODAC -----	M713-1310-B506 M715-1310-B508 M716-1310-B509

##### Cartridge drawing number:

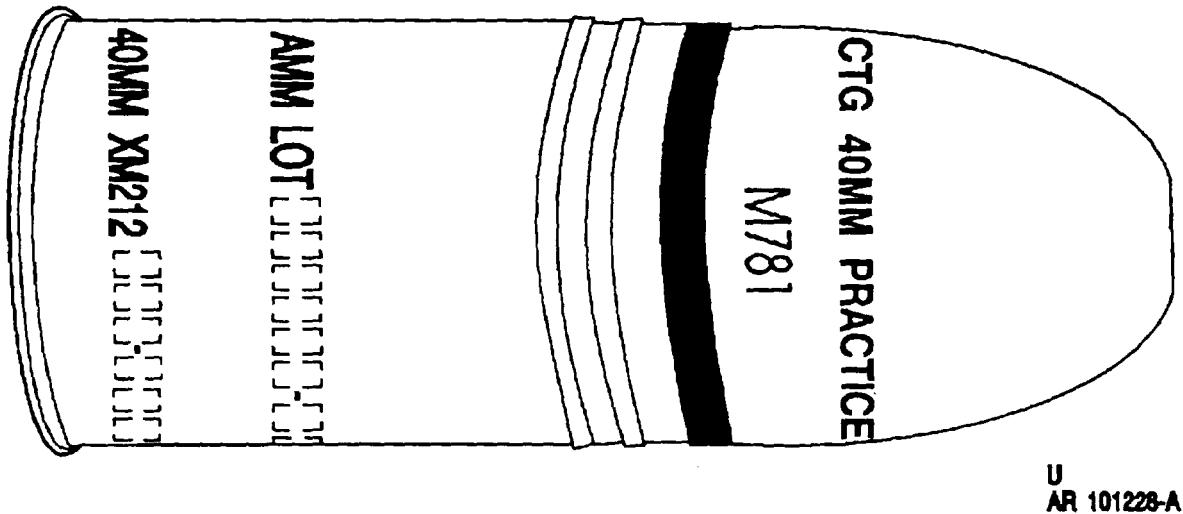
M713-----	9323251
M715-----	9323261
M716-----	9323265

##### Packing drawing numbers -----

9209204,  
9209205

#### **References:**

- SB 700-20
- TM 9-1010-205-10
- TM 9-1010-221-10
- TM 9-1300-251-20
- TM 9-1300-251-34

**CARTRIDGE, 40-MM: PRACTICE, M781****Type Classification:**

Std LCC-A, MSR 05786002

**Use:**

This cartridge is a fixed, practice type ammunition designed to be fired from 40mm Grenade Launchers M79 and M203 (attached to the M16 series rifle).

**Description:**

This cartridge is a fixed round of ammunition consisting of a metal 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 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-	U.S. Army Pack
NSN 1310-01-148-8881-	U.S. Army Pack
NSN 1310-01-211-8073-	U.S. Army Pack
NSN 1310-01-107-5404-	U.S. Marine Corps Pack

**Complete round:**

Type -----	Practice
Weight -----	205 g
Length -----	4.05
Weapons -----	Used with M79, M203 (attached to M16 series rifle) 40mm grenade launchers

Projectile:  
 Body material ----- Zinc or aluminum  
 Color ----- Blue w/white markings  
 Filler and weight ----- Orange dye  
 Fuze ----- None

Propelling charge:  
 Cartridge case ----- M212  
 Propellant ----- M9, 340 mg  
 Primer number ----- 1-1/2 (commercial)

Performance:  
 Maximum range ----- 400 m  
                          (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 limits ----- +145°F (+63°C)

**U.S. Army Pack:**

NSN 1310-01-148-8881:  
 \*Packing ----- 100 rounds per wood box  
 \*Packing Box:  
 Weight ----- 64 lb  
 Dimensions ----- 22-3/4 in. x 11-1/16 in. x 11-5/8 in.  
 Cube ----- 1.7 cu ft  
 Packing drawing number--- 9325896

NSN 1310-01-050-7967:  
 \*Packing ----- 75 rounds per wood box  
 \*Packing Box:  
 Weight ----- 53.2 lb  
 Dimensions ----- 22-318 in. x 11-1/16 in. x 11-22/32 in.  
 Packing drawing number--- 9325896

NSN 1310-01-211-8073:  
 \*Packing ----- 100 rounds per wirebound Box  
 \*Packing Box:  
 Dimensions ----- 22-3/8 in. x 10-13/16 in. x 10-5/8 in.  
 Packing drawing number--- 9325896

**U.S. Marine Corps Pack:**

NSN 1310-01-107-5404:  
 \*Packing ----- 44 rounds per box  
 \*Packing box:  
 Weight ----- 45.9 lb  
 Dimensions ----- 14-5/8 in. x 12-13/16 in. x 9-1/8 in.  
 cube ----- 1.0 cu ft  
 Packing drawing number--- 9209204,  
                          9209205

\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data.

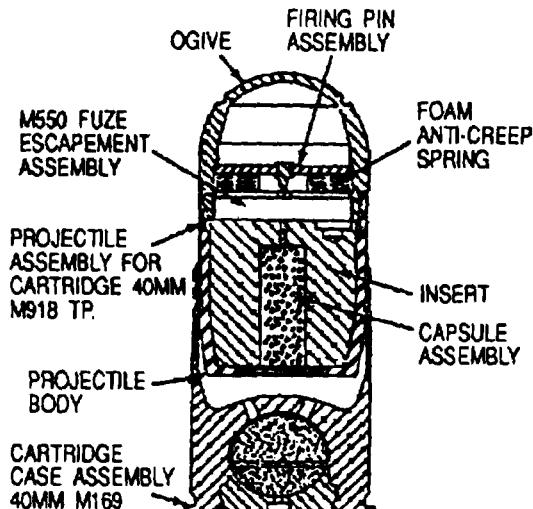
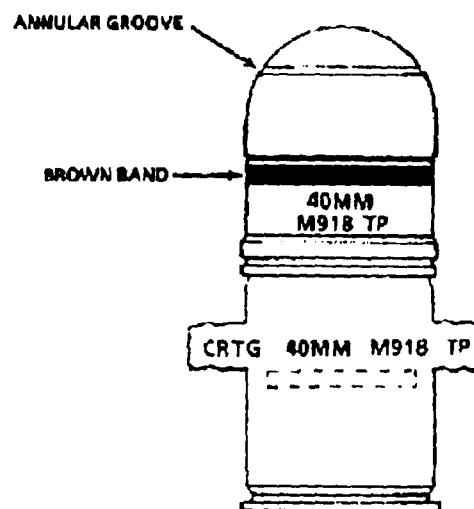
**Shipping and Storage Data:**

UNO serial number ----- 0339  
 Hazard class/division and storage compatibility group -- 1.4 C  
 DOT class ----- Class C  
 Explosive  
 CAR-  
 TRIDGES,  
 PRACTICE  
 AMMUNI-  
 TION  
 DOT marking -----  
 DODAC ----- 1310-B519  
 Cartridge drawing number ----- 9322240

**References:**

SB 700-20  
 TM 9-1010-205-10  
 TM 9-1010-221-10  
 TM 9-1300-251-20  
 TM 9-1300-251-34

## 40-MILLIMETER PRACTICE, M918

U  
AR 4951U  
AR 2685-A**Type Classification:**

Std LCC-A MSR 01866003

**Use:**

This cartridge is a target practice round designed to simulate the M430 Cartridge in appearance and ballistics. It is fired from the 40mm Grenade Machine Gun MK19 Mod 3. It is also used in the cartridge, subcaliber ammunition, training (CSAT): M970 to simulate the loading and firing of large caliber ammunition.

**Description:**

This cartridge is a fixed round of ammunition consisting of a one-piece steel projectile body which is fitted to a cartridge case assembly. An aluminum ogive, which contains a firing pin plate assembly, a cellular foam anti-creep spring, and the standard M550 fuze escapement assembly is threaded to the projectile body. An aluminum insert which contains a flash charge chamber is enclosed in the projectile body. A plastic container contains the flash charge chamber which contains one gram of flash charge composition. 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 cartridge base. The propellant in the 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.

**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 gear teeth of the fuze rotor. When the projectile attains sufficient spin, the centrifugal lock releases the rotor and arming begins. The rotor begins rotation toward the center of the projectile. The rotor gear engaged with the pinion shaft 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 entire escapement moves forward compressing the cellular foam spring and driving the detonator into the firing pin, which in turn flashes through the small hole of the insert and ignites the flash powder. Gases generated by the burning powder are concentrated upon the base of the projectile body causing it to rupture and producing a flash, smoke and a loud report.

Rupture begins at the very center of the projectile base forming hinged petals.

#### Tabulated Data:

NSN 1310-01-218-7070- U.S. Army Pack  
NSN 1310-01-218-7069- U.S. Marine Corps Pack

NSN 1310-01-283-8652- M970 Pack  
NSN 1310-01-317-5948- PA-120 Pack

##### Complete round:

Type -----	Target practice
Weight -----	0.76 lb
Length -----	4.415 in.
Weapons used with -----	MK19, Mod 3, 40mm grenade machine gun, M970 CSAT

##### Projectile:

Body material -----	Blank and draw steel
Color -----	Blue w/black markings
	brown band and blue ogive
Filler and weight -----	Flash charge composition, lg
Fuse -----	M550 escape- ment

##### Propelling charge:

Cartridge case -----	M169
Propellant -----	M2, 4.2g
Primer -----	Percussion, FED 215

##### Performance:

Maximum range -----	2,200 m
Muzzle velocity -----	244 mps (795 fps)
Arming distance -----	18 to 30 m (59 -98 ft)

#### Temperature Limits:

##### Firing:

Lower limit -----	-25°F (-31.7°C)
Upper limit -----	+110°F (+43.3°C)

##### Storage:

Lower limit -----	-30°F
Upper limit -----	+145°C (+62.8°C)

#### U.S. Army Pack:

*Packing -----	50 rounds in linked belt
*Packing Box:	
Weight -----	53 lb
Dimensions -----	26-3/8 x 16-1/4 x 6-3/16 in.
Cube -----	1.5 cu ft
Packing drawing number -----	9251995
Packing, PA-120 -----	32 rounds in linked belt
Packing Box:	
Weight -----	42 lb
Dimensions -----	18.76 x 10.39 x 6.36 in.
Cube -----	0.72 cu ft
Packing drawing number -----	12928042
PA-120 metal container -----	12564414

#### U.S. Marine Corps Pack:

*Packing -----	40 rounds in linked belt
*Packing Box:	
Weight -----	59.5 lb
Dimensions -----	18-19/32 x 14-19/32 x 8-19/64 in.
Cube -----	1.3 cu ft
Packing drawing number -----	9362543

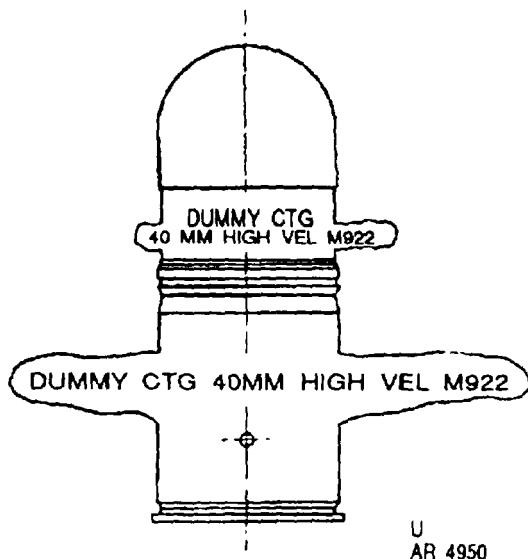
\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

#### Shipping and Storage Data:

Hazard class/division and storage compatibility group--	(04) 1.4 C
UNO serial number -----	0338
DOT class -----	Class C
Explosive	
DOT marking -----	CARTRIDGE, PRACTICE AMMUNI- TION
DODAC -----	1310-B584
Cartridge drawing number-----	9399372

#### References:

SB 700-20	
DOD Consolidated Ammunition Catalog	
TM 9-1010-230-10	
TM 9-1010-230-23&P	
TM 9-1300-251-20	
TM 9-1300-251-34	

**CARTRIDGE, 40-MILLIMETER: DUMMY, M922****Type Classification:**

Std LCC-A MSR 0689601524 May 90

**Use:**

This dummy cartridge is used as a drill round to train users in handling ammunition and loading the MK19 series grenade machine gun and the M129 grenade launcher.

**Description:**

The cartridge is completely inert and simulates a loaded round of 40mm HE ammunition in size, shape, and weight. This fixed round consists of a one-piece solid aluminum projectile body together with a copper rotating band. The cartridge case is crimped around the projectile body. There are four thru-holes drilled through the cartridge case to the high-pressure chamber for positive identification. The primer hole is filled with RTV sealant. The rotating band and the belt links are modified for repositioning after cycling in an MK19 weapon.

**Functioning:**

This cartridge is completely inert and non-functional.

**Tabulated Data:**

NSN 1310-01-154-6525- M2A1 Pack  
 NSN 1310-01-159-3161- M548 Pack  
 NSN 1310-01-315-1636- PA-120 Pack

Complete round:  
 Type ----- Dummy

Weight -----	350 g
Length -----	4.415 in.
Weapons used with -----	M12940mnl Grenade Launcher, MK19, Mod 3 Grenade Machine Gun
Projectile:	
Body material -----	Bar alloy alumin
Color -----	Gold w/black markings
Propelling charge:	
Cartridge case -----	M169
Propellant -----	None
Primer -----	None
Performance:	
Maximum range -----	N/A
Muzzle velocity -----	N/A

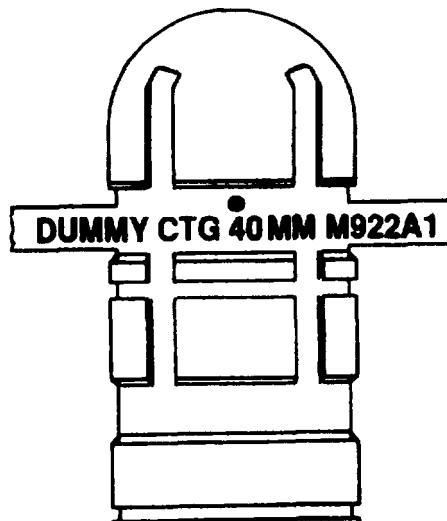
**Temperature Limits:**

Firing:	
Lower limit -----	N/A
Upper limit -----	N/A
Storage:	
Lower limit -----	N/A
Upper limit -----	N/A

M2A1 Pack:	
* Packing -----	20 rounds, 2- 10 rounds in linked belts
"Packaging Box-2 supplied:	
Weight -----	29.0 lb
Dimensions -----	14.63 x 12.81 x 9.13 in.
cube -----	0.99 cu ft

Packing drawing number --	9209205	Packing drawing number---	12928042
M2A1 metal container drawing -----	7553296	PA-120 metal container drawing number -----	12564414
<b>M548 Pack:</b>		<b>*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.</b>	
*Packing -----	48 rounds in linked belt		
<b>*Packing Box:</b>		<b>Shipping and Storage Data:</b>	
Weight -----	59.5 lb	Quantity-distance class -----	N/A
Dimensions -----	18-19/32 x 14-19/32 x 8-19/64 in.	Storage compatibility group -----	N/A
Cube -----	1.3 cu ft	DOT shipping class -----	N/A
Packing drawing number--	9362543	DOT designation -----	N/A
<b>PA-120 Pack:</b>		DODAC -----	1310-B472
*Packing -----	32 rounds in linked belt	Cartridge drawing number -----	9275763
<b>*Packing Box:</b>		<b>References:</b>	
Weight -----	42 lb	SB 700-20	
Dimensions -----	18.76 x 10.39 x 6.36 in.	TM 9-1010-230-23&P	
Cube -----	0.72 cu ft	TM 9-1010-230-10	
		TM 9-1300-251-20	
		TM 9-1300-251-34	

## CARTRIDGE, 40-MILLIMETER: DUMMY, M922A1



## Type Classification:

Std LCC-A, 31 Mar 93,  
MSR 04936031.

## Use

This dummy cartridge is used as a drill round to train users in handling ammunition and loading the MK19 series grenade machine gun and the M129 grenade launcher.

## Description:

This cartridge is completely inert and simulates a loaded round of 40mm HE ammunition in size, shape, and weight. This fixed round is a one piece solid aluminum round. There is no separate cartridge case. Four grooves allow easy repositioning of M16A2 link after being cycled through the weapon. There is a hole in the base to prevent damage to the firing pin. The entire round is gold in color.

## Functioning:

This cartridge is completely inert and nonfunctional.

## Tabulated Data:

## Complete round:

Type	Dummy
Weight	350 gr (0.771 lb)
Length	4.42 in.
Weapons used with	M129 40mm grenade launcher, MK19 Mod 3 grenade machine gun

## Projectile:

Body material	Bar alloy aluminum
Color	Gold with black markings

## Propelling charge:

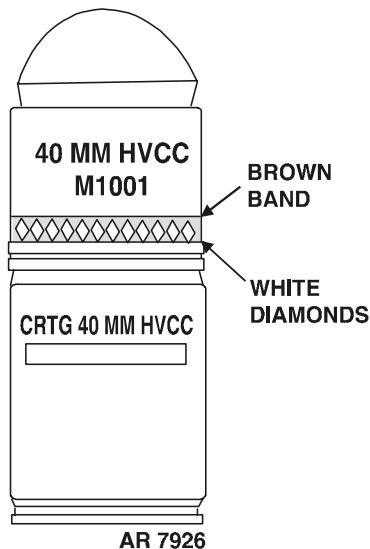
Cartridge case..	None
Propellant	None
Primer	None

## Performance:

Maximum range	N/A
Muzzle velocity	N/A

Temperature Limits:	Field storage category A M548 metal container drawing number 7258943
Firing:	
Lower limit	N/A
Upper limit	N/A
storage :	
Lower limit	N/A
Upper limit	N/A
M2A1 pack:	
NSN	1310-01-369-4705
Inner pack (metal box):	
NSN	8140-00-960-1699
*Packing	20 rounds, 2-10 rounds in linked belts
Packing drawing number	9362530
Outer pack (wirebound box):	
NSN	N/A
*Packing box - 2 supplied:	
Weight	lb
Dimensions	14.63 x 12.81 x 9.13 in.
cube	1 cu ft
Total explosive weight	N/A
Field storage category	A
M2A1 metal container	
drawing number	7553296
MS48 pack:	
NSN	1310-01-368-7104
Inner pack (packing fillers):	
*Packing	48 rounds in linked belt
Packing drawing number	9362543
(Outer pack (metal box):	
NSN	8140-00-739-0233
*Packing box:	
Weight	60 lb
Dimensions	18-19/32 x 14-19/32 x 8-19/64 in.
Cube	1.3 cu ft
Total explosive weight	N/A
PA120 pack:	
NSN	1310-01-369-1902
Inner pack (packing fillers):	
*Packing	32 rounds in linked belt
Packing drawing number	12928042
Outer pack (metal box):	
NSN	8140-01-316-9143
*Packing box:	
Weight	42 lb
Dimensions	18.76 x 10.39 x 6.36 in.
Cube	0.7 cu ft
Total explosive weight.	N/A
Field storage category	A
PA120 metal container	
drawing number	12564414
*NOTE: See DOD Consolidated Ammunition Catalog 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	N/A
DODAC	1310-B472
Cartridge drawing number	12937903
References:	
SB 700-20	
DOD Consolidated Ammunition Catalog	
TM 9-1010-230-10	
TM 9-1010-230-23&P	
TM 9-1300-25 1-20	
TM 9-1300-251-34	

## CARTRIDGE, 40 MM: HIGH VELOCITY CANISTER CARTRIDGE (HVCC), M1001



### TYPE CLASSIFICATION:

STD 9 April 2001.

### USE:

Cartridge, 40mm: High Velocity Canister Cartridge (also known as HVCC or the 40mm Canister Cartridge) is used against personnel out to 100 meters from the weapon. It is used with the Mk19 MOD 3 Grenade Machine Gun (GMG).

### DESCRIPTION:

The cartridge is a fixed round of ammunition consisting of a projectile assembly and a cartridge case assembly. The projectile has an aluminum sabot body with 113 steel flechettes, an aluminum nosecap, a pusher cap, valve plate, spring, bore rider retaining disk, rubber pad, obturator and an expulsion charge. The cartridge case is aluminum with a high pressure and a low pressure chamber and a percussion primer.

### FUNCTIONING:

When the firing pin of the Mk19 MOD 3 GMG strikes the percussion primer, propellant gases in the high-pressure chamber blow through vent holes into the low-pressure chamber to propel the projectile forward. Propellant gas is bled into the base of the canister projectile through a hole in the bottom of the sabot body. The force of the gas acting on the valve plate pushes it forward against a spring and opens

the plenum chamber. Propelling gas ignites the expulsion charge located in the plenum chamber and expulsion charge gas pushes the valve plate closed and pushes the pusher cup forward. The pusher cup is loaded with a quantity of 113 flechettes. The forward motion of the pusher cup and the flechettes releases the nosecap. Once the nosecap is released, the pusher cup and flechettes are free to deploy. No parts of the canister projectile are left in the bore of the Mk19 MOD 3 GMG after firing.

### TABULATED DATA:

NSN .....	1310-01-464-4117 (USA)
	1310-01-464-4121 (USMC)
DODAC .....	1310-BA11
Complete Round:	
Type .....	Canister
Weight .....	0.75 lb
Length .....	4.392 in.
Weapons used with.....	40mm Mk19 MOD 3 Grenade Machine Gun
Projectile:	
Body material .....	Aluminum
Color.....	Olive Drab
Filler and weight .....	113 steel flechettes
Fuze .....	None

**Propelling Charge:**

Cartridge case .....	M169
Propellant.....	M2
Primer .....	Percussion, FED 215
Expulsion charge .....	WC231 Ball Powder

**PERFORMANCE:**

Maximum range .....	100 m
Muzzle velocity .....	790 fps

**TEMPERATURE LIMITS:**

**Firing:**

Lower limit .....	-50°F
Upper limit.....	+120°F

**Storage:**

Lower limit .....	-65°F
Upper limit.....	+165°F

**DRAWINGS:**

Cartridge .....	1225707
Packing .....	12928042

**UNIT OF ISSUE:**

Packing.....	32 rounds per PA120 metal container
--------------	--

**\*PACKING DATA:**

**Packing Box:**

Weight .....	42 lb
Dimensions.....	18.76 x 10.39 x 6.36 in.
Cube .....	0.72 cu ft

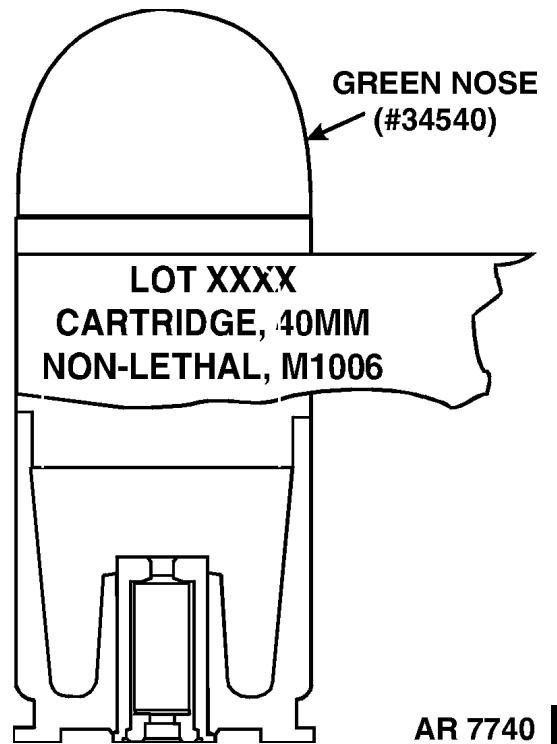
\*See DOD Consolidated Ammunition Catalog for complete packing data including NSNs.

**SHIPPING AND STORAGE DATA:**

UN identification number .....	0321
Hazard class/division and storage compatibility group .....	1.2E
DOT class .....	CARTRIDGES FOR WEAPONS
DOT marking.....	1310-BA11
DODAC .....	

**REFERENCES:**

SB 700-20
TM 9-1010-230-10
TM 9-1300-251-20&P
TM 9-1300-251-34&P

**CARTRIDGE, 40MM: NON-LETHAL, M1006****Type Classification:**

STD April 1999.

**Use:**

Cartridge, 40mm: Non-Lethal, M1006 is used to incapacitate personnel without penetrating the person's body. It is used for riot control, policing and peace keeping situations. It is used with the M203 40mm Grenade Launcher (attached below the M16 series rifle and the M4 carbine barrels).

**Description:**

The cartridge is a fixed round of ammunition consisting of a projectile assembly and a cartridge case assembly. The projectile has a foam rubber nose and a high density plastic body. The projectile assembly is attached to the cartridge case by an adhesive. The cartridge case is a hollow bi-chambered

plastic cylinder. Into the base of the cartridge case is pressed an aluminum insert which holds a brass 32 caliber case. The brass case holds the propellant and primer.

**Functioning:**

The weapon pin strikes the 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, created by the expanding gases in the low-pressure chamber, forces the projectile through the tube with a velocity of 265 feet per second. Upon impact with an individual, force is generated to incapacitate without causing a fatality.

**Tabulated Data:**

NSN ..... 1310-01-452-1190  
BA06

## Complete round:

Type ..... Non-Lethal  
Weight ..... 0.15 lb  
Length ..... 3.95 in.  
Weapon used with ..... 40mm grenade  
launchers M79,  
M203 (attached to  
M16 series rifle,  
and M4 carbines)  
Ogive make-up ..... Foam rubber  
Color ..... Green

## Projectile:

Body material ..... High density plastic  
Color ..... Black  
Filler and weight ..... None  
Fuze ..... None  
Weight ..... 30 g

## Propelling charge:

Cartridge case ..... M212  
Propellant ..... Winchester mix,  
130 mg

## Performance:

Muzzle velocity ..... 265 +20 fps

**Temperature Limits:**

## Firing:

Lower limit ..... 0°F  
Upper limit ..... +125°F

## Storage:

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

Packing ..... 22 rounds per  
M2A1 metal box;  
2 metal boxes (44  
rounds) per wire-  
bound wooden box

## \*Packing box:

Weight ..... 32 lb  
Dimensions ..... 14-5/8 x 12-13/16  
x 9-1/8 in.  
Cube ..... 1.0 cu ft

\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSNs.

**Shipping and Storage Data:**

UNO serial number .....	0339
DOT Class .....	1.4S
Hazard class/division and storage compatibility group - DOT marking .....	CARTRIDGES FOR WEAPONS, INERT PROJEC- TILES
DODAC .....	1310-BA06
Cartridge dwg no. ....	12986143
Packing dwg nos.	
Outer .....	9209205
Inner .....	9209204

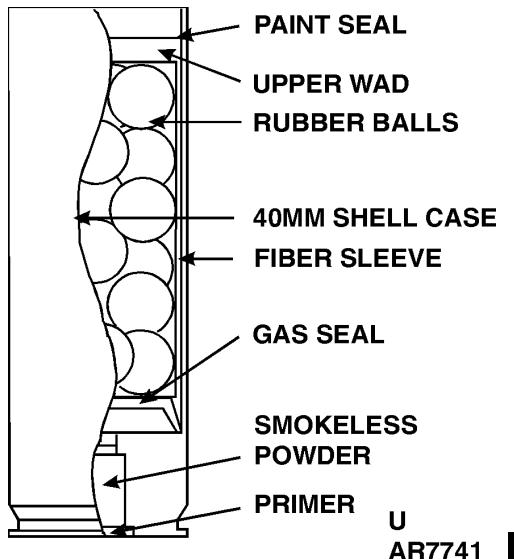
**References:**

TM 9-1310-205-10  
TM 9-1010-221-10  
TM 9-1300-251-20&P  
TM 9-1300-251-34&P

**Limitations:**

Fire only in open or well ventilated areas at a range greater than 10 meters. Avoid firing at women and children. Fire at chest area of adult males. Do not fire above chest level. To avoid hits to the head for individuals that are 10-45 meters away, aim 24 inches below center of mass. See training insert packed in ammo can for aiming instructions.

## CARTRIDGE, 40-MILLIMETER: CROWD DISPERSAL, M1029

**Type Classification:**

STD. 14 May 2001

**Use:**

Cartridge, 40mm: Crowd Dispersal, M1029 (CDC) is used to incapacitate personnel without any penetrations to the individual's body. It is used for riot control, policing, and peace keeping situations. The 40mm M203 Grenade Launcher is the only weapon that is authorized to be used to fire the M1029.

**Description:**

The 40mm Crowd Dispersal Cartridge (CDC) is an aluminum cartridge of similar proportions to standard 40mm illuminant cartridges, but with no separate cartridge case. A fiberboard sleeve and plastic cover contain the internal non-lethal payload which consists of 48 black hard rubber 48-caliber balls.

**Functioning:**

When the primer is struck by the firing pin, expanding gases from the propellant push against the gas seal. This causes the fiberboard sleeve to push the upper wad down the muzzle and expel the rubber balls.

**Tabulated Data:**

NSN .....	1310-01-475-0628
DODAC .....	1310-BA13
Type .....	Non-lethal
Weight .....	0.47 lb
Length .....	4.8 in. Used with 40mm, M203

**Projectile:**

Body material.....	N/A
Ogive.....	N/A
Color .....	White cap
Filler.....	(48) 48 cal rubber balls
Ball weight (ea).....	0.08 oz
Color .....	Black
Fuze.....	None

**Propelling Charge:**

Cartridge case material .....	Aluminum
Propellant.....	0.58 g
Primer.....	Percussion

**Performance:**

Maximum range .....	100 m
Effective range .....	15 - 30 m
Muzzle velocity.....	375 fps ± 25

**Temperature Limits:**

Firing:

Lower limit ..... +20°F  
Upper limit ..... +100°F

Storage:

Lower limit ..... -50°F  
Upper limit ..... +160°F

\*Packing Box:

Weight ..... 46 lb  
Dimensions ..... 14-7/16 x  
                  12-17/32 x  
                  8-1/8 in.  
Cube ..... 0.85 cu ft

Packing ..... 22 rounds in  
                  M2A1 metal con-  
                  tainer, 2 contain-  
                  ers/wire bound box

\*NOTE: See DoD Consolidated Ammunition Catalog for complete packing data including NSNs.

Shipping and Storage Data:

UNO serial number ..... 0339  
HC/DS/CG .....  
DOT class ..... 1.4C  
DOT marking ..... CARTRIDGES  
                  FOR WEAPONS,  
                  INERT PROJEC-  
                  TILE  
Cartridge dwg no. ..... 12987698  
Packing dwg no. ..... 9209205

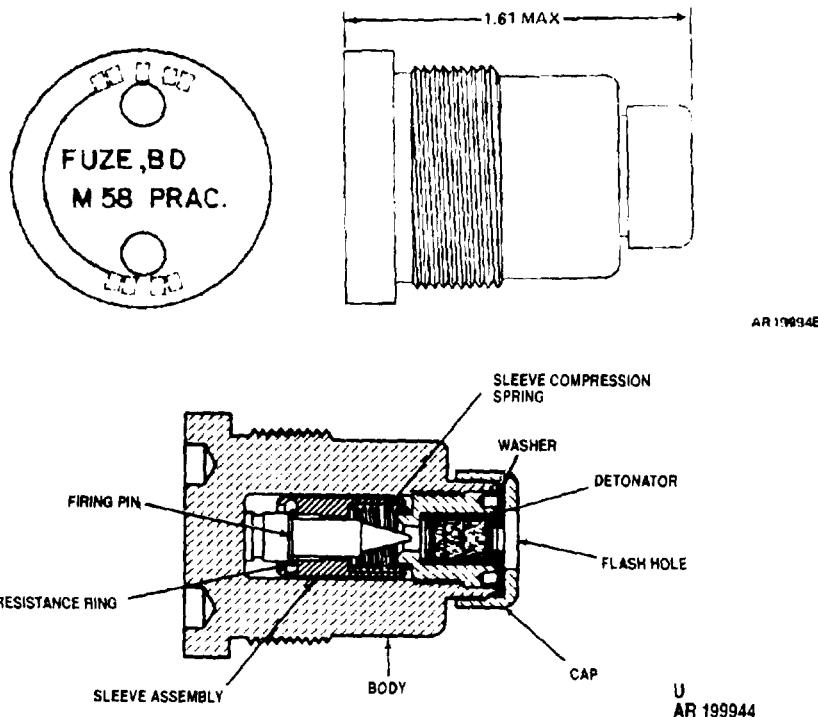
References:

TM 9-1010-221-10  
TM 9-1300-251-20&P  
TM 9-1300-251-34&P

## **CHAPTER 7**

### **FUZES**

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**FUZE, BASE DETONATING: M58, PRACTICE****Type Classification:**

Std OTCM 37119 dtd 1959.

**Used:**

Base Detonating Fuze M58 Practice is used with target practice cartridges for 37mm subcaliber 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 flashthrough.

**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 detona-

tor by the sleeve compression spring. Upon impact, inertia of the sleeve and firing pin overcomes the spring and drives the pin into the detonator.

**Tabulated Data:**

Type	BD
Weight	0.29 lb
Length Overall	1.61 in.
Thread size	1.02-1SNS-3 (LH)
Assembly Dwg. No.: Practice	73-1-191

**Temperature Limits:**

Refer to complete round for upper and lower limits.

**Explosive Components:**

Detonator M18.

**Limitations:**

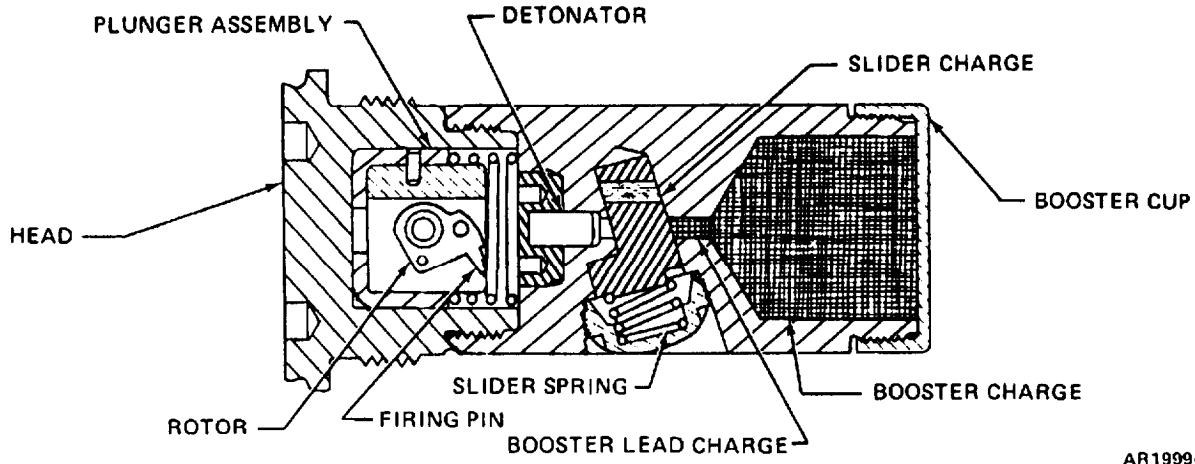
None.

**References:**

- TM 9-1015-203-12
- TM 9-1025-200-12&P
- TM 9-1800-251-20

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## FUSE, 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 75mm and 105mm recoilless rifle with HEAT and HEP cartridges. The M62A2 is used with 165mm 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 lb
Length -----	3.46 in.
Thread size -----	1.5 in.-12NS-1 (LH)
Assembly Dwg. No.:	
M62A2 -----	8886414
M62A1 -----	73-2-168

**Temperature Limits:**

Refer to complete round for upper and lower limits.

**Shipping and Storage Data:**

DODAC ----- 1390-N266

**Explosive Components:**

**M62A1** ----- 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.

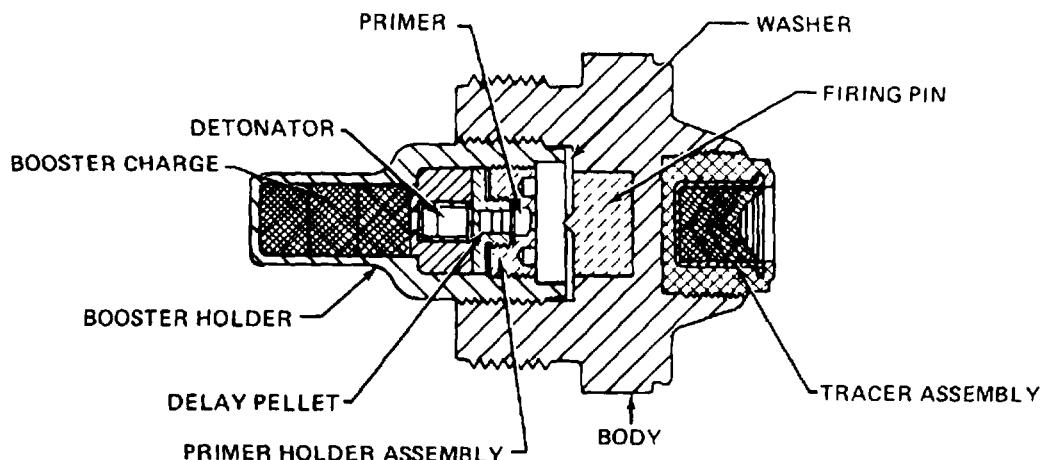
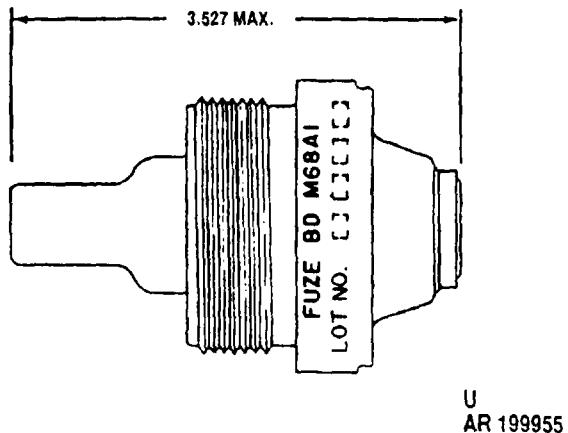
**Limitations:**

**None.**

**References:**

**TM 9-1300-251-20**  
**TM 9-2350-222-10-1**  
**TM 9-2350-222-10-2**  
**TM 9-2350-222-10-3**

## FUZE, BASE DETONATING: M68 SERIES



### Type Classification:

Std OTCM 36841 dtd 1958.

### Use:

Base Detonating Fuzes M68 series are delay-action fuzes used with 90mm 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 firing pin point 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 the projectile.

### Difference Between Models:

Fuze M68 contains primer No. 26.  
Fuze M68A1 contains primer No. 31.  
M68 tracer is press fit.  
M68A1 tracer is threaded.

### **Tabulated Data:**

### **Temperature Limits:**

Refer to complete round for upper and lower limits.

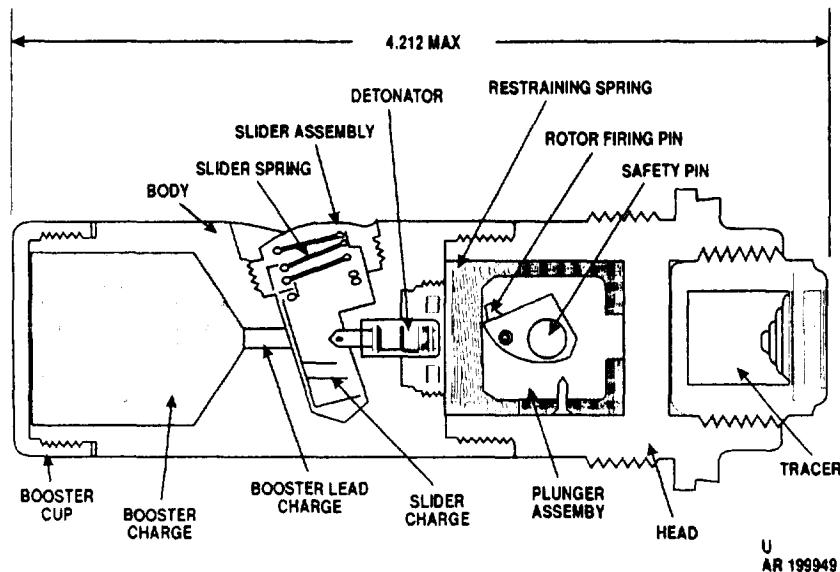
## **Explosive Components:**

Primer No. 26 (M68), No. 31 (M68A1), black powder delay pellet, Detonator M17, tetryl booster Charge, and Tracer Assembly M5.

## **References:**

TM 9-1300-251-20

## 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 105mm howitzers and with HEP cartridge in 106mm 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 Between 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 lb
Overall Length:	
M91A2 and M91A1	4.212 in.
M91	4.11 in.
Thread size	1,50 in.-12NS-1 (LH)
Assembly Dwg. No:	
M91A2	8837308 (Rev 4)
M91A1	73-2-239
M91	73-2-239

**Temperature Limits:**

Refer to complete round for upper and lower limits.

**Shipping and Storage Data:**

DODAC ----- 1390-N265  
UNO serial number ----- 0408  
UNO proper shipping name ---- Fuzes, detonating

**Explosive Components:**

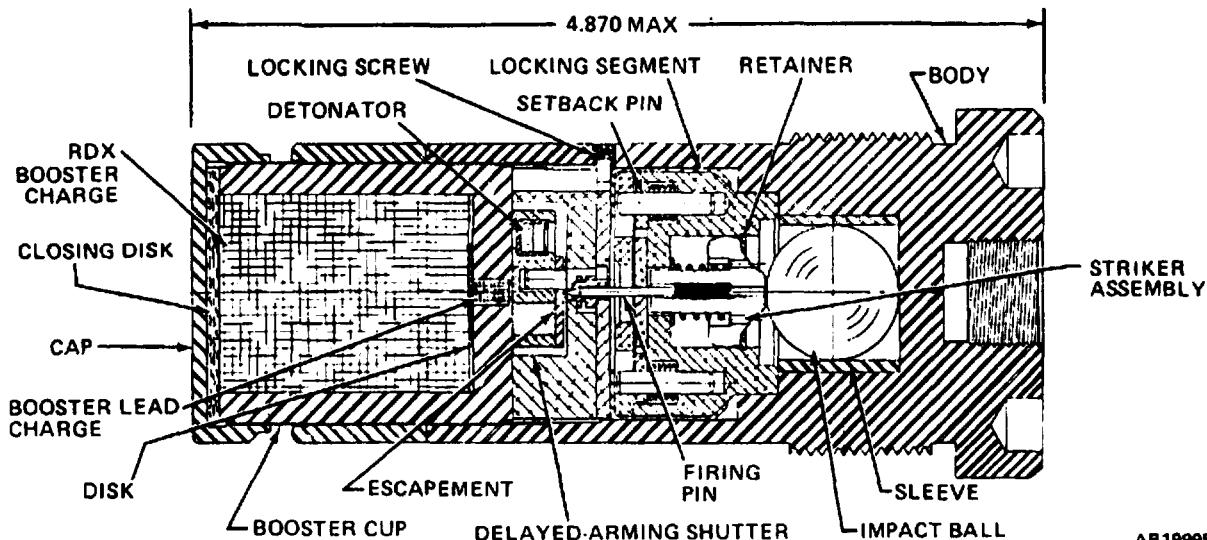
Detonator M58 (M91A2); Detonator M22 (M91 and M91A1); tetryl slider charge, tetryl booster lead charge, and tetryl booster charge.

**Limitations:**

None.

**References:**

TM 9-1015-203-12  
TM 9-1015-234-10  
TM 9-1300-251-20  
TM 9-2350-311-10

**FUZE, BASE DETONATING: M534A1**

AR199951

**Type Classification:**

Std OTCM 37930 dtd 1959.

**Use:**

Base Detonating Fuze M534A1 is used with HEP-T and W-T ammunition in 105mm 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	007 lb
Overall length	4.870 in.
Assembly Dwg. No	8860724
Thread size	1.8 in.-12UNS-2A (LH)

**Temperature Limits:**

Refer to complete round for upper and lower limits.

**Shipping and Storage Data:**

DODAC ----- 1390-N252

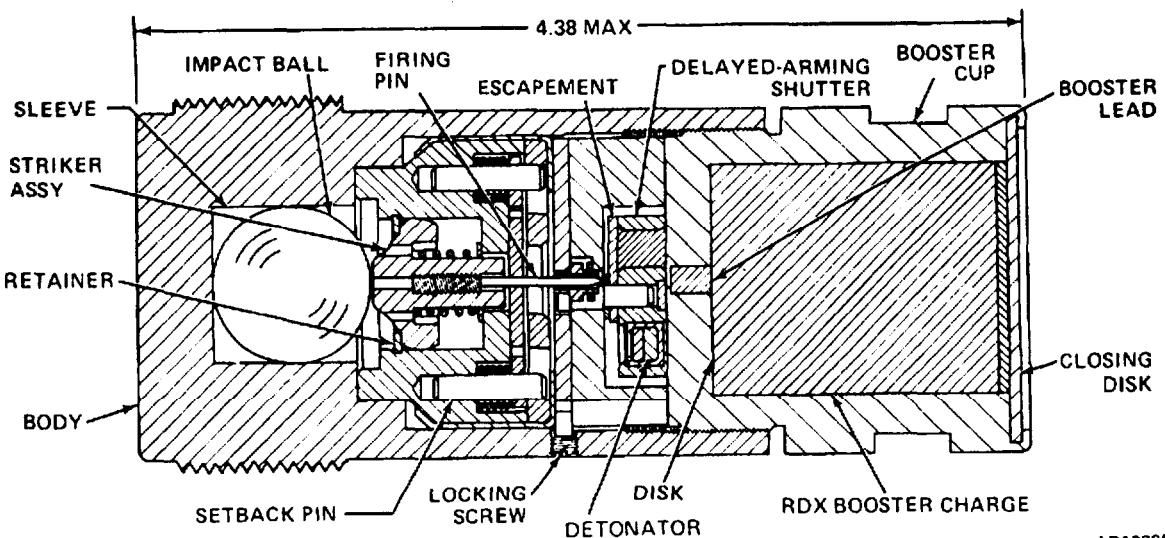
**Explosive Components:**

Detonator M61, RDX booster lead charge, and RDX booster charge.

**References:**

TM 9-1300-251-20

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**FUZE, BASE DETONATING: M578****Type Classification:**

Std AMCTC 3325 dtd 1965.

**Use:**

Base Detonating Fuze M578 is used with HEP ammunition fired from 105mm 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 lb
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,

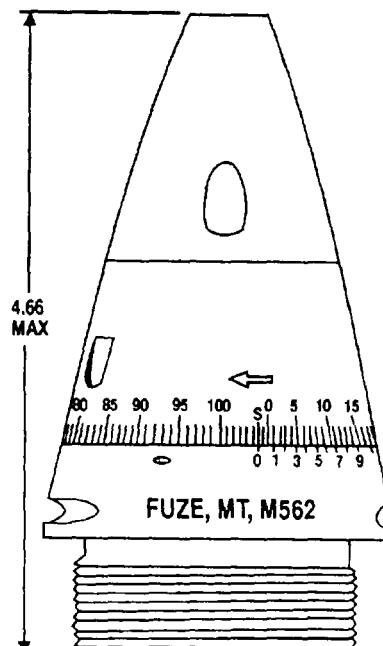
**Shipping and Storage Data:**

DODAC ----- 1390-N349

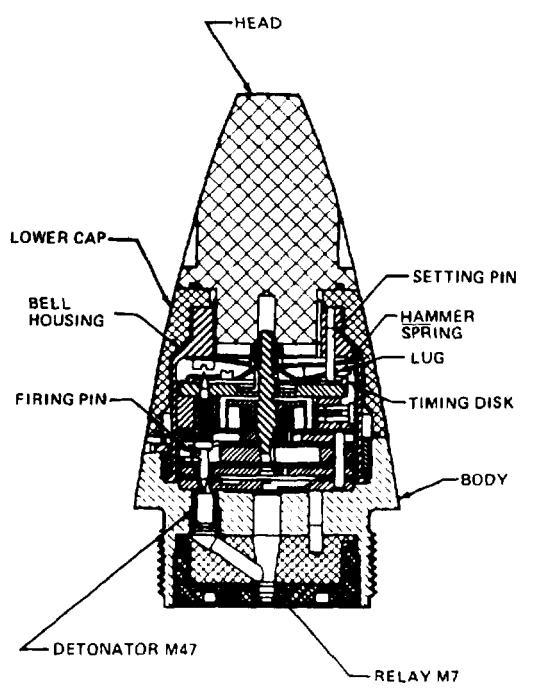
**References:**

TM 9-1300-251-20

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**FUZE, MECHANICAL TIME: M562**

U  
AR 199909



AR 199908

**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 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 lb
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)

Storage: (continued)

Upper limit -----	+160°F (for not more than 4hr/day)
*Packing -----	8 fuzes in metal con- tainer; 2 con- tainers in wirebound box
 *Packing Box:	
Weight -----	45.2 lb
Dimensions -----	14-7/8 x 12- 13/16 x 9-1/4 in.
Cube-----	1.0 cu ft

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

#### **Shipping and Storage Data:**

Quantity-distance class -----	1
Storage compatiblity group -----	B, N & E
DOT shipping class -----	C
DOT designation -----	TIME FUZES
DODAC -----	1390-N283

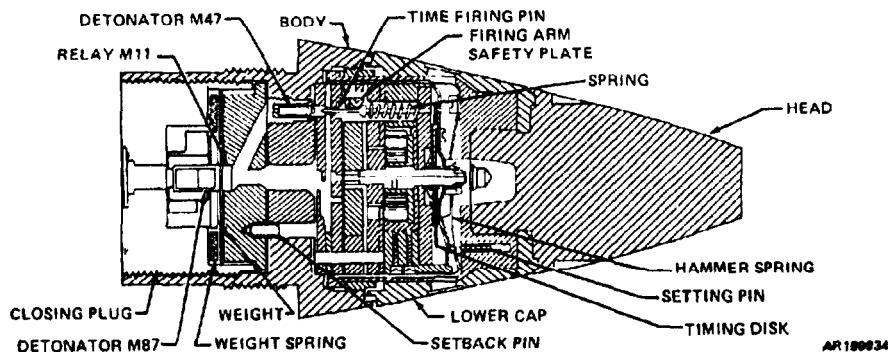
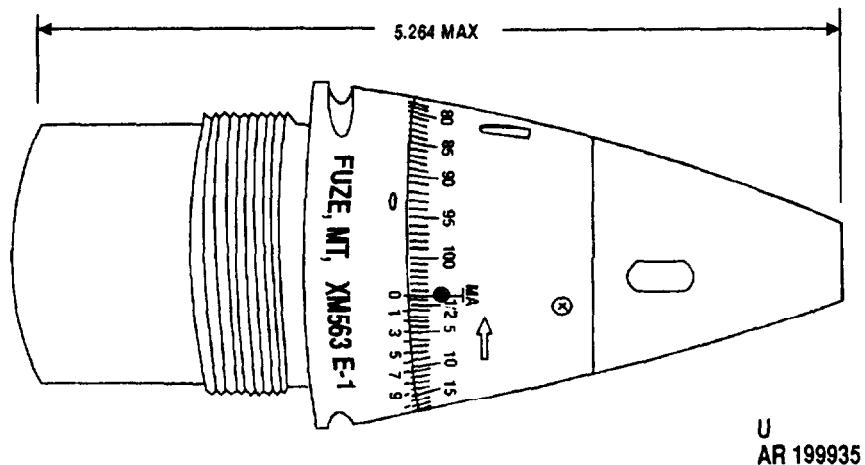
#### **Explosive Components:**

Detonator M47 and Relay M7.

#### **References:**

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

## FUZE, MECHANICAL TIME: XM563 SERIES

**Type Classification:**

LP AMCTC 8269 dtd 1971.

**Use:**

Mechanical time fuzes of the M563 series are used to function flechette-loaded 105mm 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 time 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 below 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 lb
Length:	
Visible -----	3.764 in.

Overall -----	5.264 in.
Assembly Dwg. No.	
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 hr/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.

#### **Shipping and Storage Data:**

DODAC -----	1390-N261
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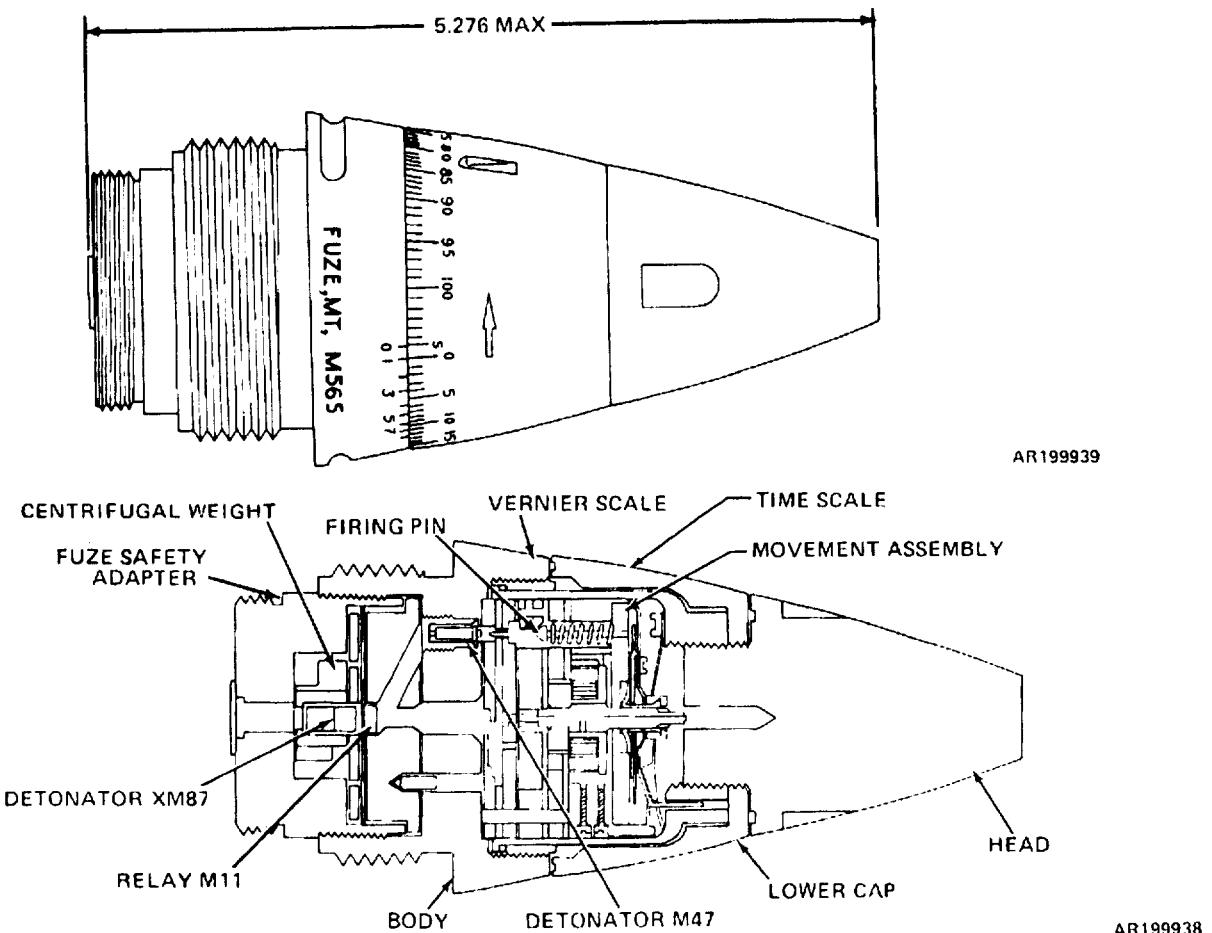
#### **Limitations:**

Overhead firing is prohibited.

#### **References**

TM 9-1015-203-12
TM 9-1300-251-20
TM 9-1015-234-10
SC 1340/98-IL
SB 700-20

## FUZE, MECHANICAL TIME: M565



**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 105mm through 8-inch, except 175mm, 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,

**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 lb
<b>Length:</b>	
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 hr/day)
*Packing .....	8 fuzes in metal con- tainer; 2 con- tainers in wire- bound box

#### \*Packing Box:

Weight .....	54.6 lb
Dimensions .....	14-7/8 x 12- 13/16 x 9-1/8 in.
Cube .....	1.0 cu ft

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

#### Shipping and Storage Data:

Quantity-distance class .....	1.4
Storage compatibility group .....	B
DOT shipping class .....	C
DOT designation .....	TIME FUZES, HANDLE CAREFULLY
DODAC .....	1390-N248
UNO serial number .....	0257
UNO proper shipping name .....	Fuzes, detonat- ing

#### Explosive Components:

Detonator M47, Relay M11, and Detonator XM87.

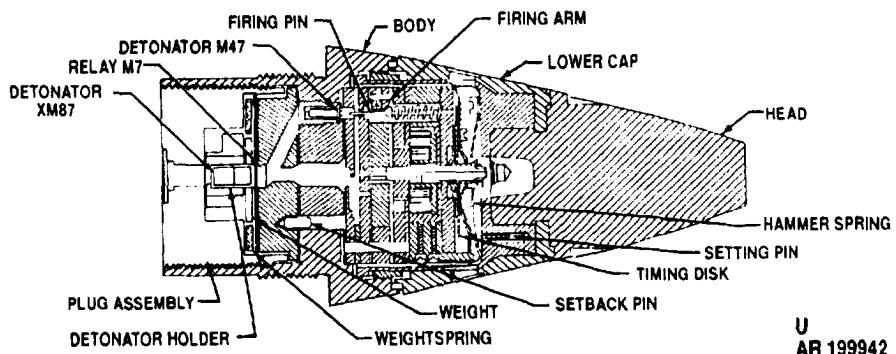
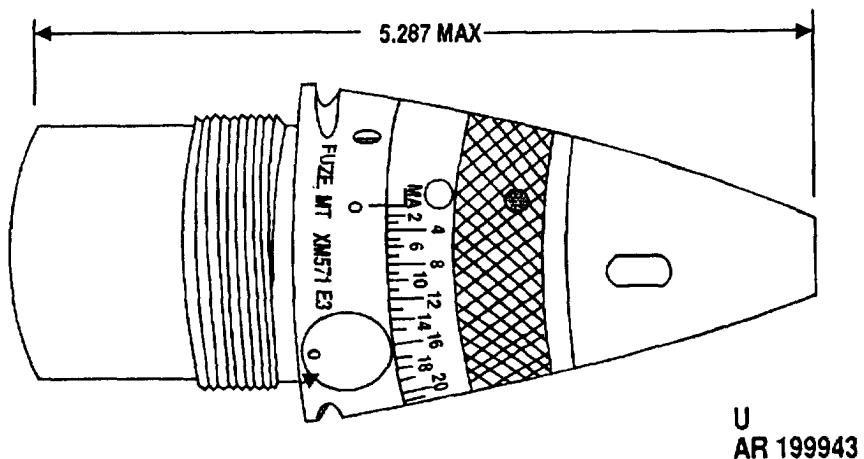
#### Limitations:

None.

#### References:

- SC 1340/98-IL
- TM 9-1300-251-20
- TM 9-1015-203-12
- TM 9-1015-234-10
- TM 9-1025-200-12&P
- TM 9-2300-216-10
- TM 9-2350-311-10

## FUZE, MECHANICAL TIME: M571

**Type Classification:**

Std AMCTC 9575 dtd 1972.

**Use:**

Mechanical Time Fuze M571 is designed especially for use with 105mm 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 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 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 lb
Length:	
Visible -----	3.787 in.
Overall -----	5.287 in.
Thread size -----	1.9-16UNS-IA
Assembly Dwg. No-----	10551670

#### **Temperature Limits:**

Firing:  
Lower limit ----- -40°F

Upper limit -----	+ 125°F
<u>Storage:</u>	
Lower limit -----	-80°F (for not more than 3 days)
Upper limit -----	+ 160°F (for not more than 4 hr/day)
Packing -----	Shipped assembled to round

#### **Shipping and Storage Data:**

DODAC ----- 1390-N247

#### **Explosive Components:**

Detonator M47, Relay M7 and Detonator XM87.

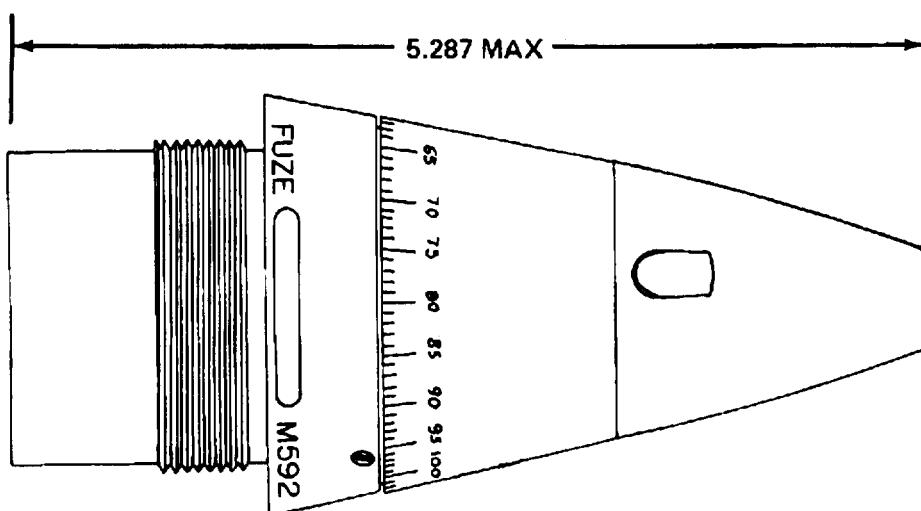
#### **Limitations:**

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.

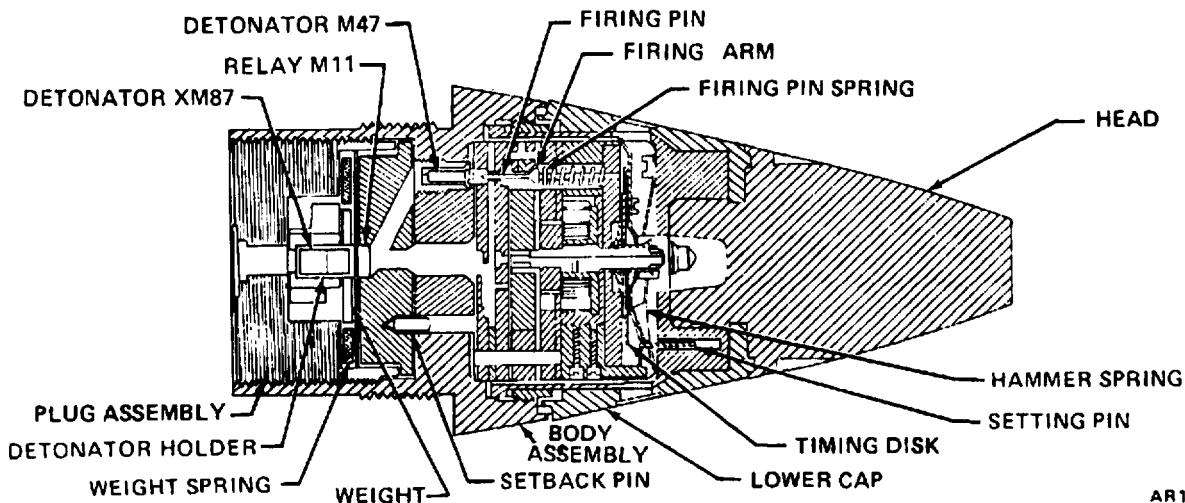
#### **References:**

TM 9-1300-251-20  
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 106mm 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 in-

scribed with range graduations from 200 to 3300 meters and an MA mm-k 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. 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 tiring 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 upraised 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 preset 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 lb
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 hr/day)
*Packing -----	8 fuzes in metal container; 2 containers in wire-bound box

\*NOTE: See DOD Consolidated Ammunition Catalog 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.

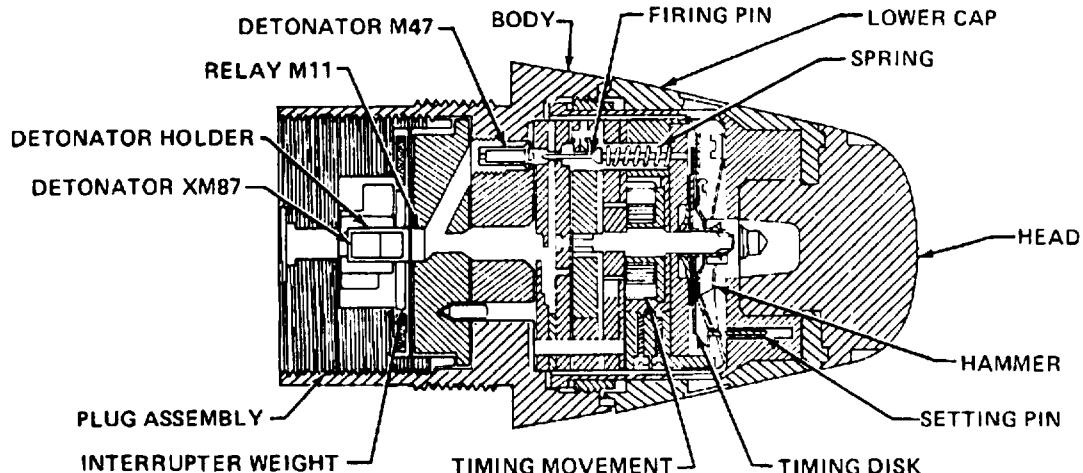
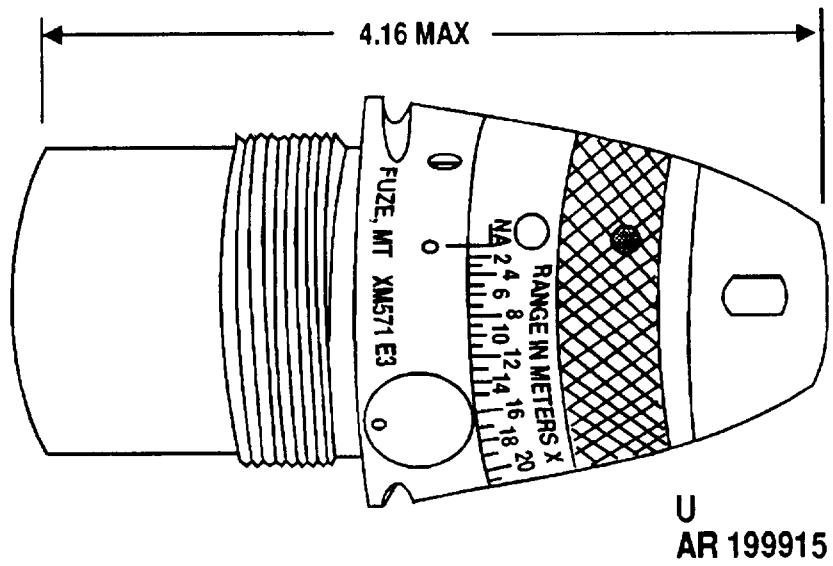
**Limitations:**

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

**Type Classification:****Use:**

Mechanical Time Fuze M711 is designed especially for use with flechette-loaded 90mm 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 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 lb
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 hr/day)
Packing	Fuze is shipped in assembly with complete round

#### Explosive Components:

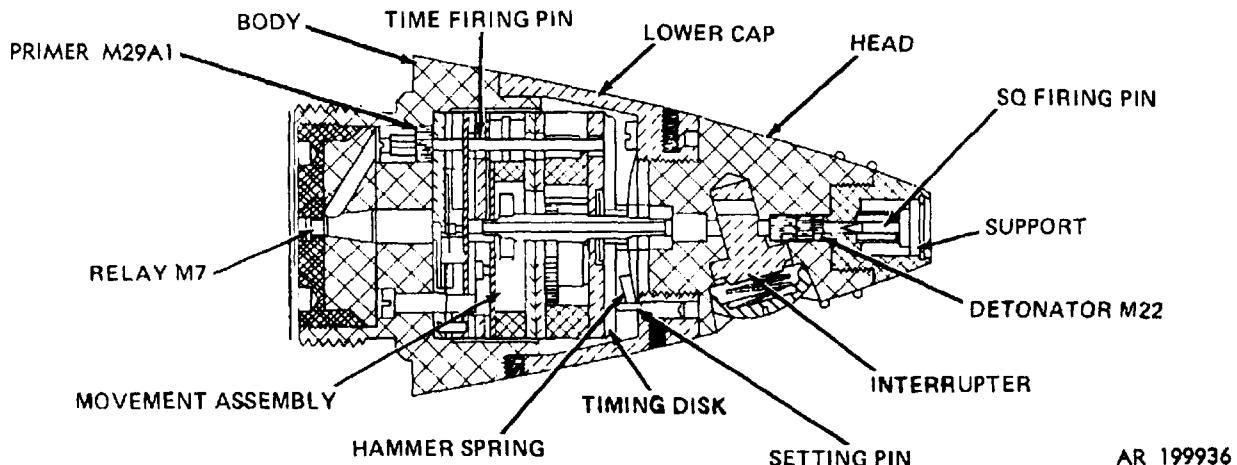
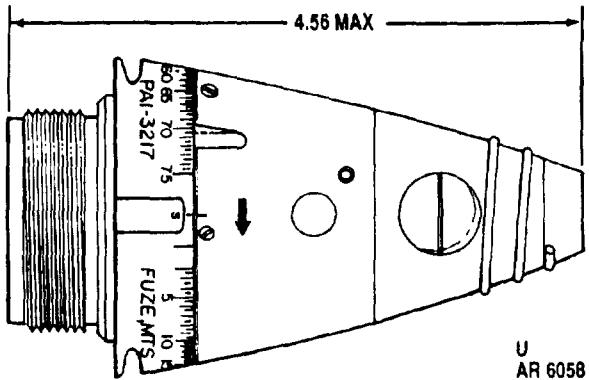
Detonator M47, Relay M11, Detonator XM87.

#### 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  
SB 700-20

**FUZE, MECHANICAL TIME AND SUPERQUICK: M501A1 (OR M501)****Type Classification:**

CON--MSR11756003--M501A1.  
OBS--MSR11756003--M501.

**Use:**

Mechanical Time and Superquick Fuzes M501A1 and M501 are a dual-purpose type used to detonate spin-stabilized projectiles fired from 105mm and 155mm howitzers and from 4.2 in. 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 firing 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 disc by means of the setting pin, engaged in a raised lug on the disc. Upon firing, setback permits the hammer

spring to strike the raised lug and release the timing disc from the setting pin. Centrifugal force from projectile spin withdraws the interrupter and releases the detents securing the timing mechanism. When the timing disc 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 lb
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 (-40°C)
Upper limit .....	+125°F (+52°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 .....	8 fuzes in metal con- tainer; 2 con- tainers in a wirebound box

##### \*Packing Box:

Weight .....	43.8 lb
Dimensions .....	14-5/8 x 12- 13/16 x 9-1/8 in.
Cube .....	1.0 cu ft

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

#### Shipping and Storage Data:

Storage class/SC .....	1.4 B
DOT shipping class .....	C
DOT designation .....	COMBINA- TION FUZES, HANDLE CAREFULLY
DODAC .....	1390-N276
UNO serial number .....	0257
UNO Proper shipping name.....	Fuze, detonat- ing

#### Explosive Components:

Detonator M22, tetryl lead charge, and Relay M7.

#### Limitations:

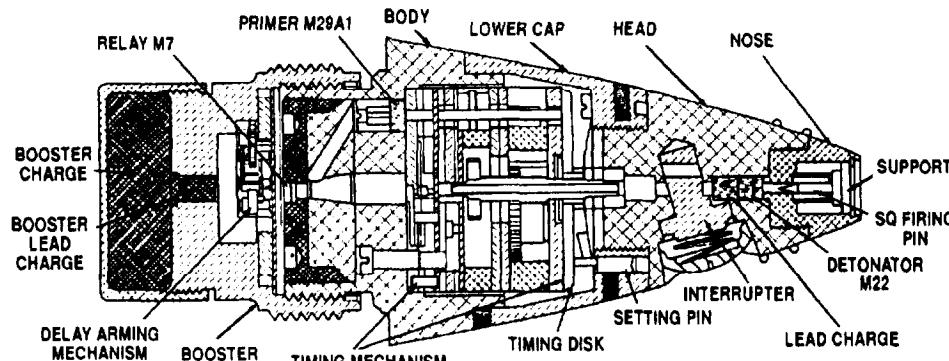
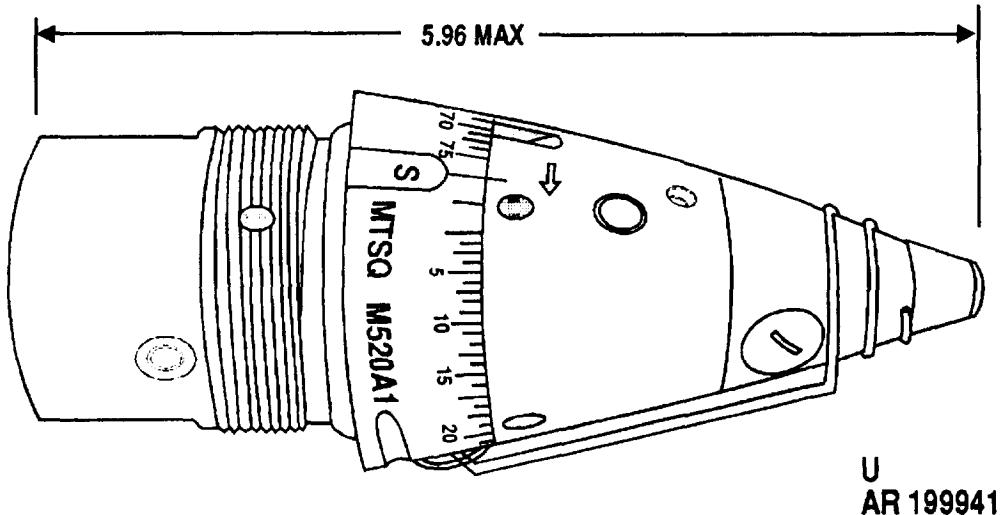
Do not use a fuze with a loose or cocked lower cap. Firing during heavy rainfall may result in premature functioning. When firing for airburst from 155mm Howitzers M1, M1A1, or M45, failures may occur with charges 1 or 2, because of insufficient setback force to release the timing mechanism. However, the fuze will then function on impact.

The M501/M501A1 fuze is not dropsafe. Dropping or rough handling of projectile assembled with fuze MTSQ M501/M501A1 can and has resulted in fuze functioning and expulsion of projectile base plate and contents. When handling projectiles assembled with this fuze, exercise extreme care to protect the fuze from impact. Keep pull wire on fuze in place until immediately prior to firing.

#### References:

- TM 9-1015-234-10
- TM 9-2350-257-10-1
- TM 9-1025-200-12&P
- TM 9-1025-211-10
- TM 9-1015-215-10
- TM 9-1300-251-20
- TM 9-1300-251-34
- TM 9-2350-311-10
- SC 1340/98-IL
- TM 9-1015-203-12
- SB 700-20

## FUZE, MECHANICAL TIME AND SUPERQUICK: M520A1 and M520



U  
AR 199940

**Type Classification:**

Std AMCTC 6697 dtd 1969.

**Use:**

These dual purpose, mechanical time and superquick fuzes are used with ammunition calibers 90mm through 280mm, except 175mm. 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 super-quick element consists of the nose of the fuze containing firing pin and support, and the head 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.

**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 M125A which provides a delay arming distance of 200 feet. Fuze M520 uses Booster M125 which provides 150 feet.

**Tabulated Data:**

Type -----	MTSQ
Weight -----	2.06 lb
Length:	
Visible -----	3.75 in.
Overall -----	5.96 in.
Thread size -----	2 in.-12NS-1
Assembly Dwg. No.:	
M520A -----	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 hr/day)
*Packing -----	8 fuzes in metal container; 2 metal containers in wirebound box

\*NOTE: Fuze maybe shipped attached to a cartridge.

**Packing Box:	
Weight -----	55.8 lb
Dimensions -----	14-7/8 x 12-13/16 x 9-1/8 in.
Cube -----	1.04 cu ft

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

**Shipping and Storage Data:**

Quantity-distance class -----	1.1 or (04) 1.2
Storage compatibility group -----	B
DOT shipping class -----	A
DOT designation -----	DETONATING FUZES CLASS A EXPLOSIVES, HANDLE CAREFULLY, DO NOT STORE WITH ANY HIGH EXPLOSIVES.
DODAC -----	1390-N280
UNO serial number -----	0106 or 0107
UNO proper shipping name -----	Fuzes, detonating

**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.

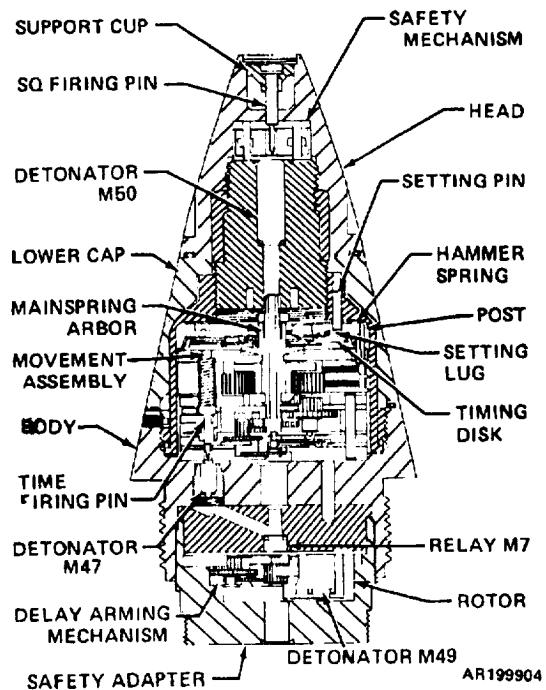
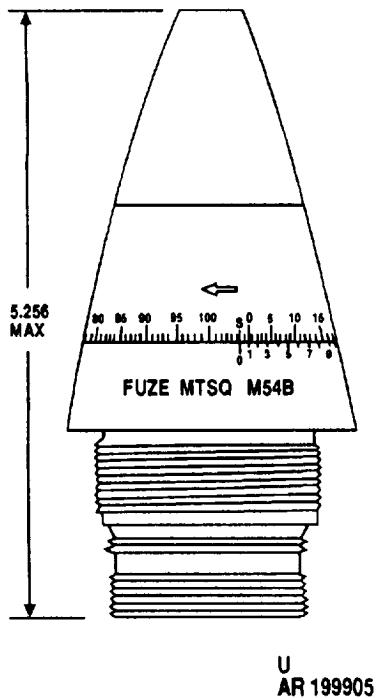
**Limitations:**

Firing during heavy rain may cause premature functioning of the fuze. Failure may occur when fuzes are set for airburst firing from 155mm 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 9-2300-216-10
- TM 9-2350-311-10

## FUZE, MECHANICAL TIME AND SUPERQUICK: M548



**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 de-

onator 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 in. 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 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 lb  
 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  
                         4 hr/day)  
 Packing ----- 1 fuze in fiber-  
                         board con-  
                         tainer; 8 con-  
                         tainers in  
                         metal can; 2  
                         metal cans in  
                         wirebound box

\*Packing Box:  
 Weight ----- 54.6 lb  
 Dimensions ----- 14-5/8 x 12-  
                         13/16 x 9-1/8  
                         in.  
 Cube ----- 1.0 cu ft

\*NOTE: See DOD Consolidated Ammunition Catalog 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 designation ----- TIME FUZES,  
                         HANDLE  
                         CAREFULLY.  
 DODAC ----- 1390-N282  
 UNO serial number ----- 0257  
 UNO proper shipping name ----- Fuzes, detonat-  
                         ing

**Explosive Components:**

Timed Action ----- Detonator  
                         M47,  
                         Detonator  
                         M50, Relay M7  
                         and Detonator  
                         M49.

**Limitations:**

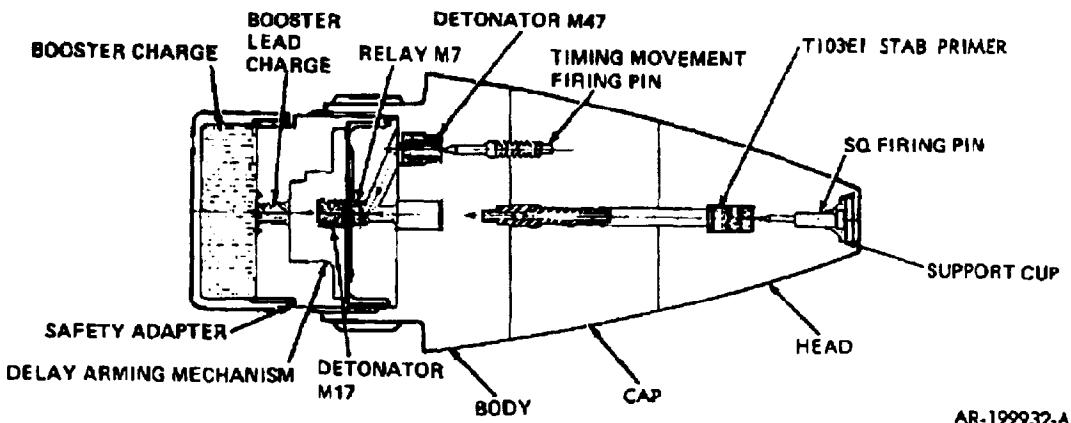
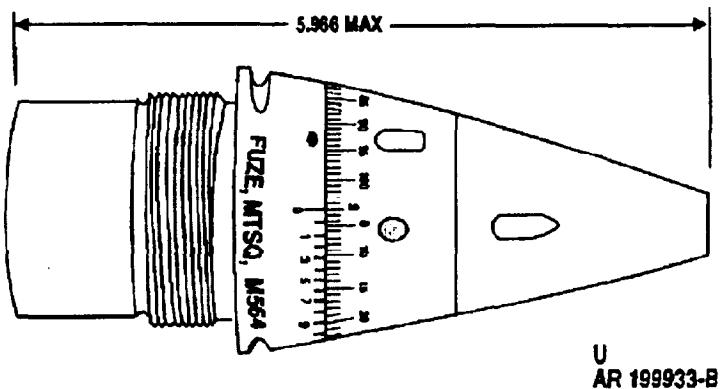
Premature functioning downrange may occur if fuze is fired in rainfall.

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 9-2350-311-10  
 TM 9-1015-203-12  
 TM 9-1015-234-10  
 TM 9-2300-216-10  
 TM 9-1015-215-10

## FUZE, MECHANICAL TIME AND SUPERQUICK: M564



### Type Classification:

Std AMCTC 268 dtd 1962.

### Use:

Mechanical Time and Superquick Fuze M564 is used with 105mm, 155mm, and 8-in. projectiles when a choice between time and superquick action is desired.

### Description:

The M564 fuze consists of head, cap, body, and delay arming mechanism (DAM). The head contains the point detonating assembly, consisting of the firing pin, support plate and two 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. The movement assembly contains a trigger mechanism, firing pin and M47 Detonator. The rear portion of the body houses the M7 Relay and the DAM assembly with an RDX (Comp A5) booster pellet. The DAM contains an M17 detonator (out-of-line) and tetryl lead charge.

### Functioning:

The fuze is set by turning the cap clockwise which 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 ft) from the Muzzle of the cannon. When the timing disc has rotated to the present 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 tiring pin striking the T103E1 stab primer on impact.

#### Tabulated Data:

Type -----	MTSQ
Weight -----	2.10 lb
Length:	
Visible -----	3.75 in.
Overall -----	5.966 in
Thread size -----	2-12UNS-1A
Assembly Dwg No. -----	10534285

#### Temperature Limits:

Firing:	
Lower Limit -----	-40°F (-40°C)
Upper limit -----	+125F: (+52°C)
Storage:	
Lower limit -----	-80°F (-62.2°C) (for a period of not more than 3 days)
Upper limit -----	+160°F (+71.1°C) (for a period of not more than 4 hr/day)
*Packing -----	X fuzes in metal containers, 2 containers in wire-hound box
*Packing Box:	
Weight -----	63.0 lb
Dimensions -----	14-5/8 x 12-13/16 x 9-1/8 in.
Cube-----	1 cu ft

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

#### Shipping and Storage Data:

Storage class/SCG -----	1.1
DOT shipping class -----	A

DOT designation -----	DETONATING FUZES. ('LASS A EXPLOSIVES. HANDLE CAREFULLY, DO NOT STOKE OK LOAD WITH ANY HIGH EXPLOSIVES. 1390-N278
DODAC -----	0408
UNO serial number -----	Fuzes, detonating

#### Explosive Components:

Detonator M47, stab primer T103, Relay M7, Detonator M17, tetryl booster lead charge, and RDX/Comp A5 booster charge.

#### Limitations:

Fuzes manufactured prior to January 1970 must be set for 90 seconds if super-quick (impact) action only is desired. Fuzes manufactured from January 1970 on, could be set on either "S" or "90 seconds" if superquick (impact) action is desired. However, current doctrine dictates that all M564 fuzes, regardless of manufacture date, must be set on 90 seconds if superquick (impact) action is desired.

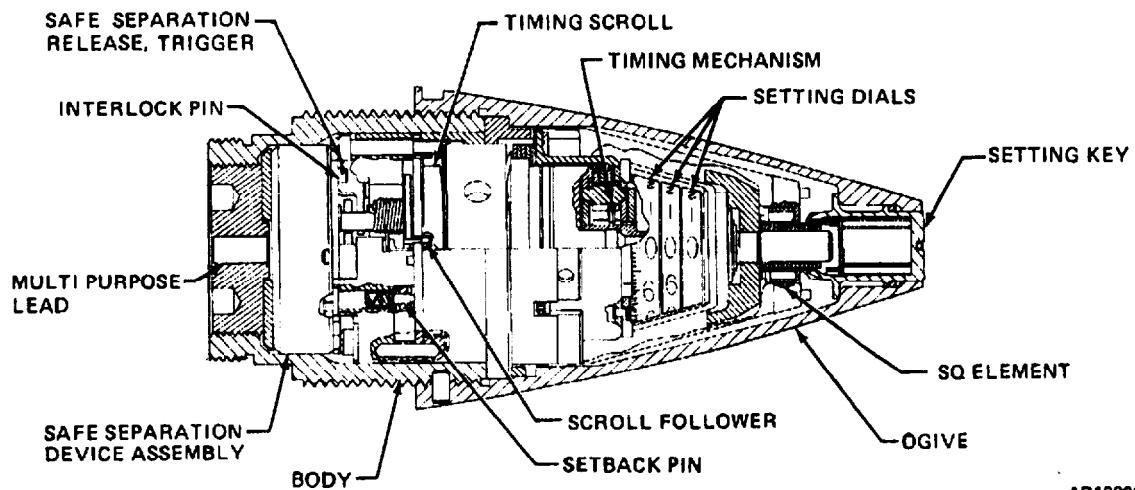
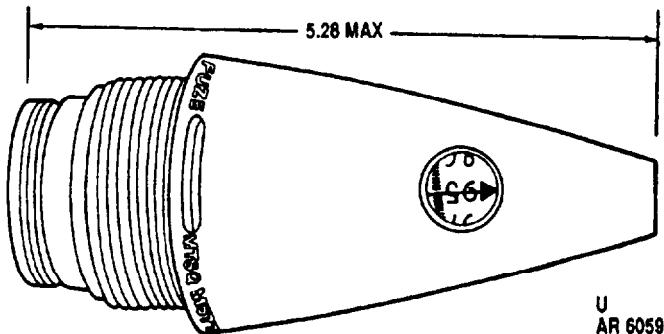
Premature functioning may occur downrange when the fuzes are fired in rainfall.

To avoid accidental functioning of PD element, do not drop, roll, or strike fuzes under any circumstances: packaged, unpackaged, or assembled to projectile, and do not strike round against breech of weapon.

#### References:

- TM 9-1025-211-10
- SB 700-20
- SC 1340/98-IL
- TM 9-1300-251-20
- TM 9-2300-216-10
- TM 9-1025-200-12&P
- TM 9-1015-203-12
- TM 9-1015-234-10
- TM 9-1300-251-34
- TM 9-2350-304-10
- TM 43-0001-28-4
- TM 43-0001-28-5
- TM 43-0001-28-6
- TM 43-0001-28-7
- TM 43-0001-28-8
- TM 43-0001-28-9
- TM 43-0001-28-10
- TM 9-2350-311-10

## FUZE, MECHANICAL TIME AND SUPERQUICK: M577 SERIES

**Type Classification:**

M577 Standard A MSR 05736060 March 73. M577A1 Standard A, MSR 06846012 June 84. M577 Standard B. MSR 06846012 June 84.

**Use:**

Mechanical Time and Superquick (MTSQ) Fuze M577A1/M577 is used with 4.2-inch and 105mm cartridges, and 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 mechanical clockwork timing mechanism that can 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 setting are made by reference to a hairline visible through the window

The timing mechanism and point detonating element are contained in the ogival nose section of the M577. The M577A1 does not contain the point detonating element, but rather utilizes the safe separation assembly as an inertial element to initiate impact function. On impact, the safe separation assembly slides forward and the detonator in the rotor is stabbed by the firing pin in the trigger mechanism. The safe separation device and trigger are contained in the fuze body. The timing mechanism and safe separation assembly are prevented from

operating 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 to block the detonation train prior to arming. Movement of the arming mechanism is interlocked by a scroll foil lower in the timing mechanism which also restrains the firing pin.

The M577 fuze has an aluminum ogive with an anodized black coating and a steel lower body. The M577A1 fuze has a zinc ogive but earlier manufactured A1 fuzes have black paint coated ogives while later manufactured A1 fuzes have chromate finished (gold color) ogives. The M577A1 ogive also has different wrench slots though the same wrench is used. The lower body is aluminum with chromate coating.

#### **Functioning:**

Setback and centrifugal forces from weapon firing acting on spring, lock, and spin detents allow the fuze to arm and function at its preset time or if the setting is point detonating, 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 (setback 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 (<98) 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.

A difference in functioning must be noted in the point detonating mode between the M577A1 and the M577. On impact, a point detonating element in the nose initiates the explosive train of the M577 fuze. For the M577A1 fuze, on impact the safe separation device will shear forward and the rotor detonator will be stabbed by the firing pin in the trigger mechanism to activate the explosive train of the fuze.

#### **Tabulated Data:**

NSN -----	1390-00-805-
	0692
Type -----	MTSQ
Weight -----	1.41 lb
Length	
Visible -----	3.77 in,
Overall -----	5.28 in.
Assembly Dwg. No, -----	M577A1- 9352381 M577-9236500

#### **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 sec/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 contain- ers in wire- bound box

*Packing Box:	
Weight -----	43.8 lb
Dimensions -----	14-5/8 x 12-13/ 16 x 9-1/8 in.
Cube -----	1.0 cu ft

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

#### **Shipping and Storage Data:**

M577 Hazard class/division and storage compatibility group --	1.4 D
M577A1 Hazard class/division and storage compatibility	..... 1.4D
DOT shipping class -----	Class C
DOT designation -----	Explosive COMBINAT- ION FUZES- HANDLE CAREFULLY
DODAC -----	M577A1/M577- 1390-N285
UNO serial number -----	0410
UNO proper shipping name -----	Fuzes, detonat- ing

**Explosive Components:**

M577:  
Detonator M55, Detonator M94

MILD Detonating Fuze Lead,  
Multipurpose (PA510)

M577A1:  
Detonator M94

Lead, Multipurpose (PA51O)

**Limitations:**

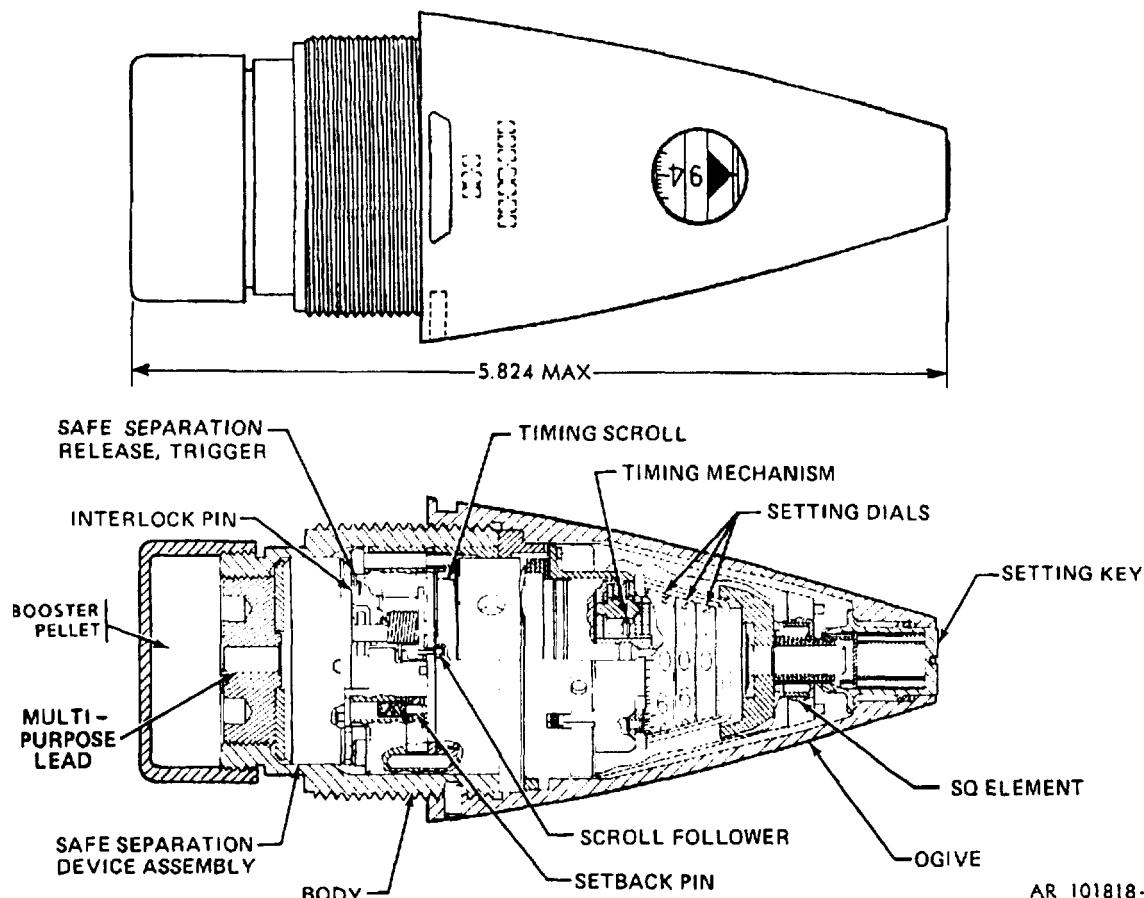
For point detonating function, a minimum impact velocity equivalent to 450 fps against 1/8-inch steel plate is required. The fuze may not function or may function on impact if set for a time-to-airburst shorter than required for arming.

**References:**

SC 1340/98-IL  
SB 700-20  
TM 9-1015-203-12  
TM 9-1015-215-10  
TM 9-1015-234-10  
TM 9-1025-200-12&P  
TM 9-1025-211-10  
TM 9-1300-251-20  
TM 9-1300-251-34  
TM 9-2350-311-10  
TM 9-2350-257-10-1  
TM 9-2350-304-10  
TM 43-0001-28-4  
TM 43-0001-28-5  
TM 43-0001-28-6  
TM 43-0001-28-8  
TM 43-0001-28-9  
TM 43-0001-28-10

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## FUZE, MECHANICAL TIME AND SUPERQUICK: M582 SERIES

Type Classification:

M582 Standard A, MSR 05736060 March 73. M582A1 Standard A, MSR 06846012 June 84. M582 Standard B, MSR 06846012 June 84.

Use:

Mechanical Time and Superquick (MTSQ) Fuze M582A1/M582 is used with the 105mm howitzer conventional cartridges HE, M 1; HERA, M548; and WP Smoke M60 series. It is used with the 155mm howitzer projectiles HE, M107; HERA, M549/M549A1; and both the M110 Agent and WP Smoke. It is also used with the 8-inch projectiles HE, M 106 and HERA, M650.

Description:

The fuze contains a mechanical clockwork timing mechanism that can 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 beset 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 indicated 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 M582 series MTSQ fuze is the same as the M577 series fuze except that it contains a Composition A5 booster pellet and cap.

The timing mechanism and point detonating element are contained in the ogival nose section of the M582. The M582A1 does not contain the point detonating element, but rather utilizes the safe separation assembly as an inertial element to initiate impact function. On impact, the safe separation assembly slides forward and the detonator in the rotor is stabbed by the firing pin in the trigger mechanism. The safe separation device and trigger are contained in the fuze body. The timing mechanism and safe separation assembly are prevented from operating 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 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 fuze has an aluminum ogive with an anodized black coating and a steel lower body. The M582A1 fuze has a zinc ogive. Earlier manufactured A1 fuzes have black paint coated ogives while later manufactured A1 fuzes have chromate finished (gold color) ogives. The M582A1 ogive also has different wrench slots though the same wrench is used. The lower body is aluminum with chromate coating.

#### Functioning:

Setback and centrifugal forces from weapon firing acting on spring, lock, and spin detents allow the fuze to arm and function at its preset time or if the setting is point detonating, 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 sequence firing environment (setback 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 (< 98) 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.

A difference in functioning must be noted in the point detonating mode between the M582A1 and the M582. On impact, a point detonating element in the nose initiates the explosive train of the M582 fuze. For the M582A1 fuze, on impact the safe separation device will shear forward and the rotor detonator will be stabbed by the firing pin in the trigger mechanism to activate the explosive train of the fuze.

#### Tabulated Data:

NSN -----	1390-01-159-
	8044
Type -----	MTSQ
Weight -----	1.51 lb

Length:	
Visible -----	3.77 in.
Overall -----	5.819 in.
Assembly Dwg. No. -----	M582A1- 9352382 M582-9236700

#### 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 sec 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 lb
Dimensions -----	14-5/8 x 12-13/ 16x 9-1/8 in.
Cube -----	1.0 cu ft

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

#### Shipping and Storage Data:

M582A1, M582 Hazard class/ division and Storage	
Compatibility Group -----	1.1 D
DOT shipping class -----	Class A
DOT designation -----	Explosive DETONATING FUZES CLASS A EXPLOSIVES, HANDLE CAREFULLY DO NOT STORE OR LOAD WITH ANY HIGH EXPLOSIVES.
DODAC -----	M582A1/1390- N286
UNO serial number -----	0409
UNO proper shipping name -----	Fuzes, detonat- ing

**Explosive Components:****M582:**

Detonator M55, Detonator M94 Booster Standard Comp A-5 MILD Detonating Fuze Lead Multipurpose (PA510).

**M582A1:**

Detonator M94 Booster Standard Comp A-5 Lead, Multipurpose (PA510).

**Limitations:**

For point detonating 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.

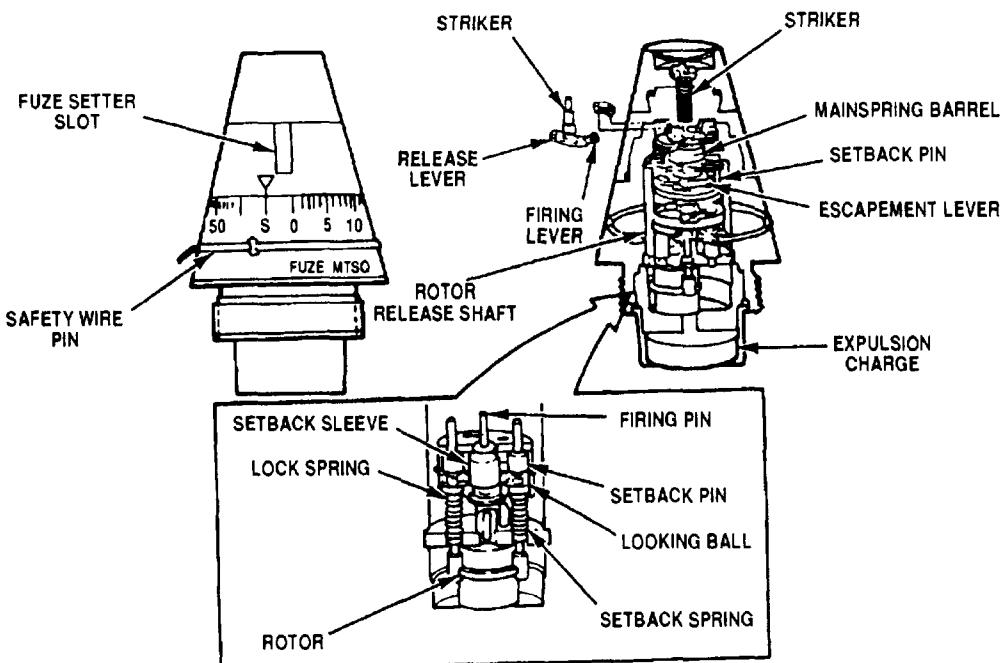
The M582 series fuze is authorized for firing with the 8-inch, M650 projectile in the rocket-off mode only.

**References:**

SC 1340/98-IL  
SB 700-20  
TM 9-1015-203-12  
TM 9-1015-234-10  
TM 9-1025-200-12&P  
TM 9-1025-211-10  
TM 9-1300-251-20  
TM 9-1300-251-34  
TM 9-2350-311-10  
TM 9-2350-304-10  
TM 43-0001 -28-4  
TM 43-0001 -28-5  
TM 43-0001 -28-6  
TM 43-0001 -28-7  
TM 43-0001 -28-8  
TM 43-0001 -28-9  
TM 43-0001-28-10

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## FUZE, MECHANICAL TIME AND SUPERQUICK: M776



U  
AR 4026

### Type Classification:

Std Sep' 87.

### Use:

This fuze is used on the 60mm illumination cartridge, M721.

### Description:

The fuze is designed for a base ejection type round. The fuze has a mechanical arming/timing device and a black powder expulsion charge. The fuze can be set to function between 6 to 52 seconds of flight.

### Functioning:

Upon setting of fuze, the setback sleeve is locked in place by the safety wire/pin. Removal of the safety pin allows the setback sleeve to move rearward. Setback force retracts the setback sleeve when the fuzed cartridge is propelled up the mortar barrel. The retracted setback sleeve allows the locking balls to move inward and the setback pins to move rearward. A V-spring locks the setback pins in the rearward position. The escapement lever and gears of the

mechanical arming/timing device are released. The gears rotate the rotor release shaft. During setback, the firing pin is driven temporarily rearward into a blind hole in the rotor; this prevents the rotor from being prematurely released until the cartridge has left the mortar barrel. The rotor is released when the grooves in the setback pins are aligned with the flange of the rotor and the end of the rotor release shaft is disengaged from the slot in the rotor. The rotor rotates to the armed position where the detonator is aligned with the firing pin. The mainspring turns the mainspring barrel. The release lever disengages from the firing lever, when the firing lever engages a slot in the mainspring barrel. Disengagement of the release lever from the firing lever allows the striker to impact the firing pin. The firing pin stabs the detonator. The detonator initiates the black powder expulsion charge. The expulsion charge ejects the payload. The time of ejection can be varied prior to firing by rotating the head of the fuze: this adjusts the starting position of the firing lever (relative to the slot in the mainspring barrel) and the required degree of rotation. The fuze functions on impact should the timing device fail or the set time exceed the time of flight.

**Tabulated Data:****M776 Fuze.**

Complete Round:

Type -----	Mechanical time super- quick
Weight.....	0.50 lb (0.23 kg)
Length -----	3.44 in. (8.77 cm)
Thread size -----	1.5-12UNF-1A
Intrusion -----	1.08 in. (2.74 cm)
Drawing number.....	12361000

**Temperature Limits:**

Firing:

Lower -----	-50°F (-45.5°C)
Upper -----	+ 145°F (+ 63°C)

Storage:

Lower .....	-50°F (-45.5°C) (for a period of not more than 3 days)
-------------	---

Upper ----- + 160°F  
(+71.1°C) (for  
a period of not  
more than 4  
hr/day)

**Shipping and Storage Data**

DOD hazard class ..... (04) 1.2  
 Storage compatibility group --- B  
 DOT shipping class ..... C  
 DOT designation ..... DETONA-  
    TING FUZE -  
    CLASS A  
    EXPLOSIVE -  
    HANDLE  
    CAREFULLY,  
    DO NOT  
    STORE OR  
    LOAD WITH  
    ANY  
    EXPLOSIVE

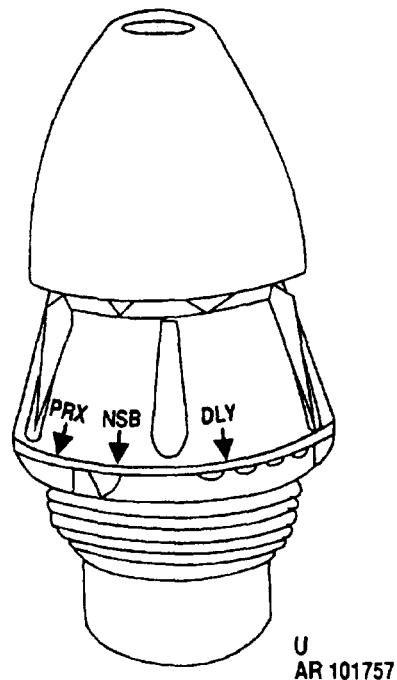
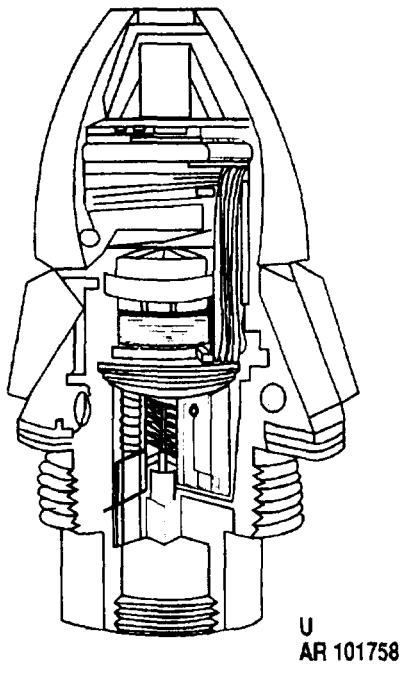
DODAC ----- 1390.T007

**Limitations:**

None.

**References:**

TM 9-1010-223-10

**FUZE, MULTI-OPTION: M734****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 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 zig-zag 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 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 both locks, the spring-driven rotor turns 180 degrees 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.

### **Tabulated Data:**

Type -----	Multi-Option (PRX, NSB, IMP, DLY)
Weight -----	0.50 lb ± 0.03 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:**

Not a separate issued item, component of cartridge, 60 MM, HE M720.

### **Shipping and Storage Data:**

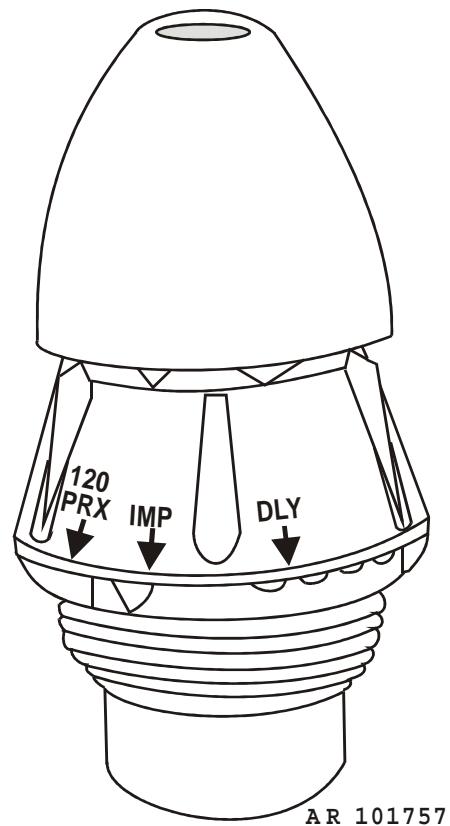
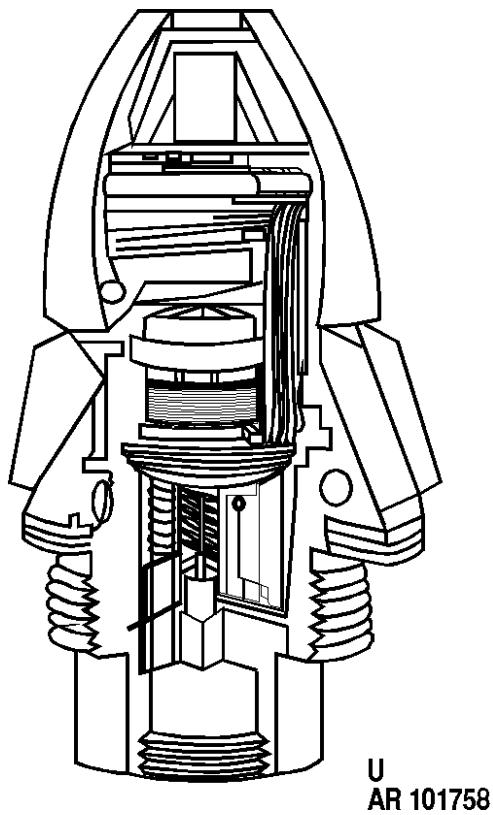
Storage class/SCG -----	1.4 B
DOT shipping class -----	A
DOT description -----	DETONATING FUZES- CLASS A EXPLOSIVES
DODAC -----	1390-N288

### **Limitations:**

**None**

### **References:**

SC 1340/98-IL  
TM 9-1300-251-20  
TM 9-1300-251-34  
TM 9-1010-223-10

**FUZE, MULTI-OPTION: M734A1****Type Classification:**

TC - STD (Jun 96)

**Use:**

Multi-Option Fuze M734A1 is designed to provide a selectable function capability for use with mortar cartridges. The four settings are 60/81 PRX (Proximity), 120 PRX, 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 60/81 PRX, 120 PRX, 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 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 zigzag setback device in 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 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 both locks, the spring-driven rotor turns 180 degrees 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. An apogee sensor prevents electrical arming prior to apogee.

### **Multi-Option Functioning**

The three function modes 60/81 PRX, 120 PRX 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. 60/81 PRX provides airburst detonation for 60MM and 81MM cartridges (mean HOB 7ft.) and 120 PRX provides airburst detonation for 120MM cartridges (mean HOB 14 ft.). 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 120 PRX, M734 could also function 60/81 PRX or IMP (and of course DLY); set 60/81 PRX, M734 could function IMP (and DLY). Only in DLY setting is there no backup.

### **Tabulated Data:**

Type .....	Multi-Option (60/81 PRX, 120 PRX, IMP, DLY)
Weight.....	0.50 lb ± 0.03 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. ....12973630

### **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:**

Not a separate issued item, component of 60MM, 81MM and 120MM mortar cartridges.

### **Shipping and Storage Data:**

Storage class/SCG.....	1.2 D
DOT shipping class.....	A
DOT description.....	DETONATING FUZES CLASS A EXPLOSIVES
DODAC.....	1390-NA06

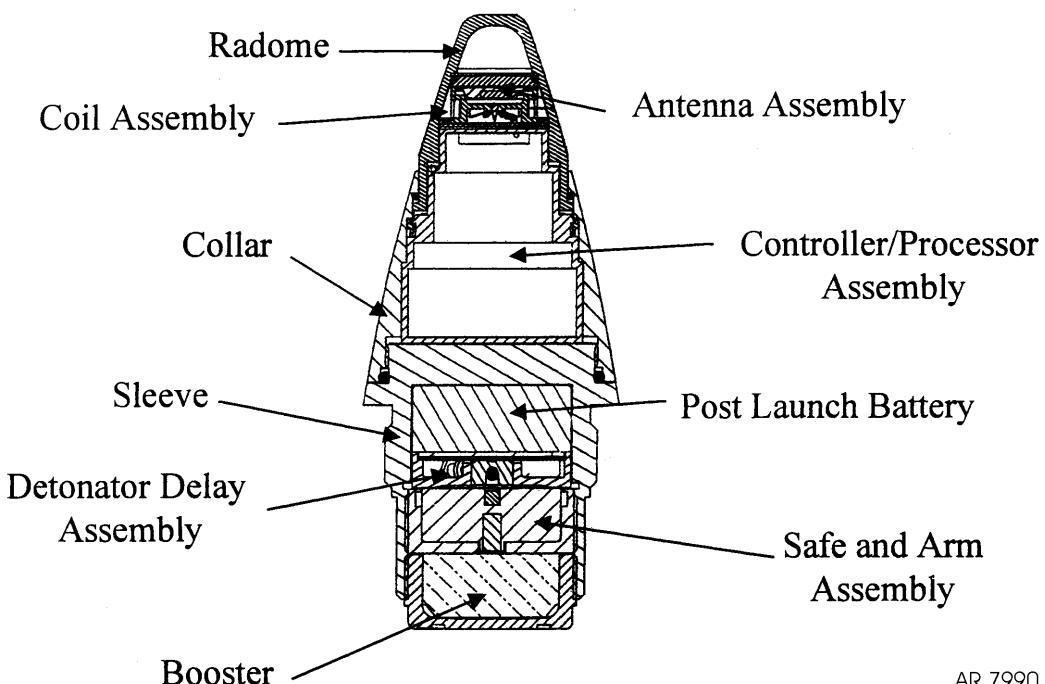
### **Limitations:**

None

### **References:**

SC 1340/98-IL
TM 9-1300-251-20&P
TM 9-1300-251-34&P
TM 9-1010-223-10

## FUZE, MULTI-OPTION ARTILLERY: M782



AR 7990

**Type Classification:**

13 Dec 1999.

**Use:**

The Multi-Option Artillery Fuze (MOFA) is used on fragmentation (HE loaded) and burster type 105mm cartridges, and 155mm projectiles.

**Description:**

The fuze has four functional modes: variable time (VT), time (TIME), point detonating (PD), and delay (DLY). MOFA contains an electronic timing system that may be set to function from 0.5 to 199.9 seconds in increments of tenths of a second. The fuze will be automatically remote set prior to launch via an inductive communication link (i.e., the M1155 portable inductive fuze setter, TM 9-1290-210-12&P). The mission data transferred from the setter to the fuze is confirmed by the M1155 fuze setter.

**Functioning:**

The fuze is inductively set. When the round is fired the post launch battery is activated and the microcomputer is reset. The microcomputer loads

the mission data from the EPROM to one of its registers. The microcomputer verifies that the mission data is valid and begins time-out. Mechanical arming by the S&A will be completed after the round has traveled 400 calibers. The time of electrical arming will depend on the mode and the set time.

If the fuze is set for the point detonating mode, the detonator will be initiated when the crush switch closes on impact. If set in delay mode, the detonator will be initiated approximately 8ms after the crush switch closes. When set for the time mode, the fuze will initiate the detonator at the function time programmed by the user. If impact occurs before time-out the crush switch will close and initiate the detonator. In the variable time mode, the microcomputer will turn on the prox sensor 4 seconds prior to the set time. The microcomputer will ignore any fire signals for the first 200ms while the signal processor circuits stabilize. The detonator will be initiated when the microcomputer receives a fire signal from the signal processor circuit. If impact occurs before the prox sensor provides a fire signal, the crush switch will close and initiate the detonator.

**Tabulated Data:**

NSN ..... 1390-01-462-0699  
 Type ..... MOFA  
 Weight..... 1.65 lb

Length:  
 Visible..... 2.41 in.  
 Overall ..... 5.97 in.  
 Assembly Dwg No. ..... 12984952

**Temperature Limits:**

Firing:  
 Lower limit ..... -45°F  
 Upper limit..... +145°F

Storage:  
 Lower limit ..... -60°F  
 Upper limit..... +160°F

**Arming Data:**

Method..... Setback and Spin

Fully armed:  
 Rotation:  
 No-arm ..... 18 rps  
 All-arm ..... 28 rps

Setback:  
 No-arm ..... 30G  
 All-arm ..... 40G

**Packaging:**

Packing ..... 8 fuzes in M2A1  
 Container; 2 containers in wire-bound box

Packing Box:  
 Weight ..... 35 lb  
 Dimensions..... 14-5/8 x 12-  
 13/16 x 9-1/8 in.  
 (37.15 x 32.54 x  
 23.18 cm)  
 Cube ..... 1.0 cu ft. (0.03  
 cu m)

**Shipping and Storage Data:**

Quantity-distance class ..... 1.1  
 Storage compatibility group..... D  
 DOT shipping class..... CLASS A  
 EXPLOSIVE  
 DOT designation..... DETONATING-  
 FUZES CLASS A  
 EXPLOSIVES,  
 HANDLE CARE-  
 FULLY. DO  
 NOT STORE OR  
 LOAD WITH  
 ANY HIGH  
 EXPLOSIVES

DODAC ..... 1390-NA09

**Explosive Components:**

Electric Detonator ..... M100  
 Stab Detonator ..... M55  
 S&A Lead Charge..... PBXN-5  
 Booster Standard Comp ..... PBXN-5

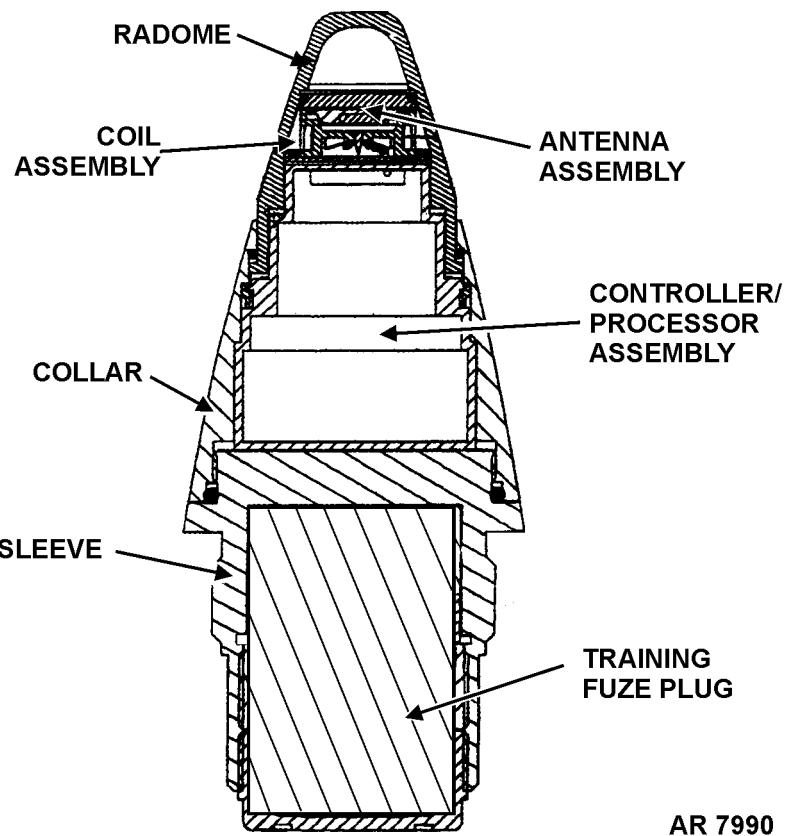
**Limitations:**

**None**

**References:**

TM 9-1300-251-20&P  
 TM 9-1300-251-34&P  
 TM 9-1015-252-10  
 TM 9-1015-234-10  
 TM 9-1025-211-10  
 TM 9-2350-311-10  
 TM 9-2350-314-10

## TRAINING AID, FUZE: PIAFS-1



### TYPE CLASSIFICATION:

Fuze is a table 62, Common Table of Allowance (CTA) authorized item.

### USE:

The inert PIAFS-1 training aid fuze will be utilized as a training aid for the Portable Inductive Artillery Fuze Setter (PIAFS). The fuze is inert but electronically identical to the M782 (MOFA) fuze, allowing it to be set and interrogated by the PIAFS.

### DESCRIPTION:

The inert PIAFS-1 training aid fuze comprises of a blue anodizing aluminum ogive and a 2-inch threaded steel base to match the projectile nose and fuze cavity.

The fuze has four setting modes: Variable Time (VT), Time (TIME), Point Detonating (PD), and Delay (DLY). PIAFS-1

training aid fuze contains an electronic timing system that may be set for times ranging from 0.5 to 199.9 seconds in increments of tenths of a second. The fuze is automatically remote set via an inductive communication link with the M1155 PIAFS.

Since the PIAFS-1 training aid fuze is inert, an aluminum plug takes the place of the Booster, Safe and Arm Assembly, Detonator Delay assembly and the Post Launch Battery, found in the M782 MOFA fuze.

### FUNCTIONING:

The PIAFS-1 training aid fuze interacts with M1155 PIAFS identically to the M782 MOFA fuze. To set the PIAFS-1 training aid fuze select M782 as the fuze being set. The M1155 PIAFS fuze setter (TM 9-1290-210-12&P) is a hand-held, battery powered electronic device that sets the fuze in less than one second, that allows test setting and verification readout of the fuze.

TABULATED DATA:

NSN .....	6910-01-462-5845
Type .....	Training Aid, Fuze: PIAFS-1
Weight .....	1.65 lb
Length:	
Visible.....	2.41 in.
Overall .....	5.97 in.

TEMPERATURE LIMITS:

Firing: N/A

Storage:

Lower limit .....	-60°F
Upper limit.....	+145°F

DRAWINGS:

Assembly Dwg No. .... 12984996

UNIT OF ISSUE:

Packing.....	8 fuzes in a M2A1 container; 2 contain- ers in a wirebound box
--------------	---

PACKING DATA:

Packing Box:	
Weight .....	35 lb
Dimensions.....	14-5/8 x 12-13/16 x 9- 1/8 in. (37.15 x 32.54 x 23.18 cm)
Cube .....	1.0 cu ft (0.03 cu m)

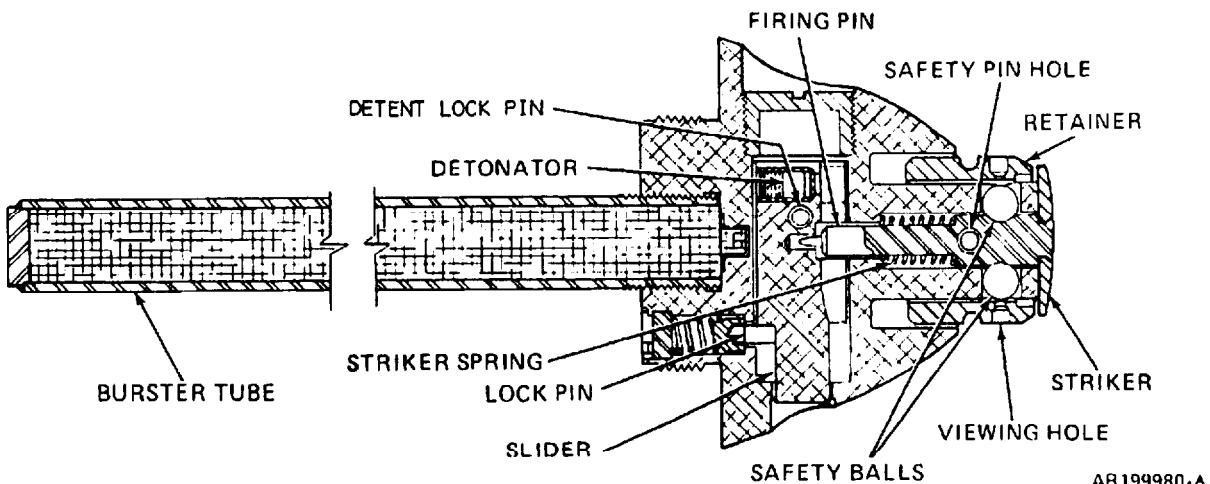
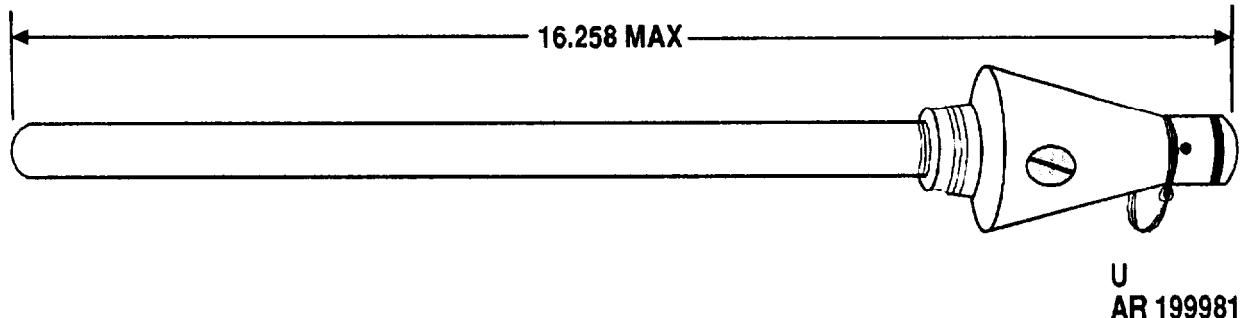
SHIPPING AND STORAGE DATA:

Quantity-distance class .....	N/A
Storage compatibility group.....	N/A
DOT shipping class.....	N/A
DOT designation.....	N/A

REFERENCES:

TM 9-1290-210-12&amp;P

## FUZE, POINT DETONATING: M8

**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
<b>Length:</b>	
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.

#### **Shipping and Storage Data:**

DODAC -----	1390-N335
UNO serial number -----	0107
UNO proper shipping name -----	Fuzes, detonating

#### **Explosive Components:**

Detonator and tetryl burster tube.

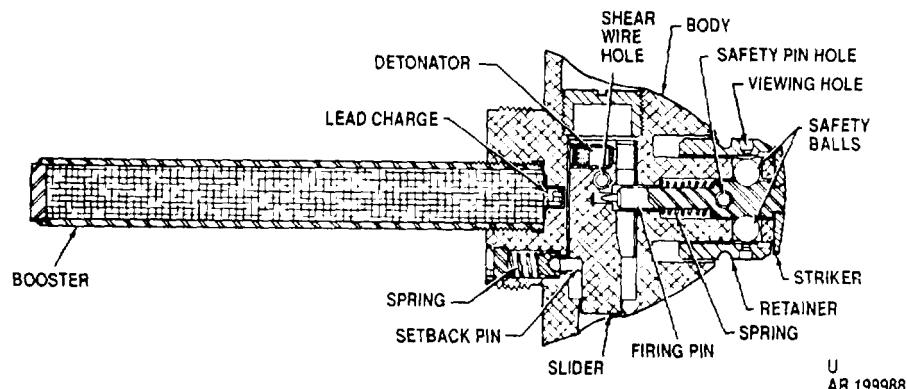
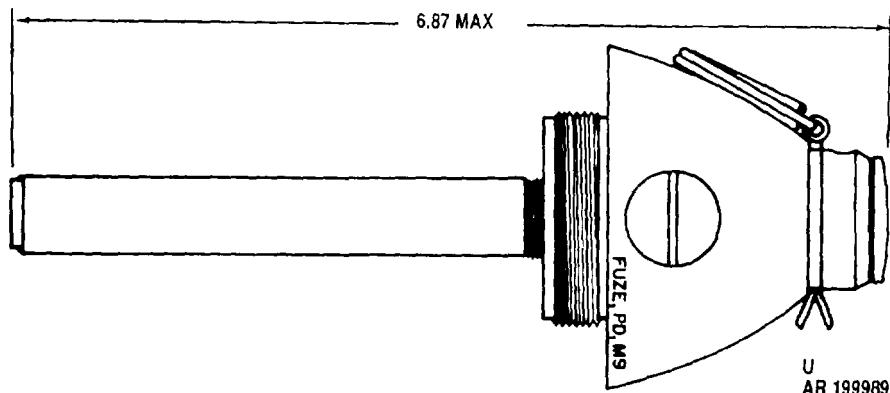
#### **Limitations:**

None.

#### **References:**

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

## FUZE, POINT DETONATING: M9

**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 lb
<b>Length:</b>	
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 DOD Consolidated Ammunition Catalog for complete packing data including NSN'S.

#### Explosive Components:

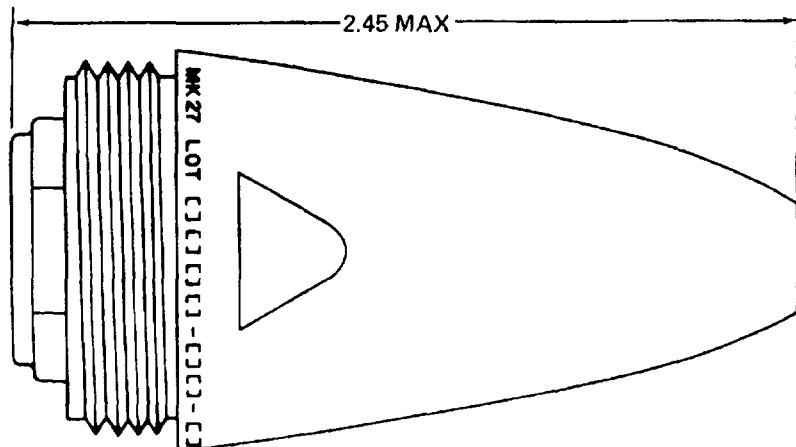
Detonator and tetryl booster.

#### Limitations:

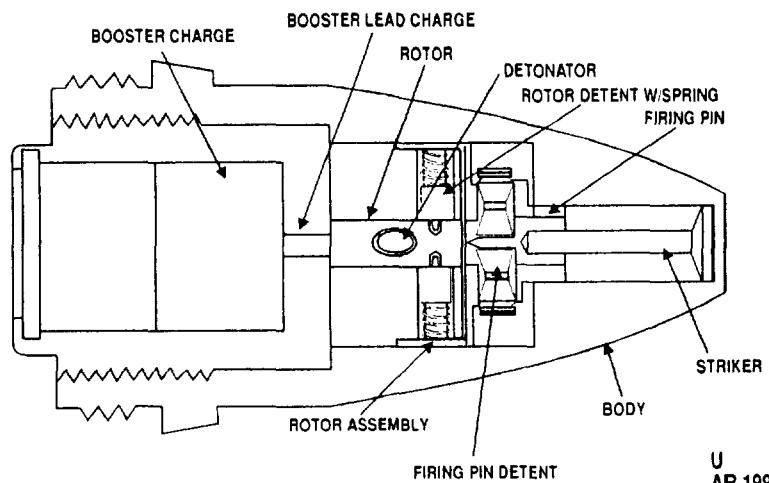
None.

#### References:

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

**FUZE, POINT DETONATING: MK27**

AR199963

U  
AR 199962**Type Classification:**

Std OTCM 37119 dtd 1959.

**Use:**

Point Detonating Fuze MK27 is of the superquick type designed to function on light impact. The fuze is used with 40mm 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.

**Shipping and Storage Data:**

DODAC ----- 1390-N345  
UNO serial number ----- 0409  
UNO proper shipping name ----- Fuzes, detonating

**Packing:**

See DOD Consolidated Ammunition Catalog for complete round, for complete packing data including NSN's.

**Explosive Components:**

Detonator MK18 Mod 0, tetryl booster lead charge and tetryl booster charge.

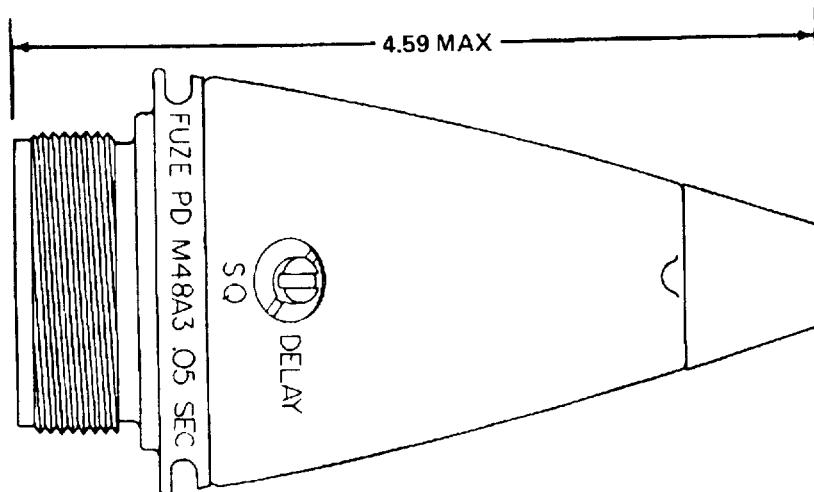
**Limitations:**

None,

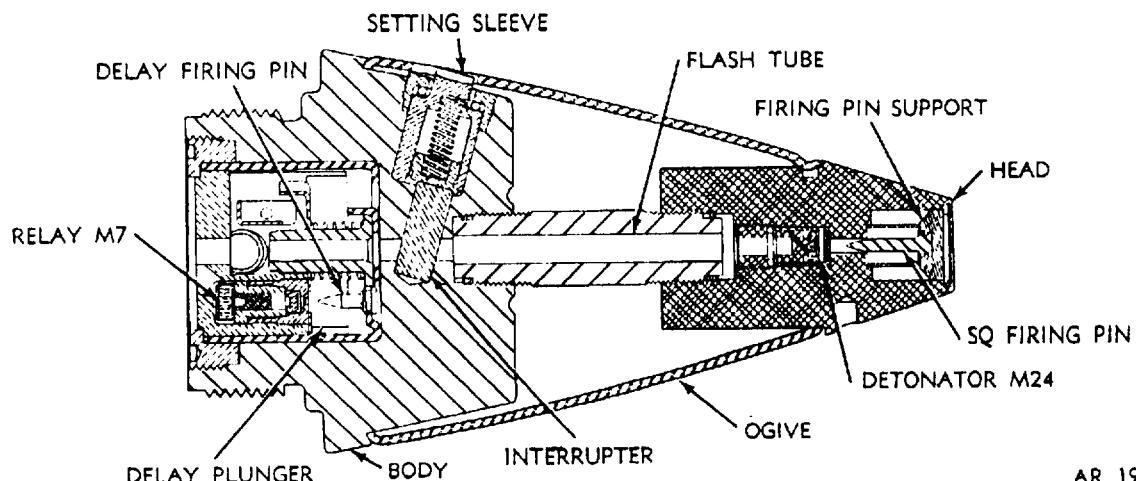
**References:**

TM 9-1300-251-20  
TM 43-0002-33

## FUZE, POINT DETONATING: M48 SERIES



AR19987



AR 19986

**Type Classification:**

Std OTCM 36841 dtd 1958 OBS MSR 11756003 (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 75mm, 90mm 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 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 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 lb
M48A3E2-----	1.63 lb
Length:	
Visible -----	3.74 in.
Overall -----	4.59 in.
M48A3E2 -----	4.55 in.
Assembly Dwg. No. :	
M48A2 -----	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 hr/day)

\*Packing ----- 8 fuzes in metal container; 2 containers in wire-bound box

\*Packing Box:  
Weight ----- 66 lb  
Dimensions ----- 14-5/8 x 12-13/16 x 9-1/8 in.  
Cube ----- 1.04 cu ft

\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's. 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
IJNO serial number -----	0257
UNO proper shipping name -----	Fuzes, detonating

#### **Explosive Components:**

SQ Action -----	Detonator M24
Delay Action -----	Primer, black powder delay charge, Relay M7

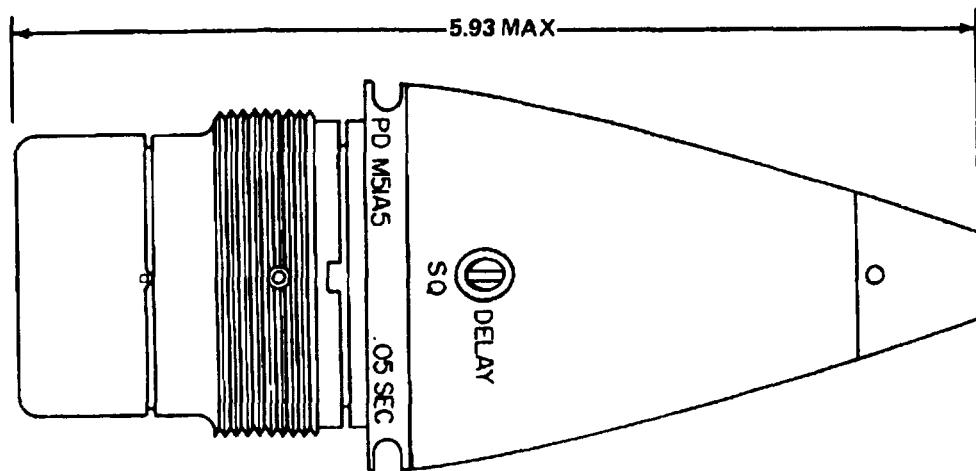
#### **Limitations:**

None.

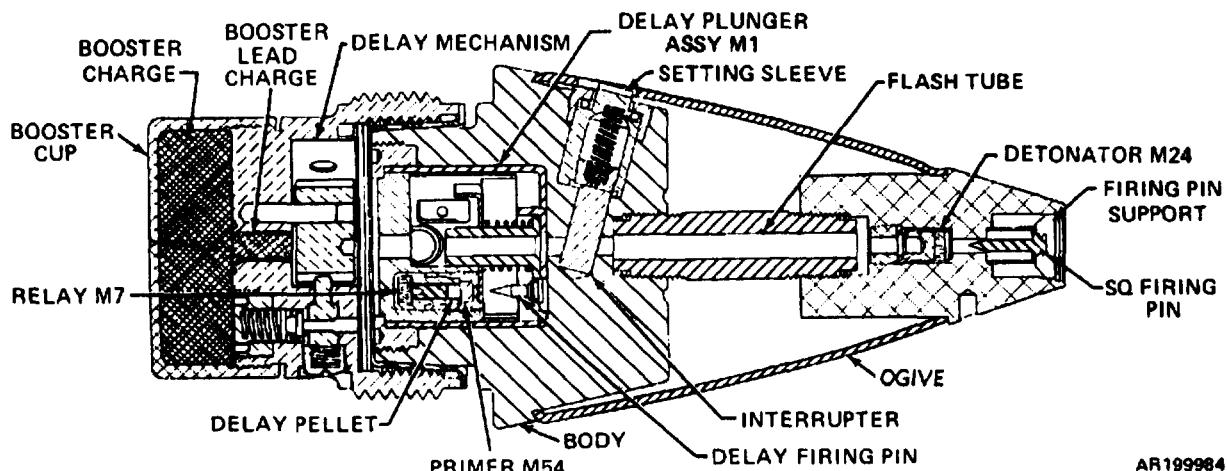
#### **References:**

TM 9-1300-251-20  
SC 1340/98-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 75mm through 105mm.

**Description:**

The M51A5 fuze consists of Fuze M48A3 assembled with the M21A4 booster. The fuze PD head assembly contains a firing pin held in position by a firing pin support which prevents initiation of Detonator M24 until impact. The fuze body contains an M1 delay plunger assembly and an interrupter assembly with a setting sleeve which provides a means of setting or selecting fuze PD (Super Quick Action) or delay

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

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

### Functioning:

Upon firing, the combination of setback and centrifugal forces are utilized to arm the fuze. The setback forces retract the booster lock pin allowing centrifugal force to extract the rotor lock pin and permitting the rotor to rotate into an armed position aligning the rotor M17 detonator with the detonation train of the fuze. Simultaneously, centrifugal force will arm the M1 delay plunger of the fuze and retract the flash tube interrupter unless the fuze is set delay, in which instance, the flash tube interrupter will not retract and the flash from the nose superquick element will be prevented from initiating the explosive train of the booster. The fuze is initiated upon impact with the target; the firing pin 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 Between Models:

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

### Tabulated Data:

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

### Temperature Limits:

Firing:	
Lower limit -----	-40°F
Upper limit -----	+125°F
Storage:	
Lower limit -----	-80°F (for not more than 3 days)
Upper limit -----	+160°F (for not more than 4 hr/day)
*Packing -----	8 fuzes in metal container; 2 containers in wooden box
*Packing Box:	
Weight -----	55.8 lb

Dimensions -----	14-5/8 x 12- 13/16 x 9-1/8 in.
Cube -----	1.04 cu ft

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

### Shipping and Storage Data:

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

### Explosive Components:

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

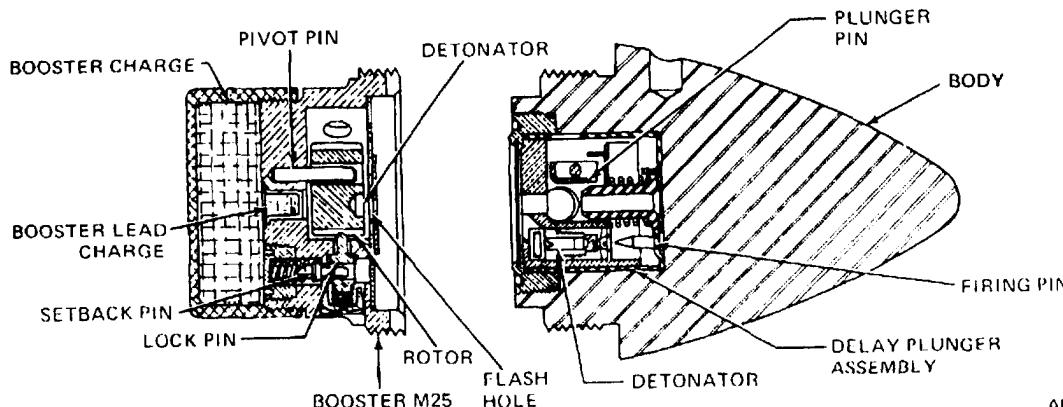
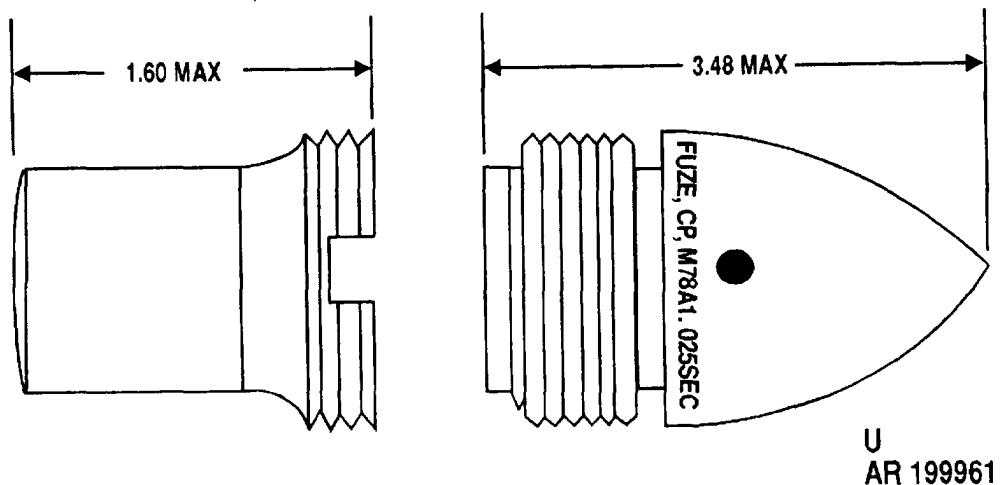
### Limitation:

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

### References:

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

## FUZE, POINT DETONATING: M78 SERIES

Type Classification:

Std OTCM 36841 dtd 1958.

Use:

Point detonating fuses of the M78 series are constructed especially for use in spotting and destruction of concrete targets. The fuses are used with HE projectiles fired from guns and howitzers in calibers 75mm through 8-inch, except 175mm.

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 fuses 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-grain tetryl booster charge. As issued, Booster M25 is packed and shipped with, but not attached to, the fuze.

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 bore 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 lb
<b>Length:</b>	
Visible -----	2.68 in
overall -----	3.48 in.
Thread size -----	2-12NS-1
Assembly Dwg. No. -----	73-2-214

#### Temperature Limits:

<b>Firing:</b>	
Lower limit -----	-40°F
Upper limit -----	+125°F
<b>Storage:</b>	
Lower limit -----	-80° (for not more than 8 days)
Upper limit -----	-1600° (for not more than 4 hr/day)
<b>Packing</b>	
8 fuzes and 8 boosters in metal container, 2 containers in wire-bound box.	
<b>Packing Box:</b>	
Weight -----	60 lb

Dimensions ----- 14-7/8 x 13 x 9-  
1/4 in,  
Cube ----- 1.04 cu ft

NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including

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
DODAC -----	1390 -N330 (Non- delay) 1390-N331 (0.025 delay)
UNO serial number -----	0106
UNO proper shipping name -----	Fuzes, detonating

#### Explosive Components:

Detonator M24, Detonator M17, tetryl booster lead charge, tetryl booster charge, and delay Plunger Assembly M1.

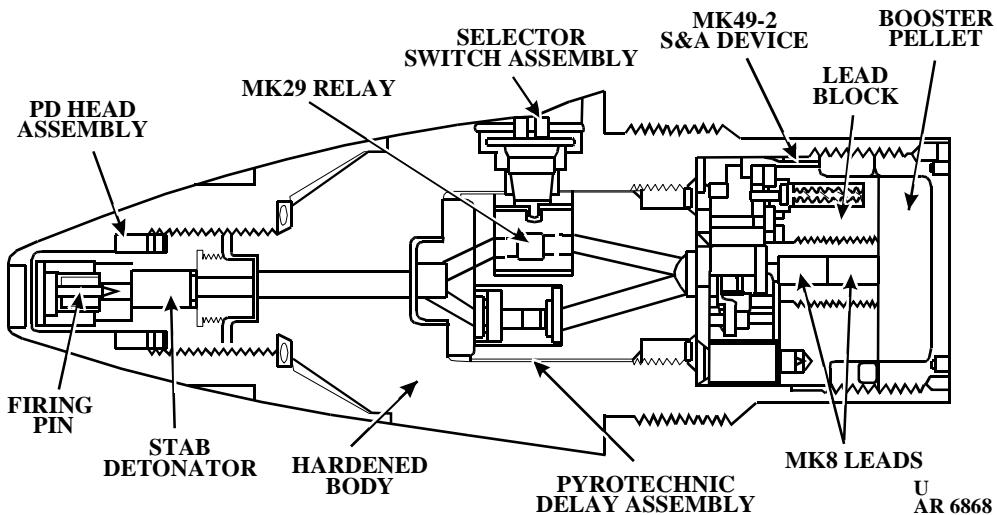
#### Limitations:

None.

#### References:

TM 9-1300-251-20  
TM 9-1015-203-12  
TM 9-1025-200-12&P  
TM 9-2350-311-10  
TM 9-1015-234-10

## FUZE, PD, MK399 MOD 1 (MOUT FUZE)



**Type Classification:**

1989.

**Use:**

Military Operations on Urbanized Terrain (MOUT) Fuze, PD, MK399, MOD 1 is used with high-explosive (fragmentation) 105mm cartridges and 155mm and 8-inch projectiles.

**Description:**

The MOUT fuze can be set to function super-quick (PD) or Delay. In the Delay mode, the fuze is designed to penetrate urban structures, i.e., buildings and bunkers, then function the projectile inside. In the PD, the fuze functions as a standard PD fuze. This setting will maximize destruction of the walls of an urban structure and is also useful for ranging in on targets. The fuze is shipped SET DELAY which is the primary MOUT mode.

The fuze has an aluminum PD head assembly threaded onto a hardened steel body. Internally, the fuze is composed of a PD head assembly, selector switch assembly (screwdriver or M18 fuze wrench operated), pyrotechnic delay assembly, the MK49 MOD 2 safe & arming device which provides 400 calibers safe separation distance, and a booster pellet.

**Functioning:**

Upon weapon firing, the setback pin located behind the S & A rotor is retracted by the setback force into the lead block assembly and is locked in place by the spin force. Rotor detents in the S & A are withdrawn by spin, allowing the unbalanced rotor to turn to the armed position. The gear escapement delays arming, a pin locks the rotor when fully armed. On impact the nose collapses, and the firing pin initiates the stab detonator. Flash from the detonator passes through flash channel into the relay block assembly. The pyrotechnic delay assembly is in one channel and the selector switch is in the other channel. When the selector is set PD then a MK29 relay is exposed to the flash and both the MK29 and the delay assembly are initiated, with the output of the MK29 initiating the MK50 detonator located in the S & A rotor. The delay assembly functions as a backup to the MK29 should it fail to function. When set delay the MK29 is out of line and the selector blocks the flash channel. The pyrotechnic delay assembly provides a delay of up to 0.009 seconds, prior to initiating the MK50 detonator in the S & A rotor. The output of the MK50 initiates the two MK8 leads and then the CH6 booster, which initiates the projectile.

**Tabulated Data:**

Type .....PD  
 Weight.....2.64 lb  
 Length:  
     Visible.....3.76 in.  
     Overall .....6.0 in.  
 Assembly Dwg No. ....5918048

**Temperature Limits:**

Firing:  
     Lower limit .....-50°F (-46°C)  
     Upper limit.....+145°F (+63°C)

Storage:  
     Lower limit .....-60°F (-51°C)  
     Upper limit.....+160°F (+71°C)

Arming Data:  
     Method.....Setback and spin  
     Fully armed.....400 calibers

Rotation:  
     Non-arm.....16 rps  
     Arm .....42 rps

Setback:  
     Non-arm.....900g  
     Arm .....1385g

\*Packing .....8 fuzes in M2A1 container; 2 containers in wire-bound box

\*Packing Box:  
     Weight.....67.4 lb  
     Dimensions .....14-5/8 x 12-13/16 x 9-1/8 in.  
     Cube.....1.0 cu ft

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

**Shipping and Storage Data:**

Quantity-distance class.....1.2  
 Storage compatibility group .....D  
 DOT shipping class .....Class A Explosive

DOT designation .....	DETONATING FUZES - CLASS A EXPLOSIVES, HANDLE CAREFULLY, DO NOT STORE OR LOAD WITH ANY HIGH EXPLOSIVES
NSN .....	1390-01-263-8046
DODAC.....	1390-N659

**Explosive Components:**

Stab Detonator  
 Relay, MK29  
 Detonator, MK50  
 Lead, MK8 (two)  
 Booster, CH6  
 Delay Assembly, lead styphnate

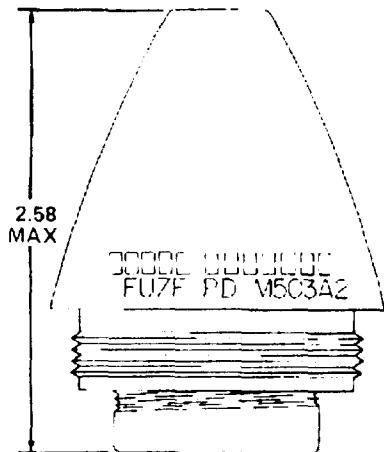
**Limitations:**

The maximum MOUT effectiveness of Delay function of the fuze is obtained when striking the target at an attack angle of 45 degrees or less. For attack angles greater than 45 degrees anticipate degraded MOUT performance and the potential for increased duds.

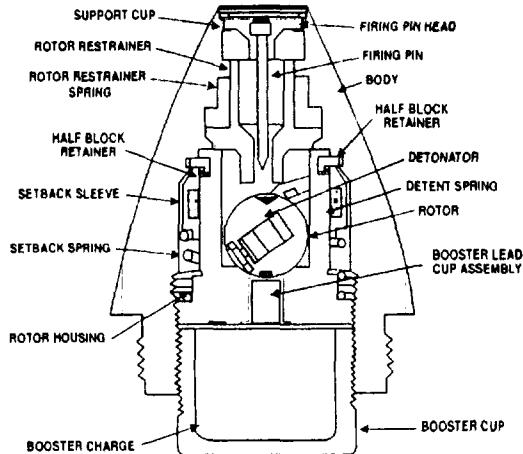
**References:**

SB 700-20  
 SC 1340/98-IL  
 TM 9-1015-203-12  
 TM 9-1015-234-10  
 TM 9-1015-252-10  
 TM 9-1025-200-12&P  
 TM 9-1025-211-10  
 TM 9-2350-304-10  
 TM 9-2350-311-10

## FUZE, POINT DETONATING: M503A2



AR199979

U  
AR 199978Type 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 57mm 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 half-block retainers mounted externally on the rotor housing, assists the detent springs 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 ..... 1.7-14-NS-1  
Assembly Dwg. No. ..... 9215031

**Temperature Limit:**

**Firing:**

Refer to complete round for upper and lower limits.

**Shipping and Storage Data:**

DODAC ..... 1390-N321

**Explosive Components:**

Detonator M42, tetryl booster lead charge and tetryl booster charge.

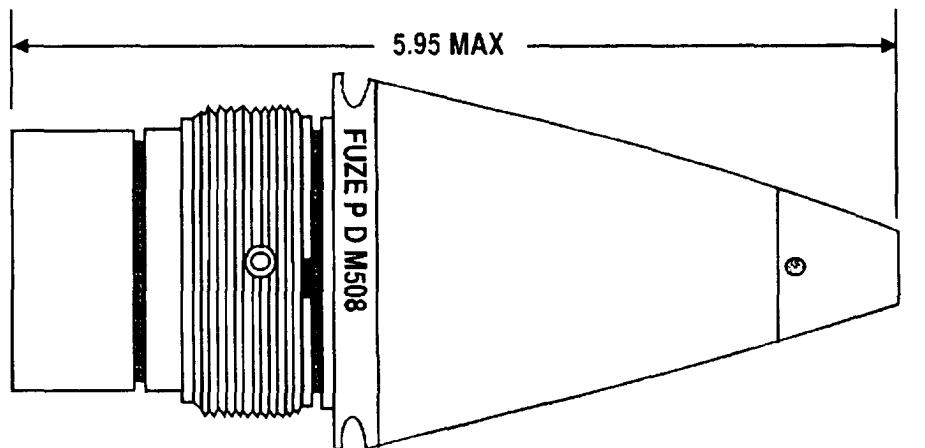
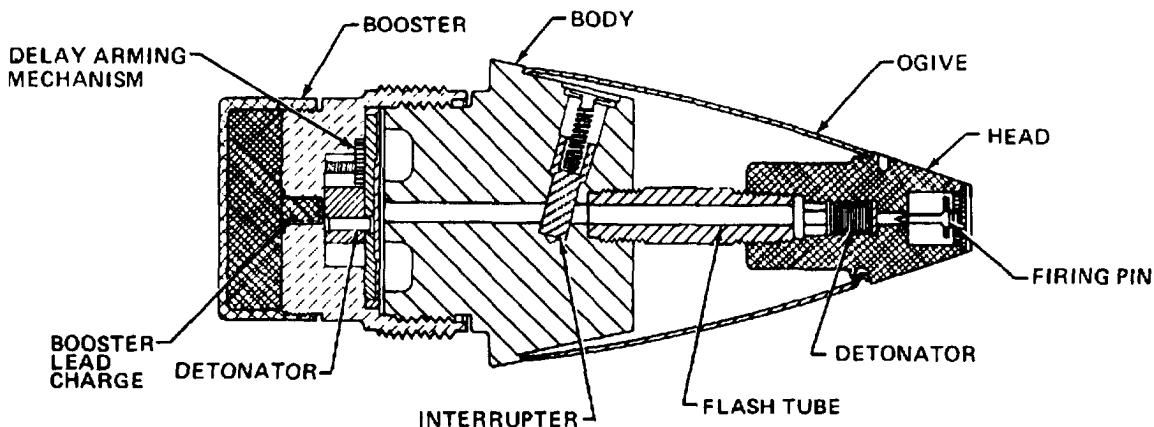
**Limitations:**

Refer to complete round.

**References:**

**TM 9-1300-251-20**

## FUZE, POINT DETONATING: M508A1 AND M508 SERIES

U  
AR 199959

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 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.

**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 DOD Consolidated Ammunition Catalog 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, HANDLE CAREFULLY, DO NOT STORE OR LOAD WITH ANY HIGH EXPLOSIVE.
DODAC -----	1390-N326
UNO serial number-----	0106
UNO proper shipping name -----	Fuzes, detonating

#### Explosive Components:

Fuze Detonator M18, Booster Detonator M17, tetryl booster lead charge, and tetryl booster charge.

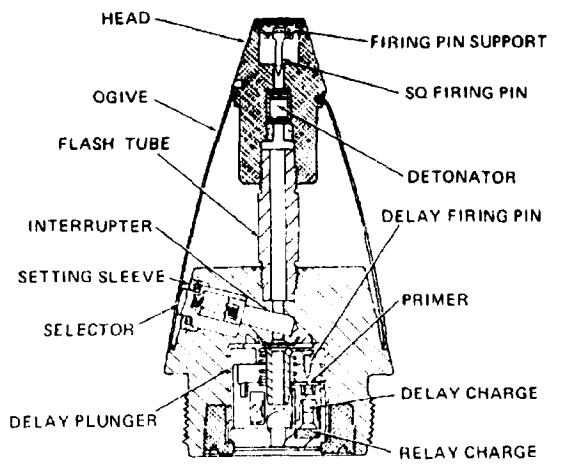
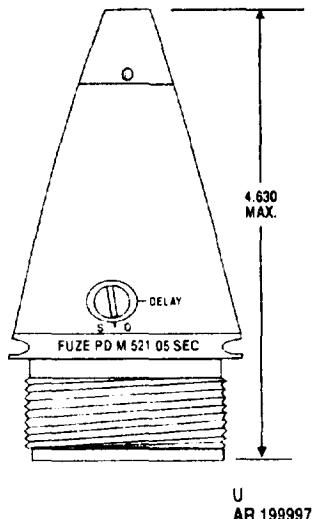
#### Limitations:

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 9-1015-234-10
TM 9-1025-200-12&P
TM 9-2300-216-10
TM 9-2350-311-10

## FUZE, POINT DETONATING: M521

**Type Classification:****Std OTCM 37119 dtd 1959.****Use:**

Point Detonating Fuze M521 is of the superquick, 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 lb  
  
Length:  
Visible ..... 3.74 in.  
Overall ..... 4.68 in.  
Thread size ..... 2 in.-12NS-1  
Assembly Dwg. No. ..... 7549112

**Temperature Limits:**

Refer to complete round for upper and lower limits.

**Shipping and Storage Data:**

DODAC ..... 1390-N301

**Explosive Components:**

Detonator, primer, black powder delay charge, and relay charge (delay plunger assembly).

**Limitations:**

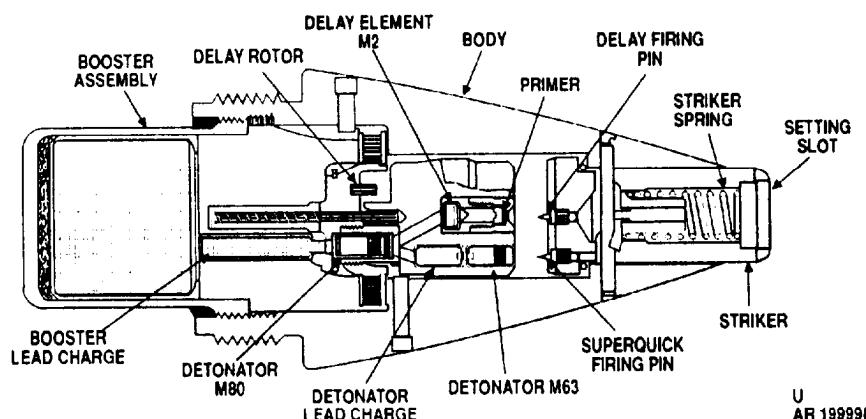
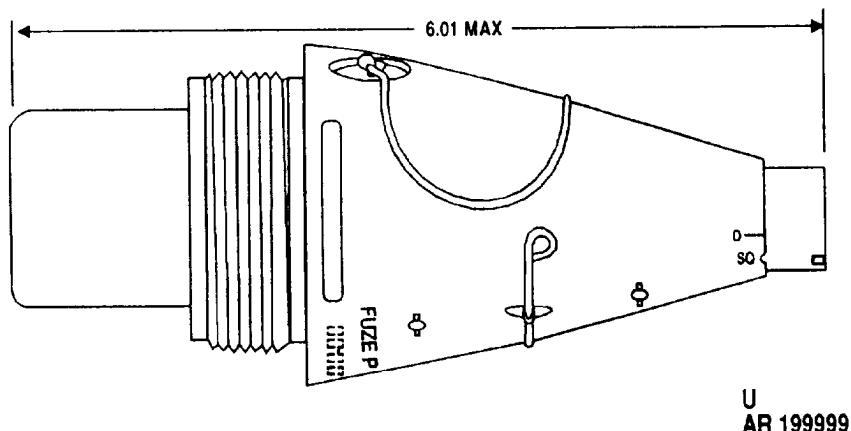
None.

**References:**

TM 9-1300-251-20

TM 9-1015-215-10

## FUZE, POINT DETONATING: M524 SERIES

**Type Classification:**

Std A AMCTC 3402 dtd 1965 (M524A1, A2, A3, and A4 for USMC/USN use only).

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 81mm 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 springloaded 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 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 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 Between 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 super-quick 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 contain- er; 2 contain- ers 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 DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

**Shipping and Storage Data:**

Quantity-distance class -----	3
Storage compatibility group -----	B
DOT shipping class -----	A
DOT designation-----	DETONAT- ING FUZES CLASS A EXPLOSIVES
DODAC -----	1390-N308
UNO serial number -----	0408
UNO proper shipping name -----	Fuzes, detonat- ing

**Explosive Components:**

SQ action -----	Detonator M63, tetryl plunger lead charge, Deton- ator M80, and tetryl booster.
Delay action -----	Primer, black powder Delay Element M2, Detonator M80, and tetryl booster.

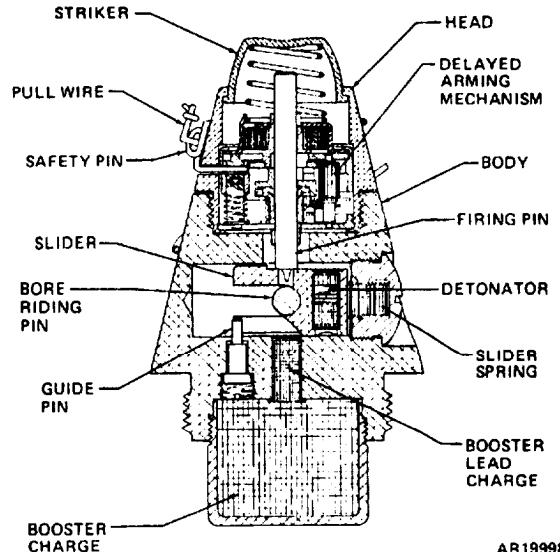
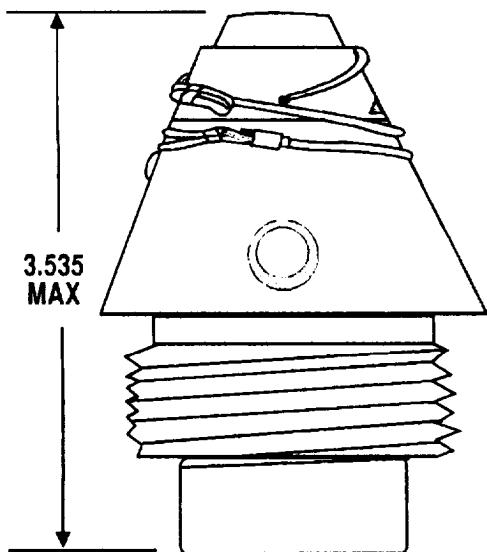
**Limitations:**

None.

**References:**

- TM 9-1300-251-20  
TM 9-2300-257-10  
SC 1340/98-IL

## FUZE, POINT DETONATING: M525A1 SERIES



AR199982

U  
AR 199983**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 60mm and 81mm HE cartridges and 81mm TP or 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 leave 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	1/2-12NF
Assembly Dwg. No.	8800197

**Temperature Limits:**

Refer to complete round for upper and lower limits.

**Shipping and Storage Data:**

DODAC ----- 1390-N312  
UNO serial number ----- 0409  
UNO proper shipping name ---- Fuzes, detonating

**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:**

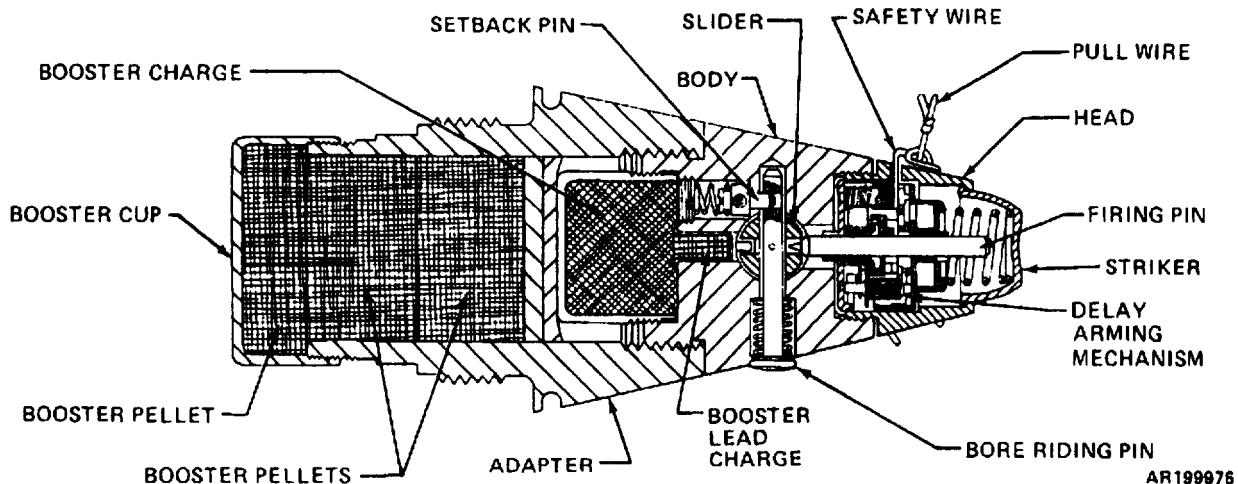
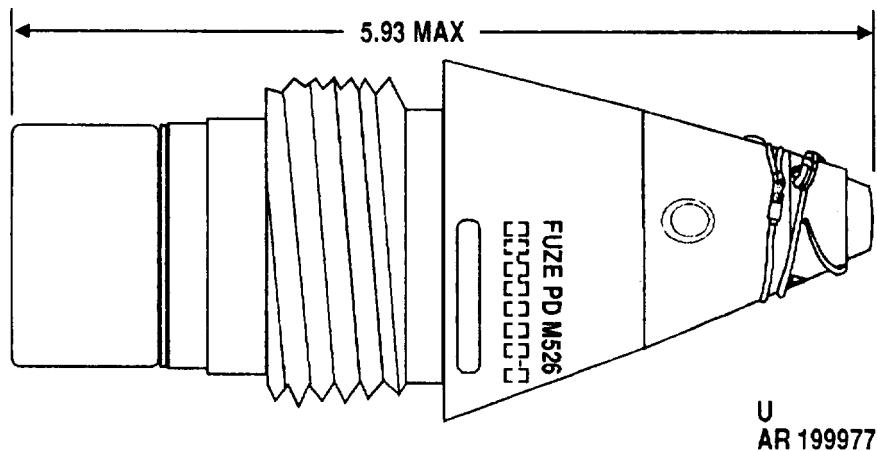
Do not fire in the immediate vicinity of any object which might deflect, obstruct, or damage the cartridge.

**M525A1 is authorized for training only.**

**References:**

**TM 9-1300-251-20**

## FUZE, POINT DETONATING: M526 SERIES

**Type Classification:**

Std AMCTC 3403 dtd 1965.

**Use:**

Point detonating fuzes of M526 series are of the superquick, delayed arming impact type used with 81mm 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 pallet 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
*Packing Box:	
Weight -----	39.8 lb
Dimensions -----	14-5/8 x 12-13/ 16 x 9-1/8 in.

Cube ----- 1.0 cu ft

\*NOTE: See DOD Consolidated Ammunition Catalog 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 1390-N309 0408 Fuzes, detonating
DODAC -----	
UNO serial number-----	
UNO proper shipping name -----	

#### Explosive Components:

Detonator, tetryl lead charge, and tetryl booster charge.

#### Limitations:

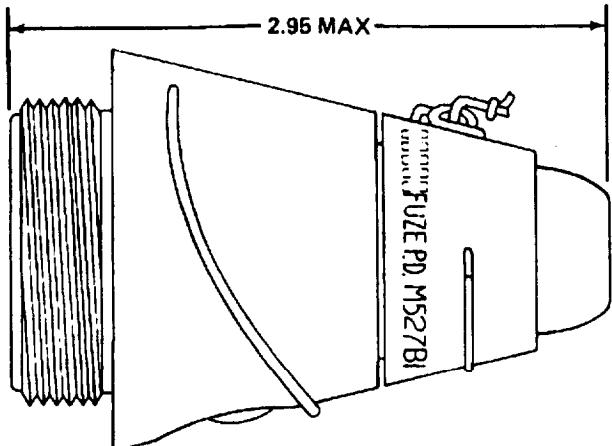
Do not fire in the immediate vicinity of any object which might deflect, obstruct, or damage the cartridge.

M526A1 is authorized for training only.

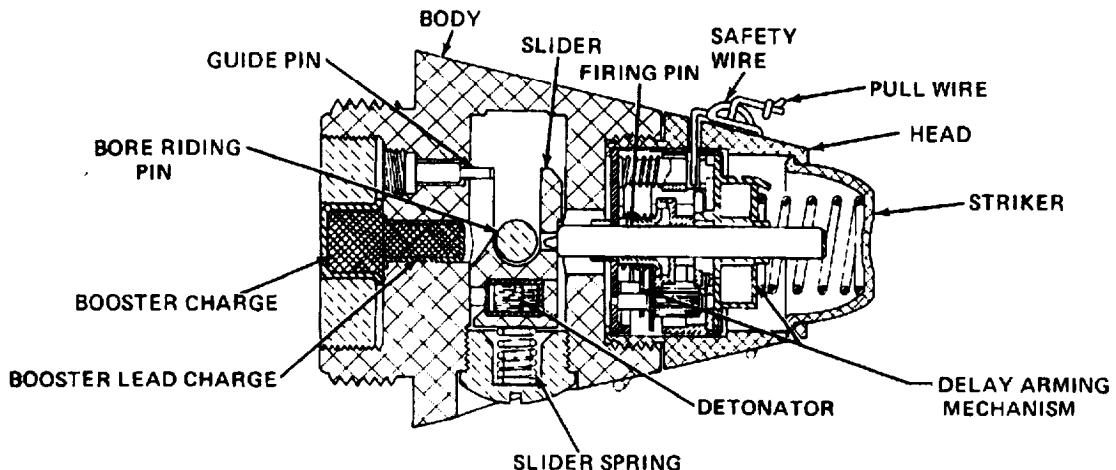
#### References:

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 60mm 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 Between 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.

#### Difference Between 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.

#### Shipping and Storage Data:

DODAC .....	1390-N312
UNO serial number .....	0409
UNO proper shipping name .....	Fuzes, detonating

#### Packing:

Refer to complete round. See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

#### Explosive Components:

Detonator, tetryl booster lead charge, and tetryl booster charge.

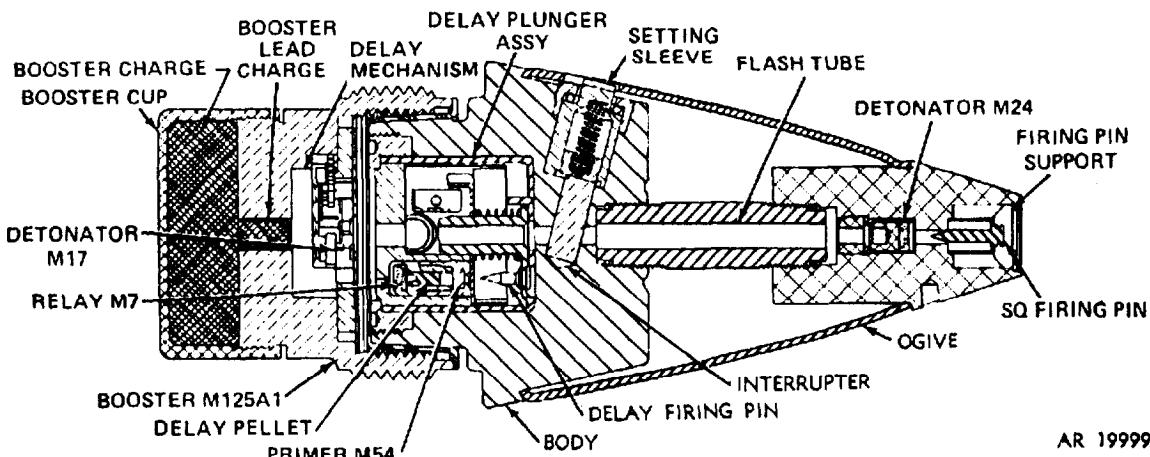
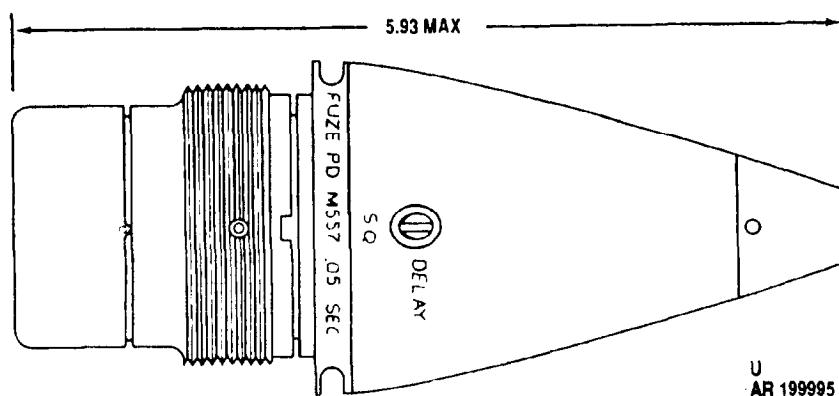
#### Limitations:

Cartridges utilizing these fuzes will not be fired in the vicinity of any object which might deflect, obstruct, or damage the projectile.

#### References:

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

## FUZE, POINT DETONATING: M557



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 75mm through 155mm, for rifles of 75mm and 105mm, for howitzers of 75mm 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

feet, 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 mid 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 lb
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 (not more than 4 hr/day)

*Packing	8 fuzes in metal container; 2 containers in wooden box
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##### \*Packing Box:

Weight	55.8 lb
Dimensions	14-5/8 x 12-13/16 x 9-1/8 in.
Cube	1.04 cu ft

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

#### Shipping and Storage Data:

Quantity-distance class	(04) 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-N335
UNO serial number	0107
UNO proper shipping name	Fuzes, detonating

#### 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

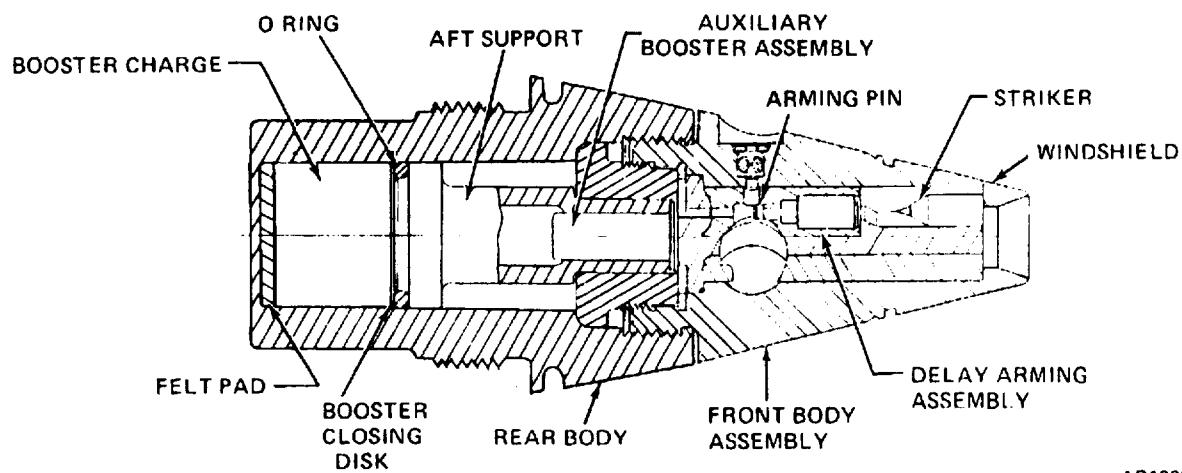
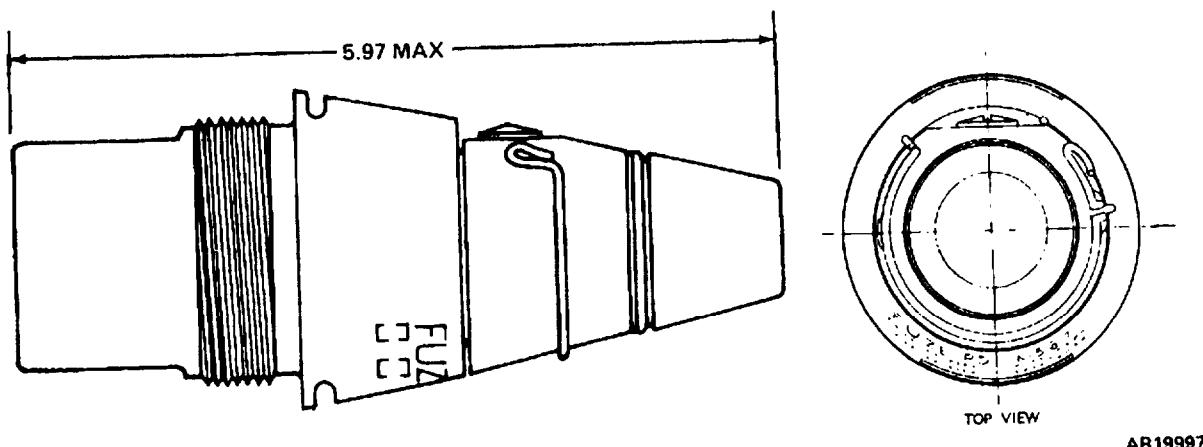
#### Limitations:

Premature functioning can occur when fuzes are fired in heavy rainfall. Duds may occur when set for delay in low zones of fire (155mm and 8-inch Zones 1 and 2). When set SQ normal functioning can be expected. To prevent duds in 4.2-inch cartridge zones (increments) should not be fewer than seven.

#### References:

- TM 9-1300-251-20
- SC 1340/98-IL
- SB 700-20
- TM 9-1015-203-12
- TM 9-1015-234-10
- TM 9-1025-200-12&P
- TM 9-2300-216-10
- TM 9-2350-311-10

## FUZE, POINT DETONATING: M567

Type Classification:

Std AMC TC 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 81mm 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 degrees 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 auxiliary 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 lb
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 wire- bound box

**\*Packing Box:**

Weight .....	42.1 lb
Dimensions .....	14-7/8 x 13 x 9- 1/4 in.
Cube .....	1.04 cu ft

**Shipping and Storage Data:**

Quantity-distance class .....	7
Storage compatibility group.....	B
DOT shipping class .....	A
DOT designation.....	DETONAT- ING FUZES CLASS A EXPLOSIVES
DODAC .....	1390-N334
UNO serial number.....	0106
UNO proper shipping name .....	Fuzes, detonat- ing

**Explosive Components**

Detonator, tetryl booster lead charge,  
tetryl booster charge, primer, black powder  
delay charge and relay.

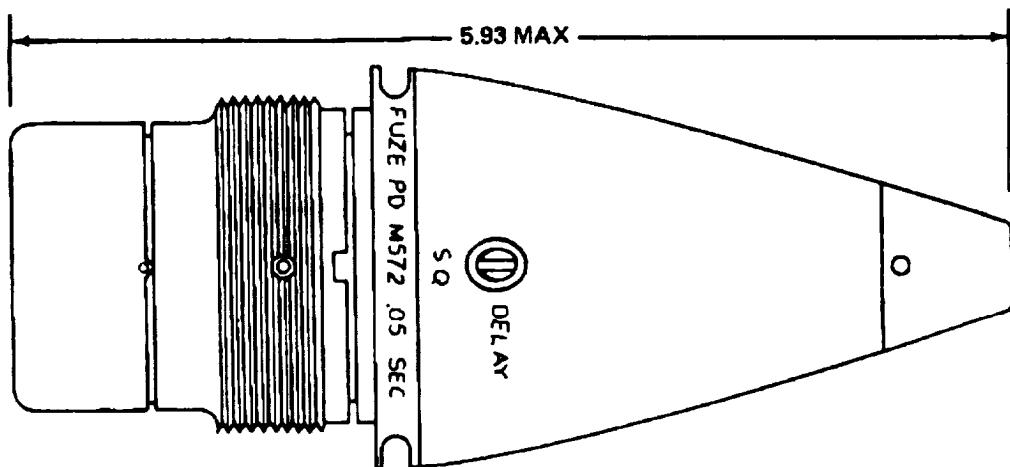
**Limitation**

None.

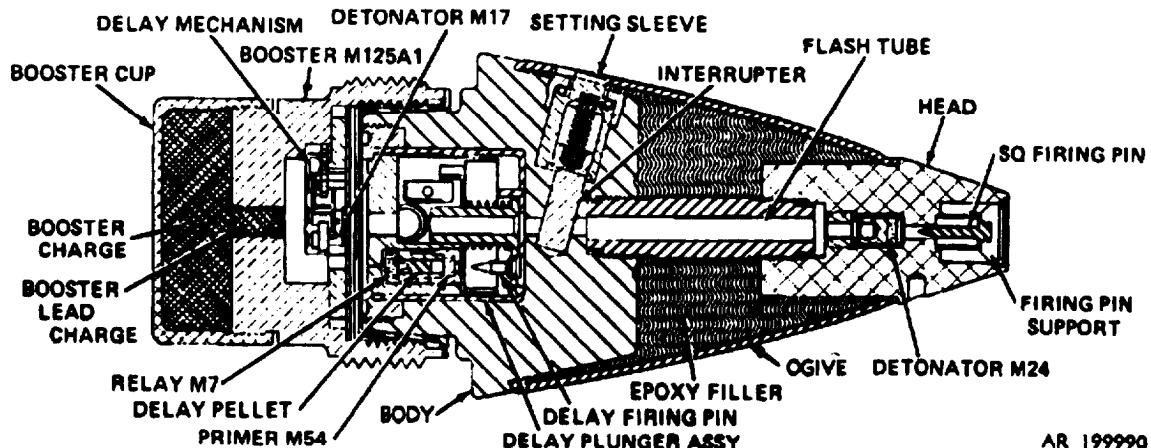
**References**

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 175mm, 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 lb
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 hr/day)
*Packing	
	8 fuzes in metal container; 2 containers in wooden box

**\*Packing Box:**

Weight	55.8 lb
Dimensions	14-5/8 x 12-13/16 x 9-1/8 in.
Cube	1.04 cu ft

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

**Shipping and Storage Data:**

Quantity-distance class	1.1
Storage compatibility group	D
DOT shipping class	A
DOT designation	DETONATING FUZES CLASS A EXPLOSIVES, HANDLE CAREFULLY, DO NOT STORE OR LOAD WITH HIGH EXPLOSIVES.
DODAC	1390-N311
UNO serial number	0408
UNO proper shipping name	Fuzes, detonating

**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

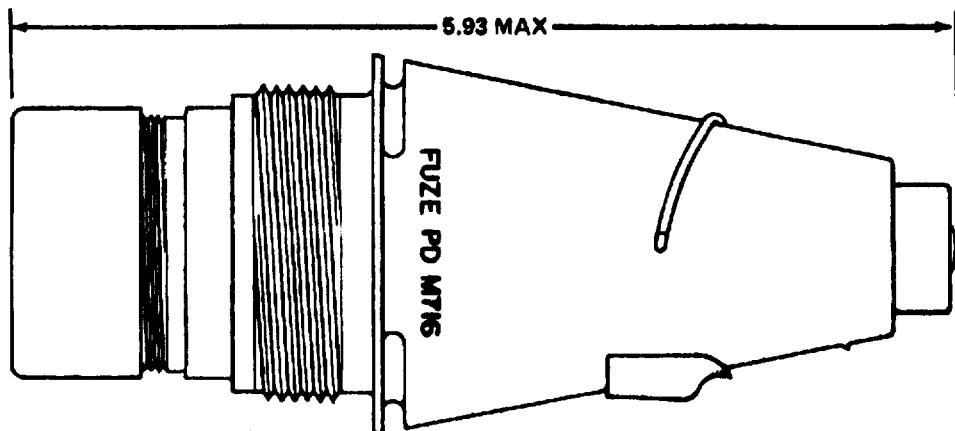
**Limitations:**

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

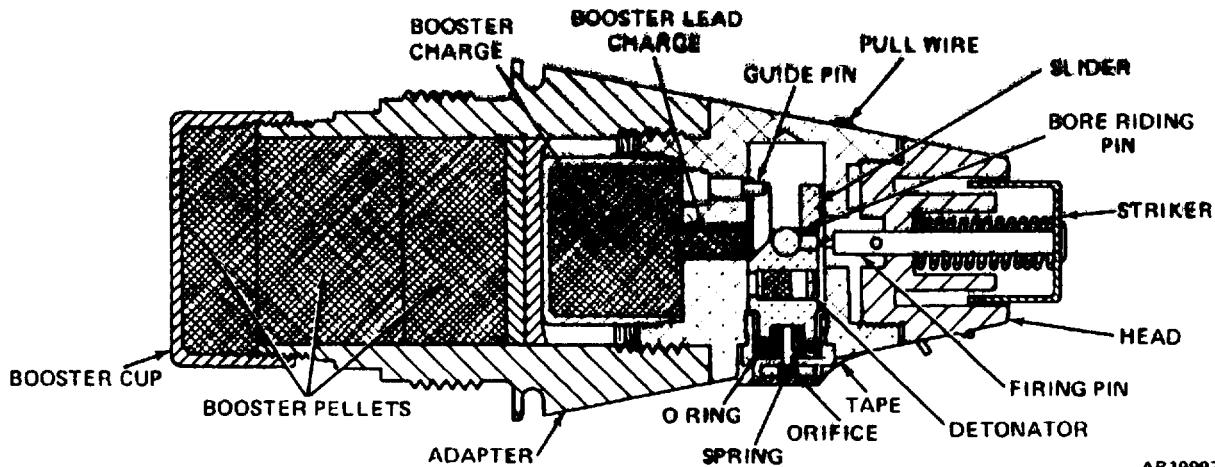
**References:**

- TM 9-1300-251-20
- TM 9-2300-216-10
- SC 1340/98-IL
- SB 700-20

## FUZE, POINT DETONATING: M716



AR199971



AR199970

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. Inbore 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 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 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 -----	1.25 lb
Length:	
Visible -----	3.72 in.
Overall -----	5.93 in.
Thread size -----	2.0 in.-12UNS-
Assembly Dwg. No-----	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 hr/day)
*Packing -----	1 fuze in metal container; 2 containers in wirebound box

\*Packing Box:  
 Weight ----- 17.4 lb  
 Dimensions ----- 14-5/8 x 12-  
                           13/16 x 9-1/8  
                           in.  
 Cube ----- 2.07 cu ft

\*NOTE: See DOD Consolidated Ammunition Catalog 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-N310
UNO serial number -----	0408
UNO proper shipping name -----	Fuzes, detonating

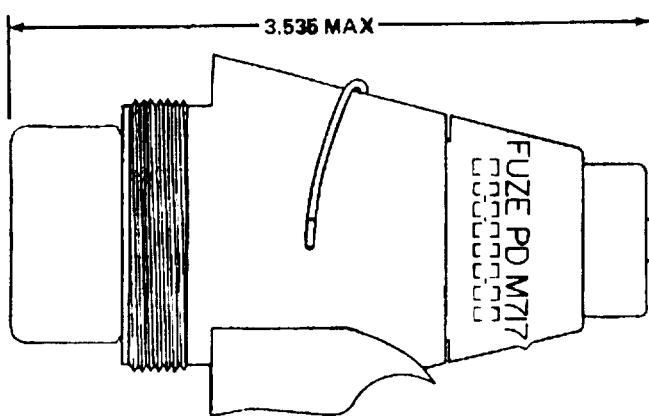
#### Explosive Component:

Detonator, tetryl booster lead charge, and tetryl booster charge

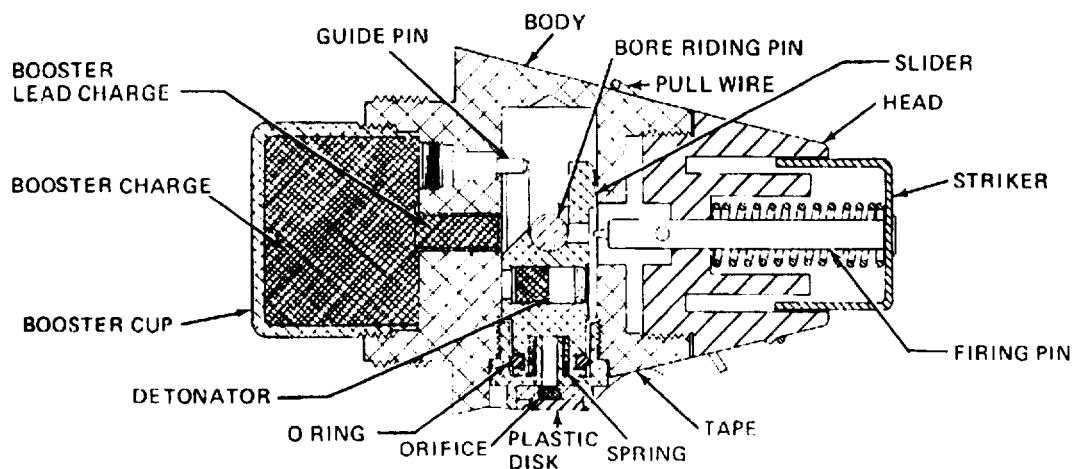
#### References:

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

## FUZE, POINT DETONATING: M717



AR199968



AR199968

Type Classification:

Std - USMC use - AMCTC 7198 dtd 1969.

Use:

Point Detonating Fuze M717 is a superquick, delayed arming impact fuze used with 60mm 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. Inbore 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 againsting pin. The bore riding pin then contacts the here 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 tiring 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:**

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 hr/day)  
 \*Packing ..... 16 fuses in  
                     fiberboard con-  
                     tainer; 6 con-  
                     tainers in  
                     wooden box  
 \*Packing Box:  
   Weight ..... 70 lb  
   Dimensions ..... 22-1/2 x 15-3/8  
                     x 12-3/8 in.

Cube ..... 2.5 cu ft

\*NOTE: See DOD Consolidated Ammunition Catalog 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	..... DETONA- TING FUZES- CLASS C EXPLOSIVES DODAC
UNO serial number	..... 1390-N314 0409
UNO proper shipping name	..... Fuzes, detonat- ing

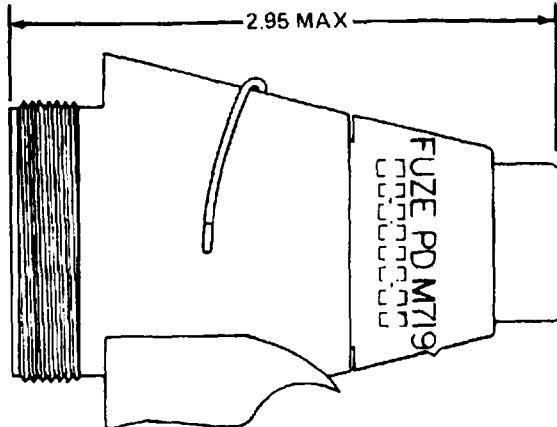
**Explosive Components:**

Detonator, tetryl booster lead charge, and tetryl booster charge.

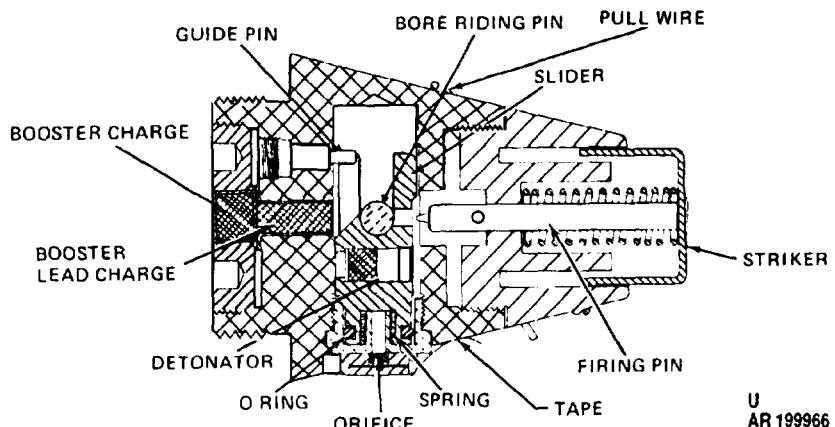
**References:**

TM 9-1015-215-10  
 TM 9-1300-251-20  
 SC 1340/98-IL

## FUZE, POINT DETONATING: XM719



AR199967

U  
AR 199966

### Type Classification:

Development.

### Use:

Point Detonating Fuze XM719 is a super quick delayed arming impact fuze, used with 60mm 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. Inbore 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 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 1b  
Length:  
    Visible ----- 2.45 in.  
    Overall ----- 2.95 in.  
Thread size ----- 1.5in.-12 NF-1  
AssemlblyDwg. No. ----- 73-1-161

**Temperature Limits:**

Refer to complete round for upper and lower limits.

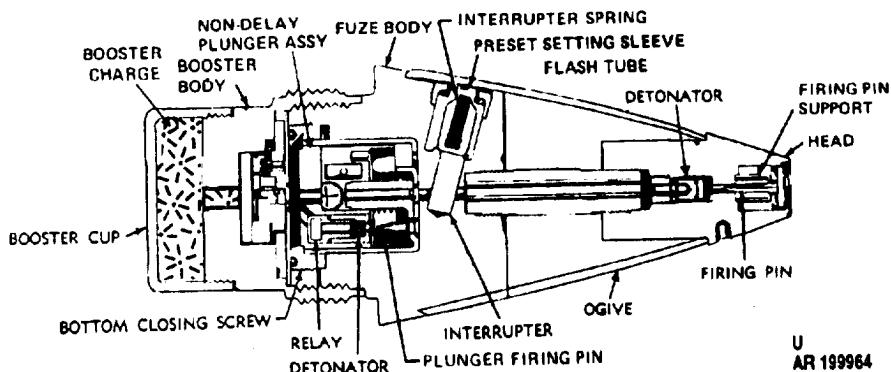
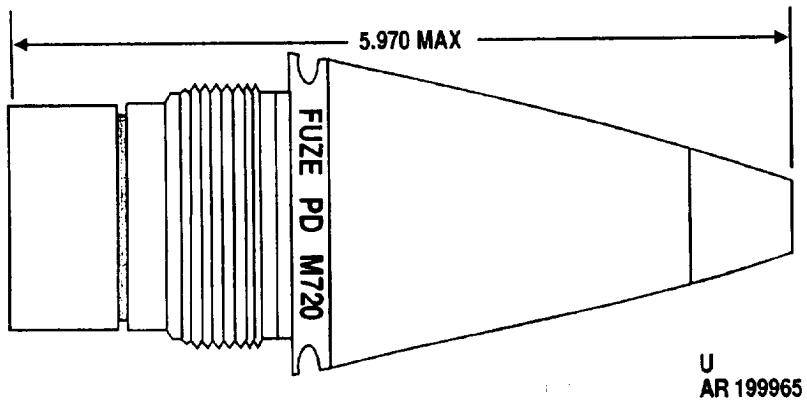
**Explosive Components:**

Detonator tetryl booster lead charge, and tetryl booster charge.

**References:**

TM 9-1015-215-10  
TM 9-1300-251-20  
SC1340/9t3-IL

## FUZE, POINT DETONATING: M720

Type Classification:

C & T AMCTC 9193 dtd 1972.

Use:

Point Detonating Fuze M720 is of the superquick type used with 152mm 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 M1. No 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 inter-

nally threaded to accept the fuze body and externally threaded to fit Cartridge M657. A 340-grain tetryl booster charge is contained by an aluminum cup threaded onto the base of the booster. The booster body contains Detonator M17 and a spin-activated 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 lb
Length:	
Visible .....	3.79 in.
Overall .....	5.97 in.
Thread size .....	12NS-1
Assembly Dwg. No.....	9229636

**Temperature Limits:**

Refer to complete round for upper and lower limits.

**Shipping and Storage Data:**

DODAC .....	1390-N314
UNO serial number.....	0409

UNO proper shipping name ----- Fuzes, detonating

**Explosive Components:**

Detonator M24, Detonator M17, tetryl lead charge, tetryl booster charge, non-delay Element M1.

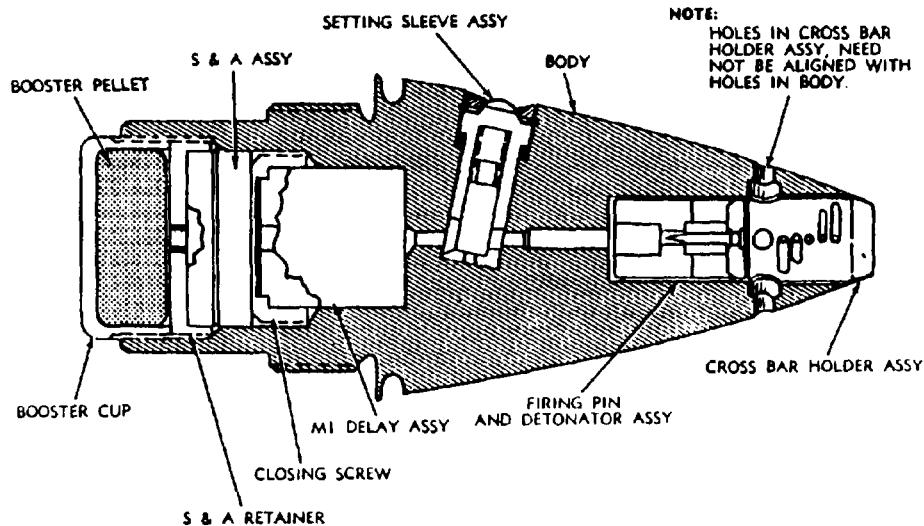
**Limitations:**

Premature functioning may occur if the fuzes are fired in extremely heavy rainfall.

**References:**

TM 9-1300-251-20  
TM 9-2350-230-10  
TM 9-2350-230-12

## FUZE, POINT DETONATING: M739 and M739A1



AR 100464 A

### Type Classification:

M739 - Std A MSR 02756077 December 1974,  
   - Std B MSR 08826010 August 1982,  
 M739A1 - Std A MSR 08826011 August 1982.

### Use:

Point Detonating Fuzes M739 and M739A1 are selective superquick and 0.05 second delay (M739) or auto-delay (M739A1) impact fuzes designed for use in all standard HE artillery 4.2 inch Mortar, 105mm through 8-inch Howitzers and 175mm Guns.

### Description:

The M739 series fuzes are the latest improved version of the selective impact fuzes. 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 fuze 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 Assembly (M739), or Impact Delay Module Assembly (M739A1), 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 down-range premature functioning. The assembly is in the nose section of the fuze and consists of five (5) crossbars 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 Assembly is located in the rear portion of the M739 fuze and provides a 0.050 second fuze initiation delay for target penetration when the setting sleeve is set "delay". When not set "delay", the M1 delay plunger provides a back-up and graze action function for the superquick setting.

The M739A1 fuze contains an Impact Delay Module (IDM) assembly instead of the M1 Delay Plunger Assembly. The IDM provides fuze initiation delay based upon the completion of mechanical actions caused by projectile deceleration and will function immediately after passing through the target. Function occurs when a spring loaded firing pin is released. There are no explosive components contained within the IDM.

The safe and arming (S&A) module is below the delay assembly. It contains a rotor with a M55 detonator, an escapement to prevent the detonator from aligning with the explosive firing train until safe arming distance

is achieved, both setback and spin locks to prevent accidental arming prior to firing. The explosive lead when initiated will detonate the booster pellet made of 22 grams of Composition A5 which is held by an aluminum booster cup assembled into the base of the fuze.

### Functioning:

#### Condition as Issued:

In the firing pin and detonator assembly the firing pin is held over the SQ detonator by a collapsible support. The setting sleeve assembly interrupter blocks the flashhole between detonator and S&A assembly.

The S&A assembly is not armed since the M55 detonator which is contained in the S&A rotor is held out of axial alignment by a setback pin and spinlock detents.

The delay assembly is not armed because the detents hold the plunger from moving forward and beginning the sequence of events required for function.

#### Prior to Firing:

For delay action the setting sleeve must be turned clockwise so that the slot is pointed toward "Delay". This keeps the flashhole blocked regardless of the interrupter position. The setting sleeve may be returned counter-clockwise to the "SQ" setting at will.

For super quick (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.

#### Action Caused by Setback and Spin in Firing the Projectile:

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.

In the delay assembly centrifugal force moves each detent outward and locks each detent in the outward position by means of the centrifugal plunger pin lock.

In the S&A assembly the setback pin is disengaged from the rotor and the spinlocks move outward under centrifugal force allowing the rotor to turn and carry the M55 into line with the flashhole. This arming action is briefly delayed by a runaway escapement. The arming distances for associated cannon and mortar systems are given in the tabulated data. The rotor is held in its armed position by the rotor lock pin.

#### Action in Flight:

The plunger restraining spring in either the M739 or M739A1 delay assembly holds the plunger rearward.

When fired in rain the crossbars, after erosion of the nose cap, serve to break up raindrops and prevent functioning of the superquick detonator. Excess water is expelled through the holes in the crossbar holder assembly due to centrifugal force created by the spin of the round.

#### Action Upon Impact:

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.

For delay setting, the solid structure of the fuze body protects the delay assembly so that it will function after penetrating the target. Within the delay assembly the plunger travels forward upon impact. The M739 Fuze contains an M1 Delay Plunger Assembly and when the plunger travels forward an explosive delay element is carried by the plunger into a stationary firing pin held by the M1 housing thus initiating a timed delay function. The M739A1 Fuze contains an impact delay module and when its plunger travels forward a series of mechanical actions are initiated culminating in the release of a spring loaded firing pin propelled into the M55 detonator contained in the S&A.

In normal functioning with superquick action, the delay action has no effect, and the superquick detonator will have fired the detonator M55 in the rotor and the S&A assembly before the delay assembly 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 (M739); 9345332 (739A1)

Length:	
Visible -----	3.76 in. (Ref)
Intrusion into projectile -----	2.21 in. (max)
Overall -----	5.97 in. (Ref)
Weight -----	1.5 lb
Thread -----	2.00 -12UNS-1A

	M739	M739A1		
	Sq	Delay	Sq	Delay
Maximum rotation where fuze unit will not arm (RPM)-----	1050	1300	1050	1075
Minimum rotation where fuze unit will arm (RPM)-----	1	800	2125	1800 2025

Explosive Components:

SQ element:	
Detonator Stab M99	
Primer Mix NOL #130-----	65
Lead Azide -----	180mg
The delay assembly M1 (M739 only);	
Delay Element M2;	
Primer Mix NOL #130-----	25 mg
Lead Azide, Type I;	
Delay Composition;	
Barium Chromate - 83%-----	32 mg
Boron Particles - 16%;	
S&A Assembly	
Detonator M55	
Primer Mix NOL #130-----	15 mg
Lead Azide RD 1333-----	51 mg
RDX -----	19 mg
Lead Explosive -----	PA508
Comp AS, Type VI (a or h) -----	172 mg
Booster Pellet, Comp A5,	
Type VI (a or b) -----	21 g

Temperature Limits:

Firing:	
Lower limit -----	-40°F -40°C
Upper limit -----	+125°F +52°C
Storage:	
Lower limit -----	-80°F (for not more than 3 days)
Upper limit -----	+160°F (for not more than 4 hr/day)

Shipping and Storage Data:

Quantity-distance class -----	(04) 1.2
Storage compatibility group -----	D
DOT shipping class -----	C (Non-propagating Package Required)
DOT designation -----	DETONATING FUZES CLASS C EXPLOSIVES HANDLE CAREFULLY, NON-PROPAGATING PACKAGE REQUIRED

NOTE: Early production lots of M739 are packed in Metal Ammo Boxes with polyethylene bottom supporter. DOT shipping ('lass A designation remains in effect for those packs.

National Stock Number:	
M739-----	NSN 1390-00 574-7705 (Propagating Pack)
NSN 1390-00-080-9447 (Non-propagating Pack)	
M739A -----	NSN 13900-01-132-7481 (Non-propagating Pack) 1390-N340
DODAC -----	UNO serial number ----- 0409
UNO proper shipping name----- *Packing	Fuzes, detonating 8 fuzes in metal container; 2 containers in a wire bound box.
*Packing Box:	
Weight -----	55.8 lb
Dimensions -----	14-5/8 x 12-12/16 x 9-1/8 in
Cube -----	1.04 cu ft

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

Limitations:

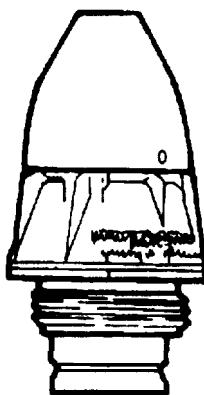
The Impact Delay Module in the M739A1 I'D fuze is considered extremely hazardous when in a dud condition as it contains a cocked striker. The M739 PD fuze, when in the same condition, is not as hazardous. Current EOD procedures for the M739 fuze cannot be used for the M739A1 fuze. The M739A1 fuze requires significantly different EOD procedures and also the addition of more specific safety precautions. An M739A1 fuze misidentified as an M739 fuze would be deadly to any person. Because there is no external difference between the two fuzes, other than stamped markings, the M739A1 fuze is anodized green to give personnel/EOD in the field an immediate and positive identification of the fuze.

References:

- SC 1340/98-IL
- TM 9-1300-251+20
- TM 9-1300-251-34
- TM 9-2350-311-10
- TM 9-2300-216-10

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## FUZE, POINT DETONATING: M745



AR 4027

Type Classification:

To be approved.

Use:

This fuze is used on the 60mm smoke cartridge, M722.

Description:

The fuze has a similar exterior configuration to the M1734 multi-option fuze, a two piece plastic/aluminum head, and an aluminum base. The head contains a turbine. The base contains a safing and arming device (S&A). The fuze functions on impact with variable point detecting action only.

Functioning:

Two independent ballistic signals are required to arm the fuze: (1) setback force and, (2) airflow through the turbine. Setback force retracts the zigzag setback sleeve in the S&A rotor and rotation of the turbine withdraws a jackscrew (through a gear mechanism), to unlock the S&A rotor. A latch interlocks the gear mechanism and zigzag setback sleeve, to prevent partial arming from spurious airflow through the turbine (e.g. wind blowing into the inlet for the turbine). The spring driven rotor rotates to the armed position where the stab detonator is aligned with a fixed firing pin. On impact, the detonator strikes the firing pin. The detonator initiates the booster lead charge and booster pellet.

Tabulated Data:

M745 Fuze:	
Type	Point detonating
Weight	0.50 lb (0.23 kg)
Length	2.6 in. (6.6 cm)
Thread size	1.5-12UNF-1A
Intrusion	1.11 in. (2.82 cm) max
Drawing number	11737000

Temperature Limits:

Firing:	
Lower	-50°F (-45.5°C)
Upper	+145°F (+63°C)

Storage:	
Lower	-50°F (-45.5°C)
Upper	+160°F (+71.1°C)

Shipping and Storage Data:

DODAC	1390-N660
UNO serial number	0246
UNO proper shipping name	Ammunition, smoke, white phosphorus

Limitations:

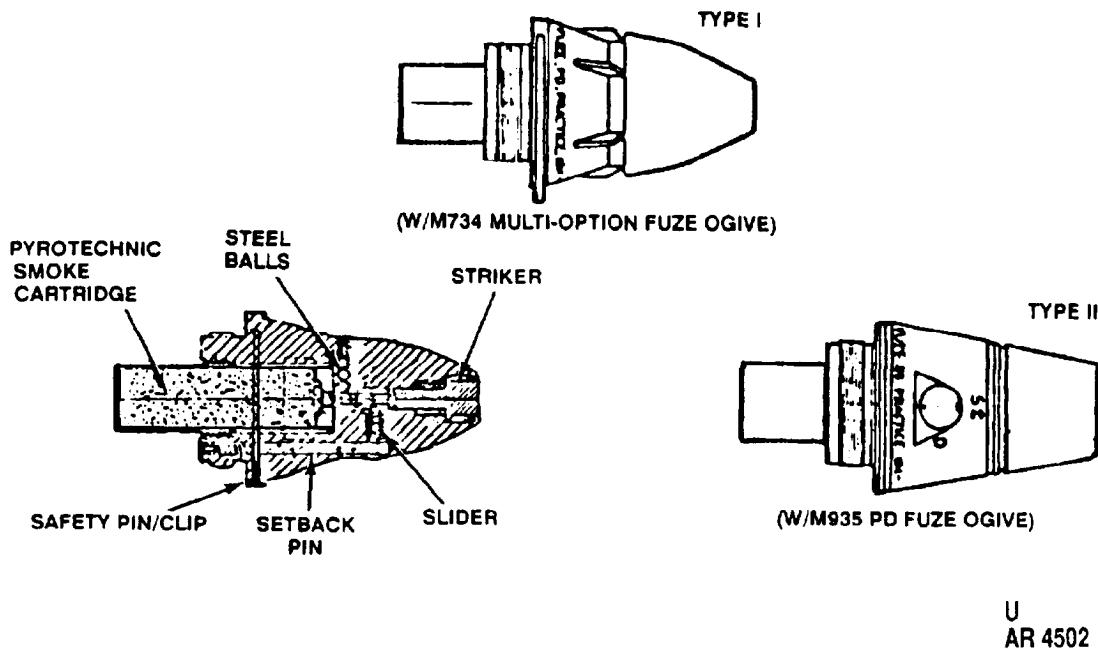
High dud rates may occur at high QE and charge zero.

References:

TM 9-1010-223-10

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## FUZE, POINT DETONATING: M751

U  
AR 4502Type Classification:

To be approved.

Use:

This fuze is a practice fuze for the 81mm M879 practice cartridge.

Description:

The fuze has an aluminum body with an M734 multi-option fuze ogive or an M935 PD

fuze ogive, a pyrotechnic smoke cartridge, a striker, and an arming mechanism.

Functioning:

During forward acceleration, the setback pin moves rearward. This action allows the slider to move radially outward. The striker is released and a steel ball is inserted between the striker and pyrotechnic smoke cartridge. On impact, the striker drives the steel ball into the percussion primer of the pyrotechnic smoke cartridge. The smoke cartridge functions and produces a flash, an audible sound, and a smoke cloud.

**Tabulated Data:**

Type -----	PD (practice)
Weight -----	0.45 lb
Length -----	4.1 in.
Thread size -----	1.5-12 UNF
Intrusion -----	1.6 in.

**Temperature Limits:**

Firing:	
Lower limit -----	0°F (-18°C)
Upper limit -----	+110°F (+43°C)
Storage:	
Lower limit -----	-45°F (-43°C) (for a period of not more than 3 days)
Upper limit -----	+145°F (+63°C) (for a period of not more than 4 hr/day)

Packing ----- Not a separate issue item

**Shipping and Storage Data:**

Quantity-distance class -----	1.4
Storage compatibility group -----	C
DOT shipping class -----	CLASS C EXPLOSIVE
DOT designation -----	DETONATING FUZE, HANDLE CAREFULLY
DODAC -----	1390-C875

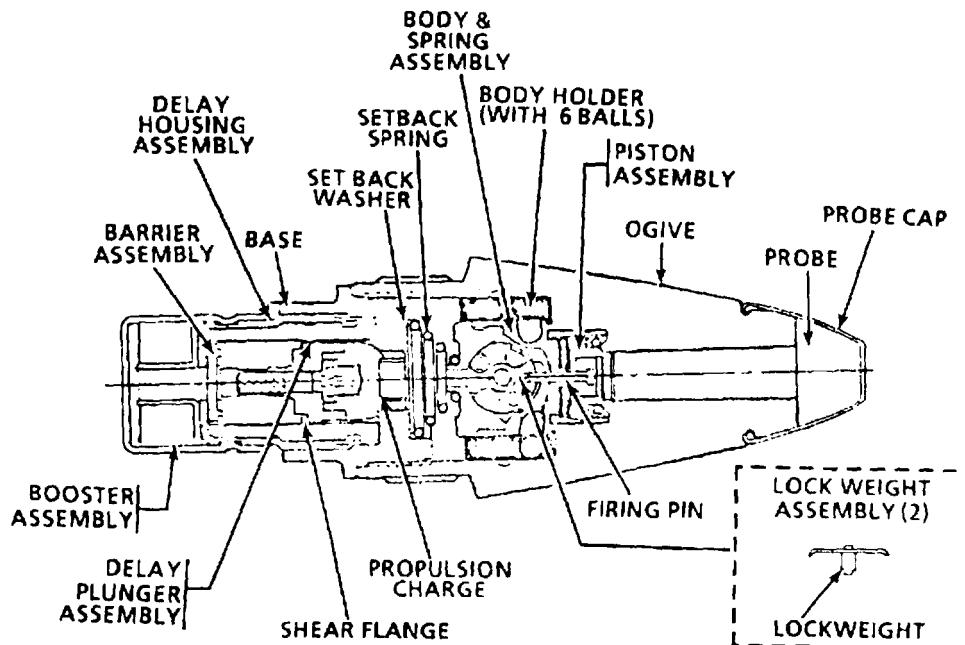
**Limitations**

None.

**References**

TM 9-1015-249-10

## FUZE, POINT DETONATING: M761

U  
AR 6029**Type Classification:**

Std MSR 05826003.

**Use:**

The Fuze Point Detonating M761 is used with the Cartridge 40mm: HE, M811 for the Sergeant York 40mm gun M247, against air and surface targets.

**Description:**

The M761 point detonating delay fuze includes a piston assembly, which carries the firing pin and a detonator contained inside the body assembly. The plunger assembly provides a 300 microsecond delay after impact.

The primary fuze operation is divided into three steps: setback, arming, and detonation. There are three different methods of detonation: target impact, graze impact, and self-destruct. Prior to launch, the piston and body assemblies and body holder are resting on the expanded setback spring. The rotor is maintained off center by the firing pin and lockweight assembly.

**Setback** - During launch, the piston and body assemblies and body holder set back

against the setback spring. Air is displaced through ports into the chamber above the piston. High spin forces cause the centrifugal lock weights of the primary fuze and the barriers of the delay modules to move against their springs. This Lockweight removes one constraint on the rotor in the safe position. Centrifugal force also causes the locking balls in the primary fuze to seat in the detent groove.

**Functioning:**

**Arming** - As the projectile exits the muzzle, the acceleration force dissipates, and the piston spring moves the piston away from the body assembly. The body assembly is retained by the locking balls which overcome the force exerted by the setback spring. The piston motion is controlled by air bleed through a porous metal restrictor. The air bleed provides a nominal mean arming delay of 40 to 60 meters over the temperature range from -50°F to + 140°F. When the piston reaches the forward position, the firing pin withdraws sufficiently to allow the rotor to move to the armed position. Centrifugal force acting on the roller weight causes it to move into a groove and lock the rotor in the armed position. The fuze is fully armed when the detonator is in line with the firing pin.

**Detonation:**

**Impact against targets** - The impact shock is transmitted by the probe to the piston assembly, which is driven rearward until the firing pin strikes the detonator.

**Graze impact** - Graze function occurs when lateral shock causes the locking force of the body holder balls to be released and overcome by the setback spring. As the body assembly is moved forward the detonator is driven into the firing pin.

**Self-Destruct** - The self-destruct function depends on the reduction of locking-ball centrifugal force as the projectile spin decays. When the setback spring force is sufficient to overcome the locking-ball force, the detonator in the body assembly is driven forward into the firing pin.

**Tabulated Data:**

Type -----	PD
Weight w/fuze -----	0.119 lb (0.054 kg)
Length -----	2.75 in. (69.7 mm)
Arming time -----	0.06 min sec
Post-impact delay time -----	0.3 min sec
Time to self-destruction -----	8.5+2 sec
Assembly drawing number -----	28117739

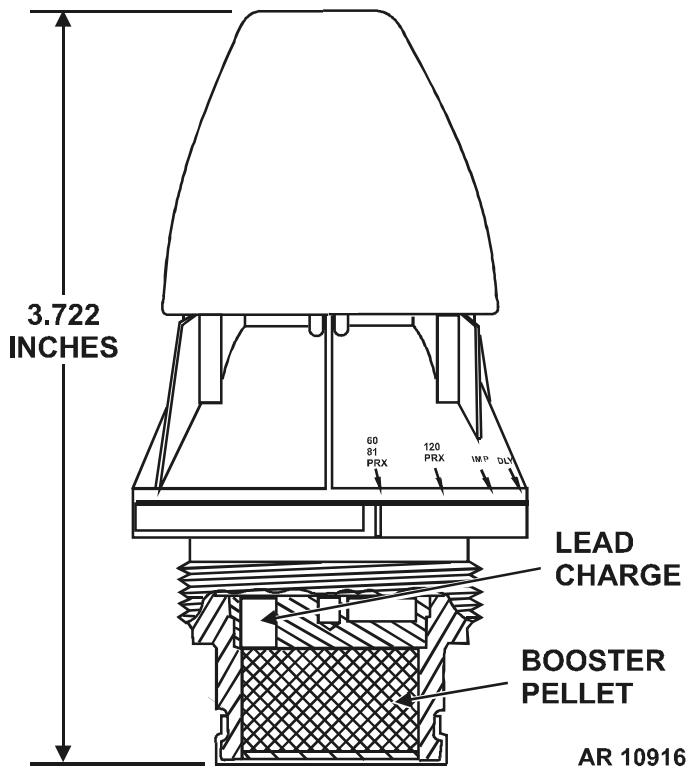
**Temperature Limits:**

See complete round for upper and lower limits.

**Limitations:**

None.

## FUZE, POINT DETONATING: M783



### TYPE CLASSIFICATION:

Standard - Nov 01.

### USE:

Point Detonating Fuze M783 is a selective, superquick (IMP) or 0.05 delay (DLY) action ONLY, impact type fuze for use with HE 60mm, 81mm and 120mm and Smoke 60mm Mortar Cartridges.

### DESCRIPTION:

The M783 Fuze has a similar exterior configuration to the M734A1 Multi-Option Fuze, with a two piece plastic/aluminum head, an aluminum base, and booster pellet. The fuze head contains a turbine alternator. The base contains a safe

and arming device (S&A). The head assembly can be rotated for selection of function on impact (IMP) or 0.05 second delay (DLY) ONLY by lining up the markings on the head with the corresponding index line on the base. Markings for 60/81 PRX, 120 PRX are not intended to be used on this fuze. Setting this fuze on either of the Proximity settings will result in a PD functioning.

### FUNCTIONING:

Two independent ballistic signals are required to arm the fuze (1) setback force and, (2) travel through the air at cartridge velocity for more than a minimum distance (airflow through the turbine). Setback force retracts the zigzag setback sleeve in the S&A rotor and rotation of the turbine withdraws a jackscrew (through a gear mechanism), to unlock the S&A rotor. A latch interlocks the gear mecha-

nism and zigzag setback sleeve, to prevent partial arming from spurious airflow through the turbine (e.g. wind blowing into the inlet for the turbine). The spring driven rotor rotates to the armed position where the electronic detonator connects with the electronics and the stab detonator is aligned with a fixed firing pin. The turbine alternator is also an electrical generator which powers up the fuze electronics. Voltage (v) and frequency (f) of the turbine alternator output depend on the 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. An apogee sensor prevents electrical arming prior to the cartridge reaching apogee in its trajectory. The detonator initiates the lead charge and booster pellet.

#### TABULATED DATA:

Type .....	PD/DLY
Weight .....	0.50 lb ± 0.03 lb
<b>Length:</b>	
Visible .....	2.605 in.
Overall .....	3.722 in.
Thread size .....	1.50 -12 UNF-1A
NSN .....	1390-01-483-4698
Booster .....	PBXN-5
DODAC.....	1390-NA19

#### 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.....	+145°F (+63°C)

#### DRAWINGS:

M783 ..... 12989030

#### UNIT OF ISSUE:

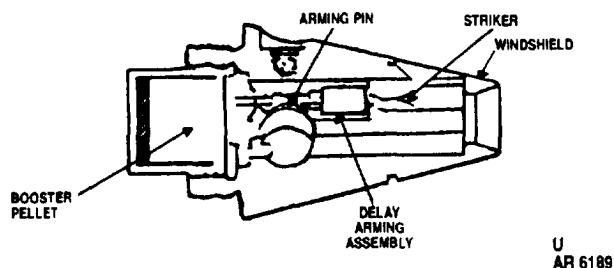
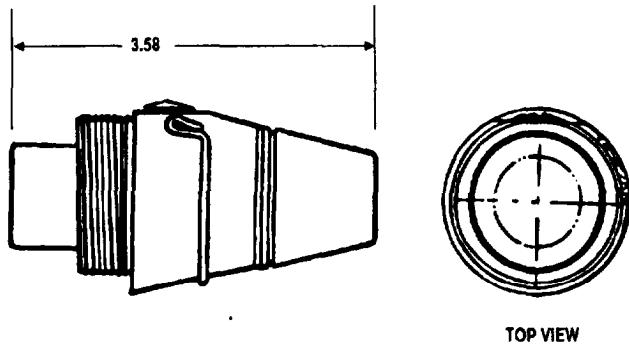
Packing.....	Not a separate issue item, component of 60mm, 81mm and 120mm Mortar Cartridges.
--------------	---

#### SHIPPING AND STORAGE DATA:

DOD hazard class/division .....	1.2.2
Storage compatibility group.....	D
DOT hazard class.....	1.2D
Proper shipping name .....	FUZE, DETONATING
UN identification number .....	0409

#### REFERENCES:

TM 9-1010-223-10
TM 9-1015-249-10
TM 9-1015-250-10

**FUZE, POINT DETONATING: M935****Type Classification:**

Std LCC-A MSR 04836008.

**Use:**

Point Detonating Fuze M935 is a selective, superquick or 0.05 delay action, impact type fuze for use with HE 60mm and 81mm 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 degrees apart in the cylindrical slider, a lead 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 during 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 .....	0.54 lb
Length:	
Visible .....	2.48 in.
Overall .....	3.58 in.
Thread size .....	1.5-12UNS-1A
Assembly drawing number ...	9255258

**Temperature Limits:**

Firing:	
Lower limit .....	-65°F
Upper limit .....	+165°F
Storage:	
Lower limit .....	-65°F
Upper limit .....	+165°F

**Packing:**

Not a separate issue item.

**Shipping and Storage Data:**

Quantity-distance class ----- (04) 1.2  
Storage compatibility group----- B  
DOT shipping class ----- A  
DOT designation ----- DETONA-  
TING  
FUZES--  
CLASS A  
EXPLOSIVES  
DODAC ----- 1390-N342  
UNO serial number ----- 0107

UNO proper shipping name ----- Fuzes, detonat-  
ing

**Explosive Components:**

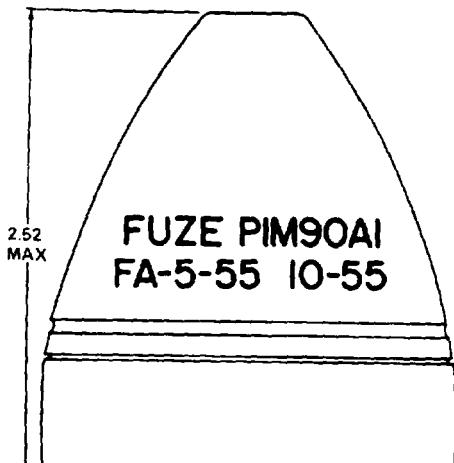
M53 Delay Arming Element; M98  
Superquick Detonator; M76 Delay Detonator;  
RDX Lead Charge and Booster Pellet.

**Limitations:**

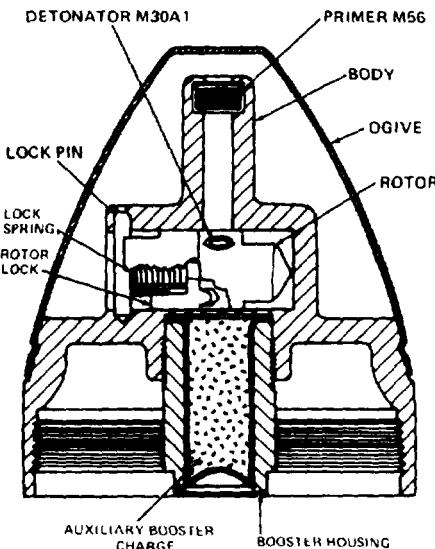
None.

**References**

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

**FUZE, POINT INITIATING: M90A1 or M90**

AR199927



AR199926

**Type Classification:**

C &amp; T OTCM 37119 dtd 1959.

**Use:**

Fuze M90A1 or M90 is a single-action, super quick point-initiating fuze designed for use with 57mm 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	PI
Weight	0.256 lb
Length:	
Visible	2.52 in.
Overall	2.52 in.
Thread size	2.095 -18NS-1
Assembly Dwg. No.	73-2-23

**Explosive Components:**

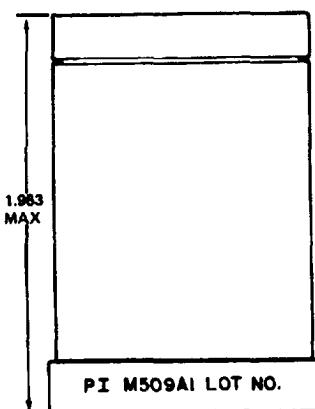
Primer M56, Detonator M30A1, and auxiliary Booster M122.

**References:**

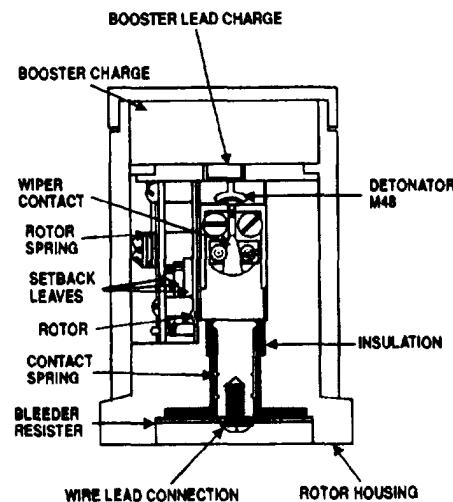
TM 9-1300-251-20

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## FUZE, POINT INITIATING, BASE DETONATING: M509A1/A2



AR199929

U  
AR 199928Type Classification:

Std AMCTC 4677 dtd 1966.

Use:

Point initiating, base detonating type Fuze M509A1 is used with fin-stabilized HEAT projectiles in calibers from 76mm to 120mm.

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 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	0.963 in.
Assembly Dwg. No.	8799735

Temperature Limits:

Refer to complete round for upper and lower limits.

Explosive Components:

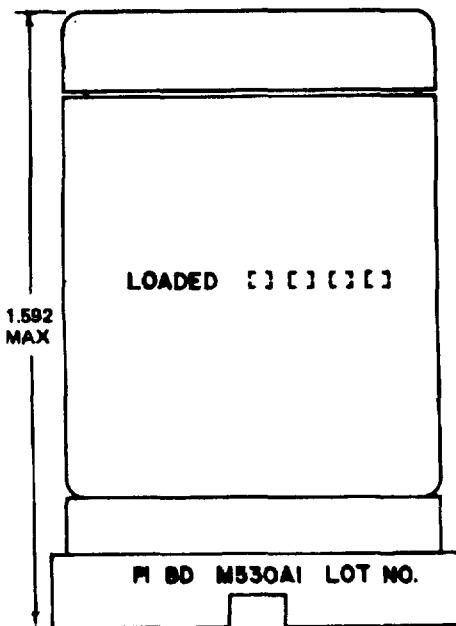
Detonator M48, tetryl booster lead charge, and tetryl booster charge.

Limitations:References:

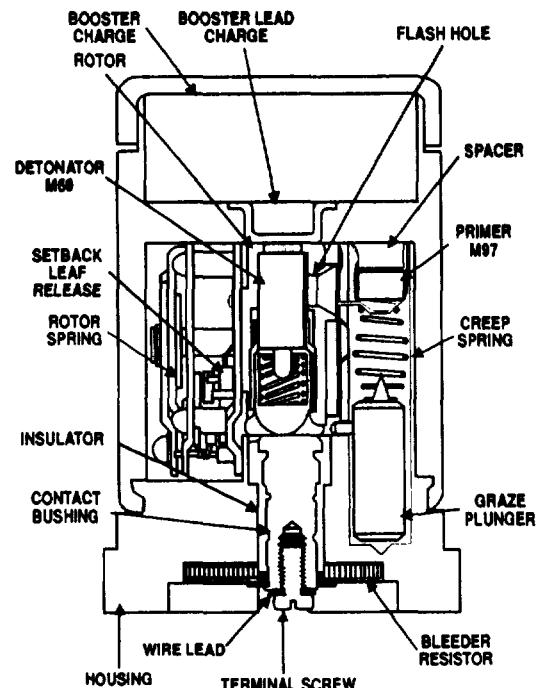
TM 9-1300-251-20

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## FUZE, POINT INITIATING, BASE DETONATING: M530A1 AND M530



AR199923

U  
AR 199922Type 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,

but retarded by an escapement mechanism. Electric contact between the housing and the rotor is made by a contact spring and a wiper contact when the rotor has moved 270° to lace the detonator in the armed position. When impact is made on the target, deformation of the piezoelectric element (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.

Explosive Components:

Primer M97, Detonator M69, tetryl booster lead charge, and tetryl booster charge.

Limitations:

None.

Difference Between 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

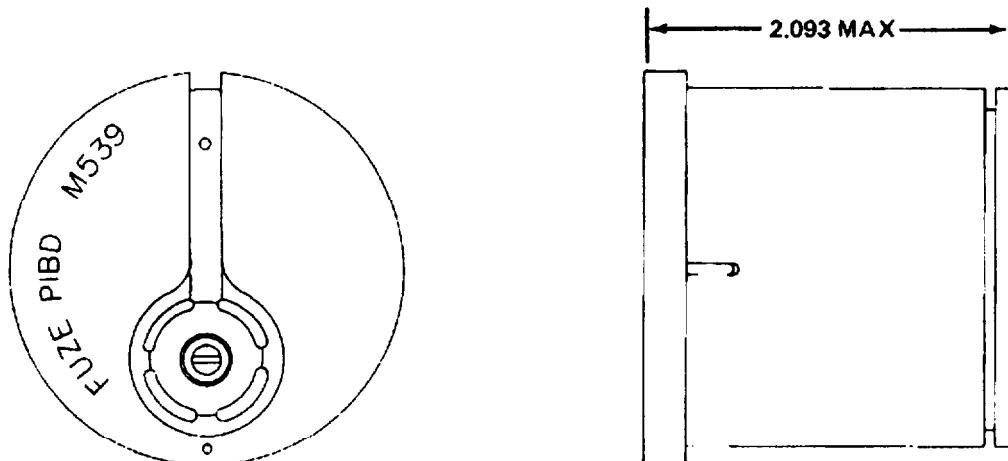
Shipping and Storage Data:

DODAC ----- 1390-N268

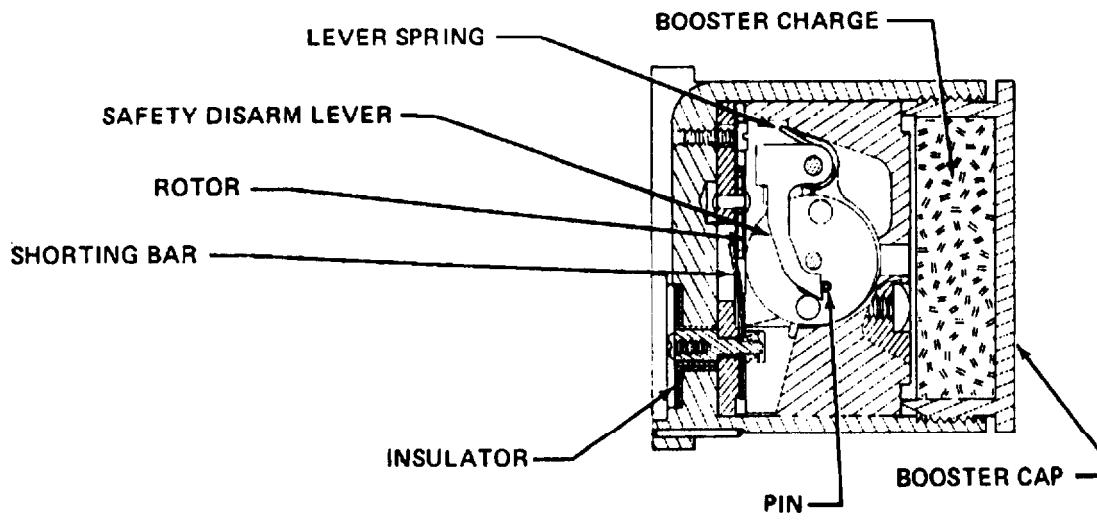
References

TM 9-1015-223-12  
TM 9-1300-251-20

## FUZE, POINT INITIATING, BASE DETONATING: M539A1



AR199925



AR199924

Type Classification:

Std AMCTC 8965 dtd 1972.

Used:

Base Detonating Fuze M539 is of the super-quick action, point initiating type used with 152mm 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 transversal 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 an 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 oppo-

site charge accumulating on the element. As set-back force decays, the shorting bar opens, leaving the charge stored on the piezoelectric 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 lb  
Length overall ----- 2.093 in.

Assembly Dwg. No----- 9204364

**Shipping and Storage Data**

DODAC ----- 1390 - N269

**Temperature Limits:**

Refer to complete round for upper and lower limits.

**Explosive Components:**

Detonator M65 and RDX booster charge.

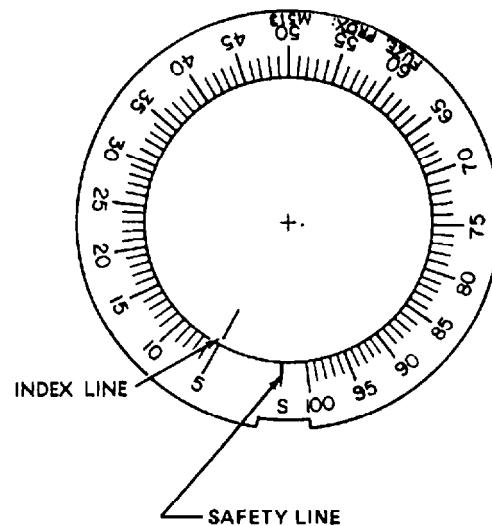
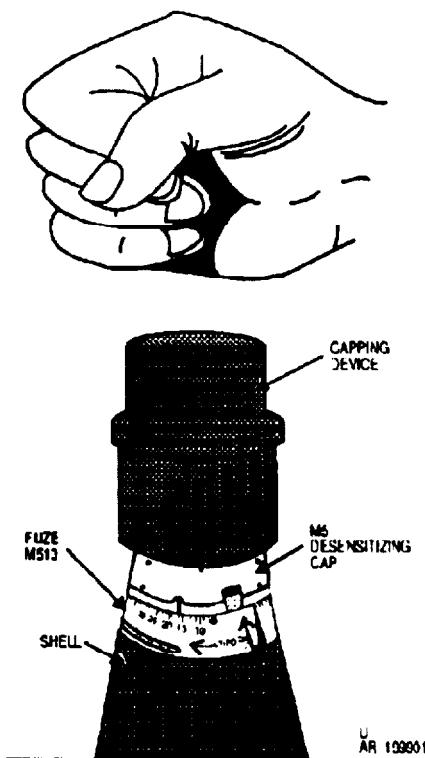
**Limitations:**

None.

**References:**

TM 9-1300-251-20

## FUZE, PROXIMITY: M513 AND M513B1



METAL SLEEVE TIME GRADUATIONS FOR FUZE M513 AND M513B1

AR 199900

Type Classification:

C &amp; T AMCTC 6558 dtd 1969.

Use:

These adjustable, delayed-arming fuzes are used in 75mm, 105mm, 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 105mm, 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. 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 M513B1 has an aluminum sleeve.

**Tabulated Data:**

Type ..... Proximity  
 Weight:  
   M513 ..... 2.96 lb  
   M513B1 ..... 2.35 lb  
 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 lb  
   Dimensions ..... 14-5/8 x 12-13/16 x 11-15/16 in.  
   Cube ..... 1.3 cu ft

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

**Shipping and Storage Data:**

Quantity-distance class ..... (0.4) 1.2  
 Storage compatibility group --- D  
 DOT shipping class ..... A

DOT designation ..... DETONATING FUZES  
 CLASS A  
 EXPLOSIVES,  
 HANDLE  
 CAREFULLY,  
 DO NOT  
 LOAD OR  
 STORE WITH  
 ANY HIGH  
 EXPLOSIVES  
 DODAC ..... 1390-N412  
 UNO serial number ..... 0409  
 UNO proper shipping name ..... Fuzes, detonating  
 Drawing number ..... GA795240

**Limitations:**

Use of less than Charge 12 in 4.2-inch mortars and less than Charge 2 in 105mm howitzers will decrease reliability because of insufficient setback for arming. Use highest charge commensurate with range in any weapon.

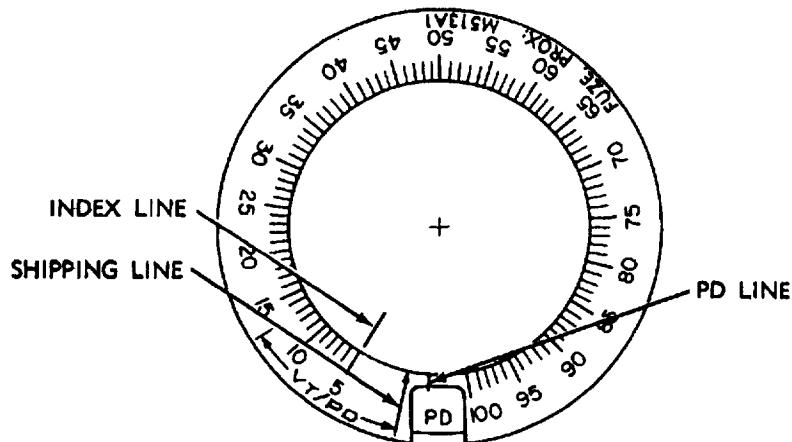
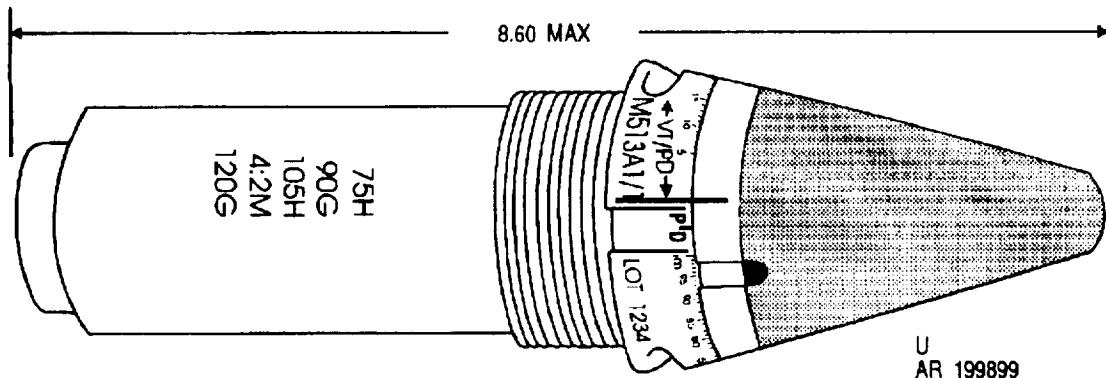
Fuze may not be fired at Charge 7 in 105mm howitzers, except under combat emergency conditions.

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 9-1015-215-10  
 TM 9-2350-311-10  
 TM 9-1300-251-20



AR 199898

**Type Classification:**

C&amp;T AMCTC 6558 dtd 1969.

**Use:**

These adjustable, delayed-arming fuzes are used in deep cavity projectiles fired in 90mm and 120mm guns, 105mm howitzers, and 4.2-inch mortars 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 tar-

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, M59 may be pressed on the nose cone when the fuze is used with 105mm, 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 transmit-

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 lb
<b>Length:</b>	
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 lb
Dimensions -----	14-5/8 x 12-13/16 x 11-15/16 in.
Cube -----	1.3 cu ft

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

#### Shipping and Storage Data:

Quantity-distance class -----	(0.4) 1.2
Storage compatibility group-----	D
DOT shipping class -----	A

DOT designation-----	DETONATING FUZES CLASS A EXPLOSIVES, HANDLE CAREFULLY, DO NOT STORE OR LOAD WITH ANY HIGH EXPLOSIVES
DODAC -----	1390-N412
UNO serial number -----	0409
UNO proper shipping name -----	Fuzes, detonating

#### 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 105mm 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 105mm 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.

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 105mm 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 105MM HOWITZER,  
EXCEPT UNDER COMBAT EMER-  
GENCY CONDITIONS.**

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:

Avoid firing 105mm or smaller projectiles at targets closer than 320 meters (350 yards) to friendly positions.

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.

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.

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 105mm or smaller projectiles.

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 functioning may be reduced by increasing the spacing of weapons or increasing the time between the rounds fired. These functioning are not related to downrange premature which may occur anywhere along the trajectory.

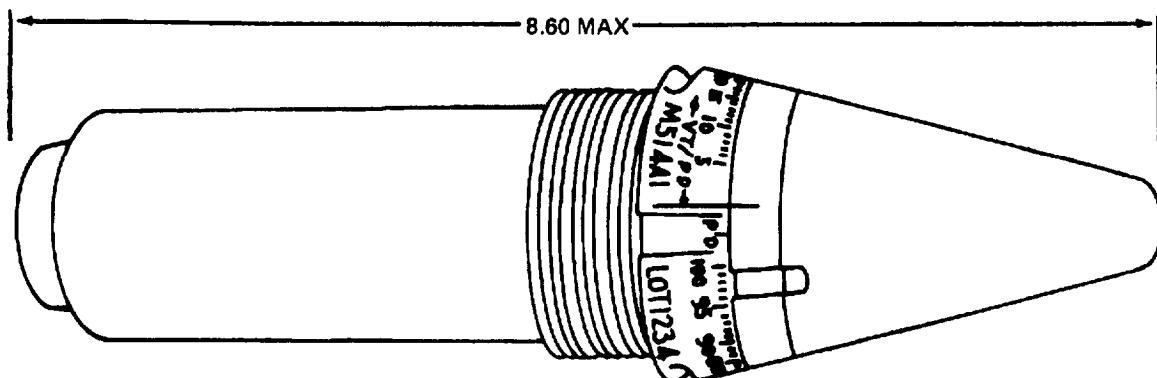
To assure maximum reliability, these fuzes should be expended at the highest charge authorized commensurate with the desired range.

#### References:

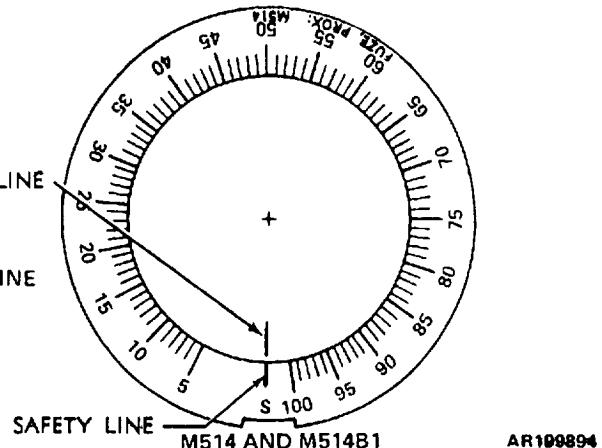
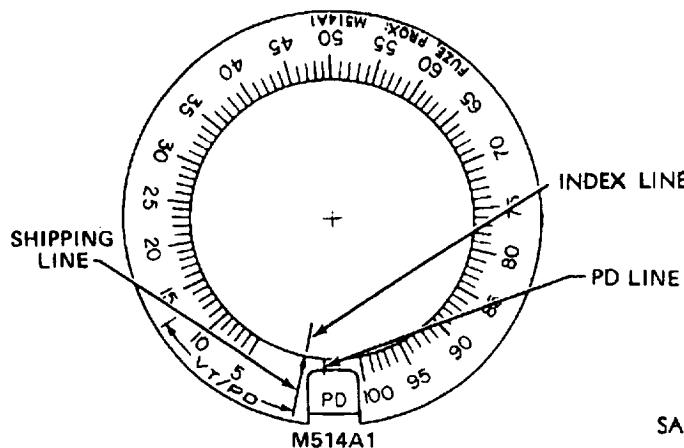
- TM 9-1015-203-12
- TM 9-1015-215-10
- TM 9-1300-251-20
- TM 9-2350-311-10

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## FUZE, PROXIMITY: M514, M514B1, M514A1



AR199895



AR199894

**Type Classification:**

Obsolete MSR 01756048 dated 1975 for training use only.

**Use:**

This fuze is utilized for US Army training in lieu of standard LCC-A items.

**Description:**

These fuses 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 fuses 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 fuses 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 Between 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 set time. 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.

#### Difference Between Models:

Feature	M514	M514B1	M514A1
PD setting	No	No	Yes
PD impact action	Yes	Yes	Yes
Sleeve material	Steel	Alum	Alum
Weapon/Prop.			
Chg combi-			
nations:			
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 DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

#### Shipping and Storage Data:

Storage Class/SCG	(0.4) 1.2D
DOT shipping class	A
DOT designation	DETONA-TING FUZES-CLASS A EXPLO-SIVES, HANDLE CAREFULLY, DO NOT STORE OR LOAD WITH ANY HIGH EXPLOSIVES
DODAC	1390-N411
UNO serial number	0409
UNO proper shipping name	Fuzes, detonating

#### Explosive Components:

Primer, detonator, detonator lead charge, and tetryl booster charge in either detonation mode.

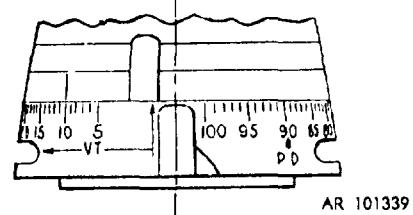
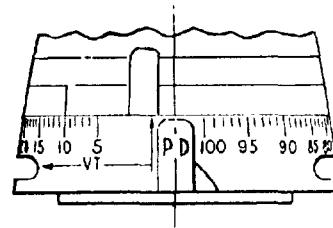
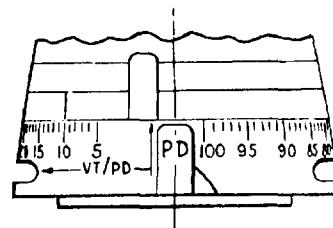
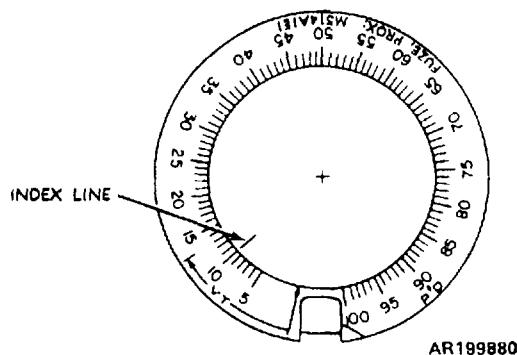
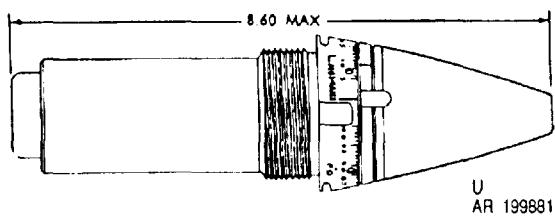
#### Limitations:

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 Between Models.)

The M514A1 fuze should be used only under ballistic conditions above 3,800 G's setback force. Burst heights with this VT fuze will be higher than with the Standard A VT fuzes (M728 and M732).

#### References:

- SC 1340/98 IL
- SB 700-20
- TM 9-1015-234-10
- TM 9-1025-200-12
- TM 9-1300-251-20
- TM 9-2300-216-10
- TM 9-2350-311-10

**FUZE, PROXIMITY M514A3 (M514A1E1)****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, 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 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 u on 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 lb  
Length:  
Visible ----- 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 con-  
tainer; 2 con-  
tainers in wire-  
bound box  
  
\*Packing Box:  
Weight ----- 63 lb  
Dimensions ----- 14-5/8 x 12-  
13/16 x 11-  
15/16 in.  
Cube ----- 1.3 cu ft

\*NOTE: See DOD Consolidated Ammunition Catalog 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 ----- DETONAT-  
ING FUZES  
CLASS A  
EXPLOSIVES,  
HANDLE  
CAREFULLY,  
DO NOT  
STORE OR  
LOAD WITH  
ANY HIGH  
EXPLOSIVES

DODAC ----- 1390-N462  
UNO serial number ----- 0408  
UNO proper shipping name ----- Fuzes, detonat-  
ing  
Drawing number ----- 11707173

**Limitations:**

The fuze may not be fired at Charge 7 in 105mm 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.

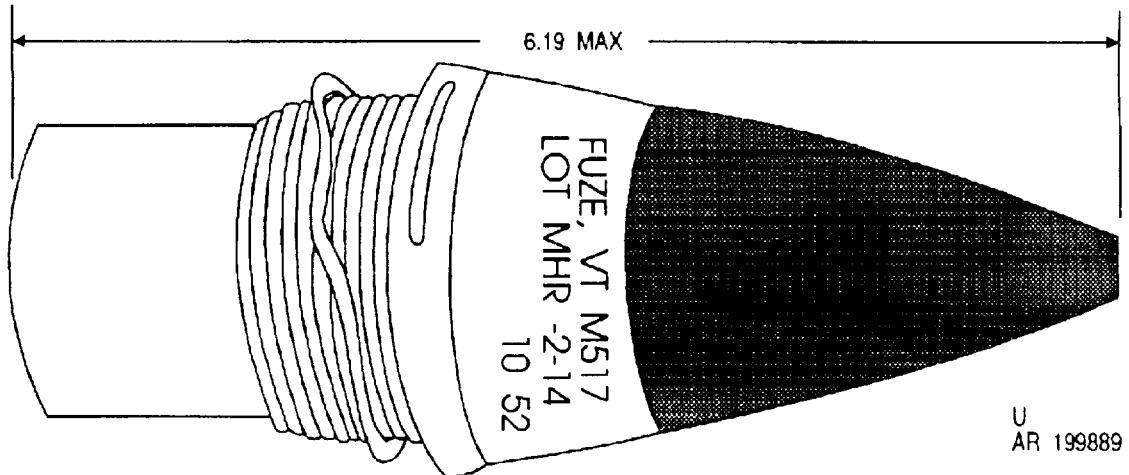
The M514A3 fuze is limited in authorized weapon/propelling charge combinations, as follows:

<u>Weapons</u>	<u>Propelling charge(s)</u>
4.2-inch mortar-----	10 and above.
105mm howitzer (all models)-----	1-6; Charge 7 under emer- gency condi- tions for prox- imity mode only For PD firings at Charge 7, use Fuze PD M557 or Fuze MTSQ M564.
155mm howitzer (all models). --	All
175mm gun (all models) -----	All
8-inch howitzer (all models). ----	All

**References:**

TM 9-1015-203-12  
TM 9-1015-215-10  
TM 9-1015-234-10  
TM 9-1025-200-12&P  
TM 9-1300-251-20  
TM 9-2300-216-12  
TM 9-2350-311-10

## FUZE, PROXIMITY: M517

Type Classification:

Std AMCTC 6558 dtd 1969  
OBS MSR 01756048.

Use:

Proximity Fuze M517 is used with 81mm Mortar 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 unarmed 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 both 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 transceiver is activated. Reflection of any part of the wave pulse back to the fuze results in a ripple or 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 -----	3.98 in.
Overall -----	6.19 in.
Thread size -----	2.00-12NS-1
Assembly Dwg. 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 lb  
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'S.

**Shipping and Storage Data:**

Quantity-distance class ----- 7  
Storage compatibility group ----- B  
DOT shipping class ----- A  
DOT designation ----- DETONAT-  
ING FUZES-  
CLASS A  
EXPLOSIVES

DODAC ----- 1390-N417  
UNO serial number ----- 0107  
UNO proper shipping name ----- Fuzes, detonat-  
ing

**Limitations:**

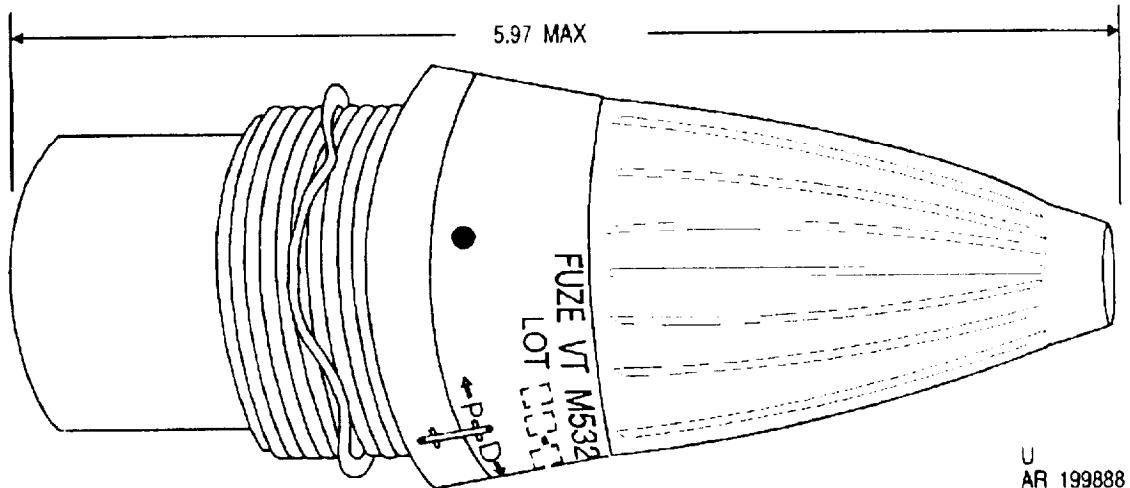
Clearance of at least 100 feet over obstacles should be allowed for maximum reliability and effect.

Heavy precipitation, or temperature extremes may result in premature functioning.

**References:**

TM 9-1300-251-20

## FUZE, PROXIMITY: M532

**Type Classification:**

Std AMCTC 3404 dtd 1965.

**Use:**

Proximity Fuze M532 is a dual purpose type used with 81mm 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/triggering 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 fuze arming cycle is completed. As the fuze approaches the ground, the reflected wave interacts with the transmitted signal to cause a triggering circuit to initiate the detonator. Initiation occurs in the region of 3 to 30 feet above the ground. The height of burst depends on the angle of fall, the nature of the terrain, and the approach velocity.

**Tabulated Data:**

Type	-----	Proximity
Weight	-----	1.30 ± 0.5 lb
Length:		
Visible	-----	3.76 max
Overall	-----	5.97 max
Thread size	-----	2.00-12NS-1
Assembly Dwg. No.	-----	11001028

**Temperate 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 wire-bound box
*Packing Box:	
Weight	----- 41.8 lb

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 compatibility group -----	B
DOT shipping class -----	A
DOT description -----	DETONATING FUZES CLASS A EXPLOSIVES
DODAC -----	1390-N402

UNO serial number ----- 0106  
UNO proper shipping name ----- Fuzes, detonating

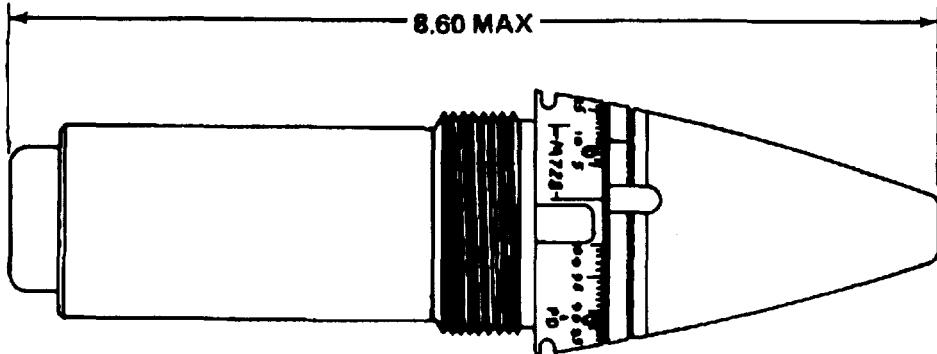
#### **Limitations:**

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.

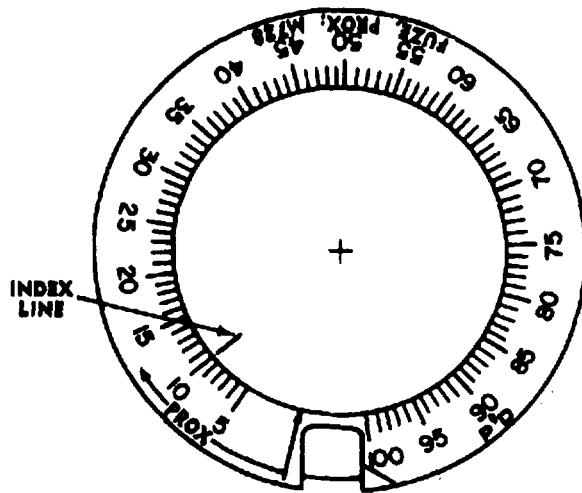
#### **References:**

TM 9-1300-251-20  
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, 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 u on 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. Radio wave transmission is initiated 5 seconds prior to set time followed by proximity arming of the electric primer 3 seconds prior to set time. 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 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 wire-bound 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 DOD Consolidated Ammunition Catalog 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 -----	DETONATING FUZES GLASS-A EXPLOSIVES, HANDLE CAREFULLY DO NOT LOAD OR STORE WITH ANY HIGH EXPLOSIVES
DODAC -----	1390-N463
UNO serial number -----	0408
UNO proper shipping name -----	Fuzes, detonating

**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 m (350 yd);  
155mm, 175mm, and 8 inch--- 731 m (800 yd)

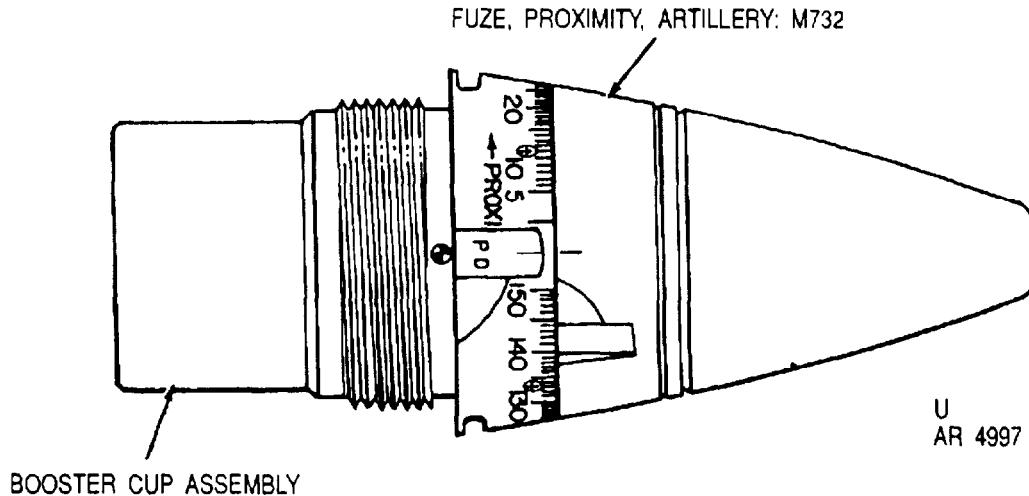
Premature bursts may occur when firing over ridges with clearance of less than 64 meters.

The fuze may not be fired at charge 7 in 105mm Howitzers (all models), except under combat emergency conditions.

**References:**

- TM 9-1015-203-12
- TM 9-1015-215-12
- TM 9-1025-200-12
- TM 9-1300-251-20
- TM 9-2300-216-10
- SC 1340/98-IL

## FUZE PROXIMITY: M732

Type Classification:

STD 05766017,

Use:

Proximity Fuze M732 is designed for use on conventional, high-explosive ammunition: specifically, 105mm, 155mm, 175mm, and 8-inch artillery ammunition, and 4.2-inch mortar ammunition, with a standard 2-inch thread. Action may be either proximity air burst 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 150 which represent seconds of flight time to target.

Functioning:

Fuzes are set for anticipated time of flight (in seconds) to the target. When set at any value between 5 seconds and 150 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.

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.

Prior to Firing - Set fuze on desired time setting.

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.

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.

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.

### **Limitations:**

#### **NOTE**

The PD setting of the M732 VT Fuze when fired into soft impact areas will produce less lethality than the superquick setting of the M739 PD Fuze.

### **Tabulated Data**

Length:			
Visible -----	3.76	in. max	
Intrusion -----	2.21	in.	
Overall -----	5.97	in.	
Weight -----	1.75	± .05	lb
Body material -----	Steel		
Thread size -----	2-12UNS-1A		
Arming:	<u>Min</u>	<u>Max</u>	
Setting time -----	5 sec	150 sec	
Spin -----	2,700 rpm	18,000 rpm	
Setback -----	1,100 g	18,000 g	
Distance (400 calibers minimum):			
105mm howitzer -----	42.6	m	
4.2-in. mortar -----	42.7	m	
155mm howitzer -----	62.0	m	
175mm 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; two containers per wirebound box

\*Packing Box:  
Weight w/contents ----- 49.8 lb  
Outside dimensions ----- 14-5/8 in. x 12-13/16 in. x 9-1/8 in.  
cube ----- 1 cu ft

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

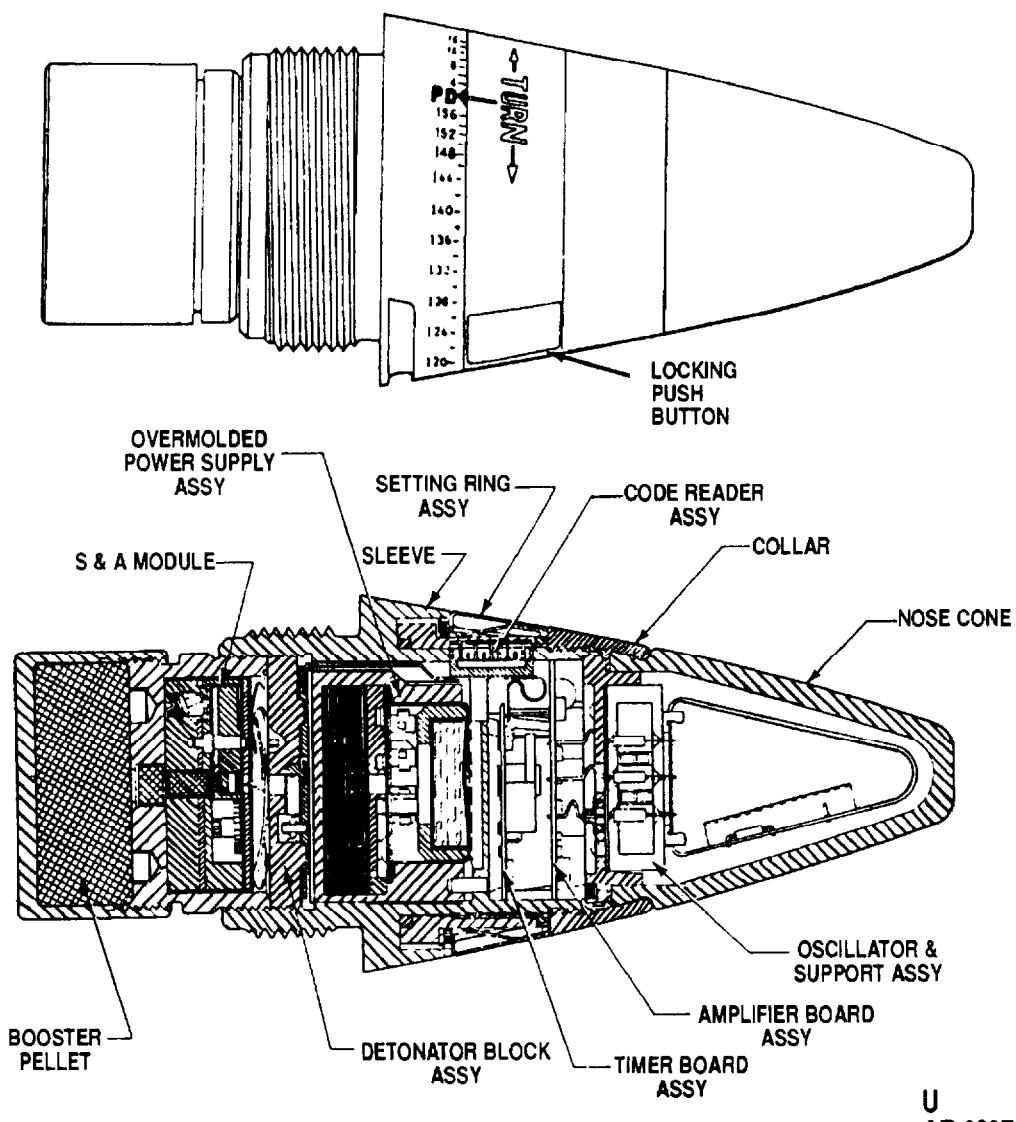
### **Shipping and Storage Data**

Quantity-distance class -----	1.1
Storage compatibility group ---	D
DOT shipping class -----	C
DOT decimation -----	DETONATING FUZES, CLASS C EXPLOSIVES- HANDLE CAREFULLY
DODAC -----	1390-N464
UNO serial number -----	0408
UNO proper shipping name -----	Fuzes, detonating

### **References:**

TC 6-40  
FM 23-90  
TM 9-1015-203-12  
TM 9-1025-200-12&P  
TM 9-1300-251-20  
TM 9-2350-311-10

## FUZE, PROXIMITY (VT), M732A2

**Type Classification:**

STD JAN 90 MSR 03906010.

**Use:**

Proximity Fuze M732A2 is used with standard and rocket-assisted high-explosive 105mm cartridges and 155mm and 8-inch projectiles. The fuze was designed as an improvement over the M732 Fuze for compatibility with RAP rounds and top zone ballistic environments.

**Description:**

Fuze M732A2 is a continuous-wave, radio doppler proximity fuze capable of being set for

proximity airburst or PD. Externally, the fuze has a plastic nose cone crimped to an aluminum collar, which threads onto a steel fuze sleeve. The collar retains a movable aluminum setting ring which has an index mark. The fuze sleeve is marked with contrasting black paint in 2 second increments in the range of 4 to 156 seconds and a PD mark. Time settings are used in the proximity mode only.

The fuze is set by simultaneously depressing two locking pushbuttons (within ogive) and rotating the setting ring to align the index mark to the desired mark on the sleeve (the fuze is shipped with index mark set on PD mark). When pushbuttons are released, the setting ring is locked in place.

Internally, the fuze consists of four modular subassemblies: the proximity detector, the timer and setting ring assembly ("minor redesigned" PS115) power supply assembly, and and S&A device with associated explosive train.

#### Functioning:

Upon weapon firing, setback and spin forces act upon the S&A module and the power supply. Setback force retracts a pin from the S&A rotor while spin unlocks two spin-locks and drives the rotor from safe to the locked-in armed position at 400 calibers of air travel. Meanwhile, setback actuates cutters that open the battery ampule to release the battery acid; spin disperses the battery acid into the cell stack to activate the battery.

When set for proximity function (time-to-target setting), the proximity firing circuit is armed at 2.8 seconds prior to the set time and the proximity element initiates the explosive train and detonates the round approximately 7 meters above target.

When set for PD, the proximity firing circuit does not arm. Upon impact with target, the S&A assembly slides forward and the M55 detonator (in the rotor of the S&A) is stabbed by a firing pin, which is restrained between the S&A module and detonator block. The output of the M55 detonator propagates through the explosive train and detonates the round.

If the fuze fails in the proximity mode, the fuze will function on impact.

#### Tabulated Data:

Type -----	Prox (VT)
Weight -----	1.24 lb
Length:	
Visible.....	3.76 in.
Overall.....	5.97 in.
Assembly Dwg No. -----	11742612

#### Temperature Limits:

Firing:	
Lower limit -----	-40°F
Upper limit -----	+ 140°F
Storage:	
Lower limit -----	-60°F
Upper limit -----	+ 160°F

#### Arming Data:

Method -----	Setback and spin and electronic signal
Fully armed -----	2.8 seconds before set time; 400 calibers in flight for PD

	Min	Max
Spin	1100 rpm	30,000 rpm
Setback	800 g	30,000 g

\*Packaging ----- 8 fuzes in M2A1 container; 2 containers in wirebound box

\*Packing Box:  
Weight ----- 50 lb  
Dimensions ----- 14-5/8 x 12-13/16 x 9-1/8 in.  
Cube ..... 1.0 cu ft.

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

#### Shipping and Storage Data (Interim):

Quantity-distance class -----	1.1
Storage compatibility group -----	D
DOT shipping class -----	Class A
DOT designation -----	Explosive DETONATING FUZES, CLASS A EXPLOSIVES, HANDLE CAREFULLY, DO NOT STORE OR LOAD WITH ANY HIGH EXPLOSIVES
DODAC -----	1390-N291

#### Explosive Components:

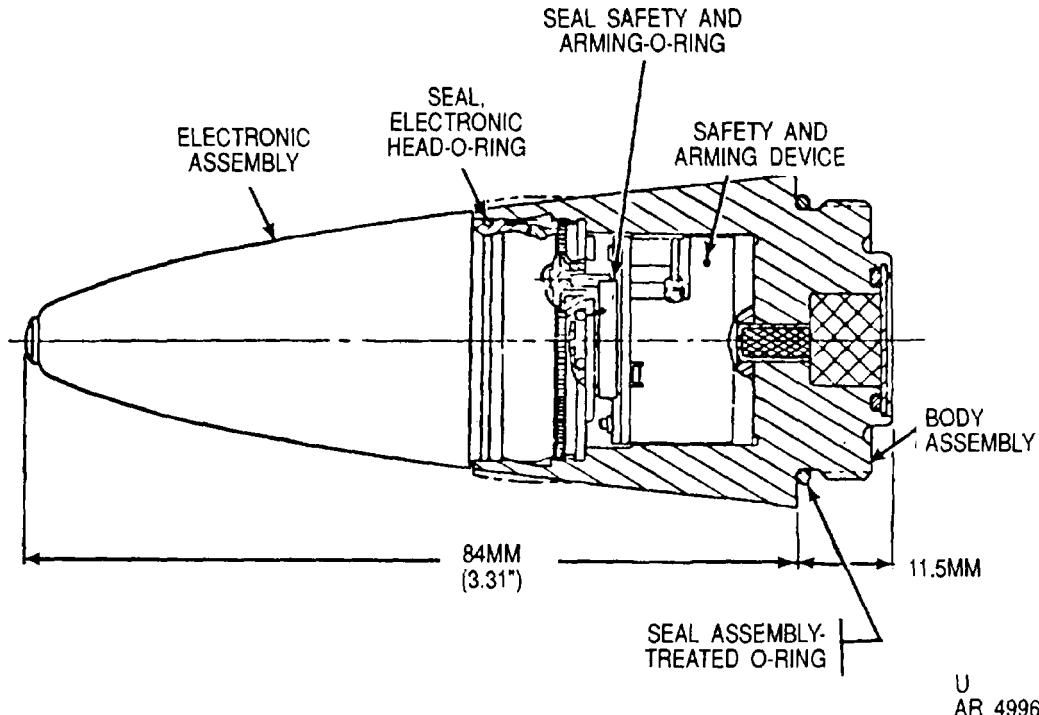
Microelectric Detonator  
M55 Stab Detonator  
Lead (S&A)  
Lead (Fuze)  
Booster Standard Comp A5

#### Limitations:

None.

#### References:

SC 1340/98-IL  
SB 700-20  
TM 9-1015-203-12  
TM 9-1015-234-10  
TM 9-1025-200-12&P  
TM 9-1025-211-10  
TM 9-2350-304-10  
TM 9-2350-311-10

**FUZE, PROXIMITY: M766****Type Classification:**

Std MSR 05826003.

**Use:**

Fuze, Proximity: M766 is used with Sergeant York Cartridge, HE, M822 for 40mm gun M247. It is used primarily against aerial targets.

**Description:**

The M766 Proximity Fuze is an electronic fuze that operates on the Doppler principle. It contains a combination of electronic and mechanical devices that provide a safe and reliable air defense munition. The electronic head of the fuze provides both safety and detonation. A mechanical safe and arm device (MS470 S&A) provides bore safety and maintains out-of-line safety until a safe arm distance is achieved. Electrical arming, which occurs well after muzzle exit, prevents an early ignition signal to the initiator. After electrical arming, the presence of a target that effects the proximity function will result in a firing signal output. The fuze also contains sensitive impact switches that provide fuze function on impact, and an electronic self-destruct feature that results in detonation

of the round after a fixed time period. A sensitivity regulation device is built into the fuze electronics, so that the triggering threshold is increased as the sea or ground reelection level increases. An inhibition channel (ECCM) allows operation in the presence of potentially interfering signals. The fuze consists principally of three subsystems: the electronic head, the safe and arm device (S&A), and the explosive train. The radome is made of thermoplastic material and the fuze body of aluminum. There are 3 modes of initiation: proximity, impact, and self-destruct.

**Functioning:**

After firing, arming is obtained approximately 0.2 second after muzzle exit by means of the sector being turned under the influence of the spin acceleration on the weight to such a position where the electrical igniter comes in contact with the blade contact and where its detonator is just opposite to the relay charge. Ignition is obtained by proximity or impact function. At power application, the master timer begins to count the flight time. When a total time of  $17 \pm 4$  seconds has elapsed without a valid firing pulse from either the proximity or impact mode, the unit will be self-destructed.

**Tabulated Data:**

Type .....	Proximity
Weight .....	0.24 lb (0.11 kg)
Length .....	3.31 in. (84.0 mm)
Arming time .....	0.2 second
Time to self-destruct .....	17 ± 4 seconds (approx)
Assembly Dwg. No.....	12703650

**Temperature Limits:**

See complete round for upper and lower limits.

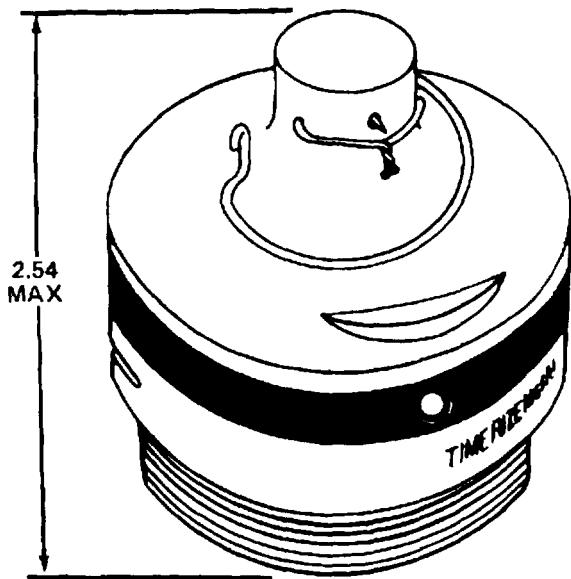
**Explosive Components:**

Igniter .....	2 mg
Initiator: Silver Azide .....	2 mg
Explosive Detonator: Lead Azide .....	135 mg
Explosive Lead: Plastic B .....	120 mg

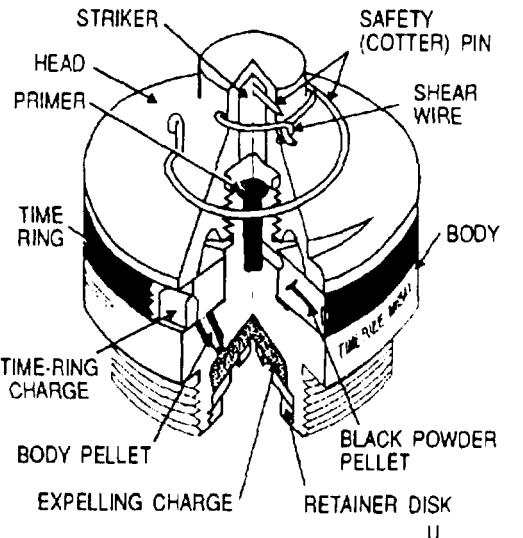
**Limitations:**

None.

## FUZE, TIME: M65A1 OR M65



AR199907

**Type Classification:**

Std AMCTC 8346 dtd 1971.

**Use:**

Time Fuze M65A1 is a powder-train fixed delay type used with 60mm 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.

**Difference Between Models:**

Fuze M65A1 differs from Fuze M65 in the following respects: the striker is longer; the body is recessed beneath the time-train ring to protect the felt pads which separate the body and ring; the fuze wrench holes in the body are replaced with two fuze wrench slots cut into the lower flange on 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. No:		
M65A1	-----	9207568
M65	-----	73-3-163

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 ..... Fuze is assembled with cartridge and is not a separate item of issue.

Shipping and Storage Data:

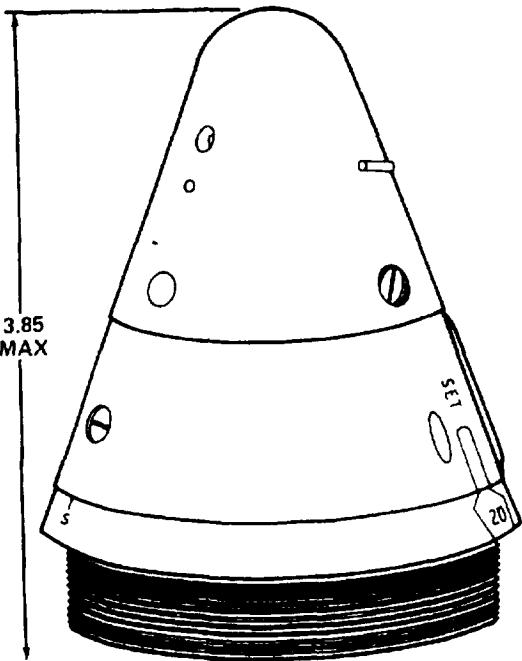
Not Applicable.

Explosive Components:

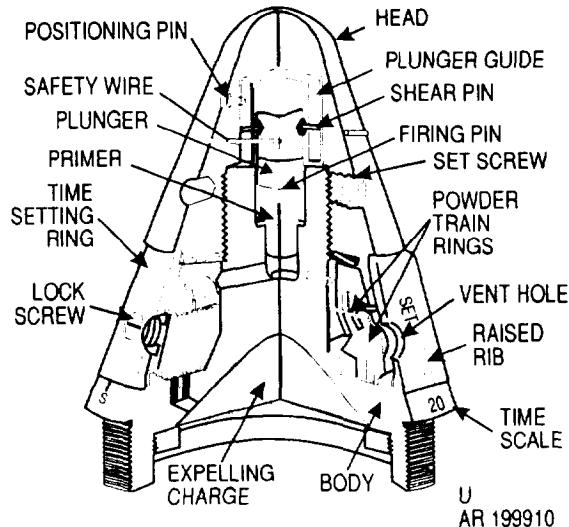
Primer; black powder time-ring charge; black powder pellet, and black powder expelling charge.

Reference:

FM 23-90

**FUZE, TIME: M84 AND M84A1**

AR199911



AR 199910

**Type Classification:**

Std AMCTC 6390 dtd 1965

**Use:**

Time Fuzes M84 and M84MA1 are the single-purpose, powder train, selective-time type and are used with 81mm illuminating cartridges.

**Description:**

The fuze has a brass head containing an inertial plunger acting from setback and a brass body containing a primer, variable-time powder train rings, and a black powder expelling charge. An outer adjustment ring on the body has six vent holes and six raised ribs to adapt to fuze setter 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 weapon firing causes the plunger to shear these pins and strike the percussion primer at the base of the plunger guide. Ignition of the primer starts 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 illuminant assemblies through the base of the projectile.

**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.

**Tabulated Data:**

Type -----	T
Weight -----	1.82 lb
Length:	
Visible -----	3.25 in.
Overall -----	3.85 in.

Thread size ----- 2.4-18NS-1  
Assembly Dwg, No.:  
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:**

DODAC ----- 1390-N384  
UNO serial number ----- 0410  
UNO proper shipping name ----- Fuzes, detonating

**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.

## 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

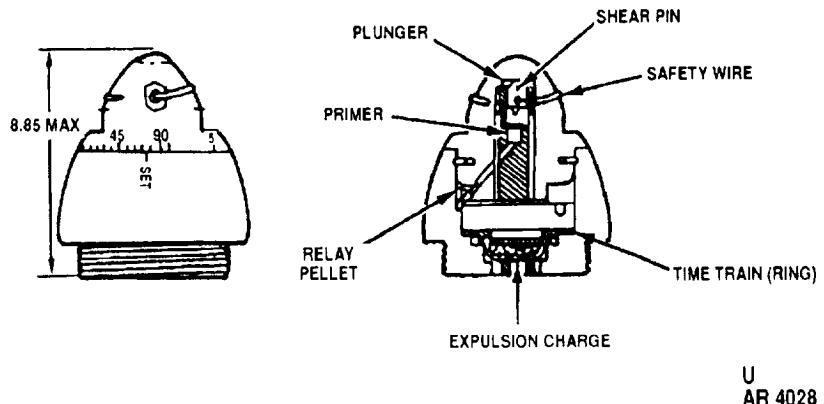
Overall ----- 4.87 in.

Service fuzes simulated ---- BD, M53 series

**References:**

TM 9-1300-251-20

Refer to operator's manuals.

**FUZE: TIME, XM768****Type Classification:****Use:**

This fuze is a variable time fuze developed for use on the illuminating and smoke cartridges of the M252 improved 81 mm mortar system.

**Description:**

The fuze contains a plunger, primer, tungsten compound time train (ring), and a black powder expulsion charge. The fuze can be set to function from 3-55 seconds. The time scale is marked in 1 second intervals.

**Functioning:**

The plunger is held in place by two shear pins and a safety wire which must be removed prior to firing. Upon setback, the plunger shears the pins and strikes the percussion primer. The primer element functions and flashes into a relay charge, which in turn flashes and ignites the tungsten compound time train (ring). The expulsion charge is ignited when the flame reaches the end of the time train. The delay time depends on the location at which the relay charge flashes onto the time train. The delay time can be changed by

rotating the fuze head. The time setting is indicated by the markings on the fuze head and body.

**Tabulated Data:**

M768 Fuze:

Type	-----	Time
Weight	-----	2.06 lb (0.93 kg)
Length (overall)	-----	3.85 in (9.78 cm)
Thread size	-----	2.4-18 UNS
Intrusion	-----	0.514 in. (1.306 cm) (max)

**Temperature Limits:**

Firing:

Lower limit	-----	-50°F (-46°C)
Upper limit	-----	+145°F (63°C)

Storage:

Lower limit	-----	-80°F (-62°C) (for not more than 3 days)
Upper limit	-----	+ 160°F (71°C) (for not more than 4 hr/day)

\*Packing: Not a separate issue item--assembled to complete rounds.

**Shipping and Storage Data**

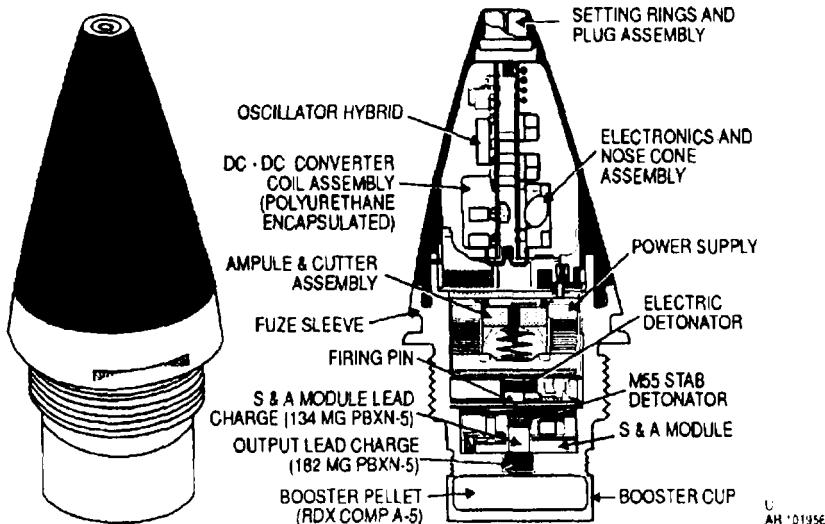
Quantity-distance class ----- 1.4  
Storage compatibility group ---- D  
DOT shipping class ----- C  
DOT designation ----- TIME FUZE--  
HANDLE  
CAREFULLY

DODAC ----- 1390-N  
Drawing number ----- 9349500

**References:**

AMC-P 700-3-3  
SB 700-20

## FUZE, ELECTRONIC TIME: M587



### Type Classification:

Std MSR 03796007.

### Use:

Electronic Time Fuze M587 is used with high explosive and related projectiles where a fuze 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. 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 import the electrical impulses which set the desired time. The fuze will provide setting time from 0.2 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 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 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 rings 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:

## Lower limit:

Fuze -----	-40°F (-40°C)
Setter -----	-40°F (-40°C)

## Upper limit:

Fuze -----	+145°F (+63°C)
Setter -----	+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 hr/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 stab detonator:

Explosive -----	85 mg total
Prime mix NOL #130 -----	15 mg
Lead azide RD 1300 -----	51 mg
RDX -----	19 mg

## S&amp;A lead charge (PBXN-5):

Explosive -----	134 mg total
-----------------	--------------

## Output lead charge (PBXN-5):

Explosive -----	182 mg total
-----------------	--------------

## Booster pellet (Comp A-5):

Explosive -----	27 g total
Packing -----	8 Fuzes in metal contain- ers; 2 contain- ers in wire- bound box

## \*Packing Box:

Weight -----	55.8 lb
Dimensions -----	14-5/8 in. x 12- 13/16 in. x 9- 1/8 in.
Cube -----	1.04 cu ft

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

**Shipping and Storage Data:**

Quantity-distance class ----- 1.1  
Storage compatibility group --- D  
DOT shipping class ----- A  
DOT designation ----- DETONA-  
TING FUZES  
CLASS A EX-  
PLOSIVES-  
HANDLE  
CAREFULLY -  
DO NOT  
STORE OR  
LOAD WITH  
ANY HIGH  
EXPLOSIVES

NSN (M587) ----- 1390-01-062-  
4574

DODAC (M587) ----- 1390-N600

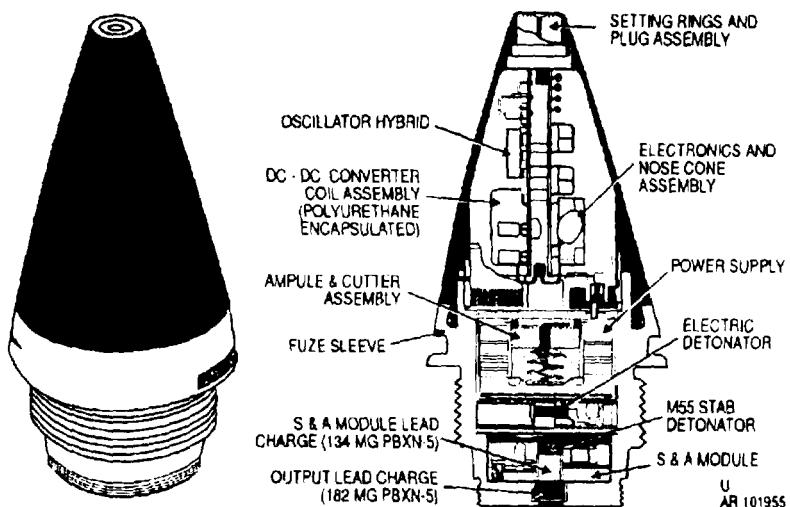
UNO serial number ----- 0408

UNO proper shipping name ---- Fuzes, detonat-  
ing

NSN (Fuze Setter) ----- 1290-01-038-  
2035

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## FUZE, ELECTRONIC TIME: M724

Type Classification:

Std MSR 03796007.

Use:

The electronic time fuze M724 is used with base 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. This is the means by which the fuze is set. A series of ins 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 0.2 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 -----	2.00-12 UNS-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)
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 wire-bound 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

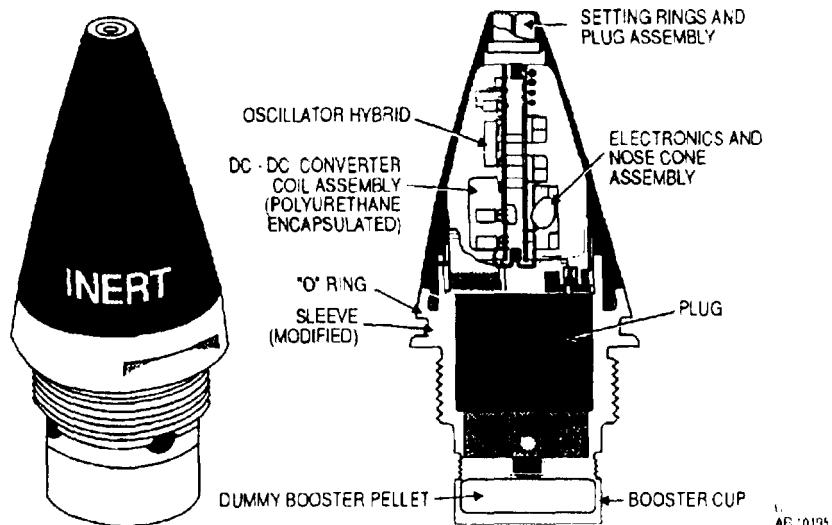
\*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN'S.

**Shipping and Storage Data**

Quantity-distance class ----- (0.4) 1.2  
Storage compatibility group ----- D  
DOT shipping class ----- A  
DOT designation ----- TIME FUZES -  
                                  HANDLE  
                                  CAREFULLY  
DODAC ----- 1390-N601  
UNO serial number ----- 0409  
UNO proper shipping name ----- Fuzes, detonating

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## FUZE, ELECTRONIC TIME: TRAINING, M744

**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 impulses which set the desired time. The fuze will provide setting time from 0.2 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

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	2.00-12 UNS-1A
Assembly Dwg. No.	11726806
Arming distance	400 - 800 calibers

**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; 3 containers in wire-bound box

**Packing box - Fuze:**

Weight -----	55.8 lb
Dimensions -----	14-5/8 x 12- 23/16 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.

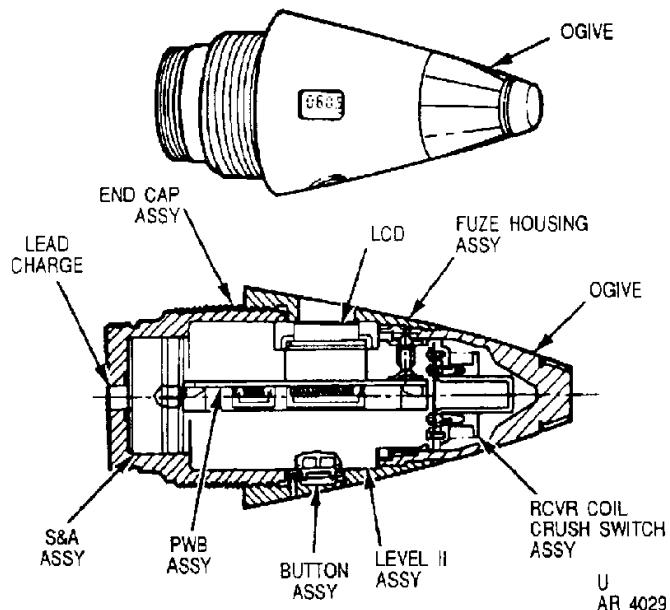
**Shipping and Storage Data:**

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.

## FUZE, ELECTRONIC TIME (ET), M762 SERIES



### Type Classification:

M762: Std, MSR12886002, Dec 88.  
M762A1: Feb 01.

### Use:

Electronic Time (ET) Fuze M762 Series is used with 105mm cartridges and 155mm and 8-inch projectiles carrying payloads that are expelled during projectile flight (airburst). The M762A1 fuze is not authorized for use with 8-inch projectiles.

### Description:

The fuze contains an electronic timing system that may be set to function from 0.5 to 199.9 seconds in increments of tenths of a second. When used with weapons equipped with auto-setters, the fuze will be automatically remote set prior to launch via an inductive communication link between the fuzed ammunition and the weapon fire control system. The fuze can also be set via inductive communication link with a portable hand-held fuze setter. In addition, the fuze can be hand set (without the need of any tool) by rotating the OGIVE while depressing a thumb operated selector and cocking button until the desired time appears in the liquid crystal display (LCD) window. The ogive of the M762A1 can be rotated bi-directionally to provide quicker manual setting. The fuze is powered by a reserve lithium battery.

In the time mode, overhead safety is provided by an S&A that arms at 50 milliseconds prior to set time. When set for PD, the fuze is armed at 0.5 seconds in flight.

### Functioning:

The fuze is energized as follows: rotation of the ogive or an inductive command from an auto-setter initiates the Battery Primer which breaks a glass ampule within the battery, releasing electrolyte fluid to power-up the battery and energize the fuze.

Upon weapon firing, setback and centrifugal forces act on the electromechanical S&A: the setback force moves the setback lock clear of the slider; at the muzzle exit, spin force frees the spin lock from the slider and disrupts the electrical shortening across the piston actuator (PA); when set for time, an electrical pulse activates the PA at 50 milliseconds prior to set time; when set for PD, the pulse activates the PA at 0.45 seconds in flight; the PA moves the slider, locking it into the armed position thereby disrupting the electrical short across the Electric Detonator; and connecting the Electric Detonator terminal to the firing circuit.

When a time setting expires, the electronics assembly sends a fire pulse through the firing circuit and detonates the Electric Detonator. For PD function, the crush switch assembly senses the impact and transmits a fire signal to detonate the Electric Detonator. The output of the Electric Detonator functions the lead charge which initiates projectile functioning.

**Difference Between Models:**

The M762A1 functions the same as the M762 but contains improved capabilities. The fuze ogive can be rotated bi-directionally to provide quicker manual setting. The LCD readout for PD is simplified to diminish the probability for manual setting errors. A battery bleed-down circuitry is added to facilitate render safe procedures. The fuze electronics is improved to provide more robustness in the operational environment and faster power on rise time for quicker response to autoset commands. The fuze can be passively interrogated by an autosetter to ascertain battery status and previously loaded setting data.

**Tabulated Data:**

## NSN:

M762 Fuze.....	1390-01-282-6038
M762A1.....	1390-01-474-2268

## Type .....

Type .....	ET
Weight.....	1.102 lb (0.5kg)
Length:	

Visible .....	3.76 in. (9.55 cm)
Overall .....	5.27 in. (13.39 cm)

## Assembly Dwg No.:

M762.....	12551000
M762A1.....	12991762

**Temperature Limits:**

## Firing:

Lower limit .....	-45°F (-43°C)
Upper limit.....	+145°F (+63°C)

## Storage:

Lower limit .....	-60°F (-51°C)
Upper limit.....	+160°F (+71°C)

**Arming Data:**

Method.....	Setback and spin and electronic pulse
-------------	---

Fully armed.....	50 millisecs before set time; 0.5 seconds in flight for PD
------------------	---

## Rotation:

Non-arm.....	18 rps
Arm .....	28 rps

## Setback:

Non-arm.....	800 G
Arm .....	1000 G

*Packing .....	8 fuzes in M2A1 container; 2 con- tainers in wire- bound box
----------------	---

**\*Packing Box:**

Weight .....	41.3 lb (18.7 kg)
Dimensions.....	14-5/8 x 12-13/16 x 9-1/8 in. (37.15 x 32.54 x 23.18 cm)
Cube .....	1.0 cu ft (0.03 cu m)

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

**Shipping and Storage Data (Interim):**

Quantity-distance class .....	1.4
Storage compatibility group.....	S
DOT shipping class.....	Class C Explosive
DOT designation.....	DETONATING FUZES, CLASS C EXPLOSIVES HANDLE CARE- FULLY

## DODAC:

M762 .....	1390-N289
M762A1 .....	1390-NA17

UNO serial number.....	0367
UNO proper shipping name .....	Fuzes, detonating

**Explosive Components:**

Electric stab battery primer (PA536)	
Piston actuator (PA535)	
Lead charge (PA534)	
Electric detonator (PA537)	

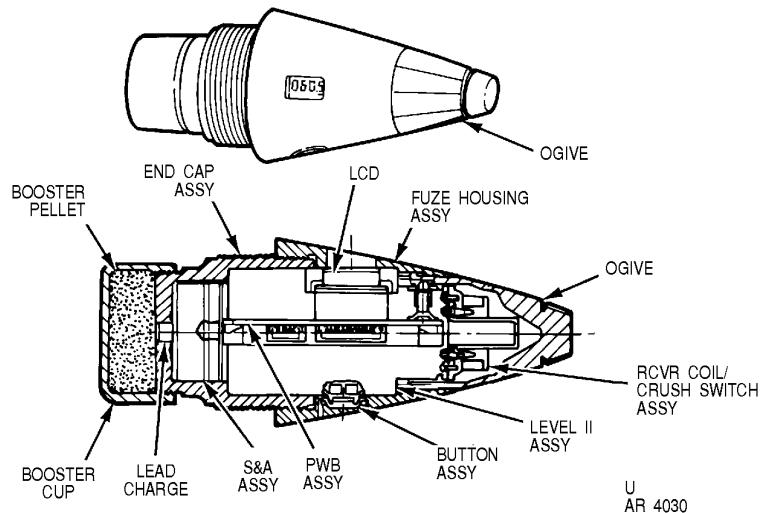
**Limitations:**

If the fuze fails in the time mode or impacts before a time setting expires, there is no true PD back-up; however, the round may or may not function on ground impact.

**References:**

SC 1340/98-1L	
SB700-20	
TM 9-1015-203-12	
TM 9-1015-234-10	
TM 9-1025-200-12&P	
TM 9-1025-211-10	
TM9-2350-311-10	
TM 9-2350-304-10	
TM 43-0001-28-4	
TM 43-0001-28-5	
TM 43-0001-28-6	
TM 43-0001-28-7	
TM 43-0001-28-8	
TM 43-0001-28-9	
TM 43-0001-28-10	

## FUZE, ELECTRONIC TIME (ET), M767 SERIES



### Type Classification:

M767: Std, MSR12886002, Dec 88.  
M767A1: Feb 01.

### Use:

Electronic Time (ET) Fuze M767 Series is used with fragmentation (HE loaded) and burster type 105mm cartridges and 155 and 8-inch projectiles. The M767A1 fuze is not authorized for use with 8-inch projectiles.

### Description:

The fuze contains an electronic timing system that may be set to function from 0.5 to 199.9 seconds in increments of tenths of a second. When used with weapons equipped with auto-setters, the fuze will be automatically remote set prior to launch via an inductive communication link between the fuzed ammunition and the weapon fire control system. The fuze can also be set via inductive communication link with a portable hand-held fuze setter. In addition, the fuze can be hand set (without the need of any tool) by rotating the OGIVE while depressing a thumb operated selector and cocking button until the desired time appears in the liquid crystal display (LCD) window. The ogive of the M767A1 can be rotated bi-directionally to provide quicker manual setting. The fuze is powered by a reserve lithium battery.

In the time mode, overhead safety is provided by an S&A that arms at 50 milliseconds prior to set time. When set for PD, the fuze is armed at 0.5 seconds in flight.

In the time mode, overhead safety is provided by an S&A that arms at 50 milliseconds prior to set time. When set for PD, the fuze is armed at 0.5 seconds in flight.

### Functioning:

The fuze is energized as follows: rotation of the ogive or an inductive command from an auto-setter initiates the battery primer which breaks a glass ampule within the battery, releasing electrolyte fluid to power-up the battery and energize the fuze.

Upon weapon firing, setback and centrifugal forces act on the electromechanical S&A: the setback force moves the setback lock clear of the slider; at the muzzle exit, spin force frees the spin lock from the slider and disrupts the electrical pulse activates the PA at 50 milliseconds prior to set time; when set for PD, the pulse activates the PA at 0.45 seconds in flight; the PA moves the slider, locking it into the armed position thereby disrupting the electrical short across the Electric Detonator; and connecting the Electric Detonator terminal to the firing circuit.

When a time setting expires, the electronics assembly sends a fire pulse through the firing circuit and detonates the Electric Detonator. For PD function, the crush switch assembly senses the impact and transmits a fire signal to detonate the Electric Detonator. The output of the Electric Detonator functions the lead charge which, in turn, functions the booster pellet to initiate projectile functioning.

**Difference Between Models:**

The M767A1 functions the same as the M767 but contains improved capabilities. The fuze ogive can be rotated bi-directionally to provide quicker manual setting. The LCD readout for PD is simplified to diminish the probability for manual setting errors. A battery bleed-down circuitry is added to facilitate render safe procedures. The fuze electronics is improved to provide more robustness in the operational environment and faster power on rise time for quicker response to autoset commands. The fuze can be passively interrogated by an autosetter to ascertain battery status and previously loaded setting data. For the M767A1, the booster pellet composition is changed from Comp A5 to PBXN-5.

**Tabulated Data:**

NSN:	
M767 .....	1390-01-283-6532
M767A1 .....	1390-01-474-2262
Type .....	ET
Weight .....	1.125 lb (0.510 kg)
Length:	
Visible .....	3.76 in. (9.55 cm)
Overall.....	5.97 in. (15.16 cm)
Assembly Dwg No.:	
M767 .....	12550850
M767A1 .....	12991767

**Temperature Limits:**

Firing:	
Lower limit.....	-45°F (-43°C)
Upper limit.....	+145°F (+63°C)
Storage:	
Lower limit.....	-60°F (-51°C)
Upper limit .....	+160°F (+71°C)

**Arming Data:**

Method .....	Setback and spin and electronic pulse
Fully armed .....	50 milliseconds before set time; 0.5 seconds in flight for PD
Rotation:	
Non-arm .....	18 rps
Arm .....	28 rps
Setback:	
Non-arm .....	800 G 28 oz)
Arm .....	1000 G (35 oz)
*Packing.....	8 fuzes in M2A1 container; 2 con- tainers in wire- bound box
*Packing Box:	
Weight .....	46.5 lb .....(21.1 kg)
Dimensions.....	14-5/8 x 12-13/16 .....9-1/8 in. (37.15 x .....32.54 x 23.18 cm)

Cube ..... 1.0 cu ft (0.03 cu m)

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

**Shipping and Storage Data:**

Quantity-distance class .....	1.2
Storage compatibility group.....	D
DOT shipping class.....	Class A Explosive
DOT designation.....	DETONATING FUZES, CLASS A EXPLOSIVES, HANDLE CARE- FULLY. DO NOT STORE OR LOAD WITH ANY HIGH EXPLOSIVES

## DODAC:

M767 .....	1390-N290
M767A1 .....	1390-NA15
UNO serial number .....	0409
UNO proper shipping name .....	Fuze, detonating

**Explosive Components:**

Electric stab battery primer (PA536)
Piston actuator (PA535)
Lead charge (PA534)
Electric detonator (PA537)
Booster standard comp A5 (M767)
Booster (PBXN-5) (M767A1)

**Limitations:**

If the fuze fails in the time mode or impacts before a time setting expires, there is no true PD back-up; however, the round may or may not function on ground impact.

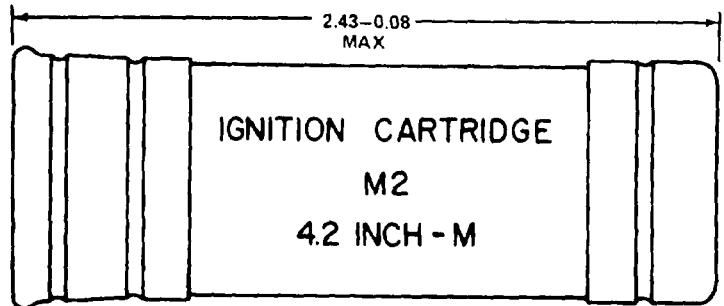
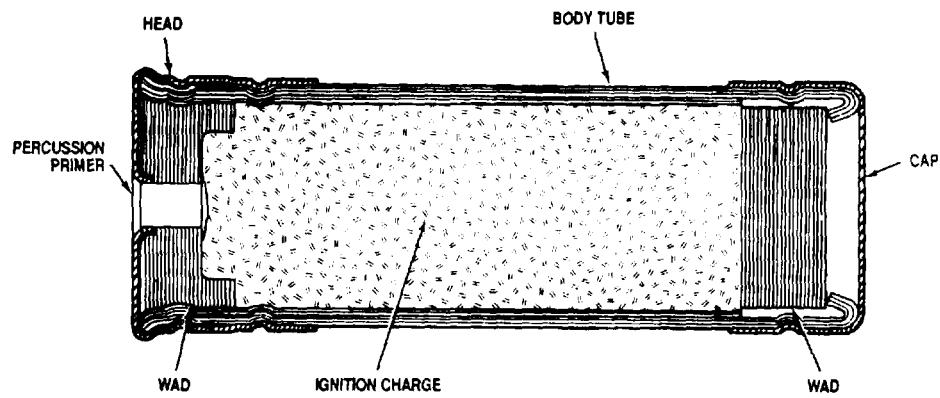
**References:**

SC 1340/98-IL
SB700-20
TM 9-1015-203-12
TM 9-1015-234-10
TM 9-1025-200-12&P
TM 9-1025-211-10
TM9-2350-311-10
TM 9-2350-304-10
TM 43-0001-28-4
TM 43-0001-28-5
TM 43-0001-28-6
TM 43-0001-28-7
TM 43-0001-28-8
TM 43-0001-28-9
TM 43-0001-28-10

## **CHAPTER 8**

### **MISCELLANEOUS**

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**CARTRIDGE, IGNITION: M2, M2A1, & M2A2**U  
AR 199470U  
AR 199469**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 M2A 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 M335A2 uses M2A2 only.

**Description:**

These cartridges are similar in external appearance to a commercial 12-gage 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 car-
	tridge

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 $\pm$ 2.5 grains
----------	--

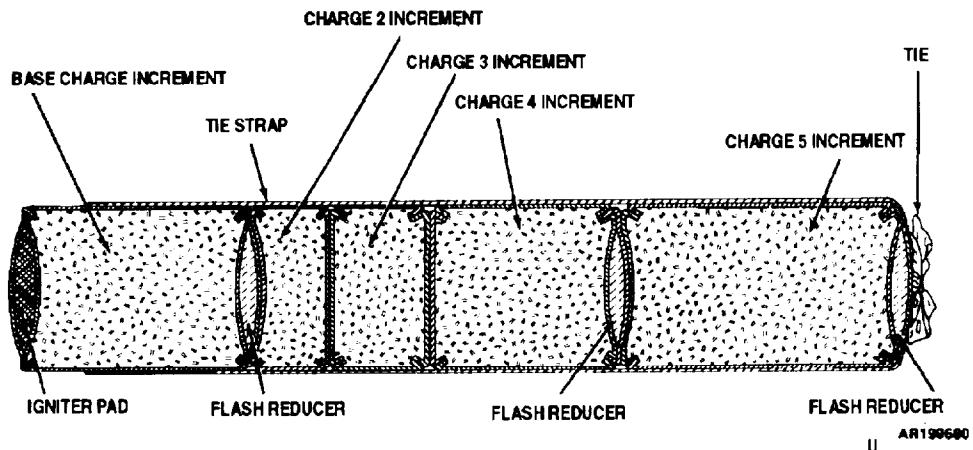
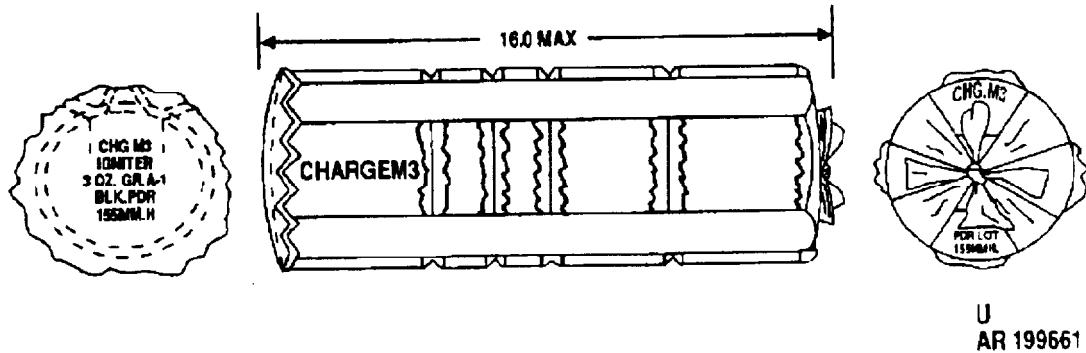
Class and div dwg. No. -----	75-19-81
M2A1, M2A2 -----	Black powder, Class 3, 170.0 $\pm$ 5 grains
Drawing No. -----	8863425- (M2A1) 9252205- (M2A2)
M2A2 -----	Black powder, Class 3, 133.0 $\pm$ 5 grains
Drawing No. -----	8882287
Primer-----	Percussion

**References:**

TM 9-1300-251-20

TM 9-1015-215-10

## CHARGE, PROPELLING, 155-MILLIMETER: M3 SERIES

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 155mm 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 hags 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 potas-

sium 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 lb
Length -----	16 in.
Color -----	Green w/black markings
Propellant -----	M1 (5.6 lb 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 hr/day)
*Packing -----	2 propelling charges in container M14
*Container:	
Weight -----	29.0 lb
Dimensions -----	33-3/4 x 6-3/8 x 6-3/8 in.
Cube -----	0.89 cu ft
Explosive per container-----	11.5 lb

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

Shipping and Storage Data:

Quantity-distance class -----	1.3
Storage compatibility group -----	C
DOT shipping class -----	B
DOT designation -----	PROPEL-LANT EXPLOSIVE SOLID CLASS B WITH CANNON PRIMERS AND IGNITERS
UNO serial number -----	0242
DODAC -----	1320-D540
Assembly Dwg. No.:	
M3A1 -----	8887277
M3 -----	8864405

Preparation For Firing:

No preparation is required other than adjusting the charge according to the firing zone.

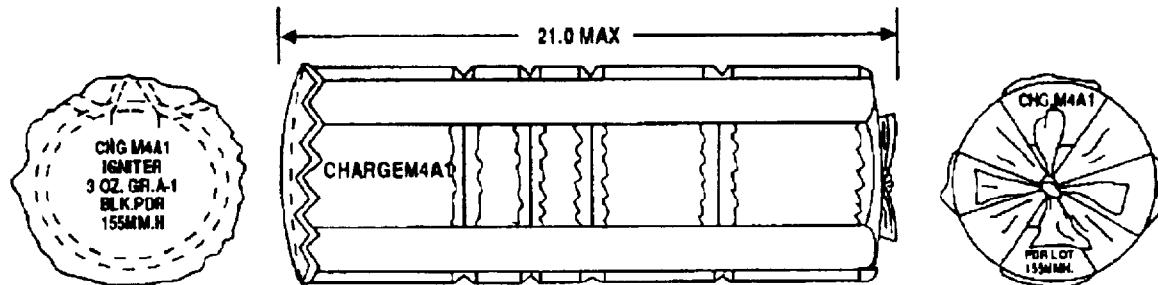
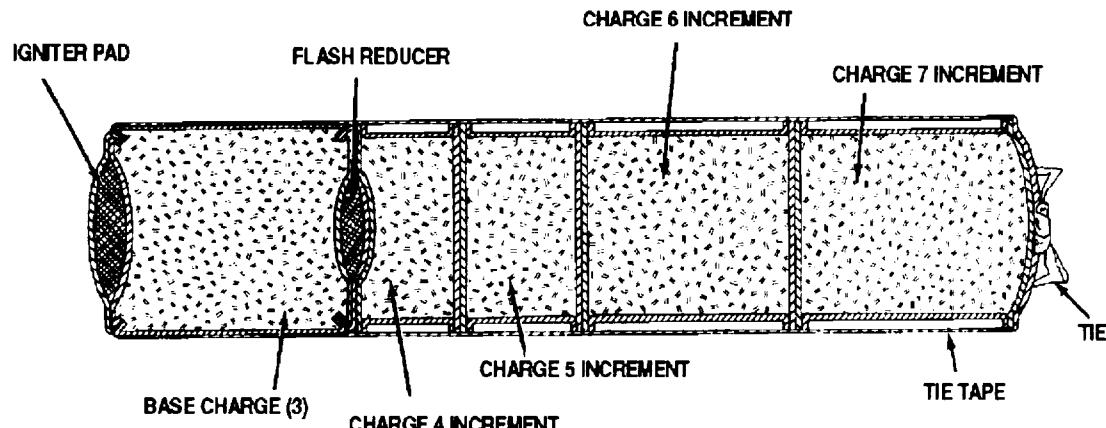
Limitations:

Increments of green bag charges may not be mixed with white bag increments.

References:

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

## CHARGE, PROPELLING, 155-MILLIMETER: M4 SERIES

U  
AR 199659U  
AR 199658Type Classification:

M4A2: Std AMCTC 4633 dtd 1966.  
 M4A1: Std AMCTC 4633 dtd 1966.

Use:

This white bag propelling charge is used in 155mm 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 lb
Length	21.0 in, max
Color	White w/black markings
Cannon used with	M1, M1A1, M45, M126, M126A1, M185, M199
Propellant M1	(13.4 lb 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	+141°F (for periods not more than 4 hr/day)
*Packing	1 charge in metal container M13

## \*Container:

Weight	30.5 lb
Dimensions	27-3/4 x 7-3/8 x 7-3/8 in
Cube	0.87 cu ft
Explosive per container	13.7 lb

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

Shipping and Storage Data:

UN0 serial number	0242
Quantity-distance class	1.3
Storage compatibility group	C
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. No.:	
M4A2	9207624
M4A1	71-9-180

Preparation For Firing:

No preparation is required except adjustment of the charge according to the firing zone intended.

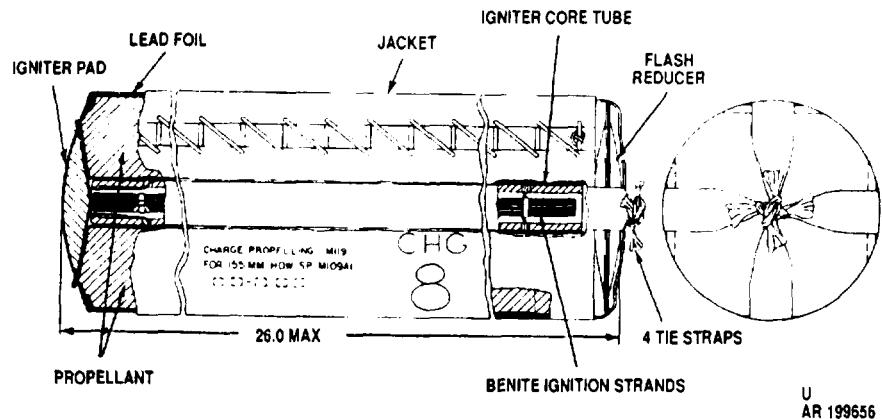
Limitations:

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:

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

## CHARGE, PROPELLING, 155-MILLIMETER: M4SERIES

**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 sulfate. 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.

**Difference 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 folded 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:**M119 (M119A1) Charge:

Type -----	White bag, separate loading
Weight -----	23 lb (10 kg)
Length -----	26 in. (66 cm)
Color -----	White w/black markings
Cannon used with -----	M185 (M109A1/A2/ A3; M199 (M198)
Propellant -----	M6, 20.5 lb (9.3 kg)
Primer -----	M82
Performance (complete round):	
Maximum range -----	(18,692 yd) (17,092m)
Muzzle velocity -----	2245 fps (684 mps)

**Temperature Limits:****Firing:**

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

**Storage:**

Lower limit ..... -65°F (-54°C)  
                   (for periods  
                   not more than  
                   3 days)  
  
 Upper limit ..... +160°F (71°C)  
                   (for periods  
                   not more than  
                   3 hr/day)

\*Packing ..... 1 propelling  
                   charge in pal-  
                   letized metal  
                   container  
                   PA37A1

**\*Propelling charge container:**

Weight ..... 70 lb (32°C)  
 Dimensions ..... 29-1/4 x 8-1/4  
                   x 8-1/4 in.  
                   (74.30 x 21.00  
                   x 21.00 cm)  
 Cube ..... 1.2 cu ft (0.03  
                   cu m)

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

**Shipping and Storage Data:**

Quantity-distance class ..... 1.3

Storage compatibility group	..... C
DOT shipping class	..... B
DOT designation	..... PROPEL- LANT 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:**

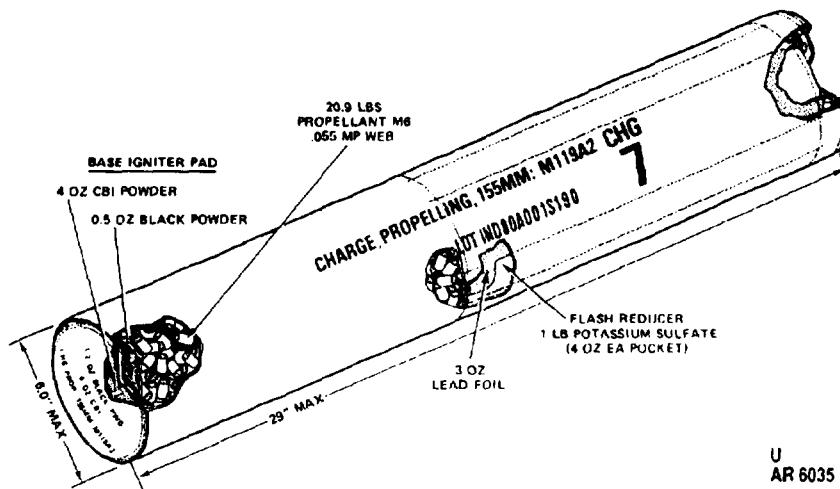
M119 not to be fired with M549/M549A1 Projectile.

Use only the M119A1 with the M549/M549A1 Projectile.

The M119 (M119A1) propelling charge must not be stored or shipped in the vertical position due to damage that could be caused to the igniter core.

**References:**

TM 9-1300-251-20  
 TM 9-2350-311-10

**CHARGE, PROPELLING 155 MM: M119A2****Type Classification:**

M119A2 STD. MSR 09806009.

**Use:**

This propelling charge is a Zone 7 red bag charge for firing in 155mm Howitzers containing M185 and M199 cannon tubes.

**Description:**

The M119A2 Propelling Charge is a single increment red bag charge which contains a base igniter pad with 4 ounces CBI powder and a center spot of 0.5 ounces of black powder. The charge is approximately 29 inches long by 6 inches in diameter and contains 20.9 pounds of M6 propellant. The forward end of the charge has a 3 ounces lead foil liner and four pockets sewn longitudinally to the circumference. Each of the four pockets contains 4 ounces of potassium sulfate to act as a flash reducer.

**Functioning:**

Upon firing the weapon, a flash from the primer ignites the CBI powder in the base igniter pad which ignites the black powder spot. The burning of the CBI and black powder spot in turn ignites the propellant. The burning propellant generates rapidly expanding gases which propel the projectile through the barrel and up to the velocity required to reach the target. The flash reducer functions to reduce blast overpressure and flash at the muzzle of the weapon. The lead foil liner serves to prevent copper build-up (coppering) in the weapon.

**Difference Between Models:**

The M119A2 is base ignited and does not contain a center igniter core and tube as in the case of the M119 (M119A1). Although this charge is a Zone 7 it can be used interchangeably with the M119, M119A1 Zone 8 charges and like these charges the M119A2 is to be used in the M185 and M199 gun tubes only. The M119A2 does not have the outer lacquered jacket that is used to wrap the M119 and M119A1 propelling charge.

**Tabulated Data:****M119A2 Charge:**

Type	Red bag, separate loading
Weight	23.5 lb (10.7 kg)
Length	29 in. (74 cm)
Color	Red w/black markings
Cannon used with	M185 (M109A1/A2/ A3) M199 (M198)
Propellant	M6, 20.9 lb (9.5 kg)
Primer	M82
Flash reducer	Potassium Sulfate, 1 lb (0.5 kg)
Igniter	CBI 4 oz (113g), black powder 0.5 oz (14.2 g)

**Temperature Limits:**

Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (+52 °C)
Storage:	
Lower limit	-65°F (-53.8°C) (for periods not more than 3 days)
Upper limit	+160°F (+71.1°C) (for periods not more than 4 hr/day)
*Packing	1 propelling charge in metal container PA37A1
*Propelling charge container:	
Weight	44 lb (20 kg)
Dimensions	32 3/4 in. long x 8 13/32 in. dia (83.19 cm x 21.35 cm)
Cube	1.3 cu ft (0.04 cu m)

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

**Shipping and Storage Data:**

Storage class/SCG	1.3 C
DOT shipping class	B
DOT designation	PROPEL- LANT EXPLOSIVES SOLID- CLASS B
DODAC	1320-D533
Assembly Dwg. No.	9333954
Container Dwg. No.	9333957

**Preparation For Firing:**

Igniter protector cap held in place by tie strap must be removed before firing. Tie strap is marked "Remove Before Firing."

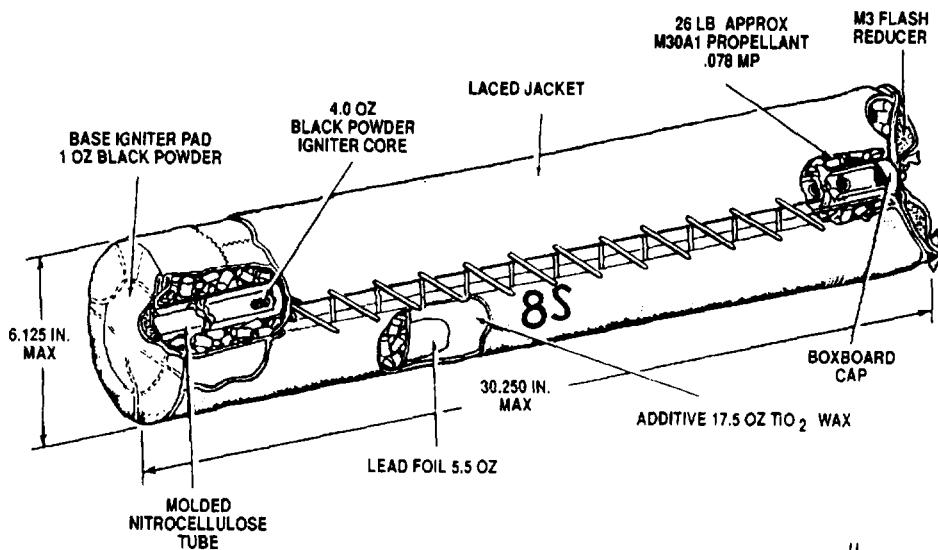
**Limitations:**

N/A.

**References:**

- TM 9-1300-251-20
- TM 9-1300-251-34
- TM 9-2350-311-10
- TM 9-1025-211-10

## CHARGE, PROPELLING, 155-MILLIMETER: M203

U  
AR 101714-B**Type Classification:**

Con MSR 06856006

**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 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 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 M19/M19A1 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 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:**

## M203 Charge:

Type	-----	Red bag, separate loading
Weight	-----	26 lb (11.8 kg)
Length	-----	(76.84 cm)
Color	-----	Red w/black markings
Cannon used with	-----	M199 (M198) system

## Propellant:

M30A1	-----	26 lb (11.8 kg)
Primer	-----	M82 (only)
Performance	-----	Zone 8 S

**Temperature Limits:**

Firing:	
Lower limit -----	-50°F (-46°C)
Upper limit -----	+125°F (+52°C)
Storage:	
Lower limit -----	-80°F (-62°C) (for periods not more than 3 days)
Upper limit -----	+160°F (+71°C) (for periods not more than 4 hr/day)
Packing -----	1 propelling charge in metal con- tainer PA68
Propelling charge containers:	
Weight -----	46 lb (21 kg)
Dimensions -----	38 x 8-13/32 x 8-13/32 in. (96.52 x 21.35 x 21.35 cm)
Cube -----	1.55 cu ft (0.04 cu m)

**Shipping and Storage Data:**

Quantity-distance class -----	1.3
Storage compatibility group -----	C
DOT shipping class -----	B
DOT designation-----	PROPEL- LANT EX- PLOSIVE SOLID CLASS B
DODAC -----	1320-D532
Assembly Dwg. No.-----	9281897 (M203)
Container Dwg. No.-----	9293303 (M203)

**Preparation For Firing:**

No preparation is required.

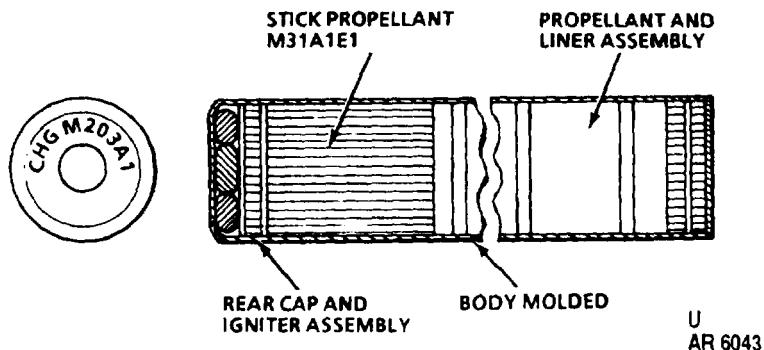
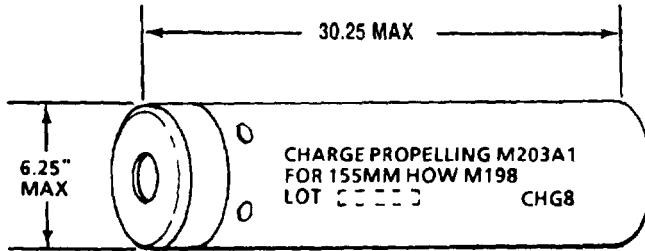
**Limitations:**

The M203 propelling charge must not be stored or shipped in the vertical position due to damage that could be caused to the igniter core.

**References:**

- TM 9-1025-211-10
- TM 9-1300-251-20

## CHARGE, PROPELLING, 155 MM: M203A1

Type Classification:

STD MSR 06856006.

Use:

The M203A1 like the M203 is a Zone 8S charge designed to supplement the standard M3, M4 series, M119, M119A1, and M119A2 charges and to provide extended range for the long-tube 155mm Howitzer M198.

Description:

The M203A1 propelling charge is a single increment base ignited charge approximately 30 $\frac{1}{4}$  inches long. The charge consists of approximately 28 pounds of M31A1E1 stick propellant and a cloth igniter base pad encased in rigid combustible cartridge case end cap. The cloth igniter base pad contains 0.7 ounces of black powder and 1.0 ounce of CBI. The combustible cartridge case consists of nitrocellulose impregnated kraft paper, a stabilizer, a resin binder, and a wear-reducing additive. A liner containing a lead foil decoppering agent and wear-reducing additive is assembled around the forward end of the propellant bundle inside the combustible case.

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 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.

Difference Between Models:

The M203A1 Propelling Charge like the M203 is a charge 8S Propelling Charge developed for extended range in long-tube (M198) 155mm howitzers. This charge consists of one increment of stick propellant and a base igniter pad encased in a full length rigid combustible cartridge case and end cap. The charge also contains a wear-reducing additive and a lead foil decoppering agent. The basic M203 charge is a red bag charge with center core ignition and granular propellant. The M203A1 charge is cooler burning which results in increased cannon tube life and a reduction in flash and blast.

**Tabulated Data:**

Type ..... Combustible case,  
separate loading  
Weight..... 31 lb  
  
 Length:..... 30-1/4 in.  
..... Neutral w/black  
markings  
Cannon used with ..... M199 (M198)  
M284 (M109A5  
and M109A6)  
  
 Propellant:  
M31A1..... 28 lb  
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 to exceed 3  
days)  
Upper limit..... +160°F (for peri-  
ods not to exceed  
4hr/day)

Packing ..... 1 propelling  
charge in metal  
container PA103

Propelling charge containers:  
Weight ..... 20 lb  
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..... 9345103  
Container Dwg. No. .... 9354642  
NSN ..... 1320-01-202-8938

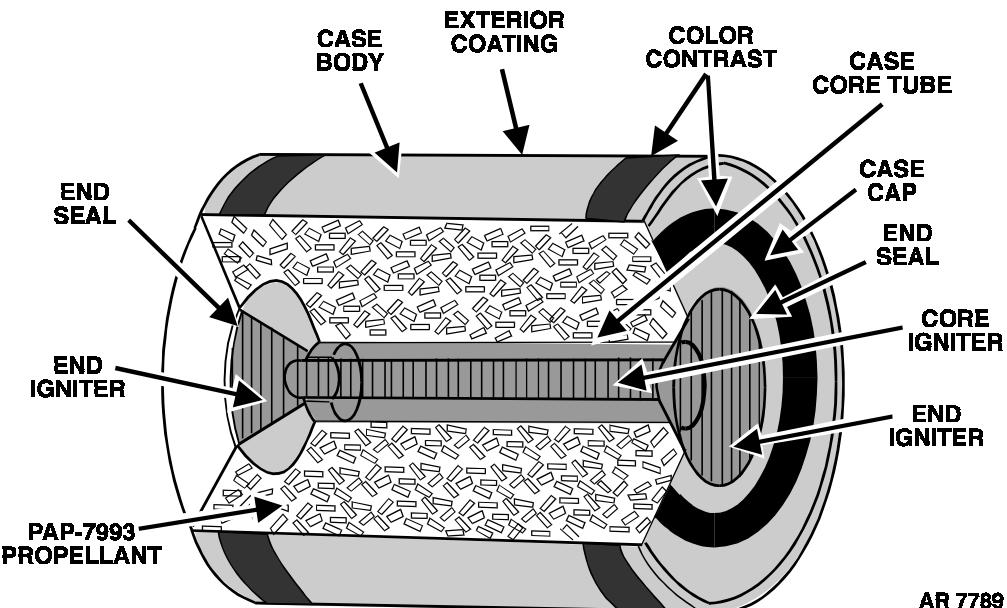
**Preparation For Firing:**

No preparation is required.

**References:**

TM 9-1025-211-10  
TM 9-1300-251-20&P

## CHARGE, PROPELLING, 155 MILLIMETER: M231 (MACS)



### Type Classification:

25 Oct 99.

### Use:

The M231 propelling charge is the Modular Artillery Charge System (MACS) low-zone charge used with 155mm field artillery cannon systems. The charge has been optimized for use in the Crusader Field Artillery System but is compatible with all 155mm 39 caliber tube length systems in the US inventory. Zoning is accomplished through the addition of increments. No more than two M231 increments may be used in a single shot.

### Description:

The M231 propelling charge is comprised of a green-colored, coated, nitrocellulose-based combustible case with black bands and black markings. Contained within the case is solid, granulated PAP-7993 propellant. A center-core ignition system containing both black and ball powders ensures rapid, controlled ignition under all temperature and pressure regimes. The end ignitor bags are sealed behind red seals. The charge is bi-directional, it can be loaded and initiated with either end forward. Two M231 increments are packaged within a green-colored extraction sleeve. Two extraction sleeves are contained within each green-colored PA161E1 ammunition can.

### Functioning:

The flash from the black powder in the percussion primer M82 or energy deposited by a suitable laser device ignites the black powder in the end igniter bag. The burning end bag then ignites the ball powder in the center core, that in turn ignites the main charge propellant, and the process repeats itself if a second increment is used. The rapidly expanding gases from the burning charge propel the projectile through the barrel of the cannon with the proper velocity to reach the target.

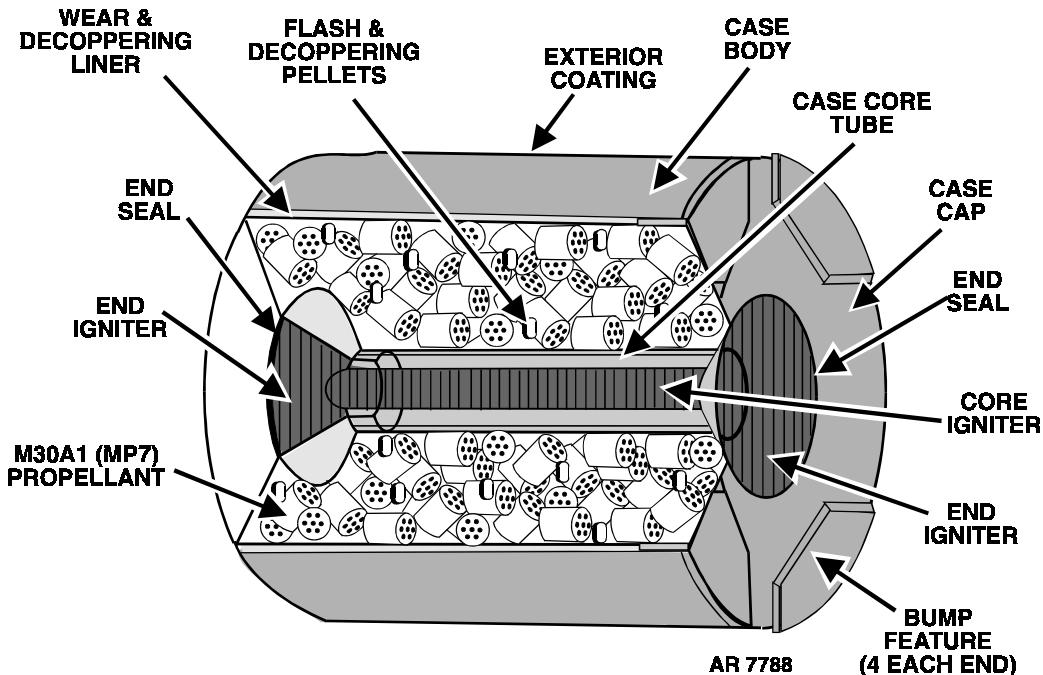
### Tabulated Data:

Propelling Charge: M231

Type -----	Combustible Case Separate Loading
Weight -----	4.25 lb approx
Length-----	6.0 in.
Color -----	Green w/black bands and black markings

Cannon used with -----	M199 (M198 System); M185 (M109A1, A2, A3 Systems); M284 (M109A4, A5, A6 Systems); XM776 (XM777 System); XM297 (XM2001 Crusader System)	Propelling charge container: PA161E1 Weight ----- 18 lb Length----- 31.38 Width----- 7.49 in. Height----- 7.49 in. Cube----- 1.02 cu ft
Propellant: PAP-7993-----	3.5 lb	Quantity-distance class ----- 1.3 Storage compatibility group ----- C DOT shipping class ----- B DOT designation ----- Propellant Explosive Solid - Class B
Ignitor: Primer-----	M82 or Laser Ignition System	DODAC ----- 1320-DA12 UNO ----- 0242 Assembly Dwg No. ----- 12972389
Performance-----	Charges 1 and 2 only	Container Dwg No. ----- 12972583
<b><u>Temperature Limits:</u></b>		
Firing: Lower limit-----	-51°F (-46°C)	<b><u>Limitations:</u></b>
Upper limit -----	+120°F (+49°C)	Do not load or fire more than two M231 charges per shot.
Storage: Lower limit-----	-60°F (-51°C)	Do not load or fire M231 charges in combination with M232 charges.
Upper limit -----	+145°F (+63°C)	<b><u>References:</u></b>
<b><u>Packaging:</u></b>		
Two M231 increments per plastic extraction sleeve. Two plastic extraction sleeves per PA161E1 metal ammunition can.		
TM 9-1025-211-10 TM 9-1300-251-20&P TM 9-1300-251-34&P TM 9-2350-311-10 TM 9-2350-314-10		

## CHARGE, PROPELLING, 155 MILLIMETER: M232 (MACS).

Type Classification:

08 Aug 01.

Use:

The M232 propelling charge is the Modular Artillery Charge System (MACS) high-zone charge used with 155mm field artillery cannon systems. The charge has been optimized for use in the Crusader Field Artillery System but is compatible with all 155mm 39 caliber tube length systems in the US inventory. Zoning is accomplished through the addition of increments. No less than three or more than five M232 increments may be used in a single shot in a 39 caliber length tube.

Description:

The M232 propelling charge is comprised of a tan-colored, coated, nitrocellulose-based combustible case with black markings. Each end has four raised 1/8-inch bumps. Contained within the case is solid, granulated M30A1 propellant. A center-core ignition system containing both black and ball powders ensures rapid, controlled ignition under all temperature and pressure regimes. Additives are also included to reduce coppering, tube-wear, flash, and blast-overpressure. The end ignitor bags are sealed behind red seals. The charge is bi-

directional, it can be loaded and initiated with either end forward. Five M232 increments are packaged within a tan-colored extraction sleeve. There is one extraction sleeve per tan-colored PA103E2 ammunition can.

Functioning:

The flash from the black powder in the percussion primer M82 or energy deposited by a suitable laser device ignites the black powder in the end igniter bag. The burning end bag then ignites the ball powder in the center core, that in turn ignites the main charge propellant, and the process repeats itself for subsequent increments. The rapidly expanding gases from the burning charge propel the projectile through the barrel of the cannon with the proper velocity to reach the target.

Tabulated Data:

Propelling Charge: M232

Type -----	Combustible Case Separate Loading
Weight -----	5.85 lb
Length-----	6.14 in.
Color -----	Tan w/black markings

Cannon used with -----	M199 (M198 System); M185 (M109A1, A2, A3 Systems); M284 (M109A4, A5, A6 Systems); XM776 (XM777 System); XM297 (XM2001 Crusader System)	Propelling charge container: PA103E2 Weight ----- 21 lb Length----- 37.99 Width----- 7.49 in. Height----- 7.49 in. Cube----- 1.23 cu ft
Propellant: M30A1-----	4.95 lb	
Ignitor: Primer-----	M82 or Laser Ignition System	
Performance-----	Charges 3, 4 and 5 in the 39 cal. tube length cannon. Charges 3, 4, 5 and 6 in the 56 cal. tube length cannon	
<b><u>Temperature Limits:</u></b>		
Firing: Lower limit-----	-51°F (-46°C)	
Upper limit -----	+120°F (+49°C)	
Storage: Lower limit-----	-60°F (-51°C)	
Upper limit -----	+145°F (-63°C)	
<b><u>Packaging:</u></b>		
Five M232 increments per plastic extraction sleeve. One plastic extraction sleeves per PA103E2 metal ammunition can.		

**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-DA13
UNO -----	0242
Assembly Dwg No. -----	12972405
Container Dwg No. -----	12961080

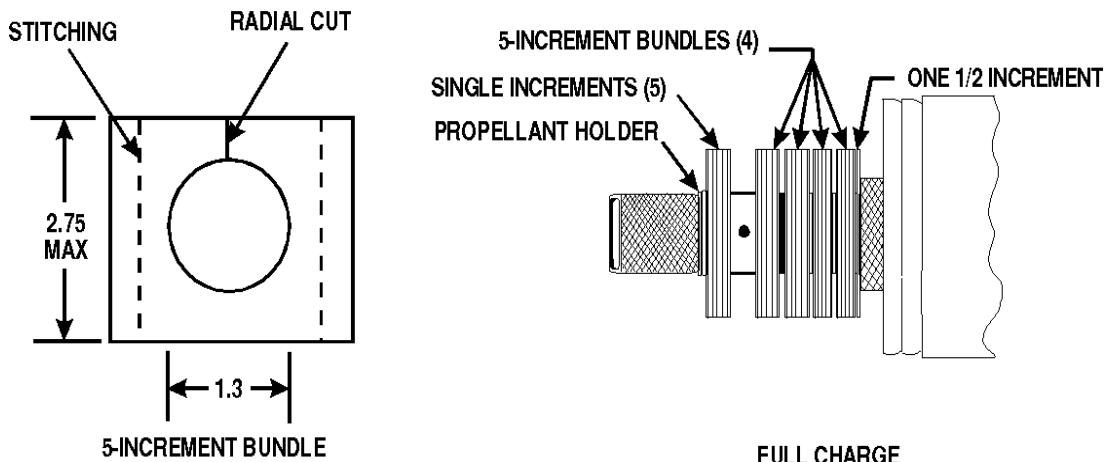
**Limitations:**

- Do not load or fire less than three M232 charges per shot.
- Do not load or fire more than five M232 charges in a 39 caliber tube length cannon.
- Do not load or fire more than six M232 charges in a 56 caliber tube length cannon.
- Do not load or fire M231 charges in combination with M232 charges.

**References:**

- TM 9-1025-211-10
- TM 9-1300-251-20&P
- TM 9-1300-251-34&P
- TM 9-2350-311-10
- TM 9-2350-314-10

## CHARGE, PROPELLING, 4.2-INCH: M6



U  
AR 199462

### TYPE CLASSIFICATION:

TBD.

### 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:

Model .....	M6
Type propellant .....	M8
Weight (full charge) .....	0.43 lb
Used with ignition cartridge .....	M2

### DRAWINGS:

M6 ..... 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 to 25-1/2 increments .....	+60°F (+15.6°C)
20 to 22-1/2 increments .....	+20°F (+28.9°C)
17 to 19-1/2 increments .....	0°F (-17.6°C)
5 to 16-1/2 increments .....	-40°F (-40°C)

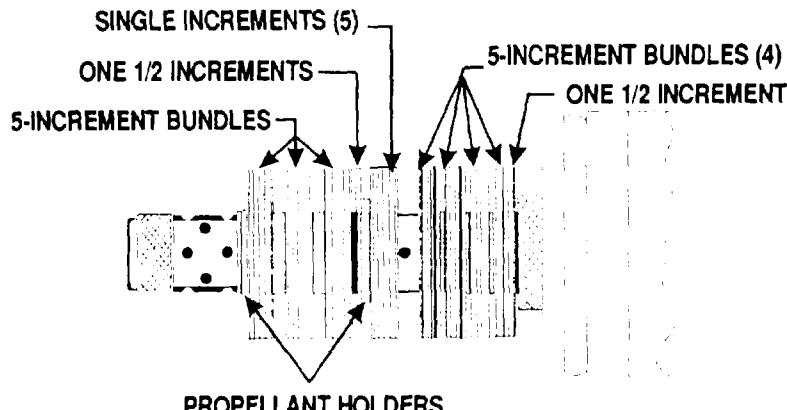
When using Cartridges M2, M2A1, M3, M3A1, M328, M329B1 and M335 assembled without cartridge container extensions.

### REFERENCES:

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

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## CHARGE, PROPELLING, 4.2-INCH: M36



U  
AR 199460

**Type Classification:****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

**Limitations:**

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.

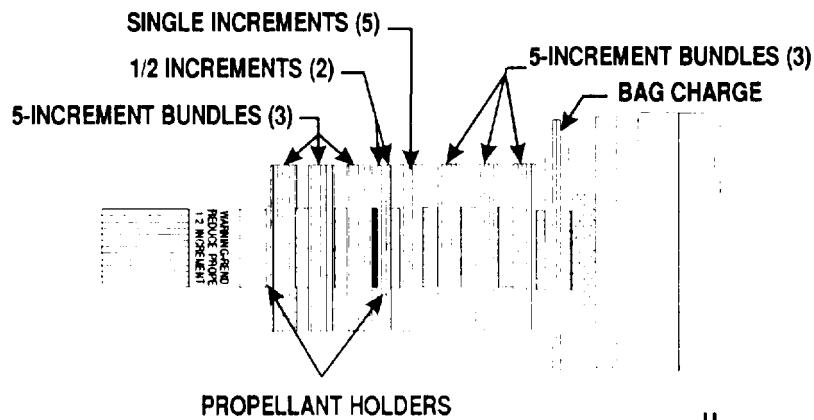
23-25-1/2 increments -----	+60°F
20-22-1/2 increments -----	+20°F
17-19-1/2 increments -----	0°F
5-16-1/2 increments -----	-40°F

Failure to observe these limitations may result in excessive pressure causing damage to materiel and injury to personnel.

**References:**

TM 9-1015-215-10  
TM 9-1300-251-20  
TM 9-1320-241-12

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**CHARGE, PROPELLING, 4.2-INCH: M36A1**U  
AR 199458**Type Classification:****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:**

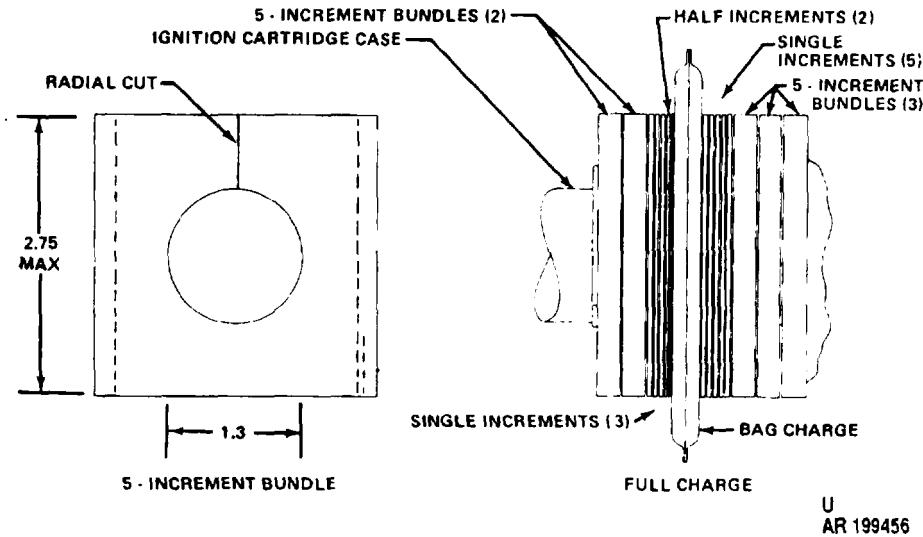
The bag charge of M9 propellant will not be removed at any time. When firing at a charge below 25-1/2 increments, remove the cartridge container extension. The ignition cartridge does not require repositioning.

**References:**

- TM 9-1015-215-10
- TM 9-1300-251-20
- TM 9-1320-241-12

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## CHARGE, PROPELLING, 4.2-INCH: M36A2

Type Classification: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.

Tabulated Data:

Type propellant .....	M8 and M9
Weight (full charge) .....	0.60 lb
Used with cartridge .....	M2A2
Drawing number .....	9244177

Limitations:

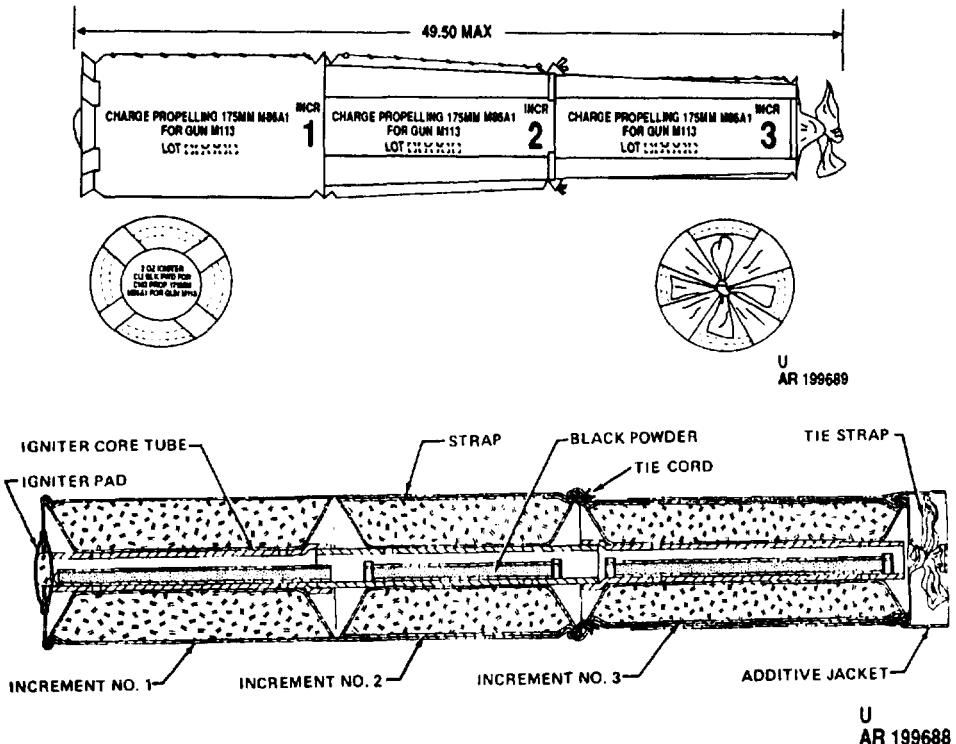
The bag charge of M9 propellant will not be removed at any time.

References:

- TM 9-1015-215-10
- TM 9-1300-251-20
- TM 9-1320-241-12

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## CHARGE PROPELLING, 175-MILLIMETER: M86 SERIES

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 2. 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 these 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 flush 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 No. 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 unbended 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 No. 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 lb
Length -----	49.5 in. (max.)
Diameter -----	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 lb
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 hr/day)

#### \*Packing:

(Propelling Charge) -----	1 charge with additive jacket in plastic barrier bag or metal container; 16 metal containers per pallet
Container -----	M460
Weight -----	96.0 lb
Dimensions -----	9-13/16 in. Dia. x 55 in.
Cube -----	3.1 cu ft

#### \*Pallet:

Weight -----	2020 lb
Dimensions -----	40 x 55 x 45-1/2 in.
Cube -----	57.9 cu ft

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

### Shipping and Storage Data:

Quantity-distance class -----	2
Storage compatibility -----	J
DOT shipping class -----	B

DOT designation -----	PROPEL-	Weight -----	80 lb
	LANT EX-	Dimensions -----	23-3/8 x 15-
	PLOSIVES		3/16 x 15-9/32
	SOLID		in.
	CLASS B	Cube -----	2.72 cu ft
DODAC -----	1320-D361		
Drawing No.-----	M86 - 8837005		
	M86A1		
	M86A2-		
	8837905		
*Packing: (M5 Flash Reducer) -----	10 per carton; 1 carton per barrier bag; 4 barrier bags per wooden box		
Weight -----	66 lb		
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: (M1 Additive Jacket)-----	10 per carton; 1 carton per barrier bag; 4 barrier bags per wooden box

**Shipping and Storage Data:**

Quantity-distance class -----	N/A
Storage compatibility -----	N/A
DOT shipping class -----	N/A
DOT designation -----	AMMUNI- TION NONEXPLO- SIVE
DODAC -----	1320-D110
Drawing number -----	9207962

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

**Limitations:**

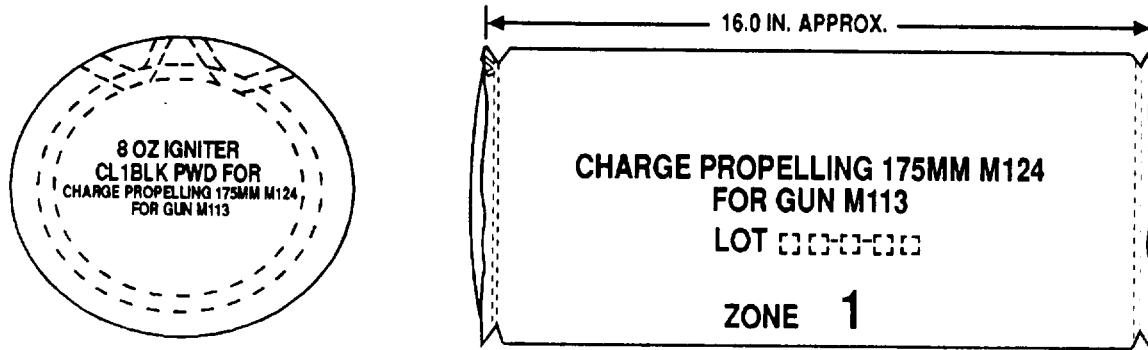
Zone 3 firing of Charges M86 and M86A1 is restricted to combat use only. The restriction does not apply to M86A2. In addition, all M86 and M86A1 charges require a special inspection of the central ignition core prior to firing. M86A2 charges suspected of rough handling must also undergo this inspection.

**References:**

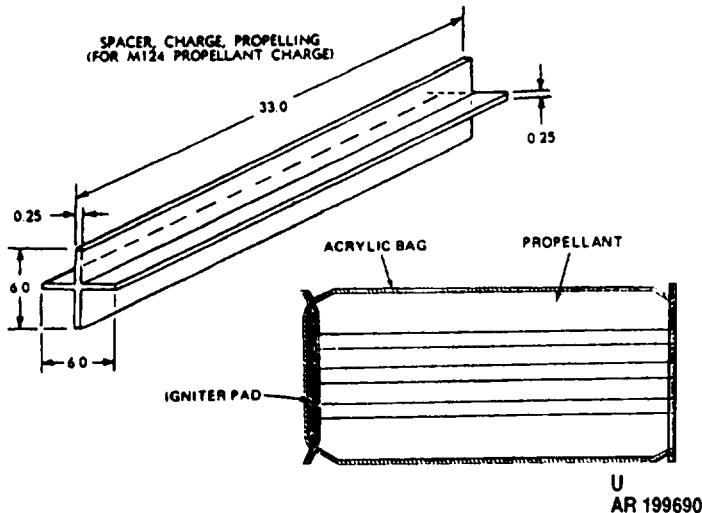
- AMC-P 700-3-3
- SB 700-20
- TM 9-1300-251-20
- TM 9-1300-251-34
- TM 9-2300-216-10

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## CHARGE, PROPELLING, 175-MILLIMETER: M124



U  
AR 199706

**Type Classification:**

Standard AMCTC 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 to prevent fallback of the projectile on top of the propelling charge.)

#### Tabulated Data:

##### Charge, Propelling M124:

Type -----	Green bag
Weight -----	17.5 lb
Length -----	16 in.
<b>Propellant:</b>	
Composition -----	M6
Grain type -----	7 perforated; L/O = 2.35
Weight -----	17 lb
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 con- tainer
<b>*Packing Box:</b>	
Weight -----	95 lb
Dimensions -----	55-3/8 x 10- 15/32 x 10- 15/32
Cube -----	3.5 cu ft

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

##### Shipping and Storage Data:

Quantity-distance class -----	
Storage compatibility group -----	
DOT shipping class -----	

DOT designation -----	PROPEL- LANT 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 wirebound box
<b>Packing Box:</b>	
Weight -----	111 lb
Dimensions -----	32-7/8 x 24-3/4 x 35-3/8 in.
Cube -----	16.2 cu ft

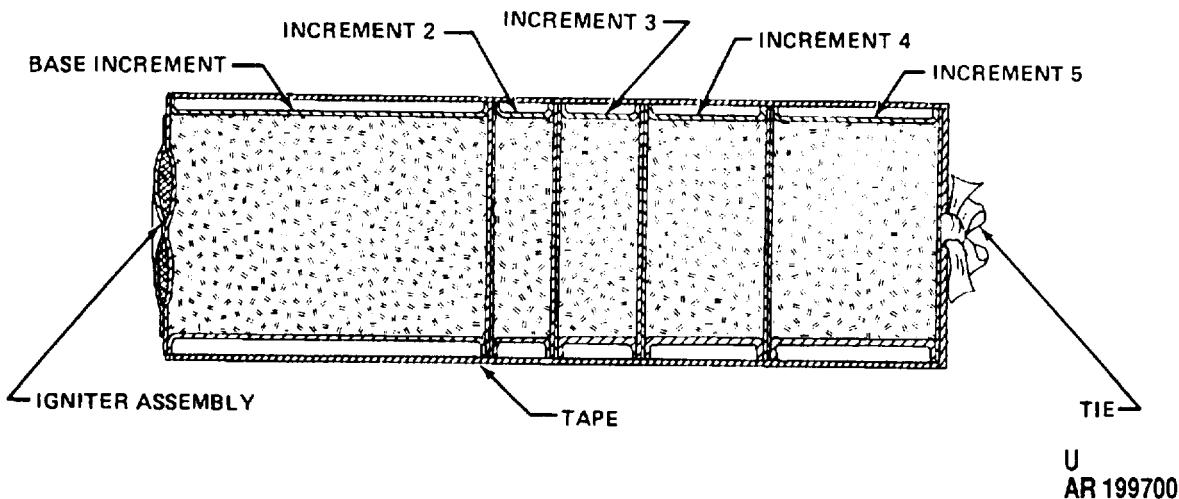
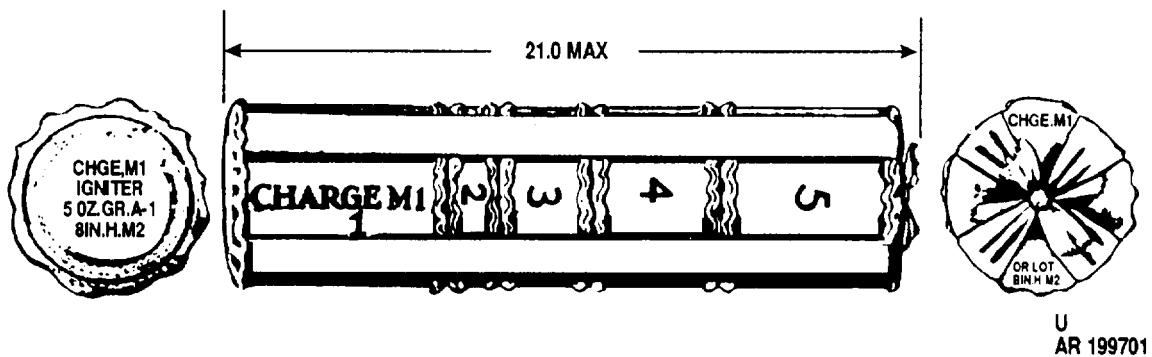
#### Shipping and Storage Data:

Quantity-distance class -----	Not applicable
Storage compatibility group -----	Not applicable
DOT shipping class -----	Not applicable
DOT shipping class -----	Not applicable
DODAC -----	Not applicable

#### References:

SB 700-20
TM 9-1300-206
TM 9-1300-251-20
TM 9-1300-251-34
TM 9-2300-216-10

## CHARGE, PROPELLING, 8-INCH: M1

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 tied over the top of Increment 5. A red igniter pad containing 5 ounces of black powder is sewn 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 M1 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 propell- ing charge
Weight -----	15.0 lb
Length -----	21.0 in. (max)
Diameter -----	6.50 in. (max)
Color -----	Green w/black marking
Propellant:	
Composition -----	M1
Grain type -----	1 perforated
L/D = 4.6	
Weight -----	13.6 lb
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 hr/day)

\*Packing ----- 1 charge in  
metal con-  
tainer; 50  
metal contain-  
ers per pallet  
Container ----- M18A2

Weight ----- 34 lb  
Dimensions ----- 8-13/32 dia. x  
26-9/32 in.

Cube ----- 1.1 cu ft  
Pallet:  
Weight ----- 1650 lb

Dimensions ----- 44 x 52 x 50  
in.  
Cube ----- 67.2 cu ft

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

#### **Shipping and Storage:**

Quantity-distance class -----	2
Storage compatibility group -----	J
DOT shipping class -----	B
DOT designation -----	PROPEL- LANT EXPLOSIVES SOLID CLASS B
DODAC -----	1320-D675

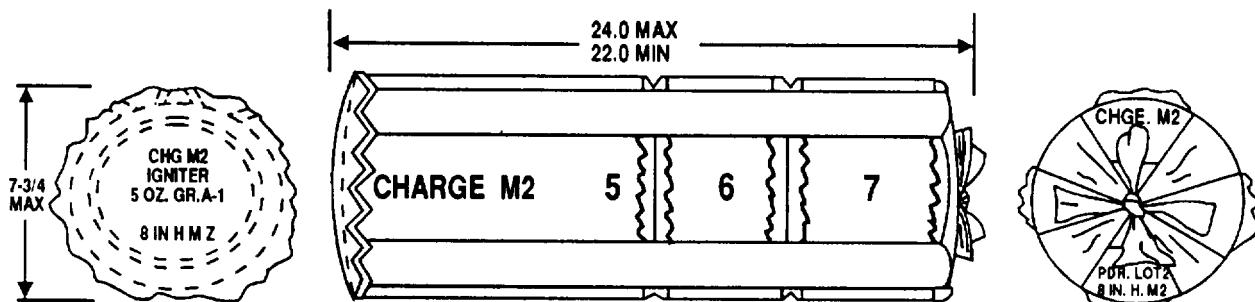
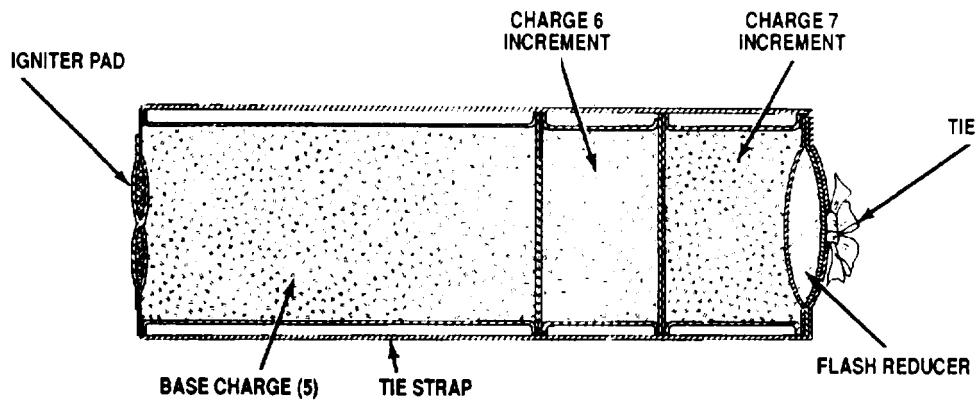
#### **Limitations:**

N/A.

#### **References:**

AMC-P 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

## CHARGE, PROPELLING, 8-INCH: M2

U  
AR 199699U  
AR 199698Type 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 M1 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 to 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 load- ing propelling charge
Weight -----	30 lb
Length -----	24.0 in. (max)
Diameter -----	7-3/4 in. (max)
Color -----	White w/black markings
Propellant:	
Composition -----	M1
Grain Type -----	7 perforated cylinder
Weight -----	28.5 lb
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 & 3	(M110)
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 hr/day)
*Packing -----	1 charge in metal con- tainer; 32 metal contain- ers per pallet
*Container -----	M19A2
Weight -----	54 lb
Dimensions -----	9-13/16 in. dia x 29-9/32 in.
Cube -----	1.6 cu ft
Pallet:	
Weight -----	1732 lb
Dimensions -----	44 x 58-1/2 x 47 in.

Cube ----- 64 cu ft

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

**Shipping and Storage Data:**

Propellant:	
Quantity-distance class -----	2
Storage compatibility group --	J
DOT shipping class -----	B
DOT designation -----	PROPEL- LANT EXPLOSIVE SOLID CLASS B
DODAC -----	1320-C676
Packing, M3 Flash Reducer---	10 per carton; 1 carton per barrier bag; 4 barrier bags per wooden box
Weight -----	80 lb
Dimensions -----	17-1/8 x 14-3/8 x 9-1/2 in.
Cube -----	1.35 cu ft

**Black powder:**

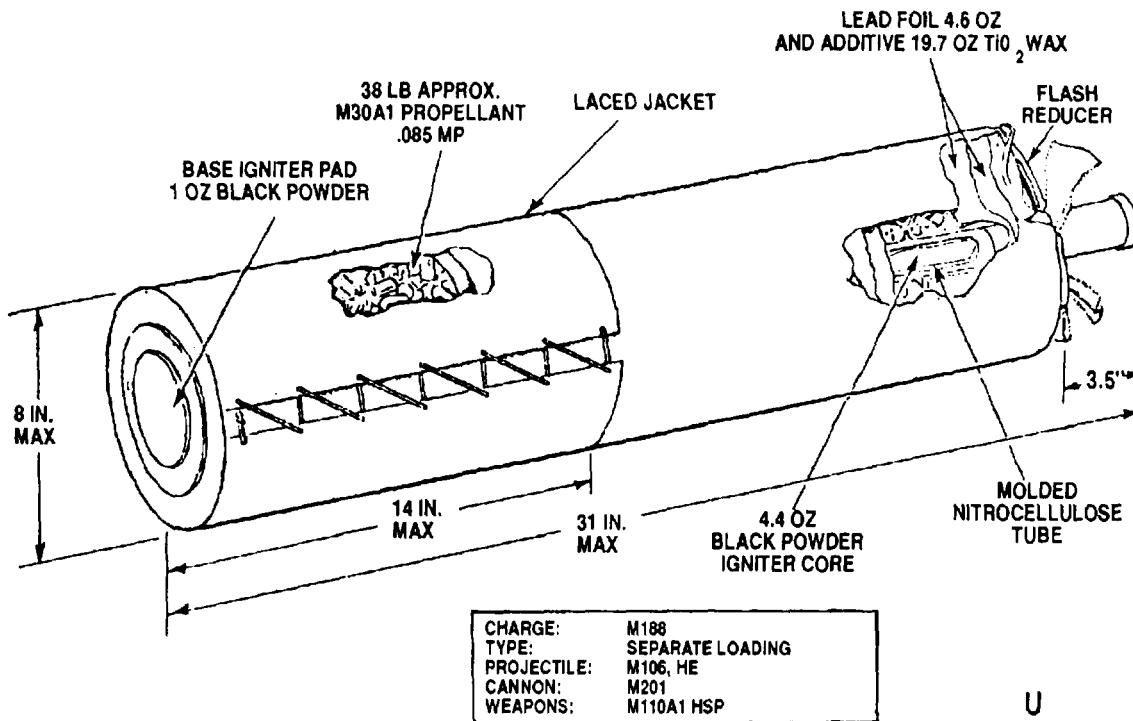
Quantity-distance class -----	7
Storage compatibility group --	0
DOT shipping class -----	A
DOT designation -----	BLACK POWDER
DODAC -----	1320-D676
Drawing number -----	8861374

**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:**

- SB 700-20
- AMC-P 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

**CHARGE, PROPELLING, 8-INCH: M188**U  
AR 100882-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 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:**

## M188 Charge:

Type -----	Separate loaded Propelling charge, white bag
Weight -----	40 lb (18 kg)
Length -----	31.0 in. (79 cm)
Color -----	White w/black markings
Primer used -----	M82
Cannon used with -----	8-inch SP Howitzer M110A1

Assembly Dwg. No, -----	9277173
Propellant:	
Grain type -----	7perforated cylinder, L/D=2.35
Composition -----	M30Al
Weight -----	38 lb (17 kg)
Web -----	0.085 in. (0.216 cm)
Igniter:	
Baaepad -----	1 oz (28 g) Black Powder
Central core -----	4.4 oz (124.7 g) black pow- der

**Temperature Limits:**

Firing:	
Lower limit -----	-40°F (-40°C)
Upper limit -----	+125°F (+52°C)
Storage:	
Lower limit -----	-80°F (-62°C) (for periods not more than 3 days)
Upper llmit -----	+160°F (71°C) (for periods not more than 4 hr/day)
*Packing -----	1 propelling chargein metal container
*Container:	
Weight -----	75 lb (34 kg)

Dimensions -----	291/4 in. x 10 15/32 in. (74.29 cm x 26.59 cm) dia
Cube -----	2.4 cu ft (0.07 cum)

NOTE: See DOD Consolidated Ammunition Catalog for complete packging data including NSN'S.

**Shipping and Storage Data:**

Quantity-distance class -----	2
Storage compatibility group ---	J
DOT shipping class -----	B
DOTdesignation -----	PROPEL- LANT EXPLOSIVES CLASSB SOLID
DODAC -----	1320-D661

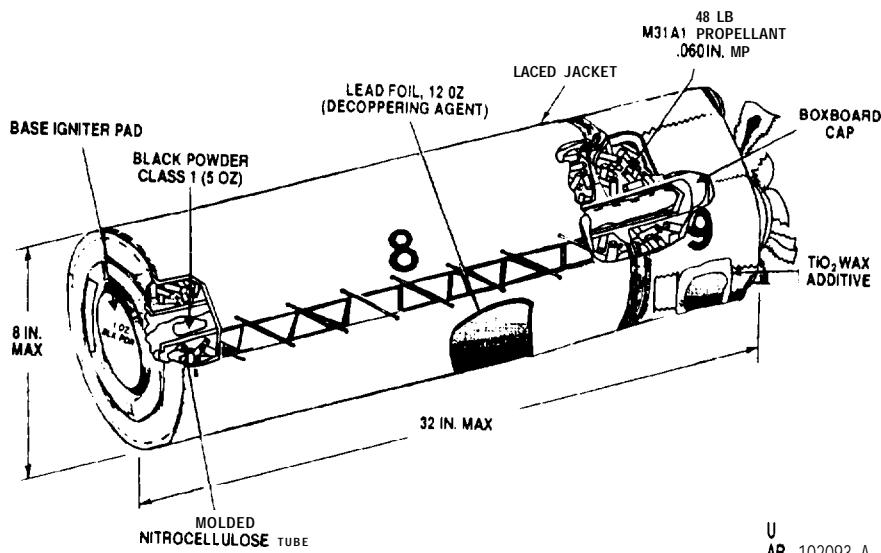
**Limitations:**

The M188 propelling charge cannot be stored or shipped in the vertical position, due to damage that could be caused to the igniter core.

**References:**

SB 700-20  
AMC-P 700-3-3  
TM 9-1300-206  
TM 9-1300-251-20  
TM 9-1300-251-34  
TM 9-2300-216-10

## CHARGE, PROPELLING, 8-INCH: M188A1

U  
AR 102093.A**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: M1 10A2 Self-Propelled Howitzer.

**Description:**

The M188A1 is a two increment (zones 8 and 9) white-bag charge, 32 inches long by 8 inches in diameter. The charge weighs 50 pounds and contains 48 pounds of high-energy propellant M31A1. A base igniter pad, containing 1 ounce of black powder, is attached to the base of the charge by a 360 degree 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 inches in diameter, containing a 5 ounce bag of class 1 black powder which is sewn to the igniter pad at the base of the charge.

An additive to reduce gun tube wear lines the increment 9 charge bag. This liner consists of cloth which is impregnated with a composition of titanium dioxide and paraffin wax. The increment 8 charge bag is lined with lead foil for decoppering. A 26-inch long lacing jacket is positioned around 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

[inter] apping 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.

During storage the cloth bag develops a yellow discoloration. This condition is not classified as a defect and all such charges are considered safe to fire.

**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:	Separate loaded
Type	Propelling charge, white bag
Model	M188A1
Weight	50 lb (22.7 kg)
Length	32.0 in. (81.3 cm)
Color	White w/black markings

<b>Propellant:</b>			
Composition -----	M31A1 (48.0 lb) (21.7 kg)		pallet
Green type Multi-perf web-----	0.060 in. (0.153 cm)		
<b>Weight:</b>			
Increment 8 -----	42 lb (19.05 kg)		
Increment 9-----	6 lb (2.27 kg)		
<b>Igniter:</b>			
Base Pad -----	1 oz BP (28 g)		
Center Core -----	5 oz BP (141.7 g)		
Weight of Liner -----	4 oz (113.4 g)		
Primer -----	M82		
Cannon 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 <sup>2</sup> )		
Chamber pressure -----	(Zone 9) 39,600 psi (27,842,760 kg/m <sup>2</sup> )		
<b>Shipping and Storage Data:</b>			
Storage class/SCG -----	1.3 C		
DOT shipping class -----	B		
DOT designation -----	PROPEL- LANT EXPLOSIVES CLASS B SOLID		
DODAC -----	1320-D662		
Drawing No. (M188A1) -----	11829092		

**Temperature Limits:**

<b>Firing:</b>			
Lower limit -----	-50°F (-45.5°C)		
Upper limit -----	+145°F (+63°C)		
<b>Storage:</b>			
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 con- tainer; 20 con- tainers per		

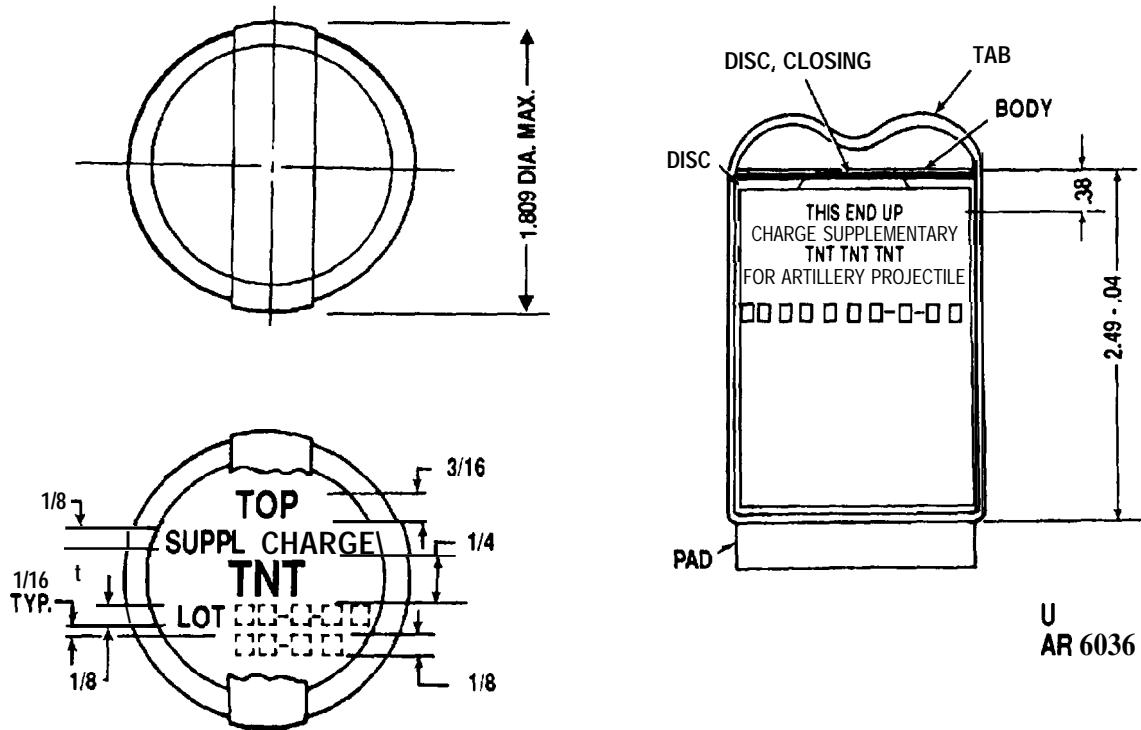
**Limitations:**

The M188A1 propelling charge cannot be stored or shipped in the vertical position.

**NOTE**

Yellow discoloration of charge bags is not a defect as all M188A1 charges containing stabilizer 2NDPA will discolor. The amount of stabilizer leaching to discolor the cloth is not an indication of stabilizer unserviceability, as the amount needed to discolor the cloth is insignificant with respect to loss of stabilizer content.

## SUPPLEMENTARY CHARGES

**Type Classification:**

Std.

**Use:**

The purpose of a supplementary charge is to aid in the detonation of the explosive filler upon activation of the fuze.

**Description:**

Supplementary charges are placed in the fuze well of all HE deep cavity howitzer rounds from 75mm to 8-Inch; in the 175mm Field Gun and in the 4.2 inch mortar projectiles. They are removed from the deep cavity when proximity fuzes with the extra large (long) booster or expelling charge, i.e., the M513, M514 Series and M728 but not the M732 or other proximity fuzes with the normal size booster. Supplementary charges are composed of approxi-

mately .30 lb of TNT pellets packed into an aluminum body cup. Supplementary charges are factory loaded into the HE rounds.

**Function:**

When the fuze mechanism detonates the booster charge this activates the supplementary charges which aids in the detonations of the explosive charge of the round.

**Tabulated Data:**

Weight -----	0.30 lb approx
Length -----	2.49-0.04 in.
Width -----	1.809 in.
Filler -----	TNT, 0.30 lb approx
Body -----	Aluminum cup

**Temperature Limits:**

Firing:

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

Storage:

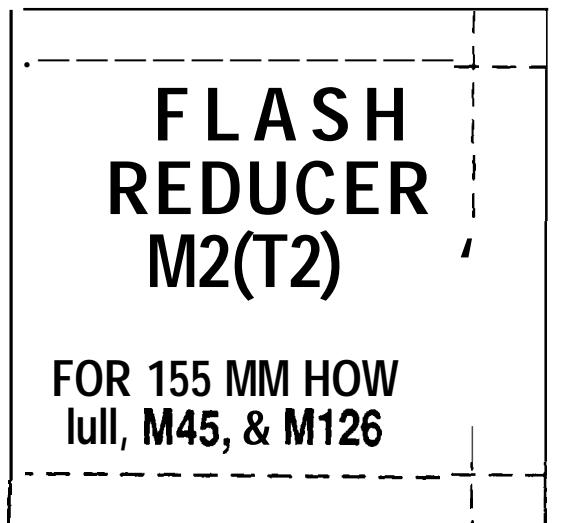
Lower limit ----- -65°F (-53.8°C)  
                                 (for period not  
                                 more than 3  
                                 days)  
Upper limit ----- +160°F  
                                 (+71.1°C) (for .  
                                 period not  
                                 more than 4  
                                 hr/day)

**Packing:**

144/Barrier bag  
1 Barrier bag/wood box  
Drawing No. ----- 8797090  
National Stock No. ----- NSN 1370-00-  
                                 824-0811

**References:**

TM 9-1300-251-20  
TM 9-1300-251-34  
TM 9-1300-206  
TM 9-2350-304-10

**FLASH REDUCER M2 (T2)**U  
AR 199645-A**Type Classification:**

STD OTCM 31154 dtd 1946,

**Use:**

Flash Reducer M2 (T2) is used with White Bag Propelling Charges M4 and M4A1 in 155mm 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) maybe 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 burns in combination with the propelling charge, the chemical reaction causes 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 ('1'2) is used.

**Tabulated Data:**

Weight -----	0.06 lb
Dimensions -----	4 x 4 in.
Cannon (Weapons) used with ---	M1, M1A1 (M114, M114A1); M45 (M44, M44A1); M126, 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 hr/day)  
 \*Packing ----- 200 flash reducers in metal container 4 container in wooden box

\*Packing Box:  
 Weight ----- 68.21b  
 Dimensions ----- 26-7/16 x 13 x 11-15/16 in.

Cube ----- 2.37 cu ft

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

**Shipping and Storage Data:**

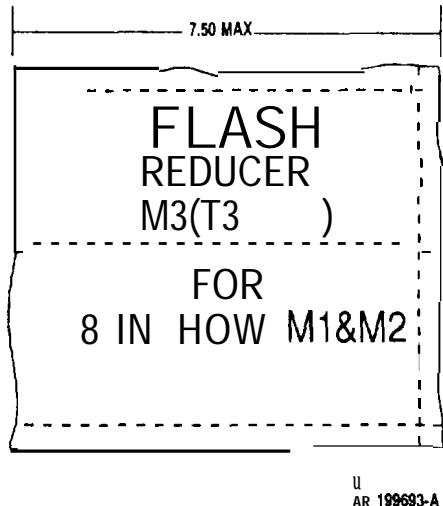
Quantity-distance class ----- 7  
 Storage compatibility group --- 0  
 DOT shipping class ----- A  
 DOT designation ----- BLACK POWDER  
 DODAC ----- 1320-D552  
 Assembly Dwg. No. ----- 9229177

**Prepmation for Firing:**

None

**References:**

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

**REDUCER, FLASH: M3 (T3)****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 daylight 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 (M115), M2A1E1 (M115)
Charges used with -----	8-inch Charge Propelling: M2
Assembly Dwg. No. -----	8881015

**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 hr/day)
*Packing -----	10 flash reducers in carton; 1 carton in barrier bag; 4 bags in wooden box

**\*Packing Box:**

Weight -----	80 lb
Dimensions -----	17-1/8 x 14-3/8 x 9-1/2 in.
Cube -----	1.35 cu ft

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

#### **Shipping and Storage Data:**

Quantity-distance class -----	7
Storage compatibility group -----	0
DOT shipping class -----	A
DOT designation -----	BLACK POWDER
DODAC -----	1320-D681

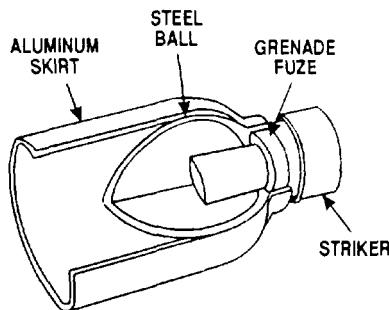
#### **Limitations:**

None.

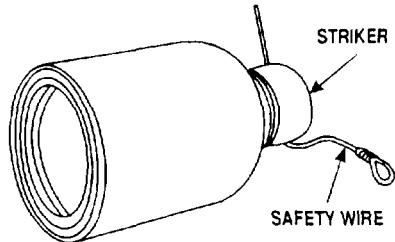
#### **References:**

TM 9-1300-251-20  
TM 9-2300-216-10

## GRENADE: GENERAL PURPOSE, M35



CUTAWAY VIEW WITH  
RIBBONS REMOVED (ARMED)  
STRIKER PLATE EXTENDED



GRENADE WITH RIBBONS FURLED  
AND SAFETY WIRE IN PLACE (UNARMED)

U  
AR 101392

#### Type Classification:

#### Use:

To provide improved antipersonnel capability when loaded in 105mm cartridge, M413.

#### Description:

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 Composition B.

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 ribbon streamers.

The fragmenting portion of the grenade body consists of a steel sphere filled with Composition 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.

#### Classification:

Standard B.

#### Tabulated Data:

Explosive	-----	28 grams
		Comp B
Length	-----	2.46 in.
Diameter	-----	1.48 in.

#### Functioning:

When each grenade M35 is expelled from the projectile body, the grenade fuze pulls free of the safety wire which is attached to the spacer plate.

This starts a mechanical action within the grenade fuze which aligns the explosive train.

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.

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.

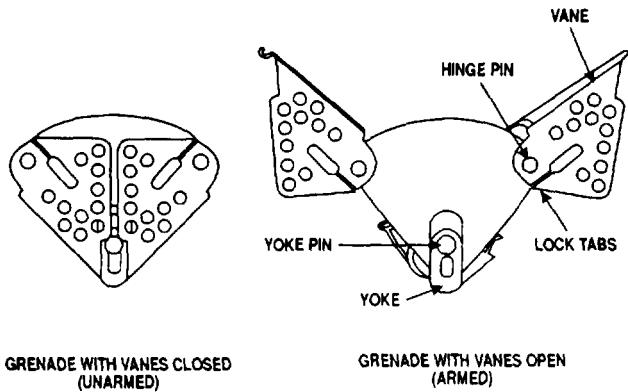
#### Drawing:

Grenade - XP94930

#### Reference:

TM 9-1300-251-20

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**GRENADE: GENERAL PURPOSE, M36**U  
AR 101393**Type Classification:****Use:**

To provide improved antipersonnel capability when loaded into 105mm cartridge M444E1 and 107mm cartridge M453.

**Description:**

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 Composition A5.

**Classification:**

Standard A.

**Tabulated Data:**

Type of Explosive -----	Comp A5
Explosive in one grenade -----	21.25 grams
Total Weight -----	0.44 lb

**Functioning:**

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.

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.

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-fuse 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.

**Drawing:**

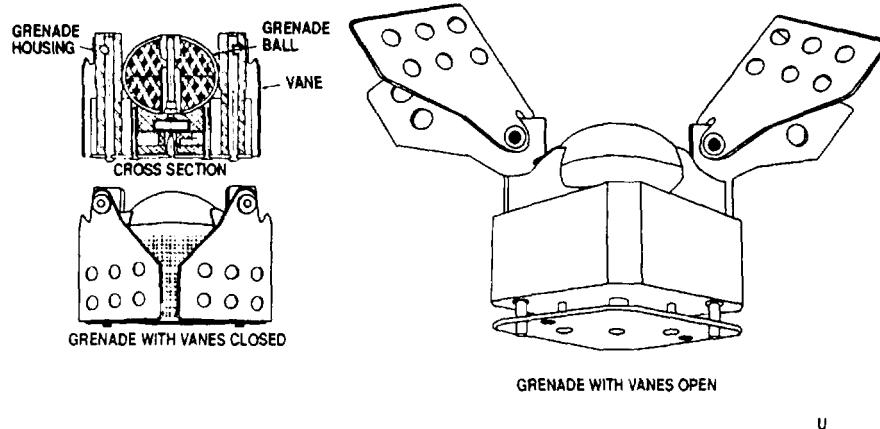
Grenade M36--C921 1946

**Reference:**

TM 43-0002-33

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## GRENADE: GENERAL PURPOSE, M39

U  
AR 101394

### **Type Classification:**

#### **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 Composition A5. There are 18 grenades in the M444 cartridge.

#### **Classification:**

Standard A.

#### **Tabulated Data:**

Explosive -----	23.55 g
	Comp A5

#### **Functioning**

When each grenade M39 is expelled from the projectile body, the vanes open and orient

the grenade by interaction of the air stream.

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.

This action withdraws the firing pin from the rotor and a spring forces the rotor into a position where the primer is aligned with the ejection charge and the delay detonator. The grenade is now armed.

The vanes are held open by the air stream and striker plate guide rods.

When the grenade impacts, the firing pin is driven into the primer which initiates the ejection charge.

The ejection charge initiates the delay detonator and propels the steel ball upward.

The delay detonator is assembled with a delay element designed to detonate the steel ball approximately 4 to 6 feet above impact surface.

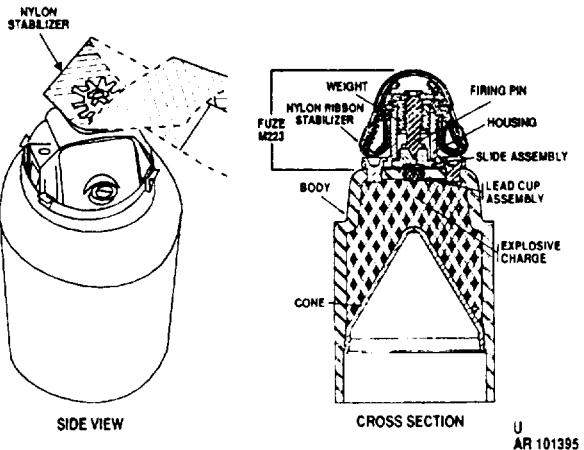
#### **Drawing:**

**F8864945**

#### **Reference:**

TM 9-1300-251-20

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**GRENADE: GENERAL PURPOSE, M42****Type Classification:****Use:**

To provide anti-materiel and anti-personnel capabilities in a submissive delivered by 155mm M483 and 8-inch M509 projectiles for howitzers.

**Description:**

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.

The inertia type fuze has a slide assembly containing an M55 detonator and a coil spring to force the slide into the armed position.

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:**

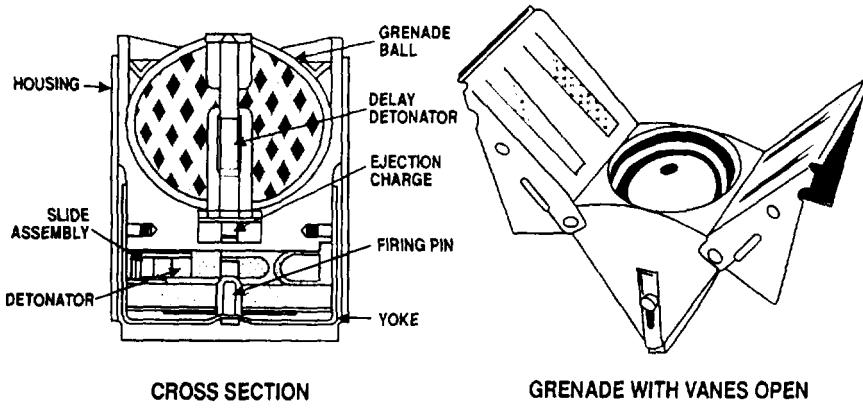
Upon expulsion from the projectile, the nylon ribbon stabilizer extends and orients the grenade, and due to rotational forces, unthreads the threaded firing pin from the weight (semi-armed), and pulls the firing pin out of the slide assembly. The slide assembly is then free to move, and moves into the armed position by action of the slide spring and centrifugal force. The spring maintains the slide assembly in the fully armed position.

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 2.75 inches of homogeneous armor plate. Antipersonnel effects are obtained by fragmentation of the grenade body.

**Drawing:**

Grenade 9215340

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**GRENADE: GENERAL PURPOSE, M43A1****Type Classification:****Use:**

To provide improved antipersonnel capability when loaded in 155mm projectile, M449 Series, 8-inch projectile M404 and 16-inch projectile mark 19 Mod O.

**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 g Comp A5.

**Functioning:**

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.

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 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. Arming delay is achieved by allowing air to pass through a porous plug in the housing located adjacent to the slider recess.

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-fuse 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.

**Drawing**

**8875900**

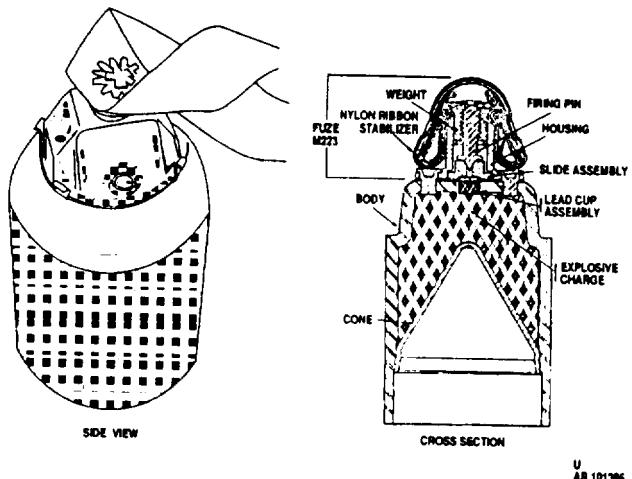
**Carriers:**

M449 Series ((iO grenades)  
**M404 <104** grenades)

**References:**

TM 9-1300-251-20

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**GRENADE: GENERAL PURPOSE, M46****Type Classification:****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	-----	30g
Length	-----	Comp A5 3.25 in
Weight	-----	0.47 lb

**Functioning:**

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 (semi-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.

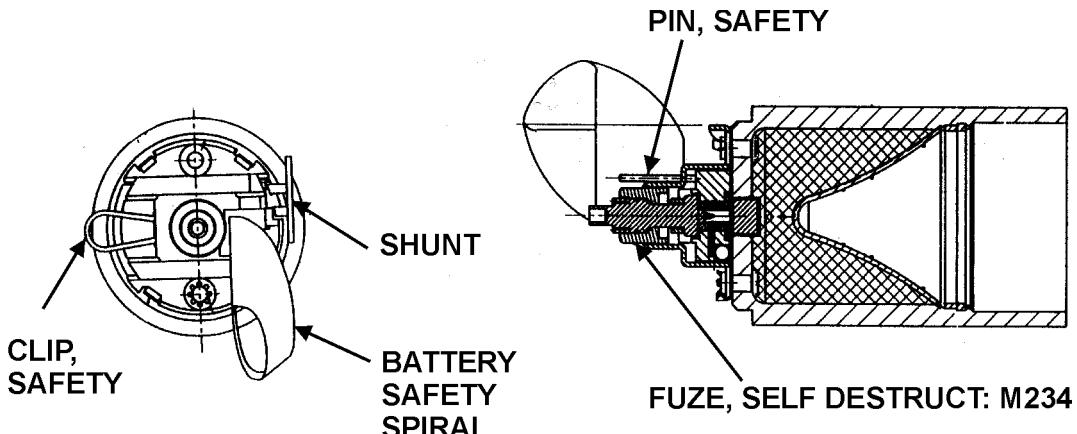
Upon impact, the inertia weight drives the firing pin into the M55 detonator, initiating the firing train. A shaped-charge jet is expelled downward while the body bursts into a large number of small fragments. The jet is capable of penetrating approximately 2.75 inches of homogeneous armor plate. Antipersonnel effects are obtained by fragmentation of the grenade body.

**Drawing:**

Grenade 9215370

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## GRENADE: DUAL PURPOSE ICM, M80



**NOTE: VIEW ROTATED 180° ABOUT GRENADE AXIS FOR CLARITY.  
RIBBON PARACHUTE REMOVED.**  
**AR 10939**

### TYPE CLASSIFICATION:

24 Mar 98.

### USE:

To provide antimateriel and antipersonnel capabilities in a submunition, with self-destruct feature. The grenades are delivered by 105mm: M915 cartridge for howitzers.

### DESCRIPTION:

The M80 grenade is a ground burst munition. The shaped charge contains approximately 16 grams of Comp PAX-2A and has a trumpet-shaped liner. The grenade body is embossed for fragmentation.

The inertia type fuze is similar to an M42 grenade fuze, with the addition of self-destruct action. The firing pin (combination arming screw) locks the slide assembly in the safe position. The ribbon parachute is attached to the arming screw, and is fluorescent pink in color.

The slide assembly contains the self-destruct system and an M55 detonator. Main self-destruct components are the reserve battery, integrated circuit, electro-explosive device, shunt, and battery safety spiral. The battery initiating mechanism is restrained by the battery safety spiral. Rotation or

removal of the battery safety spiral will result in activating the battery. The battery provides electricity to the integrated circuit. Current flowing through the circuit for approximately three minutes will function the electro-explosive device. This will initiate the M55 detonator. The shunt is the electrical safety. In the event that the battery is activated during handling, the shunt provides a safe alternate path for current, and the battery power will be drained.

### FUNCTIONING:

Grenades are expelled during the projectile flight. Air resistance causes the ribbon parachute to extend. The ribbon parachute spins, which stabilizes the grenade and unscrews the firing pin. This releases the slide. The spring loaded slide moves to the armed position (detonator in alignment). Air resistance also causes the battery safety spiral to rotate and the shunt to dislodge. These actions result in activating the battery and current flowing through the integrated circuit. Ground impact will occur before the three minute self-destruct time elapses.

Upon impact, the grenade functions in primary mode, as follows: Inertia causes the firing pin to strike the detonator, which initiates the lead and main charge. The shaped charge jet forms at the base of the grenade, and is capable of penetrating approximately 3.00 inches of armor. Also, the grenade body bursts into small antipersonnel fragments.

SELF-DESTRUCT FUNCTIONING:

If the detonator has not functioned in primary mode, the self-destruct system will render safe the grenade, as follows: Three minutes after battery activation, the electro-explosive device will function and initiate the detonator. When the slide is in the armed position, the detonator will initiate the lead and main charge. If the slide is in the safe position, the detonator will only destroy the fuze. If it happens that the electro-explosive device fails to function, current will continue to flow through the circuit until battery power is reduced to a safe level.

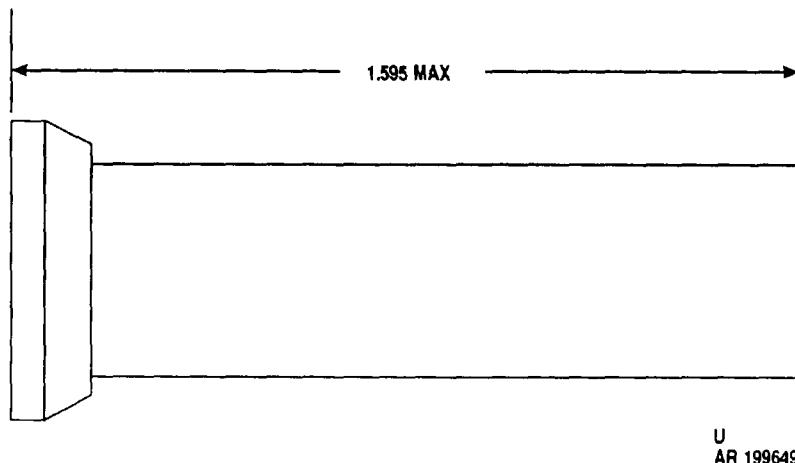
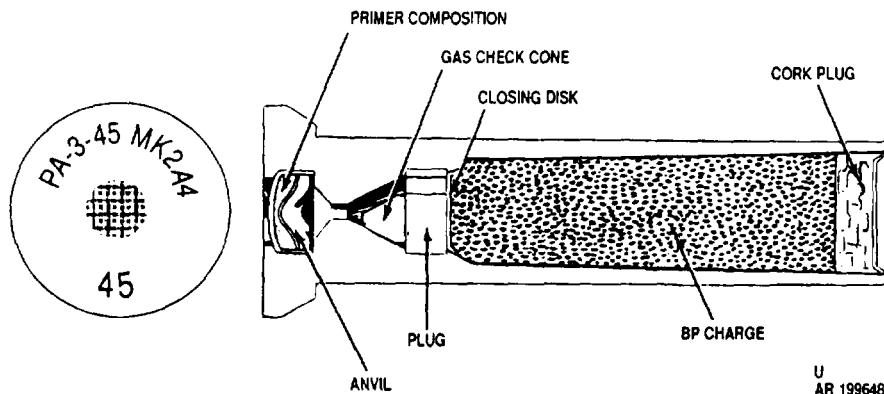
TABULATED DATA:

Explosive .....	15.9 g of Comp PAX-2A
Length .....	2.75 in.
Width .....	1.22 in.
Fuze, self destruct .....	M234
Self destruct time .....	Approx 3 minutes
Ribbon parachute .....	Fluorescent pink

DRAWINGS:

Grenade .....	9388101
---------------	---------

## PRIMER, PERCUSSION: MK2A4

U  
AR 199649U  
AR 199648**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 -----	155mm: 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 hr/day)
*Packing -----	250 primers in shipping con- tainer; 2 con- tainers in wirebound box
*Packing Box:	
Weight -----	37 lb

Dimensions -----	14-5/8 x 12- 13/16 x 9-1/8 in.
Cube -----	1.0 cu ft

\*NOTE: See DOD Consolidated Ammunition Catalog 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-N525
Assembly Dwg. No. -----	8840362

**Preparation for Firing:**

No preparation is required.

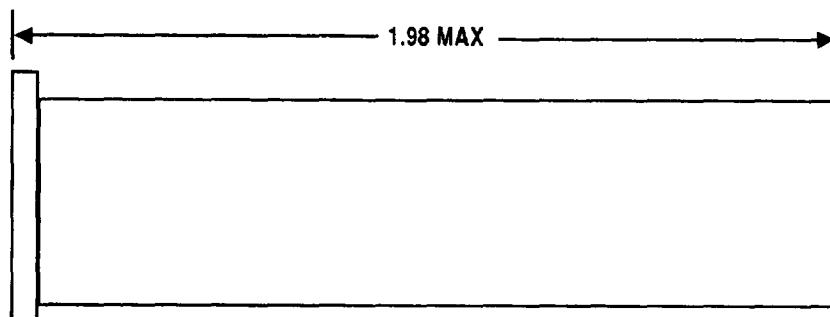
**Limitations:**

None.

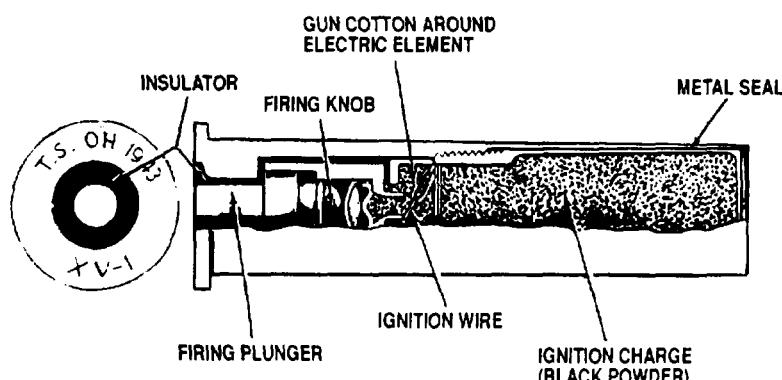
**References:**

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

## PRIMER, ELECTRIC AND PERCUSSION: MK15, MODS 2 AND 3



U  
AR 199647



U  
AR 199646

**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 lock 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 to 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 plunger 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 hr/day)
*Packing -----	38 per metal can; 24 cans (248) per metal box
*Packing Box:	
Weight -----	84 lb

Dimensions -----	25-1/4 x 16-1/2 x 6-1/4 in.
Cube -----	1.51 cu ft

\*NOTE: See DOD Consolidated Ammunition Catalog 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
AssemblyDwg No. -----	74-8-5

Preparation for Firing:

No preparation is required.

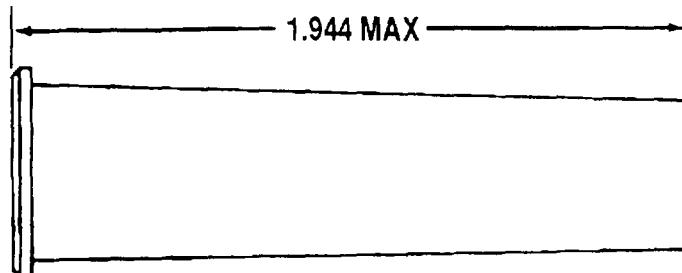
Limitations:

None.

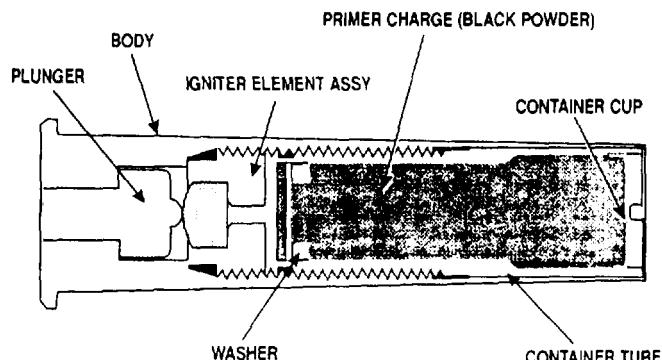
References:

- TM 9-1300-206
- TM 9-1300-251-20
- TM 9-1300-251-34
- TM 9-2300-216-10
- TM 9-2350-311-10

## PRIMER, PERCUSSION: M82



U  
AR 199651



U  
AR 199650

**Type Classification:**

Std OTCM 37807 dtd 1961.

**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.

**Tabulated Data:**

Type -----	Percussion
Weight -----	0.14 lb
Length -----	1.94 in. max

Cannon used with -----	155mm: M109A1, M1091 75- mm: M107 8-inch: M110, M110E2, M55
Filler and weight -----	Black powder, 22 grains
Percussion primer filler and weight -----	Primer mix- ture, 0.55 grains

### **Temperature Limits:**

<b>Firing:</b>	
Lower limit	-40°F
Upper limit	+125°F
<b>Storage:</b>	
Lower limit	-80°F (for periods of not more than 3 days)
Upper limit	+169°F (for not more than 4 hr/day)
*Packing	20 primers in fiberboard container; 25 containers in wooden box

**\*Packing Box:**

Weight ..... 49 lb  
 Dimensions ..... 24-1/8 x 12 x  
                   11-3/16 in.  
 Cube ..... 1.8 cu ft

**\*NOTE:** Latest packing data only. See DOD Consolidated Ammunition Catalog 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-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 9-2350-311-10

PLUGS, LIFTING (EYEBOLT TYPE) FOR PROJECTILES

**General:**

Lifting plugs **are** inserted in the nose of all projectiles 155mm through 8-inch. Their significance is to make the shipping and handling of these heavy projectiles easier for personnel. A sawed off broom handle or bar is inserted through the ring (eye) to enable two men to lift and carry these projectiles.

The plug is removed before the projectile is fired and a fuze is inserted in the fuze well.

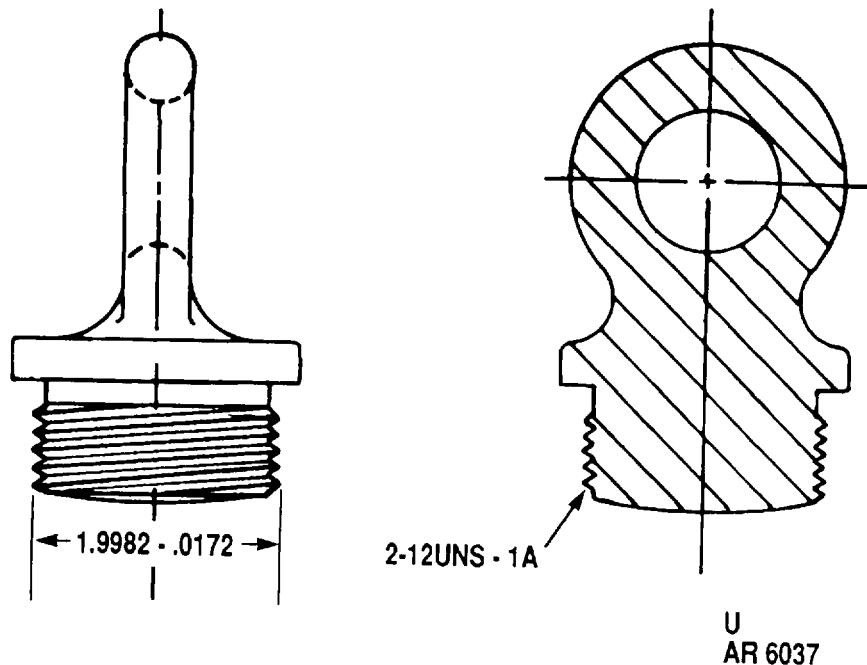
To remove the lifting plug use any available bar by unscrewing counterclockwise.

Lifting plugs are in different sizes depending on the diameter of the fuze well and the type of the projectile.

ICM projectiles must be assembled with a fusible type lifting plug which is designed to prevent cargo ejection if the projectile is involved in a fire.

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## PLUG, LIFTING - TYPE G

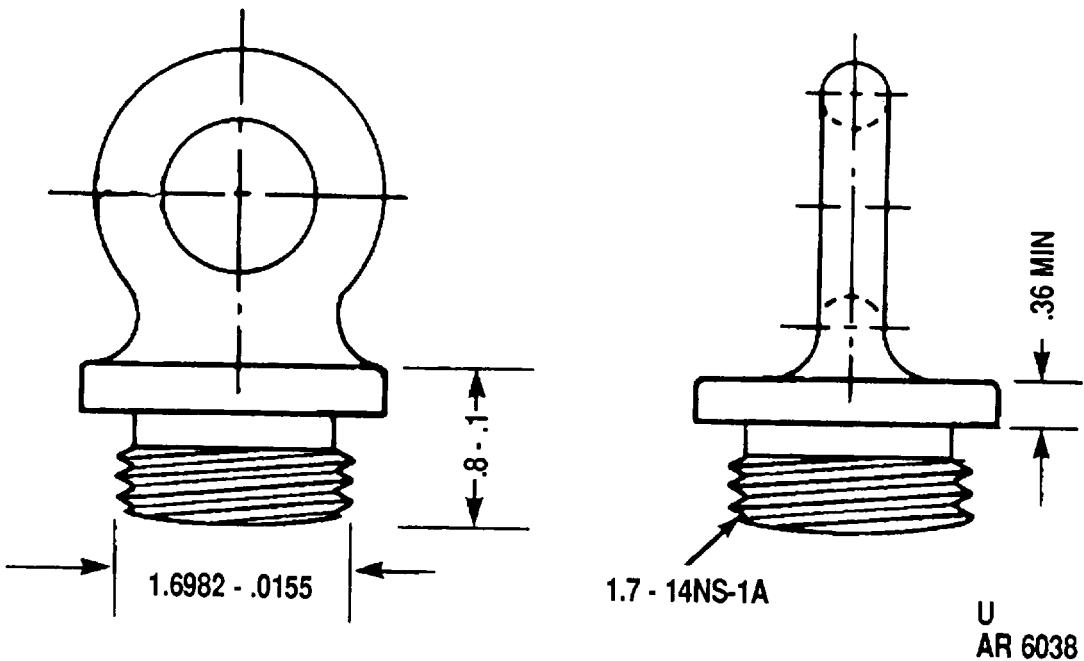
**Description:**

Lifting plug type G is used for 8-inch, 175mm, and 155mm projectiles that have a fuze well thread size of 2-12 UNS-1A, major diameter 1.9982.

Material----- Forged Steel  
 Drawing number ..... 10520074  
 NSN ..... 1320-00-844  
 6981

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## PLUG, LIFTING - TYPE C

Description:

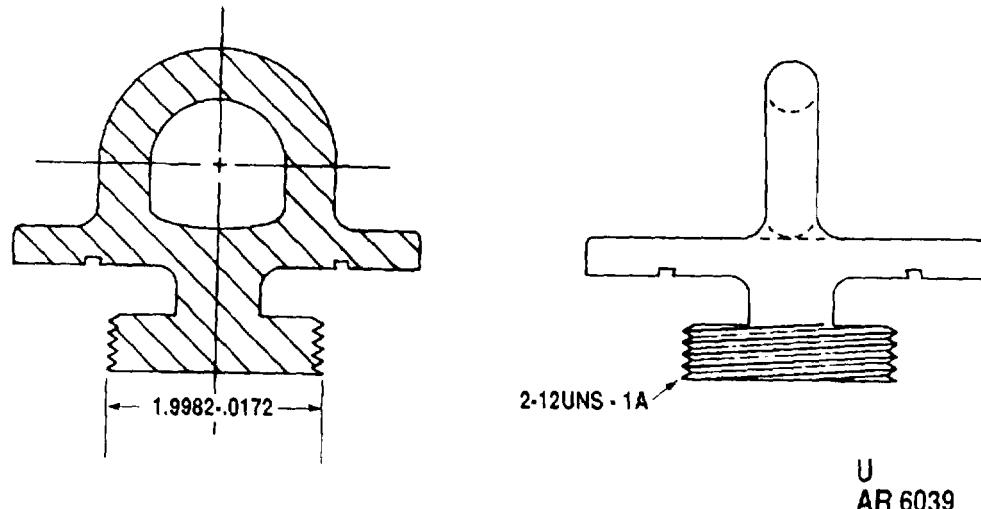
Lifting plug type C is for the older 155mm projectiles that have the fuze well thread size of 1.7-14NS-1A major diameter 1.6982 -.0155.

steel casting.  
Or malleable  
iron casting  
Drawing number -----  
75-14-42B  
NSN ..... 1320-00-861-  
2098

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**PLUG, LIFTING: ENERGY-ABSORBING FOR THE 155MM PROJECTILES  
M549/M549Al**

Threadsize:  
2-12UNS-1A  
Major dia: 1.9982-.0172



**Description:**

The M549/M549Al projectiles have the energy-absorbing lifting plug designed to protect the projectile fuze area against accidental damage. The new plug has an oversized 3-3/4 inch (9.53 cm) flange. If this 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

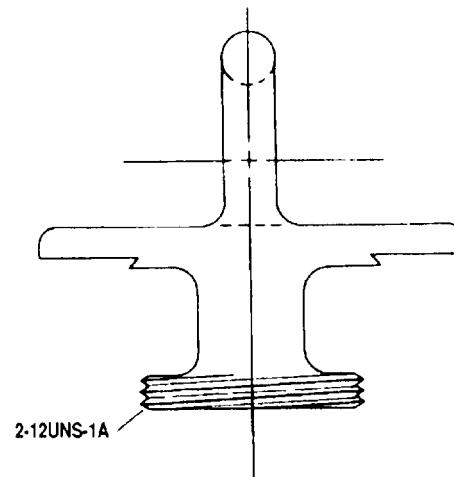
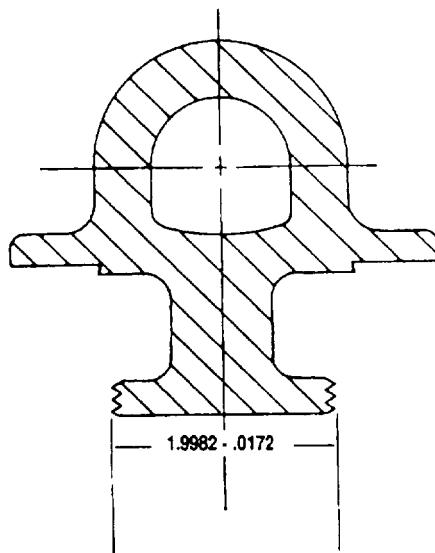
be made to extract any portion of a broken plug from a projectile; the projectile is not to be used and should be returned to supply point.

Material -----	Malleable Iron
	Grade-M
Drawing number -----	9326791
NSN -----	1320-01-065- 9830

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**PLUG, LIFTING: SHOCK ATTENUATING FOR 155MM PROJECTILES M549A1 AND  
M795 AND THE 8-INCH PROJECTILE M106**

Threadsize:  
2-12UNS-1A  
Major dia: 1.9982-.0172



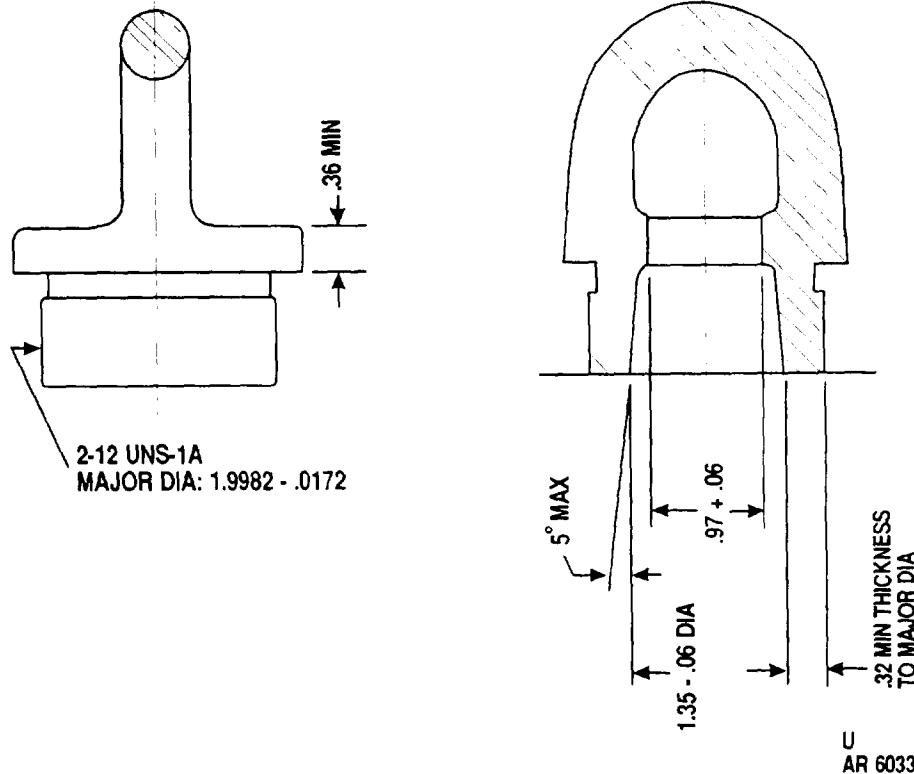
U  
AR 6040

**Description:**

Lifting plug shock attenuating has an oversized flange size 3.80-inches (9.65 cm), to protect the projectile fuze area against accidental damage. If this 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.

Material -----	Malleable Iron
Grade -	M3210
Drawing Number -----	9341742
NSN -----	1320-01-10-108- 7826
Gasket Lifting Plug -----	5330-01-354- 6972

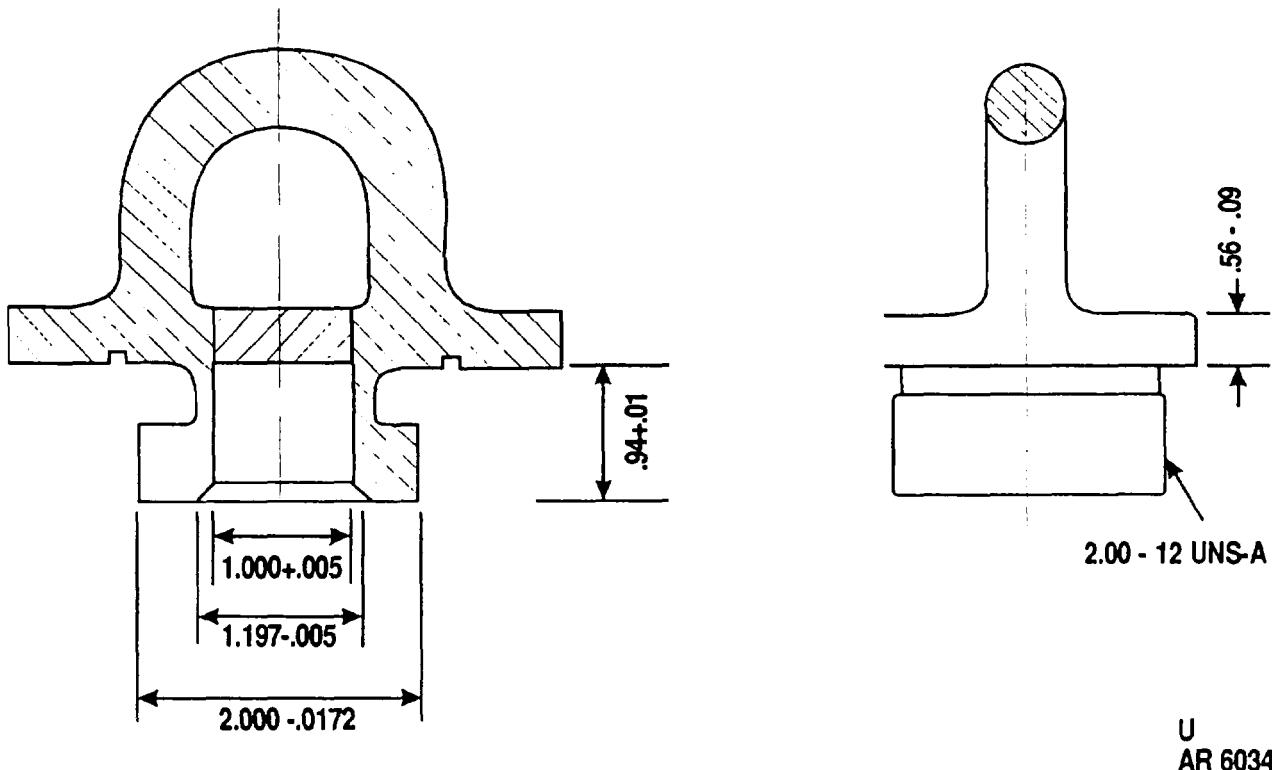
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**PLUG, LIFTING: FUSIBLE FOR 155MM AND 8-INCH PROJECTILES****Description:**

Lifting plug fusible has an eutectic alloy filled cavity in the neck area to prevent the payload in ICM rounds from being ejected accidentally at the base. The alloy will melt and vent out the pressure built-up by the burning expelling charge.

Material ----- Malleable Iron Casting,  
Grade — M3210  
Drawing Number ----- 9215390

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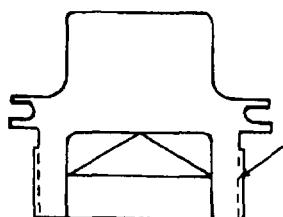
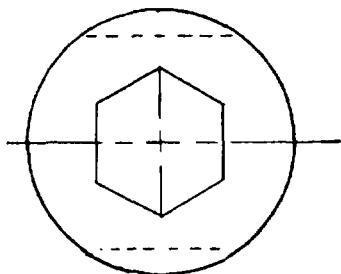
**PLUG, LIFTING: UNIVERSAL****Description:**

Lifting plug universal has an oversized flange size 3.80-inches (9.65 cm), to protect the projectile fuze area against accidental damage. If this 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. In addition, the cavity in the neck area is filled with an eutectic alloy to permit pressure venting in case expel-

ling charge gets ignited accidentally and thus it prevents the cargo from being expelled at the base of the projectile.

Material -----	Malleable Iron
	M3210
Drawing Number -----	9345325
NON-----	1320-01-220- 2166
Filler, Packing, Preformed (Gasket)-----	1320-01-272- 0971

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**CLOSING PLUGS**

2-12NS-1 (NON-STD)  
MAJOR DIA 1.9976 - .0308  
PITCH DIA 1.9435 - .0106  
MINOR DIA 1.8954 MAX.

U  
AR 6041

**Type Classification:**

Std.

**Use:**

To protect projectile filler from foreign matter and retain supplementary charges.

**Description:**

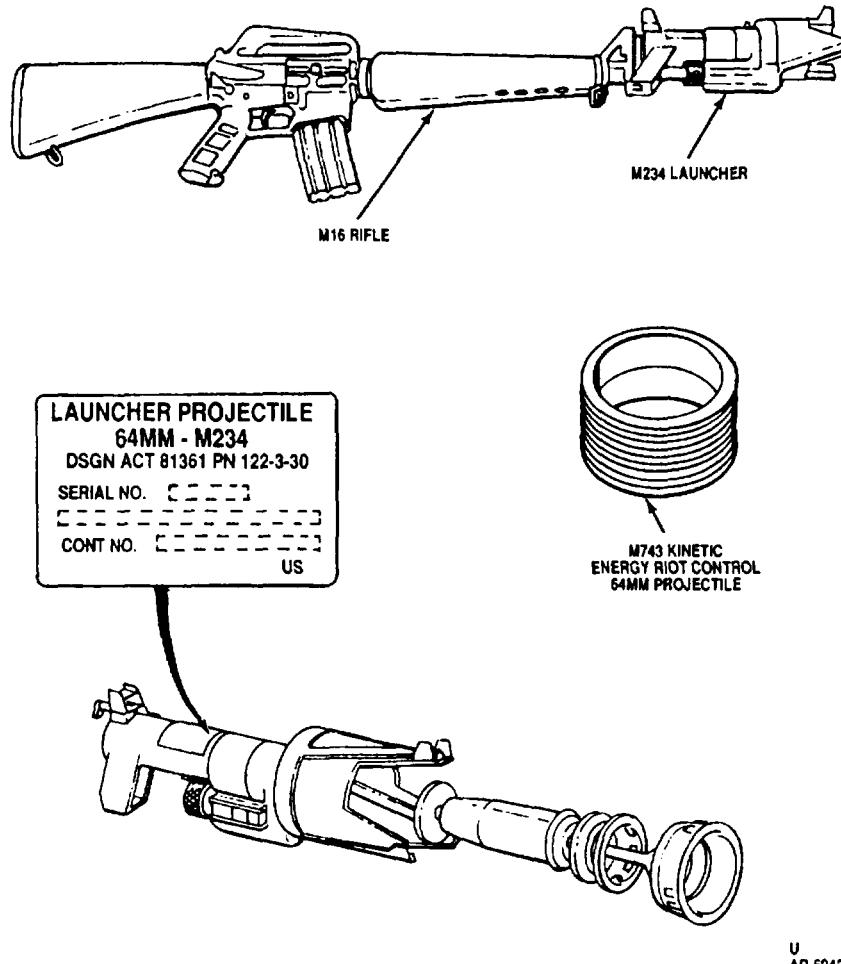
Closing plugs are used on projectiles when they are shipped without a fuze assembled to the round. When shipped with a closing plug, a chip board spacer is assembled between the supplementary charge and plug to limit movement of the supplementary charge during transportation and handling.

Closing plugs are inserted in the nose of the projectile at the ammunition loading plants in lieu of a fuze, prior to shipment to the Ammunition Supply Point (ASP).

**Tabulated Data:**

<u>Closing Plug</u> -----	Used with 81mm, M362 and M374 Series 4.2 Inch, M329A1/A2 105mm: HE, M1
Thread size -----	2.12NS-1
Material -----	Aluminum Alloy
Drawing No. -----	7549009
NSN -----	1315-00-821- 6608
<u>Closing Plug</u> -----	Used with 75111111: HE M48; 90mm, HE, M71/M71A1; 105mm, HE, M1
Thread size -----	2.12NS-1
Material -----	Steel FS- B1112
Drawing No. -----	75-14-309
NSN -----	1315-00-400- 7244

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**PROJECTILE 64MM: CS M742, KE M743, WITH LAUNCHER M234****Type Classification:**

M742 - STD - MSR 06826006.  
 M743 - STD - MSR 04786005.

**Use:**

These projectiles used with their launcher are for riot control and also to protect property during civil disturbance.

**Description:**

The two projectiles used with the launcher are the M742 CS riot-control 64mm projectile and the M743 kinetic-energy riot-control 64mm projectile. The projectiles are one-piece molded bodies of rubber-like plastic material, 64mm in diameter, with an airfoil cross section similar to a thick airplane wing. Upon

launch, the airfoil shape of the spinning projectile produces lift enabling it to overcome gravity and follow a relatively flat trajectory. Due to the low profile drag, the projectile has nearly the same impact energy at intended ranges as it has at launch. The M743 kinetic-energy projectile is identical to the M742 projectile in size and shape but it is wrapped with a white breakband. This breakband will break upon impact with the target allowing the projectile to deform into a flat shape. This action spreads the impact forces over a large area to minimize the possibility of producing serious injury.

The M234 launcher is a cylindrical, aluminum casting which weighs about 1 kilogram and is about 32 centimeters long. Below the main barrel is a shorter chamber with a nut and latch mechanism which holds the launcher

on the barrel of the M16A1 rifle. Forward and aft sights are mounted on the top of the launcher. An upper arm and a buffer housing on the rear of the launcher mate with the rifle forward sight and bayonet stud to keep the launcher from turning on the rifle barrel. A cylindrical plate closes the rear of the launcher barrel and is held in place by a connecting ring. A ball-detent assembly holds the launching cup-buffer assembly in the retracted position. This cup-buffer assembly consists of a launching cup attached to a threaded shaft. A manifold and buffer fit on the shaft and are held on the shaft by a threaded buffer plate. The manifold ring assembly is inserted to hold the launcher cup-buffer assembly in the launcher. The launcher barrel has three rifling grooves and the cup has three matching keys which give a lock to the projectile as it is propelled from the launcher.

The M755 blank cartridge, with its tip painted a bright yellow, is used with the M16A1 rifle. This special blank cartridge is loaded with just enough powder to propel the projectile to the target area. The M755 blank cartridge is for use only with this system (Ring Airfoil Grenade) (RAG). Use of any other ammunition or blank cartridge could result in serious injury or death to personnel.

### Functioning:

The M234 launcher is attached to the flash suppressor on the M16A1 rifle. When fired in the rifle, an M755 blank cartridge, which is issued with each projectile, supplies propellant gases to the launcher to propel the RAG projectile at a velocity of about 60 meters per second and a spin rate of about 5,000 rpm. The ring airfoil shaping of the 64mm-diameter, 34-gram, soft rubber-like projectile results in a relatively flat trajectory. Each launcher is capable of firing from four to six projectiles per minute. The launcher and projectiles will be issued when authorized during civil disturbances when target selectivity and accuracy are important considerations. The velocity is sufficiently high to prevent dodging by target individuals at effective ranges. The effective range of the projectile is 40 meters on an individual and 60 meters on groups of individuals with a maximum range of 100 meters. The M743 projectile has sufficient momentum to cause pain and discomfort with minimum possibility of producing injury to any part of the body. It will deter rioters and keep them at such a distance that they would not reach the control forces with thrown rocks or debris.

### Tabulated Data:

#### Projectile M742 and M743:

Diameter -----	2.52 in. (64mm)
Length -----	1.34 in. (3.40 cm)
Weight -----	1.22 oz (34.50 g)
Filler M742: CSI -----	2g

#### Launcher M234:

Length -----	10.9 in. (27.69 cm)
Weight -----	2.06 lb (0.93 kg)
Width -----	3.4 in. (8.64 cm)
NSN -----	1010-01-014- 6506

#### Cartridge M755:

Diameter -----	5.56mm
Length -----	1.90 in. (48.3 mm)
Weight -----	112 grains
Propellant Hi Skor 700X -----	12 grains
Muzzle velocity -----	172 to 198 fps
Max range -----	100 meters (328 ft)

### Packing:

#### Projectile 64mm: Riot Control, CS, M742w/Ctg

##### M755:

DODAC -----	1310-B639
Unit Pack -----	6 projectiles and 6 blank cartridges are stored and issued in a carrier.

#### Projectile 64mm: Riot Control Kinetic Energy M743 w/Ctg M755:

DODAC -----	1310-B638
Unit Pack -----	6 projectiles and 6 blank cartridges are stored and issued in a carrier.

### Performance:

#### Effective range of projectile:

Maximum range -----	100 meters
On groups of individuals -----	60 meters
On individual -----	40 meters
Rate of fire -----	4-8 projectiles per minute

**Shipping and Storage Data:****Projectile 64mm: CS M742**

Storage class ..... 1.4 G  
DOT class ..... C  
DOT designation ..... SMALL  
ARMS  
AMMUNI-  
TION  
IRRITATING  
(TEAR GAS)  
CAR-  
TRIDGES

Projectile 64mm: M743  
Storage class ..... 1.4S  
DOT class ..... C  
DOT designation ..... SMALL  
ARMS  
AMMUNI-  
TION

**Reference:**

TM 9-1010-224-10

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## APPENDIX A

### REFERENCES

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#### **A-1. Scope**

This appendix should be consulted frequently for latest changes or revisions of references and for new publications relating to the material covered in this manual.

#### **A-2. Equipment Publications**

Operator's and Organizational Maintenance Manual for Rifle, Recoilless, 106MM: M40A2 and M40A4 . . . . .	TM 9-1000-205-12
Operator's Manual for Grenade Launcher, 40MM, M79 . . . . .	TM 9-1010-205-10
Operator's Manual for 40MM Grenade Launcher, M203 . . . . .	TM 9-1010-221-10
Operator's Manual for Lightweight Company Mortar, 60MM, M224 . . . . .	TM 9-1010-223-10
Operator's Manual for Launcher, Projectile, 64MM: Riot Control, M234....	TM 9-1010-224-10
Operator's Manual for Machine Gun, 40MM, MK, MOD 3 . . . . .	TM 9-1010-230-10
Organizational and Intermediate Direct Maintenance Manual with RPSTL for Machine Gun, 40MM, MK 19, MOD 3 . . . . .	TM 9-1010-230-23&P
Operator's Manual for Mortar, 81MM, M29A1 (NSN 1015-00-999-7794) . . . . .	TM 9-1015-200-10
Operator and Organizational Maintenance Manual for Howitzer Light: Towed, 105MM, M101A1 . . . . .	TM 9-1015-203-12
Operator's Manual for 4.2-Inch Mortar, M30 . . . . .	TM 9-1015-215-10
Organizational Maintenance Manual (Including RPSTL) for Mortar, 4.2-Inch M30 (Cannon M30 on Mount M24A1) and Trainer, Subcaliber, 60MM: M31. . . . .	TM 9-1015-215-20&P
Direct Support Maintenance Manual for Mortar, 4.2 Inch: M3 (Cannon, M30 on Mount, M24A1) and Trainer, Subcaliber, 60MM, M31 . . . .	TM 9-1015-215-30
Direct Support Maintenance RPSTL (Including Depot Maintenance Repair Parts) for Mortar 4.2-Inch, M30 (Cannon M30 on Mount, M24A1) and Trainer, Subcaliber, 60MM, M31 . . . . .	TM 9-1015 -215-30P
Operator and Organizational Maintenance Manual for 90MM Recoilless Rifle: M67 W/E . . . . .	TM 9-1015-223-12
Operator's Maintenance Manual for Howitzer, Light, Towed: 105MM, M102 . . . . .	TM 9-1015-234-10
Operator's Manual for Mortar, 81MM, M252 . . . . .	TM 9-1015-249-10
Operator's and Organizational Maintenance Manual for Howitzer, Medium, 155MM: M114, M114A1, and M114A2 (Including RPSTL) . . . . .	TM 9-1025-200-12&P
Operator's Manual for Howitzer, Medium, Towed: 155MM, M198 . . . . .	TM 9-1025-211-10
Operator's Manual for M422 Nuclear Projectile . . . . .	TM 9-1100-218-10
Ammunition and Explosives Standards . . . . .	TM 9-1300-206
Ammunition Maintenance . . . . .	TM 9-1300-250
Unit Maintenance Manual (Including RPSTL) for Artillery Ammunition for Guns, Howitzers, Mortars, Recoilless Rifles, and 40MM Grenade Launchers . . . . .	TM 9-1300-251-20
Direct Support and General Support Maintenance Manual (Including RPSTL) for Artillery Ammunition for Guns, Howitzers, Mortars, Recoilless Rifles, and 40MM Grenade Launchers . . . . .	TM 9-1300-251-34

Operator's and Organizational Maintenance Manual (Including RPSTL) for 160MM Mortar Training Device - 60MM Sabot (Inert) M3 and 22MM Subcaliber, Practice Cartridge, M744, M745, M746 and M747.....	TM 9-1310-249-12&P
Operator and Unit Maintenance Manual for Cartridge 81 MM: Target Practice (SR), M880 (Including RPSTL) .....	TM 9-1315-252-12&P
Operator and Unit Maintenance Manual (Including RPSTL) for Launcher and Cartridge, 84MM: M136 (AT4) .....	TM 9-1315-886-12
Operator's Manual for Gun, Field Artillery, SP, 175MM: M107 and Howitzer, Heavy SP 8-Inch: M110 .....	TM 9-2300-216-10
Operator's Manual: Carrier, Personnel: Full-Tracked, Armored, M113A1; and M113A2; Carrier, Command Post, Light, Tracked: M577A1; and M577A2; Carrier, Mortar, 107MM, Self-propelled; M106A1 and M106A2, Carrier, Mortar, 81 MM, Self-propelled, M125A1 and M125A2 and Carrier, Flame Thrower, Self-propelled: M132A1.....	TM 9-2300-257-10
Operator's Manual for Operator Controls Preventive Maintenance Check Sheet for Vehicle, Combat Engineer, Full-Tracked: M728 .....	TM 9-2350-222-10-1
Operator's Manual for Operation Under Usual and Unusual Conditions for Vehicle, Combat Engineer, Full-Tracked: M728 .....	TM 9-2350-222-10-2
Operator's Manual for Troubleshooting and Maintenance for Vehicle, Combat Engineer, Full-Tracked: M728 .....	TM 9-2350-222-10-3
Operator's Manual (Crew) for Armored Reconnaissance/Airborne Assault Vehicle, Full-Tracked, 152MM Gun/Launcher M551 and M551A1 .....	TM 9-2350-230-10
Operator's and Organizational Maintenance Manual: Armored Reconnaissance/Airborne Assault Vehicle: Full-Tracked, 152MM Gun/Launcher, M155A1.....	TM 9-2350-230-12
Operator's Manual: Tank, Combat, Full-Tracked: 152MM Gun/Launcher, M60A2 W/E .....	TM 9-2350-232-10
Operator's Manual for Tank, Combat, Full-Tracked: 105MM Gun, M60A3 (Tank Thermal Sight) TTS .....	TM 9-2350-253-10
Operator Controls, PMCS, and Operation Under Usual Conditions, Volume 1 of 2: Tank, Combat, Full-Tracked: 105MM Gun, M1, Tank, Combat, Full-Tracked: 105MM Gun, 1PM1 General Abrams .....	TM 9-2350-255-10-1
Operator's Manual for Operation Under Unusual Conditions, Maintenance and Ammunition, Volume 2 of 2: Tank, Combat, Full-Tracked: 105MM Gun, M1, Tank, Combat, Full-Tracked: 105MM Gun, 1PM1 General Abrams .....	TM 9-2350-255-10-2
Operator's Manual, Operator Controls and PMCS Tank, Combat, Full-Tracked: 105MM Gun M60A1 (RISE) Tank, Combat, Full-Tracked: 105MM Gun, M60A1 (RISE PASSIVE).....	TM 9-2350-257-10-1
Operator's Manual for Operation Under Usual and Unusual Conditions for Tank, Combat, Full-Tracked: 105MM Gun, M60A1 (RISE) and M60A1 (RISE PASSIVE).....	TM 9-2350-257-10-2
Operator's Manual for Troubleshooting, and Maintenance for Tank, Combat, Full-Tracked: 105MM Gun, M50A1 (RISE) Tank, Combat, Full-Tracked: 105MM Gun, M60A1 (RISE PASSIVE) .....	TM 9-2350-257-10-3
Operator's Manual for Howitzer, Heavy Self-Propelled, 8-Inch M110A2....	TM 9-2350-304-10
Operator's Manual for Howitzer, Medium, Self-Propelled, 155MM, M109A2, M155MM, M109A3, 155MM, M109A4 and 155MM, M109A5 .....	TM 9-2350-311-10
Field Maintenance for 60MM Mortars, M2 and M19: 60MM Mortar Mount: M2: 60MM Mortar Baseplate, M1: 81MM Mortar and Mounts, M4, M23A1, M23A2 and M23A3.....	TM 9-3071-1

Army Ammunition Data Sheets for Artillery Ammunition: Guns, Howitzers, Mortars, Recoilless Rifles, Grenade Launchers, and Artillery Fuzes .....	TM 43-0001-28
Army Ammunition Data Sheets for Artillery Ammunition: Guns, Howitzers, Mortars, Recoilless Rifles, Grenade Launchers, and Artillery Fuzes (U) . . .	(C) TM 43-0001-28-1
Army Ammunition Data Sheets for Guns, Howitzers, Mortars, Interoperable Ammunition .....	TM 43-0001-28-3
Artillery Ammunition: Authorized Projectile, Fuze and Propelling Charge Combinations for Howitzer, Heavy Self-Propelled, 8-Inch: M110A2 w/Cannon, M201A1 .....	TM 43-0001-28-4
Artillery Ammunition: Authorized Projectile, Fuze and Propelling Charge Combinations for Gun, Self-Propelled, 175MM: M107 w/Cannon, M113 and M113A1 .....	TM 43-0001-28-5
Artillery Ammunition: Authorized Projectile, Fuze and Propelling Charge Combinations for Howitzer, Medium, Self-Propelled, 155MM: M109A2, M109A3, M109A4 w/Cannon, M185 .....	TM 43-0001-28-6
Artillery Ammunition: Authorized Projectile, Fuze and Propelling Charge Combinations for Howitzer, Medium, Towed, 155MM: M198 w/Cannon, M199 .....	TM 43-0001-28-7
Artillery Ammunition: Authorized Projectile, Fuze and Propelling Charge Combinations for Howitzer, Medium, Towed, 155MM: M114A2 w/Cannon, M1A2 and Howitzer, Medium Self-Propelled 155 MM: M109 w/Cannon, M126A1 .....	TM 43-0001-28-8
Artillery Ammunition: Authorized Projectile, Fuze and Propelling Charge Combinations for Howitzer, Medium, Towed, 155MM: M114A1 w/Cannon, M1A1 .....	TM 43-0001-28-9
Artillery Ammunition: Authorized Projectile, Fuze and Propelling Charge Combinations for Howitzer, Light, Towed, 105MM: M101, M101A1 and M102 .....	TM 43-0001-28-10
Procedures for Destruction of Approved Conventional Ammunition (ICM) to Prevent Enemy Use .....	TM 43-0002-33

### A-3. Firing Tables

Firing Table Addendum to FT 144-ADD-K-1 for Howitzer Organizational, Medium, Self-propelled, 155MM, M109, M109A1 .....	FT 155-ADD-K-1
Cannon, 155MM Howitzer, M185 on Howitzer, Medium, Self-propelled, 155MM, 109A1 and Howitzer, Medium, Self-propelled, 155MM, 109A1B Firing Projectile, HE, M483A1 .....	FT 155-AN-1

### A-4. Special Requirements

Complete Round Charts - Artillery Ammunition .....	AMC-P 700-3-3
DOD Consolidated Ammunition Catalog (AMMO 1-2-3) .....	SB 708-4

**A-5. Supply Publications**

Army Adopted/Other Items Selected for Authorization/List of  
Reportable Items ..... SB 700-20  
FSC GROUP 13: Ammunition and Explosives: (Classes 1340-1398) ..... SC 1340/98-IL

**A-6. Training Publications**

Mortars (TO 11W2-5-13-21) ..... FM 23-90  
Field Artillery Manual Cannon Gunnery ..... TC 6-40

## APPENDIX B

### CARTRIDGE/PROJECTILE-FUZE COMBINATION CHARTS

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#### SECTION I. INTRODUCTION

##### **B-1. SCOPE**

This appendix contains a comprehensive listing of authorized cartridge/projectile fuze and propelling charge combinations, artillery type of conventional ammunition. These lists (i.e. charts) supersede the fuze and propelling charge combinations referenced on the data sheets.

##### **B-2. LIST OF CHARTS FOR AUTHORIZED CARTRIDGE/PROJECTILE FUZE AND PROPELLING CHARGE COMBINATIONS**

- a. Section II - Cartridge/Projectile-Fuze Combinations for Guns.
- b. Section III - Cartridge/Projectile-Fuze Combinations for 75MM, 105MM, and 8 Inch Howitzers.
- c. Section IV - Projectile/Fuze Combinations for 155MM Howitzers.
- d. Section V - Cartridge-Fuze Combinations for Mortars.
- e. Section VI - Cartridge-Fuze Combinations for Recoilless Rifles.
- f. Section VII - Authorized Projectile/Propelling Combinations for M1A1 Cannon Tube (155MM).
- g. Section VIII - Authorized Projectile/Propelling Charge Combinations for M1A2 Cannon Tube and M126A1 Cannon Tube (155MM).
- h. Section IX - Authorized Projectile/Propelling Charge Combinations for M185/M284 Cannon Tubes (155MM).
- i. Section X - Authorized Projectile/Propelling Charge Combinations for M199 Cannon Tube (155MM).
- j. Section XI - Authorized Projectile/Propelling Charge Combinations for 8 Inch Howitzers.

##### **B-3. PRECAUTIONS**

Precautions and restrictions to be observed in handling fuzes and firing ammunition with the cartridge/projectile fuze combinations indi-

cated in this appendix are published in the applicable weapon manuals.

##### **A-4. KEY TO ABBREVIATIONS AND SYMBOLS**

•	.....	Authorized
X	.....	Authorized
APC	.....	Armor piercing capped
APERS	.....	Antipersonnel
AT	.....	Antitank
BD	.....	Base detonating
BE	.....	Base ejection
CLD	.....	Colored smoke
CP	.....	Concrete piercing
CS	.....	Tactical riot control agent
ET	.....	Electronic time
GB	.....	Nonpersistent toxic (casualty) nerve gas
H	.....	Mustard gas
HC	.....	White smoke
HA	.....	Distilled mustard gas
HE	.....	High explosive
HEAT	.....	High explosive antitank
HEAT-T-MP	.....	High explosive antitank with tracer, multipurpose
HEI	.....	High explosive incendiary
HERA	.....	High explosive rocket assisted
HEP	.....	High explosive plastic
ICM	.....	Improved conventional munitions
Ilum	.....	Illuminating
LCC	.....	Logistic control code
Mod	.....	Modified
MT	.....	Mechanical time
MTSQ	.....	Mechanical time and superquick
P	.....	Authorized, requires removal of supplementary charge if present
PD	.....	Point detonating
PI	.....	Point initiating
PIBD	.....	Point initiating, base detonating
Prox	.....	Proximity
SD	.....	Self destroying
T	.....	Time fuze or for training use only -T With tracer
TP	.....	Target practice
TSQ	.....	Time superquick
VX	.....	Persistent toxic (casualty) nerve gas
WE	.....	White phosphorus

**SECTION II**  
**CARTRIDGE/PROJECTILE-FUZE COMBINATIONS FOR GUNS**

		FUZE								
		PD			PIBD	MT	MTSQ	BD	PROX	
<b>CANNON</b> (Weapon)	Cartridge/Projectile	M48A3	M51A5	M64A1	M78 Series (CP)	M557	MK27 MOD 1*			
<b>40 Millimeter</b> M1, M2 (M42, M42A1)	HE-T, HEI-T, MK2, SD MK11, M3A1			X						
	HE-T, MK2, SD, M3		X							
<b>40 Millimeter</b> DIVADS HE, M822 (Sgt York)	HE-I, M811				X					X
	HE, M822									
<b>90 Millimeter</b> M1, M2 (M36, M48 M54 Tanks)	APERS, M580						X			
	HE, M71 (Normal Cavity)	X	X	X				X		
	HE, M71 (Deep Cavity)	X	X	X				X	P	
	HE-T, M71A1	X		X				X		
	HEAT, M348 SERIES				X					
	HEAT-T, M431				X					
	HEP-T, T142 SERIES								X	
	SMOKE, WP, M313 SERIES	X						X		
<b>105 Millimeter</b> M68 (M60A1 Tank)	APERS-T, M494					X				
	HEAT-T, M456 SERIES					X				
	HEP-T, M393 SERIES								X X	
	SMOKE, WP-T M416								X	
<b>120 Millimeter</b>	HEAT-MP-T, M830					X				
<b>152 Millimeter</b> M81, M162 (M60A2 Tank M551 Recon)	HE-T, M657			X						
	HEAT-T-MP, M409 SERIES					X				
	TP-T, M411 (XM411E3)		X							
<b>165 Millimeter</b> M135 (M728)	HEP, M123A1							X		
<b>175 Millimeter</b> M113 (M107)	HE, M437 SERIES (Deep Cavity)		X	X				X	P X	
	HE, M437 (Shallow Cavity)		X	X				X		X

\*Firing of 40mm MK2 Cartridges with MK27 MOD 0 Fuze is not authorized.

**SECTION III**  
**CARTRIDGE/PROJECTILE-FUZE COMBINATIONS FOR 75MM, 105MM**  
**AND 8 INCH HOWITZER**

		Fuze																		
CANNON (Weapon)	Cartridge/Projectile	PD		MT		MTSQ		BD		PROX		ET		MOFA						
		MK339 MOD 1	M78 Series (CP)	M572	M739 Series	M563	M565	M565 (MOD)	M501 Series	M548 (MOD)	M548	M564	M577 Series	M582 Series	M62 Series	M91 Series	M513 Series*	M728*	M732 Series	M762 Series**
75 Millimeter	HE, M48 (Normal Cavity)	X																		
M3	HE, M48 (Deep Cavity)	X														P				
(for M1A1)																				
105 Millimeter	APERS-T, M546				X															
M2A1	BE, M84, M84B1							X												
M2A2	BE, HC, M84A1					X			X	X							X			
(Towed M101/A1)	GB, M360		X	X																
M137	HE, M1 (Normal Cavity)	X	X	X	X						X	X						X	X	X
(Towed M102)	HE, M1 (Deep Cavity)	X	X	X	X					X	X				P	P	X	X	X	X
M49	HE, M444						X	X												
(SP M52)	TACTICAL, CS, M629					X			X											
HEP-T, M327														X	X					
HE, RA, M548	X	X									X			P			X	X		
ILLUM, M314A2, M314A1							X													
ILLUM, M314A3						X			X	X							X			
GAS, H, M60	X	X																		
SMK, WP, M60 SERIES	X	X								X	X						X	X		
TP, M67												X	X							
DPICM, M916										X							X			
HERA, M927	X	X								X					X	X	X	X	X	
105 Millimeter	APERS-T, M546				X															
M20A1	BE, M84, M84B1						X													
(Towed M119A1)	BE, HC, M84A1					X			X	X							X			
GB, M360	X	X																		
HE, M1 (Normal Cavity)	X	X	X	X						X	X						X	X	X	X
HE, M1 (Deep Cavity)	X	X	X	X						X	X			P	P	X	X	X	X	
HE, M444							X	X												
TACTICAL, CS, M629					X			X							X	X				
HEP-T, M327														X	X					
HE, RA, M548		X	X								X			P			X	X		
ILLUM, M314A2, M314A1							X										X			
ILLUM, M314A3						X			X	X							X			
GAS, H, M60	X	X																		
SMK, WP, M60 SERIES	X	X							X	X							X	X		
TP, M67											X	X								
DPICM, M915										X							X			
DPICM, M916										X							X			
HERA, M913		X	X							X					X	X	X	X	X	
HERA, M927		X	X							X					X	X	X	X	X	

**SECTION IV**  
**PROJECTILE/FUZE COMBINATIONS FOR 155 MM HOWITZER**

CANNON (Weapon)	Projectile	FUZE										
		PD		MT	MTSQ			PROX			ET	
		MK399 MOD1	M557/M572	M739 Series	M565	M501 Series	M564	M577 Series	M582 Series	M728	M732	M514 Series
M1A1 (for M114A1 Towed Howitzer)	AGENT, H, HD, M110	X	X				X	X				X
	AGENT GB, VX, M121A1	X	X							CP	C	
	HE, M107 (Normal Cavity)	X	X	X			X	X		X		X
	HE, M107 (Deep Cavity)	X	X	X			X	X	P	X	MP	X
	HE, M449 Series				X			X				X
	SMK, HC, BE, M116A1				X			X				X
	SMK, HC&CLD BE, M116, ML16B1					X						
	SMK, WP M110 Series	X	X				X	X				X
	ILLUM, M485 Series			X			X					X
	PRACTICE, M804	X	X				X	X		X		X
	PRACTICE, M804A1	X	X				X	X		X		X
M1A2 (for M114A2 Towed Howitzer M126/M126A1) (for M109 SP Howitzer)	AGENT H, HD, M110	X	X				X	X		X		X
	AGENT, GB, VX, M121A1	X	X							CP	C	X
	HE, M107 (Normal Cavity)	X	X	X			X	X		X		X
	HE, M107 (Deep Cavity)	X	X	X			X	X	P	X	MP	X
	HERA, M549/M549A1	X	X					X				X
	HE, M449 Series				X			X				X
	HE, M483A1						S					X
	HE, M692/M731						X					X
	AT, M7181M741 Series						X					X
	SMK			X			X					X
	SMK, HC&CLD BE, M116, M116B1				X							
	SMK, WF, M110 Series	X	X				X	X				X
	ILLUM, M485 Series			X			X					X
	PRACTICE, M804	X	X				X	X		X		X
	PRACTICE, M804A1	X	X				X	X		X		X
	SMOKE, WP M825, M825A1						X					X
	EXTENDED RANGE, DP, M864							S				X
	AGENT, GB2, M687	X	X									
	HEAT, M712 COPPERHEAD	FUZE IS INTEGRAL PART OF PROJECTILE										

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**SECTION IV**  
**PROJECTILE/FUZE COMBINATIONS FOR 155MM HOWITZERS**

CANNON (Weapon)	Projectile	FUZE								
		MK399 MOD 1	PD	MT	MTSQ		PROX		ET	MOFA
M1A1 (for M114A1 Towed Howitzer)	AGENT, H, HD, M110	X	X	M739 Series	M565	M564	M577	M582 Series	M728	
	AGENT, GB, VX, M121A1	X	X					CP C		
	HE, M107 (Normal Cavity)	X	X	X		X	X	X		X
	HE, M107 (Deep Cavity)	X	X	X		X	X P X MP		X	
	HE, M449 Series			X		X			X	
	SMK,HC,BE,M116A1			X		X			X	
	SMK,HC&CLD BE,M116, M116B1				X					
	SMK, WP, M110 Series	X	X		X		X		X	
	ILLUM,M485 Series			X		X			X	
	PRACTICE, M804	X	X		X		X	X	X	
	PRACTICE, M804A1	X	X		X		X		X	
M1A2 (for M114A2 Towed Howitzer M126/M126A1) (for M109 SP Howitzer)	AGENT,H,HD, M110	X	X		X		X		X	
	AGENT,GB,VX,M121A1	X	X				CP C			
	HE,M107 (Normal Cavity)	X	X	X		X	X		X	
	HE,M107 (Deep Cavity)	X	X	X		X	P X MP		X	
	HERA,M549/M549A1	X	X	X			X		X	
	HE,M449 Series			X		X			X	
	HE,M483A1					S			X	
	HE,M692/M731					X			X	
	AT,M718/M741 Series					X			X	
	SMK,HC,BE,M116A1			X		X			X	
M126/M126A1 (for M109 SP Howitzer)	SMK,HC&CLD BE,M116, M116B1				X					
	SMK,WP,M110 Series	X	X		X		X		X	
	ILLUM,M485 Series			X		X			X	
	PRACTICE,M804	X	X		X		X		X	
	PRACTICE,M804A1	X	X		X		X		X	
	SMOKE,WP,M825,M825A1					X			X	
	EXTENDED RANGE,DP, M864					S			X	
	AGENT,GB2,M687	X	X							
	HEAT, M712 COPPERHEAD	FUZE IS INTEGRAL PART OF PROJECTILE								

**SECTION IV**  
**PROJECTILE/FUZE COMBINATIONS FOR 155MM HOWITZERS (Continued)**

CANNON (Weapon)	Projectile	FUZE								
		MK399 MOD 1	PD	MT	MTSQ			PROX	ET	MOFA
M185 (for M109A2, M109A2, M109A4 SP Howitzer) M284 (for M109A5, M109A6 SP Howitzer) M199 (for M198 Towed Howitzer)	AGENT, H, HD, M110	X	X	M739 Series	M565	M501 Series	M564	M577	M582 Series	M728
	AGENT, GB VX, M121A1	X	X						CP C	
	HE, M107 (Normal Cavity)	X	X	X		X	X	X		X X
	HE, M107 (Deep Cavity)	X	X	X		X	X	P X	MP	X X
	HE, M795	X	X	X		X		X		X X
	HERA, M549/M549A1	X	X	X			X	B		X X
	HE, M449 Series			X		X			X	
	M483A1					S			S	
	HE, M692/M731					X			X	
	AT, M718/M718A1 and M741/M741A1					X			X	
	SMK, HC, BE, M116A1			X		X			X	
	SMK, HC&CLD BE, M116 M116B1				X					
	SMK, WP, M110 Series	X	X		X		X			X X
	ILLUM M485 Series			X		X			X	
	PRACTICE, M804	X	X		X		X	X		X X
	PRACTICE, M804A1	X	X		X		X			X X
	SMOKE, WP, M825, M825A1				X				X	
	EXTENDED RANGE, DP, M864				S				S	
	HEAT, M712 COPPERHEAD	FUZE IS INTEGRAL PART OF PROJECTILE								
	AGENT, GB2, M687	X	X							X

See Projectile/Propelling Charge Charts for correct combinations, Section VIII thru Section XI.

B = THE M549 SERIES RA PROJECTILES ARE ONLY COMPATIBLE WITH THE M732A2 FUZE

C = COMBAT EMERGENCY USE ONLY

M = USMC TRAINING USE ONLY; FIRING LIMITS 0°F TO 120°F (-18°C TO +49°C)

P = SUPPLEMENTARY CHARGE MUST BE REMOVED TO MAKE ROOM FOR LONG INTRUSION FUZE

S = PROJECTILE MAY BE USED FOR SELF-REGISTRATION (AS SPOTTING ROUND) BY REPLACING EXPULSION CHARGE ASSEMBLY WITH PROJECTILE SPOTTING CHARGE ADDED TO FUZE

**SECTION V**  
**CARTRIDGE-FUZE COMBINATIONS FOR MORTARS**

		FUZE																											
		PD						MT		MTSQ				T		PROX													
Canon (Weapon)	Cartridge	M8	M48A3 w/adapter	M521	M524 SERIES	M525 SERIES	M526 SERIES	M527 SERIES	M557	M567	M751	M775	M935	M936	M745	M562	M565	M577 SERIES	M520 SERIES	M548	M564	M772	M776	M65, M65A1	M84, M814A1	M768	M513 SERIES	M532	M734 Multi-Option
60 Millimeter M2, M19, M224	HE, M49 Series HE M720 HE M888 Illum, M83 Series Illum, M721 Smoke, WP 1432/A Smoke, WP MJ302A TP, M50A3 TP, M840		X								X															X			
81 Millimeter M1, M29, M29A1 M252	HE, M362 Series HE, M374 Series HE, M821 HE, M889 HE, M983 HE, 984 Illum, M301 Series Illum, M853A1 Smoke, WP, M57 Series Smoke, WP, M375 Series Smoke, RP, M819 TP, M43 Series TP, (FR), M879 TP, (SR), M880			X	X							X														X			
4.2 Inch M2, M30	CS, M630 GAS, M2 Series HE, M329, M329A1 HE, M329A2 Illum, M335A1 Illum, M335A2 Smoke, WP, M328 Series	X				X												X							P				
120 Millimeter, M120, M121	HE, M57 HE, M933 HE, M934 Illum, M91 Illum, XM930 Smoke, WP, M68 Smoke, WP, XM929	X	X									X			X	X										X			

P = SUPPLEMENTARY CHARGE MUST BE REMOVED TO MAKE ROOM FOR LONG INTRUSION FUZE.

**SECTION VI**  
**CARTRIDGE-FUZE COMBINATIONS FOR RECOILLESS RIFLES**

CANNON (Weapon)	Cartridge	FUZE				
		PD	PI	MT	BD	
	M503 Series					
	M90 Series					
	M509 Series (BD)					
	M530 Series (BD)					
	M592 Series					
	M62 Series					
	M91 Series					
57 Millimeter Rifle M18, M18A1	HE, M306	X				
	HE, M306A1	X				
	HEAT, M307 SERIES		X			
	SMOKE, WP, M308	X				
	SMOKE, WP, M308A1	X				
	TP, M306A1	X				
75 Millimeter Rifle M20	HEAT, M310					X
	HEAT-T, M310A1					X
90 Millimeter Rifle M67	HEAT, M371 SERIES			X		
	PRACTICE, M371			X		
105 Millimeter Rifle M27, M27A1	HEP-T, M326					X
106 Millimeter Rifle M40A6 M40A4	APERS-T, M581				X	
	HEAT, M344 SERIES		X			
	HEP-T, M346 SERIES					X

**SECTION VII**  
**AUTHORIZED PROJECTILE/PROPELLING COMBINATIONS FOR**  
**\* M1A1 CANNON TUBE (155MM)**

Projectiles	Propelling Charge										Firing Limitations	
	(Green Bag) M3 & M3A1					(White Bag) M4A1 & M4A2						
	Zone					Zone						
	1	2	3	4	5	3	4	5	6	7		
HE, M107	X	X	X	X	X	X	X	X	X	X		
HE, M449 SERIES ICM	X	X	X	X	X	X	X	X	X	X		
ILLUM, M485A1 & A2	X	X	X	X	X	X	X	X	X	X	M485A1/A2 Projectiles not reliable when fired at charges 6 and 7 with fuze settings of 10 seconds or less	
AGENT H, HD, M110	X	X	X	X	X	X	X	X	X	X	M110 Agent burster loaded with tetrytol cannot be stored or fired at temperatures exceeding 125°F (+52°C)	
AGENT (GB or VX) M121A1	X	X	X	X	X	X	X	X	X	X	M121 Agent burster loaded with tetrytol cannot be stored or fired at temperatures exceeding 125°F (+52°C) (M121A1 Projectile burster is loaded with Comp B)	
SMOKE, WP, M110 (M110E1) M110A1 (M110E2) M110A2 (M110E3)	X	X	X	X	X	X	X	X	X	X	M110 (M110E1) burster loaded with Tetrytol cannot be stored or fired at temperatures exceeding 125°F(+52°C) M110A1&A2 Burster loaded with Comp B	
SMOKE HC,BE,M116A1	X	X	X	X	X	X	X	X	X	X		
SMOKE HC, CLD, BE, M116, M116B1	X	X	X	X	X	X	X	X	X	X	**Overhead Fire Restrictions	
PRACTICE, M804	X	X	X	X	X	X	X	X	X	X		

\* Primer M2A4 is the only authorized primer to be used with M 1A 1 Cannon tube

\*\* M116 and M116B1 restricted from overhead fire with zone 7 of M4A1 and M4A2

charges due to possible base plate separations creating downrange safety hazard.

**SECTION VIII**  
**AUTHORIZED PROJECTILE/PROPELLING CHARGE COMBINATIONS FOR**  
**\*M1A2 CANNON TUBE AND M126A1 CANNON TUBE (155MM)**

Projectiles	Propelling Charge												Firing Limitations	
	(Green Bag) M3 & M3A1					(White Bag) M4A1&M4A2								
	Zone					Zone								
1	2	3	4	5		3	4	5	6	7				
HE, M107	x	x	x	x	x	x	x	x	x	x				
HE, M449, M449A1, ICM	x	x	x	x	x	x	x	x	x	x				
HE, M483A1, ECM	x	x	x	x	x	x	x	x	x	x				
HE, M692/M731	x	x	x	x	x	x	x	x	x	x				
HEAT, M712 (Copperhead)	No	No	No	x	x	No	x	x	x	x				
AT, M718/M741	x	x	x	x	x	x	x	x	x	x				
ILLUM, M485A1, M482A2	x	x	x	x	x	x	x	x	x	x	M485A1/A2 Projectiles not reliable when fired at charges 6, 7 with fuze settings of 10 seconds or less			
AGENT H, M110	x	x	x	x	x	x	x	x	x	x	M110 Agent Burster loaded with Tetrytol cannot be stored or fired at temperatures exceeding 125°F (+52°C)			
SMOKE, WP, M1100 (M110E1) (M110E2) M110A2 (M110E3)	x	x	x	x	x	x	x	x	x	x	M1010 (M110E1) burster loaded with Tetrytol cannot be stored or fired at temperatures exceeding 125°F (+52°C)			
SMOKE BE, HC, M116, M116B1	x	x	x	x	x	x	x	x	x	x	**Overhead Fire Restriction			
SMOKE, BE, HE, M116A1	x	x	x	x	x	x	x	x	x	x				
AGENT (GB or VX) M121/M121A1	x	x	x	x	x	x	x	x	x	x	M121 Burster loaded with Tetrytol cannot be stored or fired at temperatures exceeding 125°F (+52°C)			
HERA, M549, M549A1	No	No	No	No	No	No	No	No	No	x	Rocket on only			
PRACTICE, M804	x	x	x	x	x	x	x	x	x	x				
SMOKE, WP, M825, M825A1	x	x	x	x	x	x	x	x	x	x	Firing below charge 3 may result min stickers M825 projectiles are restricted to firing below 950 mils elevation with the M203 charge Firing this combination at elevations exceeding 950 mils may result in short rounds. This limitation does not apply to M825A1 projectile			
AGENT, GB2, M687	x	x	x	x	x	x	x	x	x	x				
HE, M864 (ICM) EXTENDED RANGE	No	No	No	No	No	No	No	No	No	x	M864 fired to achieve ranges beyond M483A1 or when M483A1 is not available			

\*Primer Mk2A4 is the only authorized primer for Cannon Tube M1A2. Use M82 Primer for Cannon Tube M126A1.

\*\*M116 and M116B1 restricted from overhead fire with Zone 7 of M4A1 and M4A2 Charges due to possible base plate separation creating downrange safety hazard.

**SECTION IX**  
**AUTHORIZED PROJECTILE/PROPELLING CHARGE**  
**COMBINATIONS FOR \*M185/M284 CANNON TUBES (155MM)**

Projectiles	Propelling Charge										M119 Zone 8	M119A1, M119A2 Zone 8	M119A2 Zone 7***	M203 and M203A1 Charge 8	Propelling Charge					Firing Limitations					
	(Green Bag) M3&M3A1					(White Bag) M4A1&M4A2									M231 <sup>6</sup>		M232 <sup>6</sup>								
	Zone		Zone				Charge		Charge						Charge		Charge								
	1	2	3	4	5	3	4	5	6	7					1	2	3	4	5						
HE, M107	No	x	x	x	x	x	x	x	x	x	x	x	No	x	x	x	x	No							
HE, M795	No	No	x	xc	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
HE, M449, M449A1, ICM	No	x	x	x	x	x	x	x	x	x	x	x	No	x	x	x	x	No							
HE, M483A1, ICM	No	No	x	x	x	x	x	x	x	x	x	x	No	x	x	x	x	No	Firing below charge three may result in stickers <sup>8</sup>						
HE, M692/M731	No	No	x	x	x	x	x	x	x	x	x	x	No	x	x	x	x	x	No	Firing below charge three may result in stickers <sup>8</sup>					
AT, M718/M741	No	No	x	x	x	x	x	x	x	x	x	x	No	x	x	x	x	x	No	Firing below charge three may result in stickers <sup>8</sup>					
ILLUM, M485A1, M485A2	No	x	x	x	x	x	x	x	x	x	****	****	****	No	x	x	x	x	No	M485A1/A2 projectiles not reliable when fired at charges 6, 7, & 8 with fuze settings of 10 seconds or less.					
AGENT, H/HD, M110	No	x	x	x	x	x	x	x	x	x	x	x	x	No	x	x	x	x	No	M110 agent burster loaded with tetrytol cannot be stored or fired at tempera- tures exceeding 125°F (+52°C)					
SMOKE, WP, M110 (M110E1) M110A1 (M110E2) M110A2 (M110E3)	No	x	x	x	x	x	x	x	x	x	x	x	No	x	x	x	x	No	M110 (M110E1) burster loaded with tetrytol can- not be stored or fired at temperatures exceeding 125°F (+52°C)						
SMOKE, BE, HC, M116, M116B1	No	x	x	x	x	x	x	x	x	x	No	No	No	No	x	x	x	x	No	**Overhead Fire Restric- tion					
SMOKE, BE, HC, M116A1	No	x	x	x	x	x	x	x	x	x	x	x	No	x	x	x	x	No							
AGENT (GB OR VX) M121	No	x	x	x	x	x	x	x	x	x	x	x	No	x	x	x	x	No	M121 burster loaded with tetrytol cannot be stored or fired at temperatures exceeding 125°F (+52°C)						
HERA, M549/M549A1 <sup>3</sup>	No	x	x	x	x	x	x	x	x	x	x	x	x <sup>1</sup>	No	No	x	x	x <sup>1</sup>	Rocket on firing only <sup>5</sup>						
PRACTICE, M804, M804A1	No	x	x	x	x	x	x	x	x	x	x	x	No	x	x	x	x	No	Firing at charge 2 in the M119 cannon may result in stickers occasionally <sup>8</sup>						
HEAT, M712 (Copperhead) M109A2/A3/A4/A5/A6 Howitzer	No	No	x	x	x	No	x	x	x	x	x	x	No	No	x	x	x	x	No						
HEAT, M712 (Copperhead) M109A1 Howitzer	No	No	x	x	x	No	x	x	x	x	No	No	No	No	No	No	**	No	No						

**SECTION IX**  
**AUTHORIZED PROJECTILE/PROPELLING CHARGE**  
**COMBINATIONS FOR \*M185/M284 CANNON TUBES (155MM) (Continued)**

Projectiles	Propelling Charge										M119 Zone 8	M119A1, M119A2 Zone 8	M119A2 Zone 7** <sup>*</sup>	M203 and M203A1 Charge 8	Propelling Charge					Firing Limitations					
	(Green Bag) M3&M3A1					(White Bag) M4A1&M4A2									M231 <sup>6</sup>		M232 <sup>6</sup>								
	Zone					Zone									Charge		Charge								
	1	2	3	4	5	3	4	5	6	7					1	2	3	4	5						
SMOKE, WP, M825, M825A1 <sup>1,3</sup>	No	No	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	Firing below charge 3 may result in stickers. M825 projectiles are restricted to firing below 950 mils elevation with the M203 charge. Firing this combination at elevations exceeding 950 mils may result in short rounds. This limitation does not apply to M825A1 projectile. <sup>8</sup>					
EXTENDED RANGE, M864 <sup>3</sup>	No	No	No	No	No	No	No	No	No	x	No	x	x	x	No	No	x	x	x	<sup>4</sup>					
AGENT, GB2, M687	No	No	x	x	x	x	x	x	x	x	x	x	x	x	No	No	x	x	x	Firing below charge 3 may result in stickers <sup>8</sup>					

\*Primer M82 is the only authorized primer to be used in the M185/M284 cannon tube.

\*\*M116 and M116B1 restricted from overhead fire with zone 7 of M4A1 and M4A2 charges due to possible base plate separation creating downrange safety hazard.

\*\*\*The M119A2 charge zone 7 is equivalent to the M119/M119A1 charge zone 8. Refer to firing tables for small differences in velocity which affect range.

\*\*\*\*Combat emergency use only.

<sup>1</sup>M825 projectiles (manufactured Jan 85-May 86) fired at temperatures above +100F (+43C) (WP liquified) have resulted in flight instability and short rounds. This instability does not occur below +110F (+43C) (WP solid). This restriction does not apply to the M825A1 projectile.

<sup>2</sup>The M203/M203A1 charges are to be fired by the M284 cannon only.

<sup>3</sup>Do not fire the M549/M549A1/M864/M825/M825A1 projectiles if the obturator is missing or broken. If the obturator is displaced and can be repositioned and remain in the groove, the projectile can be fired.

<sup>4</sup>The M864 will be fired to achieve ranges beyond the capabilities of the M483A1 projectile or when the M483A1 is not available.

<sup>5</sup>This restriction does not apply when firing the M732 series fuze with the M549/M549A1 projectile.

<sup>6</sup>Do not load or fire M231 charges with the M232 charges. Critical malfunction could result.

<sup>7</sup>Only the M549A1 should be fired at this zone.

<sup>8</sup>For bag charges only.

**SECTION X**  
**AUTHORIZED PROJECTILE/PROPELLENG CHARGE COMBINATIONS FOR**  
**M199 CANNON TUBE (155MM)**

Projectiles	Propelling Charge										M119 Zone 8	M119A1 Zone 8	M119A2 Zone 7** <sup>#</sup>	M203/M203A1 M8S**	Firing Limitations					
	(Green Bag) M3 & M3A1					(White Bag) M4A1&M4A2														
	Zone					Zone														
	1	2	3	4	5	3	4	5	6	7										
HE, M107	No <sup>1</sup>	x	x	x	x	x	x	x	x	x	x	x	x	No						
HE, M449, M449A1, ICM	No <sup>1</sup>	x	x	x	x	x	x	x	x	x	x	x	x	No						
HE, M483A1, ICM	No <sup>1</sup>	No	x	x	x	x	x	x	x	x	x	x	x	No	Firing below charge three may result in stickers.					
HE, M692, M731, (ADAM)	No <sup>1</sup>	No	x	x	x	x	x	x	x	x	x	x	x	No	Firing below charge three may result in stickers					
AT, M718, M741, (RAAMS) M718A1, M741A1	No	No	x	x	x	x	x	x	x	x	x	x	x	No	Firing below charge three may result in stickers					
ILLUM, M485A1, M485A2	No <sup>1</sup>	x	x	x	x	x	x				x	x		No	M485A1/A2 Projectiles not reliable when fired at charges 6, 7 with fuze settings of 10 seconds or less					
AGENT H, HD, M110	No <sup>1</sup>	x	x	x	x	x	x	x	x	x	x	x	x	No	M110 Agent Burster loaded w/ Tetrytol cannot be stored or fired at temperatures exceeding 125°F (+52°C)					
SMOKE, WP, M110 (M110E1) M110A1 (M110E2) M110A2 (M110E3)	No <sup>1</sup>	x	x	x	x	x	x	x	x	x	x	x	x	No	M110 (M110E1) burster loaded with Tetrytol cannot be stored or fired at temperatures exceeding 125°F (+52°C)					
SMOKE BE, HC, M116, M116B1	No <sup>1</sup>	x	x	x	x	x	x	x	x	*	No	No	No	No	****Overhead Fire Restriction Do not fire WP projectiles known to have been stored other than base down. Firing of such projectiles could contribute to inbore explosions or close-in premature malfunctions.					
SMOKE, BE, HC, M116A1	No <sup>1</sup>	x	x	x	x	x	x	x	x	x	x	x	x	No						
AGENT (GB or VX) M121A1	No <sup>1</sup>	x	x	x	x	x	x	x	x	x	x	x	x	No	M121 Burster loaded with Tetrytol cannot be stored or fired at temperatures exceeding 125°F (+52°C)					
M687, AGENT (GB)	No <sup>1</sup>	No	x	x	x	x	x	x	x	x	x	x	x	No	Firing below charges may result in stickers					

\* M116 and M116B1 restricted from overhead fire with Zone 7 of M4A1 and M4A2. Charge due to possible base plate separation creating down range safety hazard

\*\* M728 Proximity Fuse cannot be fired w/Zone 8's, M203 Propelling Charge.

\*\*\*The 119A2 Charge Zone 7 is equivalent to M119/M119A1 Charge zone 8. Refer to firing tables for small

differences in velocity which affect range

<sup>1</sup> Firing at charge 2 may result in sticker occasionally

**SECTION X**  
**AUTHORIZED PROJECTILE/PROPELLING CHARGE COMBINATIONS FOR**  
**M199 CANNON TUBE (155MM) continued**

Projectiles	Propelling Charge										M119 Zone 8	M119A1 Zone 8	M119A2 Zone 7**	M203/M203A1	M8S**	Firing Limitations							
	(Green Bag) M3&M3A1					(White Bag) M4A1&M4A2																	
	Zone					Zone																	
	1	2	3	4	5	3	4	5	6	7													
HERA, M549	No <sup>1</sup>	No	No	No	No	No	No	No	No	x	No	x	x	x	No	M549 must never be fired with M203 charge****							
HERA, M549A1	No	No	No	No	No	No	No	No	No	x	No	x	x	x	x	M549 must never be fired with M203 charge****							
PRACTICE, M804	No <sup>1</sup>	x	x	x	x	x	x	x	x	x	x	x	x	x	No								
HE, M795	No <sup>1</sup>	No	x	x	x	x	x	x	x	x	x	x	x	x	x								
HEAT, M712 (Copperhead)	No <sup>1</sup>	No	No	x	x	No	x	x	x	x	x	x	x	x	No								
SMOKE, WP, <sup>2</sup> M825/M825A1	No <sup>1</sup>	No	x	x	x	x	x	x	x	x	x	x	x	x	x	Firing below charge 3 may result in stickers. M825 projectiles are restricted to firing below 950 mils elevation with the M203 charge. Firing this combination at elevations exceeding 950 mils may result in short rounds. This limitation does not apply to M825A1 projectile							
HE, ICM, M864 Extended Range										x	x	x	x	x	x	Firing below charge 3 may result in stickers. The M864 shall be fired to achieve ranges beyond the capabilities of the M483A1 projectile or when the M483A1 is not available							

\*M116 and M116B1 restricted from overhead fire with Zone 7 of M4A1 and M4A2. Charge due to possible base plate separation creating down range safety hazard.

\*\*M728 Proximity Fuse cannot be fired w/Zone 8's, M203 Propelling Charge.

\*\*\*The M119A2 Charge Zone 7 is equivalent to M119/M119A1 Charge Zone 8. Refer to firing tables for small differences in velocity which affect range.

\*\*\*\*Rocket On Firing Only.

<sup>1</sup>Firing at Chg 2 may result in sticker occasionally.

<sup>2</sup>M825 projectiles (manufactured Jan 85-May 86) fired at temperature above +110°F (+43°C) (WP liquified) have resulted in flight instability and short rounds. This instability does not occur below +110°F (+43°C) (WP solid). This restriction does not apply to the M825A1 projectile.

**SECTION XI**  
**AUTHORIZED PROJECTILE/PROPELLING CHARGE COMBINATIONS FOR**  
**8 INCH HOWITZERS**

Weapon	Cannon	Projectile	Propelling Charge										
			M1					M2			M188		
			Zone				Zone			Zone		Zone	
			1	2	3	4	5	5	6	7	8	9	
M110 & M115	M2A2 & M2A1	AGENT, GB or VX M426	x	x	x	x	x	x	x	No	No	No	
		HE, M106	x	x	x	x	x	x	x	No	No	No	
		HE, M404	x	x	x	x	x	x	x	No	No	No	
M110A1	M201	HERA, M650 Rocket On							x	x	x	No	
		HERA, M650 Rocket Off	x	x	x	x	x	x	x	x	x	No	
		HE, M106	x	x	x	x	x	x	x	x	x	No	
M110A2	M201A1	HE, M404	x	x	x	x	x	x	x	No	No	No	
		HE, M106	x	x	x	x	x	x	x	x	x	*	
		HE, M404	x	x	x	x	x	x	x	No	No	No	
		HERA, M650 Rocket On						x	x	x	x	x	
		HERA, M650 Rocket Off	x	x	x	x	x	x	x	x	x	x	
		HE, M509A1	x	x	x	x	x	x	x	x	x	x	
		AGENT, GB or VX M426	x	x	x	x	x	x	x	x	x	x	

\*M106 Projectile can be fired w/M557, M739, M572, M728, M732, MS82 and MS87 Fuze at this zone. The MS64 can only be fired with the M106 Projectile with zones 1 through 8.

**APPENDIX C****DODAC LISTING**

<u>DODAC</u>	<u>ITEM</u>
1310-B470	Cartridge, 40mm: HE, M384
1310-B475	Cartridge, 40mm: Canopy Yellow Smoke, M676
1310-B477	Cartridge, 40mm: Canopy White Smoke, M680
1310-B479	Cartridge, 40mm: Canopy Red Smoke, M682
1310-B480	Cartridge, 40mm: Practice, M385
1310-B504	Cartridge, 40mm: Parachute, Green Star, M661
1310-B505	Cartridge, 40mm: Parachute, Red Star, M662
1310-B506	Cartridge, 40mm: Ground Marker Red Smoke, M713
1310-B508	Cartridge, 40mm: Ground Marker Green Smoke, M715
1310-B509	Cartridge, 40mm: Ground Marker Yellow Smoke, M716
1310-B519	Cartridge, 40mm: Practice, M781
1310-B526	Cartridge, 37mm: TP M63, MOD1
1310-B534	Cartridge, 40mm: Multiple Projectile, M576
1310-B535	Cartridge, 40mm: Parachute, White Star M583A1
1310-B536	Cartridge, 40mm: Cluster, White Star, M585
1310-B542	Cartridge, 40mm: HEDP, M430
1310-B546	Cartridge, 40mm: HEDP, M433
1310-B552	Cartridge, 40mm: AP-T, M81A1 and M81
1310-B559	Cartridge, 40mm: HE-T, SD, MK11, MK2, MV2890
1310-B562	Cartridge, 40mm: HE-T SD, MK11, MK2 MV2870 and SD, M3 or M3A1, MV2700
1310-B564	Cartridge, 40mm: TP-T, M91
1310-B565	Cartridge, 40mm: Dummy, M25
1310-B568	Cartridge, 40mm: HE, M381
1310-B568	Cartridge, 40mm: HE, M406
1310-B569	Cartridge, 40mm: HE, M397A1
1310-B569	Cartridge, 40mm: HE, M397
1310-B571	Cartridge, 40mm: HE, M383
1310-B573	Cartridge, 40mm: HE, M684
1310-B574	Cartridge, 40mm: HE, M386
1310-B575	Cartridge, 40mm: HE, M441
1310-B577	Cartridge, 40mm: Practice, M407A1
1310-B577	Cartridge, 40mm: Practice, M382
1310-B584	Cartridge, 40 Millimeter Practice, M918
1310-B585	Cartridge, 57mm: Canister, T25E5
1310-B586	Cartridge, 57mm: HE, M306A1 and M306
1310-B587	Cartridge, 57mm: HEAT, M307A1 and M307
1310-B588	Cartridge, 57mm: TP, M306A1
1310-B590	Cartridge, 57mm: Smoke, WP, M308A1 and M308
1310-B627	Cartridge, 60mm: Illuminating, M83A3, M83A2, and M83A1
1310-B629	Cartridge, 60mm: Training, M69
1310-B630	Cartridge, 60mm: Smoke, WP, M302
1310-B630	Cartridge, 60mm: Smoke, WP, M302A1 302E1)
1310-B632	Cartridge, 60mm: HE, M49A3 (M49A2E1) and M49A2
1310-B632	Cartridge, 60mm: HE, M49A4 (M49A2E2)

<u>DODAC</u>	<u>ITEM</u>
1310-B633-----	Cartridge, 60mm: Target Practice, M50A3 (M50A2E1)
1310-B638-----	Projectile, 64mm: CS M742 and KE M743 with Launcher M234
1310-B642-----	Cartridge, 60mm: HE, M720
1310-B670-----	Cartridge, 50mm: Pyrotechnic, M800
1315-C025-----	Cartridge, 75mm: Blank, M337A2 (M337A1E1), M337A1 and M337
1315-C027w/PD Fuze-----	Cartridge, 75mm: HE, M48
1315-C028 w/o PD Fuze-----	Cartridge, 75mm: HE, M48
1315-C033-----	Cartridge 75mm: Dummy, M19 or M19B1
1315-C051-----	Cartridge, 75mm: HE, M309A1 and M309
1315-C052-----	Cartridge, 75mm: HEAT-T M310A1 and M310
1315-C053-----	Cartridge, 75mm: HEP-T, M349
1315-C056-----	Cartridge, 75mm: Smoke, WP, M311A1 and M311
1315-C110-----	Cartridge, 76mm: HEAT-T, M496
1315-C120-----	Cartridge, 76mm: AP-T, M339
1315-C121-----	Cartridge, 76mm: Canister, M363
1315-C122-----	Cartridge, 76mm: HE, M352
1315-C124-----	Cartridge, 76mm: HVAP-T, M319
1315-C125-----	Cartridge, 76mm: HVAP-D-S-T, M331A1 and M331A2
1315-C127-----	Cartridge, 76mm: TP-T, M340A1 and M340
1315-C128-----	Cartridge, 76mm: Smoke, WP, M361A1 or M361
1315-C131-----	Cartridge, 76mm: Blank, M355A2
1315-C225-----	Cartridge, 81mm: HE, M43A1 and M43A1B1
1315-C227-----	Cartridge, 81mm: Target Practice, M43A1
1315-C228-----	Cartridge, 81mm: Training, M445 (T32E1)
1315-C230-----	Cartridge, 81mm: Smoke, WP, M57A1 and M57
1315-C256-----	Cartridge, 81mm: HE, M374A3(M374A2E1)
1315-C258-----	Cartridge, 90mm: Smoke, WP,M313 and M313C
1315-C259(MV2800)-----	Cartridge, 90mm: AP-T, M318, MV2800, and M318 (T33E7) or M318A1, MV3000
1315-C259-----	Cartridge, 90mm: AP-T, M77
1315-C260-----	Carttidge, 90mm: APC-T, M82
1315-C261-----	Cartridge, 90mm: Blank, M394
1315-C262-----	Cartridge, 90mm: Canister M336
1315-C263-----	Cartridge, 90mm: Dummy M12, M12B1 and M12B2
1315-C265(M71)-----	Catiridge, 90mm: HE-T, M71A1 and HE, M71
1315-C266(M71)-----	Cartridge, 90mm: HE-T, M71A1 and HE, M71
1315-C267(M71)-----	Cartridge, 90mm: HE-T, M71A1 and HE, M71
1315-C268-----	Cartridge, 90mm: HEAT, M348A1(T108E46) andM348
1315-C270-----	Cartridge, 90mm: HVAP-T, M332A1
1315-C275-----	Cartridge, 90mm: APERS--M580
1315-C276-----	Cartridge, 81mm: Smoke, WP,M375A2 and M375A1
1315-C276-----	Cartridge, 81mm: Smoke, WP,M375A3
1315-C276-----	Cartridge, 81mm: Smoke, WP,375
1315-C280(M71A1)-----	Cartridge, 90mm: HE-T, M71A1 and HE, M71
1315-C282-----	Cartridge, 90mm: HEAT, M371A1
1315-C283-----	Cartridge, 90mm: Practice, M371
1315-C285(MV300)-----	Cartridge, 90mm: AP-T, M318, MV2800, and M318(T33E7) or M318A1, MV3000
1315-C290-----	Cartridge 90mm: TP-T,M353(T22E1J M353A1(M353E1) and M353A2
1315-C294-----	Cartridge, 90mm: HEAT-T M431(T300E59JM431A), and M431A2

<u>DODAC</u>	<u>ITEM</u>
1315-C410	Cartridge, 90mm: Canister Antipersonne~ M590 (XM590E1)
1315-C429	Cartridge, 105mm: HEP-T, M393A2 and M393A1
1315-C440	Cartridge, 105mm: Blank, M395
1315-C441	Cartridge 105mm: Agent, GB,M360
1315-C442	Cartridge, 105mm: Agent, Hor HD,M60
1315-C444	Cartridge, 105mm: HE,M1
1315-C448	Cartridge, 105mm: HE,HEP-T,M327 (T81E28)
1315-C449	Cartridge, 105mm: Illuminating, M314, M314A2, M314A2B1
1315-C449-	Cartridge, 105mm: Illuminating, M314A3
1315-C450	Cartridge, 105mm: Leaflet M84B1
1315-C452	Cartridge, 105mm: H.C. BE, M84 Series
1315-C454	Cartridge, 105mm: Smoke, WP,M60 Series
1315-C457	Catiridge, 105mm: TP-t,M67
1315-C458	Cartridge, 105mm: Dummy M14
1315-C462	Cartridge, 105mm: He,M444
1315-C463	Cartridge, 105mm: HERA, M548
1315-C468	Cartridge, 105mm: Tactical CS,M629
1315-C469-	Cartridge, 105mm: HE, M413(T377E1)
1315-C472	Cartridge, 105mm: HEAT-T, M622
1315-C473	Cartridge, 105mm: HE,M760
1315-C494	Cartridge, 105mm: APDS-T, M467
1315-C505	Cartridge, 105mm: APDS-T,M392A2and M392
1315-C506	Cartridge, 105mm: APDS-T,M392A2 and M392
1315-C508	Cartridge, 105mm: HEAT-T, M456 Series
1315-C510	Cartridge, 105mm: TP-T.M467
1315-C511	Cartridge, 105mm: TP-T, M490
1315-C511	Cartridge, 105 mm: TP-TM490A1
1315-C512	Cartridge, 105mmun: Smoke, WP-T, M416
1315-C513	Cartridge, 105 mm: APERS-~M546
1315-C514-	Cartridge, 105mm/ Dummy M457
1315-C518-	Cartridge, 105mm: HEP-T,~M393A2 and M393A1
1315-C519-	Cartridge, 105mm: APERS-TM494
1315-C520-	Cartridge, 105mm: TPDS-T, M724A1 and M724
1315-C521	Cartridge, 105nm: APFSD-TM735
1315-C524-	Cartridge, 105mm: APFSDS-T,XM833
1315-C533	Cartridge, 105mm: TPCSDS-TD M128(Patrone, 105mm, DM128)
1315-C543	Cartridge, 105mm: APFSDS-~M900
1315-C570	Cartridge, 165mm: HEP,M123A1 and M123
1315-C601	Cartridge, 90mm: Canister, M377
1315-C650	Cartridge, 106mm: HEAT,M344A1 and M344
1315-C651-	Cartridge, 106mm: HEP-T,M346A1
1315-C654-	Cartridge, 106mm: Dummy M368
1315-C660	Cartridge, 106mm: APERS-T, M581
1315-C699-	Cartridge, 4.2-Inch: HE, M329A2(M329A1E1) w/oFuze
1315-C701	Cartridge, 4.2-Inch: Gas, M2A1and M2, CNB,CNS
1315-C703	Cartridge, 4.2-Inch: Gas, M2A1and M2, H,HD,HT
1315-C704	Cartridge, 4.2-Inch: HE, M3A1and M3
1315-C704	Cartridge, 4.2-Inch: HE, M329and M329B1 w/Fuze
1315-C704	Cartridge, 4.2-Inch: HE, M329A1w/Fuze
1315-C704	Cartridge, 4.2-Inch: HE, M329A2(M329A1E1) w/Fuze
1315-C705-	Cartridge, 4.2-Inch: HE, M329and M329B1 w/oFuze
1315-C705-	Cartridge, 4.2-Inch: HE, M329A1 w/o Fuze

<u>DODAC</u>	<u>ITEM</u>
1315-C706 .....	Cartridge, 4.2-Inch: Illuminating, M335A1 and M335
1315-C706 .....	Cartridge, 4.2-Inch: Illuminating, M335A2
1315-C708 .....	Cartridge, 4.2-Inch: Smoke, PWP or WP, M2A1 and M2
1315-C708 .....	Cartridge, 4.2-Inch: Smoke, WP, M328A1 and M328
1315-C710 .....	Cartridge, 4.2-Inch: Tactical CS, M630
1315-C784 .....	Cartridge, 120mm: TP-T, M831
1315-C785 .....	Cartridge, 120mm: TPCSDS-T, M865
1315-C787 .....	Cartridge, 120mm: HEAT-MP-T, M830
1315-C800 .....	Projectile, 120mm: HE-T, M356 (T15E3)
1315-C802 .....	Projectile, 120mm: AP-T, M358
1315-C804 .....	Projectile, 120mm: TP-T, M359E2 (T14E7)
1315C806.....	Projectile, 120mm: Smoke, WP-T, M357 (T16E4)
1315-C807 .....	Projectile, 120mm: HEAT-T, M469 (T153E15)
1315-C868 .....	Cartridge, 81mm: HE, M821
1315-C869 .....	Cartridge, 81mm: HE, M889
1320-D001 .....	Canister, DF, M20 for Projectile, 155mm: GB2, M687
1320-D002 .....	Canister, OPA, M21 for Projectile, 155mm: GB2, M687
1320-D003 .....	Charge, Spotting, Projectile
1320-D380 (M411).....	Cartridge, 152mm: TP-T, M411
1320-D381 .....	Cartridge, 152mm: HEAT-T-MP-M409A2, M409A1, and M409
1320-D383 (M411A3), M411A2, and M411A1.....	Cartridge, 152mm: TP-T, M411 Series
1320-D390 .....	Cartridge, 152mm: Canister, M625A1 and M625
1320-D493 .....	Charge, Propelling, 175mm: M86 Series
1320-D500 .....	Cartridge, 152mm: Dummy, M596
1320-D501 .....	Projectile, 155mm: HE, M692
1320-D502 .....	Projectile, 155mm: HE, M731
1320-D503 .....	Projectile, 155mm: AT, M718
1320-D505 .....	Projectile, 155mm: Illuminating, M485 Series
1320-D506 .....	Projectile, 155mm: Smoke, HC, M116A1
1320-D509 .....	Projectile, 155mm: AT, M741
1320-D510 .....	Projectile, 155mm: HEAT, Cannon-Launched, Guided, M712
1320-D511 .....	Projectile, 155mm: Training, M823
1320-D513 .....	Projectile, 155mm: Practice, M804/M804A1
1320-D514 .....	Projectile, 155mm: M741E1
1320-D515 .....	Projectile 155mm: M718E1
1320-D528 .....	Projectile, 155mm: Smoke, WP, M825/M825A1
1320-D529 .....	Projectile, 155mm: HE, M795
1320-D532 .....	Charge, Propelling, 155mm: M203A1
1320-D533 .....	Charge, Propelling, 155mm: M119 (M119A1)
1320-D533 .....	Charge, Propelling, 155mm: M119A2
1320-D533 .....	Charge, Propelling, 155mm: M203
1320-D535 .....	Projectile, 175mm: Dummy, M458 with Charge Propelling: Dummy, M98
1320-D539 .....	Projectile, 155mm: Dummy, M7 with Charge, Propelling: Dummy, M2
1320-D540 .....	Charge, Propelling, 155mm: M3 Series
1320-D541 .....	Charge, Propelling, 155mm: M4 Series
1320-D542 .....	Projectile, 155mm: GB (Non-Persistent), M121A1
1320-D543 .....	Projectile, 155mm: Agent H/HD, M110
1320-D544 .....	Projectile, 155mm: HE, M107 (Deep Cavity)
1320-D545 .....	Projectile, 155mm: Illuminating, M118 Series
1320-D548 .....	Projectile, 155mm: Smoke, BE, M116 and M116B1, HC
1320-D548 .....	Projectile, 155mm: Smoke, HC, M116, M116B1

<u>DODAC</u>	<u>ITEM</u>
1320-D549 -----	Projectile, 155mm: Smoke, BE, M116 and M116B1, Red
1320-D550 -----	Projectile, 155mm: Smoke, WP,M110 and M110A1
1320-D550 -----	Projectile, 155mm: Smoke, WM110A1 (M110E2L M110A2(M110E3)
1320-D551 -----	Projectile, 155mm: Smoke, BE, M116 and M116B1, Yellow
1320-D552 -----	Reduceq Flash: M2(T2)
1320-D553 -----	Projectile, 155mm: Dummy M7: Dummy,M2
1320-D554 -----	Projectile, 155mm: Smoke, BE, M116 and M116B1, Violet
1320-D561 -----	Projectile, 155mm: HE, M449 and M449E1
1320-D562 -----	Projectile, 155mm: HE, M449A1, M449E2
1320-D563 -----	Projectile, 155mm: HE,M483A1
1320-D864 -----	Projectile, 155mm: Extended Range, DP,M864
1320-D568 -----	Projectile, 155mm: VX(Persistent), M121A1
1320-D570 -----	Projectile, 155mm: HE, M107 (Normal Cavity)
1320-D572(M437A2, M437A1) w/ Supplementary Charge -----	Projectile, 175mm: HE, M437A2and M437A1
1320-D579 -----	Projectile, 155mm: HERA, M549
1320-D579 -----	Projectile, 155mm: HERA, M549A1
1320-D581 -----	Projectfle, 155mm: Tactical CS, XM631
1320-D590 -----	Cartridge, 165mm: TP,M623
1320-D591(M437A1, M437A2w10 Supplementary Charge) -----	Projectile, 175mm: HE, M437A2and M437A1
1320-D592 -----	Cartridge, 152mm: HE-T, M657
1320-D594 -----	Projectile 55mm: GB2, M687
1320-D624 -----	Projectle 8-Inch: HERA, M650
1320-D651 -----	Projectfle, 8-Inch: HE, M509A1
1320-D661 -----	Charge, Propelling, 8-Inch: M188
1320-D662 -----	Charge, Propelling, 8-Inch: M188A1
1320-D675 -----	Charge, Propelling, 8-Inch: M1
1320-D676 -----	Charge, Propelling, 8-Inch: M2
1320-D667(M4) -----	Projectile, 8-Inch: Dummy M14, with Charge PropellingDummyM4
1320-D679(M14)-----	Projectile, 8-Inch: Dummy M14, with Charge, Propelling Dummy M4
1320-D679 -----	Projectile, 8-Inch: Dummy M845
1320-D680 -----	Projectfle, 8-Inch: HE,M106
1320-D681 -----	Reduce L Flash: M3 (T3)
1320-D684 -----	Projectfle, 8-Inch: HE,M404
1320-D695 -----	Projectfle, 8-Inch: Agent, VX(Persistent), M426
1320-D696 -----	Projectile, 8-Inch: Agent GB (Non-Persistent), M426
1320-D709(M458) -----	Projectfle, 175mm: Dummy M458with Charge, Propelling: Dummy M98
1390-N248 -----	Fuze, Mechanical Time: M565
1390-N276 -----	Fuze, Mechanical Time, and Superquick: M501A1(or M501)
1390-N278 -----	Fuze, Mechanical Time, and Superquick: M564
1390-N280 -----	Fuze, Mechanical Tinle, and Superquick: M520A1 and M520
1390-N282 -----	Fuze, Mechanical Time, and Superquick: M548
1390-N283 -----	Fuze, Mechanical Time: M562
1390-N285 -----	Fuze, Mechanical Time, and Superquick: M577

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1390-N286 -----	Fuze, Mechanical Time, and Superquick: M582
1390-N308 -----	Fuze, Point Detonating: M524 Series
1390-N309 -----	Fuze, Point Detonating: M526 Series
1390-N310 -----	Fuze, Point Detonating: M716
1390-N311 -----	Fuze, Point Detonating: M572
1390-N314 -----	Fuze, Point Detonating: M717
1390-N318 -----	Fuze, Point Detonating: M48 Series
1390-N326 -----	Fuze, Point Detonating: M508A1and M508 Series
1390-N330 -----	Faze, Point Detonating: M78Series (Non-delay)
1390-N331 -----	Fuze, Point Detonating: M78Series (0.025 Delay)
1390-N334 -----	Fuze, Point Detonating: M567
1390-N335 -----	Fuze, Point Detonating: M557
1390-N340 -----	Fuze, Point Detonating: M739
1390-N402 -----	Fuze, Proximity: M532
1390-N411 -----	Fuze, Proximity: M514, M514B1, M514A1
1390-N412 -----	Fuze, Proximity: M513and M513B1
1390-N412 -----	Fuze, Proximity: M513A1and513A2
1390-N417 -----	Fuze, Proximity: M517
1390-N462 -----	Fuze, Proximity: M514A3(M514A1E1)
1390-N463 -----	Fuze, Proximity: M728
1390-N523 -----	Primeq Percussion: M82
1390-N525 -----	Prime~ Percussion: MK2A4
1390-N535 -----	Primeq E1ectric, and Percussion: MK15, M0DS 2and 3
1390-N600 -----	Fuze, E1ectronic Time: M587
1390-N601 -----	Fuze, E1ectronic Time: M724
1390-N464 -----	Fuze, Proximity: M732

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PAGE NO. PARA GRAPH FIGURE NO. TABLE NO.  
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