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.

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.

Remove Pages	Insert Pages
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
0329326

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CHANGE)
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NO. 10)

HEADQUARTERS
DEPARTMENT OF THE ARMY
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:

1. File this change sheet in front of the publication for reference purposes.
2. Remove old pages and insert new pages as indicated below.
3. New or changed material is indicated by a vertical bar in the outer margin of the page.
4. 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 iv	i thru iv
None	2-114.1 and 2-114.2
None	2-120.1 thru 2-120.3
4-115 and 4-116	4-115 and 4-116
4-119 and 4-120	4-119 and 4-120
B-4.1 and B-4.2	B-4.1 and B-4.2
B-5 and B-6	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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CHANGE)
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NO. 9)

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.

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.
3. New or changed material is indicated by a vertical bar in the outer margin of the page.
4. 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 and ii	i and ii
vii and viii	vii and viii
None	2-24.1 and 2-24.2
3-39 and 3-40	3-39 and 3-40
3-77 and 3-78	3-77 and 3-78
None	6-61 and 6-62
7-46.3 and 7-46.4	7-46.3 and 7-46.4
7-147 thru 7-150	7-147 thru 7-150
8-15 and 8-16	8-15 and 8-16
B-3 and B-4	B-3 and B-4
None	B-4.1 and B-4.2
B-5 and B-6	B-5 and B-6
B-13 and B-14	B-13 and B-14
C-3 and C-4	C-3 and C-4

By Order of the Secretary of the Army:

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General, United States Army
Chief of Staff

Official:

JOEL B. HUDSON
Administrative Assistant to the Secretary of the Army
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CHANGE)
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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 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:

1. File this change sheet in front of the publication for reference purposes.
2. Remove old pages and insert new pages as indicated below.
3. New or changed material is indicated by a vertical bar in the outer margin of the page.
4. 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
iii and iv	iii and iv
vii and viii	vii and viii
None	3-68.1 thru 3-68.4
3-183 thru 3-186	3-183 and 3-184
None	8-16.1 thru 8-16.4
B-9 thru B-12	B-9 thru B-12

By Order of the Secretary of the Army:

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

Official:

JOEL B. HUDSON
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TM 43-0001-28
C7

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.

By Order of the Secretary of the Army:

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General, United States Army
Chief of Staff

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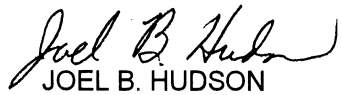

JOEL B. HUDSON
Administrative Assistant to the Secretary of the Army
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TM 43-0001-28
C6

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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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
7-58.1 and 7-58.2	7-58.1 and 7-58.2

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

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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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:

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

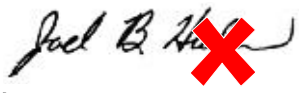
Remove pages	**Insert pages**
A thru D	A thru D
i and ii	i and ii
v and vi	v and vi
3-155 and 3-156	3-155 and 3-156
3-159 and 3-160	3-159 and 3-160
None	6-59 and 6-60
B-3 and B-4	B-3 and B-4
B-5 and B-6	B-5 and B-6
B-9 and B-10	B-9 and B-10

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

By Order of the Secretary of the Army.

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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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

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

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TM43-0001-28, dated 28 April 1994 is changed as follows:

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Remove Pages	Insert Pages
A thru D	A thru D
4-111 and 4-112	4-111 and 4-112
None	4-112.1 and 4-112.2
None	4-117 and 4-118

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

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

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General, United States Army
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JOEL B. HUDSON
Administrative Assistant to the Secretary of the Army
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Change)
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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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TM 43-0001-2828 April 1994, is changed as follows:

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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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General, United States Army
Chief of Staff

Official:
JOEL B. HUDSON
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Distribution:
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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, RECOILESS RIFLES, GRENADE
LAUNCHERS AND ARTILLERY FUZES
(Federal Supply Class, 1310,1315,1320,1390)**

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

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

Remove pages	Insert pages
v thru viii	v thru viii
3-75 and 3-76	3-75 and 3-76
3-169 thru 3-172	3-169 thru 3-172
None	4-66.1 and 4-66.2
4-77 and 4-78	4-77 and 4-78
7-33 and 7-34	7-33 and 7-34
7-89 and 7-90	7-89 and 7-90
8-5 thru 8-8	8-5 thru 8-8
B-13 and B-14	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:

DENNIS J. REIMER
General, United Stares Amy
Chief of Staff

Official:

JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Amy
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Change)
)
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)**

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

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

Remove pages	Insert pages
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	Insert pages
3-167 thru 3-170	3-167 thru 3-170
3-175 thru 3-184	3-175 thru 3-184
7-5 and 7-6	7-5 and 7-6
7-9 thru 7-14	7-9 thru 7-14
7-17 thru 7-22	7-17 thru 7-22
7-27 thru 7-36	7-27 thru 7-36
7-39 and 7-40	7-39 and 7-40
7-43 thru 7-48	7-43 thru 7-48
7-51 thru 7-58	7-51 thru 7-58
None	7-58.1 thru 7-58.2
7-59 thru 7-82	7-59 thru 7-82
7-85 and 7-86	7-85 and 7-86
7-89 thru 7-94	7-89 thru 7-94
7-97 and 7-98	7-97 and 7-98
7-101 thru 7-110	7-101 thru 7-110
7-113 thru 7-126	7-113 thru 7-126
7-131 and 7-132	7-131 and 7-132
7-135 and 7-136	7-135 and 7-136
7-139 and 7-140	7-139 and 7-140
7-143 and 7-144	7-143 and 7-144
7-147 thru 7-150	7-147 thru 7-150
B-5 and B-6	B-5 and B-6
B-9 thru B-12	B-9 thru B-12

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

By Order of the Secretary of the Army:

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

Official:

JOEL B. HUDSON
Acting Administrative Assistant to the Secretary of the Army
00288

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LIST OF EFFECTIVE PAGES

INSERT LATEST CHANGED PAGES. DESTROY SUPERSEDED PAGES.

NOTE The portion of the text affected by the changes is indicated by a vertical line in the outer margins of the page. Changes to illustrations are indicated by a vertical line adjacent to the identification number.

Dates of issue for original and changed pages are:

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

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

Page	*Change
Cover	0
A thru C	11
D	8
i	11
ii	10
iii thru ix	11
x	0
1-1	0
1-2	1
1-3 and 1-4	0
2-1 thru 2-24	0
2-25 thru 2-114	0
2-114.1 and 2-114.2	10
2-115 thru 2-120	0
2-120.1 thru 2-120.4	10
2-121 thru 2-164	0
3-1 thru 3-5	0
3-6	1
3-7	0
3-8	1
3-9 and 3-10	0
3-11	1
3-12 thru 3-16	0
3-17	1
3-18 and 3-19	0
3-20 and 3-21	1
3-22 and 3-23	0
3-24	1
3-25 and 3-26	0
3-27	1
3-28 thru 3-31	0
3-32	1
3-33	0
3-34	1
3-35 thru 3-38	0
3-39	9
3-40 and 3-41	0
3-42	1
3-43	0
3-44	1
3-45 thru 3-47	0
3-48	1
3-49 and 3-50	0
3-51	1
3-52 thru 3-54	0
3-55	1
3-56 thru 3-58	0
3-59	1
3-60 thru 3-62	0
3-63	1
3-64 thru 3-66	0
3-67	1
3-68	0
3-68.1 thru 3-68.4	8
3-69 and 70	0
3-71	1
3-72 and 3-73	0
3-74	1
3-74.1 and 3-74.2	11
3-75 and 3-76	2
3-77	9
3-78	1
3-79 thru 3-81	0
3-82	1
3-83 thru 3-85	0
3-86	1
3-87 thru 3-89	0
3-90	1
3-91 thru 3-93	0
3-94	1
3-95 thru 3-97	1
3-98	1
3-99 thru 3-101	0
3-102	1
3-103 thru 3-105	0
3-106	1
3-107 thru 3-109	0
3-110	1
3-111	0
3-112	1
3-113 thru 3-115	0
3-116	1
3-117 thru 3-119	0
3-120	1
3-121 thru 3-125	0
3-126	1
3-127	0
3-128	1
3-129 thru 3-132	0
3-133	1
3-134 and 3-135	0
3-136	1
3-137 thru 3-139	0
3-140	1
3-141 thru 3-143	0
3-144	1
3-145 thru 3-147	0
3-148	1
3-149 thru 3-151	0
3-152	1
3-153 and 3-154	0
3-155 and 3-156	5
3-157	1
3-158	0
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
3-168 and 3-169	0	7-12	0	7-66 thru 7-68	1
3-170 and 3-171	2	7-13	1	7-69	0
3-172 thru 3-175	0	7-14 thru 7-17	0	7-70	1
3-176	1	7-18	1	7-71	0
3-177	0	7-19	0	7-72	1
3-178	1	7-20	1	7-73	0
3-179	0	7-21	0	7-74	1
3-180	1	7-22	1	7-75	0
3-181	0	7-23 thru 7-27	0	7-76	1
3-182	1	7-28	1	7-77	0
3-183 and 3-184	8	7-29	0	7-78	1
3-185 and 3-186 Deleted	8	7-30	1	7-79	0
3-187 and 3-188	0	7-31	0	7-80	1
4-1 thru 4-10	0	7-32	1	7-81	0
4-10.1 thru 4-10.4	11	7-33	0	7-82	1
4-11 and 4-12	0	7-34	2	7-83 thru 7-85	0
4-12.1 and 4-12.2	7	7-35	0	7-86	1
4-13 and 4-14	0	7-36	1	7-87 and 7-88	0
4-14.1 and 4-14.2	11	7-37 thru 7-39	0	7-89 and 7-90	2
4-15 thru 4-30	0	7-40	1	7-91	1
4-30.1 and 4-30.2	11	7-41 thru 7-43	0	7-92 and 7-93	0
4-31 thru 4-66	0	7-44	1	7-94	1
4-66.1 and 4-66.2	2	7-45	0	7-95 and 7-96	0
4-67 thru 4-76	0	7-46	1	7-96.1 and 7-96.2	11
4-77 and 4-78	2	7-46.1 thru 7-46.2	7	7-97	0
4-79 thru 4-106	0	7-46.3 and 7-46.4	9	7-98	1
4-106.1 and 4-106.2	11	7-46.5 and 7-46.6	11	7-99 and 7-100	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

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
HVTP ---------- 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
		LENGTH		
in.	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		WEIGHT		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lbs)	0.9	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3

TEMPERATURE

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

Approximate Conversions from Metric Measures

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

TEMPERATURE

Symbol	When You Know	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 1/		Storage compatibility group 1/3/
Old	New 2/	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	C
1	1.4	S

Notes:

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

2/ 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.)

3/ 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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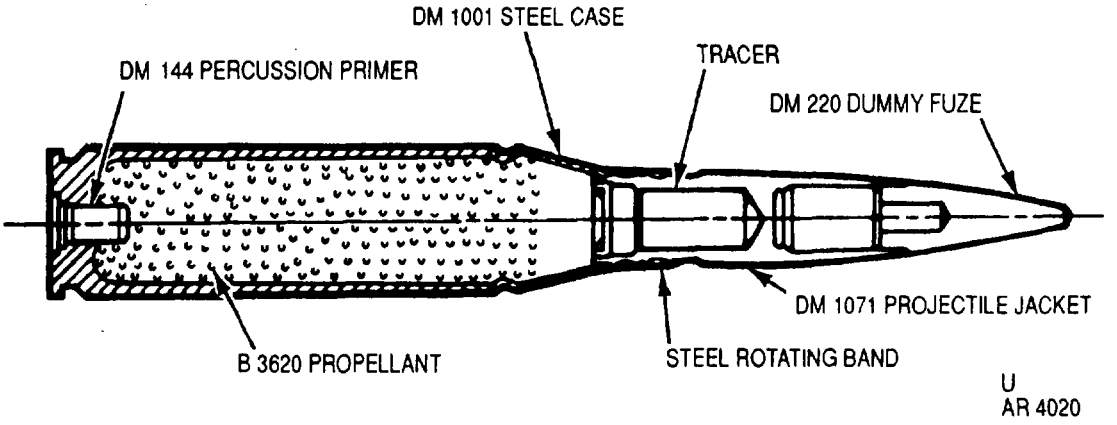
CARTRIDGE, 35 MILLIMETER: TP-T M968 WITH IGNITOR, ELECTRIC, M63



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 Thiocynate, 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 (-31.7ºC)
  - Upper limit ---------- +125°F (+51.7ºC)

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 comparability group ---------- C
DOT designation ---------- AMMUNITION FOR CANNON W/SOLID PROJECTILE, CLASS C EXPLOSIVE
DODAC ---------- 1310-B591

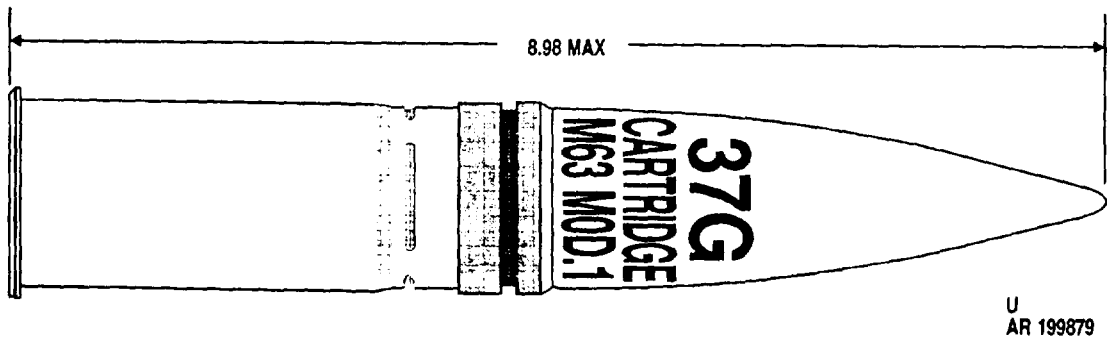
M63 Ignitor.

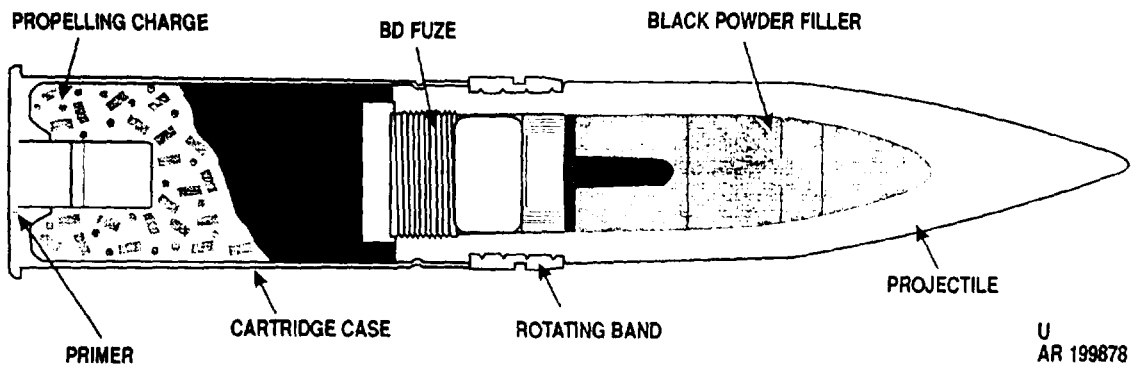
DOT hazard class ---------- (04) 1.2 C
DOD storage compatibility group ---------- G
DOT designation ---------- CANNON PRIMER - HANDLE CAREFULLY
DODAC ---------- 1305-N700

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,
- 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.

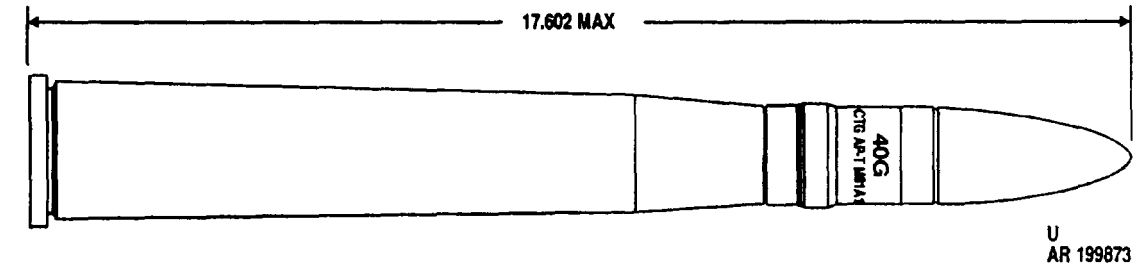
Shipping and Storage Data:

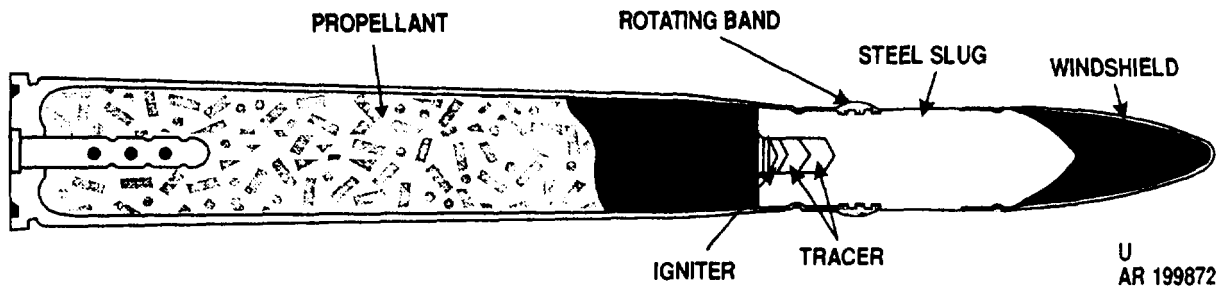
Quantity-distance class --------- 4
Storage compatibility group--- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ---------- 1310-B526
Drawing number ---------- 8831141

References:

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

CARTRIDGE, 40 MILLIMETE: 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 cartridge case filled with loose propellant is crimped to the projectile. The case has an extractor rim base, and the base contains a percussion primer consisting of a perforated tube containing black powder and a percussion element.

Functioning:

When the firing pin of the weapon strikes the primer, the black powder in the primer tube is ignited. Sparks flash through the tube perforations to ignite the propelling charge, and the burning propelling charge drives the projectile through the barrel with the velocity required to reach the target. 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 -------- Ml, 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 ---------- +l60°F (for period not more than 4 hr/day)

*Packing ---------- 1 per fiber container; 8 containers 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:

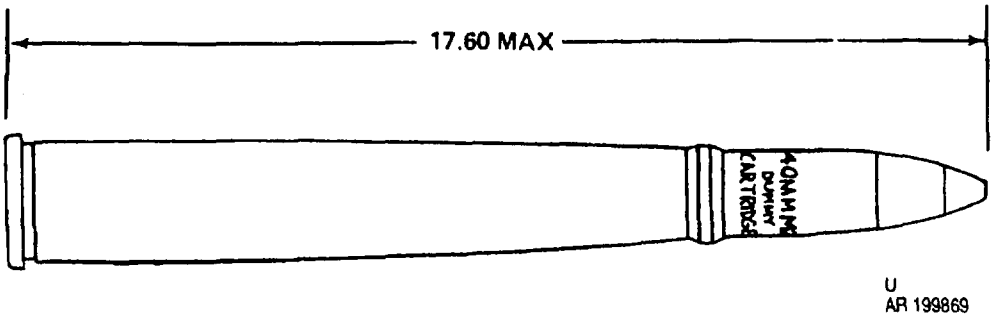
UNO serial number ---------- 0328
Quantity-distance class --------- (08) 1.2
Storage compatibility group --- C
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC ---------- 1310 -B552
Drawing number ---------- 75-1-140

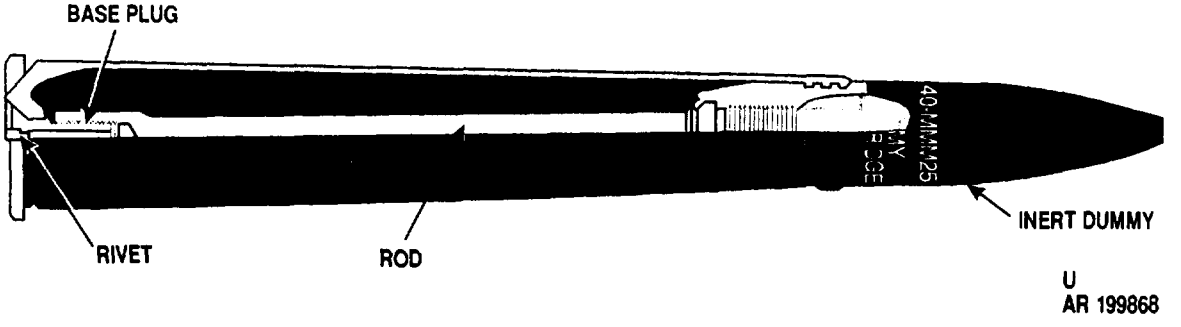
References:

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.

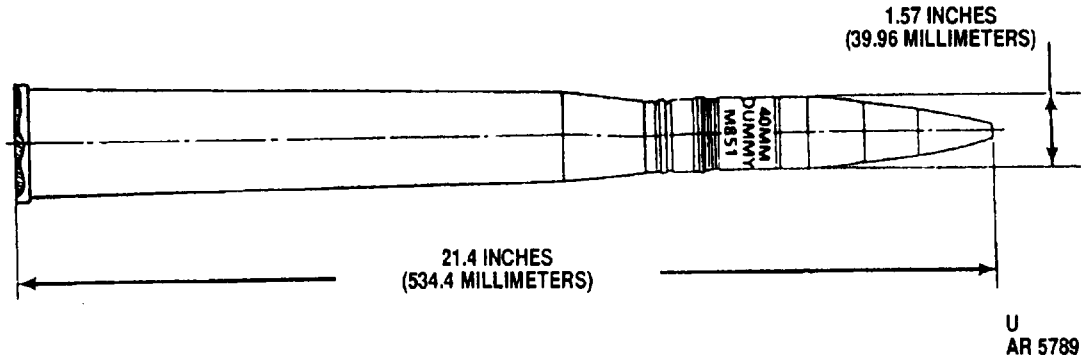
Shipping and Storage Data:

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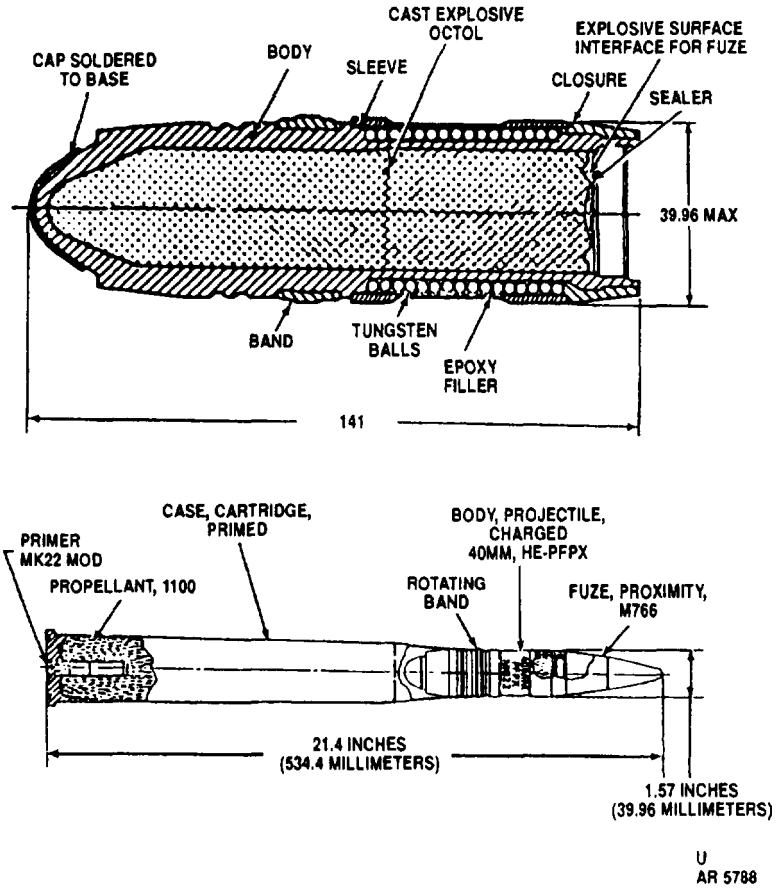
CARTRIDGE, 40 MILLIMETER: HE M822 WITH FUZE PROXIMITY, M766 (FOR SGT YORK)



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, 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; 48 clips, 4 rounds per clip

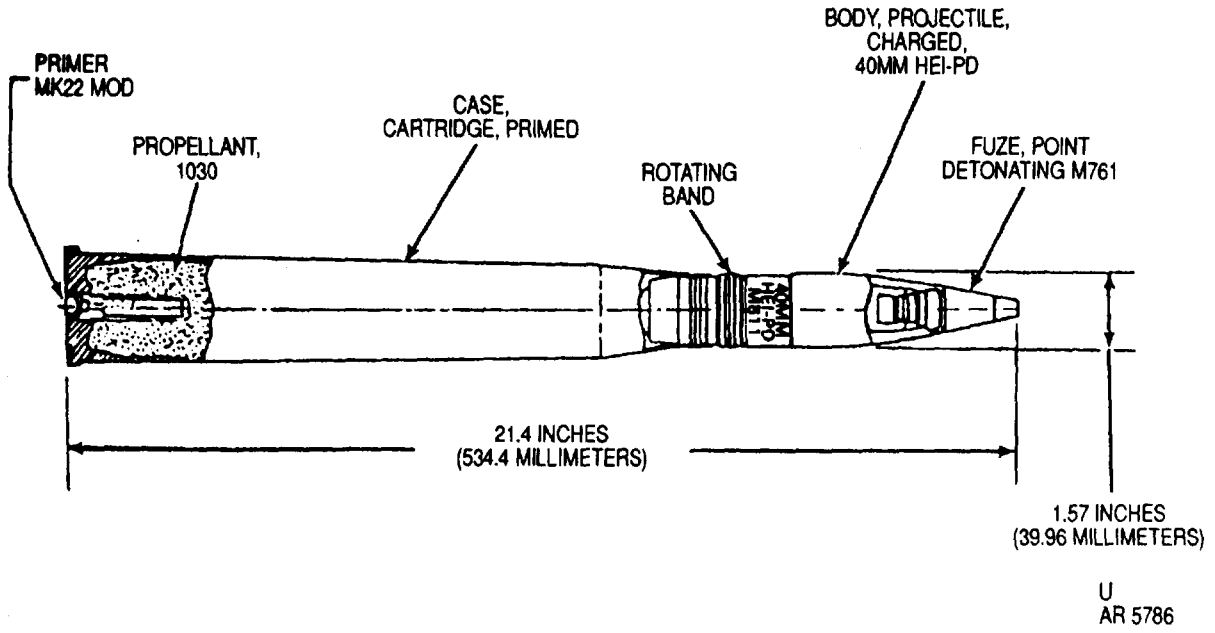
*Packing box:
- Weight (empty) ---------- 242 lb
- Weight (loaded)---------- 1500 lb
- Dimensions ---------- 56.3 x 43.1 x 28 in.
- cube ---------- 39.9 cu ft

* 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)



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
Faze	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

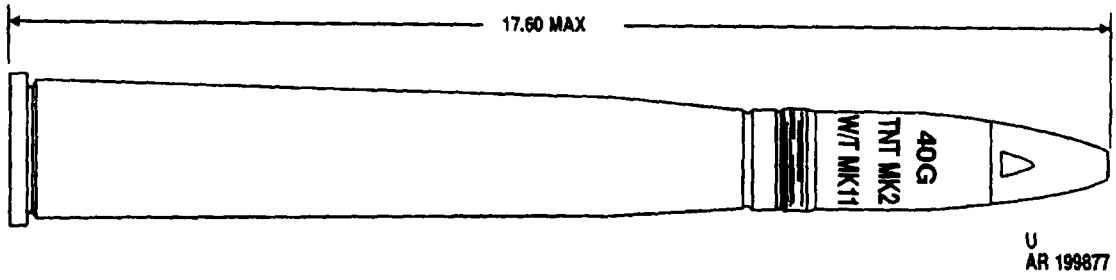
*Packing box:
- Weight (emply)---------- 242 lb
- Weight (loaded) ---------- 1500 lb
- Dimensions ---------- 56.3 x 43.1 x 28 in.
- cube ---------- 38.9 cu ft

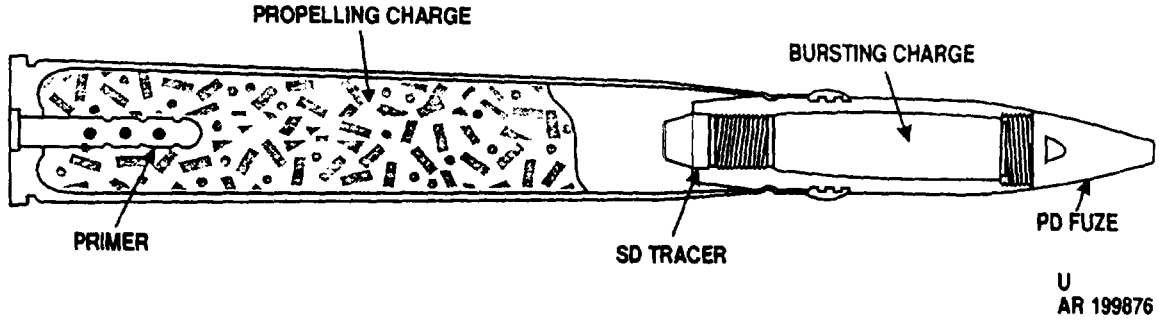
* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

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.

Complete round (cont):

Cannon used with	M1 series, M2 series or MK1 (Navy)
Projectile:	
Body material	Steel
Color:	
Army mfg	Olive drab w/yellow markings
Navy mfg	Green w/white markings and green tip fuze
Filler and weight	TNT or Tetryl, 0.14 lb
Components:	
Cartridge case	M25, M25B1
Propelling charge	M1 propellant, 0.72 lb
Primer	M38, M38B2 or M K 2
Tracer	MK11, MK11 Mod 2; M3, M3A1-Red
Bursting charge	Pressed TNT
Faze	PD-MK27 (M3 or M3A1) M27, M71 (MK11, MK11 Mod 2)
Performance:	
Maximum range	SD, MK2 (2870 fps): 4300 yd (tracer burn-out); SD, MK2 (2700 fps): 5700 yd (tracer burn-out)
Temperature limits:	
Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for period not more an 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.

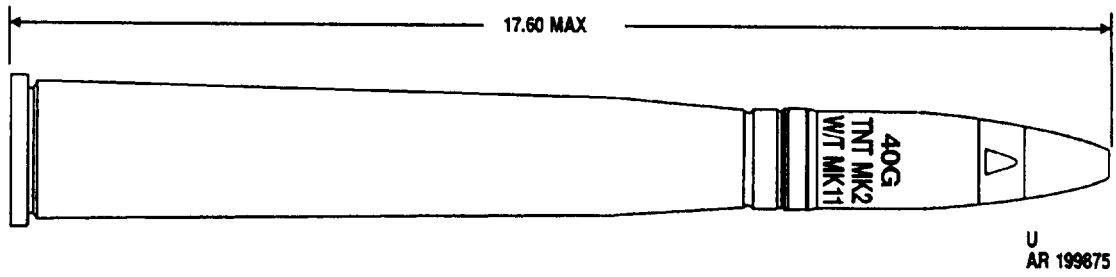
Shipping and Storage Data:

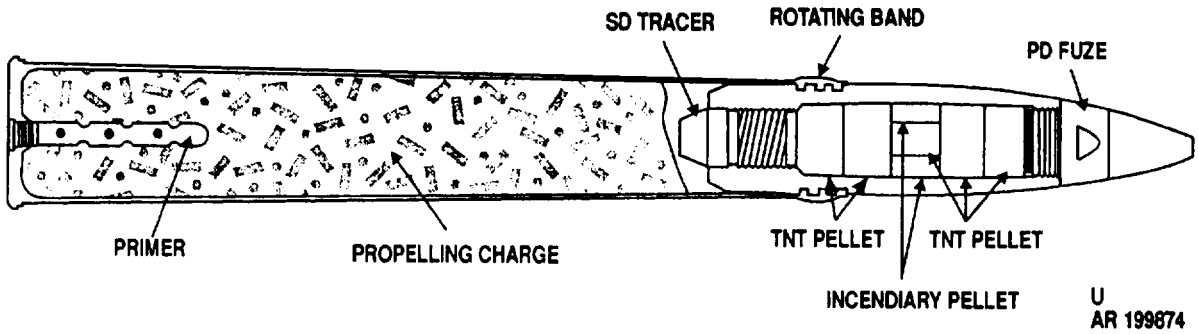
UNO serial number	0321
Quantity-distance class	(08) 1.2
Storage compatibility group	E
DOT shippng class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1310-B562
Drawing number	75-1-166

References:

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:
- Body material ---------- Steel
- Color:
  - Army mfg---------- Olive drab w/yellow marking
  - Navy mfg ---------- Green w/black band
- Filler and weight ---------- TNT, 0.14 lb (tracer incendiary charge, 36 gr)

Components:
- Cartridge case ---------- MK2, MK2 Mod, or MK3
- Tracer ---------- MK11, MK11 Mods
- Tracer charge ---------- Igniting charge, a red tracer composition, and a relay igniting charge of black powder
- Faze ---------- PD, MK27
- Propelling charge ---------- M1 propellant, 0.72 lb
- Primer ---------- MK22, M38A1, M38B2
- Burster charge ---------- TNT powder and incendiary charge

Performance:
- Maximum range ---------- 3932 m (4300 yd)
- Muzzle velocity ---------- 879 mps (2890 fps)

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

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

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

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

*Packing box:
- Weight ---------- 59 lb
- Dimensions ---------- 21-11/16 x 7-31/32 x 12-9/16 in.
- Cube ---------- I.3 cu ft

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

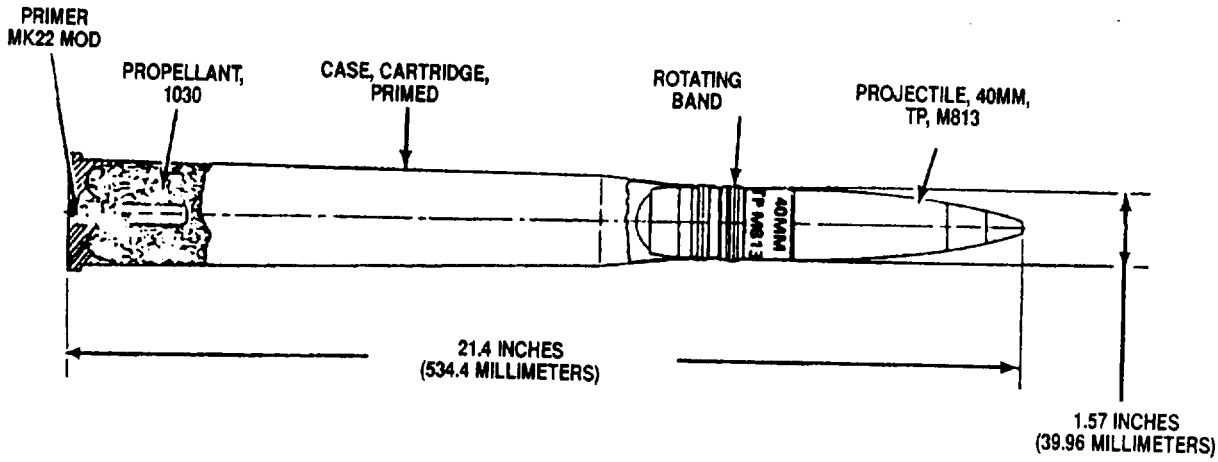
Shipping and Storage Data:

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 ---------- 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)



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:
- 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 markings
- Filler ---------- 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

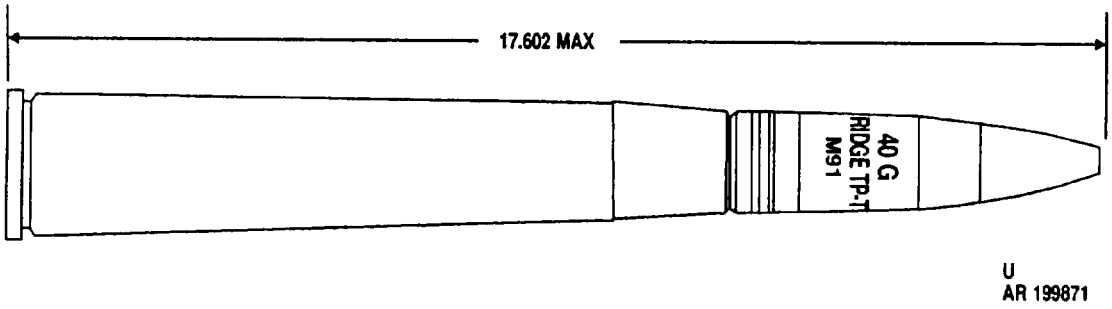
*Packing Box:
  Weight (empty) ---------- 242 lb
  Weight (loaded) ---------- 1500 lb
  Dimensions ---------- 56.3 x 43.1 x 28 in.
  Cube ---------- 38.9 cu ft

* 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



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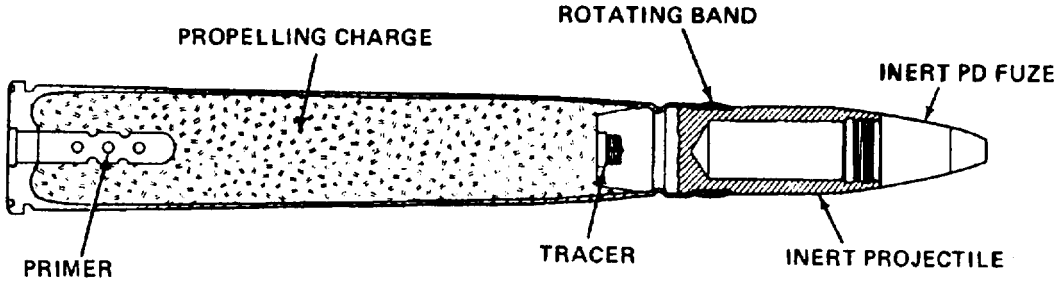


AR199870

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	Ml series, M2 series, MK1 (Navy)

Projectile:	
Body material	Steel
Color:	
Old	Blue or black w/white markings
New	Blue w/brown band and white markings
Filler	Inert material
Components:	
Tracer and weight	Red, 0.02 lb
Fuzes	Dummy, M69 or M69B1 Inert, M71 or MK27
Propelling charge:	
Cartridge case	M25, M25B1
Propellant and weight	M1, 0.721b
Primer	M38A1, M38B2, MK22
Performance:	
Maximum range	10,058 m (l1,000 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.
cub	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.

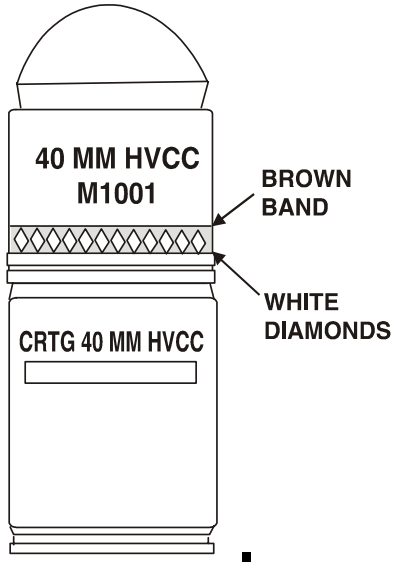
Shipping and Storage Data:

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:

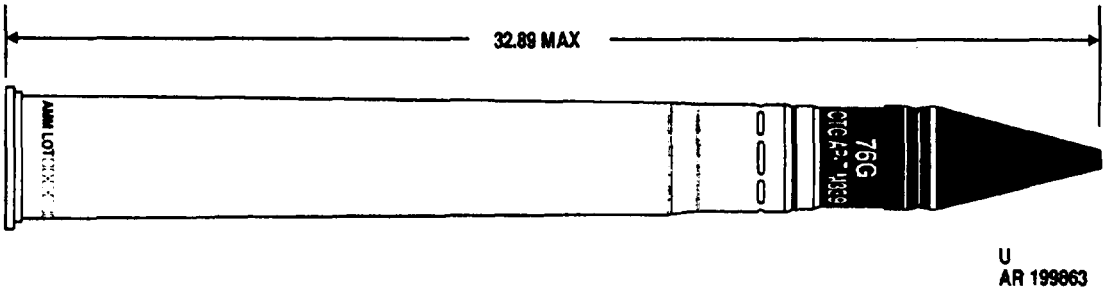
UNO serial number..... 0321
Hazard class/division and storage compatibility group
DOT class 1.2E
DOT marking..... CARTRIDGES FOR WEAPONS
DODAC 1310-BA11

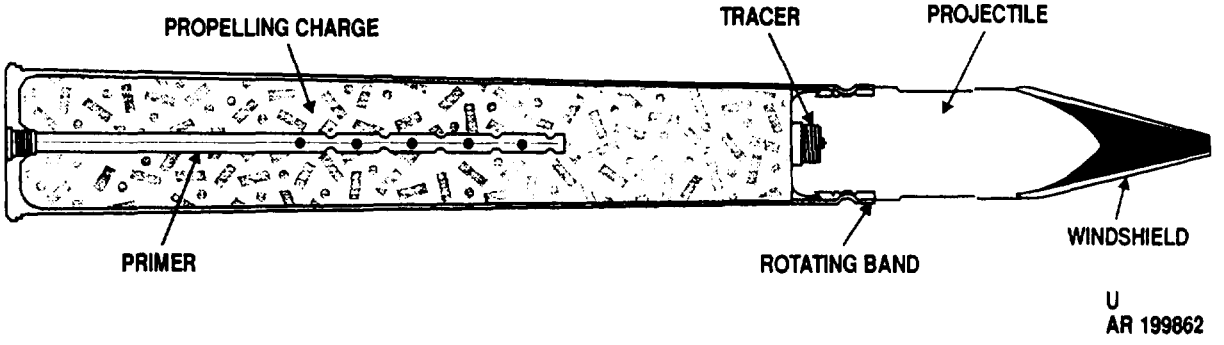
Cartridge drawing number..... 1225707
Packing drawing number 12928042

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





Type Classification:

OBS MSR 11756003.

Use:

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

Description:

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

Functioning:

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

Tabulated Data:

Complete round:

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

Projectile:

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

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

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

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

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

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

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

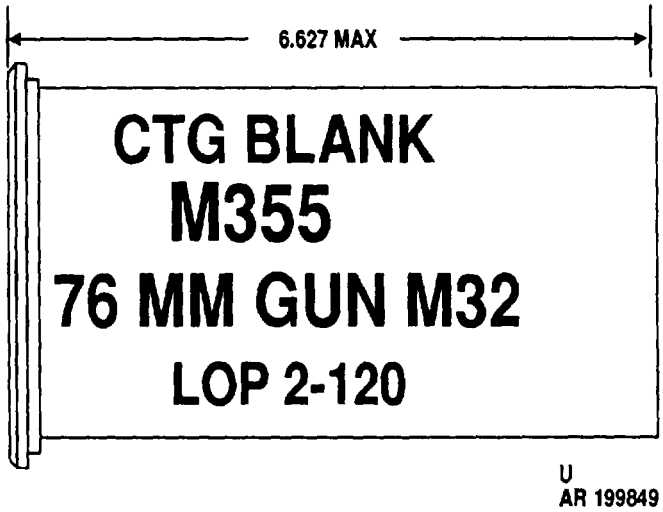
Shipping and Storage Data:

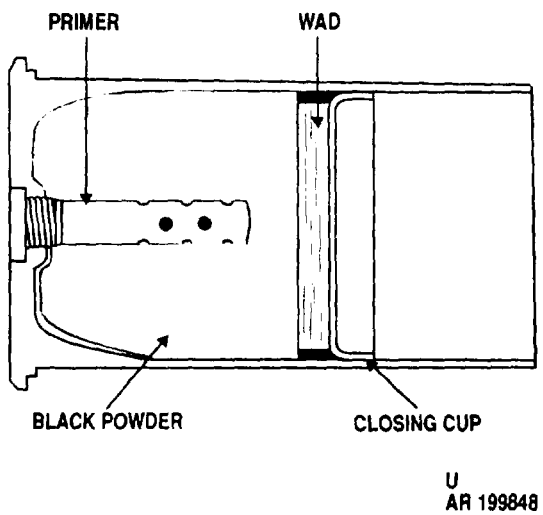
UNO serial number ---------- 0328
Quantity-distance class --------- (08) 1.2
Storage compatibility group--- C
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC ---------- 1315-C120
Drawing number ---------- 8886612

References:

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

CARTRIDGE, 76 MILLIMETER: BLANK, M355A2





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

Components	
Body material	Brass or steel
Color	Blue or black w/white marking
Filler and weight	BP, 1 lb
Cartridge case	M101 (brass); M101B1 (steel)
Primer	M70percussion
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; 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.

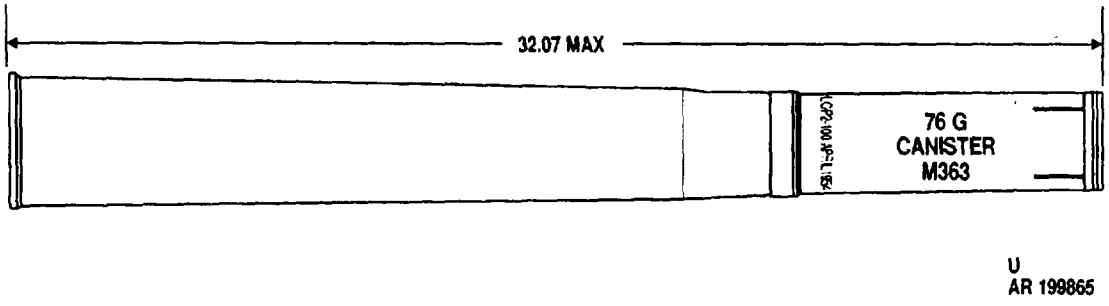
Shipping and Storage Data:

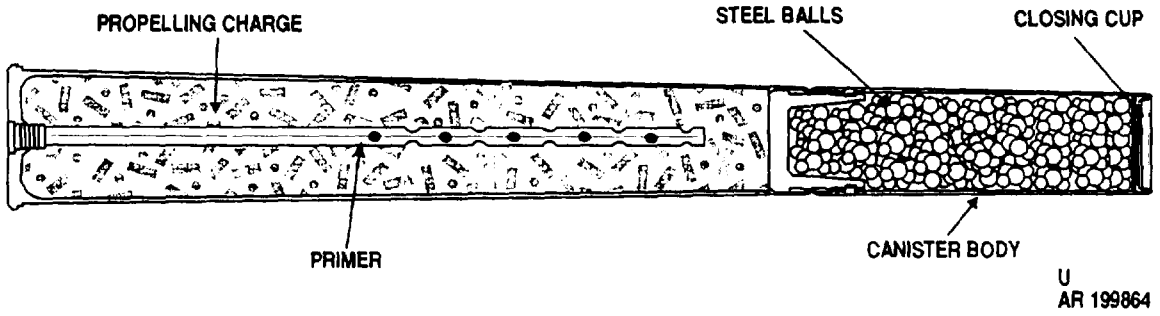
UNO serial number	0327
Quantity-distance class	1.3
Storage compatibility group	C
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITHOUT PROJECTILES
DODAC	1315-C131
Drawing number	7549267

References:

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

CARTRIDGE, 76 MILLIMETER: CANISTER, M363





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 lightweight body construction. The canister body is assembled to a brass or steel cartridge case, loaded with a single-base propellant, and fitted with a percussion primer. A distinguishing physical characteristic of these rounds is the case-over-band construction. The specially designed rotating band has a crimping groove which permits the cartridge case to be assembled over the rotating band and rigidly crimped to it.

Functioning:

When the weapon is fired, a flash from the primer ignites the propellant. Gases from the burning propellant force the projectile out of the gun barrel. Immediately after leaving the gun barrel, 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.

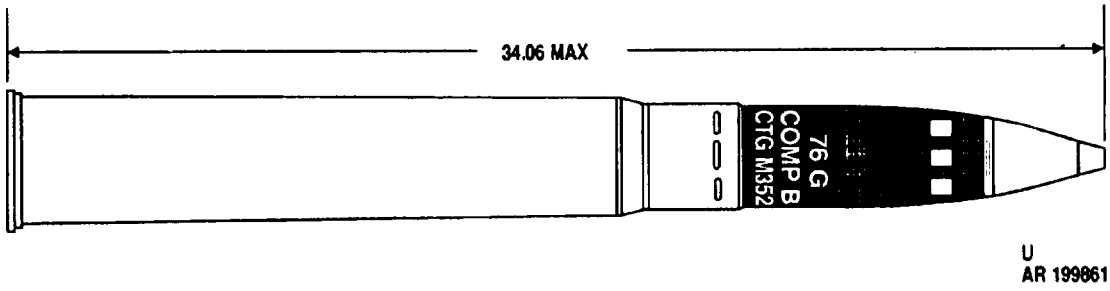
Shipping and Storage Data:

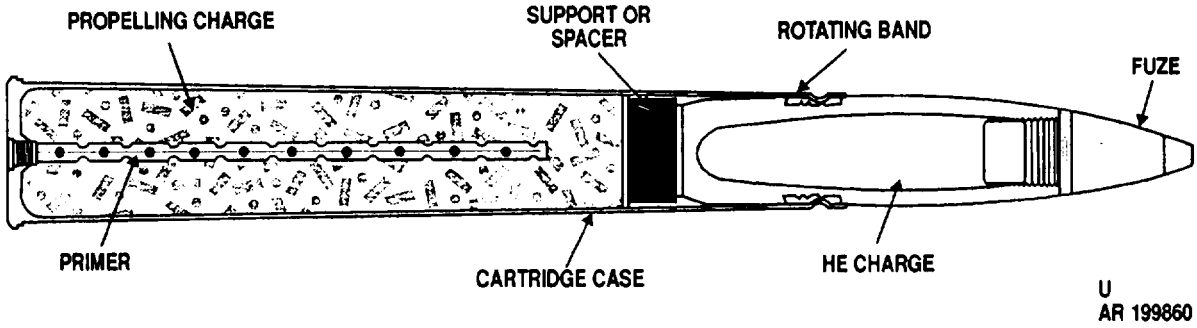
UNO serial number ---------- 0328
Quantity-distance class --------- (08) 1.2
Storage compatibility group--- C
DOT shipping class ---------- B
DOT designation ---------- Ammunition FOR CANNON WITH SOLID PROJECTILE
DODAC ---------- 1315-C121
Drawing number ---------- 9204458

References:

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

*Packing box:
- Weight ---------- 86 lb
- Dimensions ---------- 39.15/16 x 10-15/16 x 7-3132 in.
- Cube ---------- 1.8 cu ft

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

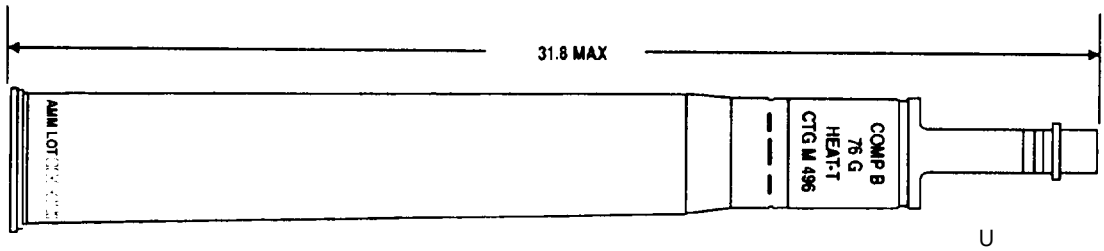
Shipping and Storage Data:

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



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AR 199859

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
- 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.

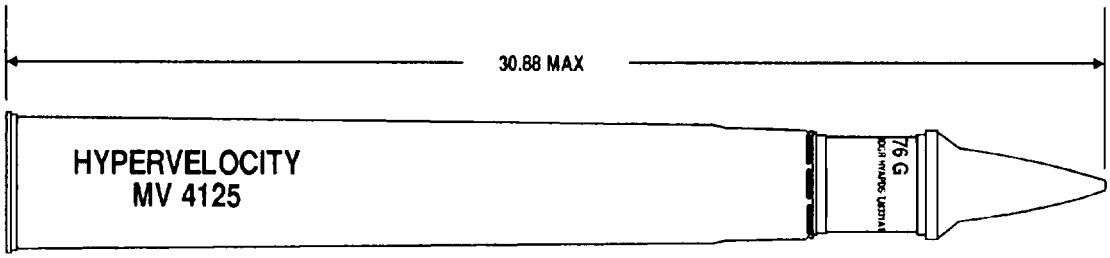
Shipping and Storage Data:

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 ---------- l315-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



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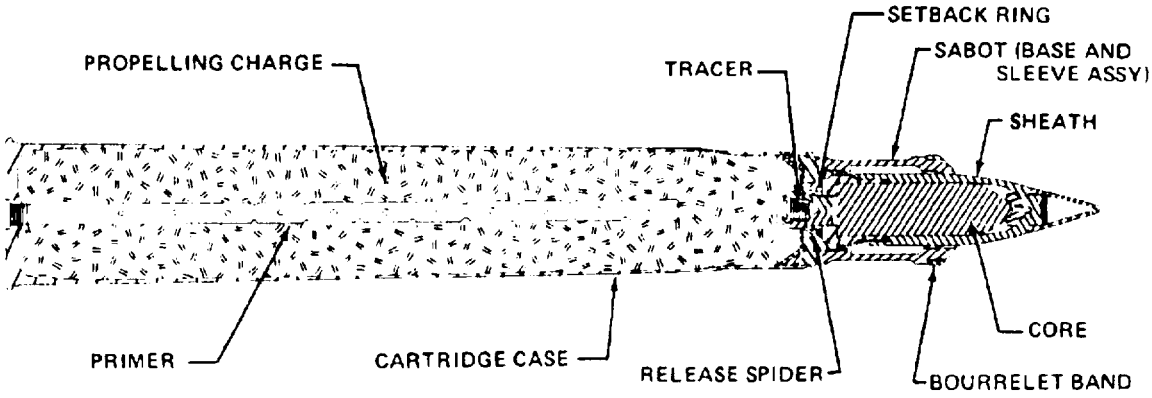
AR 199855



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

Functioning:

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

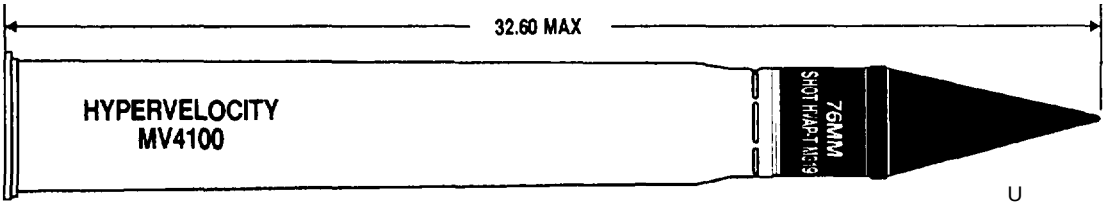
Limitations:

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



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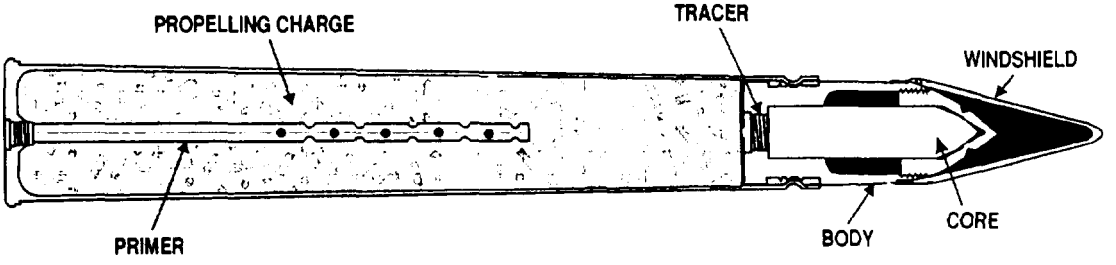
AR 199853



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AR 199852

Type Classification:

C & 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 tired, 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.

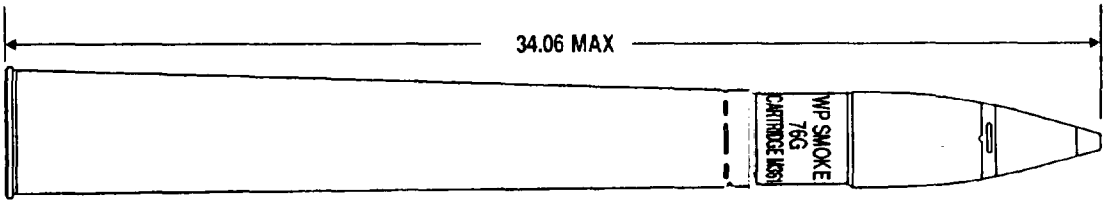
Shipping and Storage Data:

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



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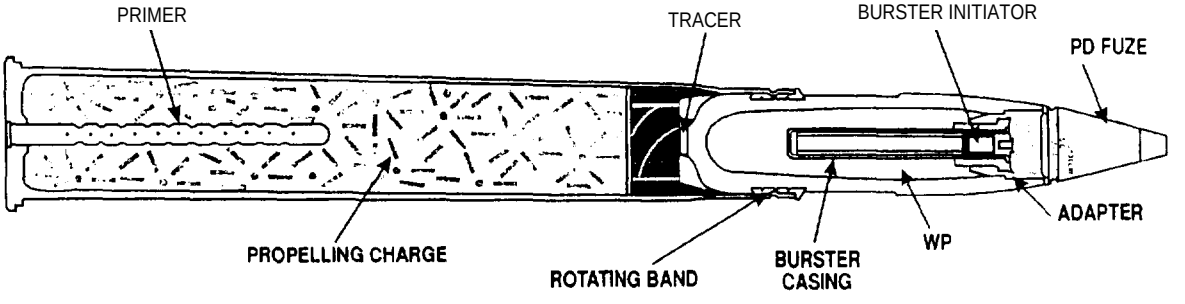
AR 199851



U
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 marking
Filler and weight	WP, 1.38 lb
Burster	M28, 1.2 oz tetrytol
Burster initiator	M2
Component:	
Cartridge case	M361A1: M88B1; M361: M88
Propelling charge	M6, 3.64 lb
Primer	M68, M58 percussion
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:

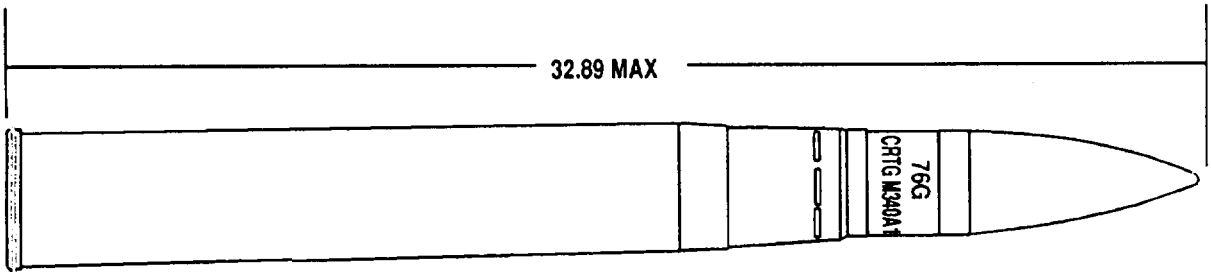
Since the burster in this ammunition is loaded with tetrytol, it is not to be stored or fired at temperatures exceeding +125°F.

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



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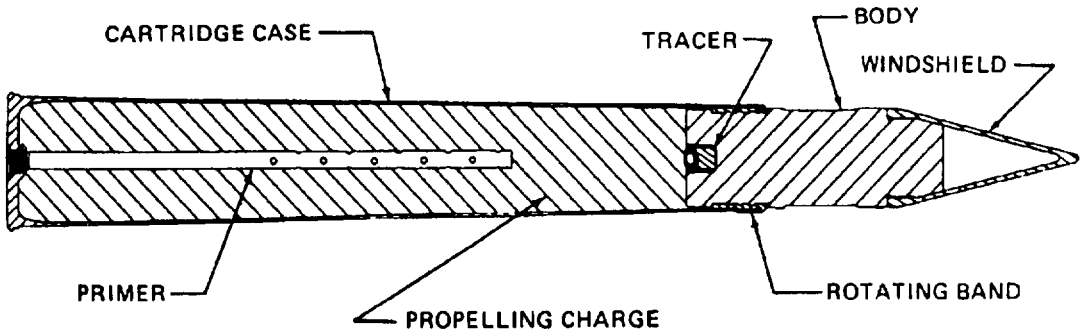
AR 199857



U
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:
---------- TP-T
Weight ---------- 27.32 lb
Length ---------- 32.89 in
Cannon used with ---------- M32, M48

Projectile:
- Body material ---------- Steel
- Color:
  - Old---------- Blue or black w/white marking
  - New ---------- Blue w/white marking

Components:
- Cartridge case ---------- M340A1: M88B1: M340: M88
- Propelling charge ---------- M30, 5.6 lb
- Primer ---------- M58, percussion
- Tracer ---------- M5A2B1 (M340); M13 (M340A1)

Performance:
- Maximum range ---------- 14,704 m (16,419 yd)
- Muzzle velocity ---------- 955 mps (3200 f p s)

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.

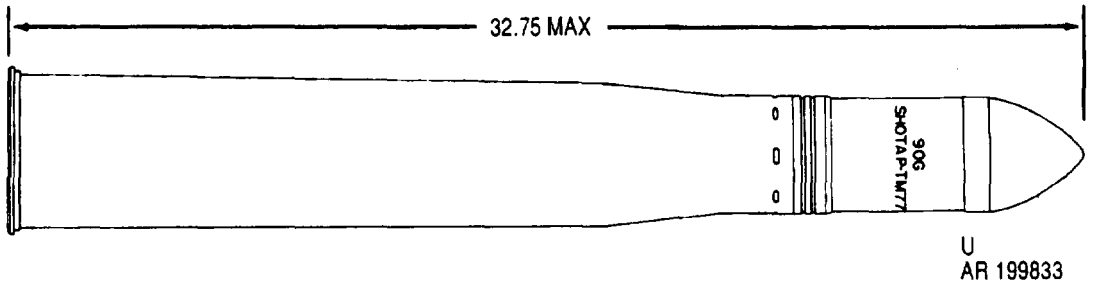
Shipping and Storage Data:

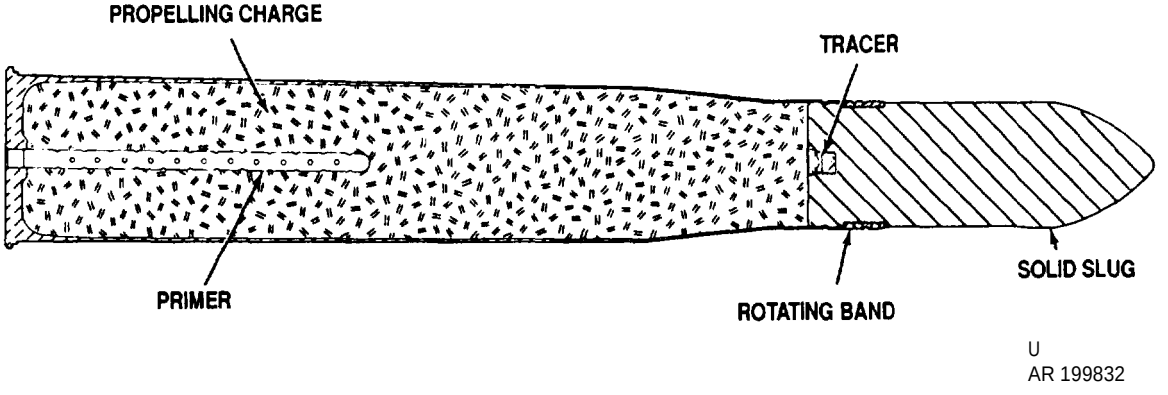
UNO serial number ---------- 0328
Quantity-distance class --------- (08) 1.2
Storage compatibility group--- C
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC ---------- 1315-C127
Drawing number ---------- 8857345

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.

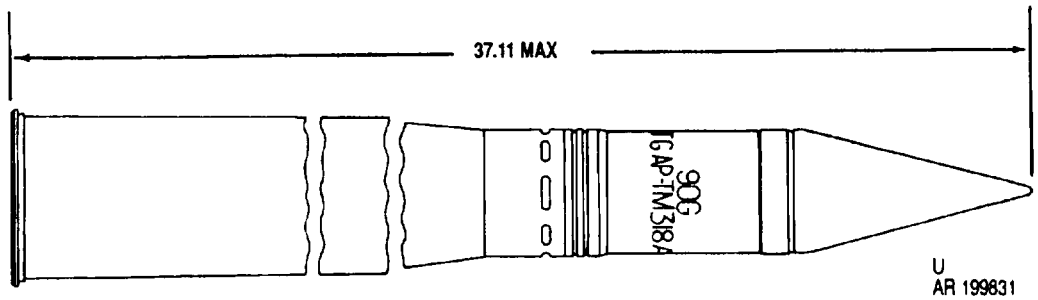
Shipping and Storage Data:

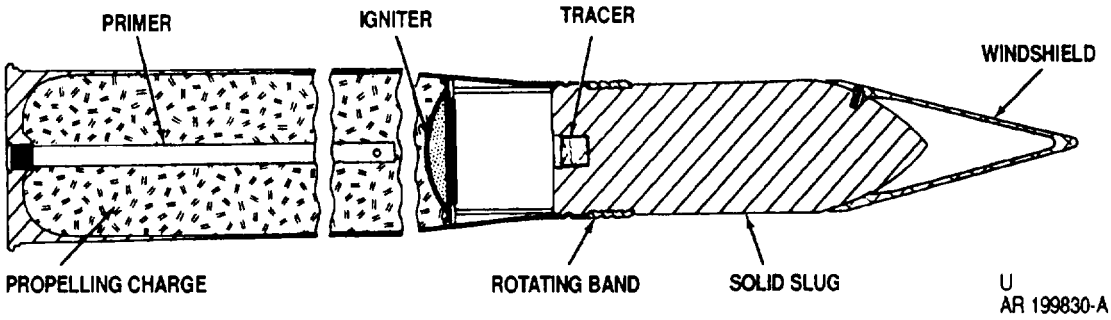
UNO serial number ----------
Quantity-distance class --------- 5
Storage compatibility group--- E
DOT shipping class ---------- B
DOT designation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC ---------- 1315-C259
Drawing number ---------- 75-1-136

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 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.

Difference Between Models:

See Tabulated Data.

Tabulated Data:

Complete round:

	M318	M318 (T33E7) or M318A1
Type	AP-T	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:

	M318	M318 (T33E7) or M318A1
Cartridge case	M19, M19B1	M108, M108B1
Propelling charge	M6, 8.6 lb	M17, M30, 8.6 lb
Primer	M49 (T33)	M58
Tracer	(Red) M5A2B1, M5A2, 0.1 lb	M5A2B1, M5A2 or M13, 7.5 g

Performance:

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.

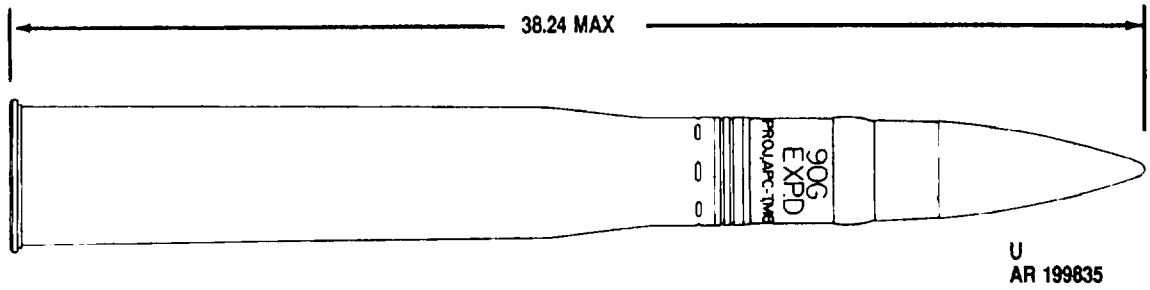
Shipping and Storage Data:

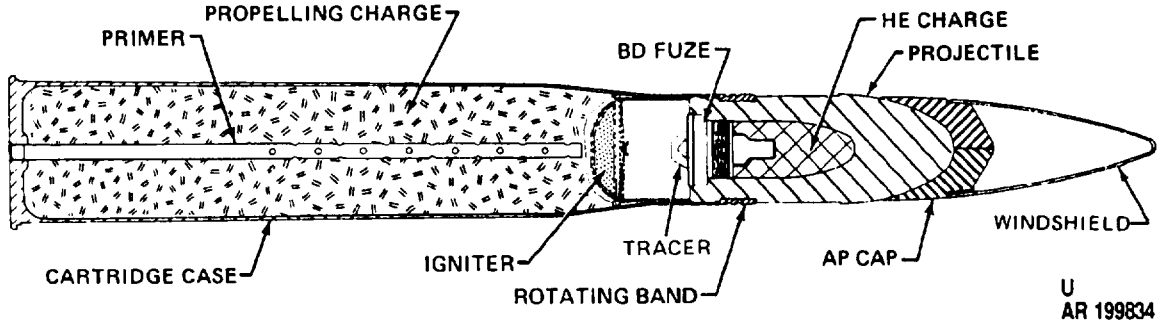
UNO serial number	0328
Quantity-distance class	(08) 1.2
Storage compatibility group	C
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC	1315-C285 (MV3000); 1315-C259 (MV2800)
Drawing number	75-1-358 (M318); 9207966 (M318A1)

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 tiller 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.

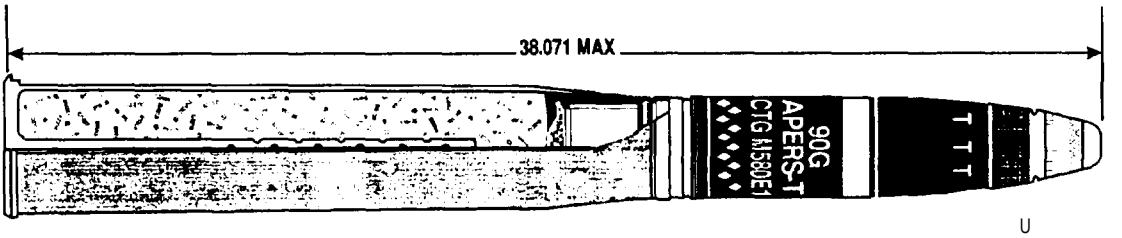
Shipping and Storage Data:

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-C260
Drawing number ---------- 75-1-145

References:

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

CARTRIDGE, 90 MILLIMETER: APERS-T, M580



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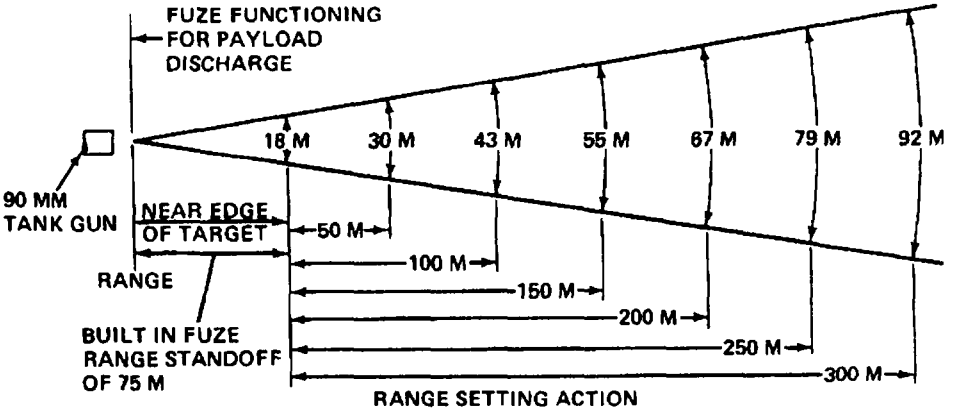
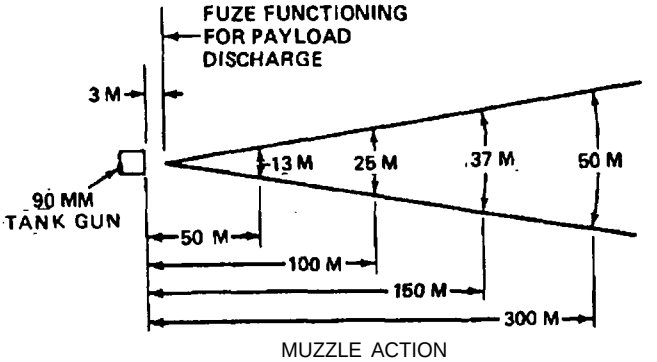


AR 199846



AR 199883

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 mechnical-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
- Faze ---------- 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

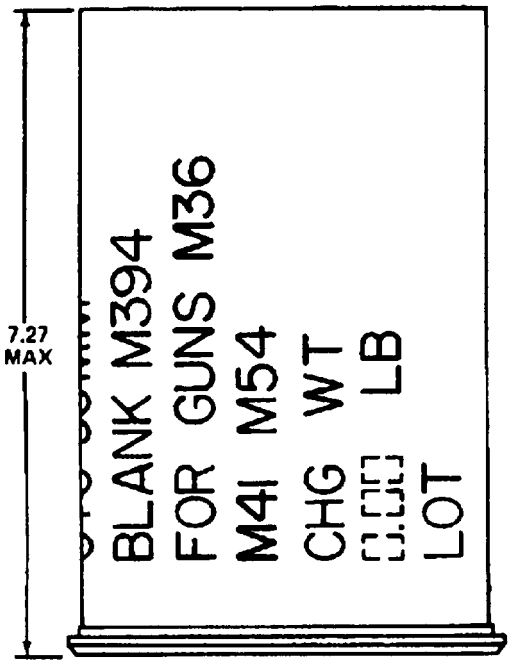
Limitations:

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

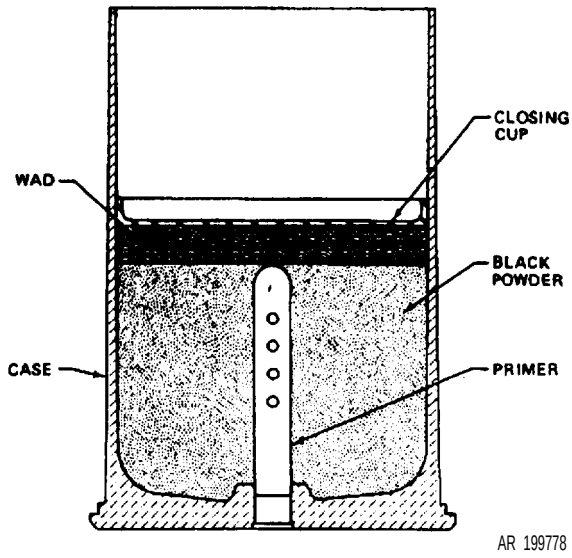
References:

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

CARTRIDGE, 90 MILLIMETER: BLANK, M394



AR 199779



AR 199778

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

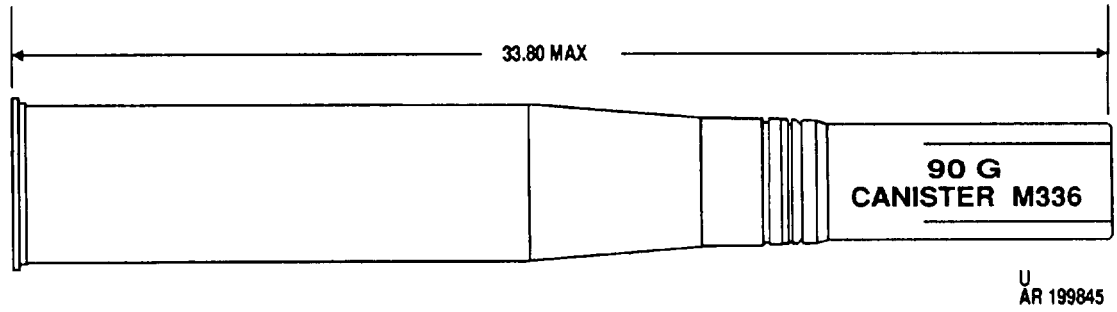
Limitations:

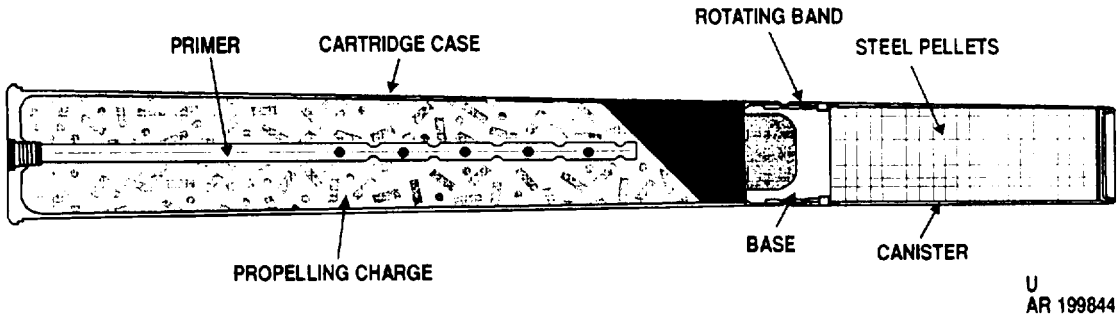
Closure debris from blank ammunition can be expelled a distance of 300 feet forward of the weapon muzzle.

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

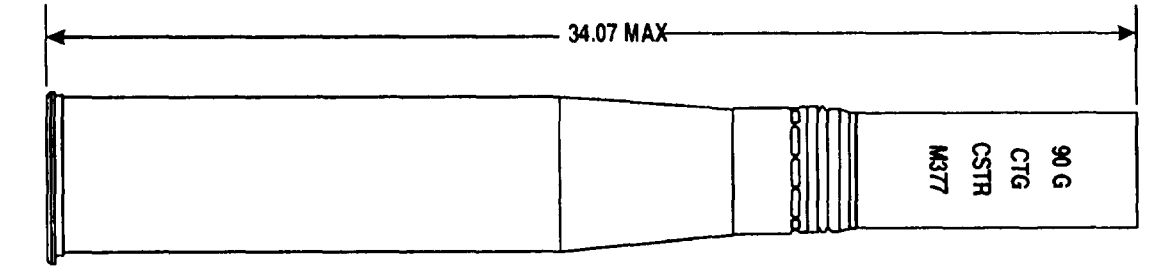
Limitations:

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



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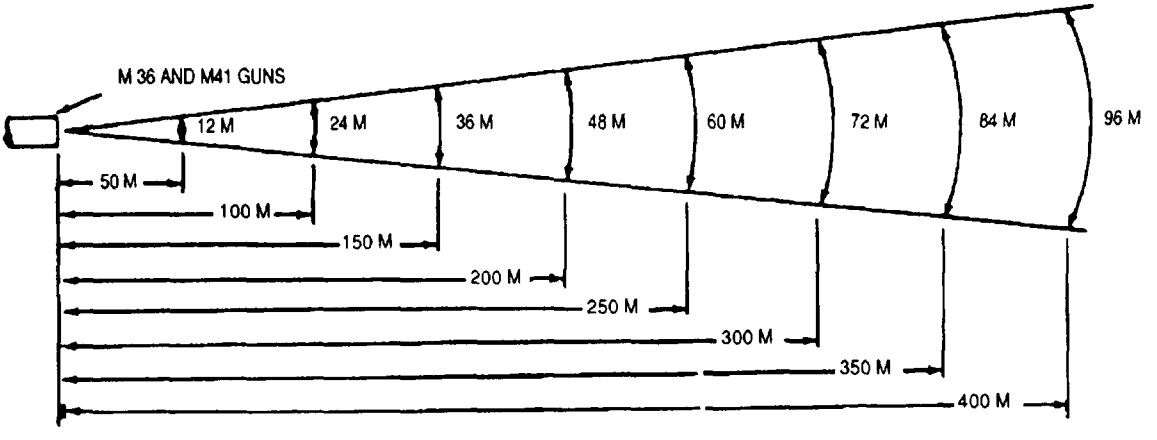

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AR 199842

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

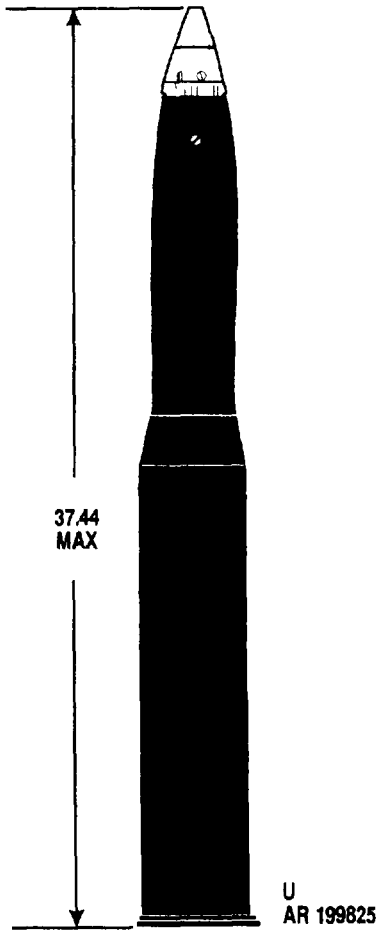
Limitations:

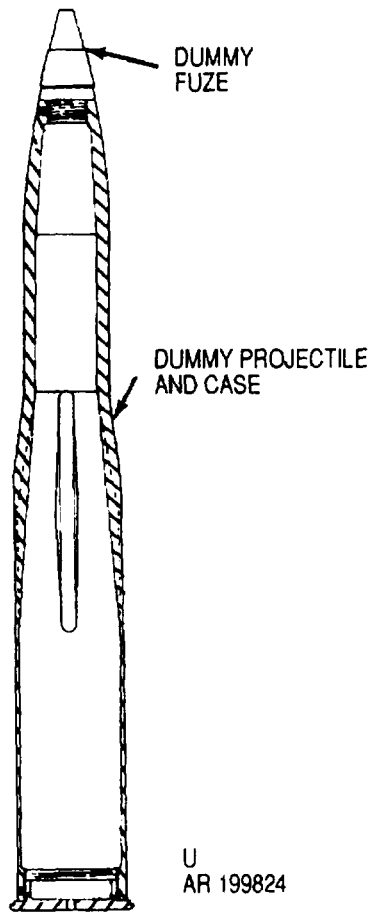
Before firing, clear friendly personnel from dispersion cone area. Firing over the heads of friendly troops is prohibited.

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
- Faze ---------- 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.

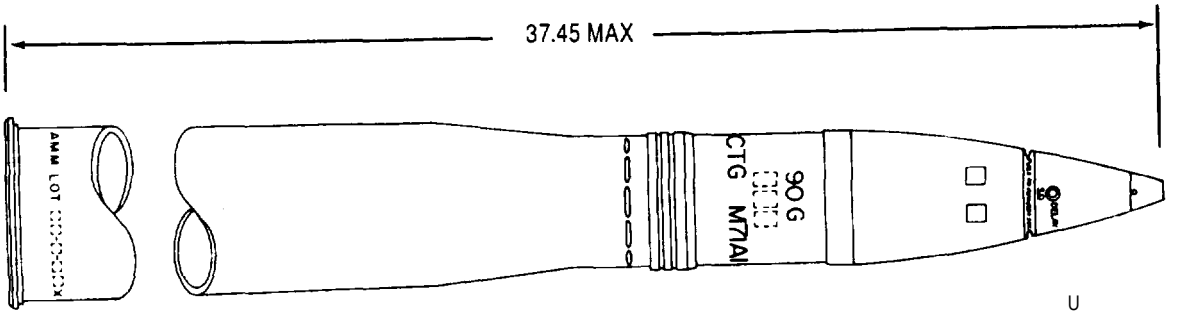
Shipping and Storage Data:

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



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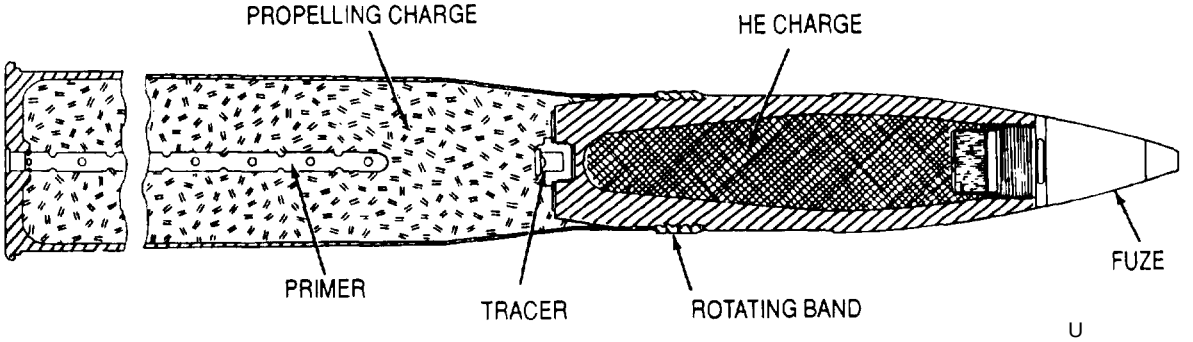
AR 199839



U
AR 199838

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 superquick or delay, as preset, and detonates the high-explosive filler producing Mast 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	4l.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.

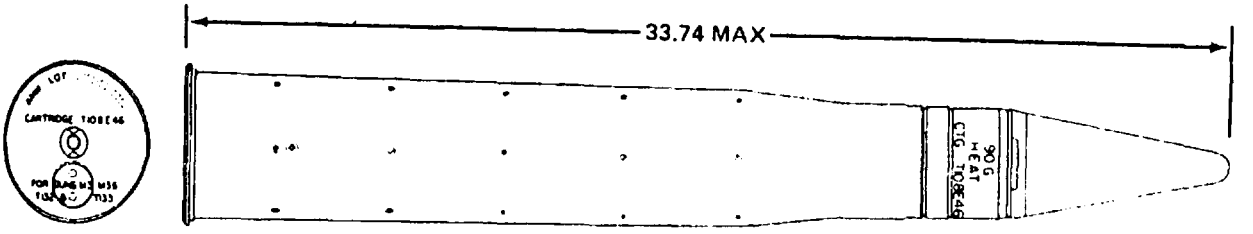
Shipping and Storage Data:

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)



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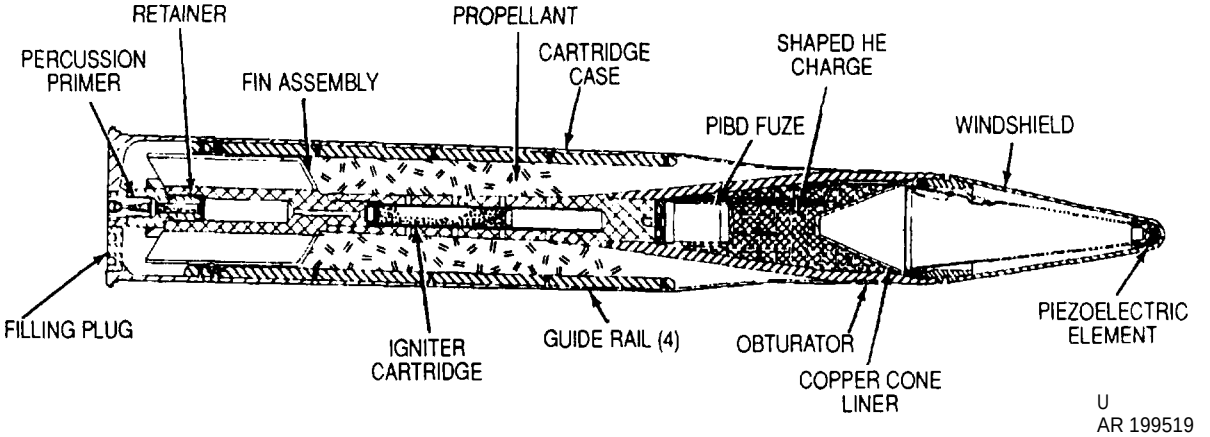


U
AR 199519

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
Faze	PIBD, M509A1
Performance:	
Maximum range	11,650 m (13,010 yd)
Muzzle velocity	832 mps (2800 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	1 round per fiber container; 2 containers per wooden box
*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.

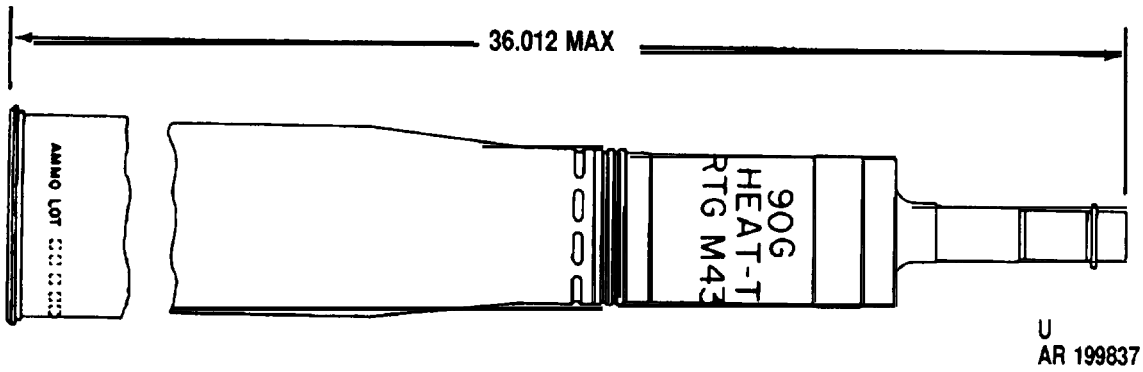
Shipping and Storage Data:

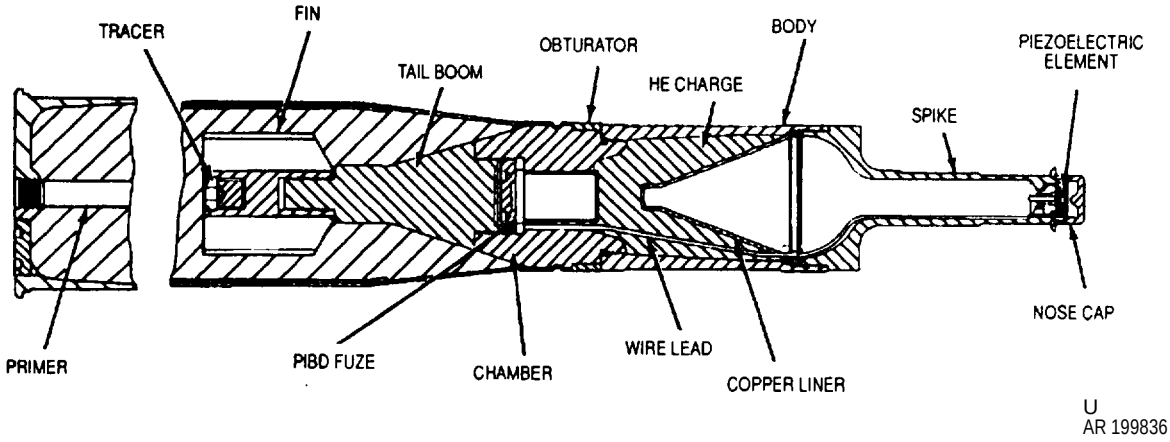
UNO serial number	0321
Quantity-distance class	(12) 1.2
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1315-C268
Assembly drawing number	75-1-359

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:

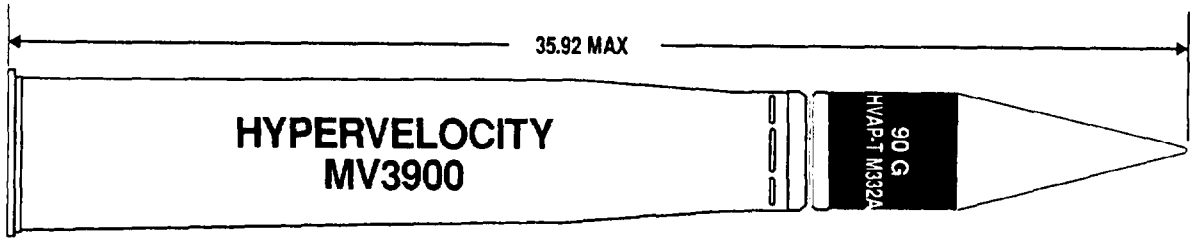
Because of the low melting point of the waxin M431A1 cartridges, tank-transported cartridges that are exposed to temperatures above +120°F shall not be fired.

References:

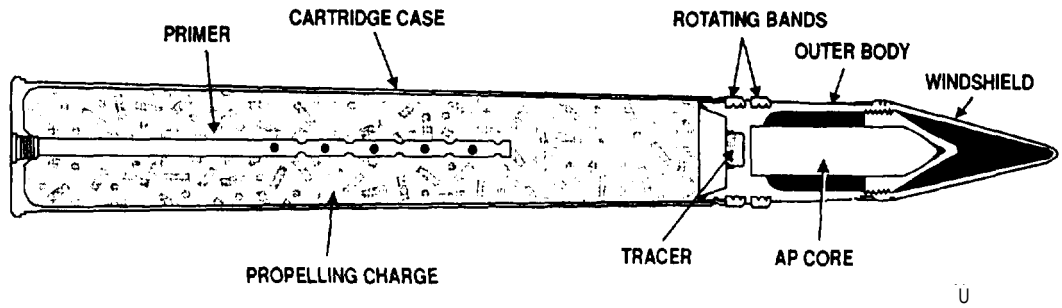
AMC-P 700-3-3

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

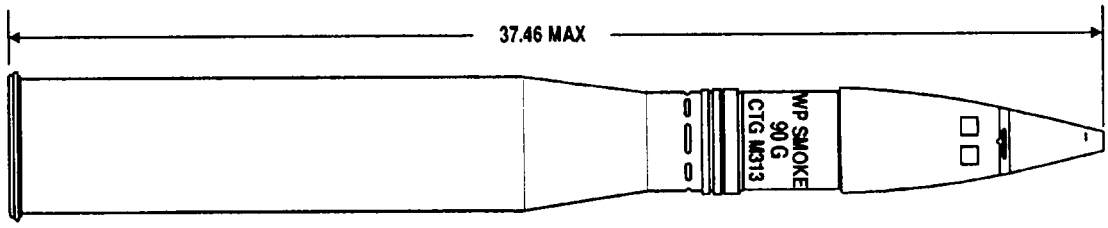
Limitations:

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



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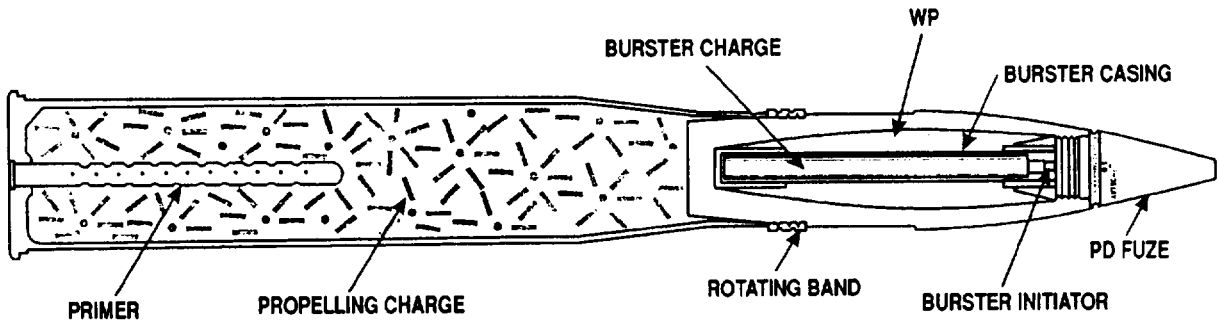
AR 199829



U
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 provides 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:

	M313	M313C
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 manufacture)	
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:

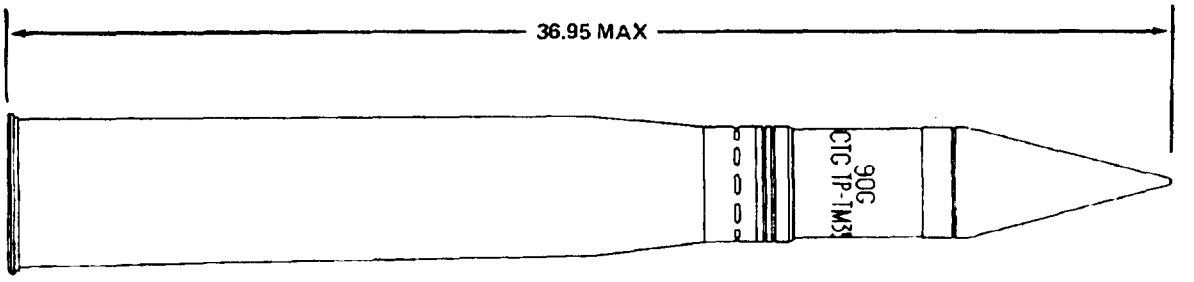
Since the burster in this ammunition is loaded with tetrytol, it is not to be stored or fired at temperatures exceeding + 125°F.

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



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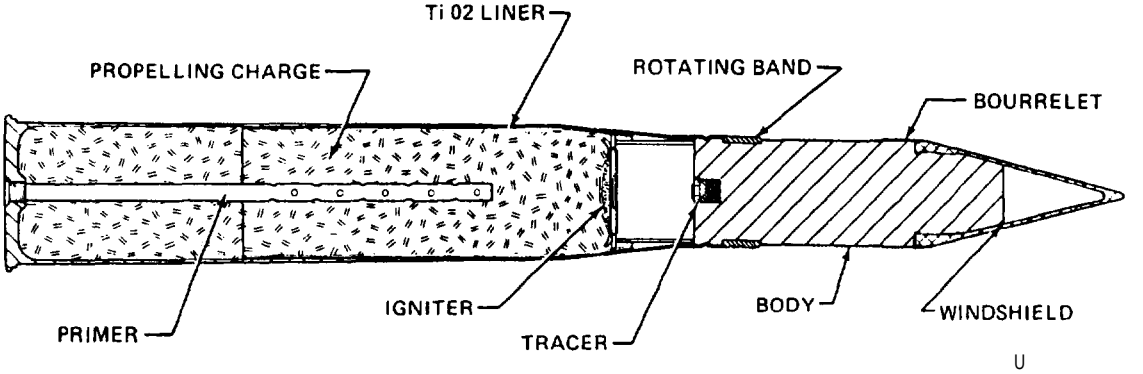
AR 199827



U
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_2 liner with low temperature melt wax.

M353A2 contains TiO_2 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 f p s)

Temperature limits:
- Firing:
  - Lowerlimit ---------- -65°F
  - Upper limit ---------- +120°F
- Storage:
  - Lower limit ---------- -65°F
  - Upper limit ---------- +120°F

*Packing ---------- l 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

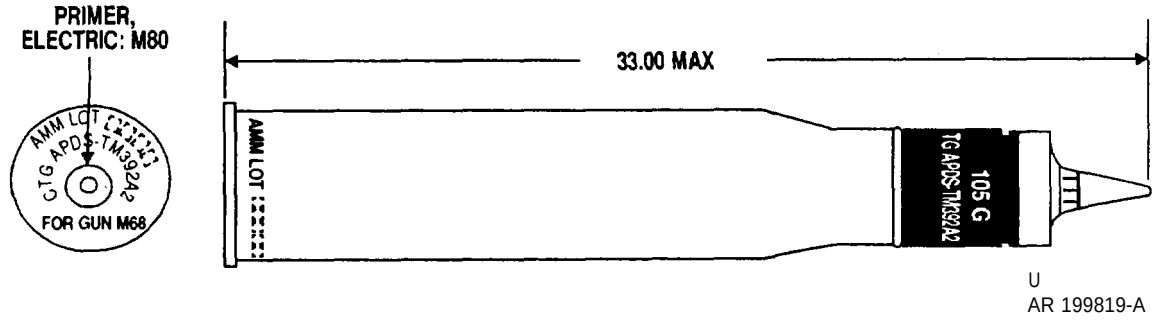
Limitations:

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



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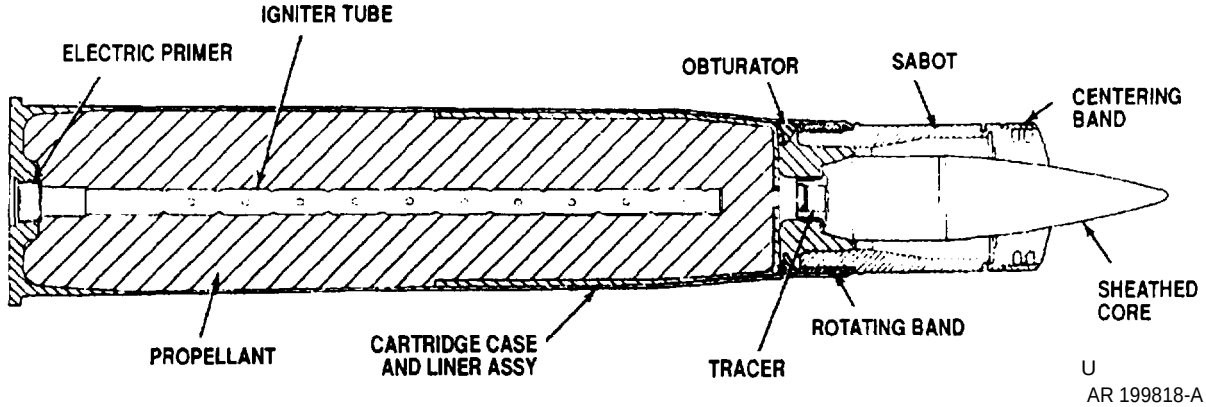
AR 199819-A



U
AR 199818-A

Type Classification:

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

Use:

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

Description:

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

Functioning:

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

Difference Between Models:

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

Tabulated Data:

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

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

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

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

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

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

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

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

Shipping and Storage Data:

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

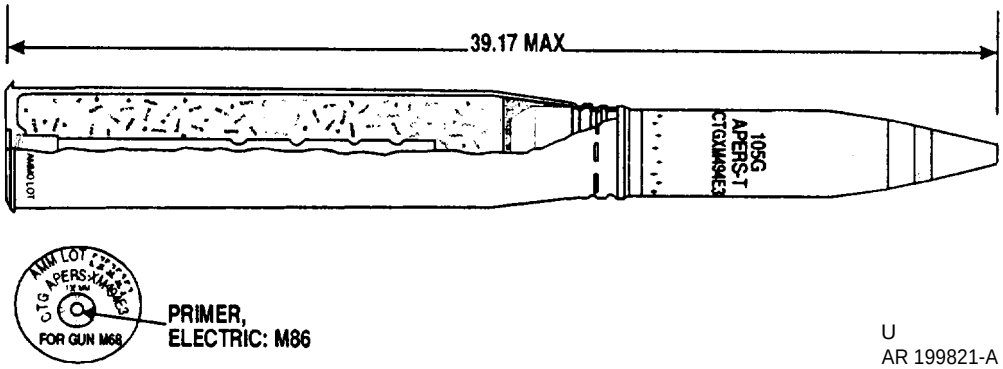
Limitations:

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

References:

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

CARTRIDGE, 105 MILLIMETER: APERS-T, M494



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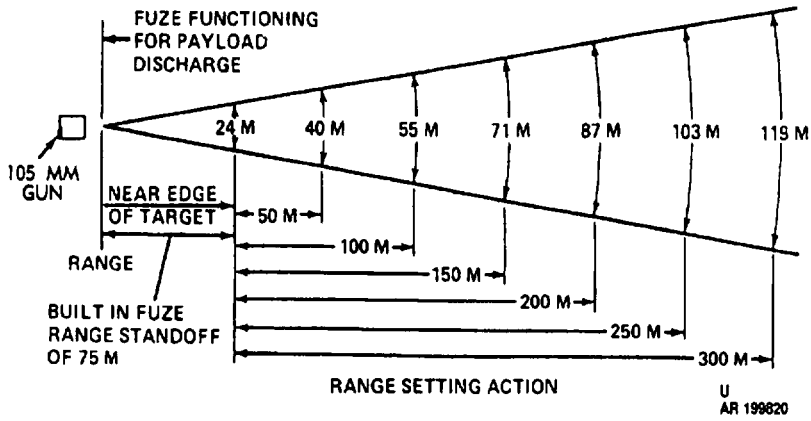

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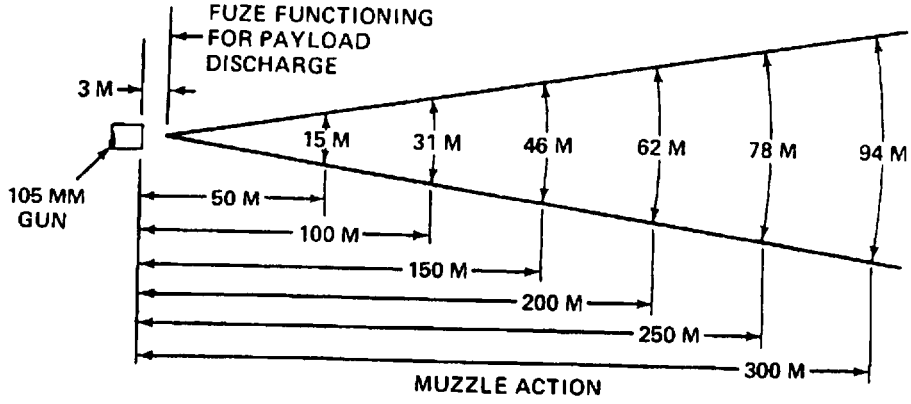


U
AR 199882

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 tire 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 mechnical-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
- Faze ---------- 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

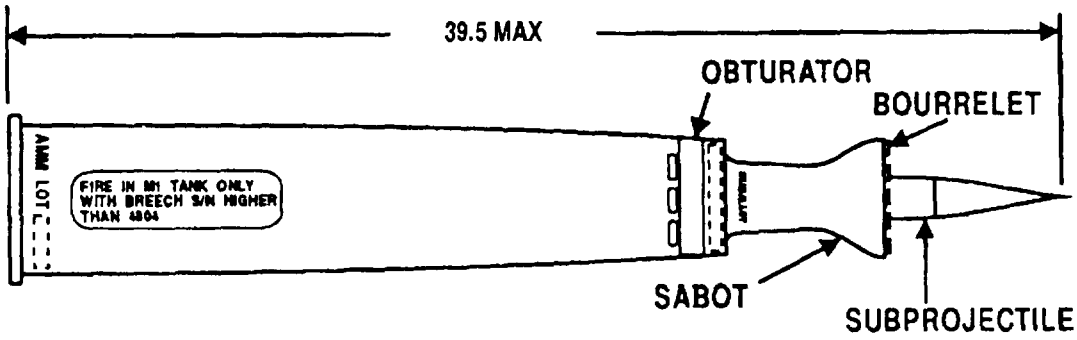
Limitations:

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



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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 PROJECTILE 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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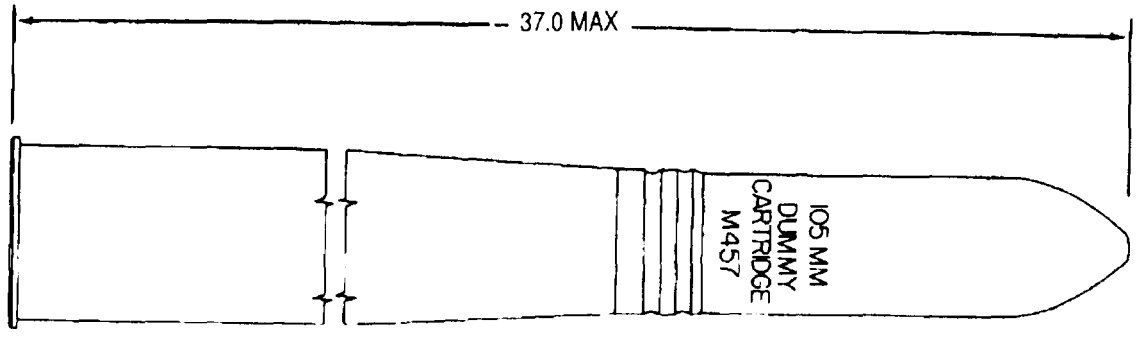
CARTRIDGE, 105 MILLIMETER: DUMMY, M457



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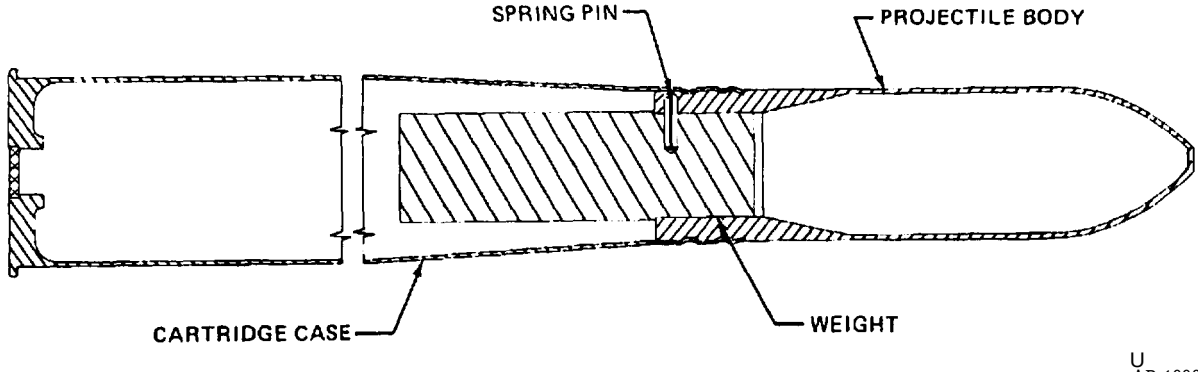

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AR 199808

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.

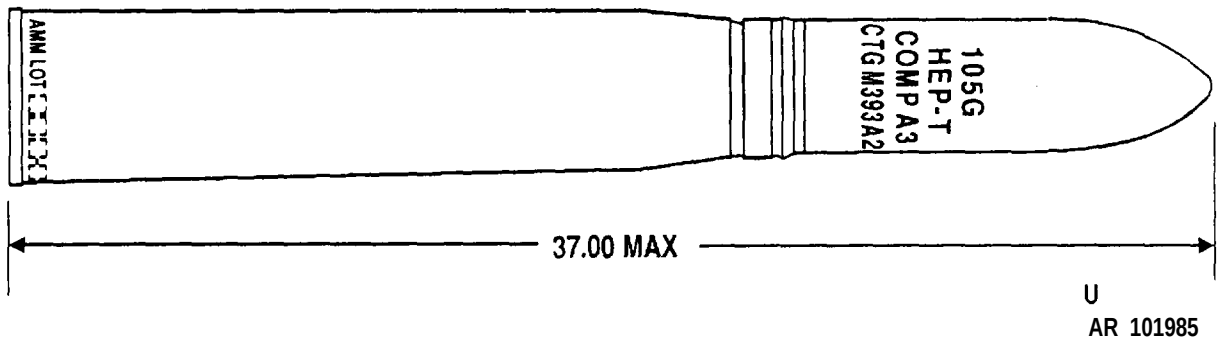
Shipping and Storage Data:

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 M392A2 employs the BD fuze M578. The filler weight on the M393A1 is 0.3 pounds less.

Tabulated Data:

Complete round:
- Type ---------- HEP-T
- Weight ---------- 45 lb
- Length ---------- 37 in

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 ---------- Ml, 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.

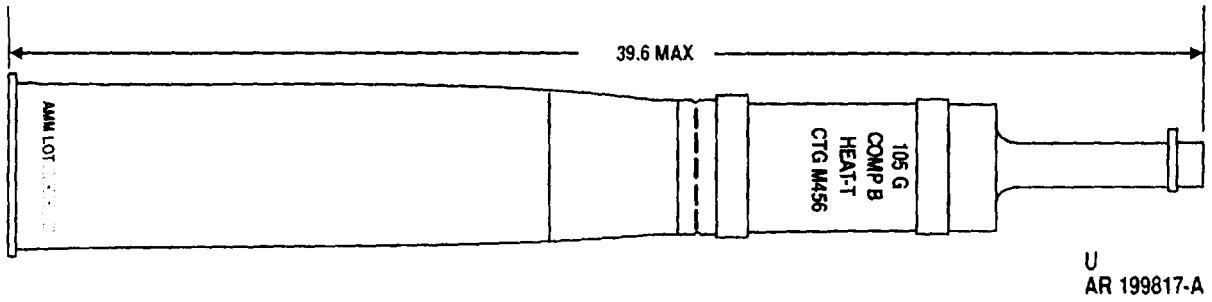
Shipping and Storage Data:

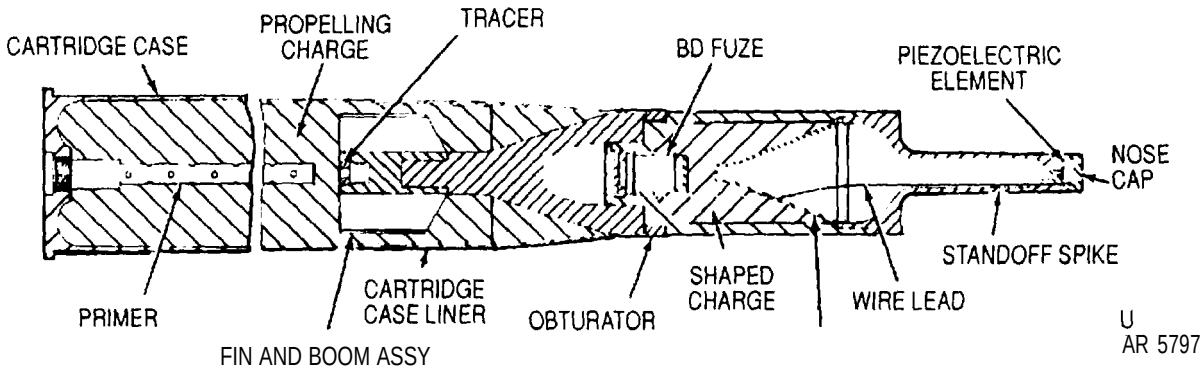
UNO serial number ---------- 0006
Quantity-distance class --------- 1.1
Storage compatibility group --- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC ---------- 1315-C429; 1315-C518
Drawing number ---------- M393A2 8886470 M393A1-8853735

References:

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

CARTRIDGE, 105 MILLIMETER: HEAT-1; M456 SERIES





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	48lb
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

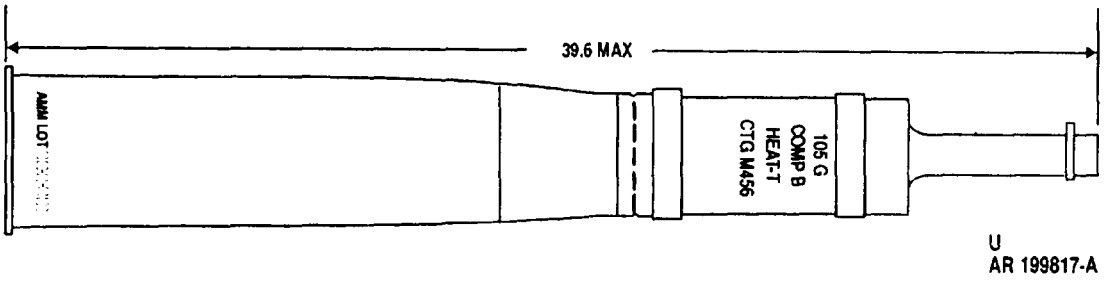
Limitations:

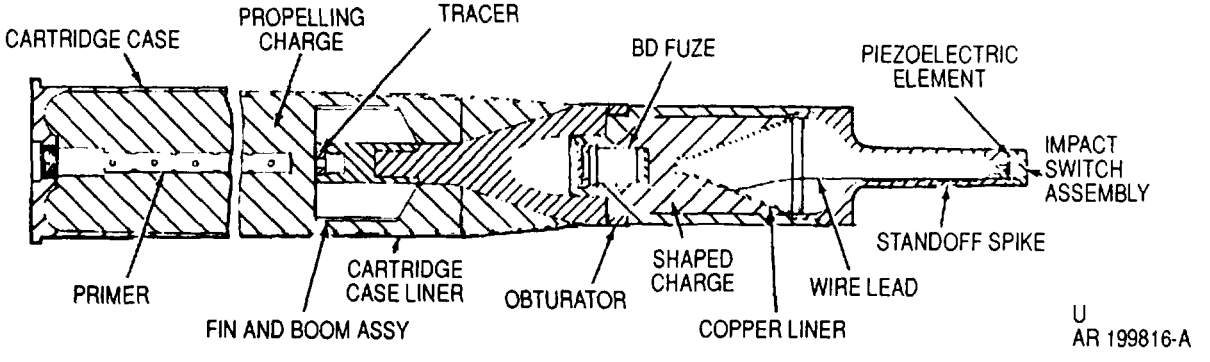
Do not fire M456El cartridges which have been tank transported at temperatures above 120°F

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 Offcers 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 tin 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:

M456	M456E1	M456A1	M456A2
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 (base of projectile body)	Aluminum chamber 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-M509Al

Performance:
- Maximum range ---------- 8200 m (8975 yd)
- Muzzle velocity ---------- l173mps (3850 fps)

Temperature limits:
- Firing:
  - Lower limit ---------- -40°F (-400C)
  - Upper limit ---------- +125°F (+52.O°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

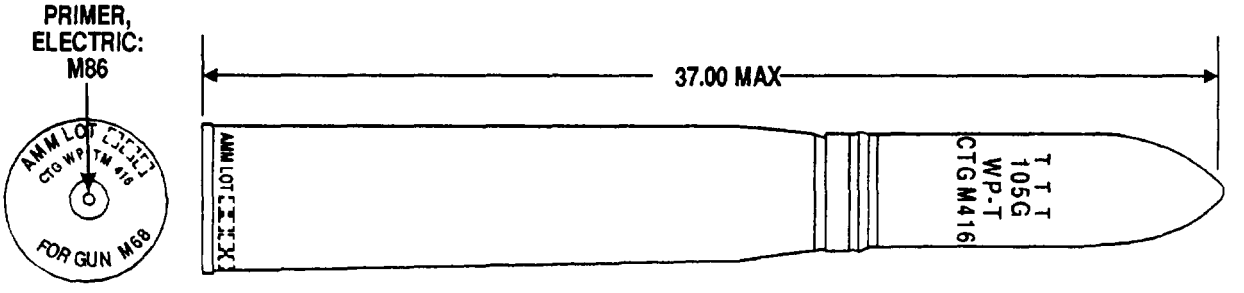
Limitations:

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 downrange.

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



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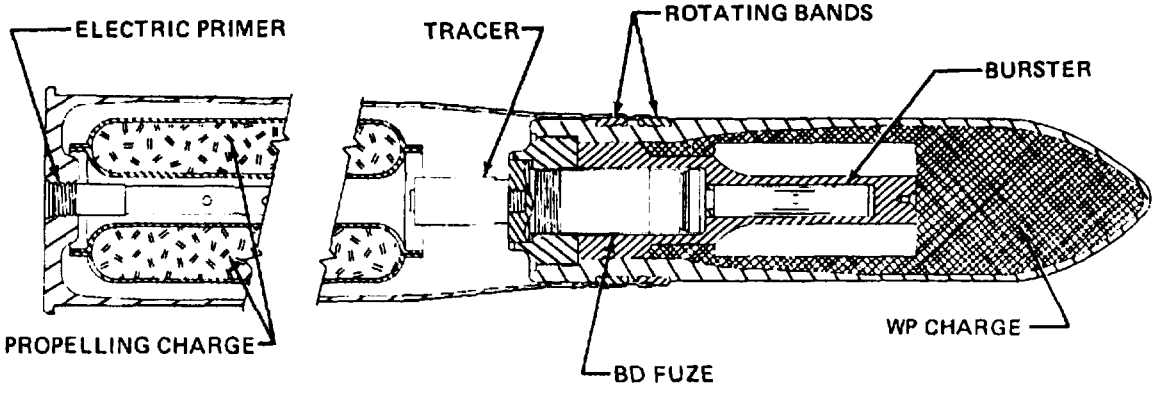


AR1W814

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 detomates the burster charge which ruptures the projectile and clisperses 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 ---------- Ml
- 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 than3 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 designayion ---------- AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC ---------- 1315-C512
Drawing number ---------- 8886487

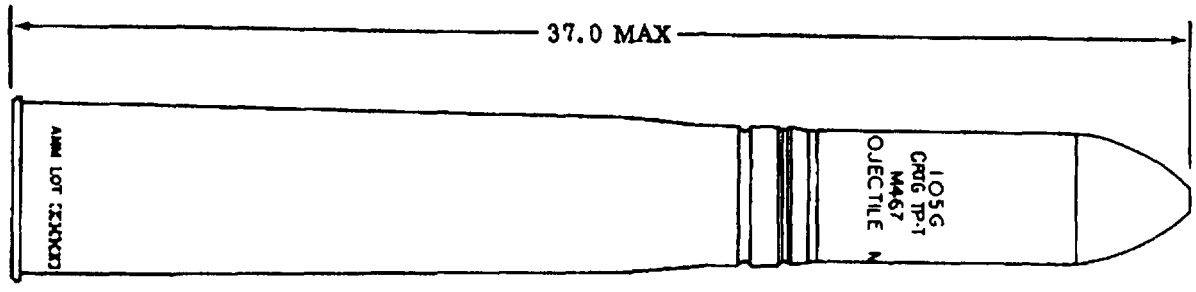
Limitations:

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



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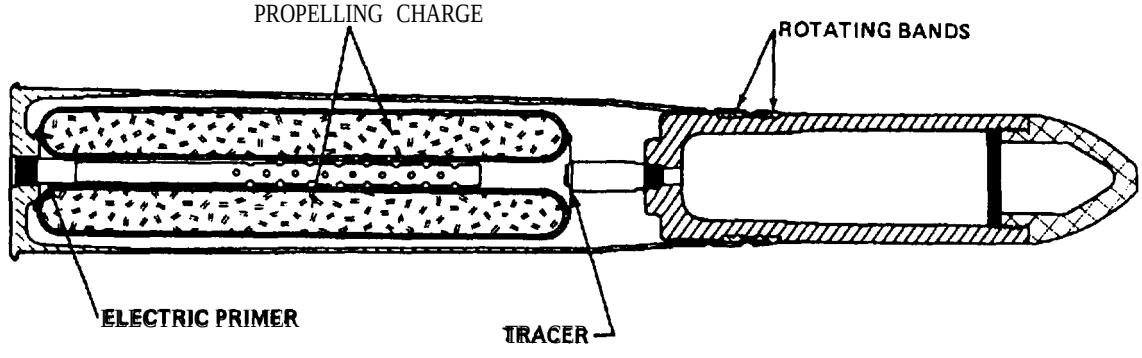


AR1981O

Type Classification:

STD MSR 0173625 dtd 1973,

Use:

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

Description:

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

Functioning:

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

Tabulated Data:

Complete round:

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

Projectile:

Body material	Steel
Color	Blue w/white marking

Components:

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

Performance:

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

Temperature limits:

Firing:	
Lower limit	40^{0}F (-40^{0}C)
Upper limit	+125°F (+52.0°C)
Storage:	
Lower limit	-80°F (-62.2°C) (for period not more than 3 days)
Upper limit	+160°F (-71.1°C) (for period not more than 4 hr/day
*Packing	1 round per fiber container; 2 containers per wooden box
*Packing box:	
Weight	137 lb
Dimensions	43-1/2 x 14 x 8-1/2 in.
Cube	3 cu ft

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

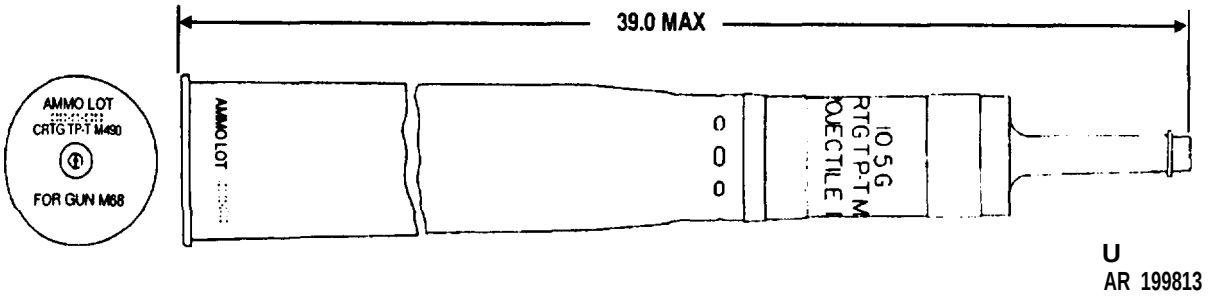
Shipping and Storage Data:

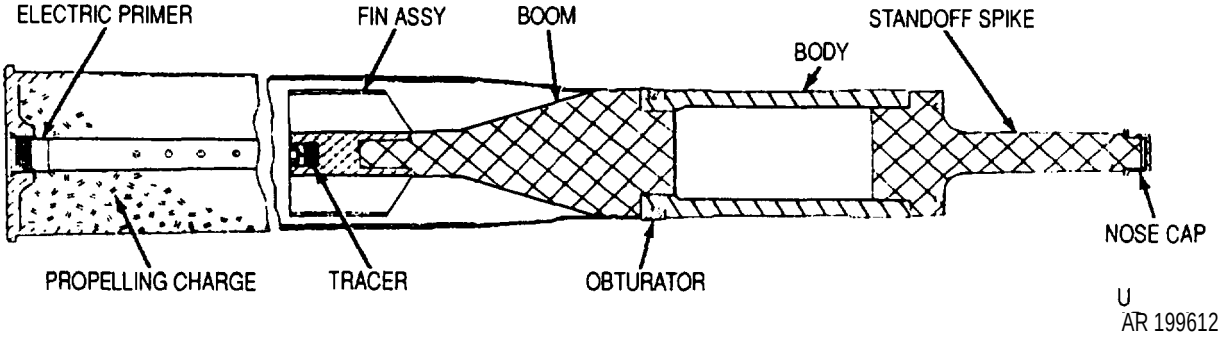
UNO serial number	0328
Quantity-distance class	(08) 1.2
Storage compatibility group	C
DOT shipping class	
DOT designation	AMMUNITION FOR CANNON WITH EMPTY PROJECTILES
DODAC	1315-C510
Drawing number	8863618

References:

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

CARTRIDGE, 105 MILLIMETER: TM490





Type Classification:

STD AMCTC 1103 dtd 1963.

Use:

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

Description:

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

Functioning:

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

Tabulated Data:

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

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

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

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

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

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

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

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

Shipping and Storage Data:

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

Limitations:

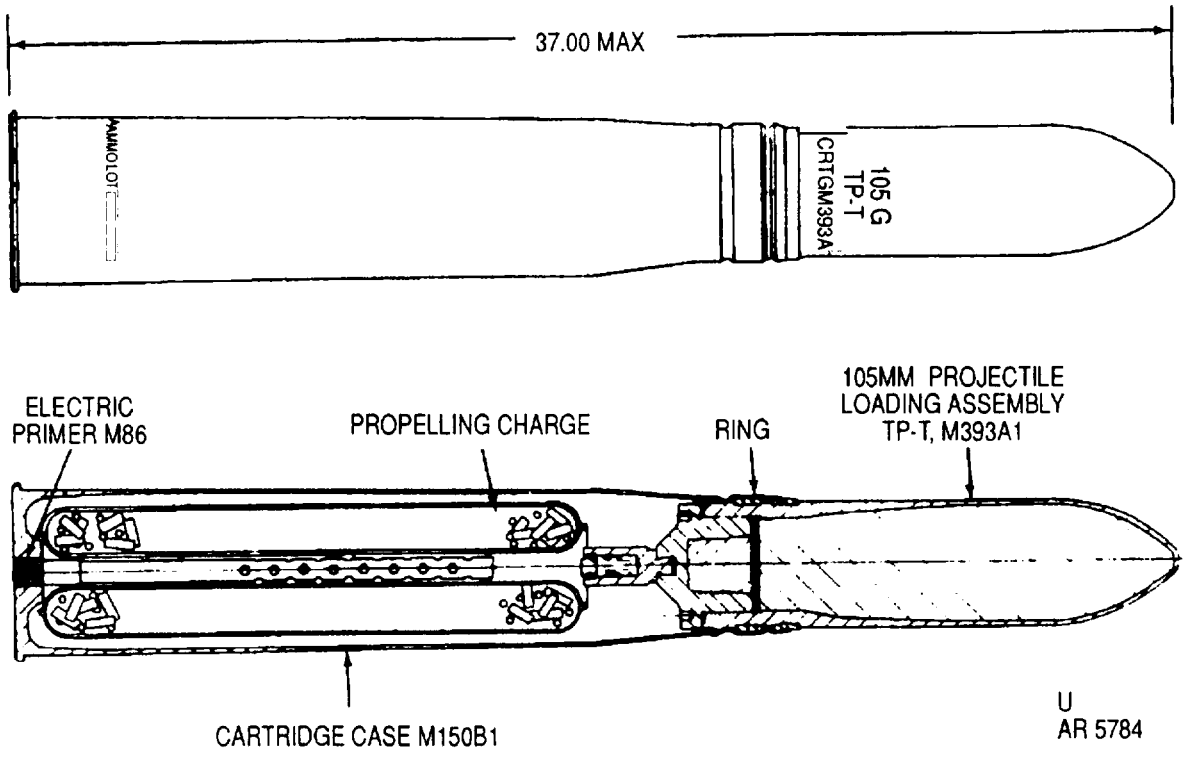
M490 cartridges manufactured prior to January 1967 have a cartridge case liner which utilizes a low-melt wax. Do not fire cartridges which have been tank transported at temperatures above + 120°F (+49°C).

References:

AMC-P 700-3-3

TM 9-1300-251-20

CARTRIDGE, 105 MILLIMETER: TP-T, 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 ---------- Ml (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.

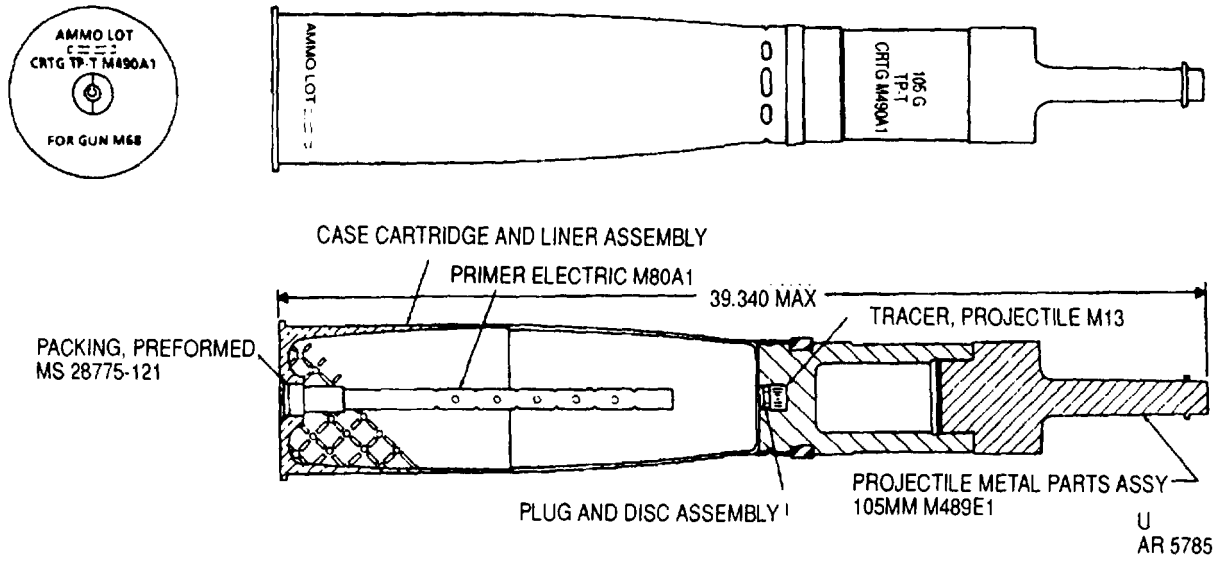
Shipping and Storage Data:

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:

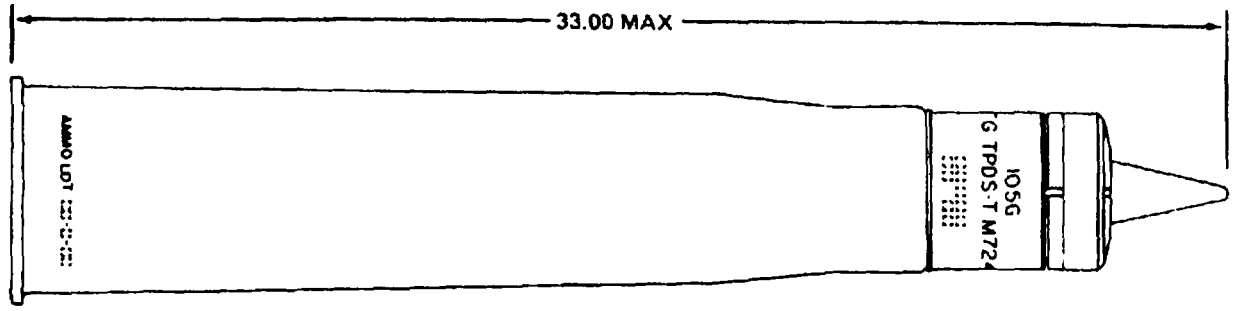
UNO serial number	0328
Quantity-distance class	(04) 1.2
Storage compatibility group	C
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITH EMPTY PROJECTILES
Drawing number	9343009 12935040***
DODAC	1315-C511

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

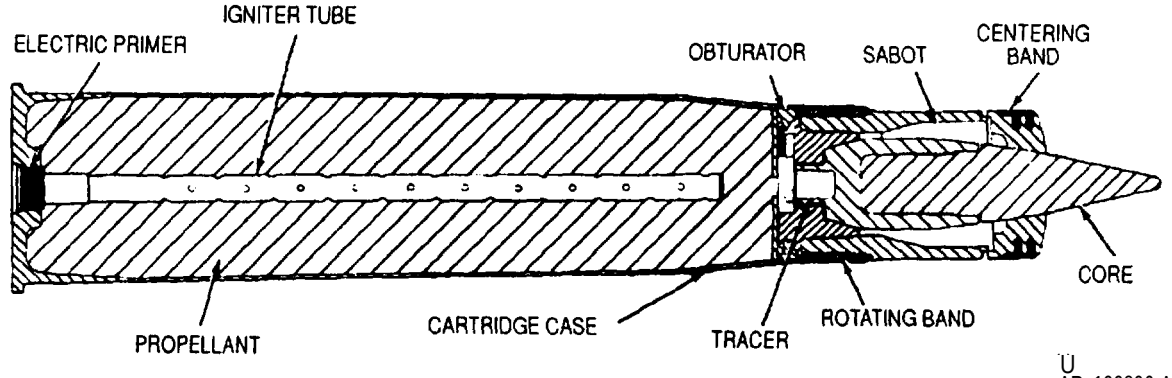
References:

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



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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 M724.A1 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:

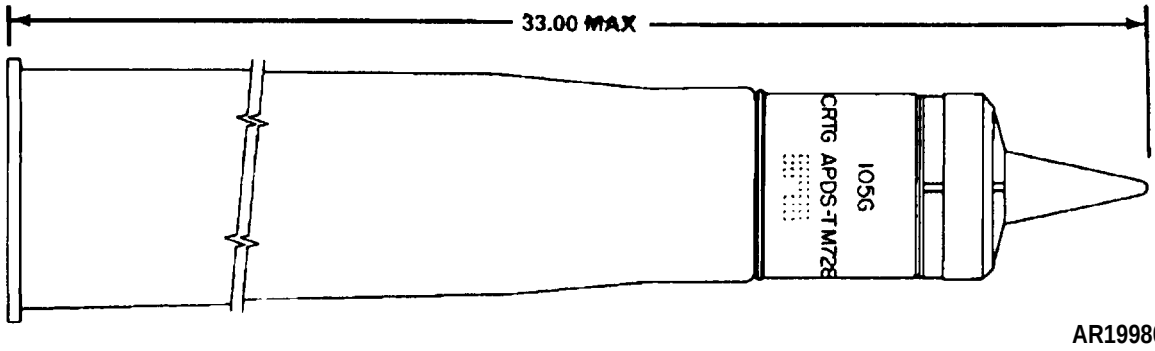
UNO serial number ---------- 0328
Quantity-distance class --------- (04) 1.2
Storage compatibility group--- C
DOT shipping class ---------- B
DOT decimation ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC ---------- 1315-C520
Drawing number ---------- 9278500 12935041***

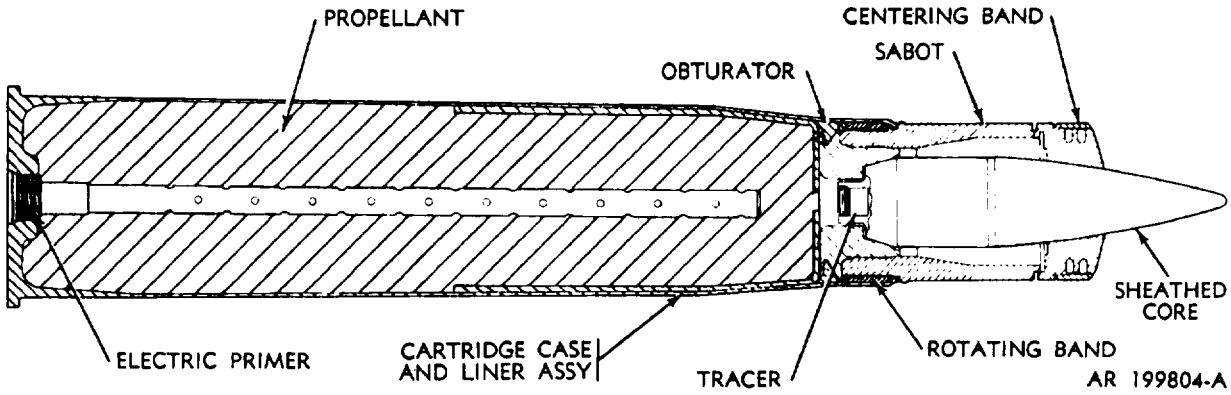
*** This drawing shows the M724A1 assembled with the spiral-wrapped cartridge case.

References:

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

CARTRIDGE, 105-MILLIMETER: APDS-T, M728





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

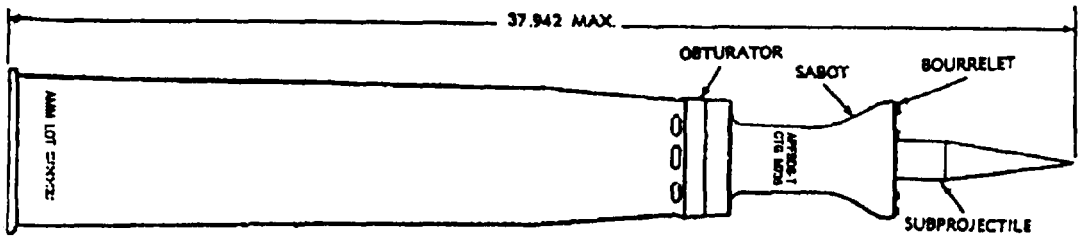
Limitations:

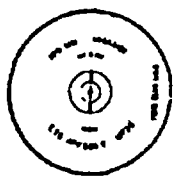
None.

References:

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

CARTRIDGE, 105-MILLIMETER: APFSDS-T M735





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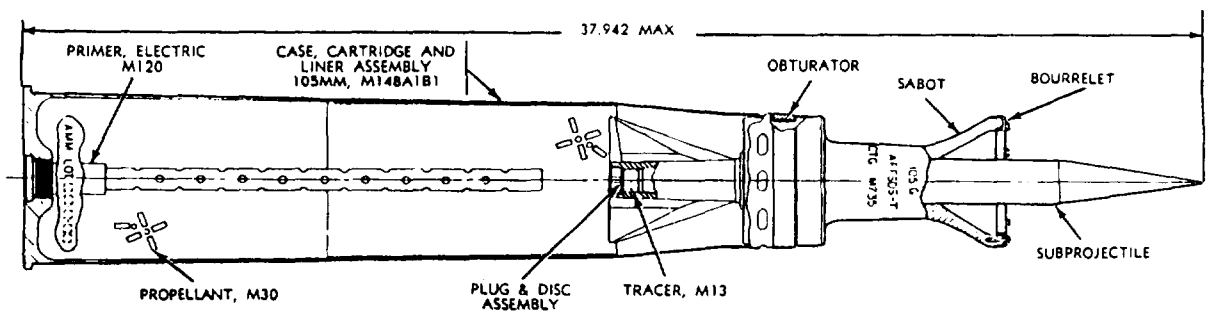
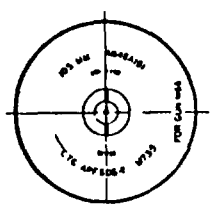
AR 101660-A





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 sub 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.l°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.

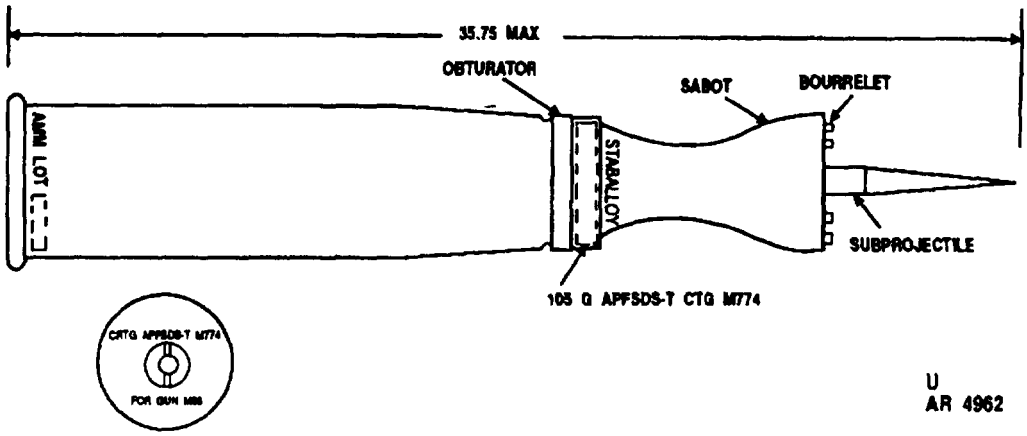
Shipping and Storage Data:

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-MILL1METER: APFSDS-T, M774



Type Classification:

LCCA Oct 1980.

Use:

This cartridge is an armor-piercing antitank 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 titaniun-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	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

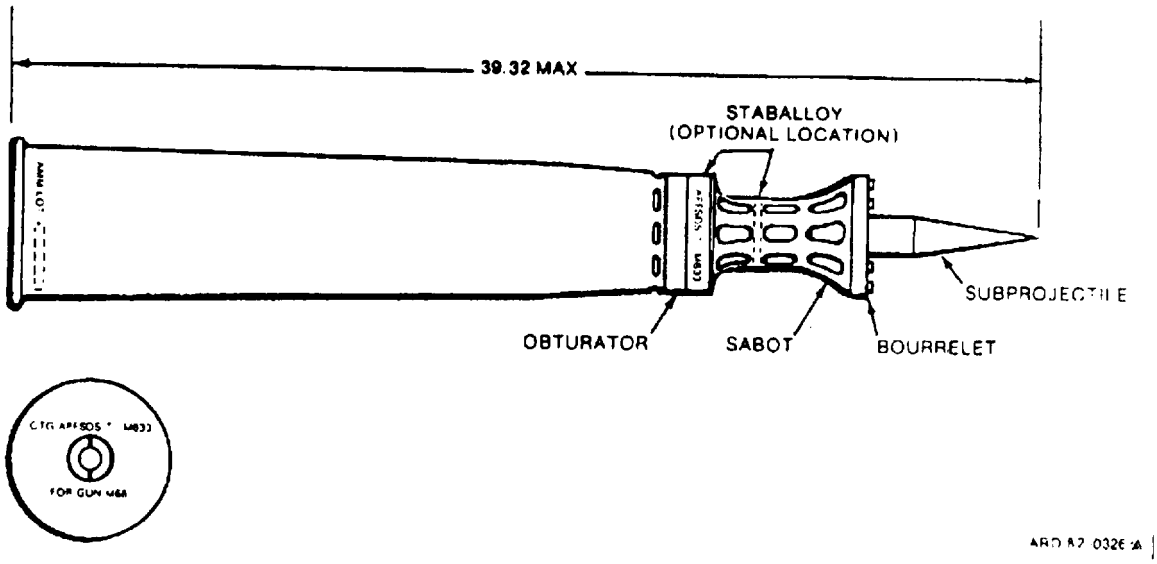
All transmissions regarding incidents of this nature must be classified at least CONFIDENTIAL.

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 conlpliance 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



ARD A2 032E A

Type Classification:

TC Std 7 Apr 83 by DA Letter.

Use:

This cartridge is an armor-piercing antitank cartridge and is intented 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

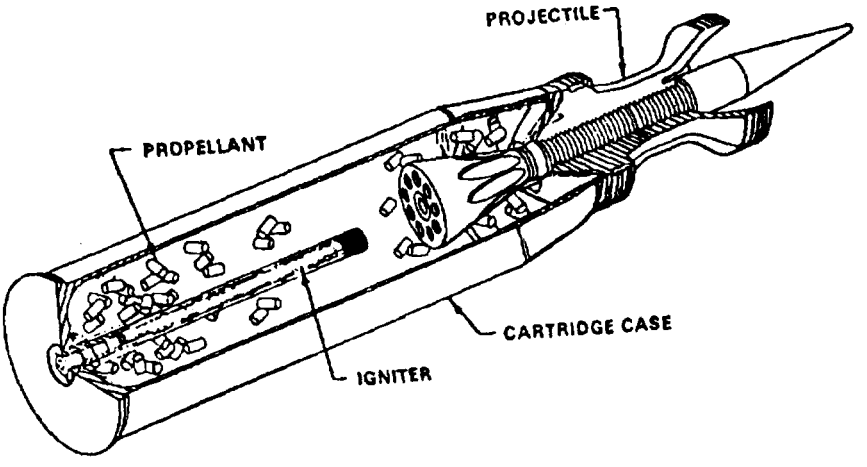
Loss or unauthorized firings of the M833 must be reported to HQ, AMCCOM RPO within 24 hours of the discovery. Telephone reports should be followed with a written report to:
Commander
USA AMCCOM
ATTN: AMSMC-SF
Radiological Protection Officer (RPO)
Rock Island, IL 61229-6000
Autovon: 793-2969/2964/2965/2966
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 DISCARDED 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 Treibkafiggescho Bnarchbildung -T
[ ] Kg [ ] m3 GEF [ ]
LOS [ ]

Fiber Container: C533
PATRONE, UEBUNG, 105MM X 617 DM128 Treibkafiggescho Bnarchbildung -T
LOS [ ]

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

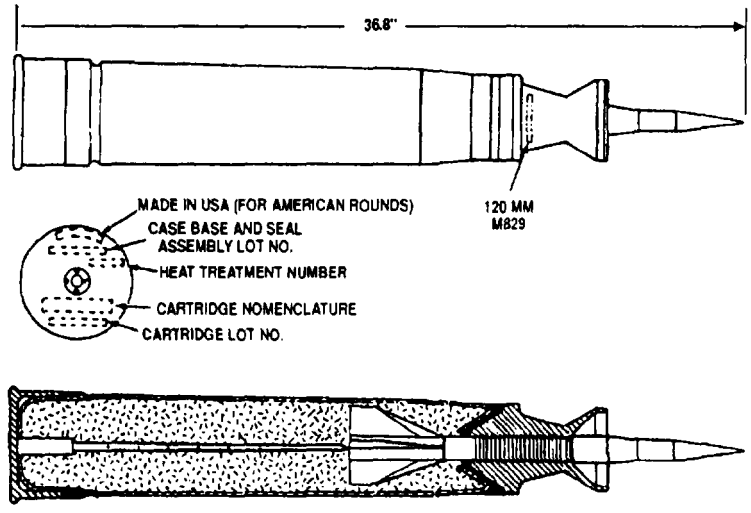
GERMAN

PATRONE, UEBUNG
Treibkafiggescho Bnarchbildung
-T
LOS
GEF

ENGLISH (Meaning)

TARGET PRACTICE ROUND
Sabot Simulation
Tracer
Lot
Loader

CARTRIDGE, 120-MILLIMETER: APFSDS-T, M829



U
AR 6252

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 propelling 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 containers 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.

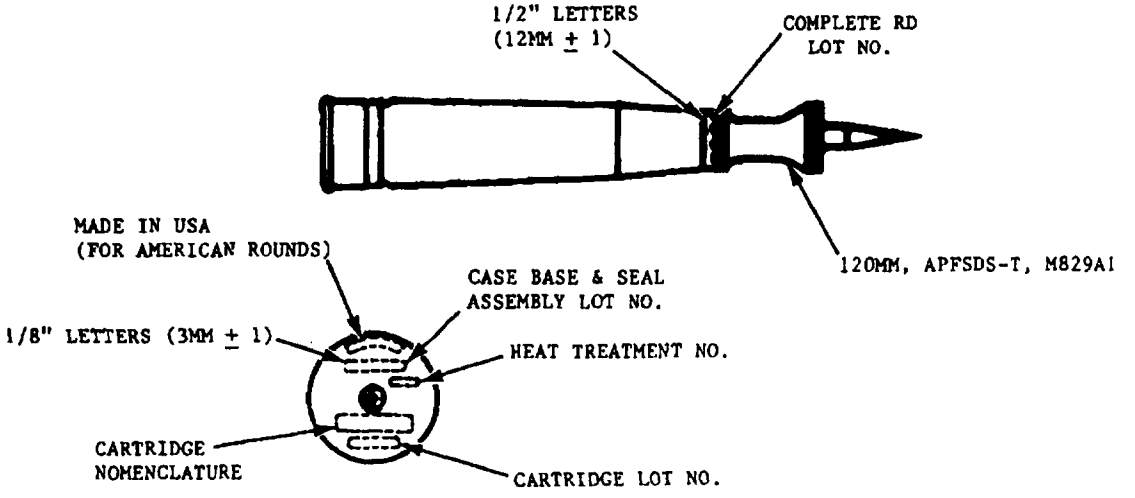
The M829 is a full service round which may only be fired during war emergency. All peace-time firings are prohibited except on ranges which are NRC (Nuclear Regulator Commission) approved and/or have host nation agreement. The M829 will not be fired over the heads of friendly troops, unless troops are 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 buttress 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 container; 30 containers 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

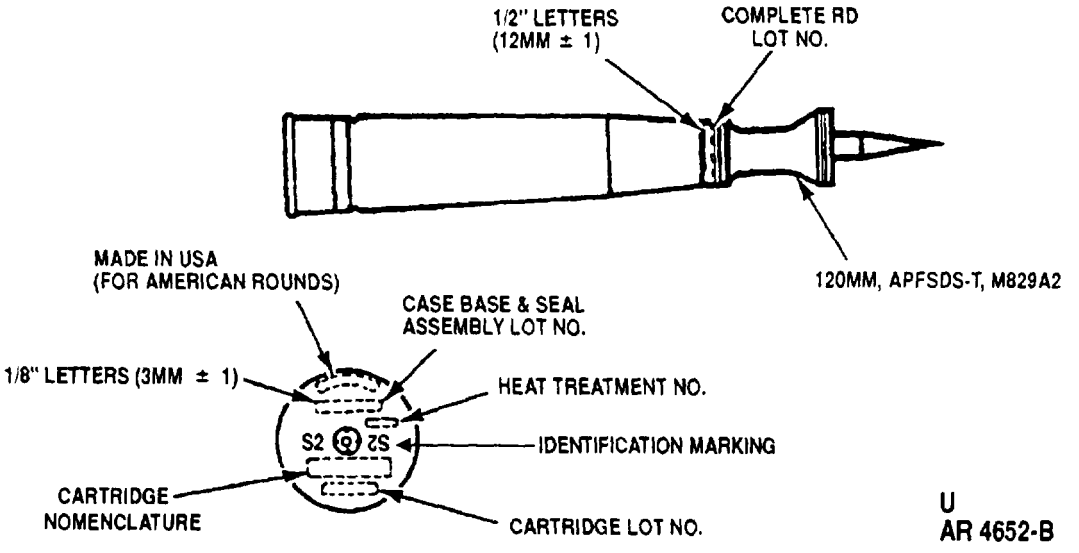
THE DAMAGED CARTRIDGE SHALL BE PLACED IN A CONTAINER AND SHALL BE RETURNED IN A SEALED CONTAINER TO THE APPROPRIATE ASP FOR DISPOSITION.

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

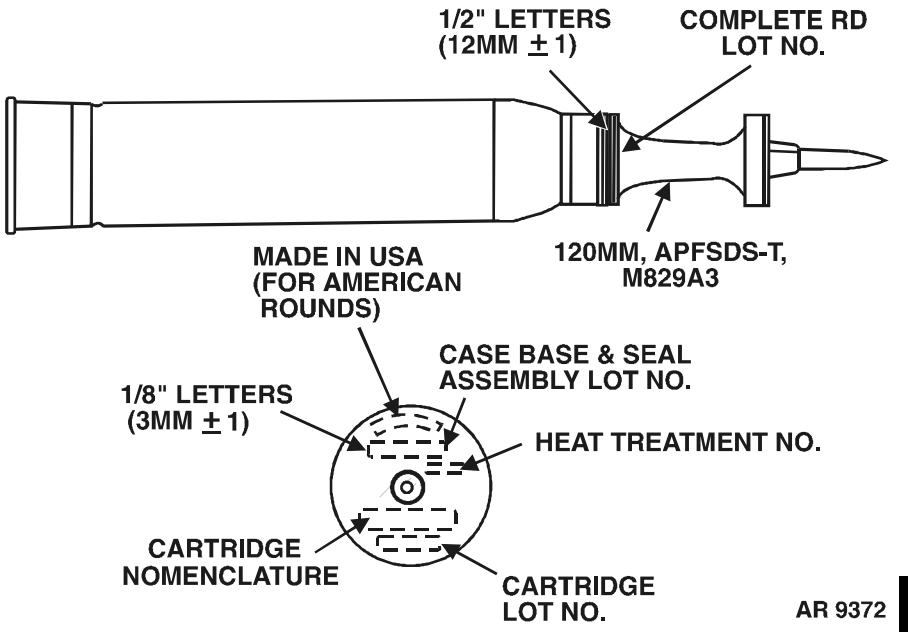
IF THE CARTRIDGE IS DAMAGED TO THE POINT WHERE THE INTERNAL PROJECTILE COMPONENTS ARE VISIBLE, THE ITEM SHALL BE TREATED AS CONFIDENTIAL, THE DAMAGED CARTRIDGE SHALL BE PLACED IN A CONTAINER OR OTHERWISE COVERED TO PREVENT EXPOSURE. THE CARTRIDGE SHALL BE RETURNED IN A SEALED CONTAINER (AS A CLASSIFIED 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

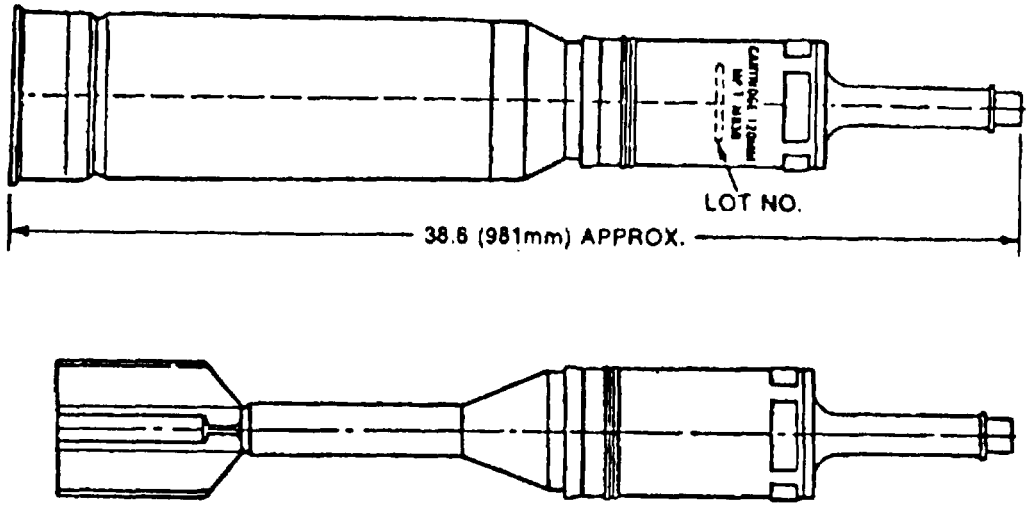
IF THE CARTRIDGE IS DAMAGED TO THE POINT WHERE THE INTERNAL PROJECTILE COMPONENTS ARE VISIBLE, THE ITEM SHALL BE TREATED AS CONFIDENTIAL. THE DAMAGED CARTRIDGE SHALL BE PLACED IN A CONTAINER OR OTHERWISE COVERED TO PREVENT EXPOSURE. THE CARTRIDGE SHALL BE RETURNED IN A SEALED CONTAINER (AS A CLASSIFIED 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 antiarmor 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 antiarmor 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 containers 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.

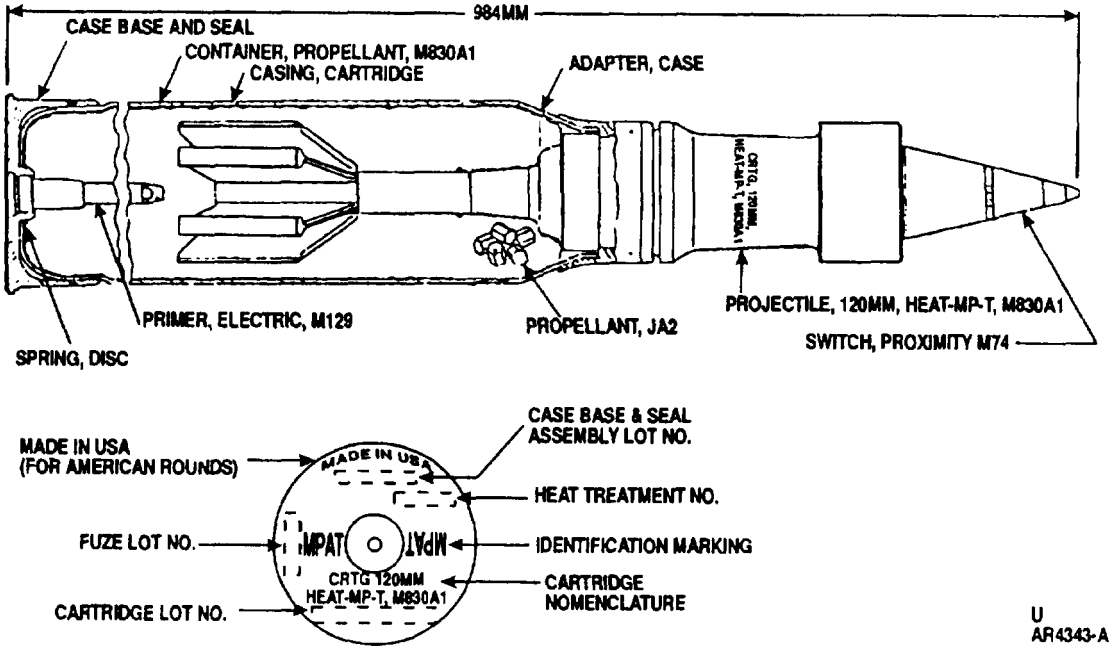
Shipping and Storage Data:

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 fuzing 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 fuzing 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 M830Al fuzing 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 blowby 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 hand 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 containers 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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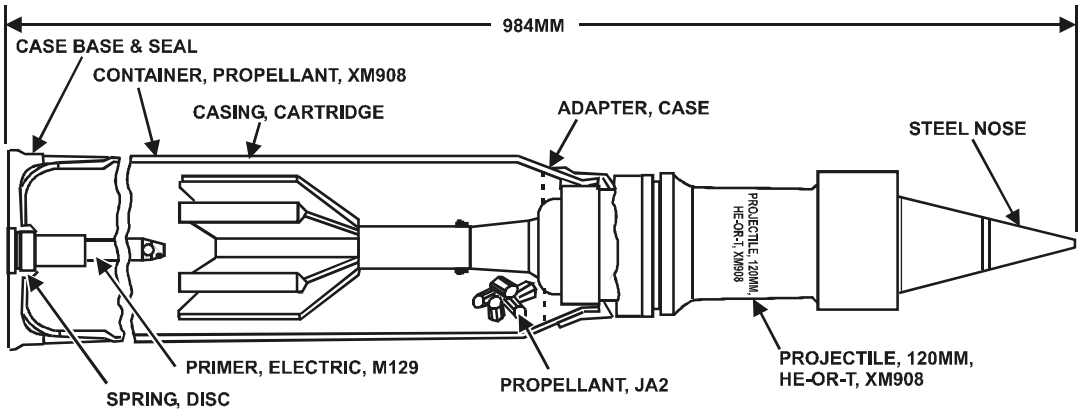
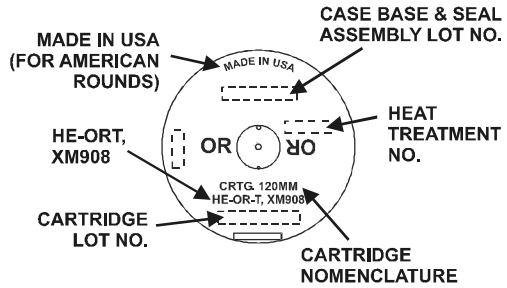
CARTRIDGE, 120 MILLIMETER, HE-OR-T, M908





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 fuzing 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 fuzing 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 inducted 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 containers 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 WEAPONS
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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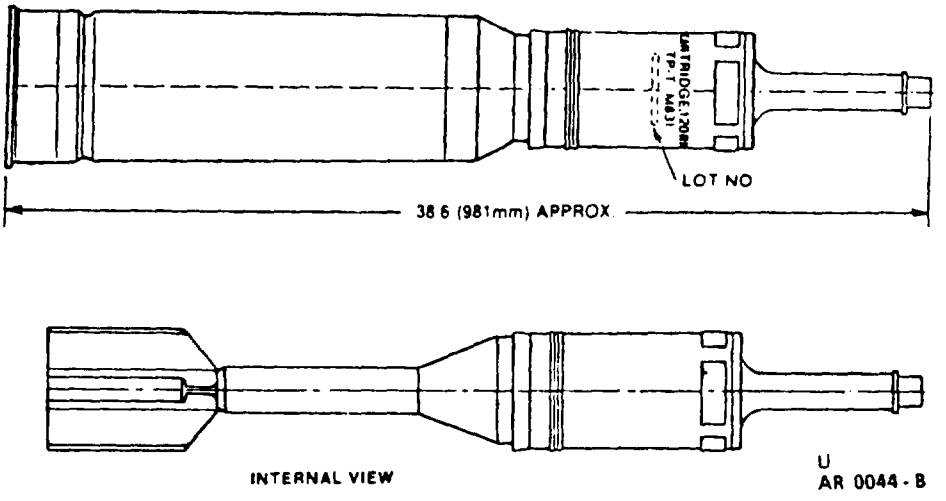
CARTRIDGE, 120-MILLIMETER: TP-T, M831



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:

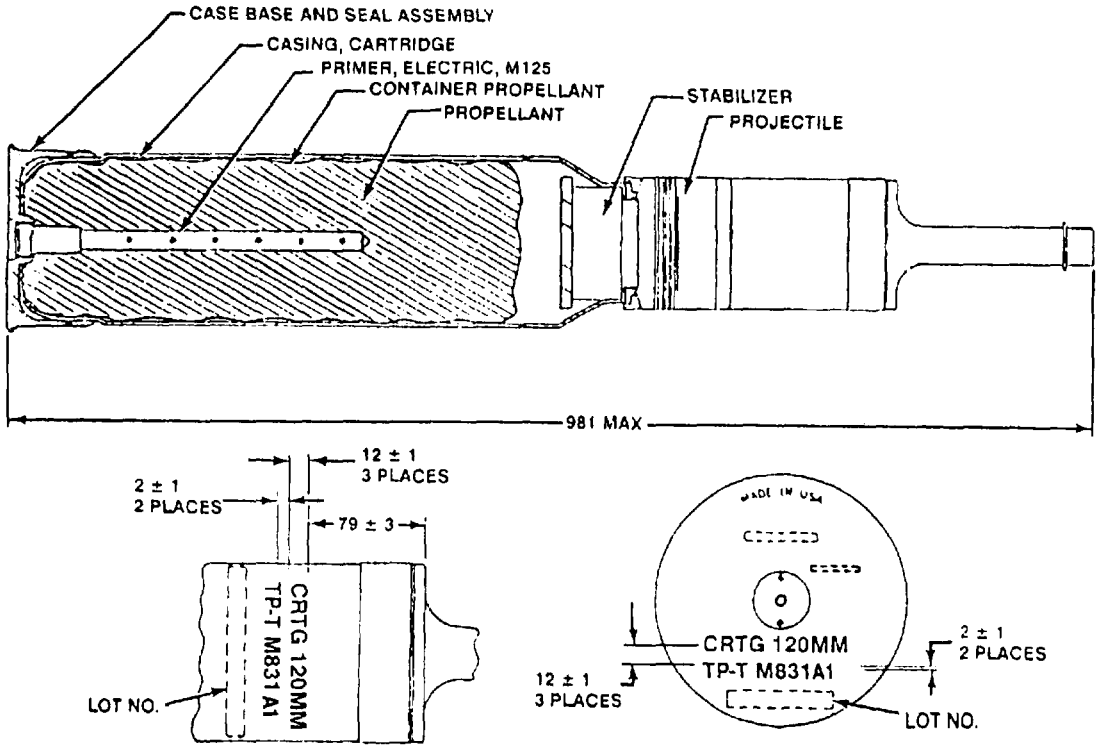
Inner pack drawing ---------- 12527220
Outer pack drawing ---------- 12527240
Weight:---------- 36 lb
Cube ---------- 2.4 cu ft
*Packing ---------- 1 round per fiber container; 1 container per wooden box; 20 boxes per pallet
*Packing box:
Weight ---------- 89 lb
Dimensions ---------- 45.6 in. x 9.02 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, combustible 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:
- Type ---------- Fixed, TP-T
- Weight ---------- 50.5 1b (22.9 kg)
- Length ---------- 38.62 in. (981mm)
- Assembly drawing ---------- 12944397

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 ---------- 55,000 psi @ 70°F 73,000 psi @ 145°F

Velocity (nominal) ---------- l140 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 containers per pallet

*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

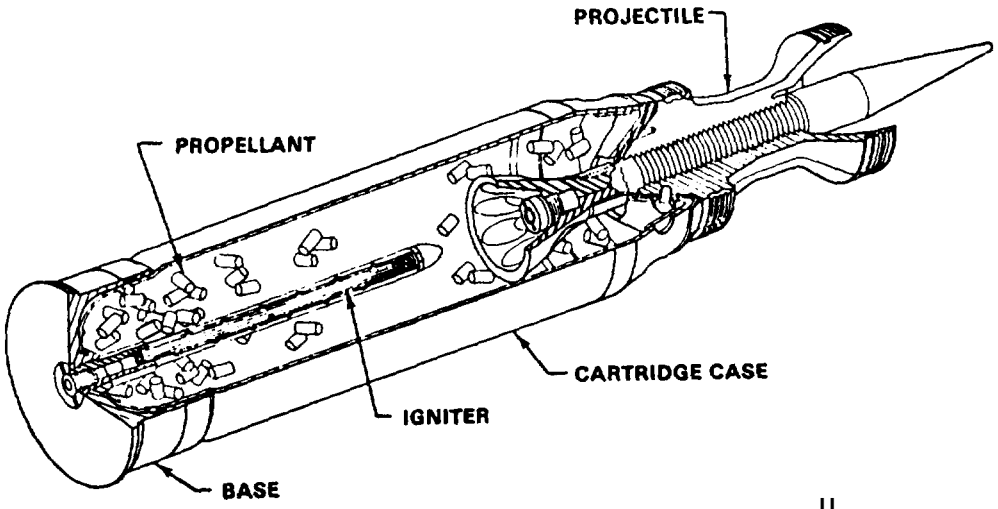
DOT shipping class ---------- B

DOT designation ---------- AMMUNITION FOR CANNON WITH EMPTY PROJECTILE

UNO serial number ---------- 0417

DODAC ---------- 1315-C784

CARTRIDGE, 120-MILLIMETER: TPCSDS-T, M865



Type 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
l-Inch shorter sabot	12525000
New Alliant F^3 design	28251796
New Olin F^3 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^3 design ---------- 12913175
Olin F^3 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 bourrelete.

Metal Container (PA116)

Differences Between NSN's: (cont.)

1315-01-288-5545*

6 hole cone

l-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)

l-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)

l-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: l/2-inch letters (12-mm ± 1) in 3 lines on sabot midsection.

b. Marking for 6 cone/reduced length sabot: l/4-inch letters (6-mm ± 1) in 2 lines on sabot midsection or bourrelet.

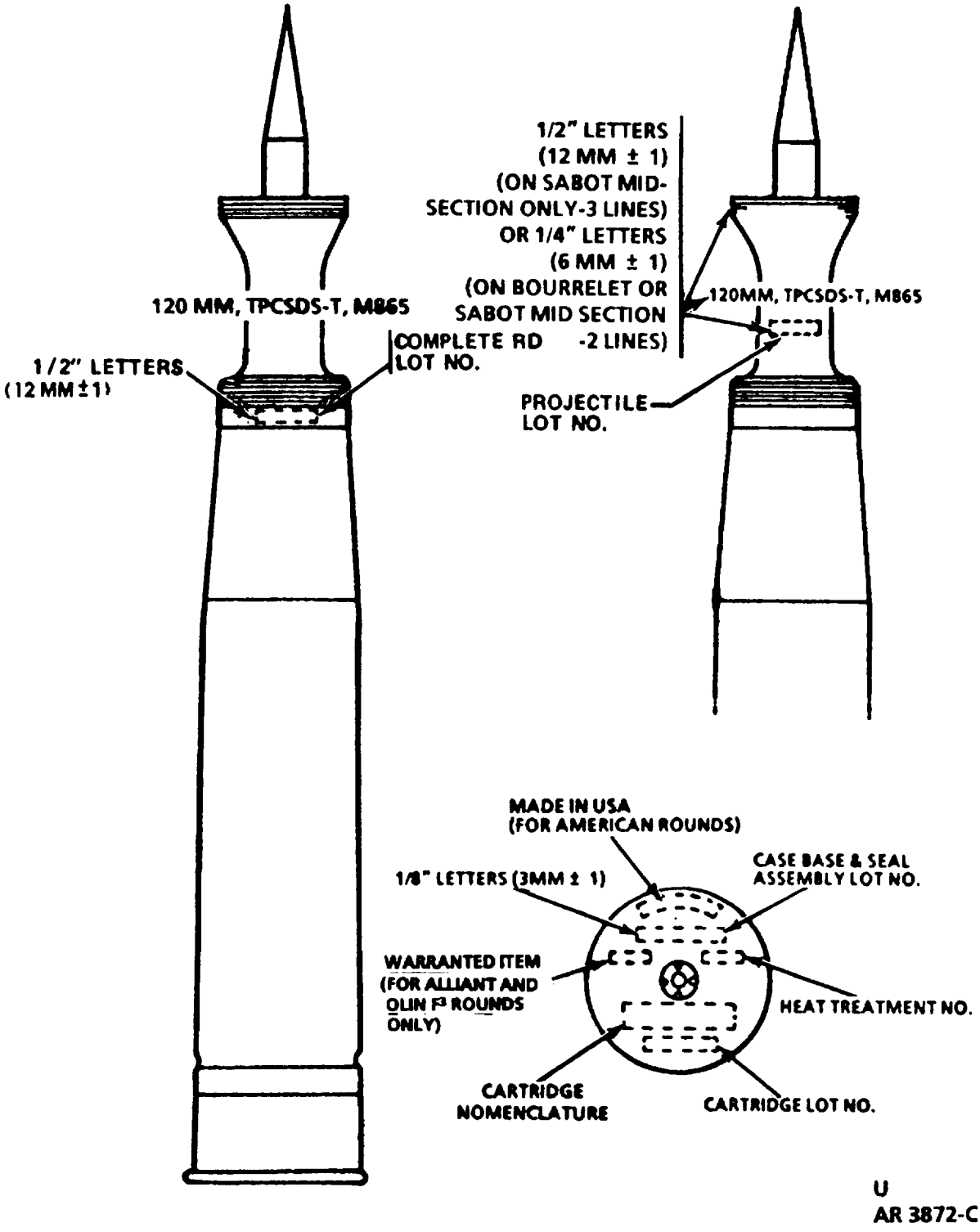
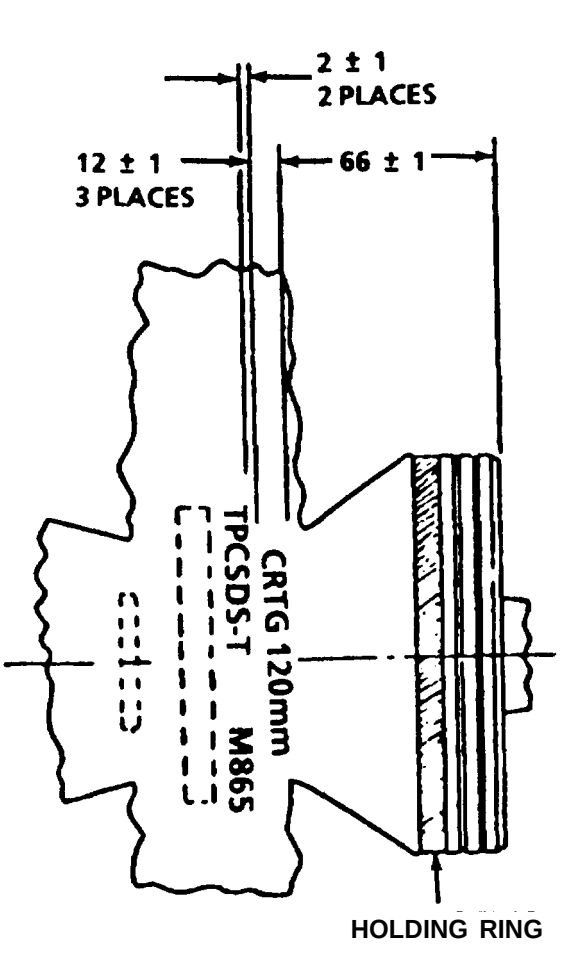
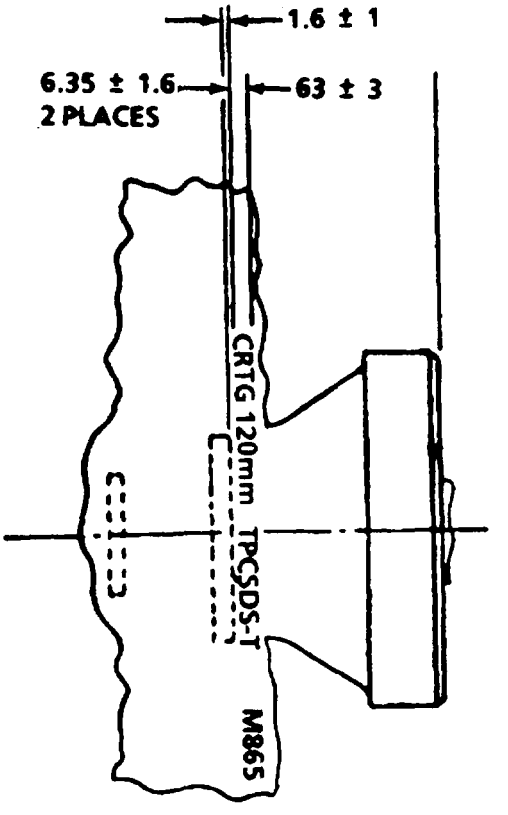


Figure 1. Typical marking for 120-mm gun cartridges, M865



STANDARD SABOT (OLD)



SHORTER SABOT (NEW)

NOTE: All dimensions shown are in millimeters.

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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^3 design round and the Olin F^3 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 9-1300-251-20 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
Unit of measure	each
Quantity incorporated in unit	1

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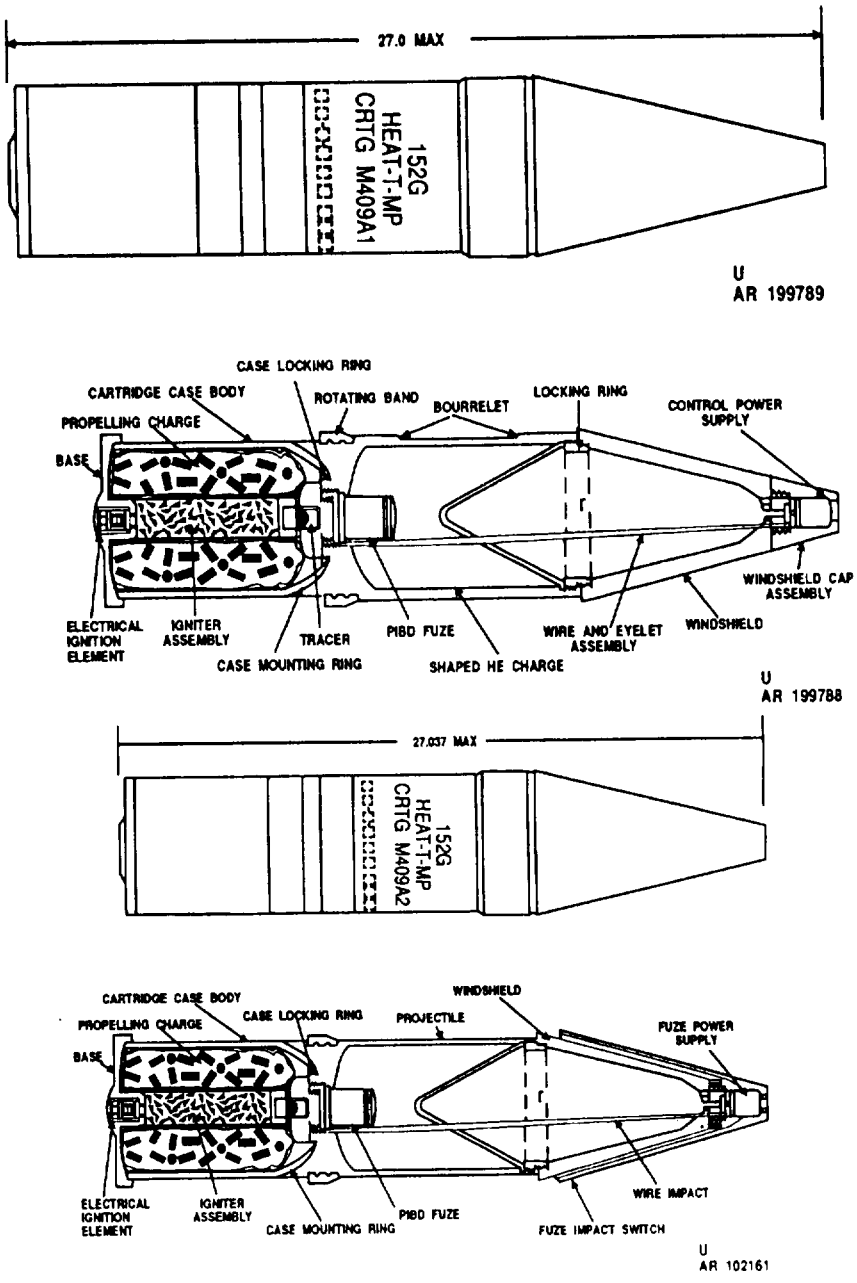
CARTRIDGE, 152-MILLIMETER: HEAT-T-M, M409A2, M409A1 AND M409



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 shockwave 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	M91	Electric	M91
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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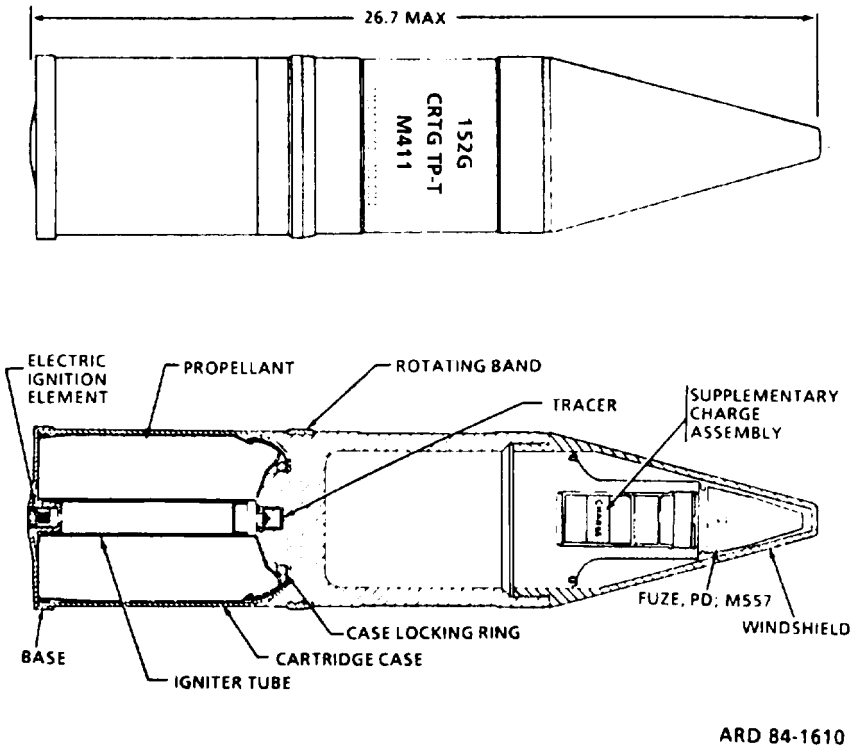
CARTRIDGE, 152-MILLIMETER: TP-T, M411



Type Classification:

C&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

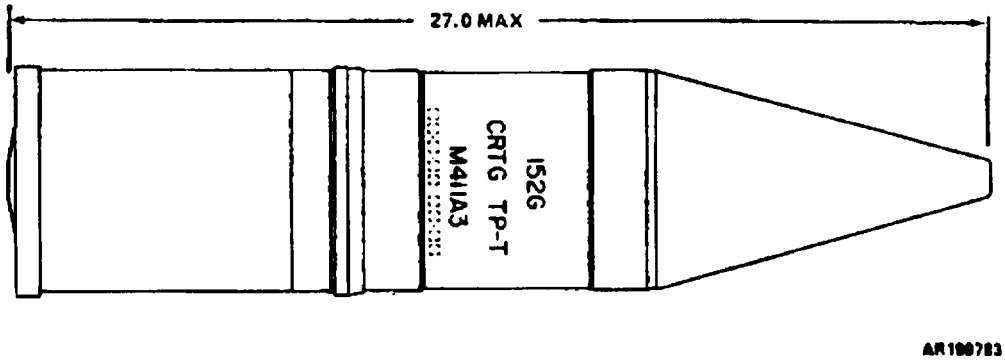
Limitations:

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



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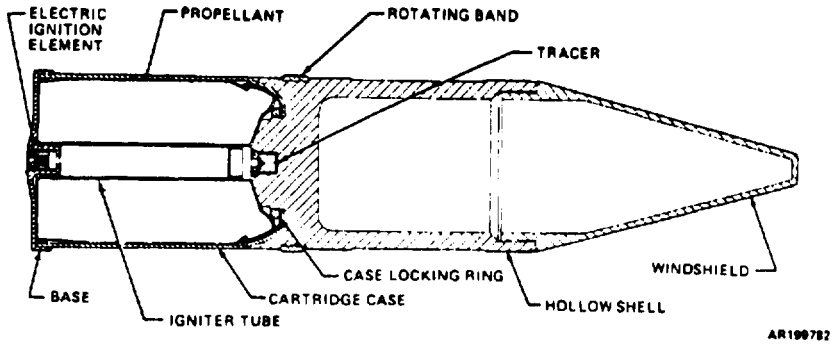


AR190782

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 nonfunctioning.

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
DOTdesignation ---------- AMMUNITION FOR CANNON WITH INERT LOADED PROJECTILE. (M411): AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC ---------- 1320-D383 (M411A3, M411A2, and M411A1)
Drawing number ---------- 9266944, (M411A3); 9242430, (M411A2); 9233376. (M411A1)

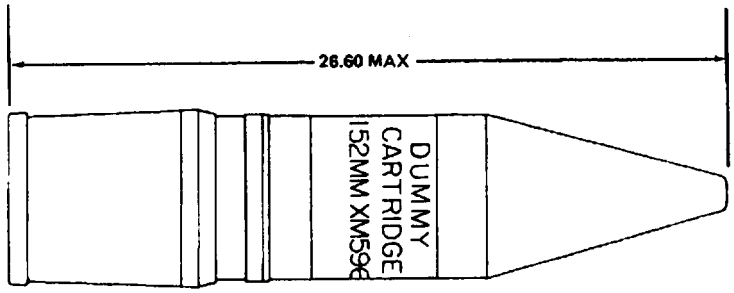
Limitations:

None.

References:

SB 700-20
AMC-P 700-3-3
TM 9-2350-230-12
TM 9-2350-232-10
'I'M 9-1300-251-20

CARTRIDGE, 152-MILLIMETER: DUMMY, M596



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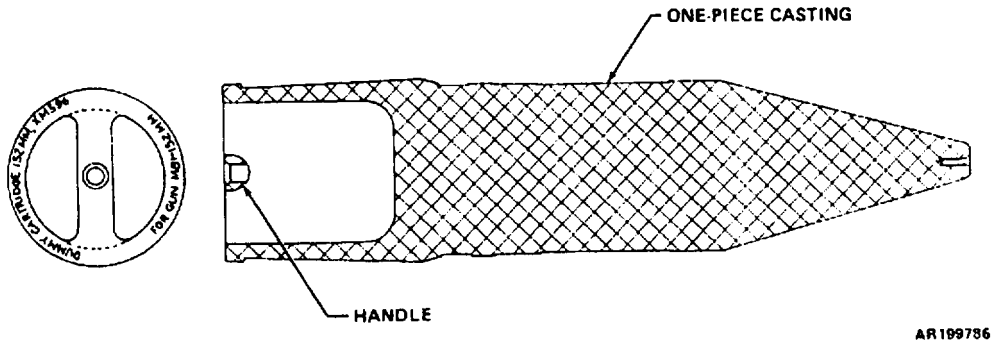


AR199786

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-nun, 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

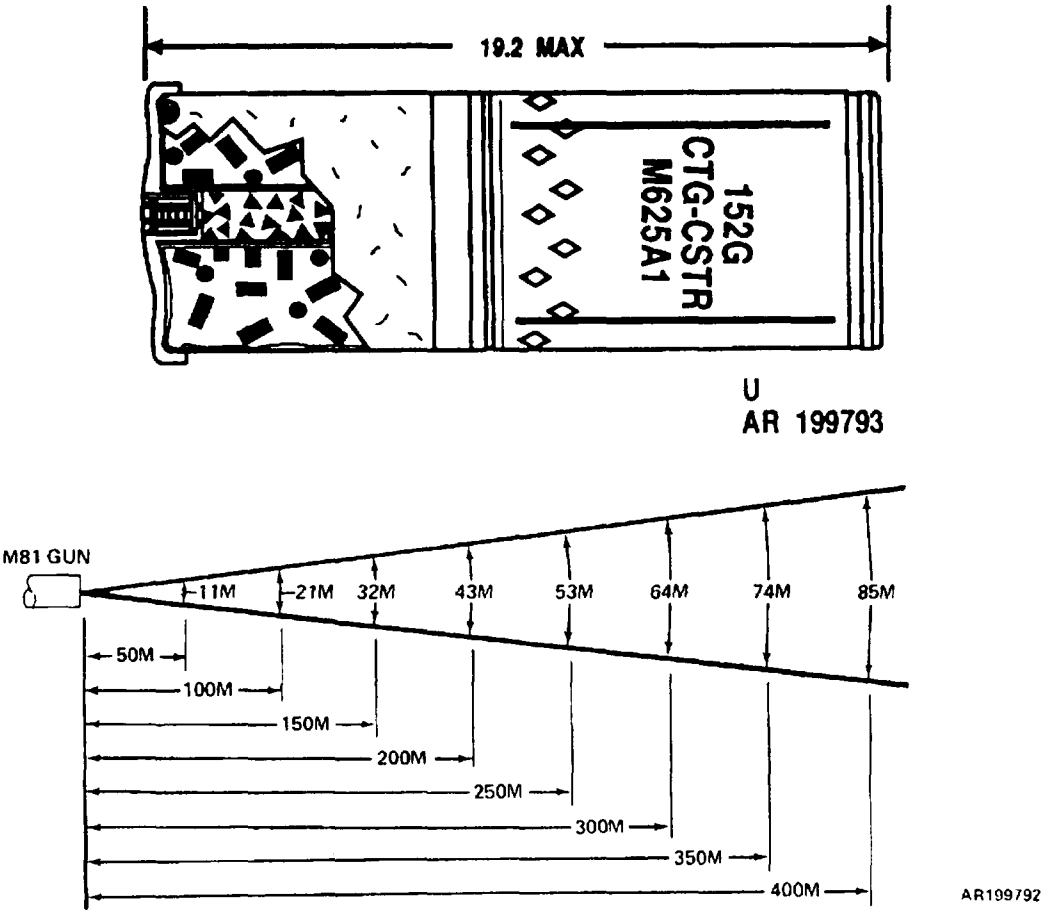
Limitations:

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



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 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 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 accidenally 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.

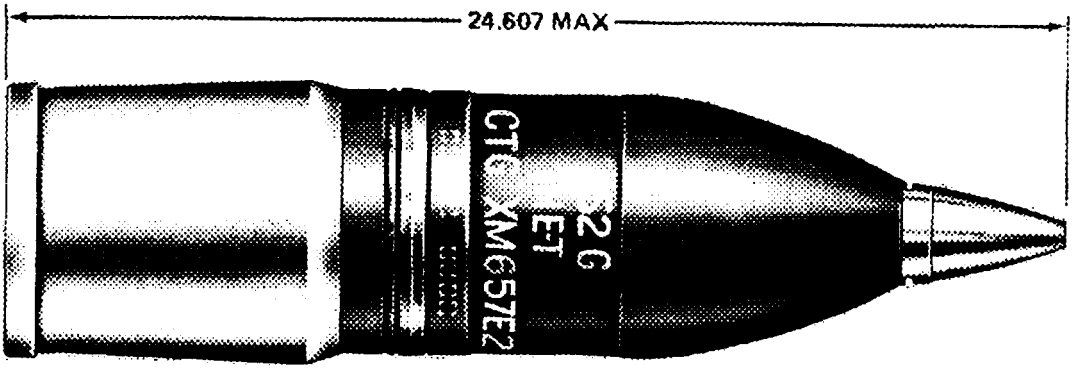
Limitations:

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



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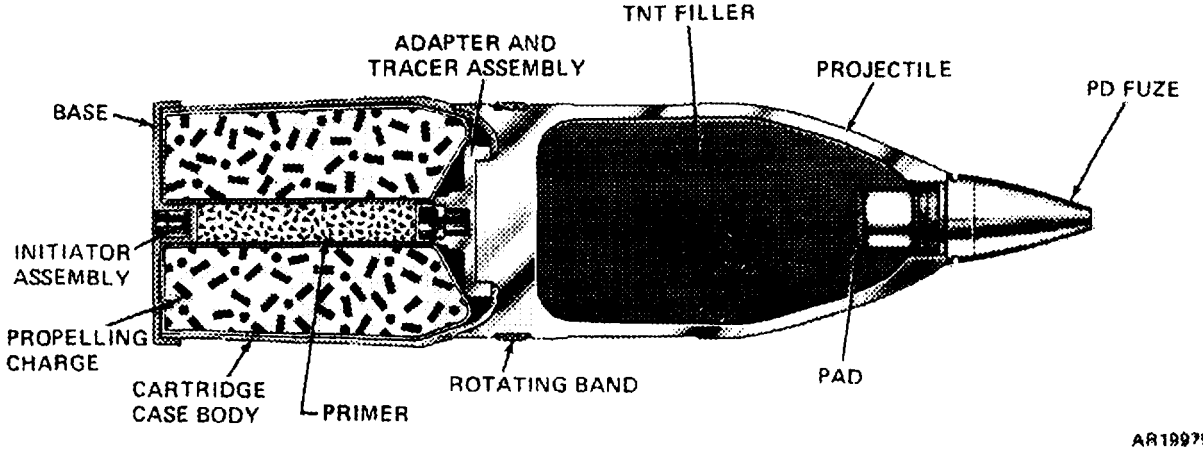


AR199790

Type Classification:

C&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 hand 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

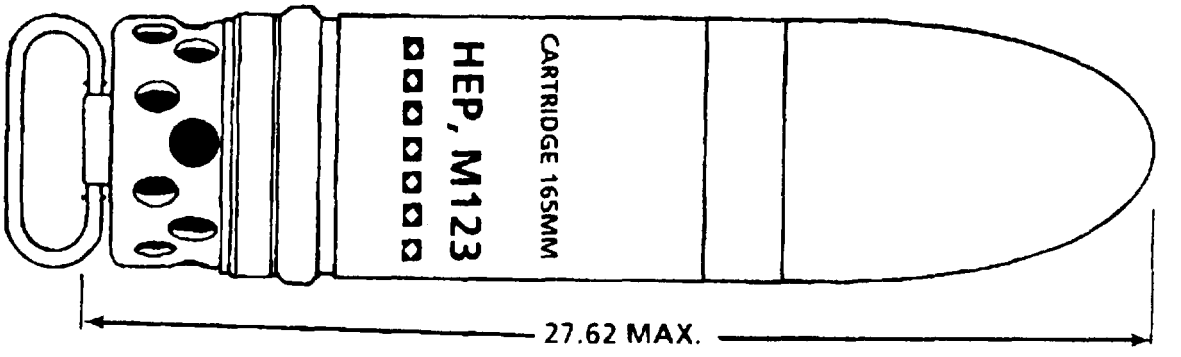
Operational Characteristics:

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 olyethylene 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.l°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

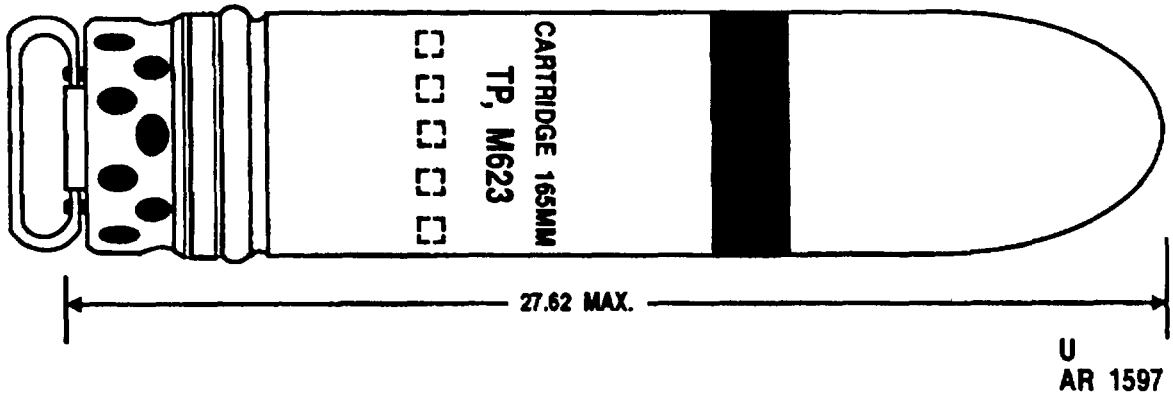
Limitations:

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:

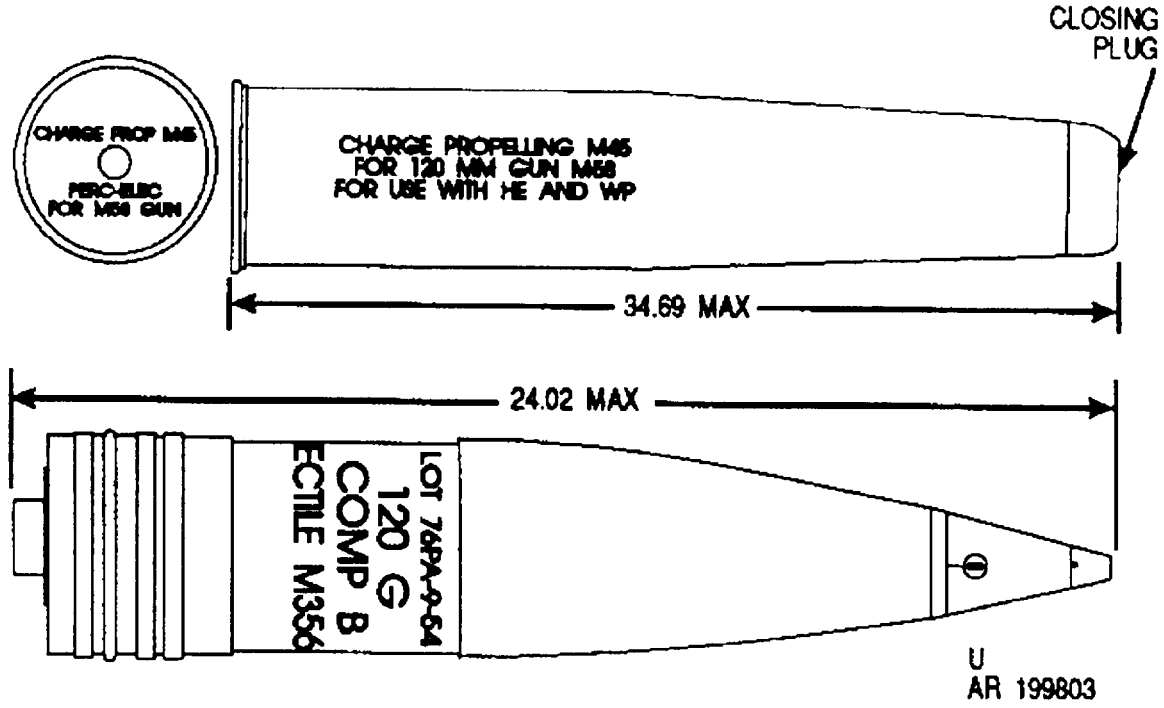
Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (+52°C)
Storage:	
Lower limit	-80°F (-62.2°C) (for period not more than 3 days)
Upper limit	+160°F (+71.1°C) (for period not more than 4 hr/day)
*Packing	1 round per fiber container; 1 container per wooden box
*Packing Box:	
Weight w/cartridge	94.0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

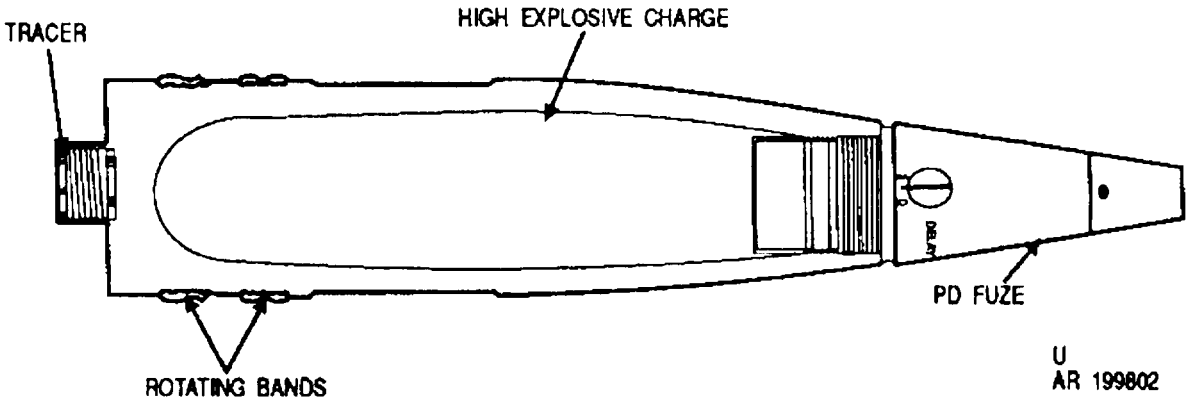
*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

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:

Projectile w/fuze:	
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

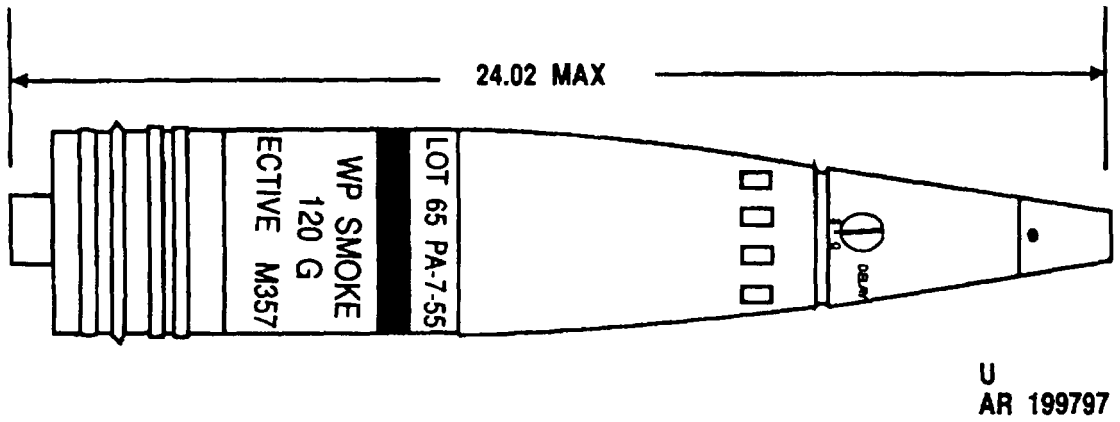
Limitations:

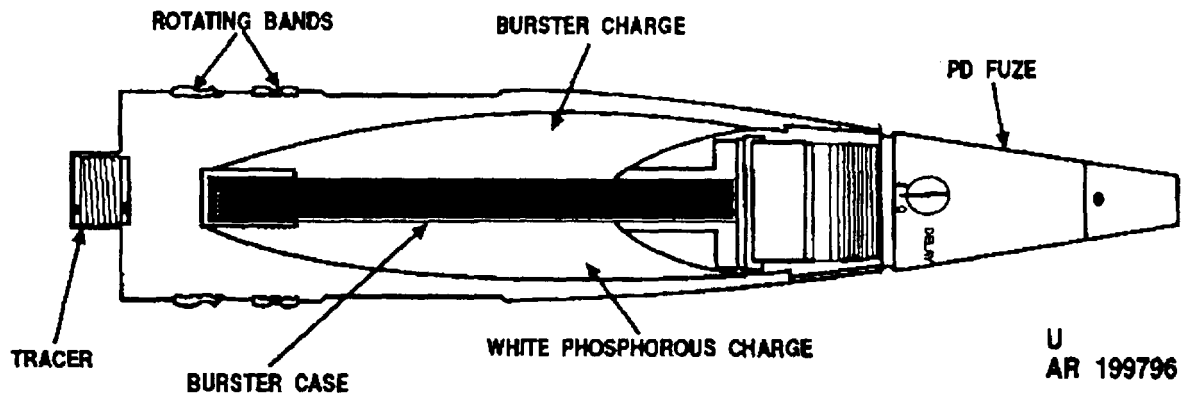
None.

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 ---------- l315-C806
Drawing number ---------- 8826688

Limitations:

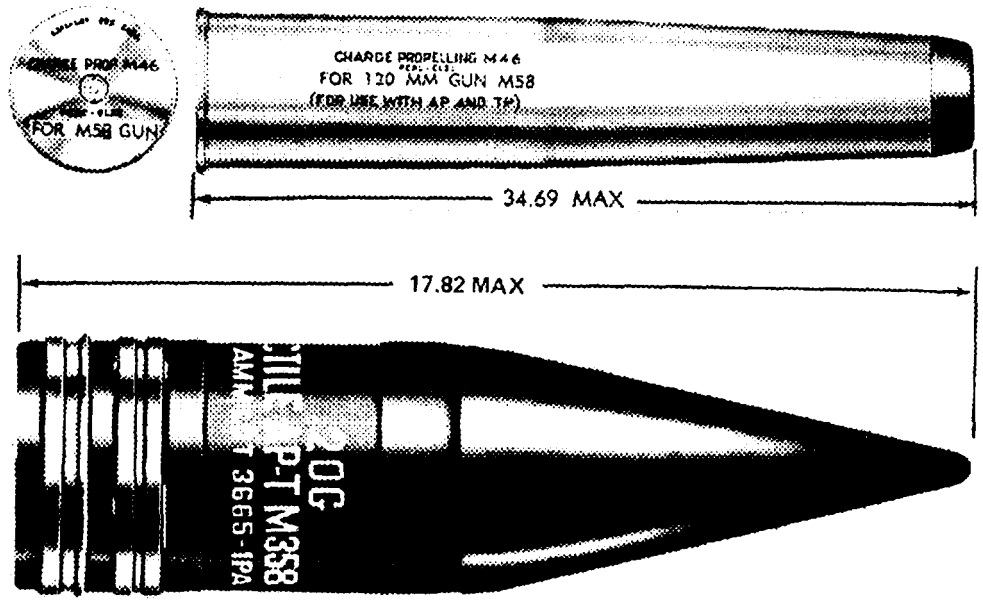
Since the burster in the ammunition is loaded with tetrytol, it should not be stored or fired at temperatures exceeding +125°F.

Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractial, 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.

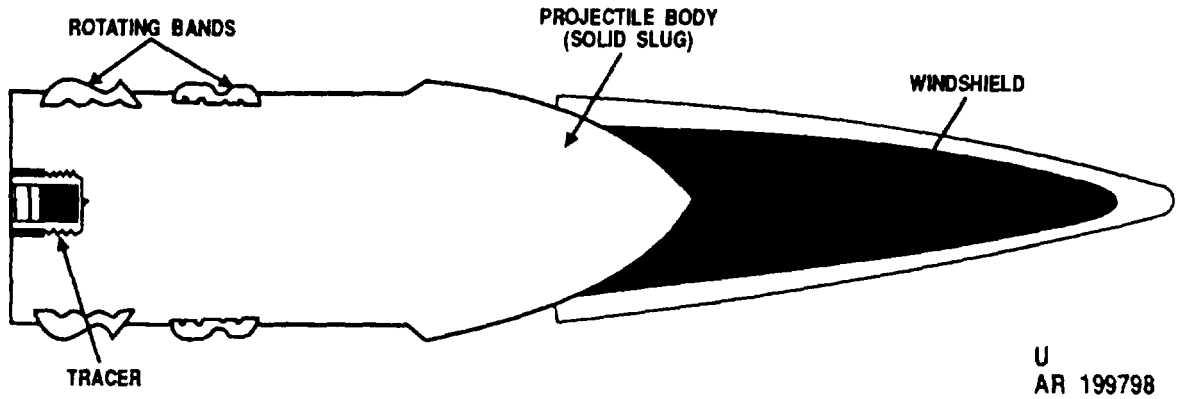
References:

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

PROJECTILE, 120-MILLIMETER: AP-T, M358



AR 199799



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AR 199798

Type Classification:

Std. OTCM 36841 dtd 1958.

Use:

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

Description:

The complete round consists of a steel projectile and a propelling charge assembly. The projectile body is a monobloc slug with a blunt 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 assemhly 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

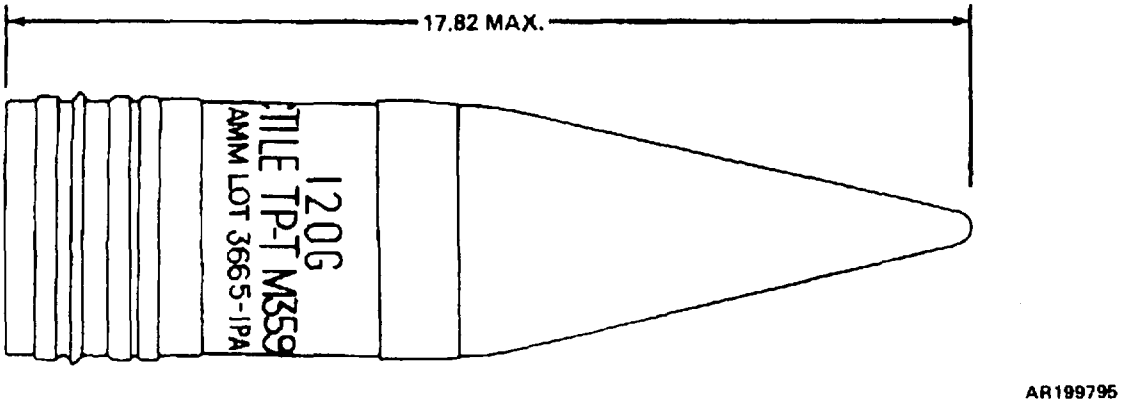
Limitations:

None.

References:

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

PROJECTILE 1209 MILLIMETERS: TP-T, M359E2 (T14E7)



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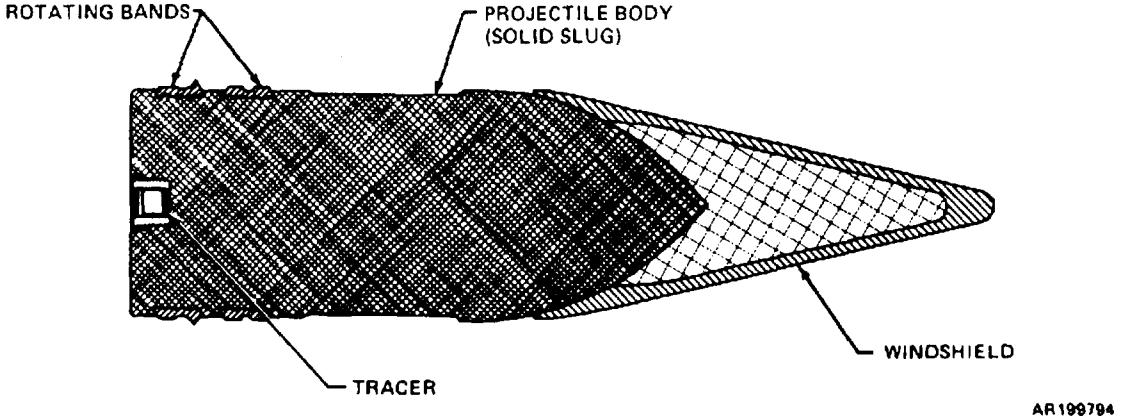


AR199794

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 expand - ing gases to drive the projectile through the br- rel 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 ---------- l,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

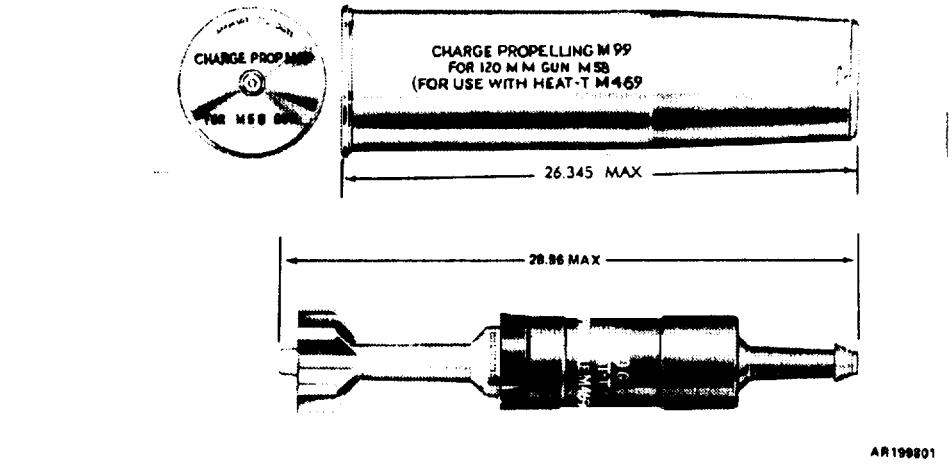
Limitations:

None.

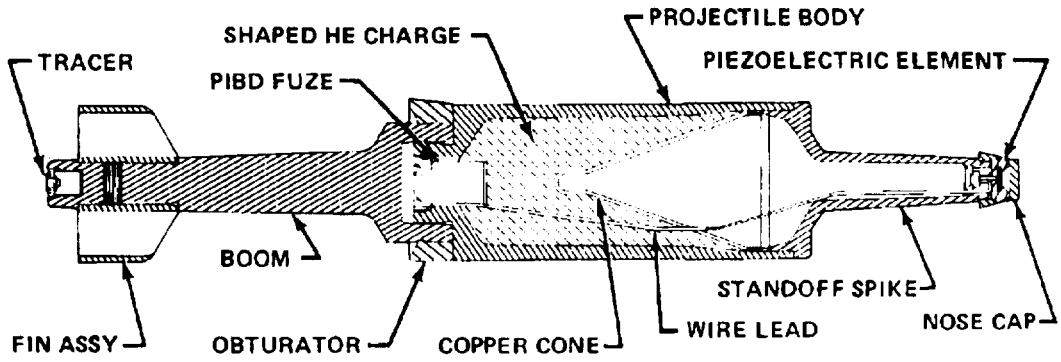
References:

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

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



AR199801



AR199800

Type Classification:

Std. OTCM 38009 dtd 1962.

Use:

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

Description:

The complete round consists of a projecttile 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

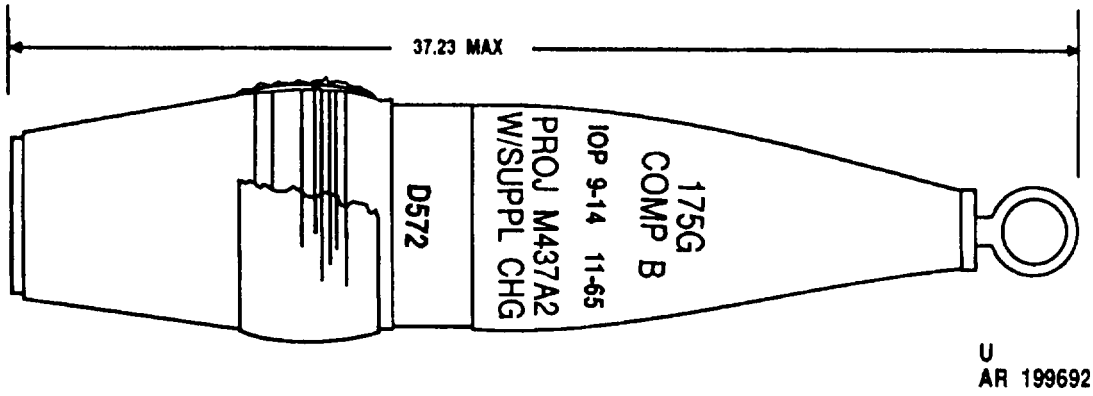
Limitations:

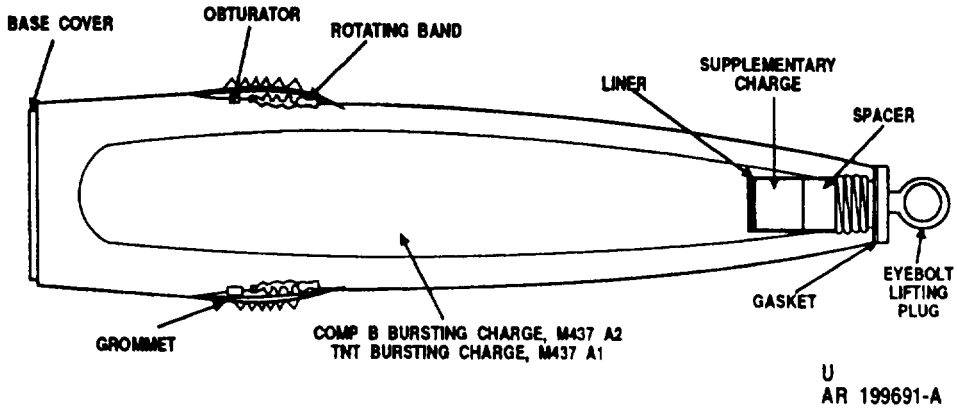
None.

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/supplementary charge; 1320-D591 (M437A1, M437A2 w/o supplementary charge)
Assembly drawing number --- 8837902

Ballistics: (M113 and M113A1 Cannons)

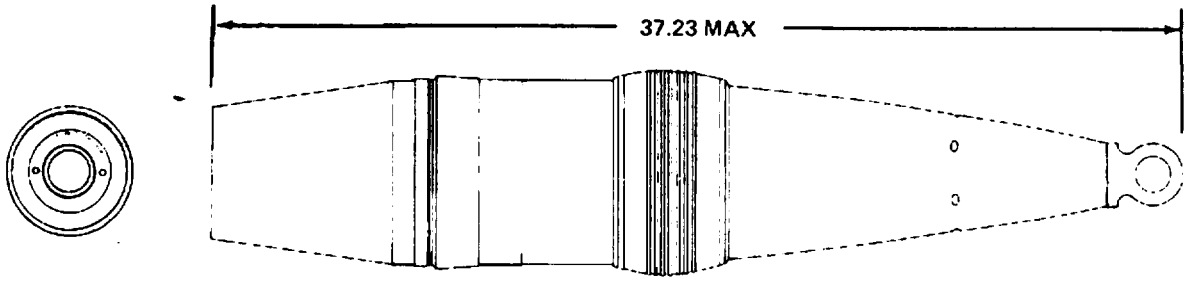
Charge M86	Muzzle Velocity (fps)	Maximum Range (yd)	Maximum Range (m)	Chamber Pressure (psi)
*1	1675	16,515	15,100	10,100
2	2310	24,200	22,100	20,200
3	3000	35,800	32,700	45,700

*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



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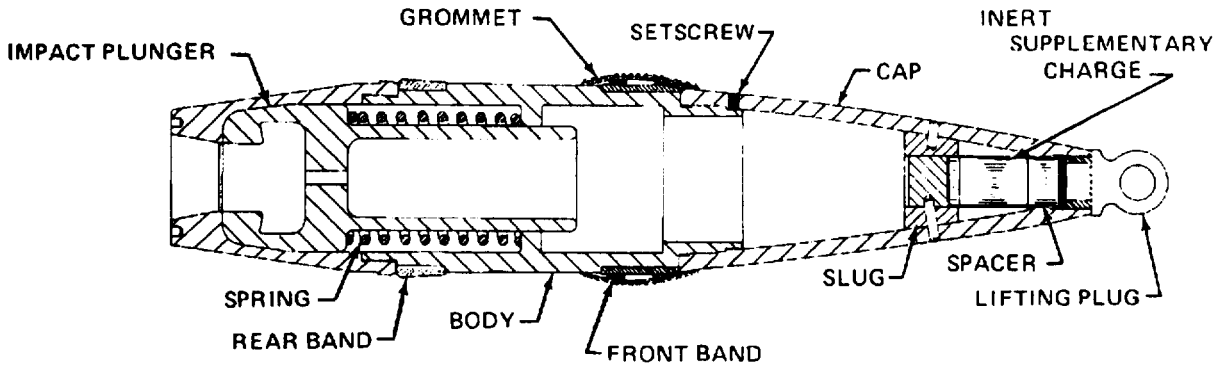

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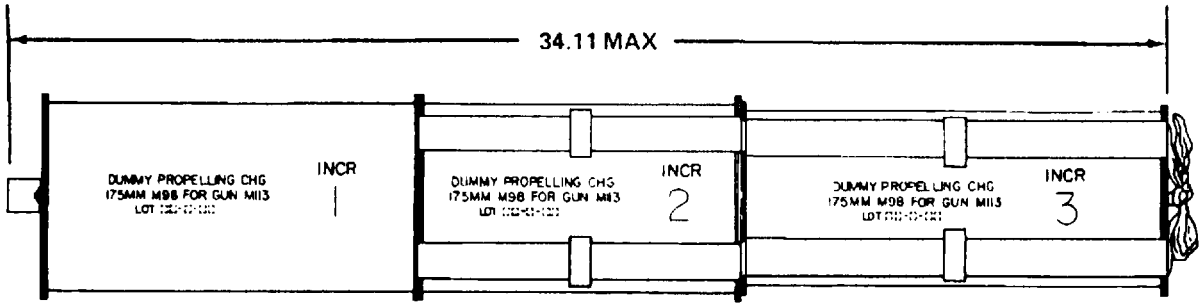


AR199707

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-EXPLOSIVE
DODAC:	
M458	1320-D709
M98	1320-D535

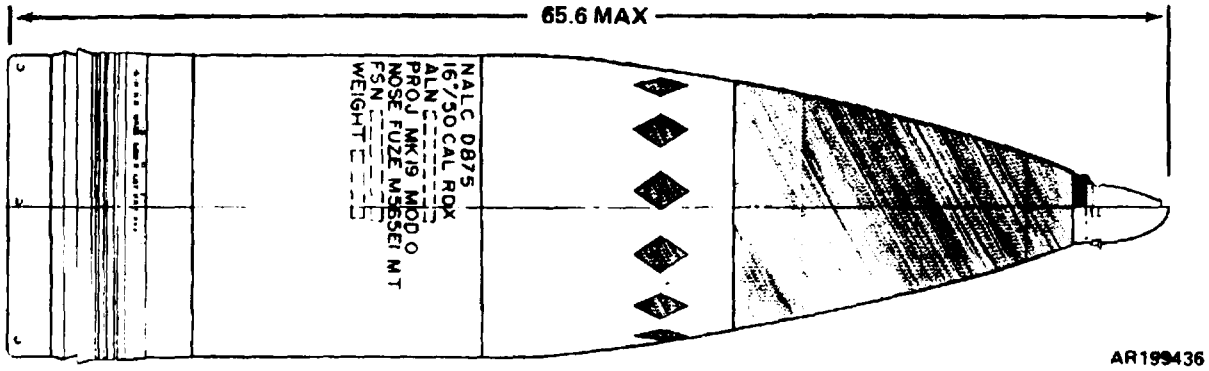
Ballistics:

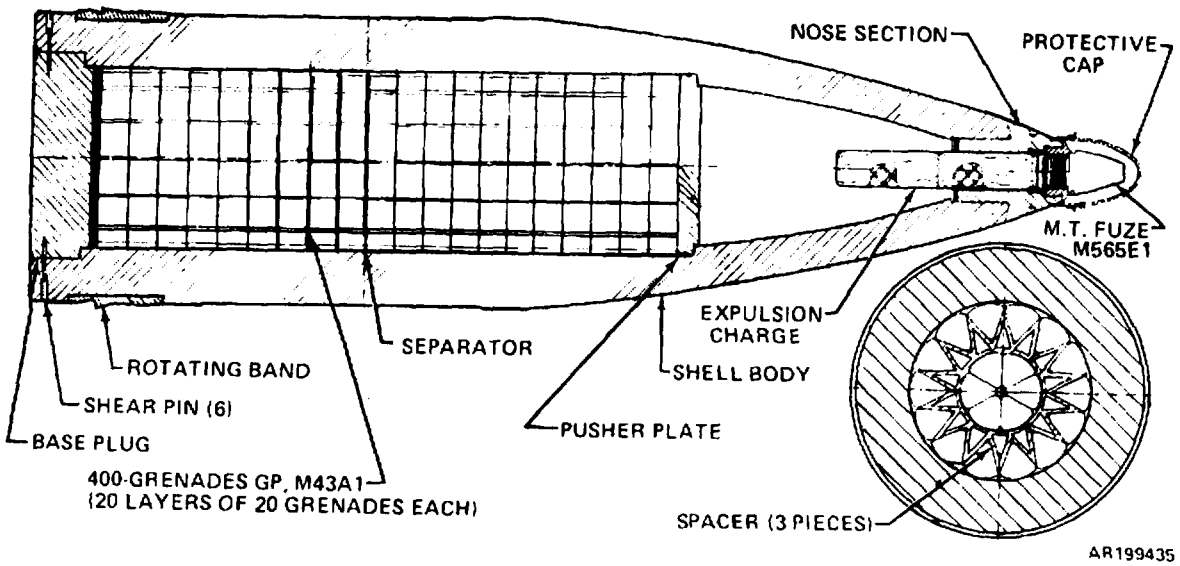
Not Applicable.

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 m 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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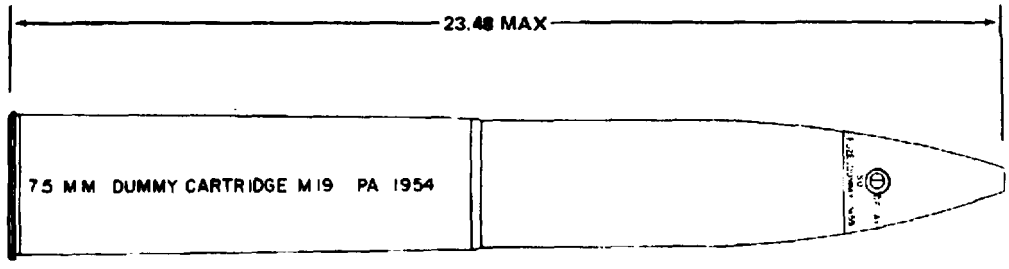
CARTRIDGE, 75-MILLIMETER: DUMMY, M19 OR M19B1



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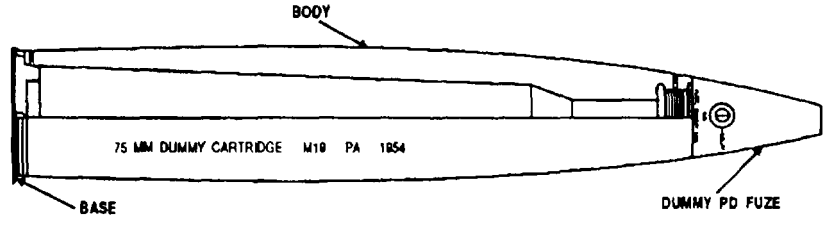

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Type Classification:

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.

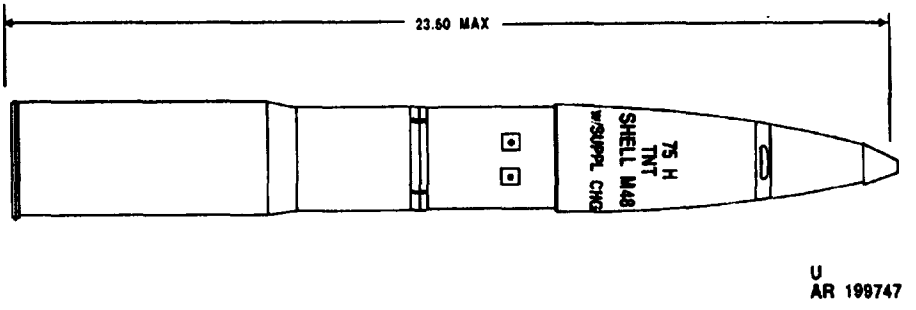
Shipping and Storage Data:

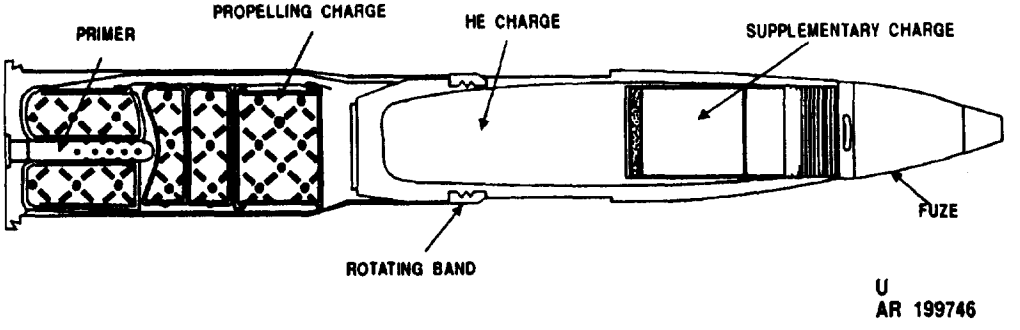
DOT desiccation ---------- DRILL CARTRIDGES INERT
DODAC ---------- 1315-C033
Drawing number ---------- 72-3-8

References:

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

CARTRIDGE, 75-MILLIMETER HE, M48





Type Classification:

OBS MSR 11756003.

Use:

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

Description:

The projectile of this cartridge is loosely assembled in the cartridge case because of the necessity for removal to adjust the propelling charge. The projectile is made with either a normal or deep fuze cavity. The deep fuze cavity type may be issued with or without a supplementary charge. As issued, the projectile may be fuzed or assembled with a closing plug. Impact, mechanical time-superquick, or proximity fuzes may be used. The propelling charge consists of a four-increment charge (base charge plus three increments) assembled in the cartridge case. A percussion primer is fitted in the base of the cartridge case.

Functioning:

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

Tabulated Data:

Complete round:	
Type	HE
Weight	18.24 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 containers 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

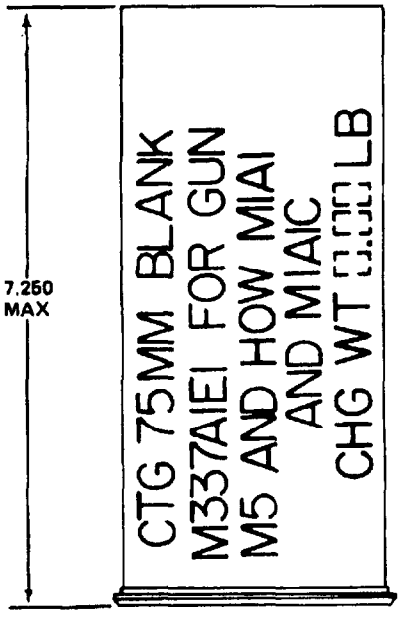
Operational Characteristic

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



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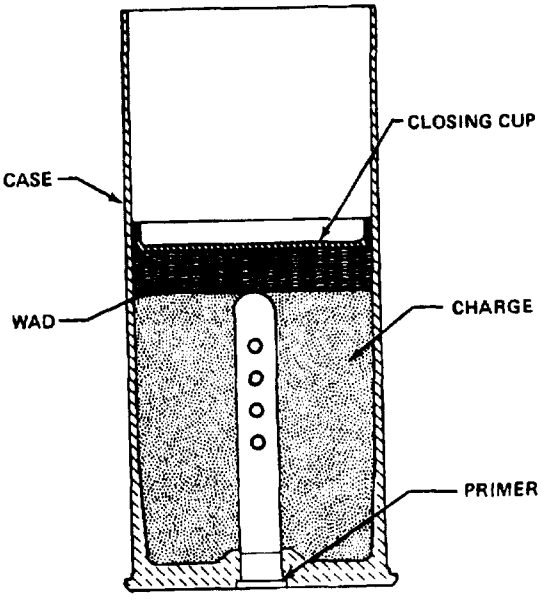


AR199866

Type Classification:

Std AMCTC 4371 dtd 1966 (M337A2) CON MSR 11756003 (M337A1) Std OTCM 36841 dtd 1958 (M337)

Use:

These cartridges are provided for saluting and simulated firing.

Description:

Cartridge M337A2 (M337A1E1) consists of a cartridge case of brass or aluminum containing loosely packed black powder (potassium nitrate) and a press-fitted percussion primer. A fiberglass wad is inserted over the black powder and a polystyrene closing cup is cemented in place with a polyester resin adhesive.

Functioning:

When the firing pin of the weapon strikes the primer, a flash is generated which ignites the black powder charge producing flash, smoke, and a loud report to simulate weapon firing.

Difference Among Models:

Cartridges M337A1 and M337 have brass cartridge cases containing a charge of black powder (sodium nitrate or potassium nitrate) in a cotton bag, and a press-fitted percussion primer. A hair felt wad is inserted over the cotton bag, and a chipboard closing cup is cemented in place with pettman cement.

Tabulated Data:

Complete round:

Type	Blank
Weight	3.25 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

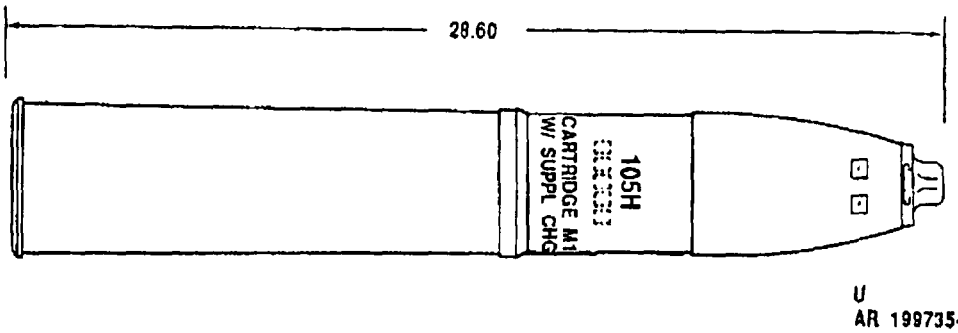
Limitations:

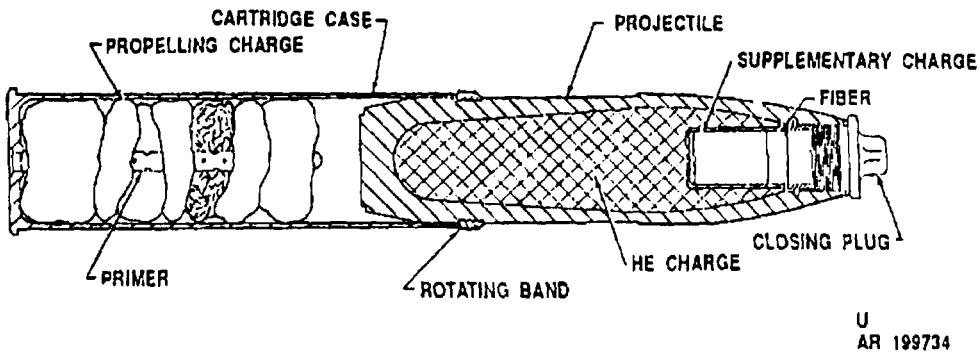
Closure debris from blank ammunition can be expelled a distance of 300 feet forward of the weapon muzzle.

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)	Over lb	up to & Incl	Zones	Marking
Pounds	29.90	30.60	1	⊡
	30.50	31.20	2	⊡ ⊡
	31.10	31.80	3	⊡ ⊡ ⊡

NOTE: Comp B filled projectiles fall in weight zone 2-1/2 Cartridge Case:

Model	Matl	Wt (lb) (approx)
M14	Brass	5.9
M14B1	Steel, Drawn	5.4
M14B3	Steel, 5 pc spiral wrap	4.7
M14B4	Steel, 3 pc spiral wrap	4.7

Propelling charge:
- Model----------M67

Components:

Increment No.	Prop Comp & Type	Web Size in. approx	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 Increments 1-7 ---------- 2.83 lb

Percussion primer assembly:

	M28A2	M28B2
Primer	M61	M61
Black powder	Cl 1, Spec MIL-P-223 (Note B)	Cl 1, Spec MIL-P-223 (Note B)
Weight (lb) (primer)	0.00014	0.00014
(BP)	0.043	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:

Charge	Muzzle Velocity (fps)	(mps)	Maximum Range (m)	(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)	(mps)	Maximum Range (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 ---------- -40 °F (-40 °C)
Upper limit ---------- +125°F (+52.0°C)

Storage:
Lower limit ---------- -80°F (for periods not exceeding three days) (-62.2°C)
Upper limit ---------- +160°F (for periods not exceedinq 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 without 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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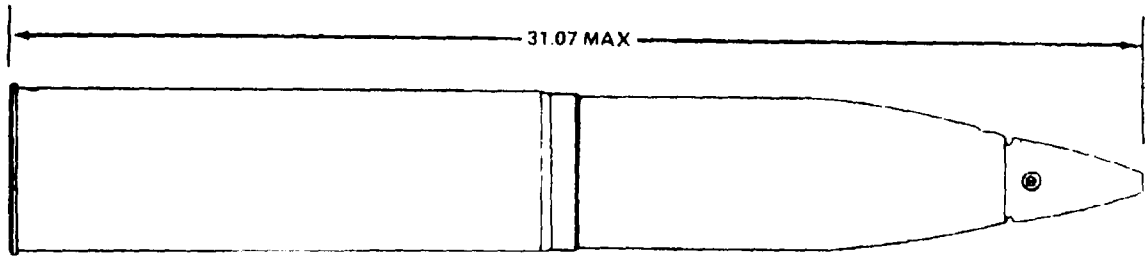
CARTRIDGE, 105-MILLIMETER: DUMMY, M14



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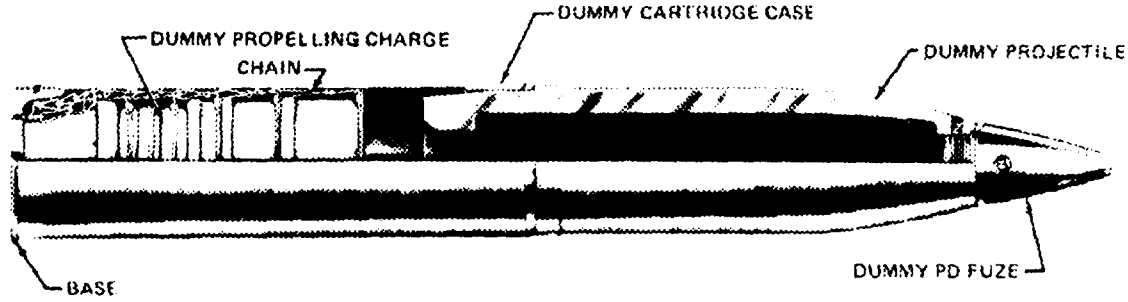


AR199742

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 casting

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.

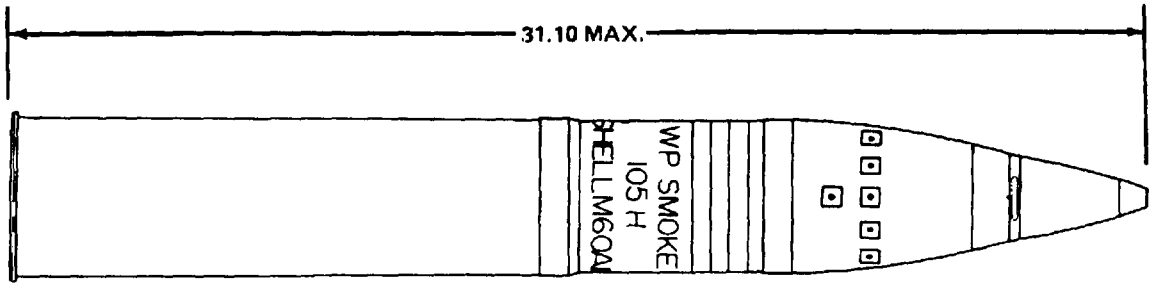
Shipping and Storage Data:

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



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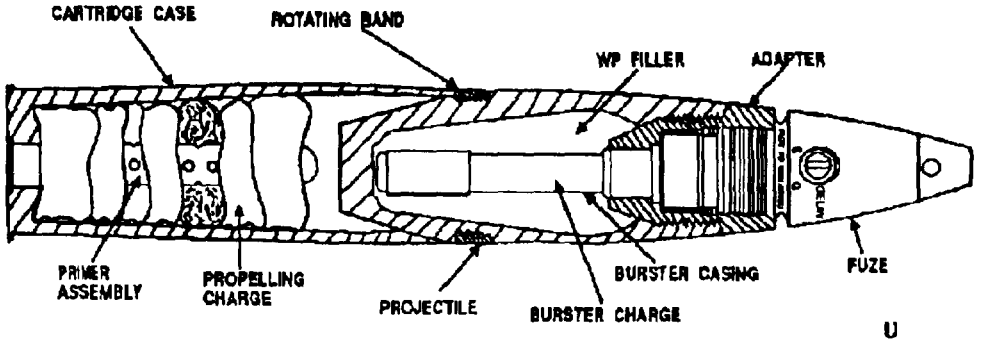

U
AR 199720

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 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:

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	Fuze
M60	Steel	M5	Tetrytol	PD M557
M60A1	High strength aluminum	M53	Comp B	PD M557, MTSQ M564, M582, ET M767
M60A2	High strength aluminum	M53A1 (XM53E1)	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 lb	Up to & Incl lb	Marking
3	31.1	31.8	⊡ ⊡ ⊡
4	31.7	32.4	⊡ ⊡ ⊡ ⊡
5	32.3	33.0	⊡ ⊡ ⊡ ⊡ ⊡
6	32.9	33.8	⊡ ⊡ ⊡ ⊡ ⊡ ⊡

Fuze ---------- PD, M557 or M739

Cartridge case:

Model	Matl	Wt (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 Comp & Type	Web Size in.Approx	Wt oz Approx	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)

	M28A2	M28B2
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)	(fps)	Maximum Range (m)	(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)	(fps)	Maximum Range (m)	(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:	M60	M60A1	M60A2(E3)
Lower limit	-40°F	-50°F	-50°F
Upper limit	+125°F	+145°F	+145°F
Storage:			
Lower limit	-65°F	-50°F	-50°F

*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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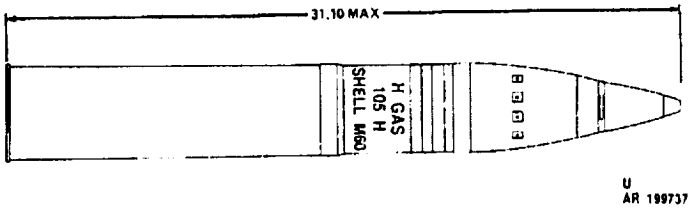
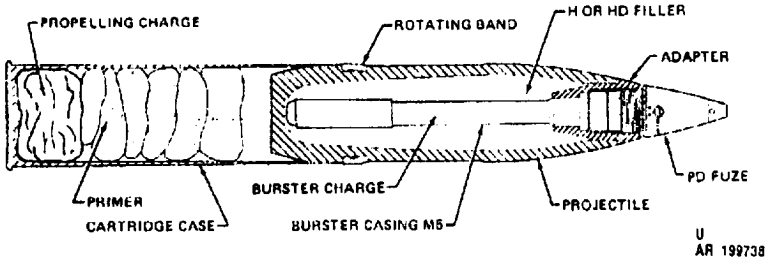
CARTRIDGE, 105-MILLIMETER AGENT, H OR HD, M60





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 lb	Marking
2	30.5	31.2	▫• ▫•
3	31.1	31.8	▫• ▫• ▫•
4	31.7	32.4	▫• ▫• ▫• ▫•

Propelling charge:
- Cartridge case ---------- M14 series
- Propellant ---------- M67, 2.825 lb
- Primer ---------- M28A2, or M28B2

Performance:

For M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle (mps)	Velocity (fps)	Maximum (m)	Range and (yd)	Elevation (mil)	Angle (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	Muzzle (mps)	Velocity (fps)	Maximum (m)	Range and (yd)	Elevation (mil)	Angle (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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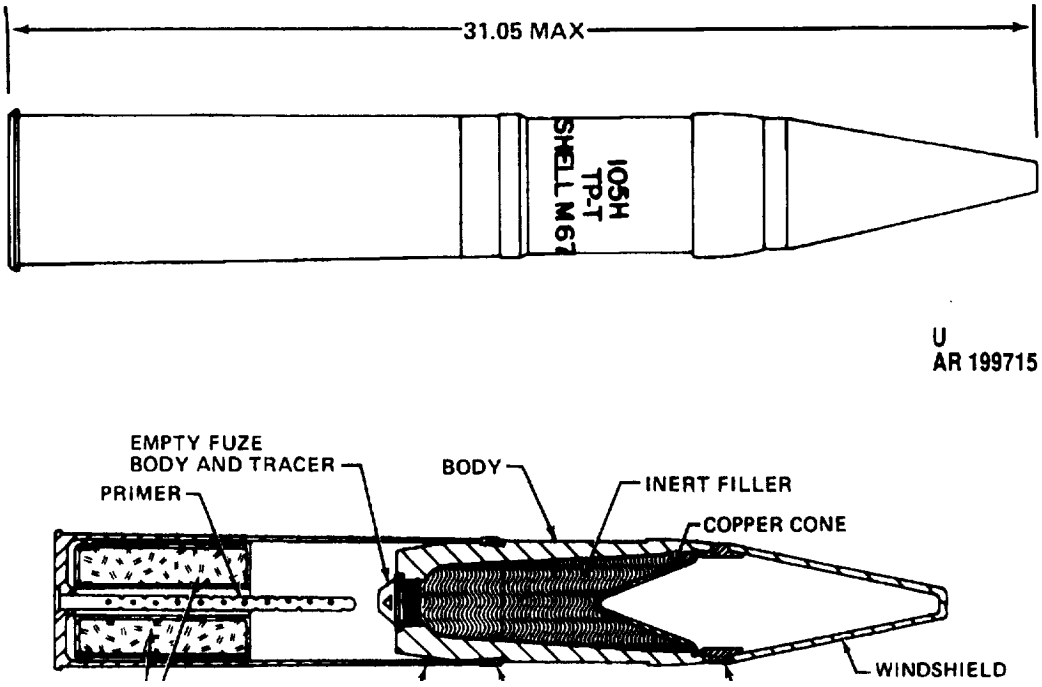
CARTRIDGE, 105-MILLIMETER TP-T, M67



Type Classification:

CONT AMCTC 8650, dtd 1971.

Use:

This cartridge is used for training in marksmanship.

Description.

The projectile consists of a boattailed steel body fitted with a steel windshield and gilding metal rotating band, The windshield is a hollow steel cone fitted to the front of a steel adapter. The adapter is threaded into the front end of the projectile, and retains a copper conical liner in the projectile cavity. The projectile cavity contains an inert filler instead of a shaped HE charge as in the service projectile. An empty fuze body with a live tracer is threaded into the base of the projectile. The complete projectile assembly is a free fit in the cartridge case. The cartridge case contains a percussion primer assembly and a single propelling charge increment. The base of the cartridge case is drilled and the primer assembly is pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing black powder. The single increment bag is assembled into the cartridge case around the primer assembly.

Functioning:

The weapon firing pin strikes the percussion primer which ignites the black powder in the primer. The primer ignites the propelling charge uniformly through the perforations in the primer tube and also ignites the tracer. The rotating metal band around the projectile engages the rifling in the barrel to impart spin to the projectile for in-flight stablilty. 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 Limts:

Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (+52.0°C)
Storage:	
Lower limit	-80°F (for periods not exceeding 3 days) (-62.2°C)
Upper limit	+160°F (for periods not exceeding 4 hr/day) (+71.1°C)
*Packing	1 round in fiber 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.

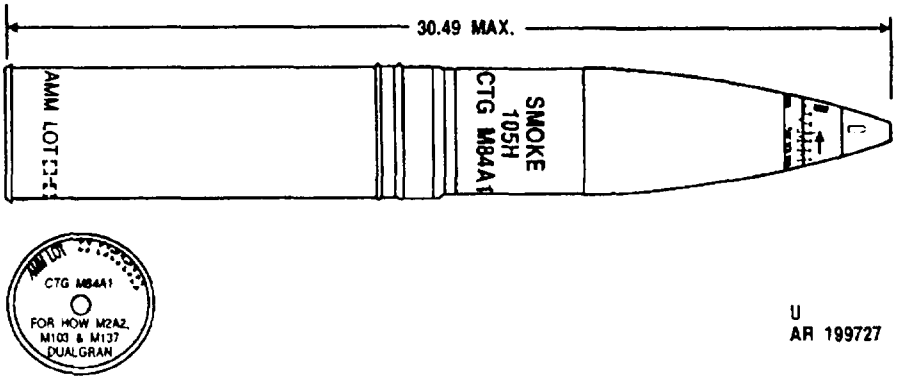
Shipping and Storage Data:

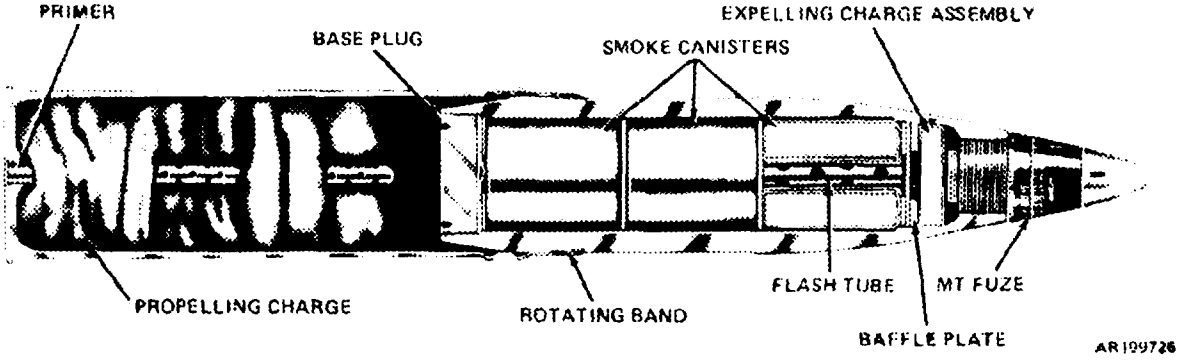
Quantity-distance class	(08) 1.2
Storage compatibility group	C
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITH INERT-LOADED PROJECTILES
DODAC	1315-C457
UNO serial number	0328
UNO proper shipping name	Cartridges for weapons, inert projectile
Drawing number	75-1-491/75-1-191

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





Type Classification:

Std AMCTC 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	M84B1	M84A1
Body forging	Transom below Fuze Thd	Transom below Fuze Thd	No transom
Expelling charge	BP in cloth bag	BP plastic cup encased	BP in plastic cylinder
Nose Thd	1.7 x 14 TPI	1.7x 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

Chg Wt in Oz Approx	Type	Web Approx
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)	(reps)	Maximum range	(yd)
1	650	198.1	3510	3840
2	710	216.4	4110	4495
3	780	237.7	4860	5315
4	875	266.7	5950	6505
5	1020	310.9	7650	8370
6	1235	376.4	9380	10,260
7	1550	472.4	11,270	12,330

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

Using M102 and M108 howitzers:

Charge	Muzzle Velocity (fps)	(mps)	Maximum Range (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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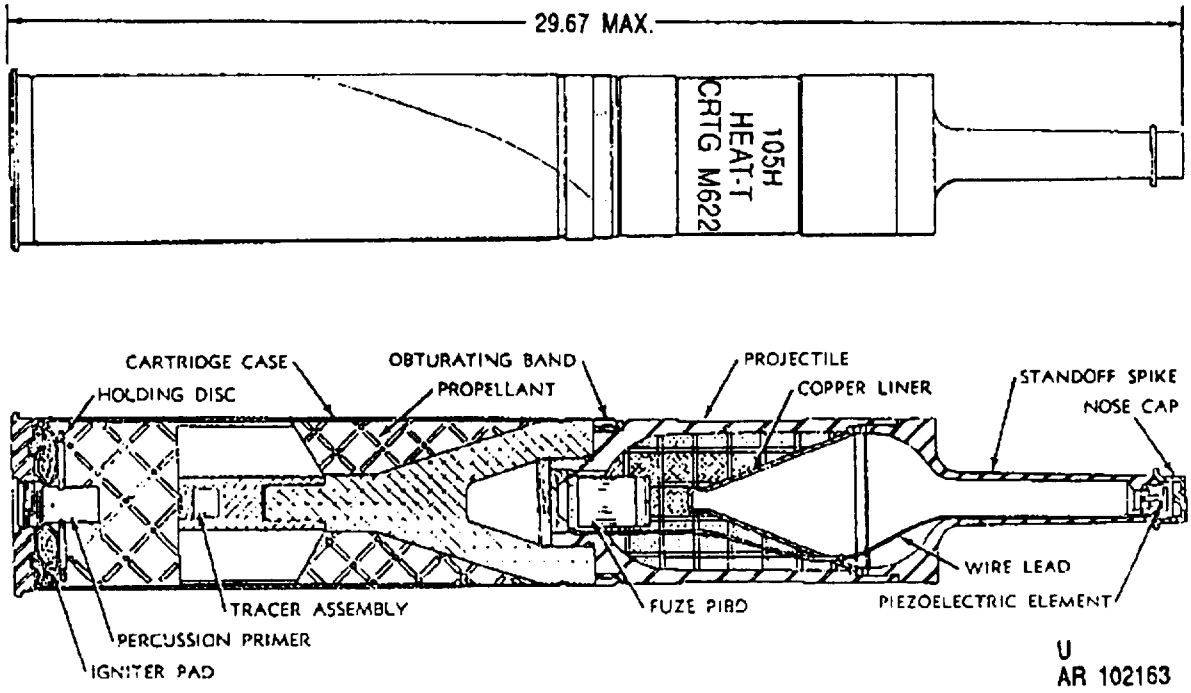
CARTRIDGE, 105-MILLIMETER: HEAT-T, M662



Type Classification:

Std-MSR 06786019.

Use:

This cartridge is a fixed high-explosive antitank 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 M1OO MOD percussion 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 ---------- -45ºF (-41.8ºC)
- Upper limit ---------- 45°F (+62.8°C)

Storage:
- Lower limit ---------- -80ºF (62.2ºC) (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.

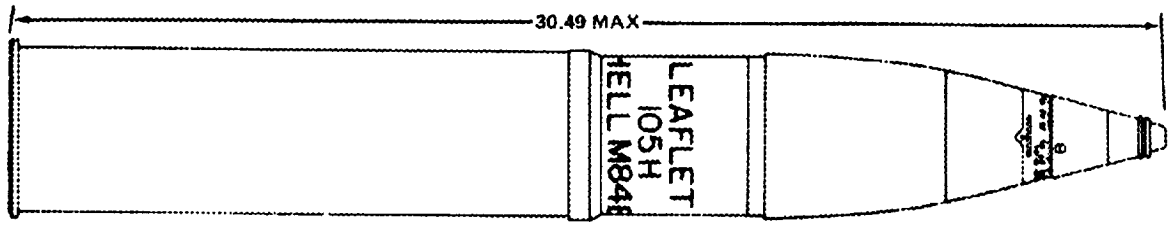
Shipping and Storage Data:

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



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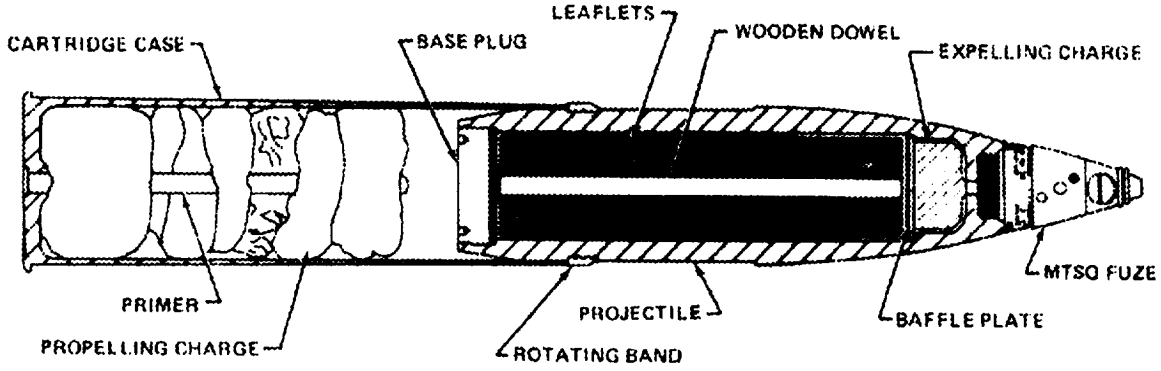


AR199706

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

Propelling charge:
- Model ---------- M67

Components:

Increment No.	Prop Comp & Type	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 ---------- M28A2, M28B2

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.

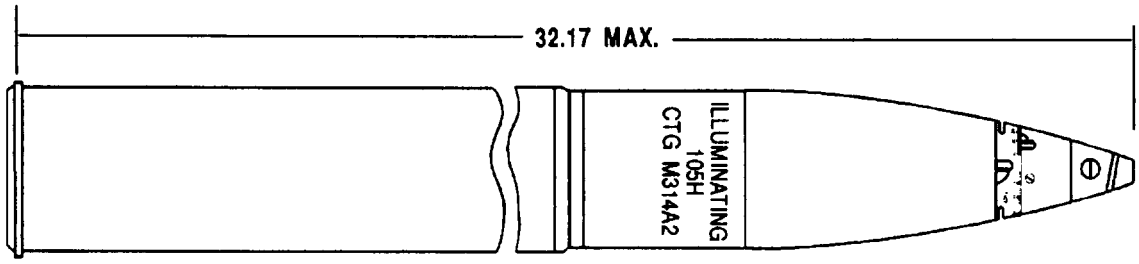
Shipping and Storage Data:

- 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



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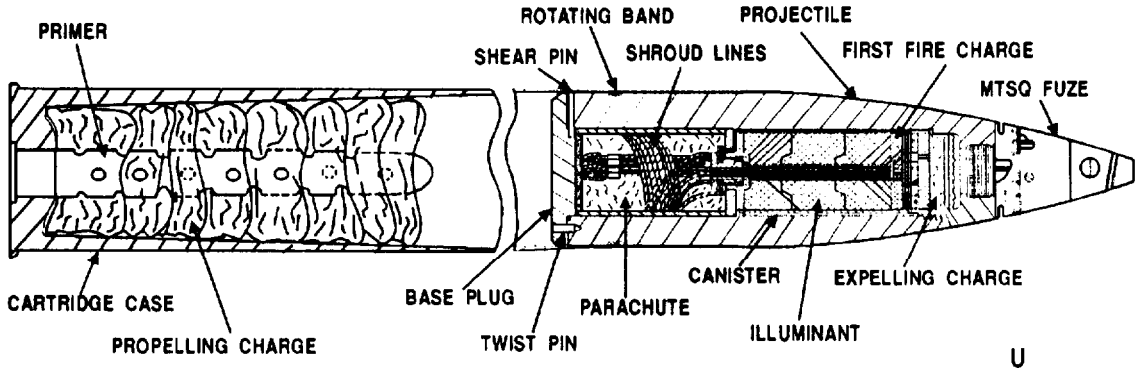

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Type Classification:

C & T AMCTC 7467, dtd 1970.

Use:

This cartridge is intended for illuminating a designated target area.

Description:

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

Functioning:

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

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

Tabulated Data:

Complete round:

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

Projectile:

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

Propelling charge:

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

Performance:

Using M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle Velocity (fps)	(mps)	Maximum Range (m)	(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)	(mps)	Maximum Range (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	-40°F (-40°C)
Upper limit	+125°F (+52°C)

Storage:

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

*Packing Box:

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

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

Shipping and Storage Data:

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

Limitations:

The M501/M501Al 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 expulsion 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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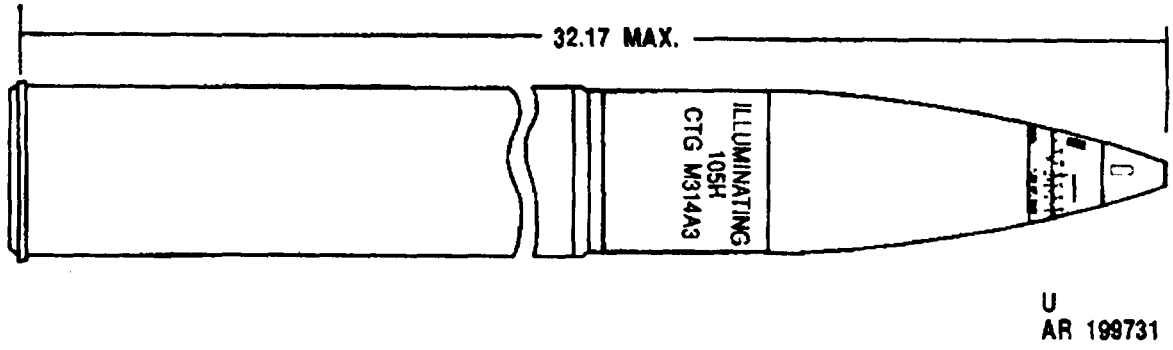
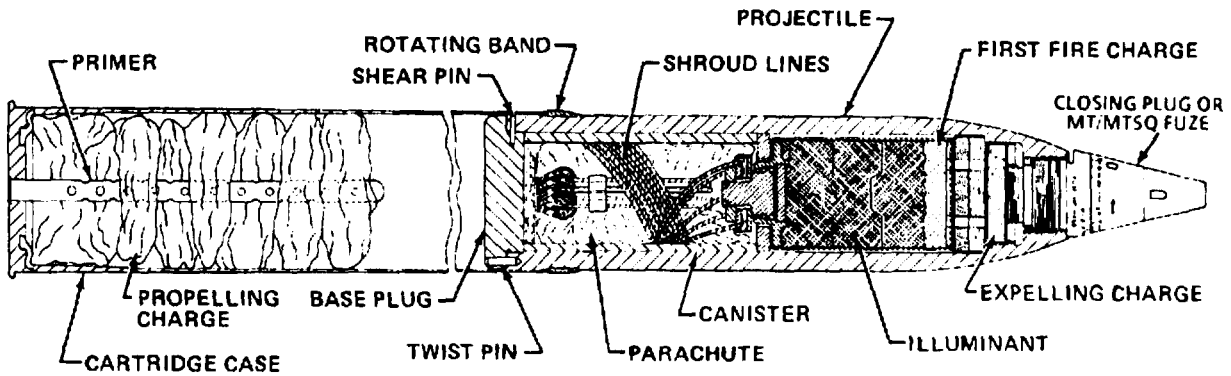
CARTRIDGE, 105-MILLIMETER: ILLUMINATING, M314A3





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 opening at the base of the projectile and held in place by three shear pins and three twist pins. The complete projectile assembly is free fitted to a cartridge case. The cartridge case contains a percussion primer assembly and seven individually bagged and numbered propelling charge increments. The base of the cartridge case is drilled and the primer assembly is pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing black powder. The seven numbered increment bags are tied together, in numerical order, with acrylic cord. These are assembled into the cartridge case, around the primer flash tube, with Increment 1 at the base of the cartridge case and Increment 7 toward the mouth of the cartridge case.

Functioning:

If the projectile is unfuzed, the closing plug is removed and a fuze assembled to the projectile prior to adjusting the charge and loading the cartridge into the weapon. Impact of the weapon firing pin results in the initiation of the percussion primer which, in turn, ignites the

black powder in the flash tube. The flash tube provides for uniform ignition of the propelling charge producing a rapid expansion of the propellant gas which 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:

	M28A2	M28B2
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)	(m)	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)	(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 ---------- -40ºF (-40ºC)
- 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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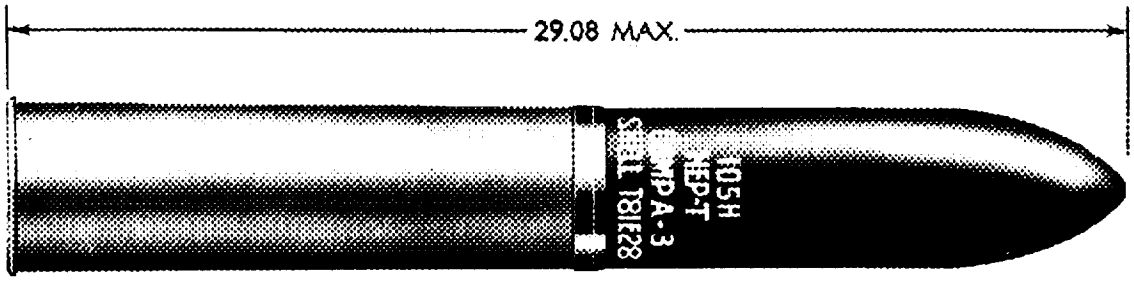
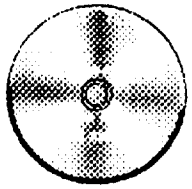
CARTRIDGE, 105-MILLIMETER: HEP, HEP-T, M327 (T81E28)





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 llmlts	+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.

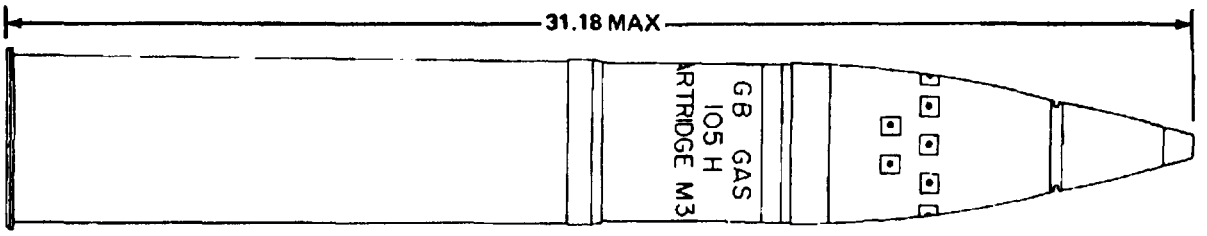
Shipping and Storage Data:

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

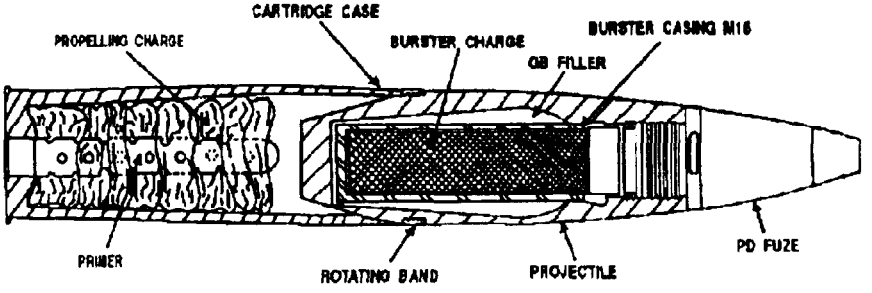
References:

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

CARTRIDGE, 105-MILLIMETE: AGENT, GB, M360



AR199739



U
AR 199738

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 char e 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 s in 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 lb	Up to and Incl lb	Marking
5	30.39	31.09	
6	30.99	31.59	
7	31.59	32.29	

No projectile wt zones lower than Zone 5.

Fuze	PD, M739, M557

Propelling charge:

Cartridge case	M14 series
Propellant	M67, 2.83 lb
Primer	M28A2, M28B2

Performance:
Using M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle (fps)	Velocity (mps)	Maximum (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

*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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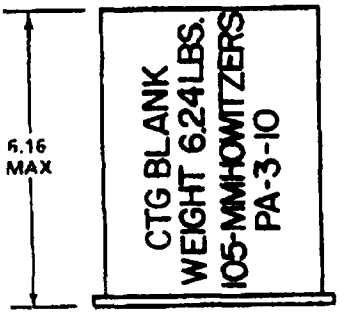
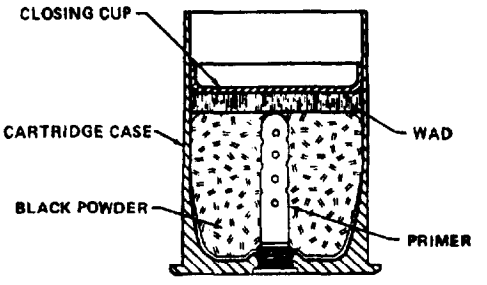
CARTRIDGE, 105-MILLIMETER BLANK, M395



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

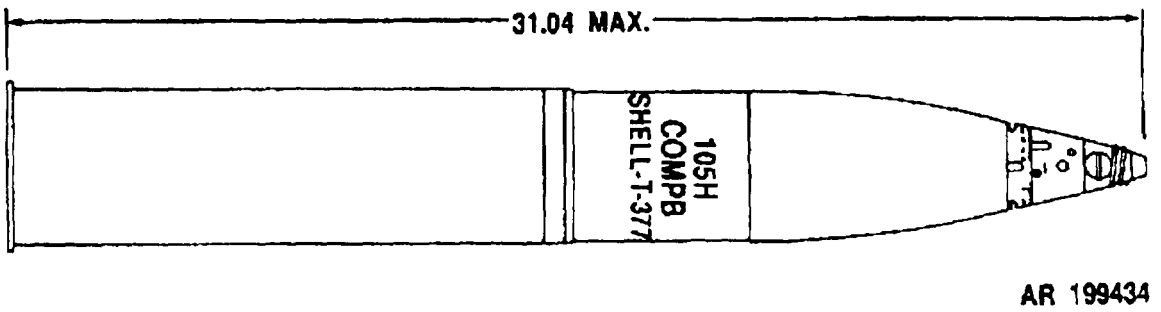
Limitations:

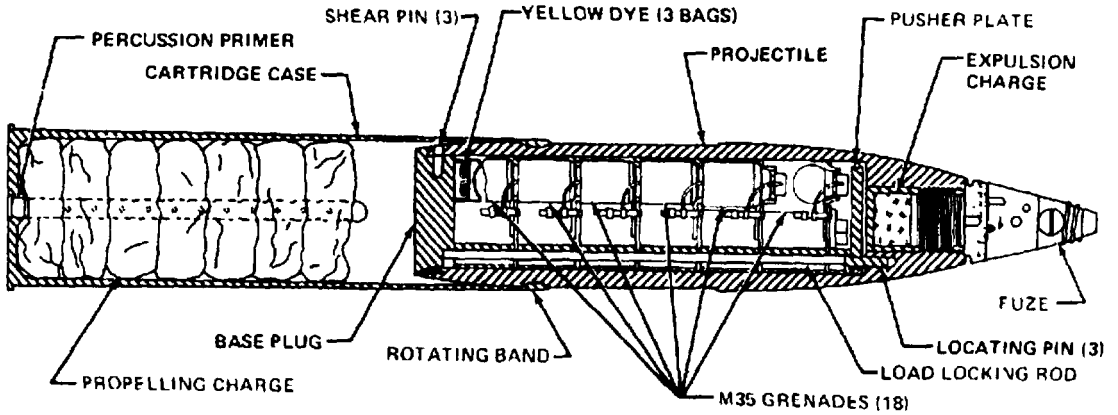
Closure debris from blank ammunition can be expelled a distance of 300 feet forward of the weapon muzzle.

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)





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 tiring 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:

Increment	Prop Comp & Type	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

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	0.00014
(BP)	0.043	0.043
Body	Brass, Type 1	Steel, Type 2

Performance:

Using M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle Velocity fps	mps	Maximum Range m	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)	(mps)	Maximum Range (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 ---------- -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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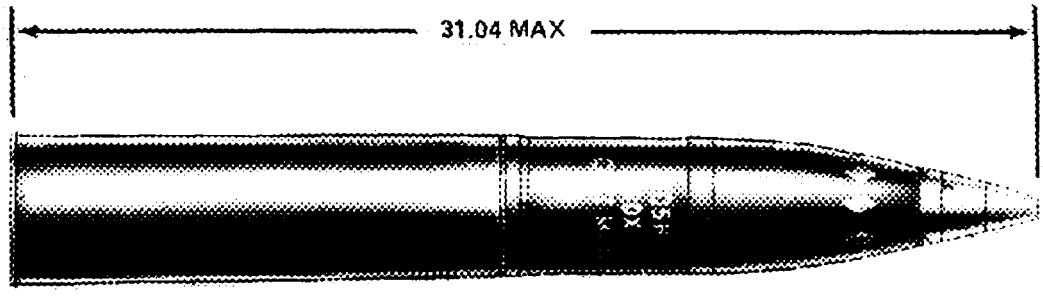
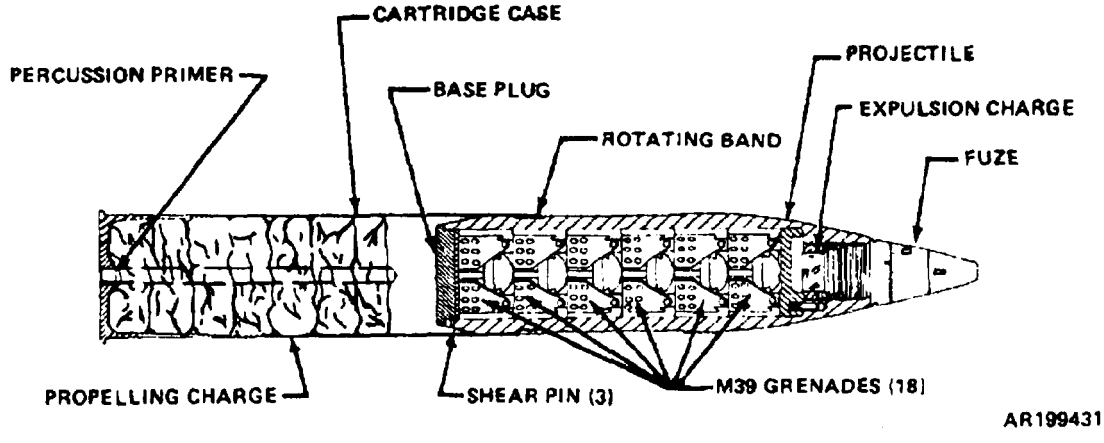
CARTRIDGE, 105-MILLIMETER: HE, M444



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 expulslon 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:

Increment No.	Prop Comp & Type	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

Percussion primer assembly:

	M28A2 (Note B)	M28B2 (Note B)
Primer	M61	M61
Black powder	Cl 1, Spec MIL-P-223	Cl 1, Spec MIL-P-223
Weight (lb) (primer)	0.00014	0.00014
(BP)	0.043	0.043
Body	Brass, Type 1	Steel, Type 2

Performance:

Using M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle Velocity (fps)	(mps)	Maximum Range (m)	(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 m, 1550 fps

Using M102 and M108 howitzers:

Charge	Muzzle Velocity (fps)	(mps)	Maximum Range (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 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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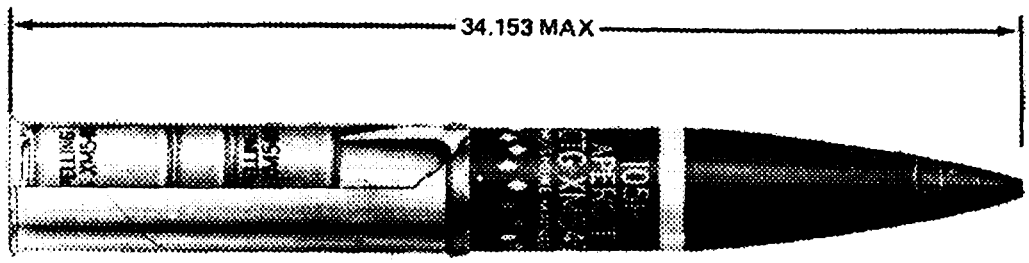
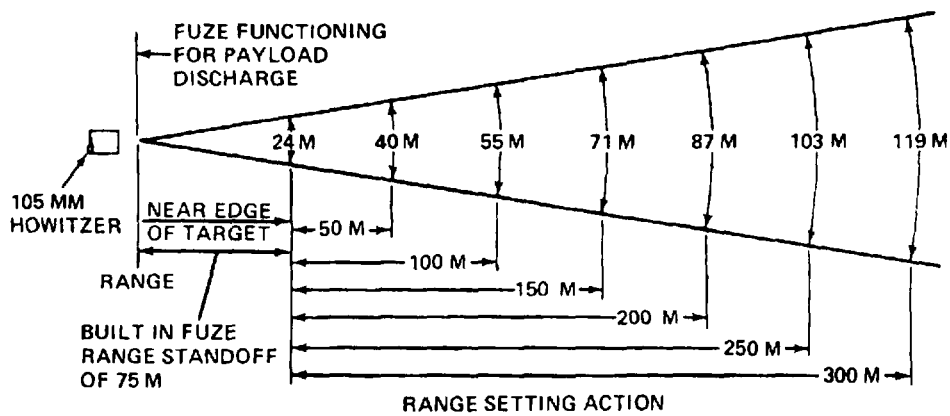
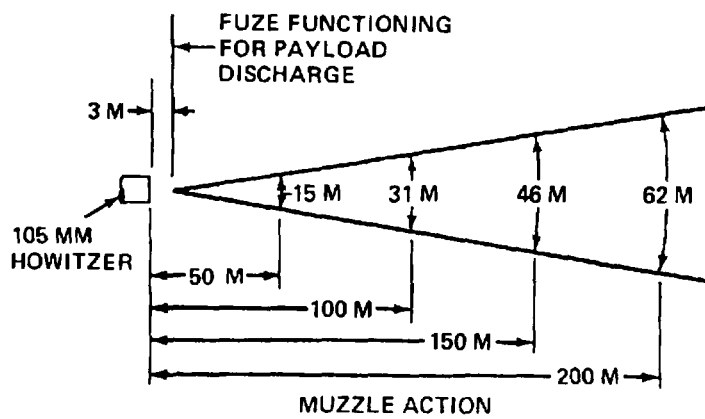
CARTRIDGE, 105-MILLIMETER: APERS-T, M546



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 palyload 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 (Ml19)

Projectile:
- Body material ---------- Aluminum/ Steel
- Color ---------- Olive drab wlyellow 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 Velocity (fps)	(mps)	Maximum Range (m)	(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 periods not more than 3 days) (-62.2°C)
Upper limit ---------- +145°F (+63°C)
*Packing ---------- 1 round per fiber container; 2 containers per wooden box
*Packing Box:
Weight ---------- 122 lb
Dimensions ---------- 44-3/4 x 12-1/16 x 7-9/16 in.
Cube ---------- 2.3 cu ft

*NOTE: See 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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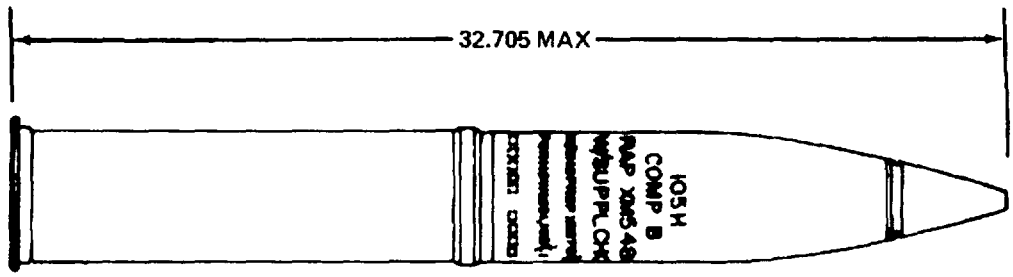
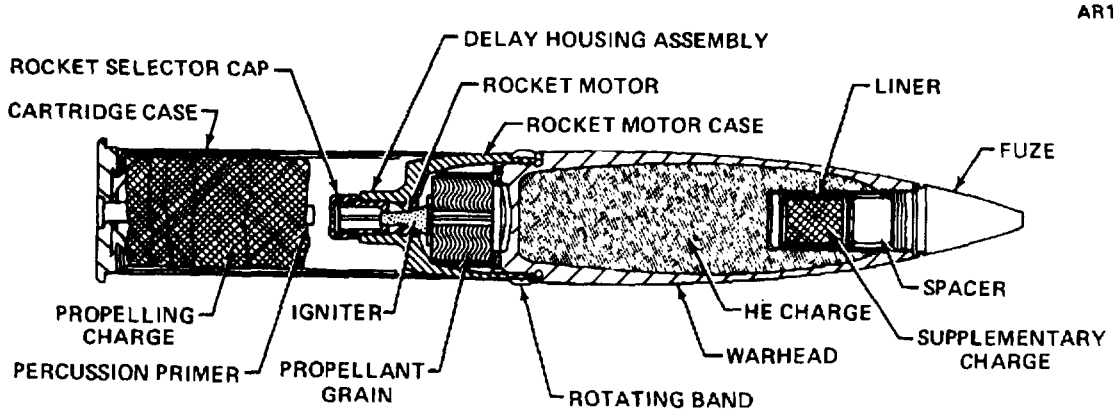
CARTRIDGE, 105-MILLIMETER: HERA, M548



AR199733



AR199732

Type Classification:

Std AMCTC 8414, dtd 1971.

Use:

This cartridge is a high explosive, rocket assisted round with extended range capability used for fragmentation, blast and mining in support of ground troops and armored columns.

Description:

The projectile consists of two pieces, a streamlined warhead and rocket motor body of boattail design. The nose of the warhead is threaded for a fuze and the warhead is filled with cast Composition B having a deep cavity and supplementary charge. The rocket motor body contains the rocket grain and rocket ignition system, contained in a spike at the rear of the body. The spike housing ignition system is fitted with a cap. A sintered iron rotating band is swaged to the rocket motor body and the body threaded to the warhead to complete the projectile assembly The cartridge case contains a primer and five individually bagged and numbered propelling charge increments. The base of the cartridge case is drilled and a percussion primer assembly is pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing benite. The five numbered increment bags are tied together, in numerical order, 3, 4, 5, 6 and 7 with acrylic cord. These are assembled into the cartridge case, around the primer flash tube, with Increment 3 at the base of the cartridge case and Increment 7 toward the mouth of the cartridge case.

Functioning:

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 m projectile fragmentation and blast.

Tabulated Data:

Complete round:
- Type ---------- HERA
- Weight ---------- 38.5 lb
- Length ---------- 32.7 in.
- Cannon (weapon) used with ---------- M49 (M52, M52A1), M2A1, M2A2 (M101 M101A), M103 (M108), M137 (M102)

Projectile:
- Body material ---------- High carbon steel forging
- Color ---------- Olive drab w/yellow markings
- Filler and weight ---------- Comp B, 5.2 lb
- Fuzes ---------- Prox M728, PD, M739, M557 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 forging
- Rocket propellant grain ----- XM33 propellant Nitrocellulose base 1.06 lb

Delay assembly:

No. increments	Weight	Composition
1	250 mg	Flash
6	950 mg (ea)	Delay
1	200 mg	Igniter

Flash composition:

Constituent	Parts by wt
Zirconium	58 ± 1.0
Chromium oxide	16 ± 1.0
Molybdenum trioxide	25 ± 1.0
Vinyl alcohol Acetate resin (solids)	1.0 ± 0.1

Igniter composition:

Constituent	Parts by wt
Zirconium	65 ± 1.0
Iron oxide	25 ± 1.0
Diatomaceous earth	10 ± 1.0
Vinyl alcohol Acetate resin (solids)	1 ± 0.1

Delay composition:

Constituent	Parts by wt
Tungsten	42.5 ± 5
Barium chromate	45 ± 5
Potassium perchlorate	12.5 ± 0.25
Vinyl alcohol Acetate resin (solids)	1 ± 0.1

Rocket propellant grain igniter:
Type 1 Class 3 boron potassium nitrate pellets 5.0 grains (approx)

Performance:
- Maximum range ---------- 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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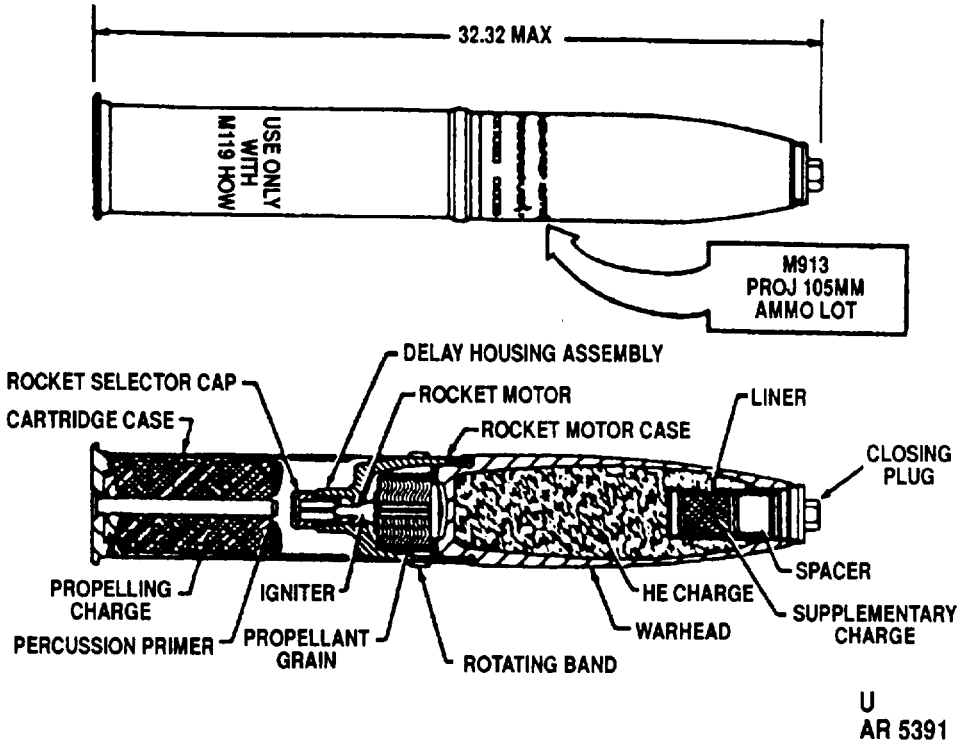
CARTRIDGE, 105-MILLIMETER: HERA, M913



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 markings
- 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 forging

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 Ml19 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 Amunition 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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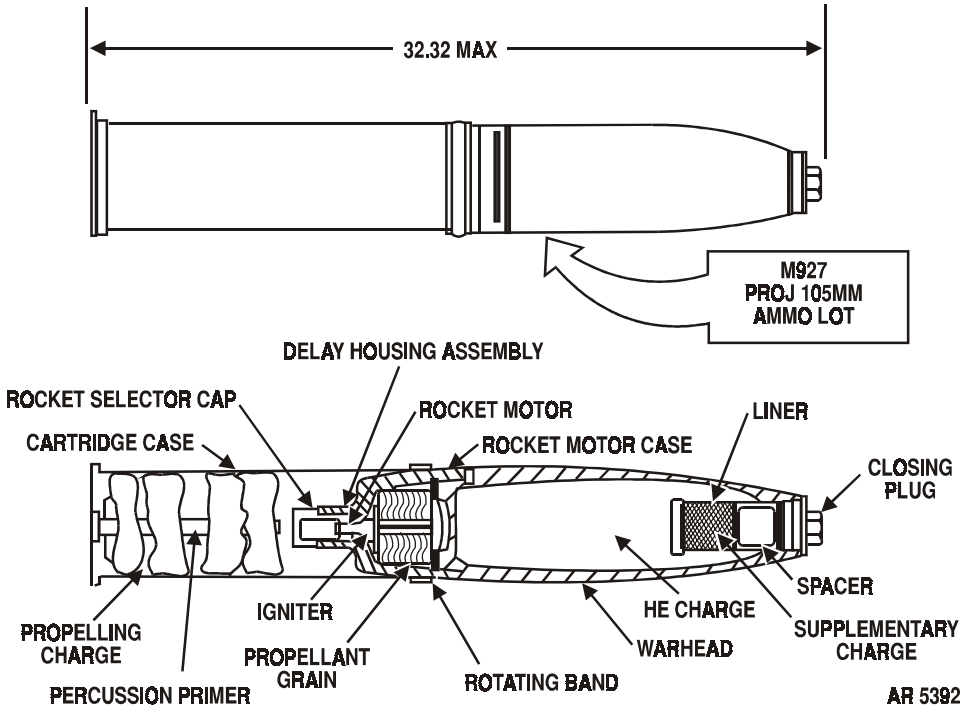
CARTRIDGE, 105 MILLIMETER: HERA, M927



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 ± 0.25
Tungsten	50.0 ± 5.0
Vinyl Alcohol-Acetate Resins (solids)	1.0 ± 0.1
Barium Chromate	35.5 ± 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)	1.0 ± 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

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
DOT designation	CARTRIDGES FOR WEAPONS 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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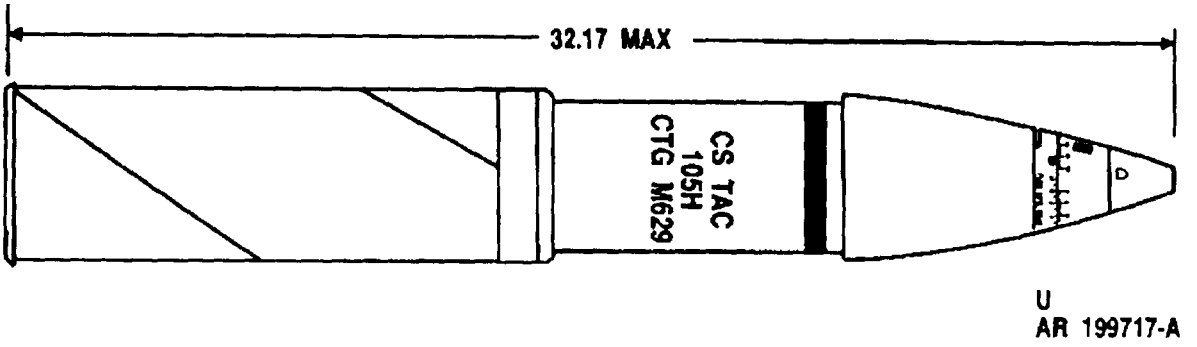
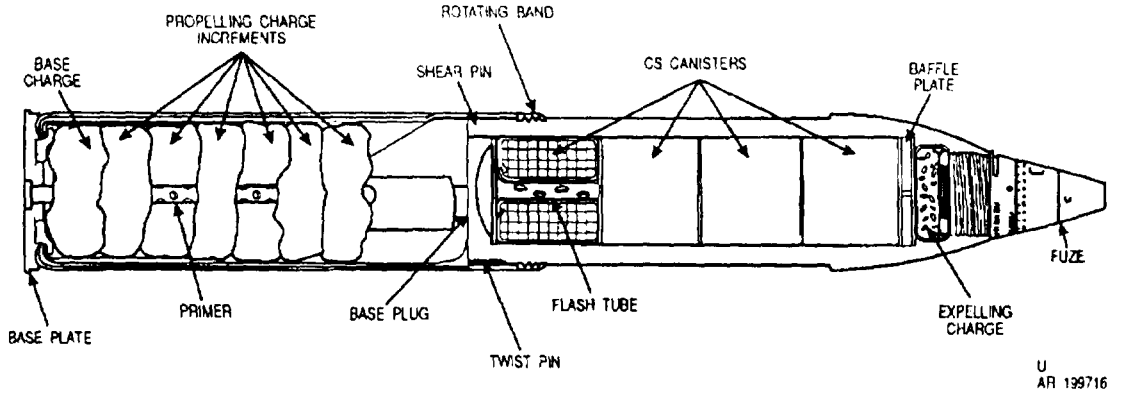
CARTRIDGE, 105-MILLIMETER: TACTICAL CS, M629





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 pro 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:

	M28B2	M28A2
Primer & weight	M61, .00014 lb	M61, .00014 lb
Black powder	C1 1, MIL-P-223 (Note B)	C1 1, MIL-P-223 (Note B)
Weight	0.043 lb	0.043 lb
Body	Steel, Type 2	Brass, Type 1

Performance:

Using M52, M52A1 and M101/M101A1 howitzers:

Charge	Muzzle Velocity (fps)	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 Velocity (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 PERMIT 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. Fuzes 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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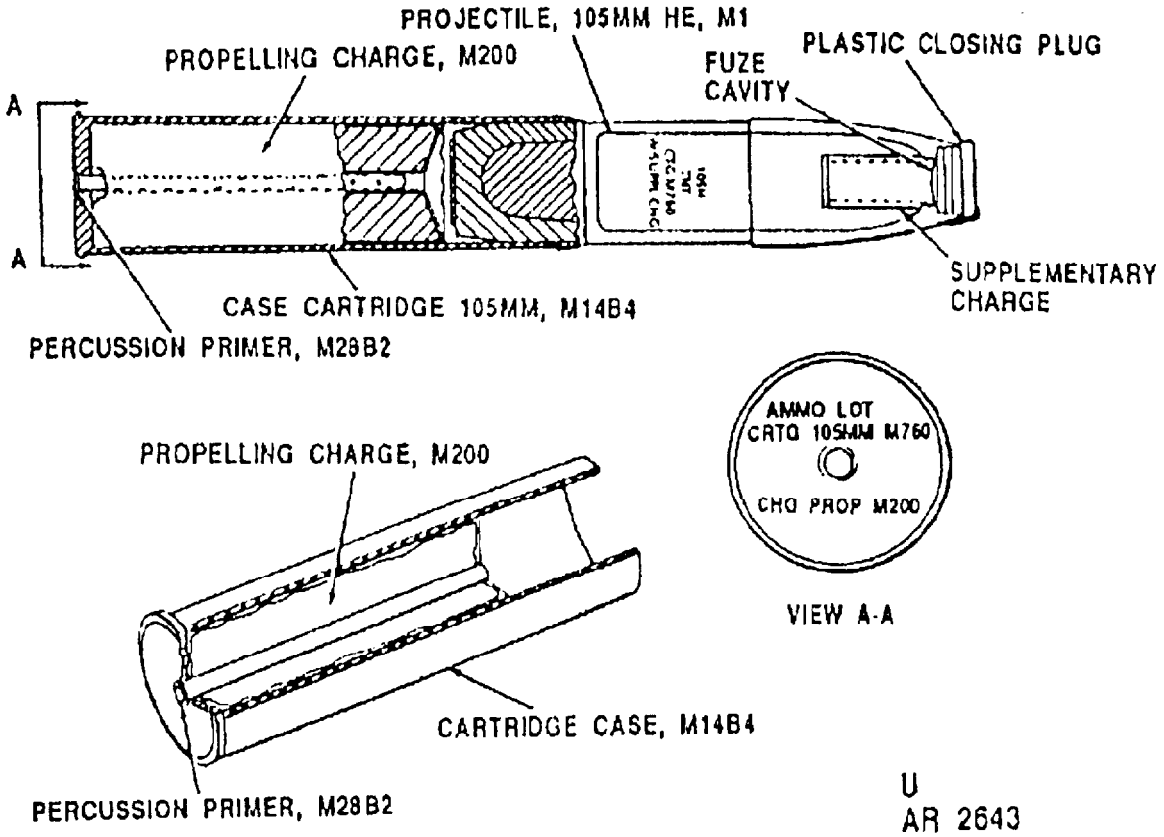
CARTRIDGE, 105-MILLIMETER: HE, M760



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 propelling 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)

*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

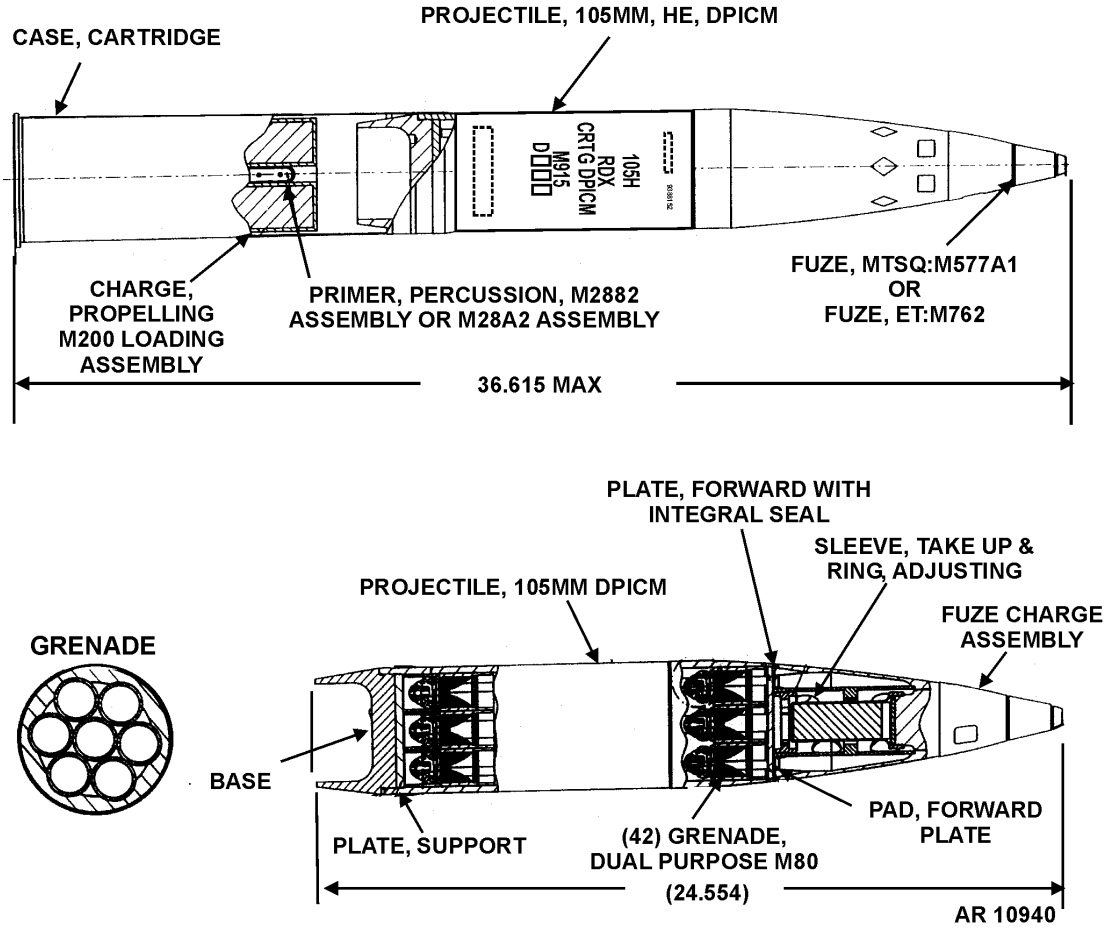
Limitations:

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

*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

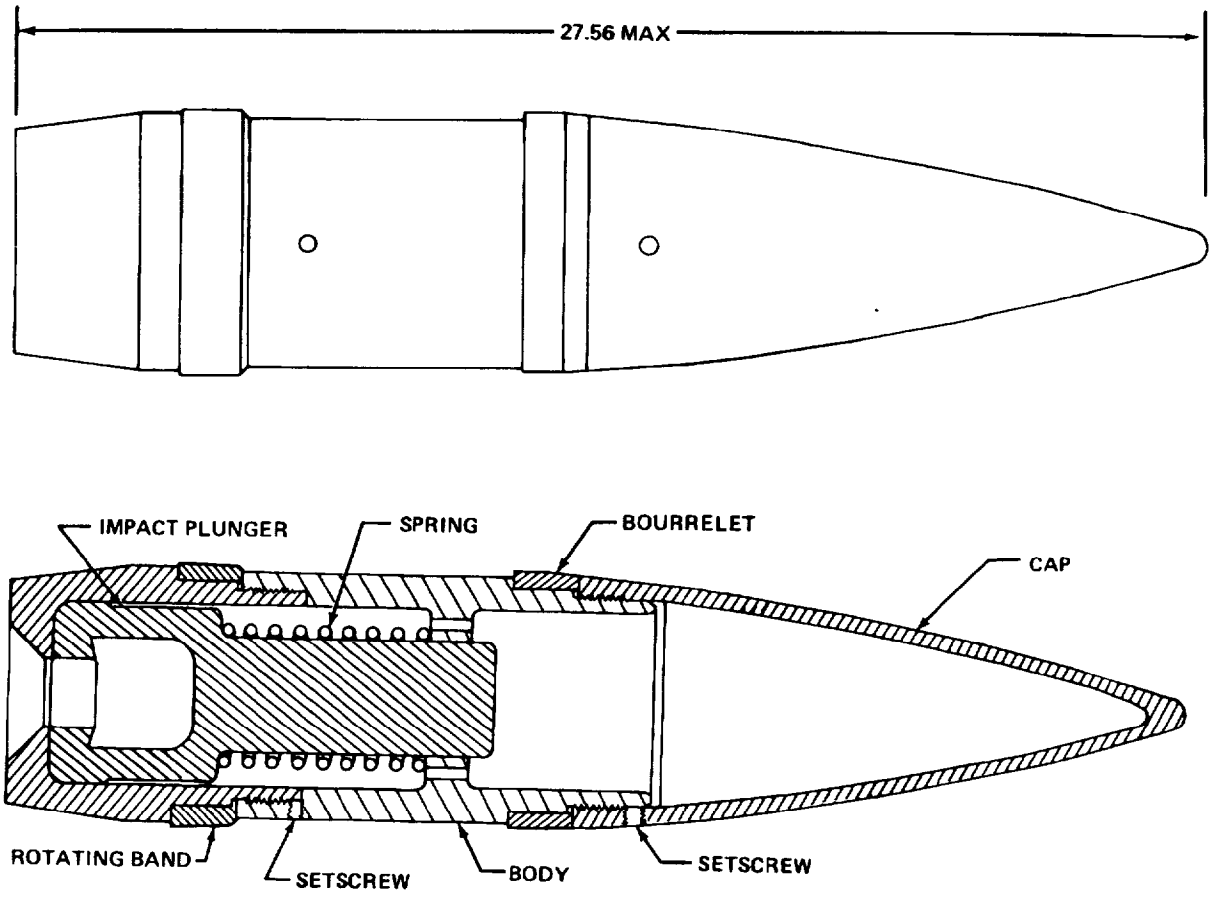
LIMITATIONS:

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



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-loadd impact plunger to assist in extraction from the weapon. Exterior markings indicate weapons with which the dummy projectile may he 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. Roth 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:

Type	Inert
Cannon used with	Howitzers M1, M1A1,M45,M126, M126A1,M185, M199,M284 Guns M2, M2A1, M46

Projectile:

Body material	Cast steel
Weight	95 lb
Length	27.56 in.

Color:

Old mfg	Blue or black w/white markings
New mfg	Bronze w/white markings

Propelling charge:

Weight	7.371
Length	11.0 in.
Primer	Expended M82 or MK2A4 depending on weapon used with
Fuze	None
*Packing	1 projectile in wooden crate; 2 propelling charges M2 per metal container M13A2

*Crate:

Weight	106 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 for complete packing data including NSNs.

Shipping and Storage Data.

Quantity-distance class	00
Storage compatibility group	N/A
DOT shipping class	00
DOT designation	PROJECTILE NON-EXPLOSIVE

DODAC:

Dummy Projectile	1320-D553
Dummy Propelling Charge	1320-D539

Assembly Dwg No:

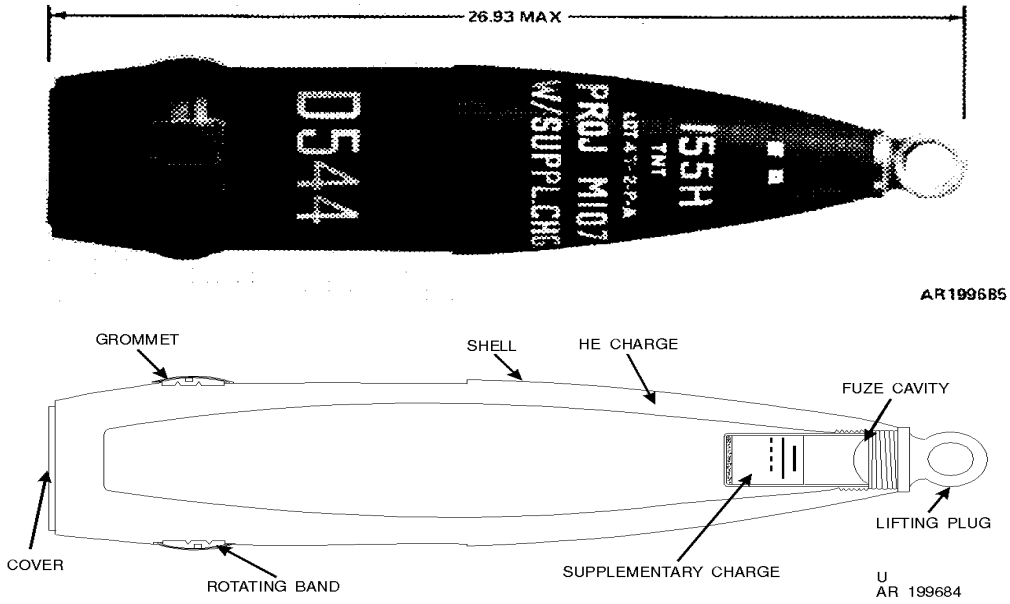
Dummy Projectile	72-l-69
Dummy Propelling Charge	72-2-54

Limitations:

References

SB 700-2
AMC-P 700-3-3

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:

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

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

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

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

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

Primers:
- For cannon: M45, M126, M126A1, M199, and M185 ---------- M82
- M1, M1A1 ---------- MK2A4

Propelling charges ---------- M3, M3A1, M4A1, M4A2, M119/M119A1

Fuzes ---------- PD: M557, M78 series; M739 series; MK399 MOD 1; MTSQ: M564, M582 series; Prox: M728, M732 series, ET: M767

Temperature Limits:

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

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

*Packing ---------- 8 projectiles on pallet

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

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

Shipping and Storage Data:

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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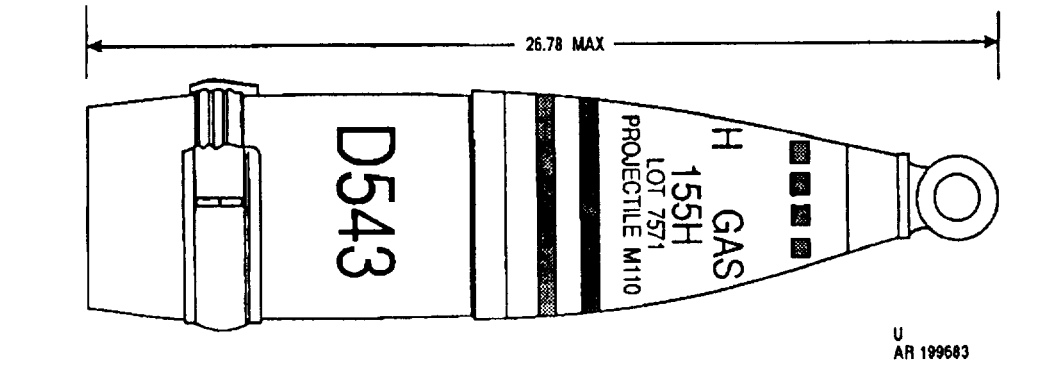
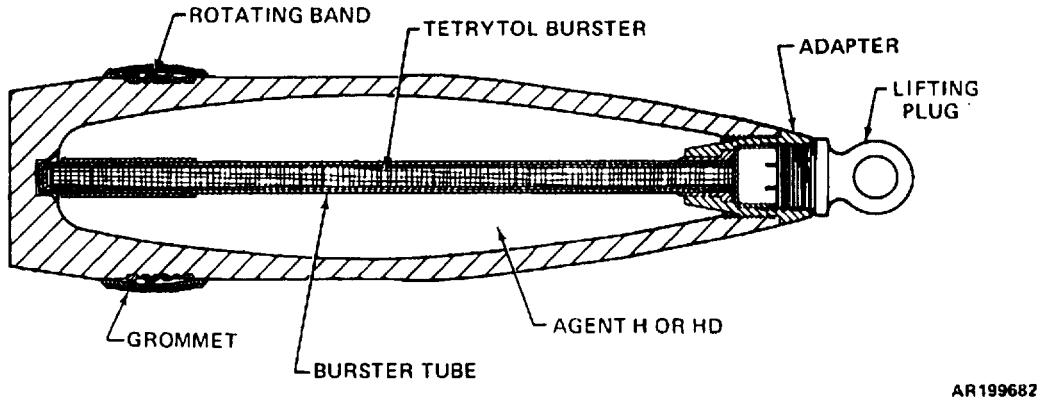
PROJECTILE, 155-MILLIMETER: AGENT H/HD, M110





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 propel the projectile through the barrel with the velocity required to reach the target. The soft alloy of the rotating band engages the barrel rifling to impart spin to the projectile for stability in flight, The rotating band also forms a seal to prevent escape of gas pressure past the projectile, The PD fuze functions on impact to explode the burster. The burster ruptures the projectile case and disperses the agent.

Tabulated Data:

WEIGHT ZONES
Loaded Shell Without Fuze
Lifting Plug And Grommet

Zone	Over lb H	Up to & Including lb H	Marking H
2	90.0	91.3	▫ ▫
3	91.1	92.4	▫ ▫ ▫
4	92.2	93.5	▫ ▫ ▫ ▫

Projectile:
- Type ---------- H/HD agent
- Weight w/lifting plug ---------- 94.59 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--kings, 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)
- Fazes ---------- 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 tobe 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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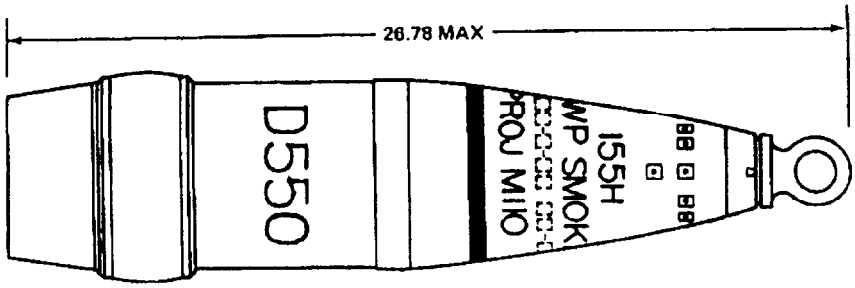
PROJECTILE, 155-MILLIMETER: SMOKE, WP, M110 AND M110E1



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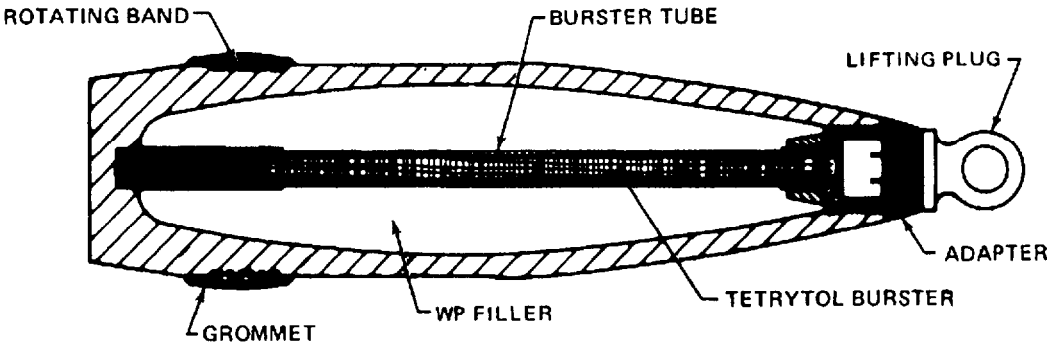

AR199678

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 Catolog 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 terytol 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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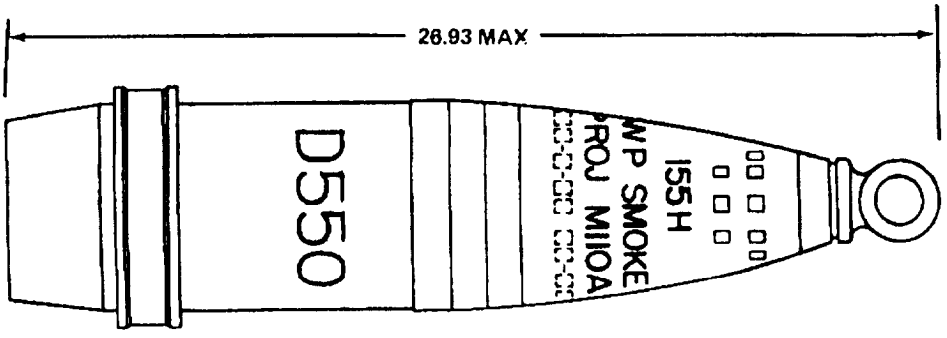
PROJECTILE, 155-MILLIMETER: SMOKE WP, M110A1 (M110E2) M110A2 (M110E3)



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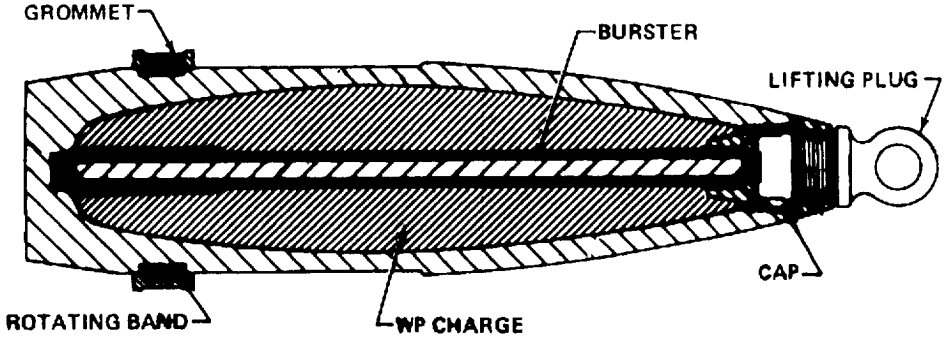

AR199680

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 lifting plug is installed in the fuze cavity. A rotating band encircles the projectile near the base and is protected by a grommet to be removed before loading the projectile in the weapon. A PD fuze is normally used with this projectile, although an 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

Zone	Over Pounds	Up To & Incl Pounds	Marking
5	93.3	94.6	⊡ ⊡ ⊡ ⊡ ⊡
6	94.4	95.7	⊡ ⊡ ⊡ ⊡ ⊡ ⊡
7	95.5	96.8	⊡ ⊡ ⊡ ⊡ ⊡ ⊡ ⊡
8	96.6	97.9	⊡ ⊡ ⊡ ⊡ ⊡ ⊡ ⊡ ⊡

Complete round:
- Type ---------- Smoke WP
- Weight w/lifting plug --------- 98.49 lb nominal
- Length w/lifting 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, Ml19/Ml19A1
- 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

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

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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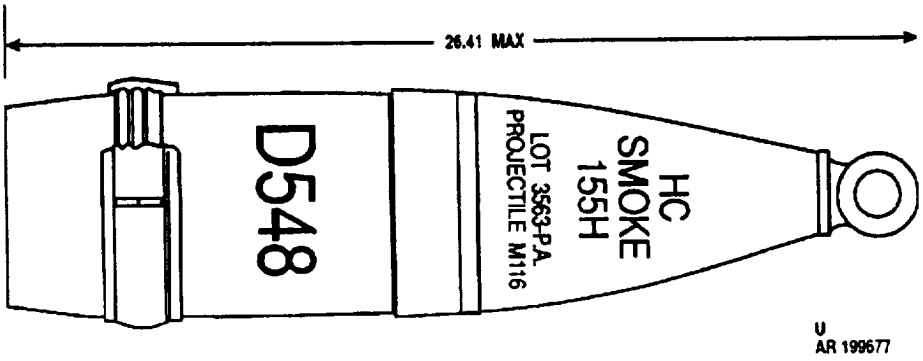
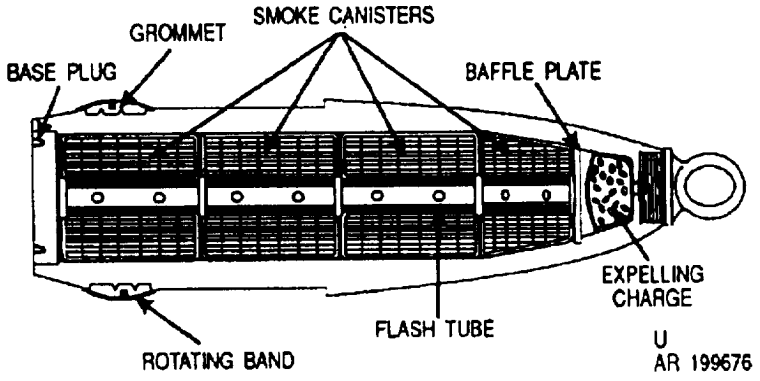
PROJECTILE, 155-MILLIMETER: SMOKE BE, M116 AND M116B1, HC AND COLORED





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 m a cloth bag as in M116 (0.29 lb of black powder), Also, the copper closure disk used in Model Ml16 has been replaced with a steel disk in the newer model.

Tabulated Data:

WEIGHT ZONES

Zone	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.l°C)

*Packing ---------- 8 projectiles on pallet

*Pallet:

	Colored Smoke	HC Loaded
Weight	727 lb	802 lb
Dimensions	27-1/8 X 13-5/8 X 32 in.	27-1/8x 13-5/8x 32 in.
Cube	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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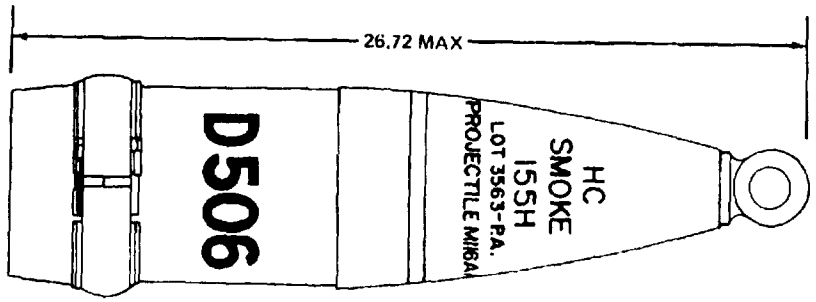
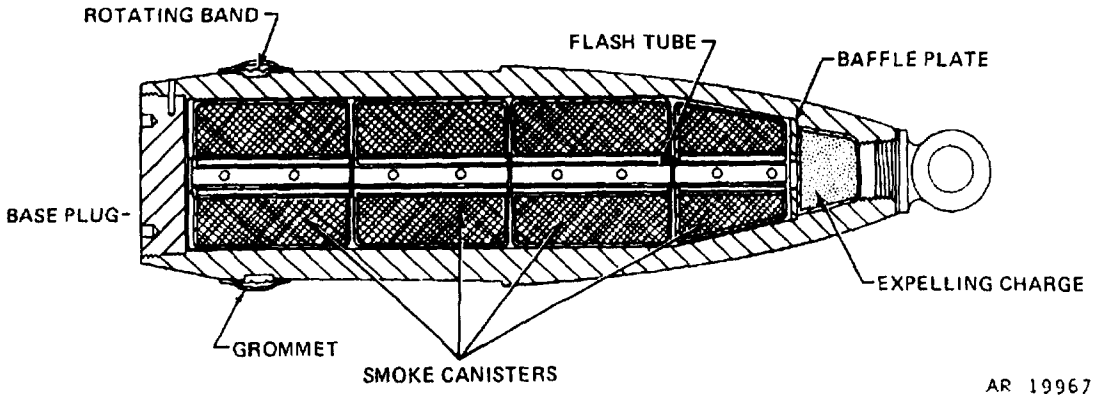
PROJECTILE, 155-MILLIMETER: SMOKE, HC, M116A1



AR 199675-B



AR 199674-A

Type Classification:

Std MSR 04786002.

Use:

This projectile is tired 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 containning 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:

WEIGHT ZONES

Zone	Pounds Over	Up To & Incl	Marking
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; MTSQ, 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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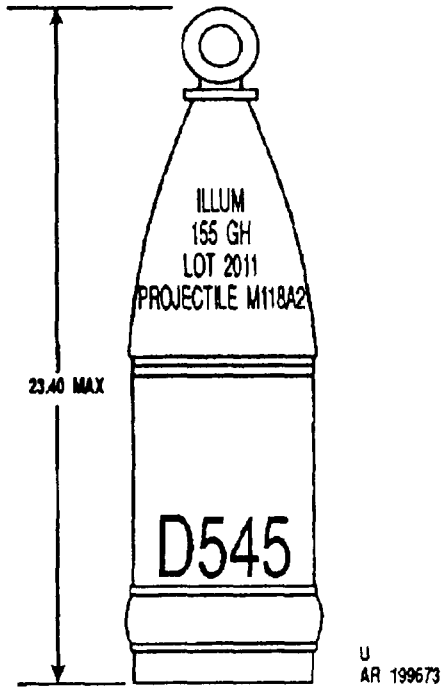
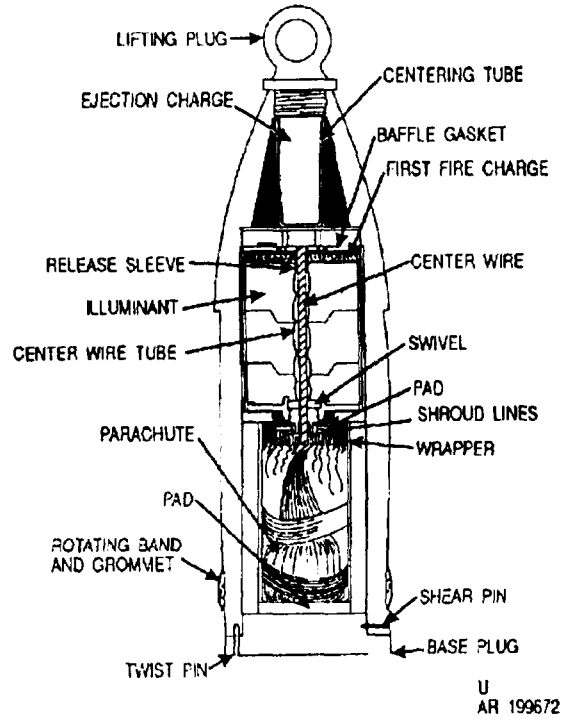
PROJECTILE, 155-MILLIMETER: ILLUMINATING, M118 SERIES





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

Functioning:

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

Tabulated Data:

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

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

Temperature Limits:

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

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

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

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

Shipping and Storage Data:

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

Ballistics:

Cannon M126/M126A1:

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

Cannon M199:

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

Cannon M199: (cont.)

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

References:

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

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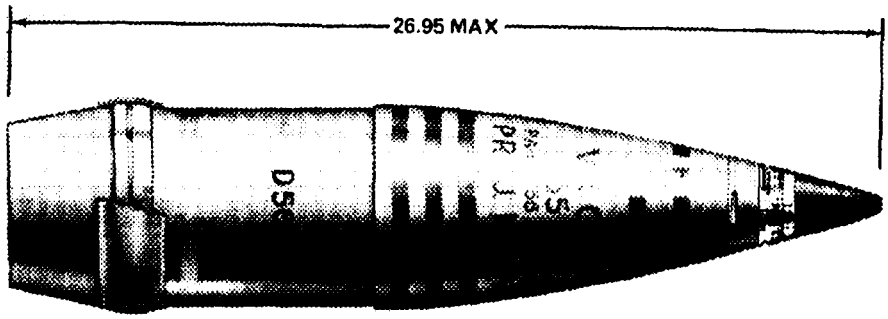
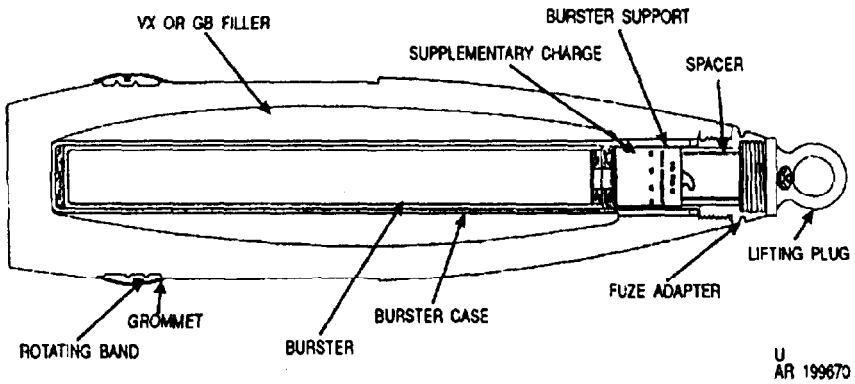
PROJECTILE, 155-MILLIMETER: VX (Persistent) or GB (Non-Persistent): M121A1



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 s ace 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:

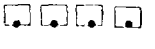
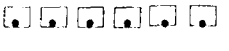
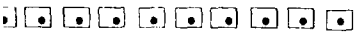
When the weapon is fired, the burning propellant generates rapidly expanding gases to propel the projectile through the barrel with the velocity required to reach the target. The soft alloy of the rotating band engages the barrel rifling to impart spin to the projectile for stability in flight. The rotating 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, Ml99
- 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.l°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 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	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

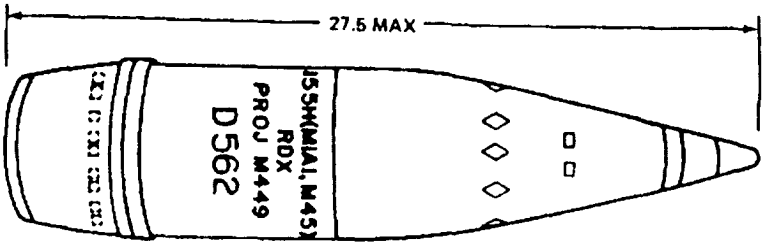
Limitation:

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



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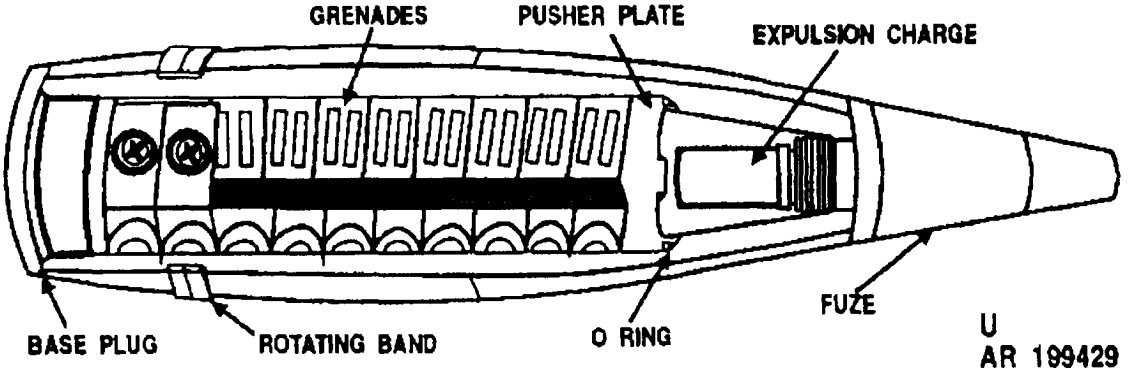


Type Classification:

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 Ml, 13,5 lb (Zones 3-7)
Ml19/Ml19A1 ---------- Propellant M6, 20.5 lb (Zone 8)
Primer ---------- M82, MK2A4 or MK15
Fuze ---------- MT, M565; MTSQ, 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.

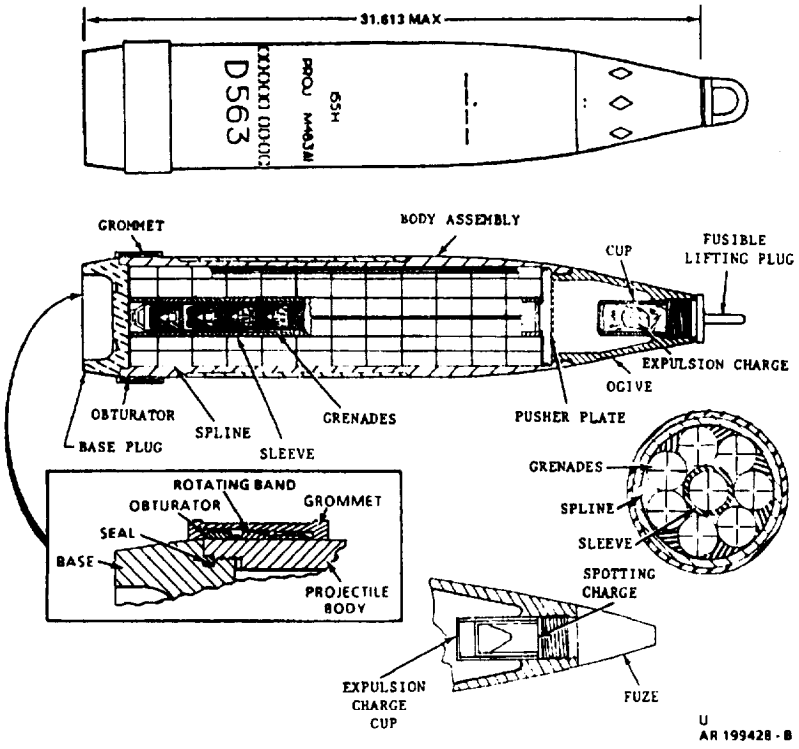
Shipping and Storage Data

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 antipersonnel grenades.

Description

This projectile is of the separate loading type. The fuze, propelling charge, and primer are handled and loaded separately. The projectile is provided with a fusible lifting plug in place of a fuze for handling. The 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 groundburst 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

M483A1 Projectile:
- Projectile:
  - Type ---------- HE
  - Weight ---------- 102.6 lb (46,5 k)
  - Length w/fuze ---------- 35.4 in. (89.9 cm)
  - Body material ---------- Forged steel/aluminum
  - Color ---------- Olive drab w/yellow diamonds and markings

Filler and weight:
- Number of grenades, M42 -- 64
- Number of grenades, M46 -- 24
- Explosive, Comp A5, each grenade ---------- 30.5 g (1.08 oz)
- Explosive, Comp A5, each projectile ---------- 6.25 lb (2.84 kg)
- Expulsion charge ---------- M10 propellant, 58 g (2.05 oz)

Components:
- Propelling charge M3 -------- Propellant M1, 5.0 lb (2.3 kg) (Zones 1 -5)
- Propelling charge M4A2 ---- Propellant M1,13.5 lb (Zones 3 -7)
- Primer ---------- M82
- Fuze ---------- MTSQ, M577; ET, M762

HOWITZER	CANNON USED WITH
M109	M126A
M109A1	M185
M109A1B	M185
M109A2	M185
M109A3	M185
M198	M199
M114A2	M1A2

Performance (full charge):
- Maximum range ---------- 14,586 m (15,951 yd)
- Muzzle velocity ---------- 560,2 mps (1837.9 fps)

Propelling charge
- M119 ---------- Special Single Zone (8) for use with the M109A1 only

Performance:
- Maximum range ---------- 17,740 m (19400 yd)
- Muzzle velocity ---------- 650 mps (2132,5 fps)

Temperature Limits:

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

Storage:
- Lower limit ---------- -65°F (-53.8°C)
- Upper limit ---------- + 165°F (+73.9°C)
- *Packing ---------- Pallet of 8 projectiles

*Pallet:
- Weight (loaded) ---------- 874 lb (396 kg)
- Dimensions ---------- 39-3/8 x 29 x 14-1/2 in (100.01 -- 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 ---------- (18) 1.1D
DOT class ---------- Class A Explosive
DOT marking ---------- EXPLOSIVE PROJECTILES
DODAC ---------- 1320-D563
UNO serial number ---------- 0168
UNO proper shipping name --- Projectiles
Drawing number ---------- 9215220
Top packing drawing number ---------- 8837839

Shipping and Storage Data For:

Charge, Spotting, Projectile:

Hazard class/division and Storage Compatibility Group ---------- 1.1D
DOT class ---------- Class A Explosive
DOT marking ---------- Class A SUPPLEMENTARY CHARGE (EXPLOSIVE) HANDLE CAREFULLY
DODAC ---------- 1320-D003
UNO serial number ---------- 0060
Drawing number ---------- 9272016
Payment drawing number ---------- 9273539

WEIGHT ZONES
Loaded Projectile (w/o fuze, w/o plug)

Zone	Over lb	Up to & Incl	Markings
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)
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	455.7	12150
7W	546.2	543.2	14650

Charge	Muzzle velocity (m/s)	Max Range (m)
Propelling Charge - M119/M119A1		
8	655.8	17740
Propelling Charge - M119A2		
7R	660.0	17740

**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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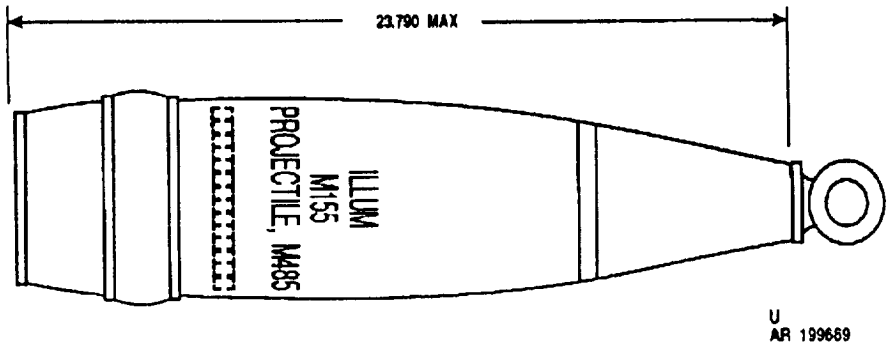
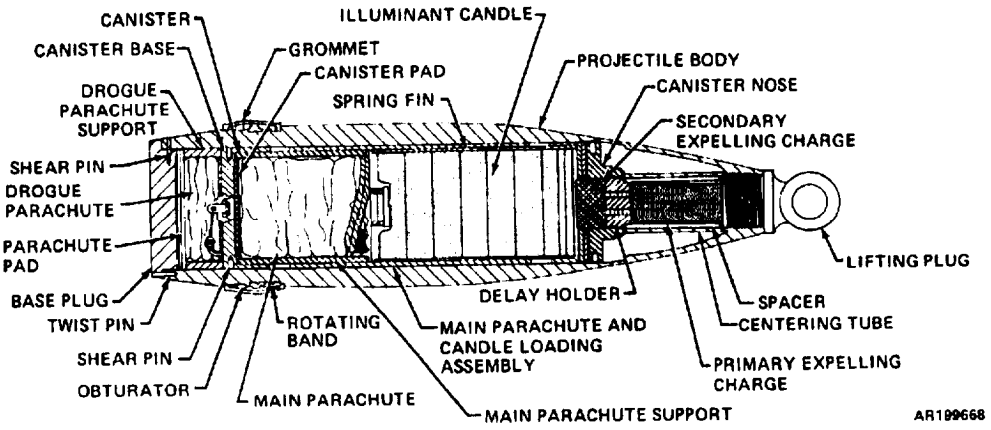
PROJECTILE, 155-MILLIMETER: ILLUMINATING, M485 SERIES





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 plastic obturating band encircle the projectile near the base and are protected by a grommet during shipment and handling. The projectile uses an MT type fuze. The fuze cavity is fitted with a lifting ring plug for shipment and handling.

Functioning.

When the weapon is fired, the rotating band engages the barrel rifling to impart spin to the projectile for stability in flight. The obturator band expands to prevent leakage of gas pressure past the projectile. The burning propellant charge 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

*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)	Elevation (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)	Elevation (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)	Elevation (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	781.5

Limitations:

Reliability of projectiles M485A1 and M485A2 degrades rapidly when firing at Zones 6 and 7 with fuze settings of 10 seconds or less. Model M485 is restricted to firing at Zones 1 through 6. Model M485 is also restricted to a firing temperature range of 40°F to 145°F.

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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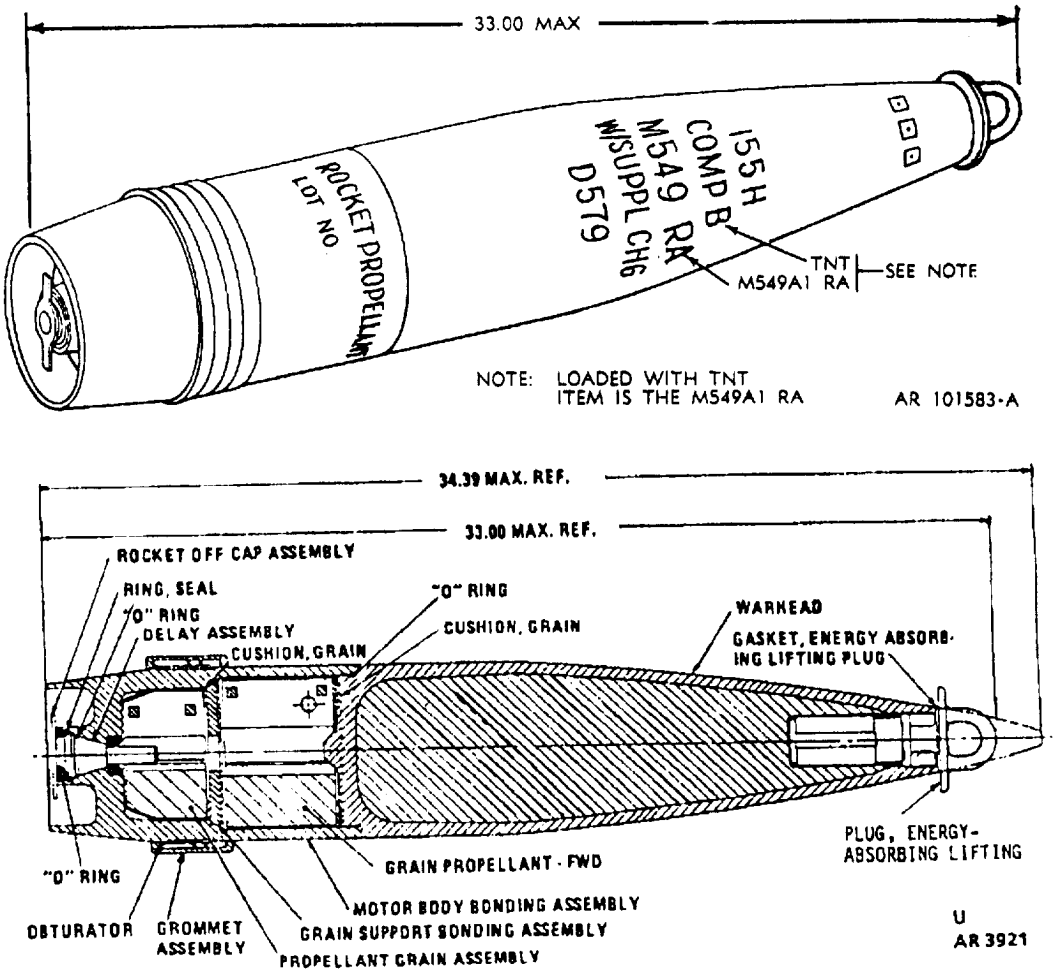
PROJECTILES, 155-MILLIMETER: HERA, M549 AND M549A1



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 stremlined 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	Pounds Over	Up to & Incl	Marking
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 TNT
M549	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:

	M549	M549A1
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	Charge	Muzzle Velocity (m/s)	Maximum Range
M114A2	M4A2	7	560.8	19,300
M109	M4A2	7	560.8	19,300
(M109A1 M109A2)	M4A2		567.5	19,500
M109A3)	M119A1, A2	8,7	678.2	23,500
M198	M4A2	7	567.5	19,500
	M119A1, A2	8,7	678.2	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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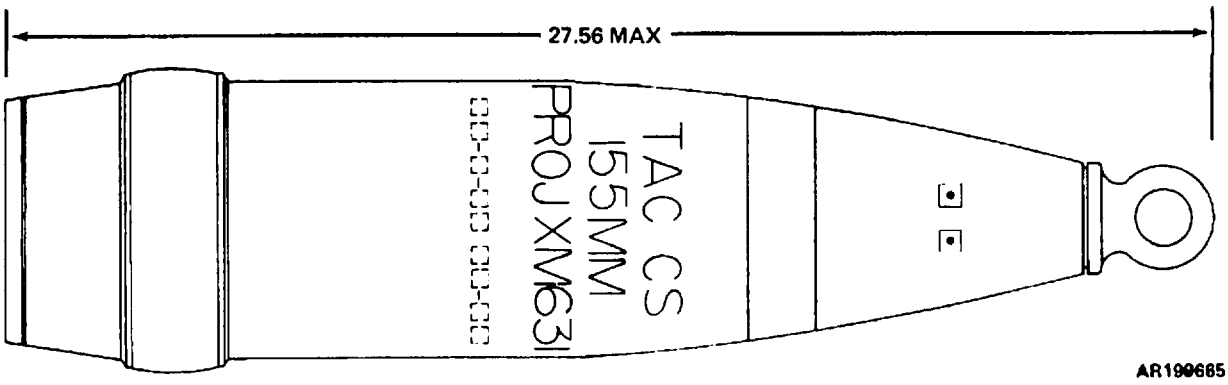
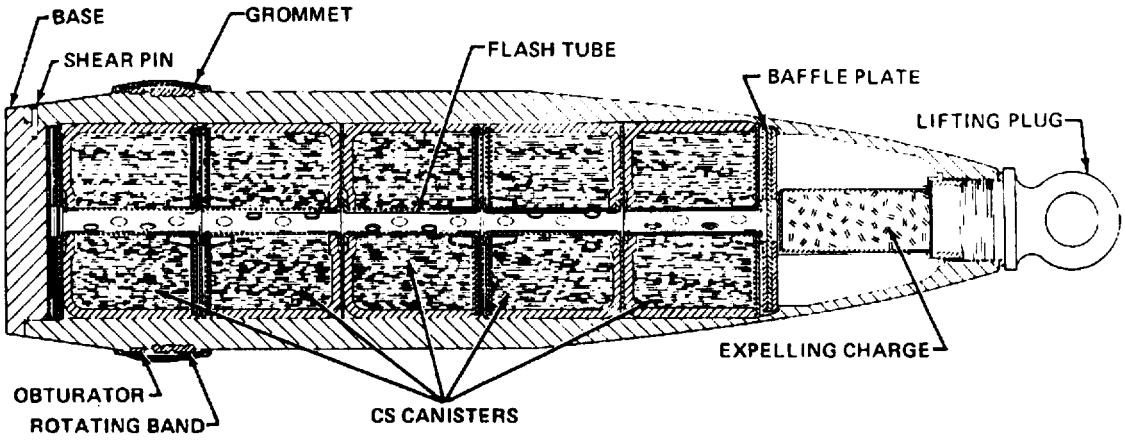
PROJECTILE, 155-MILLIMETER: TACTICAL CS, XM631





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)
- Upperlimit ---------- +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

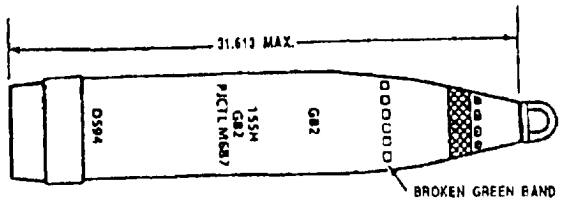
Limitations:

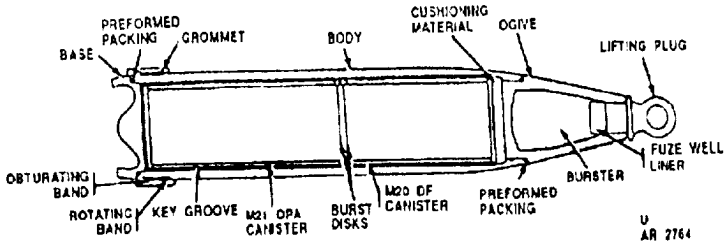
Do not fire with fuze set as issued. If impact detonation is intended instead of time functioning, set the fuze for 90 seconds.

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:

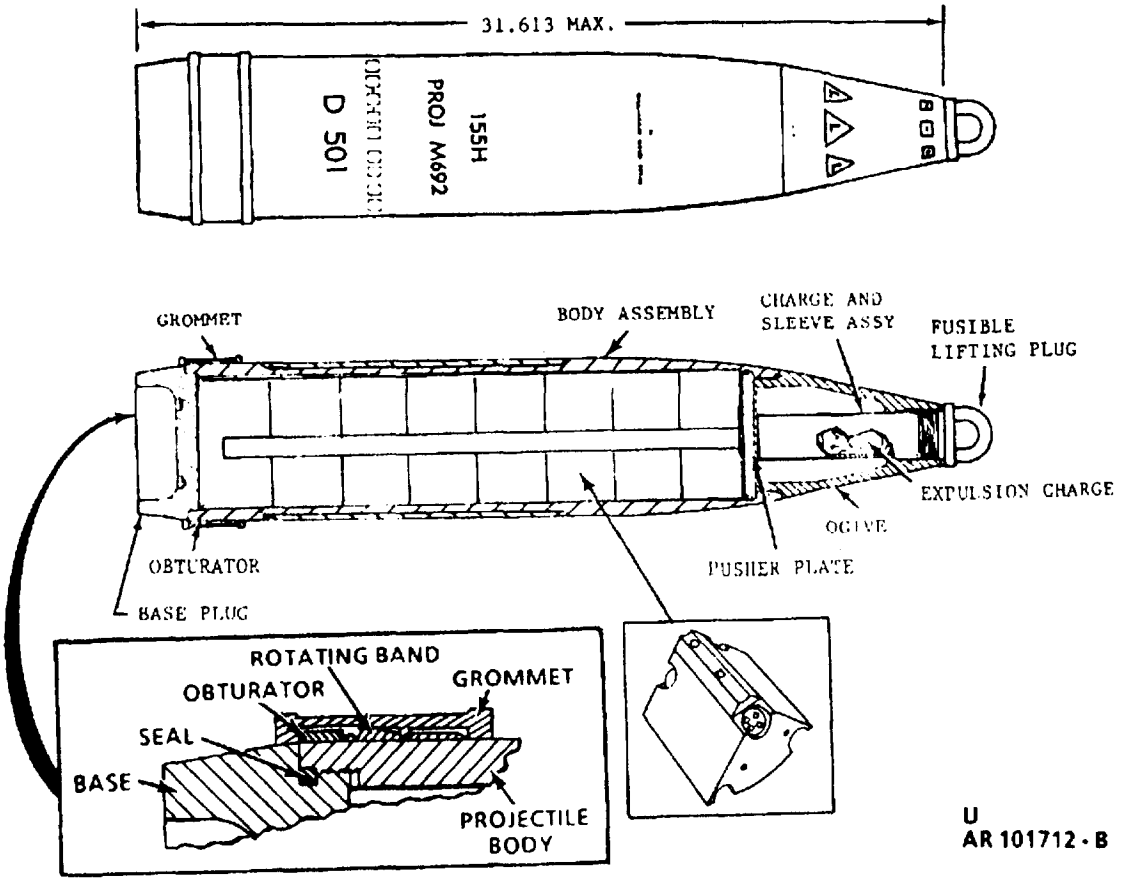
DOT hazard class	Flammable Liquid
DOT marking	FLAMMABLE LIQUID N.O.S. (ISOPROPYL ALCOHOL-ISOPROPYLAMINE) UN 1993

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 predetermined time in flight, initiates the expulsion charge ejecting the mines from the rear of the projectile. Centrifugal force disperses the mines radially from the projectile line-of-flight. The mines are completely armed a short time after ground impact. A self-destruct mechanism is activated which initiates the mine after a predetermined time if the munition is not functioned by trip wire or disturbance.

Tabulated Data:

Projectile:
- Type ---------- HE
- Weight ---------- 102.5 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 and Storage 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
2	99.1 (41.3 kg)	100.4 (45.5 kg)	⊡ ⊡
3	100.2 (45.5 kg)	101.5 (46.0 kg)	⊡ ⊡ ⊡
4	101.9 (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-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	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	455.7	12150
7W	546.2	543.2	14650
Propelling Charge-M119/M119A1			
8	655.8		17740
Propelling Charge-M119A2			
7R	660.0		17740

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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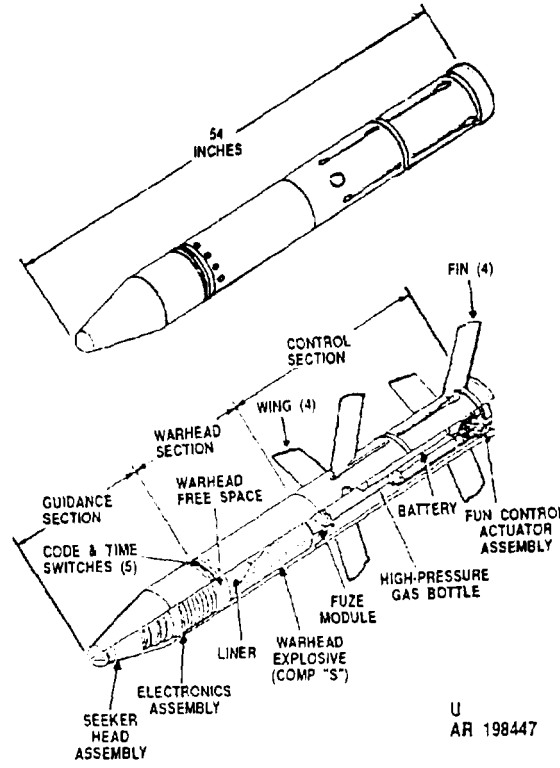
PROJECTILE, 155-MILLIMETER: HEAT GUIDED, CANNON-LAUNCHED, M712



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 fuzing 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 conpartment 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) - (with projectile)	67.5 lb 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*			
Charge 8	577	16,000	29.60

*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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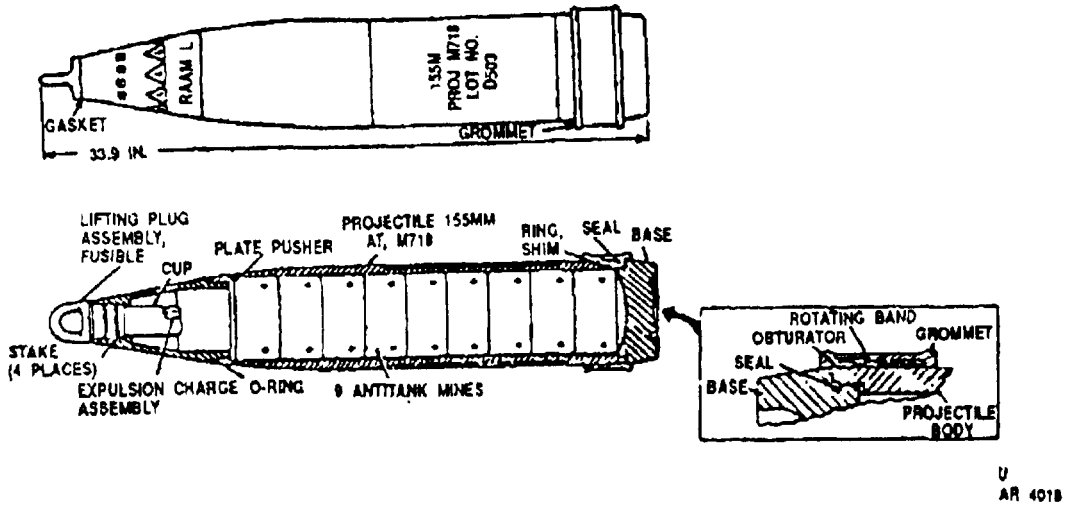
PROJECTILE, 155-MILLIMETER AT, M718



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, M82
Fuze	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
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 Explosive
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
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)	▣▣
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	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
Propelling Charge - M119A2			
7R	660.0		17740

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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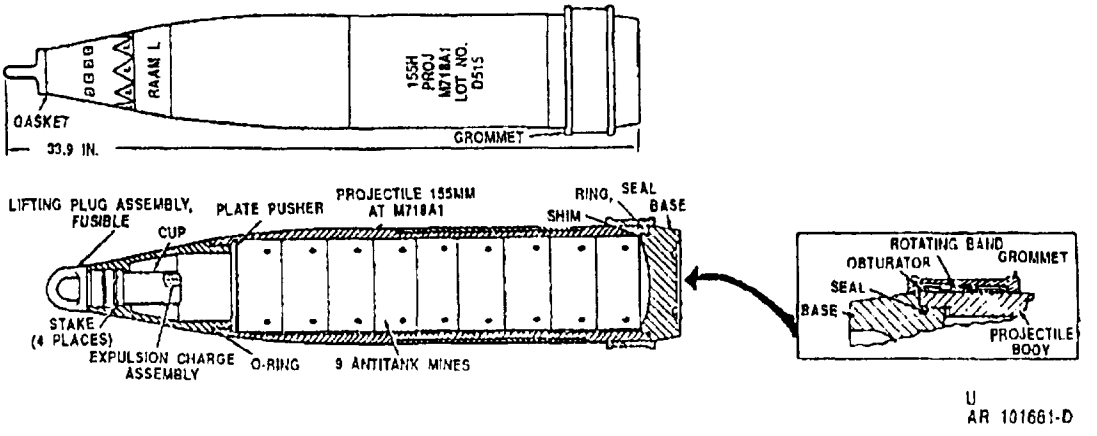
PROJECTILE, 155-MILLIMETER AT, M718A1



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 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 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	M3Al, M4A2, M119, M119A1, M119A2
Primers	MK2A4, 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:*

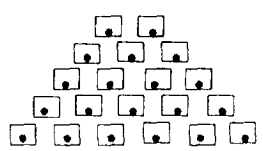
Packing	Pallet of 8 projectiles
Pallet:	
Weight (loaded)	882 lb (400 kg)
Dimensions	39-3/8 x 29-1/8 x 14-5/8 in. (100.01 x 73.98 x 37.15 cm)
Cube	9.7 cu ft (0.3 cu m)

*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-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 M119A1, M119A2	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)
	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
	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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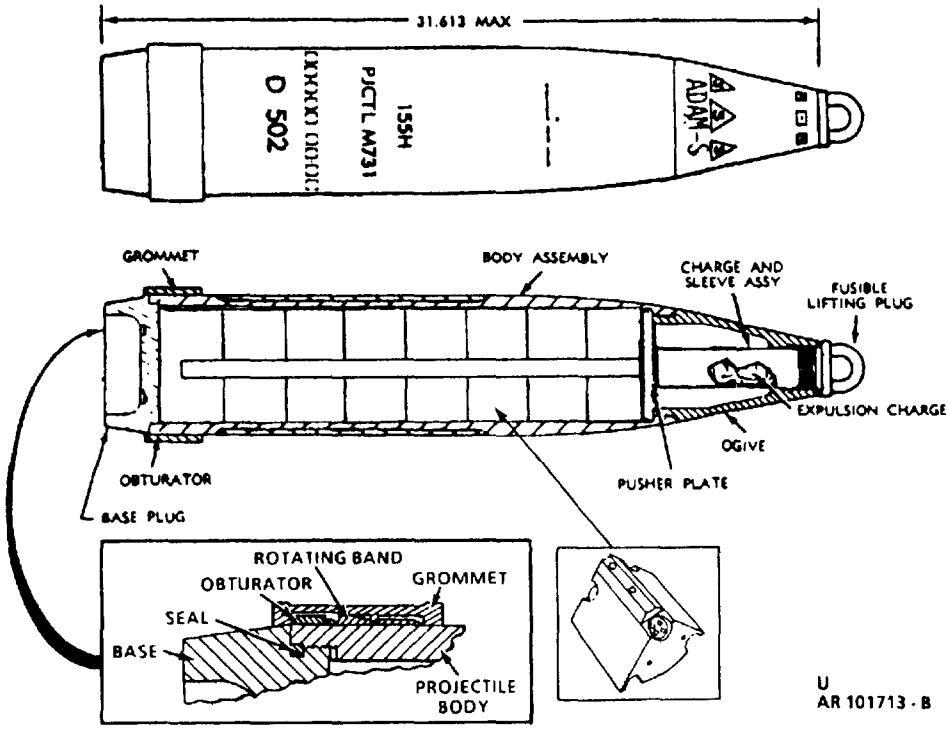
PROJECTILE, 155-MILLIMETER. HE, M731



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 separate] . The projectile is provialed 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 protected during storage and handling by a removable plastic grommet.

Functioning

When the primer is detonated, the flash ignites the propelling charge producing gases which force the spin-stabilized projectile out of the gun tube and propels it to the target, The M577 fuze, having been set to function at a predetermined time in flight, initiates the expulsion charge ejecting the mines from the rear of the projectile. Centrifugal force disperses the mines radially from the projectile line-of-flight. The mines are completely armed a short time after ground impact. A self-destruct mechanism is activated which initiates the mine after a predetermined time if the munition is not functioned by trip wire or disturbance.

Tabulated Data:

Projectile:

Type	HE
Weight	102.5 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:

Firing:	
Lower limit	-25°F(-32°C)
Upper limit	+125°F (+52°C)
Storage:	
Lower limit	-30°F (-31.1°C)
Upper limit	+160°F (+71.1°C)
*Packing	Pallet of 8 projectiles
*Pallet:	
Weight (loaded)	874 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)	▪ ▪
3	100.2 (45.5 kg)	101.5 (46.0 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-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):

Charge	Muzzle Velocity (reps)	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)
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	455.7	12150
7W	546.2	543.2	14650
Propelling Charge - M119/M119A1			
8	655.8		17740
Propelling Charge -M119A2			
7R	660.0		17740

Howitzer, Towed, M114A2

Firing Tables not compiled at this time.

Weapons fired from:

M109, M109A1, M114A2, M198

Weapon/Propelling Charge/Primer/Combinations:

M109/M3Al, 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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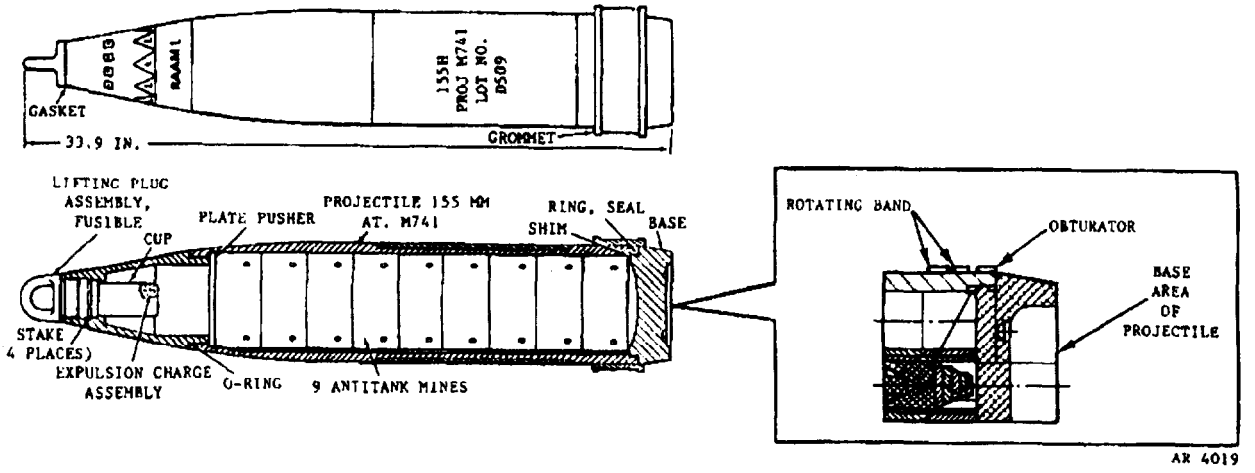
PROJECTILE, 155 MILLIMETER: AT, M741



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 tiring, 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 char e 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 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, 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	-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 Explosive
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)	⊡ ⊡
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-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)
	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 9-2350-314-10

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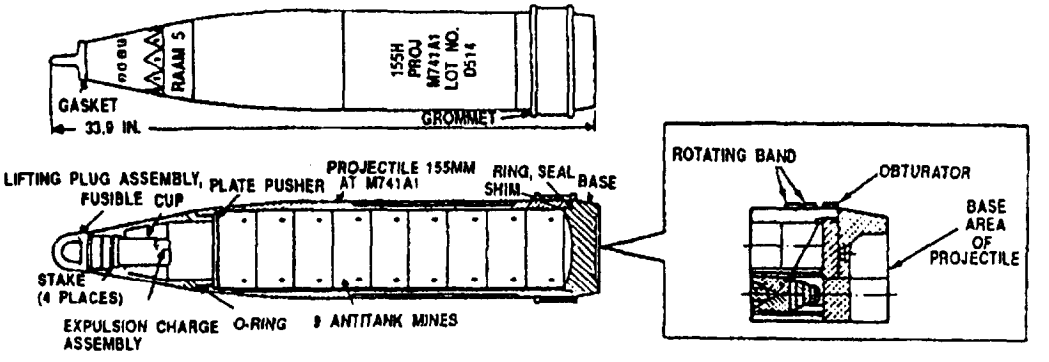
PROJECTILE, 155-MILLIMETER: M741A1



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 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) 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 Over	Up to & Inc	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, M119A1, M119A2	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 1 55ADD-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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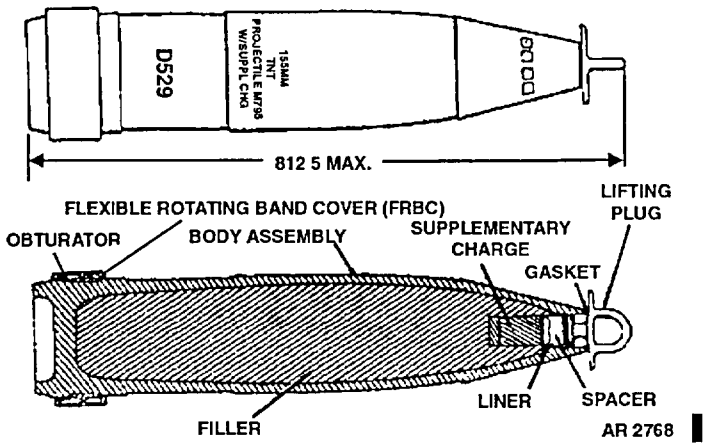
PROJECTILE, 155-MILLIMETER: HE, M795



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)

	Over		Up to & Incl		
Zone	kg	lb	kg	lb	Markıng
2	44.9	99.0	45.5	100.3	⊡ ⊡
3	45 4	100.1	46.0	101.4	⊡ ⊡ ⊡
4	45.8	101.0	46 6	102.7	⊡ ⊡ ⊡ ⊡
5	46.4	102.3	47.0	103.6	⊡ ⊡ ⊡ ⊡ ⊡
6	46.9	103.4	47 5	104.7	⊡ ⊡ ⊡ ⊡ ⊡ ⊡

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 (Zone 1-2)	830 fps	253 mps (Zone 2 only)
Trilateral Cartridge 2 (Zone 3-7)	938 to 2190 fps	288 to 668 mps
Trilateral Cartridge 3 (Zone 8)	2630 fps	802 mps

Weapon/Ammunition Combinations for M795 Projectile:

WEAPON	FUZES	PROP CHARGE
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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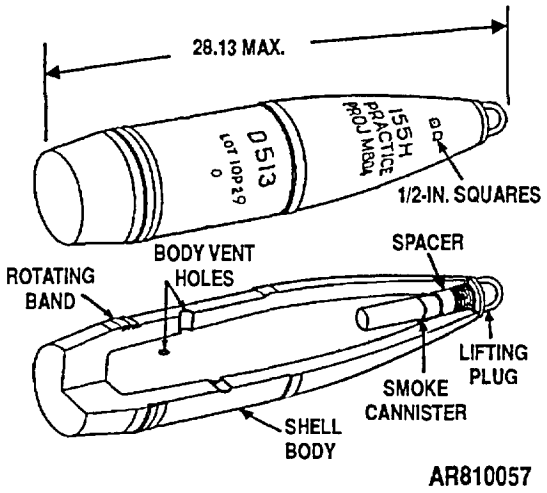
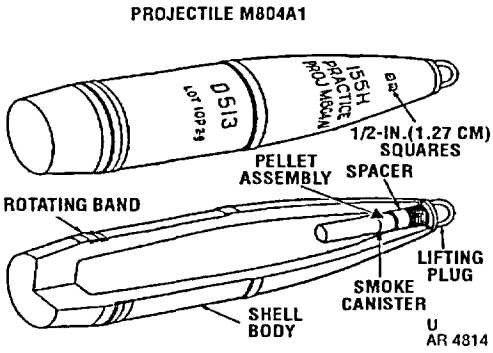
PROJECTILE, 155 MILLIMETER: PRACTICE, M804 AND M804A1





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)

Zone	Pounds Over	Up to & Incl	Marking
2	90 0	91.3	⊡ ⊡
3	91.1	92.4	⊡ ⊡ ⊡
4	92.0	93.7	⊡ ⊡ ⊡ ⊡
5	93.3	94.6	⊡ ⊡ ⊡ ⊡ ⊡

Complete Round.
- Type.....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 yellow 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:

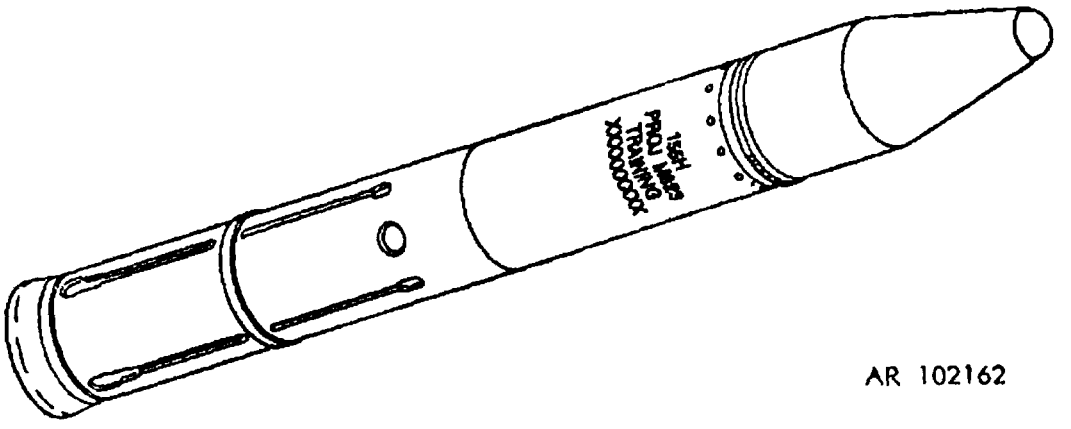
Charge	Muzzle Velocity (mps)	Max Range (m)	Elevation (mi)
*2, M3A1 green bag	236	4900	735.1
3. M3A1, green bag	276	6500	725.8
4, M3A1 green bag	316	8100	719.3
5, M3A1 green bag	376	9900	724.0
3, M4A2, white bag	297	7300	700.3
4, M4A2 white bag	337	8800	770.5
5, M4A2 white bag	397	10300	728.7
6, M4A2 white bag	476	12254	726.6
7, M4A2, white bag	572	14808	756.8
8, M119 M119A1	688	18208	804.1
7, M119A2, red bag	690	18262	804.1

* Firing at charge 2 may result in stickers occasionally.

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 9-1025-211-10
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
TM 9-2350-314-10

PROJECTILE, 155 MILLIMETER: TRAINING, M823



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 closure. 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 he 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 Ml 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:

Weapon Type Cannon Tube
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.

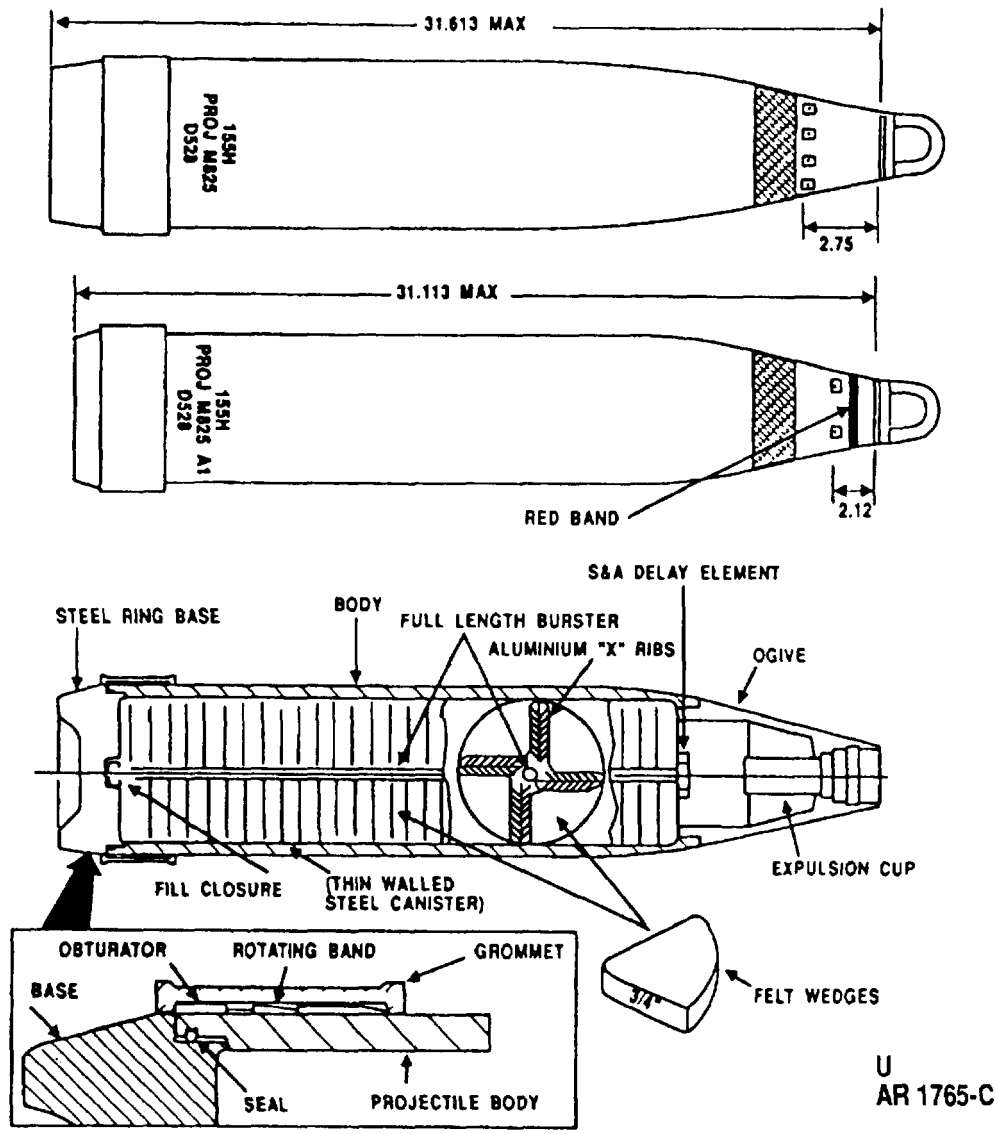
Limitations:

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 consists 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 char e 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.

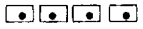
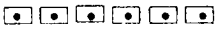
A pallet insert is necessary to support the base of each M825A1 projectile while on the pallet. These inserts are considered part of the pal-

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	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, 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 preparation . 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	2980
4G	303.6	301.6	4220
5G	358.1	356.1	5940
Propelling Charge - White bag			
	M4A2	M4A1	
3W	285.2	285.2	7230
4W	326.5	324.5	8630
5W	381.3	378.3	10080
6W	460.7	455.7	12150
7W	546.2	543.2	14650
Propelling Charge - M119/M119A1			
8		655.8	17740
Propelling Charge - M119A2 - Red Bag			
7		660.0	17740
Propelling Charge - M203 - Red Bag			
8S		797.0	22400

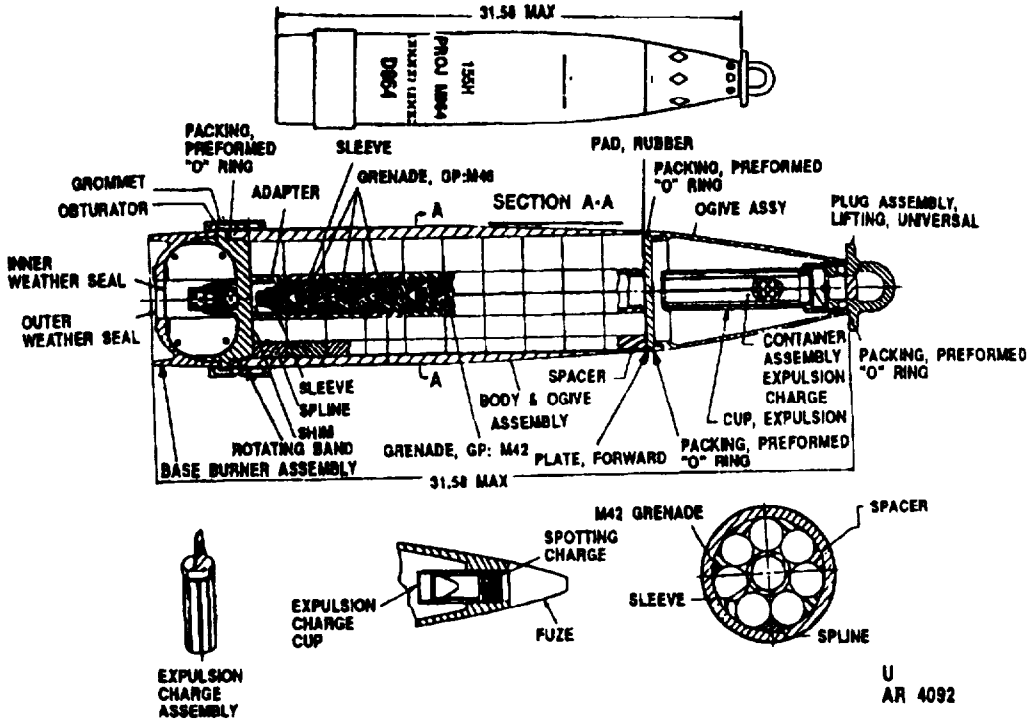
Limitations:

Firing the M825 projectile below charge 3 in the M185 or the M199 cannons may result in stickers, M825 projectiles are restricted to fir- 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
UN0 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:

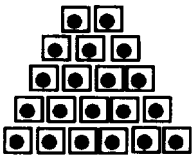
Hazard class/division and storage compatibility group ----- (18) 1.2D
DOT class---------- Class A explosive
DOT marking ---------- EXPLOSIVE PROJECTILES
DODAC ---------- 1320-D864
UNO serial number ---------- 0168
UNO proper shipping name ------- Projectile
Drawing number ---------- 9381131
Top packaging 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 SUPPLE-MENTARY CHARGE (EXPLOSIVE)-HANDLE CAREFULLY
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	Pounds Over	Up to & Incl	Marking
2	99.1	100.4	
3	100.2	101.5	
4	101.1	102.8	
5	102.4	103.7	
6	103.5	104.8	

Ballistics:

Howitzer, Self-Propelled, M109A2/A3
(Ml85 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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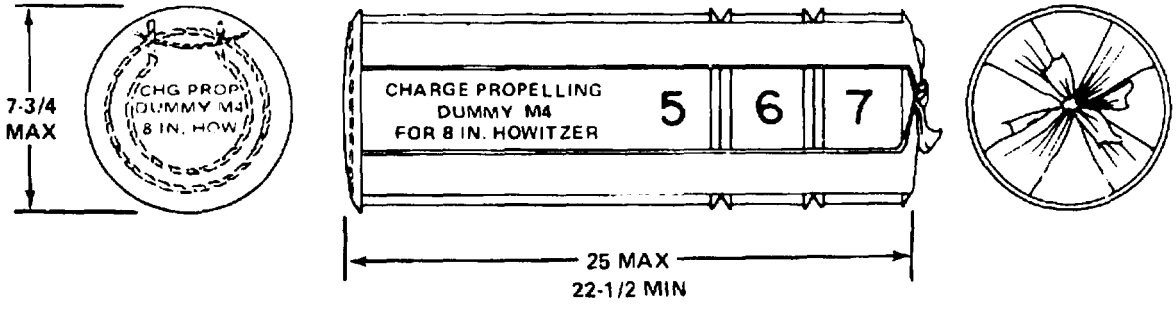
PROJECTILE, 8-INCH: DUMMY, M14 WITH CHARGE, PROPELLING: DUMMY, M4



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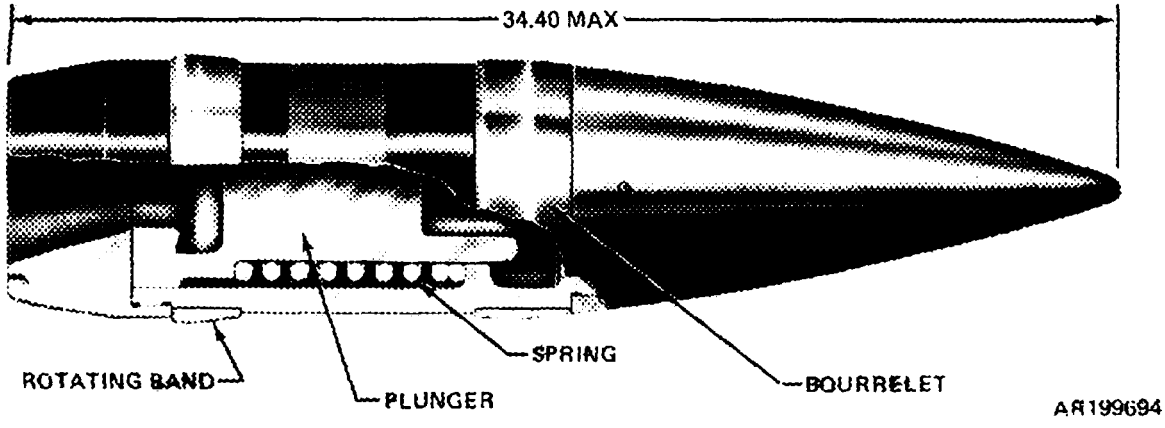


AR199694

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 NONEXPLOSIVE
- Dummy Charge M4 ---------- DUMMY PROPELLING CHARGE

DODAC:
- M14 ---------- 1320-D679
- M4 ---------- 1320-D677

Assembly drawing number.:
- M14 ---------- 72-1-82
- M4 ---------- 8863354

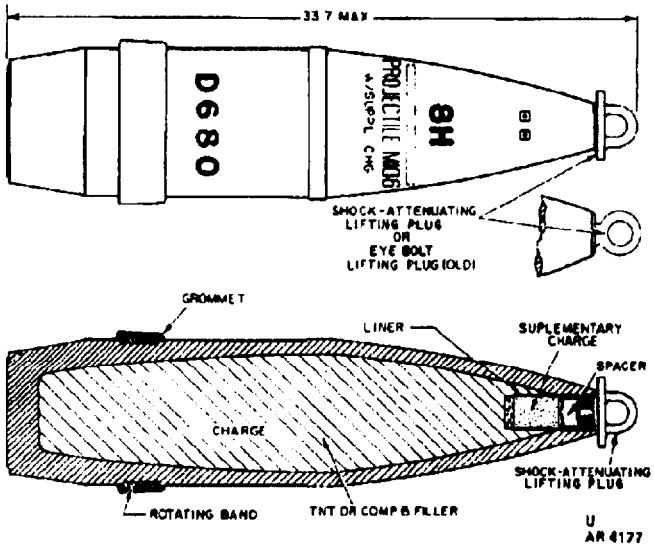
Ballistics:

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:

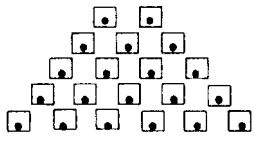
The grommet and lifting plug are removed from the projectile and the projectile is fitted with one of the authorized fuzes and rammed into the weapon chamber. When deep cavity projectiles are fitted with a proximity fuze, the supplementary charge is removed. Fuze arming occurs after firing, during projectile flight downrange. Depending upon the type of fuze fitted, the fuze functions detonating the projectile on impact, after an elapsed time or on sensing of the target,

Tabulated Data:

Projectile:
Type ---------- HE

WEIGHT ZONES

Loaded Projectile (w/o fuze, w/o lifting plug)

Zone	Over Pounds	Up To & Incl	Marking
2	191.4	194,3	
3	193.9	196.8	
4	196.4	199.3	
5	198.9	201.8	
6	201.4	204.3	

Length:
w/o Lifting plug ---------- 31.43 in.
w/Lifting plug ---------- 34.35 in. (max)

Diameter:
Rotating band ---------- 8.28 in.
Bourrelet ---------- 7.998 (max)

Body material	Steel
Color	Olive drab w/yellow markings
Filler and weight	TNT 36.3 lb Comp B 38.8 lb
Supplementary charge	TNT 0.3 lb
Grommet	3 types, metal w/wire ties, fiberglass, or plastic w/metal lever

Weapon System Information:

	Weapon	Model	Type
	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	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):

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	

Ballistics (XM201 Cannon):

Charge	Muzzle Velocity (fps)	Maximum Range (m)	Chamber Pressure (psi)
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	1390	12,405	
or M2, white bag	1463	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

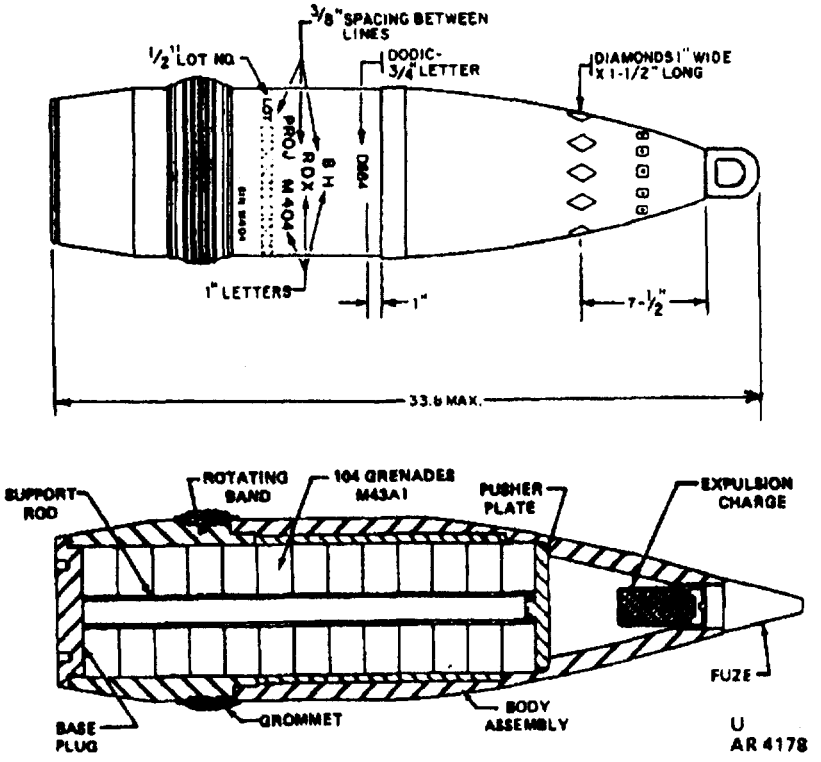
Limitations:

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 propellant; M2 (Zones 5-7), 28.5 lb M1 propellant
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 M115 towed	Model M110SP, M110A1/A2 2A2, M201A1	Type M55SP
Cannon			
Tube	M2A1, M2	(M2A1E1)	M47
Prop. Chg.	M1, M2	M1, M2	M1, M2
Primer	MK2A4	M82	M82

Temperature Limits:

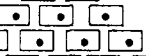
Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (+51.6°C)
Storage:	
Lower limit	-65°F (-53.8°C)
Upper limit	+165°F (+73.9°C)
*Packing	Pallet of 6 projectiles
*Pallet:	
Weight	1.253 lb
Dimensions	39-1/2 x 28-3/8 x 19-1/4 in.
Cube	12.4 cu ft

*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 Pounds	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:

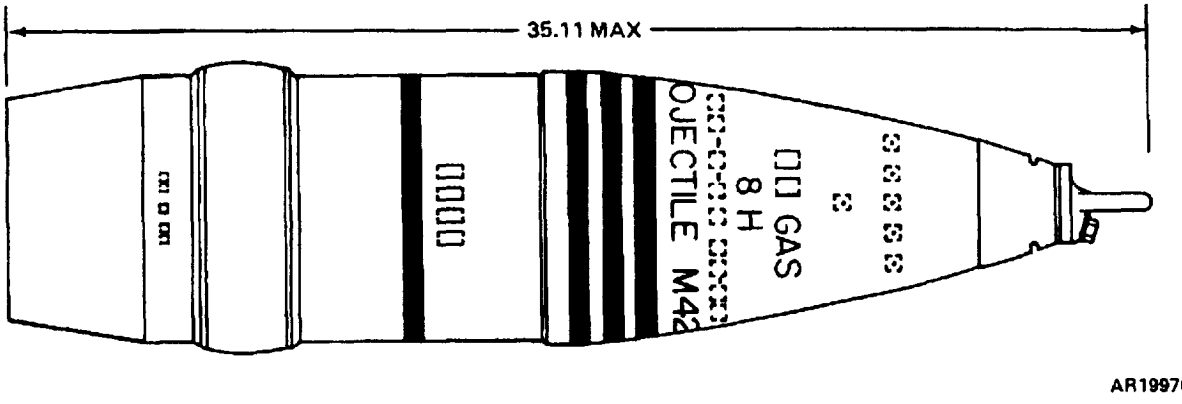
Charge	Muzzle Velocity (fps)	Maximum Range (m)	Chamber Pressure (psi)
1, M1, green bag	820	5600	
2, M1, green bag	900	6600	
3, M1, green bag	1000	8000	
4, M1, green bag	1150	9700	
5, M1, green bag or M2, white bag	1380	11,600	
6, M2, white bag	1640	13,900	
7, M2, white bag	1950	16,800	

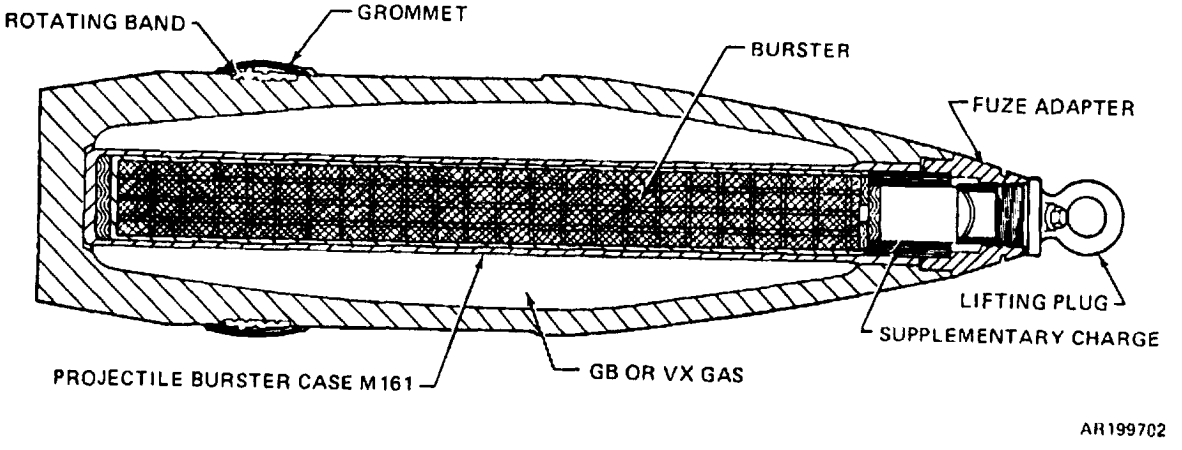
References:

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





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:

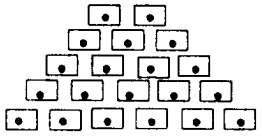
Ignition of the primer by the breech firing pin results in ignition of the propelling charge. The burning propellant generates rapidly expanding gases to propel the projectile through the cannon barrel at the velocity required to reach the target. The rotating band of soft gilding metal is incised by 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

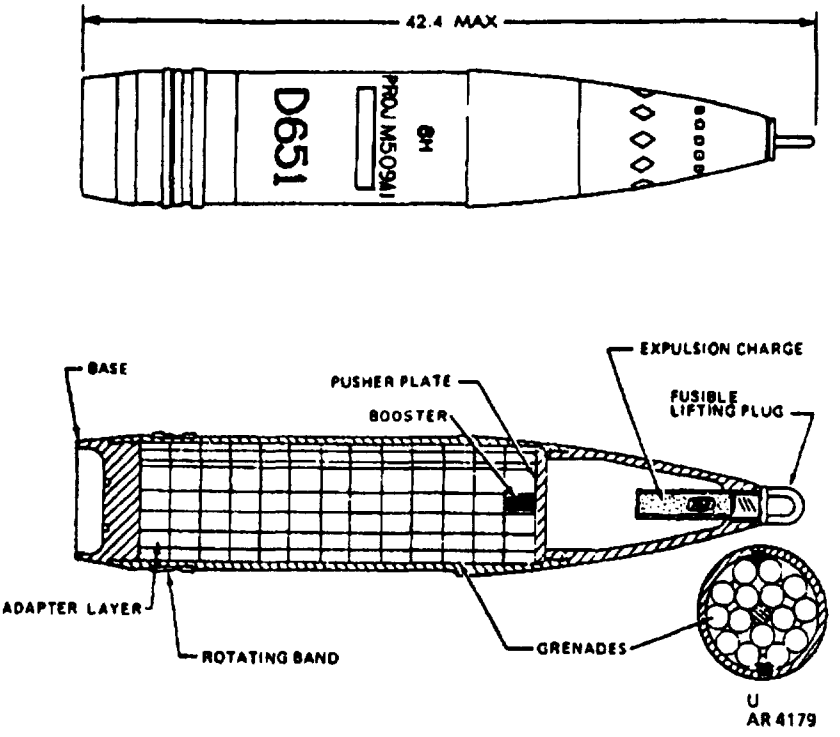
Limitations:

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 qwund-burst submissiles which explode on impact. With the alternate loading of the spotting charge in place of the expulsion charge, the functioning of the fuze detonates the entire projectile over the target permitting observation of the projectile fuze functioning in relation to the target.

Tabulated Data:

Projectile:

Type	HE
Weight	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.lD
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 Explosive
DOT marking ---- 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

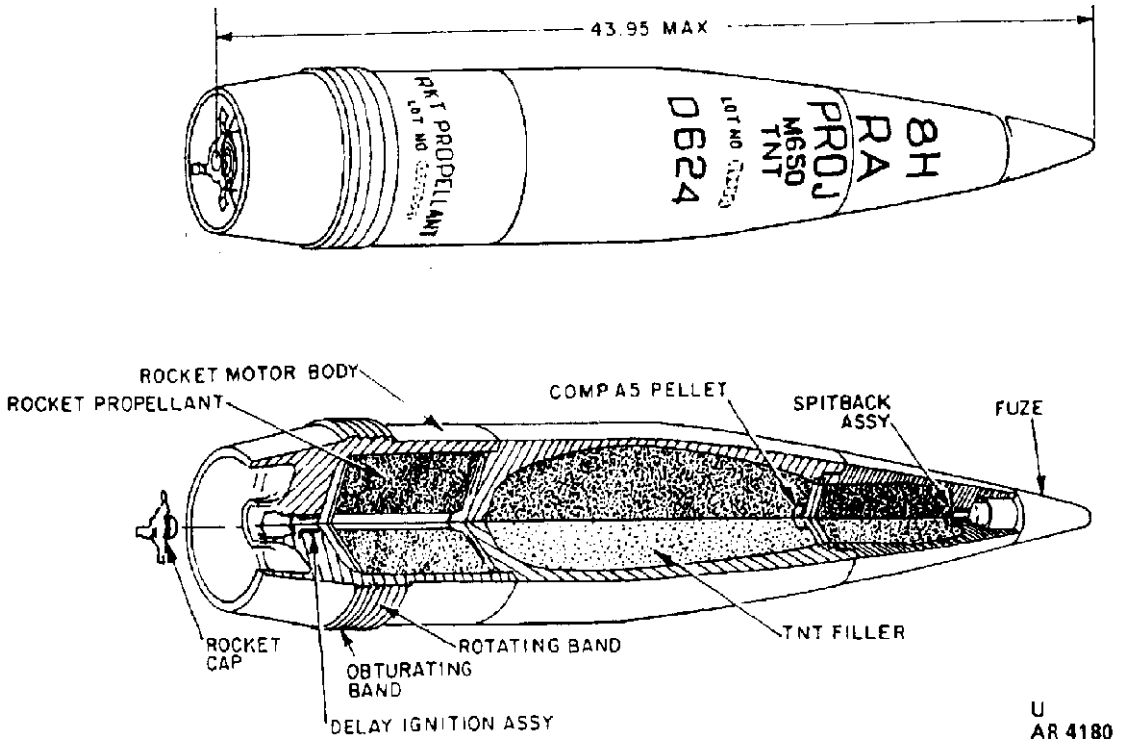
Limitations:

None.

References:

DOD Consolidated Ammunition Catalog, Ammo-l-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.

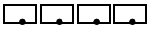
Functioning:

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 though 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 Pounds	Up to & Incl Pounds	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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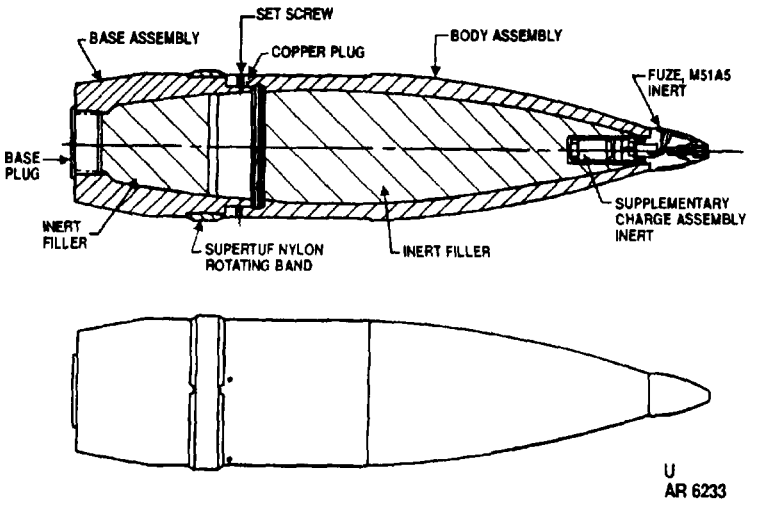
PROJECTILE, 8-INCH: DUMMY, M845



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, M11OA2 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 boattail 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 supplemen-tary charge and a lifting plug. The basesection is fitted with a replaceable plastic rotating band at its forward end and a threaded cutout 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 Extracter 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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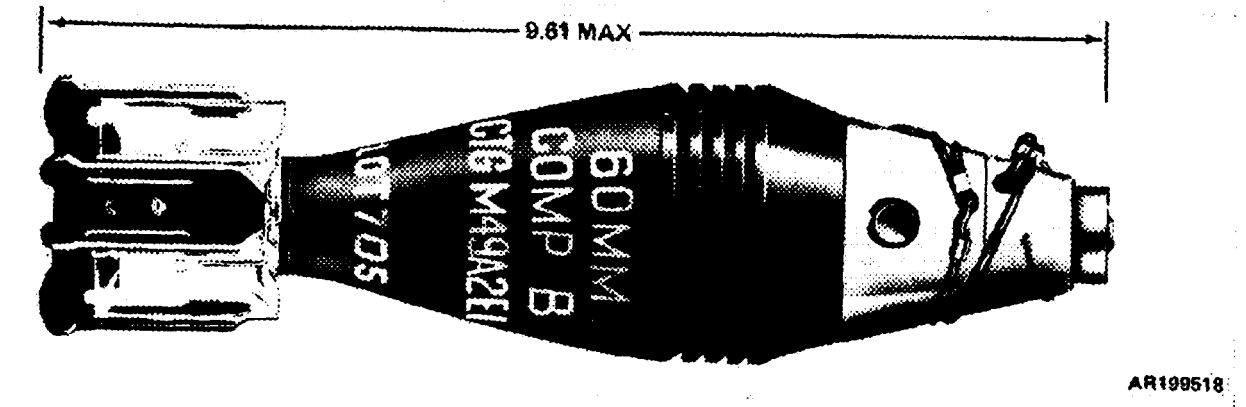
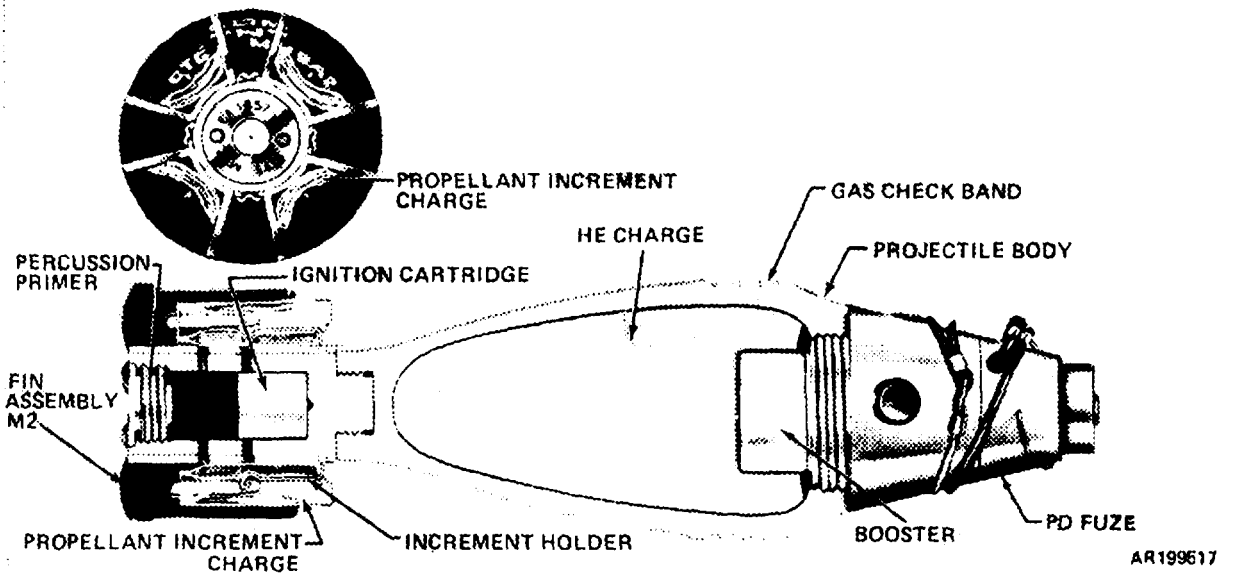
CARTRIDGE, 60 MILLIMETER: HE, M49A3 (M49A2E1) AND M49A2





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 ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
- DODAC ---------- 1310-B632
- Drawing number ---------- 9207925

Ballistics:

Charge	Muzzle Velocity (fps)	Maximun Range (yd)	Maximun Range (m)
0*	189	332	303
1	292	784	716
2	377	1204	1101
3	449	1594	1458
4	518	1978	1809

*Charge O 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.

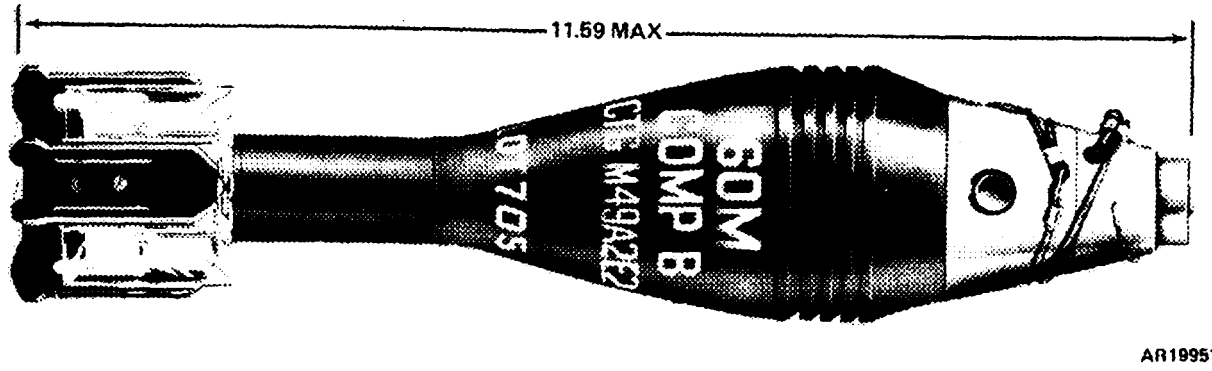
Limitations:

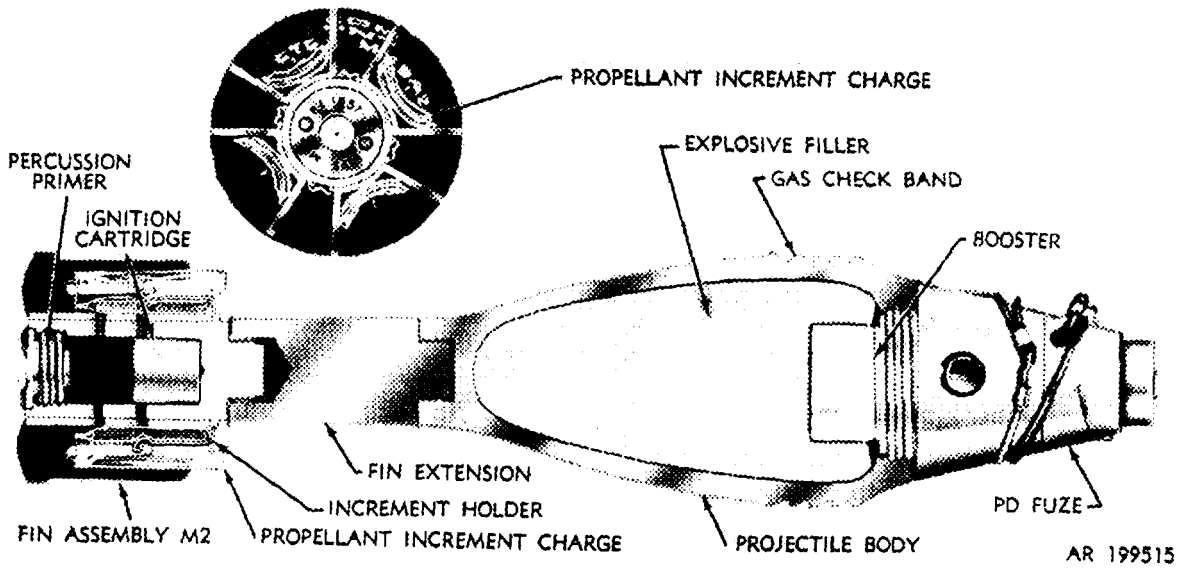
Although this cartridge is safe for firing at standard temperatures, excessive pressure may develop at Charge 4 below 0°F. Maximum allowable rate of fire: 30 rounds-per-minute for periods not exceeding one minute; 18 rounds-per-minute for periods not exceeding 4 minutes; 8 rounds-per-minute indefinitely.

References:

FM 23-90
TM 9-3071-1
TM 9-1015-215-10

CARTRIDGE, 60 MILLIMETER: HE, M49A4 (M49A2E2)





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 assemby ---------- M2 plus extension
- Faze ---------- 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; l2 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)	Maximum Range (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.

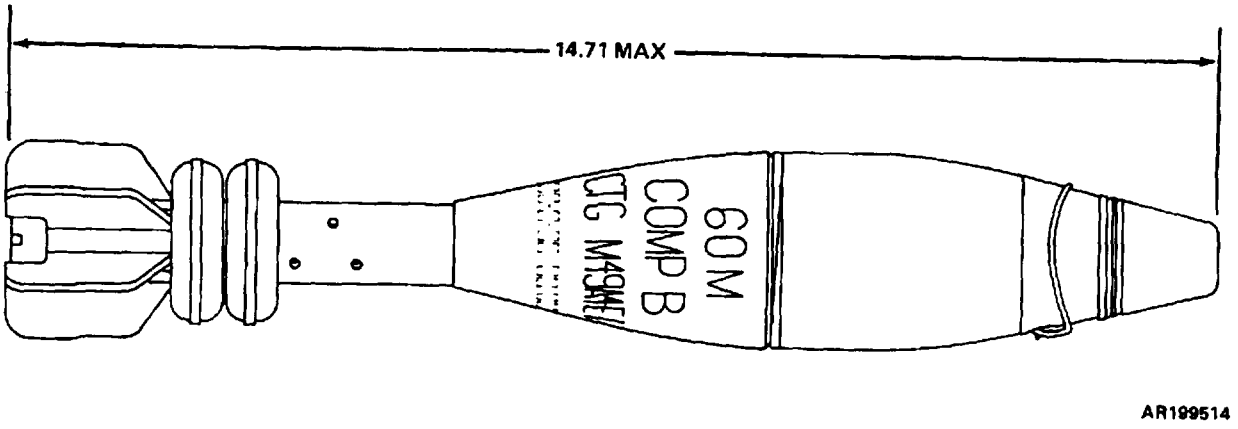
Limitations:

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.

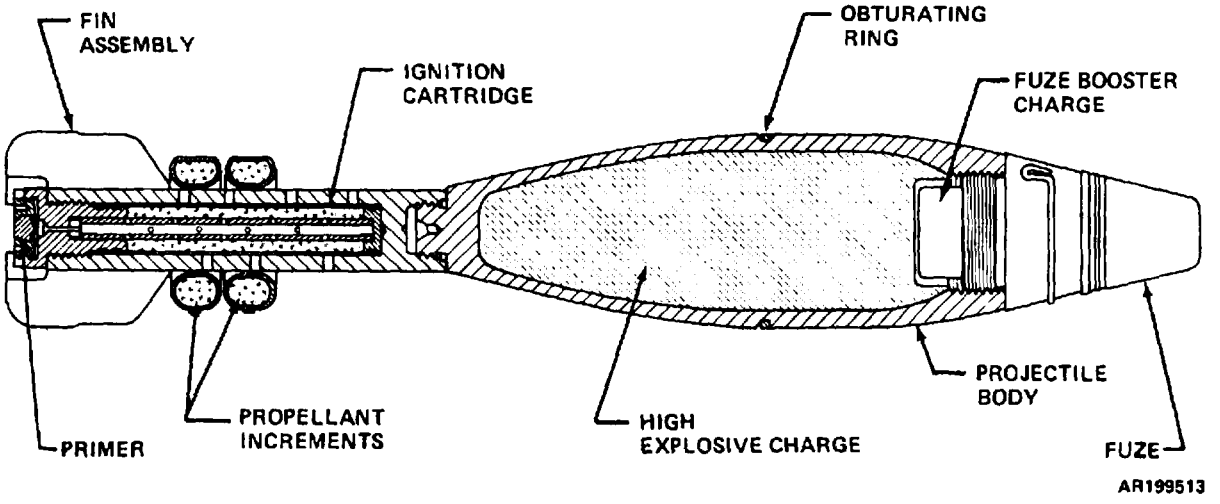
References:

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 container; 8 containers 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 Catolog for complete packing data including NSN's.

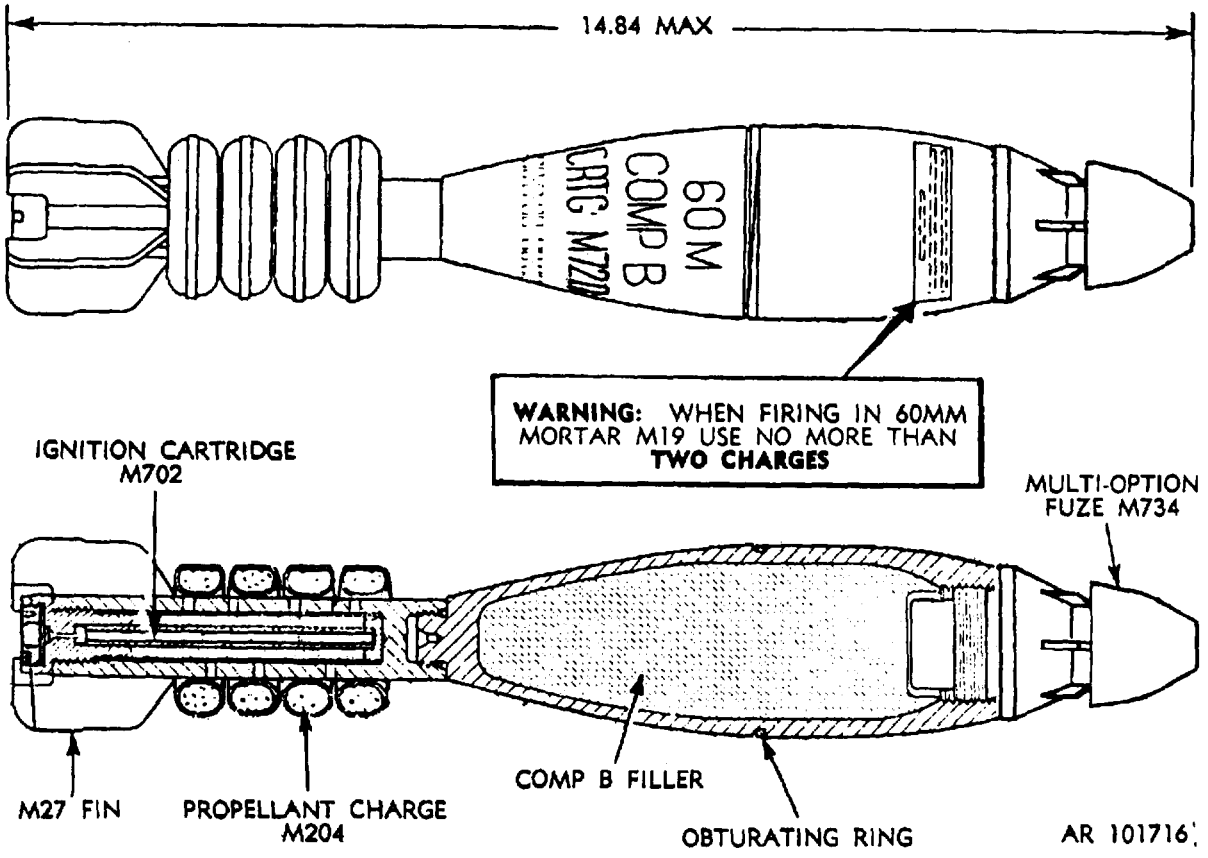
Shipping and Storage Data:

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-
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 ---------- Comp B 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 4hr/day) (+71.1°C)

*Packing ---------- 1 round in fiber container; 8 fiber containers in metal container; 2 metal containers in wirebound box

*Packing Box:
- Weight ---------- 112 lb
- Dimensions ---------- 14-15/16 x 13-3/16 x 17-3/4 in.
- Cube ---------- 2.1 cu ft

*NOTE: See 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:

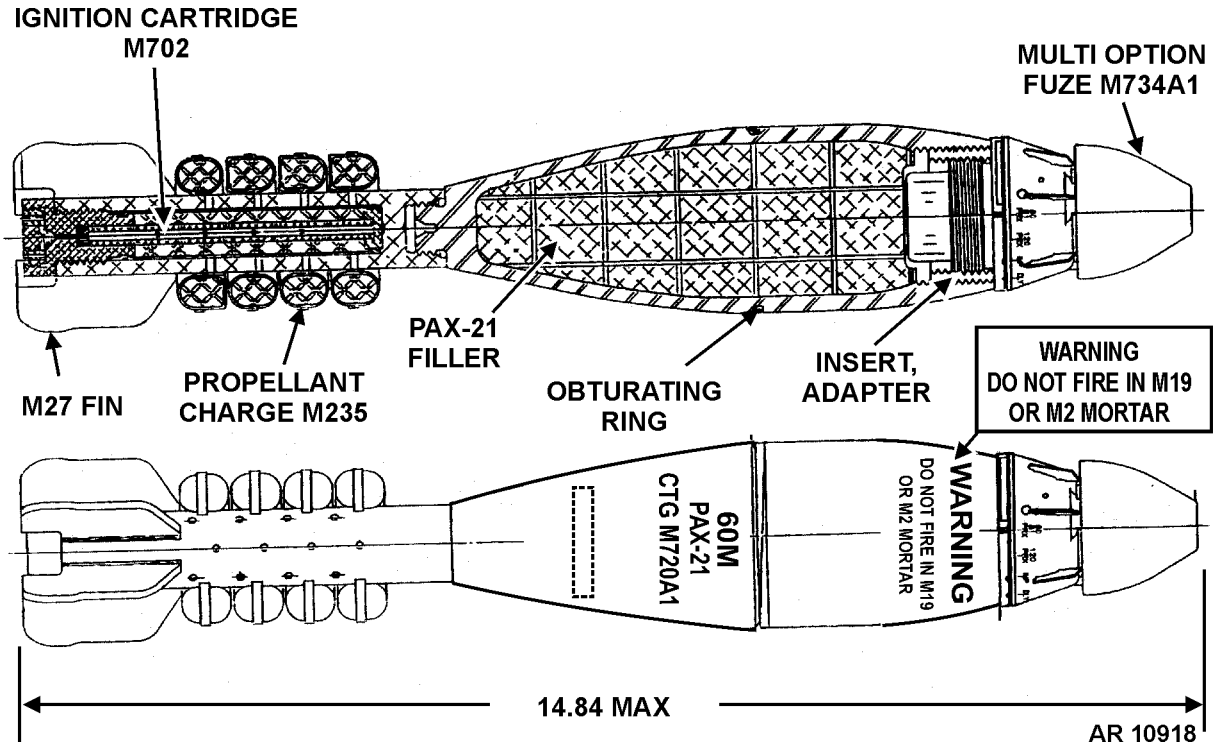
Do not tire the M720 cartridge in the M19 mortar above propellant charge 2.

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

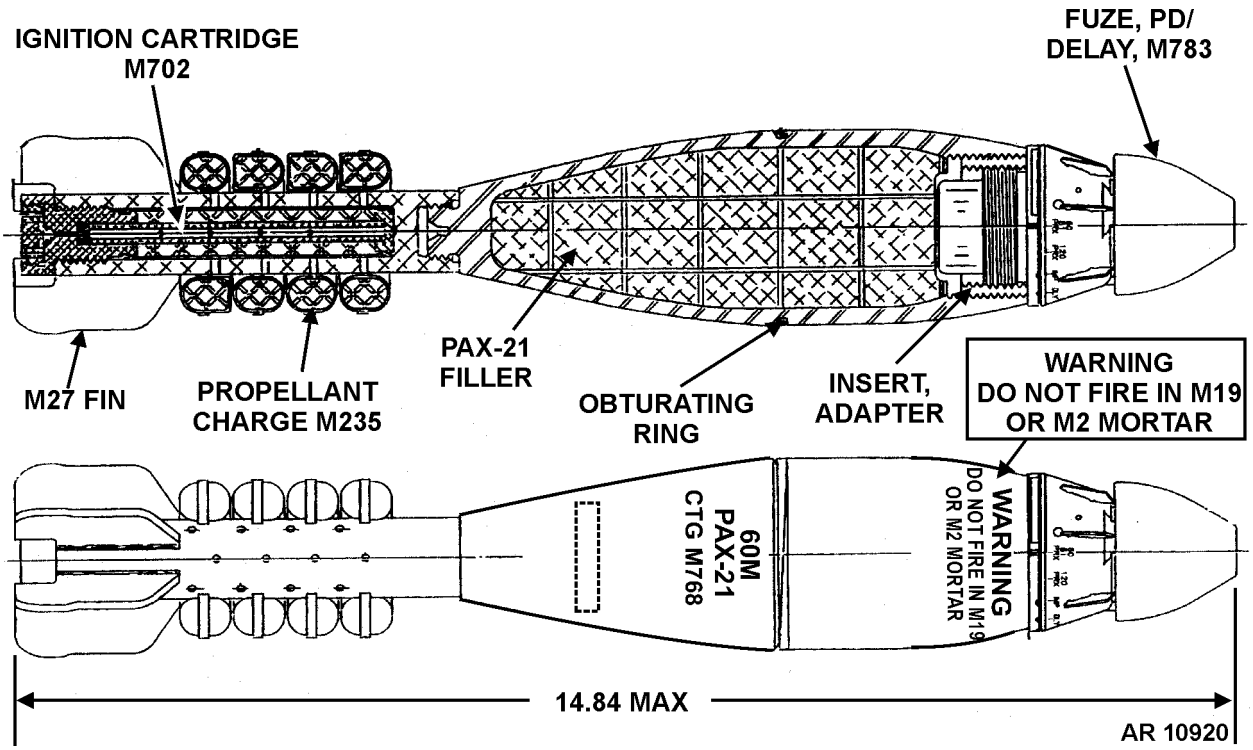
LIMITATIONS:

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

UNIT OF ISSUE:

Packing	1 cartridge per fiber container; 8 containers per metal box; 2 metal boxes per wirebound box

*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

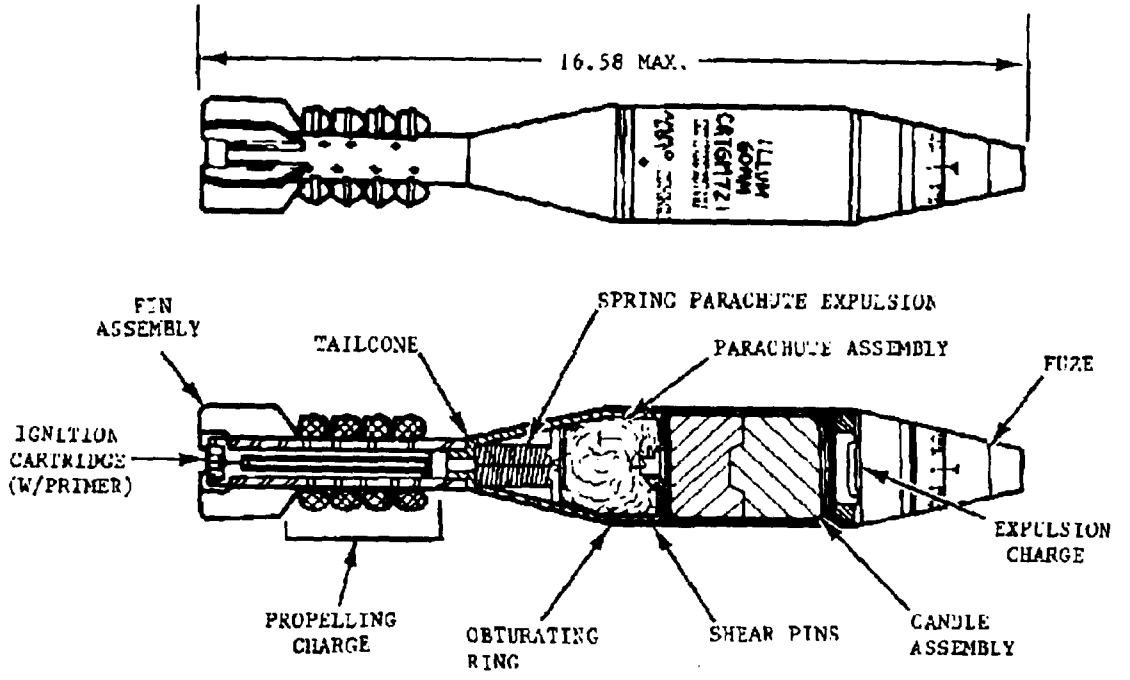
LIMITATIONS:

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 laminating a desired point or area.

Description:

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

Functioning:

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

Tabulated Data:

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

Temperature Limits:

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

Shipping and Storage Data:

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

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

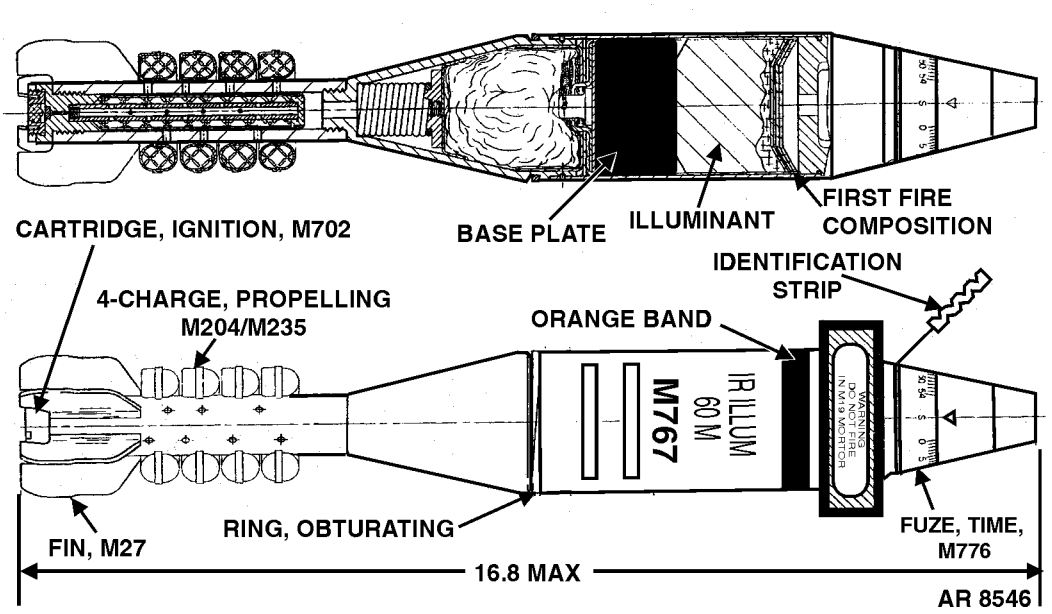
Limitations:

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

References:

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

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 candlepower/sec max.

Components:	
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 ILLUMINATING PROJECTILES
*Packing	1 cartridge per fiber container; 8 containers per metal box; 2 metal boxes per wirebound box.
*Packing Box:	
Weight	112 lb (50.80 kg)
Dimensions	14-15/16 x 13-3/16 x 20 in. (37.94 x 33.50 x 50.8 cm)
Cube	2.3 cu ft (0.07cu m)
DODAC	1310-BA04

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

Limitations:

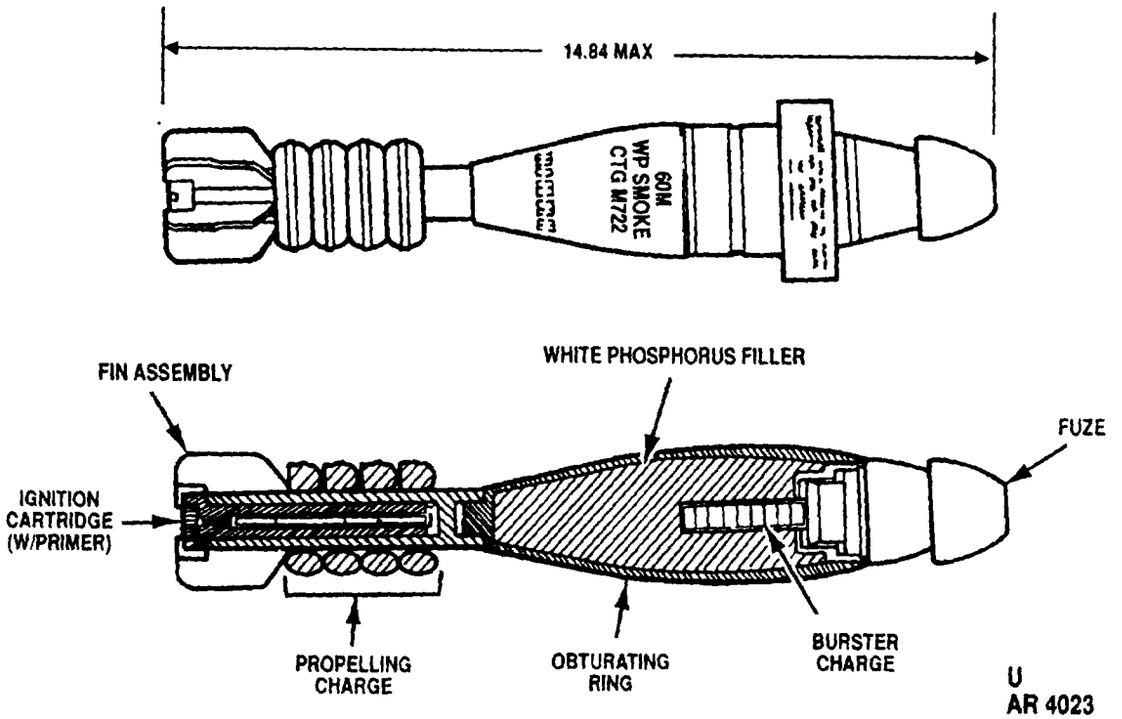
The M767 cartridge shall not be fired in the M2 or M19 mortar.

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

Shipping and Storage Data:

UNO serial number	0246
DOD hazard class	1.3
Storage compatibility group	H
DOT shipping class	B
DOT designation	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
*Packing	1 cartridge per fiber container; 8 containers per metal box; 2 metal boxes per wirebound box
*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:

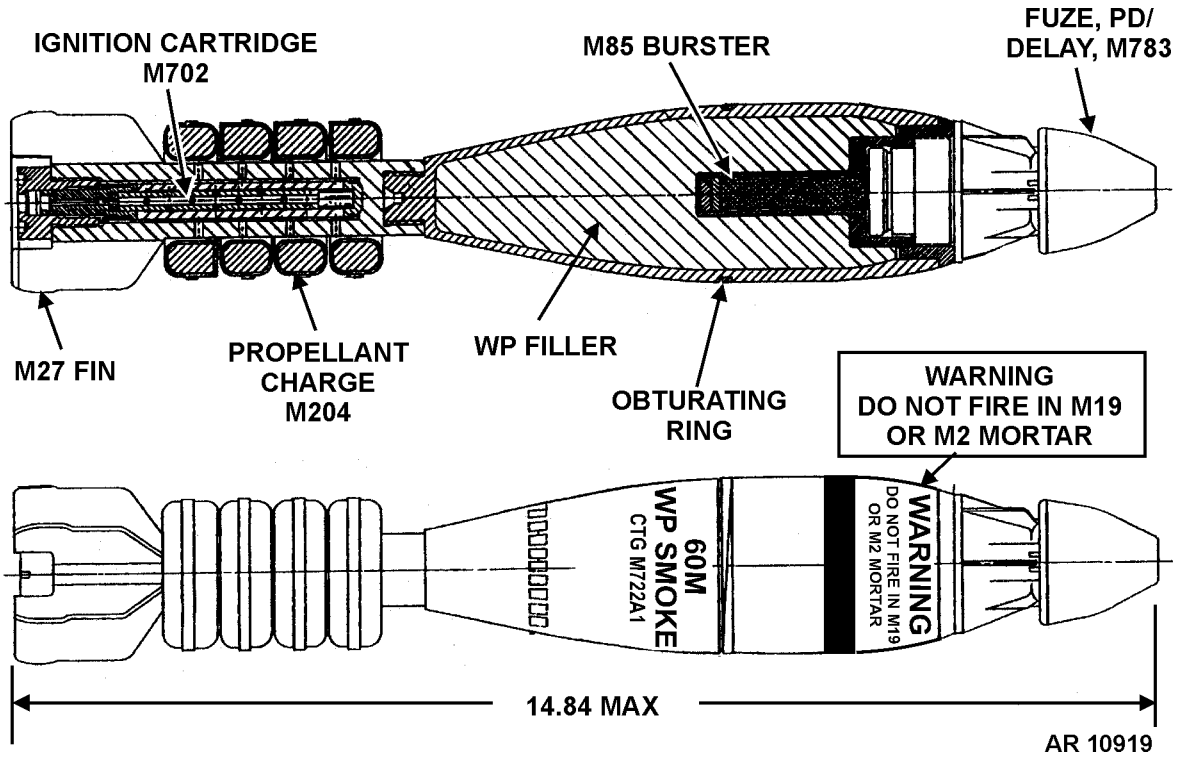
The M722 cartridge cannot be fired above Charge 2 in the M19 mortar.

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 wirebound 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:

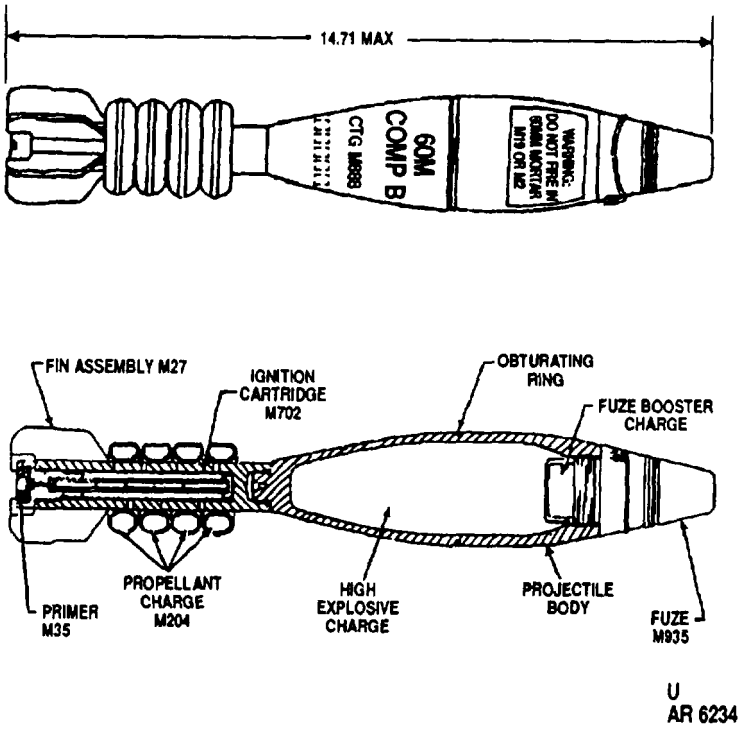
The M722A1 cartridge cannot be fired in the M2 or the M19 mortar.

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 propelant 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	1 round in fiber container; 8 fiber containers in metal box; 2 metal boxes in wirebound box
*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	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1310-B643
Drawing number	9354430

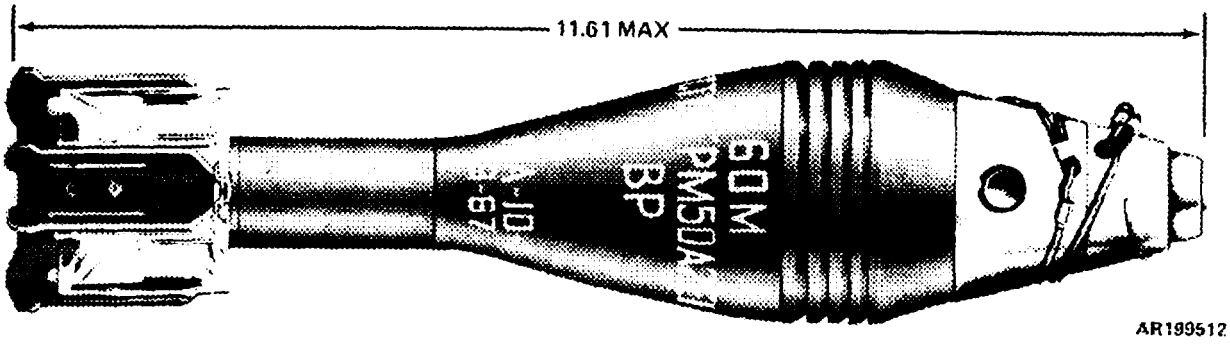
Limitations:

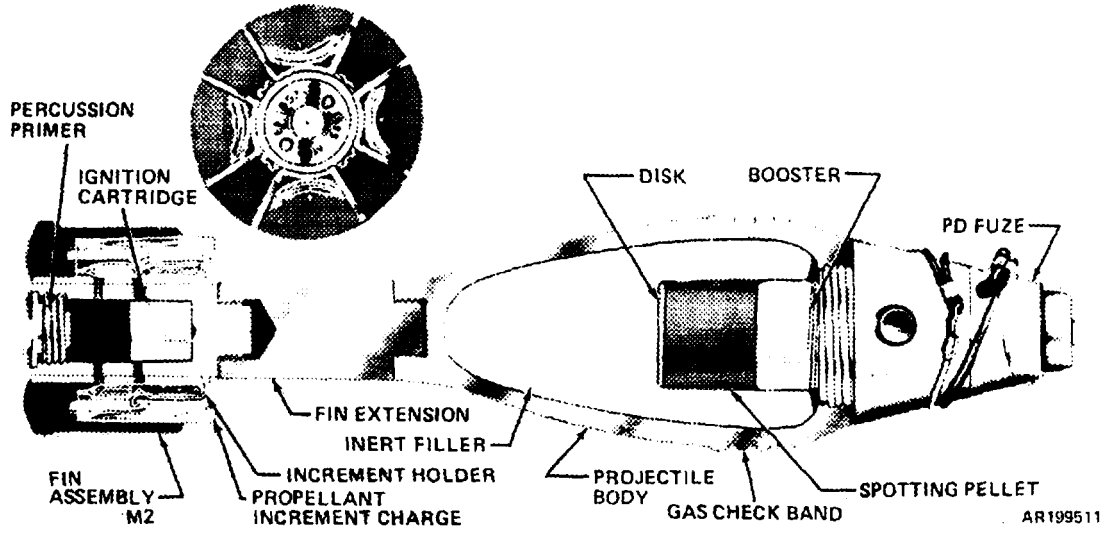
When firing in 60mm mortar M19 or M2 use no more than two (2) charges.

References:

FM 23-90
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 plaster filler to simulate the weight and ballistic characteristics of a high explosive cartridge. A pellet of black powder for a spotting charge is loaded in a cavity just below the booster casing of the fuze.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The flash from the primer ignites the ignition cartridge, and the cartridge ignites the propellant charge. Rapidly expanding gases from the burning propellant expel the projectile from the mortar tube and propel it to the target. The projectile is 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
Finassemby	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	1 round in fiber container; 10 containers in wooden box
*Packing Box:	
Weight	49.0 lb
Dimensions	17-9/16 x 12-1/8 x 8-7/32 in.
Cube	1.3 cu ft

*NOTE: See 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 WITHEXPLOSIVE PROJECTILES
DODAC	1310-B634
Drawing number	9220383

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (yd)	Maximum Range (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.

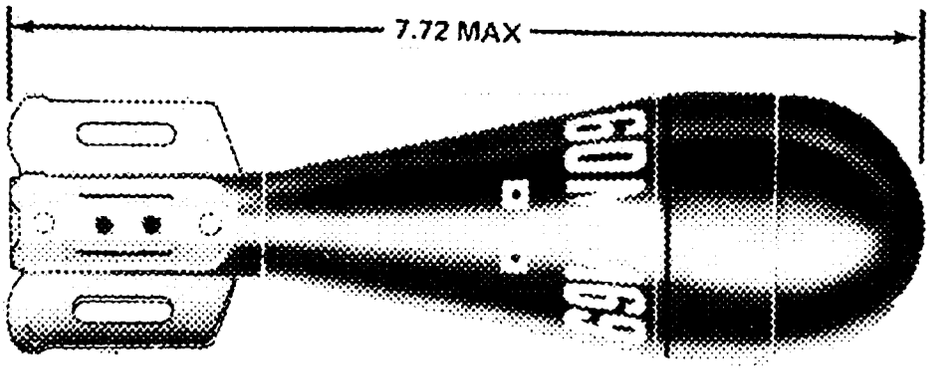
Limitations:

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.

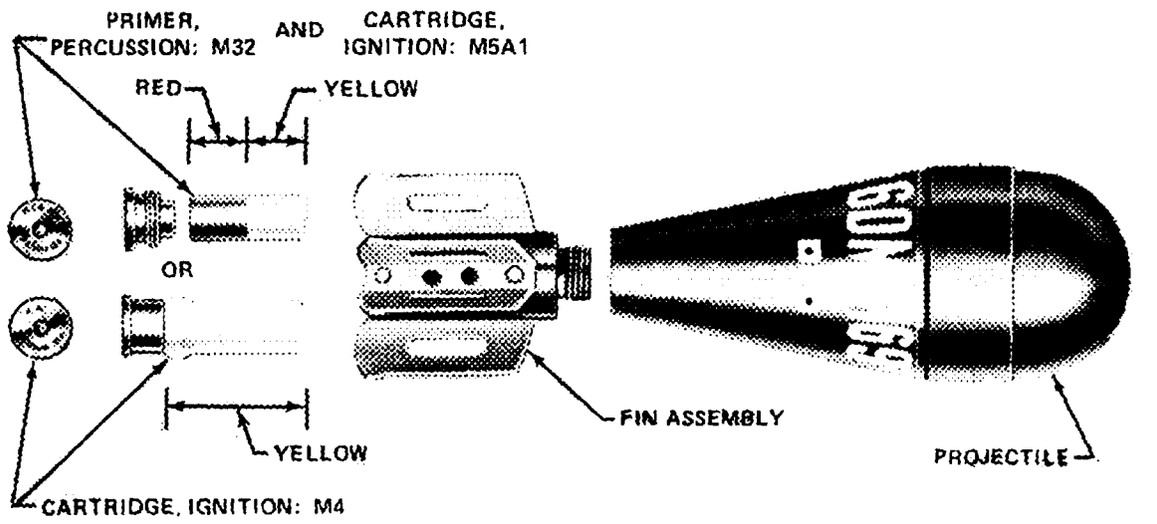
References:

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:	
Old mfg	Black or blue w/white markings
New mfg	Bronze w/white markings
Filler and weight	Inert
Components:	
Ignition cartridge	M5A1 or M4 (complete)
Propellant charge	None
Percussion primer	M32
Fin assembly	M5 (or modified M2)
Fuze	None

Temperature Limits:

Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (+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 cartridges and accessories

*Packing Box:	
Weight	65 lb
Dimensions	21-7/16 x 18-5/16 x 7-27/32 in.
Cube	1.4 cu ft

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

Shipping and Storage Data:

Quantity-distance class	N/A
Storage compatibility group	N/A
DOT shipping class	N/A
DOT designation	AMMUNITION FOR CANNON WITH INERT PROJECTILES
DODAC	1310-B629
Drawing number	9222994

Ballistics:

Charge	0
Muzzle velocity	46.4 mps (152.24 fps)
Maximum range	193 m (211.14 yd)

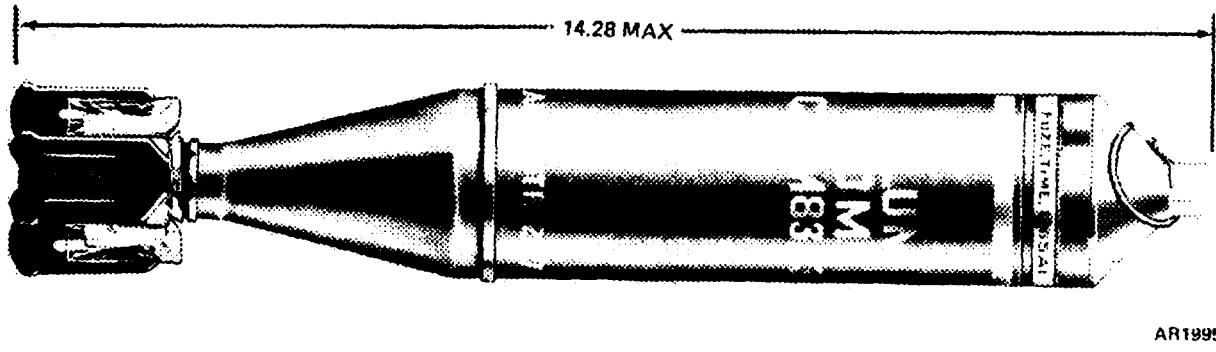
Limitations:

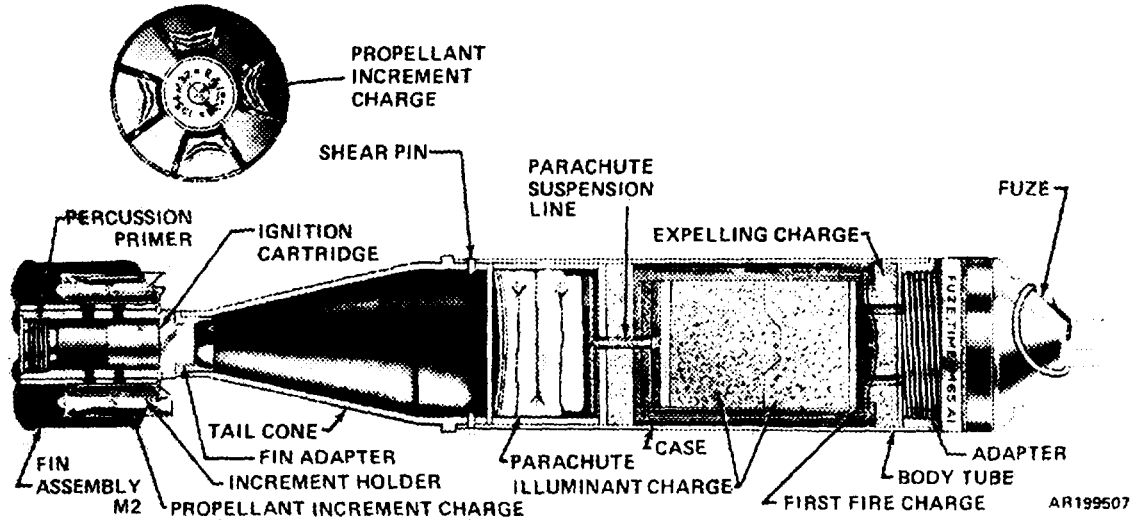
This round is to be fired at Charge 0 only.

Reference:

TM 9-3071-1
TM 9-1015-215-10

CARTRIDGE, 60 MILLIMETER: ILLUMINATING, M83A3, M83A2, AND M83A1





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)	Horizontal Range (m)	Height of Burst (yd)	Height of Burst (m)	Elevation (deg/min)
2*	312	475	434	170	155	68/00
2	312	500	457	157	144	66/45
2	312	525	480	145	133	65/30
3	374	875	800	152	139	51/45
4	434	1100	1006	175	160	45/15

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

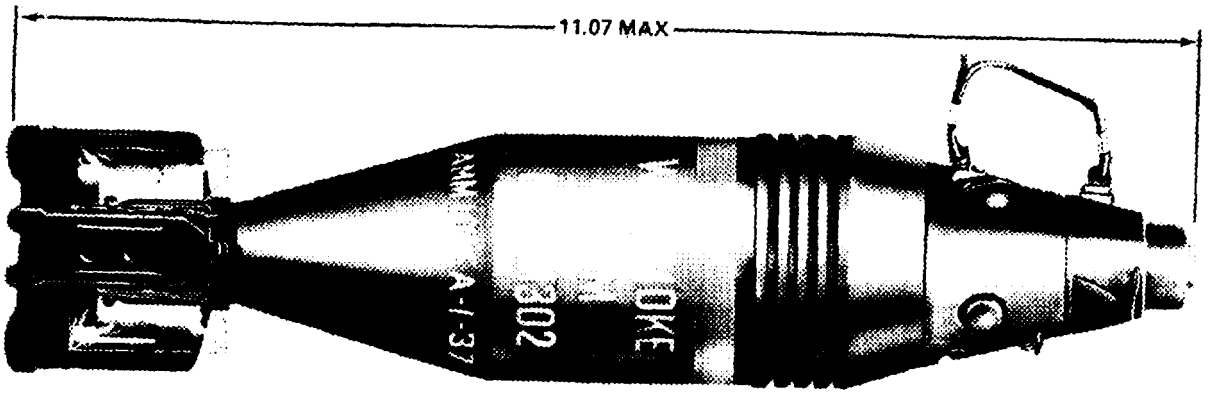
Limitations:

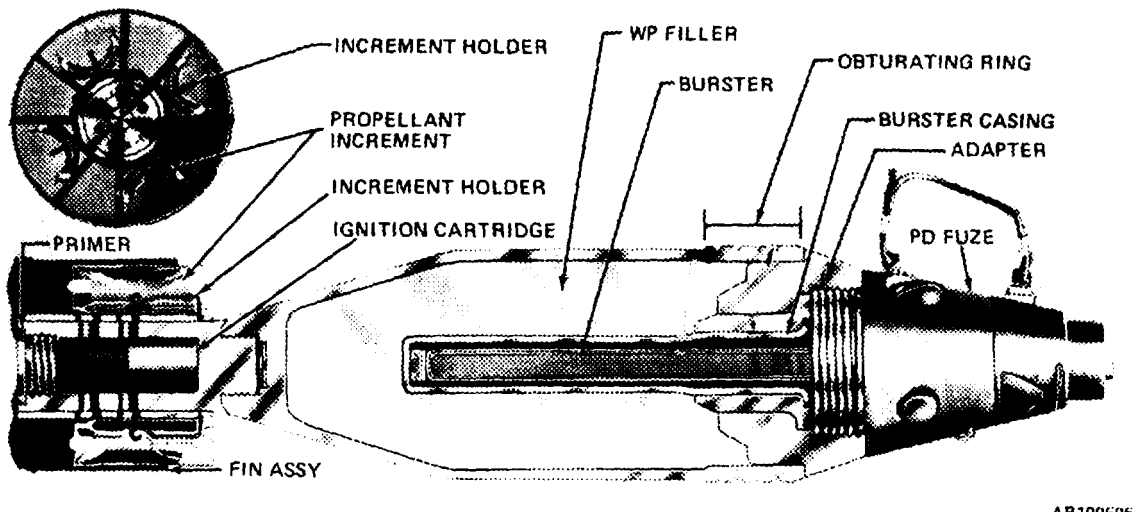
Firing this cartridge below Charge 2 will result in duds.

References:

AMC-P 700-3-3
TM 9-1015-215-10
TM 9-3071-1

CARTRIDGE, 60 MILLIMETER: SMOKE, WP, M302





Type Classification:

C&T OTCM 37119, dtd 1959.

Use:

This smoke cartridge is fired in 60mm mortars M2 or M19 and is used for screening and spotting.

Description:

The complete round consists of a projectile with a 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 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 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)	Maximum Range (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:

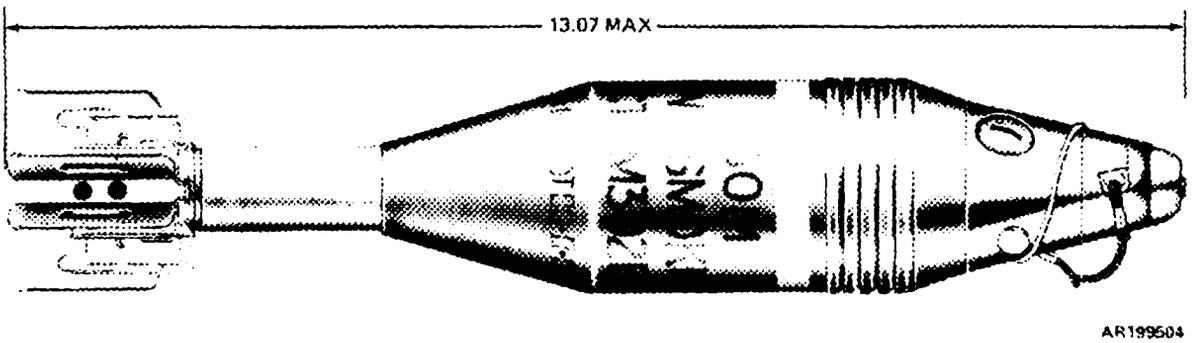
Excessive short rounds may occur when this round is fired at temperatures below 0°F.

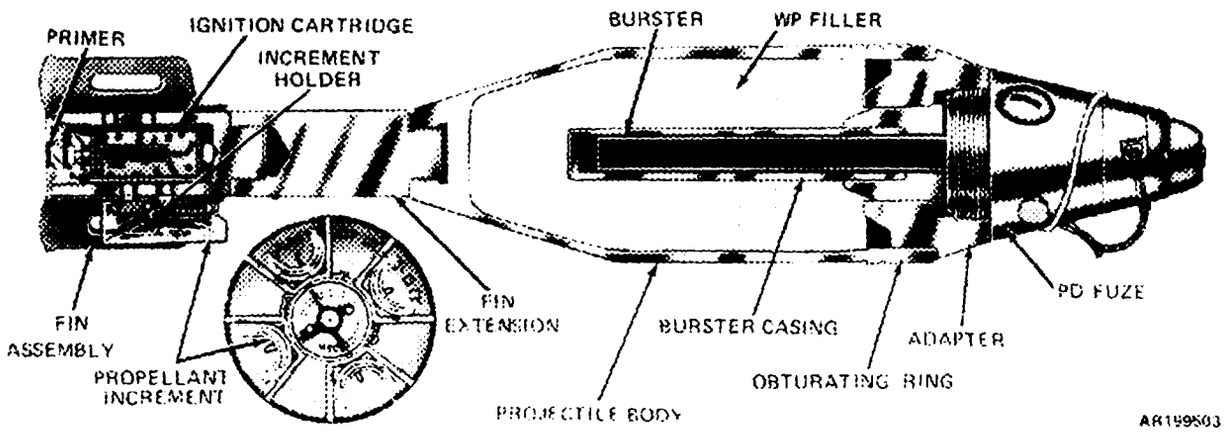
Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

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





Type Classification:

C&T OTCM 37119, dtd 1959.

Use:

This smoke cartridge is fired in 60mm mortars M2 or M19 and is used for screening and spotting.

Description

The complete round consists of a projectile body with a PD fuze, a fin assembly and a 2-inch extension, four increments of propellant charge, an ignition cartridge, and a percussion primer. The projectile body is a relatively thin-walled steel cylinder with a conical base, and is filled with a charge of white phosphorous. The base is internally threaded to accept the fin assembly. The projectile nose is fitted with a steel adapter, internally threaded to accept the fuze, and designed to hold the sleeve of the 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 container; 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 ---------- AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC ---------- 1310-B630
Drawing number ---------- 9215575

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (yd)	(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:

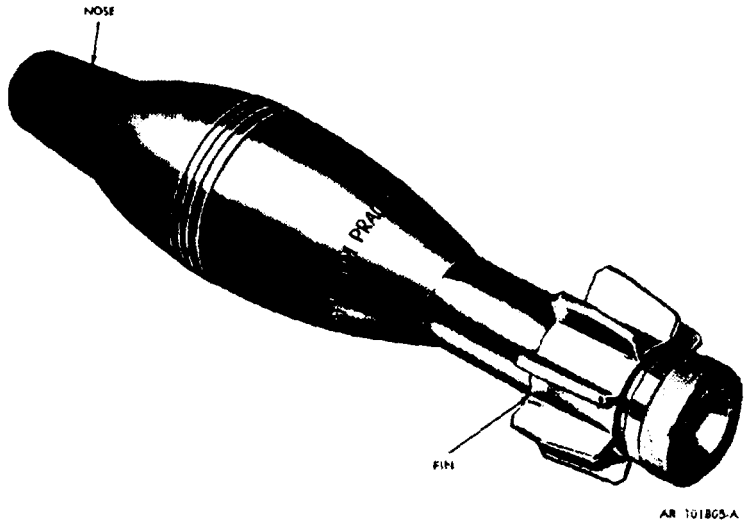
Excessive short rounds may occur when this round is fired at temperatures below 0°F. Maximum allowable rate of fire: 30 rounds-per minute for periods not exceeding 1 minute; 18 rounds-per-minute for periods not exceeding 4 minutes; 8 rounds-per-minute indefinitely.

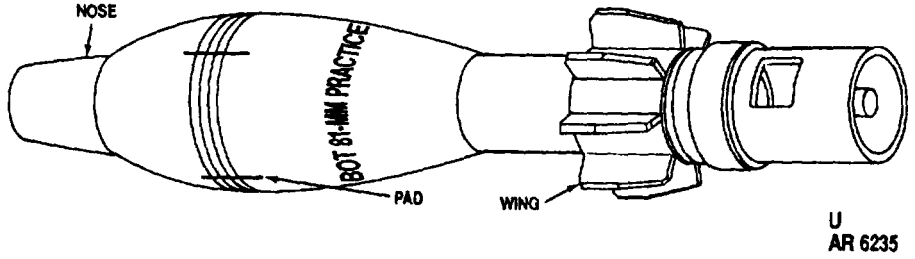
Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space in normal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

References:

AMC-P 700-3-3
TM 9-1015-215-10
TM 9-3071-1
SB 700-20

CARTRIDGE, 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)

Shipping & Storage Data:

UNO serial number	0015
Quantity-distance class	(04) 1.2
Storage compatibility group	G
Dot shipping class	C
Dot designation	PRACTICE AMMUNITION 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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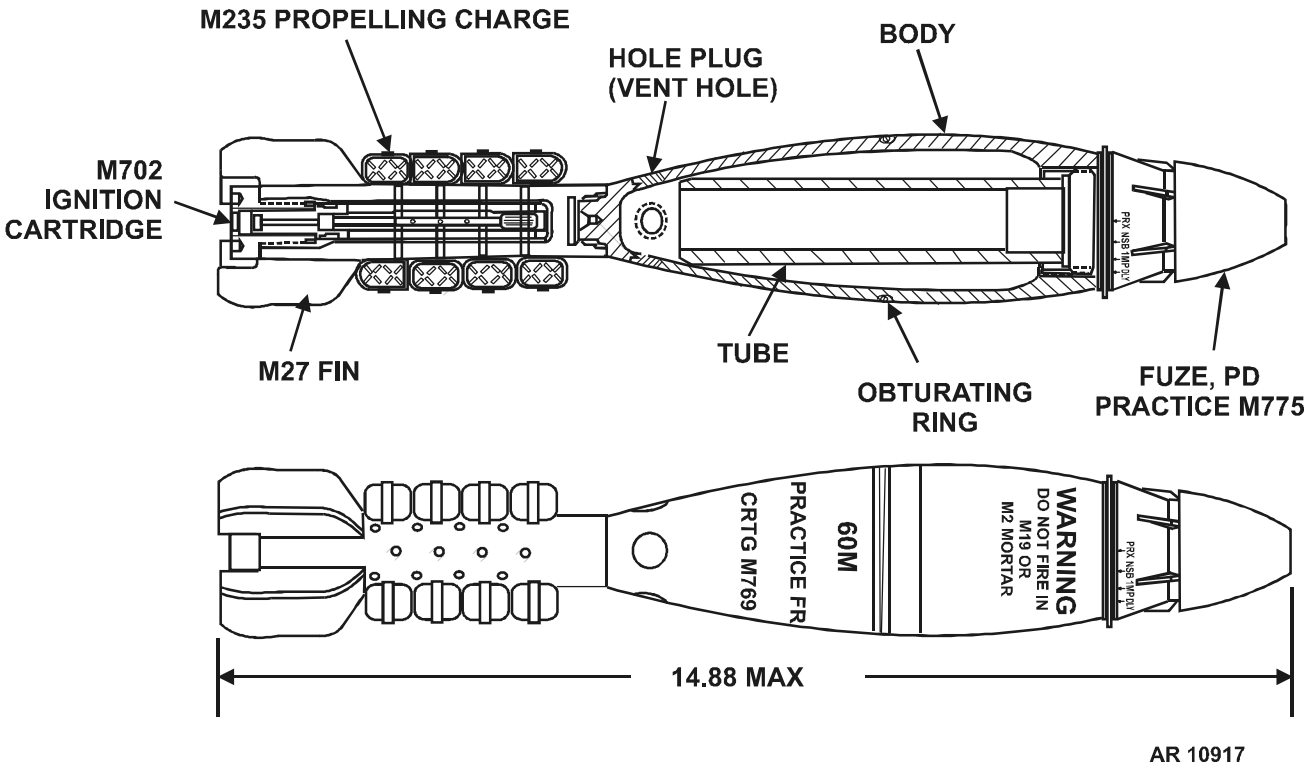
CARTRIDGE, 60MM: FULL RANGE PRACTICE, M769



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

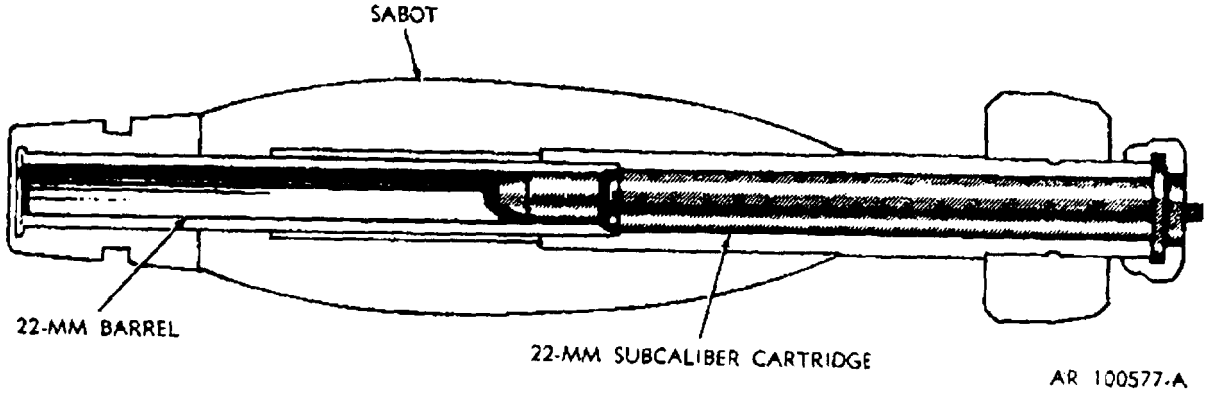
LIMITATIONS:

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 respectvely) 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 1oaded 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 tins (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 saaembly. 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 polystyrene compartment; 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 AMMUNITION EXPLOSIVE 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:

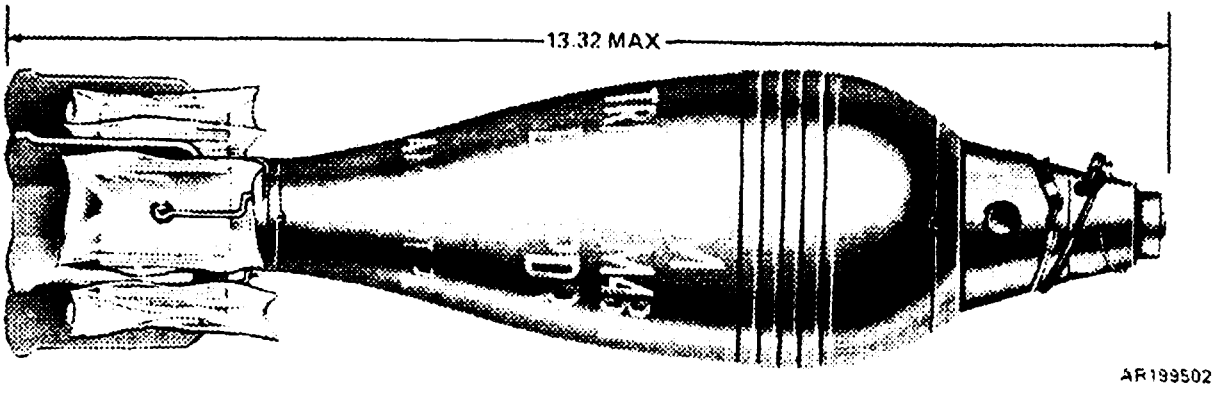
Muzzle velocity:
- Charge 1 ---------- 148 ft/sec (45 m/sec)
- Charge 2 ---------- 164 ft/sec (50 m/sec)
- Charge 3 ---------- 197 ft/sec (60 m/sec)
- Charge 4 ---------- 230 ft/sec (70 m/sec)

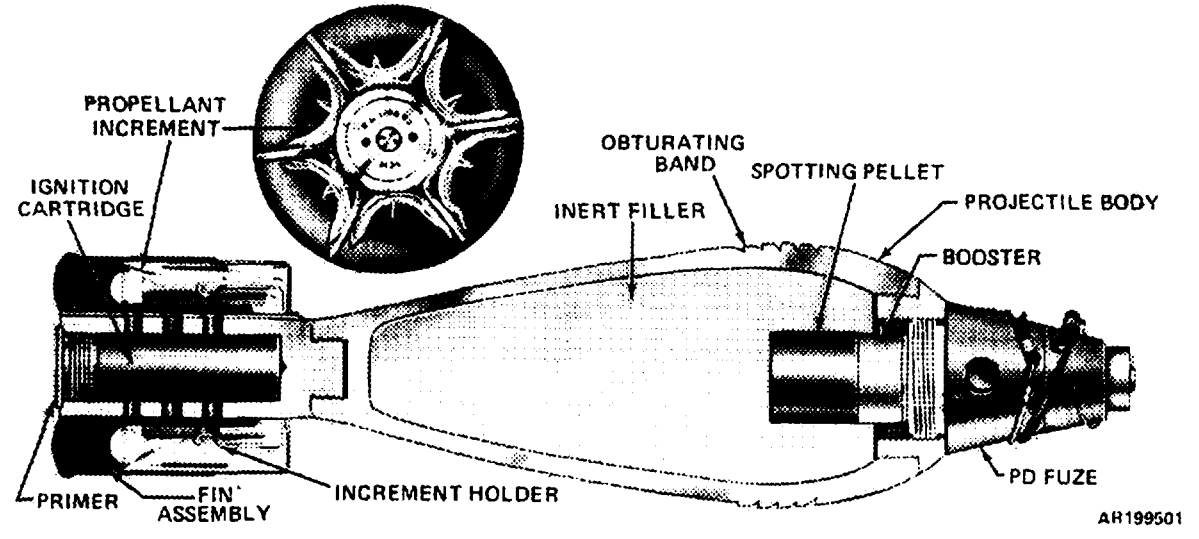
Maximum effective range:
- Charge 1 ---------- 639 ft (195 m)
- Charge 2 ---------- 770 ft (235 m)
- Charge 3 ---------- 1082 ft (330 m)
- Charge 4 ---------- 1427 ft (435 m)

References:

TM 9-1300-251-20
TM 9-1315-249-12&P

CARTRIDGE, 81 MILLIMETER: TARGET PRACTICE, M43A1





Type Classification:

C&T AMCTC 6267 dtd 1968.

Use:

This cartridge is used for target practice and contains a spotting charge for observation.

Description:

The complete round consists of a projectile body, a PD fuze, a fin assembly, a propellant charge, an ignition cartridge, and a percussion primer. The projectile body is of forged steel, and is threaded internally at the nose to accept the fuze and at the base to accept the fin assembly. The body is loaded with an inert plaster filler to simulate the weight and ballistic characteristics of a high explosive cartridge. A pellet containing a spotting charge of black powder is loaded in a cavity just below the booster charge of the fuze.

Functioning:

When the cartridge is loaded, it slides down the mortar 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:

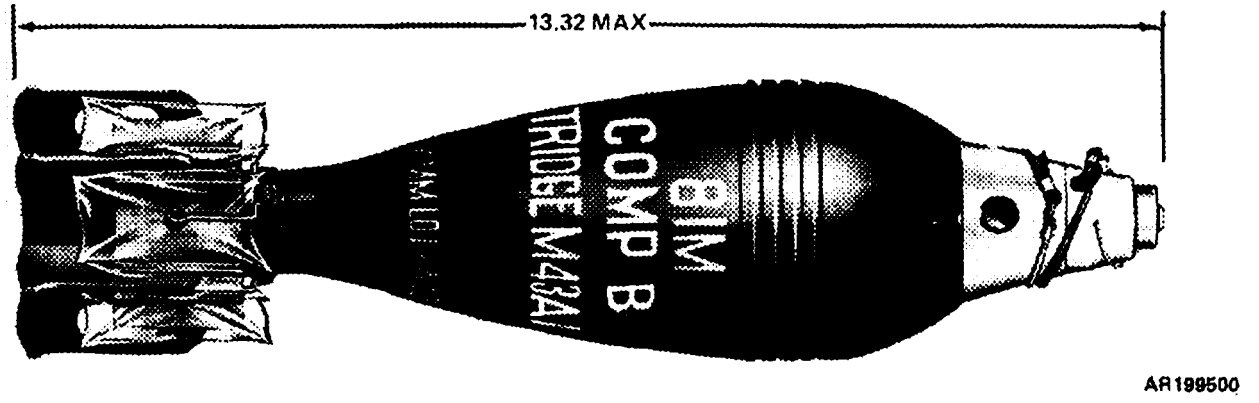
Charge	Muzzle Velocity (fps)	Maximum Range (m)	Maximum Range (yd)
**0	238	517	565
1	351	1024	1111
2	443	1511	1649
3	519	1947	2120
4	590	2349	2560
5	656	2700	2950
6	719	3016	3290
7	779	3292	3590
8	834	3701	4050

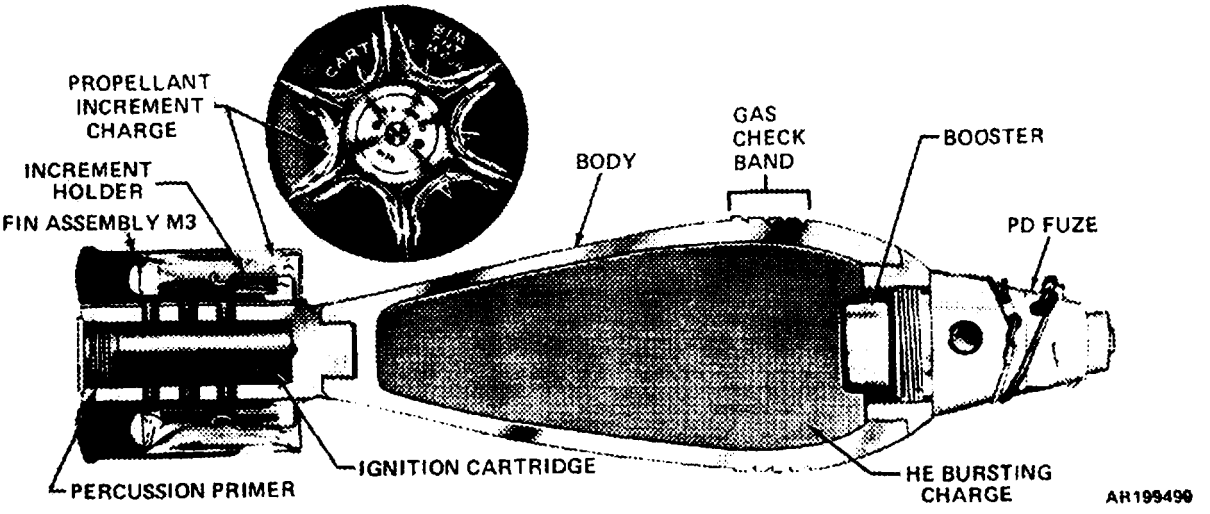
**Charge 0 is the $_{\text{ignition}}$ cartridge only; Charge 1 is the ignition cartridge andone increment charge; Charge 8 is the ignition cartridge and eight increment charges.

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





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 tin 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:
- HE
- Weight ---------- 07.5 lb
- Length ---------- 13.32 in.
- Cannon used with ---------- M1, M9, M29A1

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 ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ---------- 1315-C225
Drawing number ---------- 9218433

Ballistics:

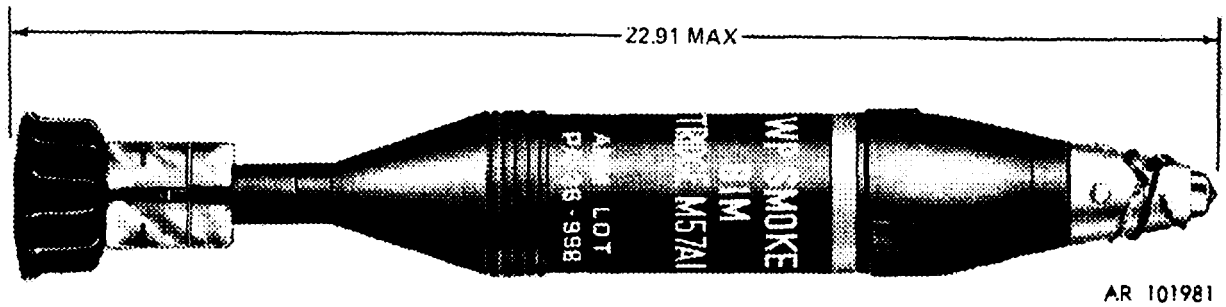
Charge	Muzzle Velocity (fps)	Maximum Range (m)	(yd)
** 0	238	517	565
1	351	1029	1111
2	443	1511	1649
3	519	1947	2120
4	590	2349	2560
5	656	2700	2950
6	719	3016	3290
7	779	3292	3590
8	834	3701	4050

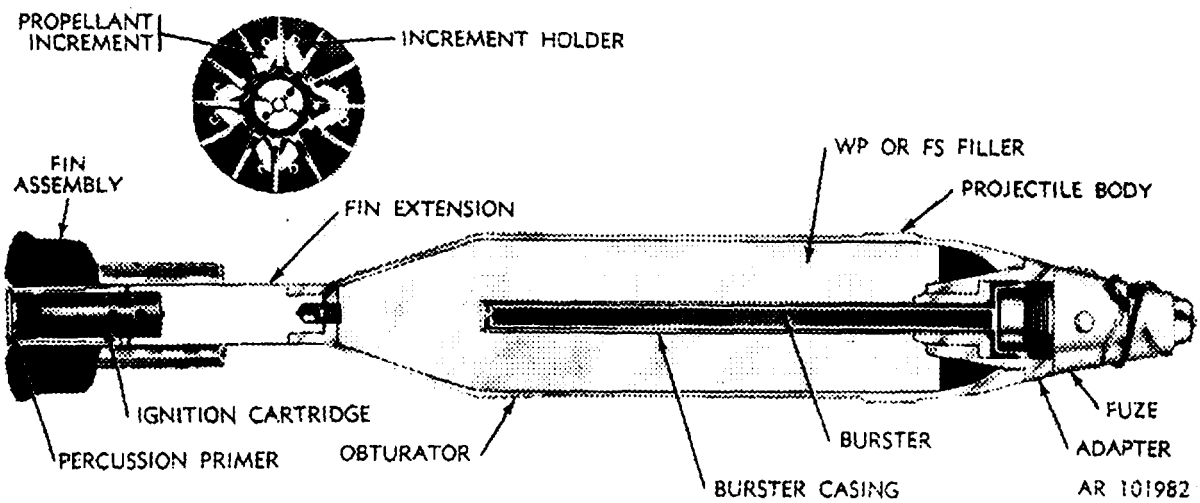
**Charge 0 is the ignition cartridge only; Charge 1 is the ignition cartridge and one increment charge; Charge 8 is the ignition cartridge and eight increment charges.

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 container; 2 containers in wooden box

*Packing Box:
- Weight ---------- 43.0 lb
- Dimensions ---------- 28 x 9-11/16 x 6-15/32 in.
- Cube ---------- 1.0 cu ft

*NOTE: See 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-C230
Drawing number ---------- 75-l-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.

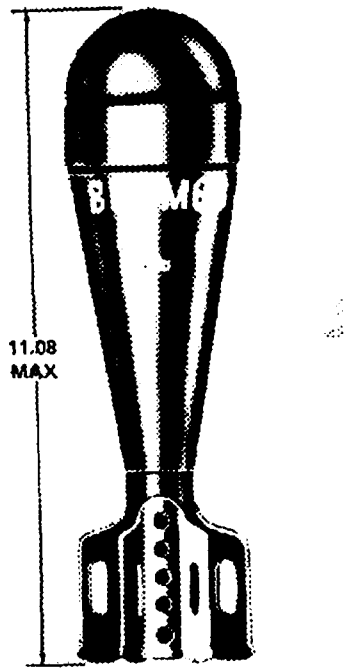
Limitations:

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



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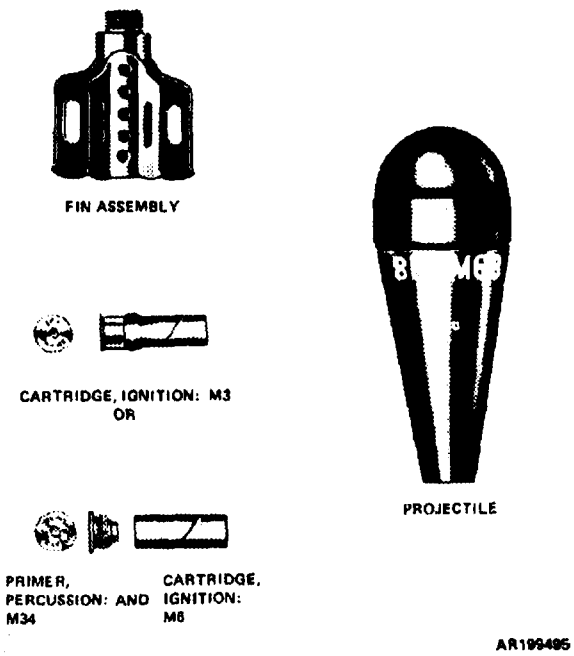


Type Classification:

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 (Later manufacture - no paint or bronze body)
Filler and weight	Inert
Components:	
Ignition cartridge	M6 or M3
Propellant charge	None
Percussion primer	M34
Fin assembly	M6
Fuze	None

Temperature Limits:

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

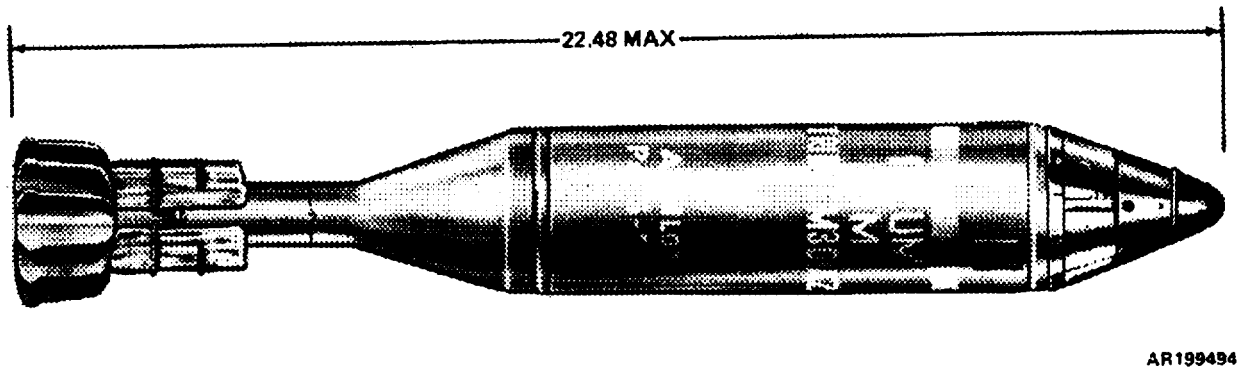
Limitations:

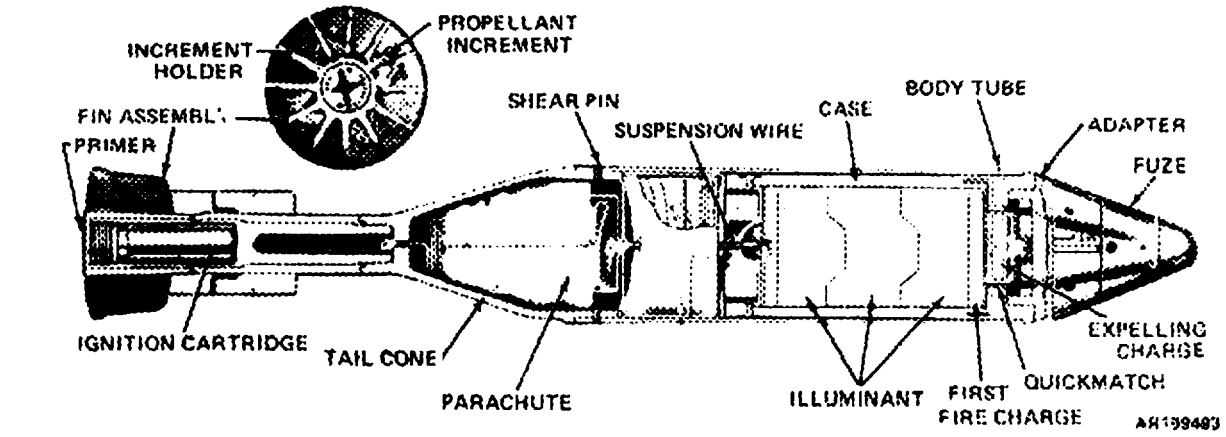
This round is to be fired at Charge 0 only.

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





Type Classification:

CONT MSR 11756003.

Use:

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

Description:

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

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer ignites the ignition cartridge, and the cartridge ignites the propellant charge. Rapidly expanding gases from the burning propellant expel the projectile from the tube and propel it to the desired height. The projectile is fin-stabilized in flight. Functioning of the time fuze detonates the expelling charge and ignites the first-fire charge by means of a length of quickmatch. The expelling charge separates the cone from the tube allowing the illuminant candle and parachute to fall free. The first-fire charge ignites the illuminant, and the parachute deploys to support the burning candle. Burning time is at least 60 seconds with a minimum of 500,000 candlepower.

Difference Between Models:

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

Tabulated Data:

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

Temperature Limits:

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

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

Shipping and Storage Data:

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

Ballistics:

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

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

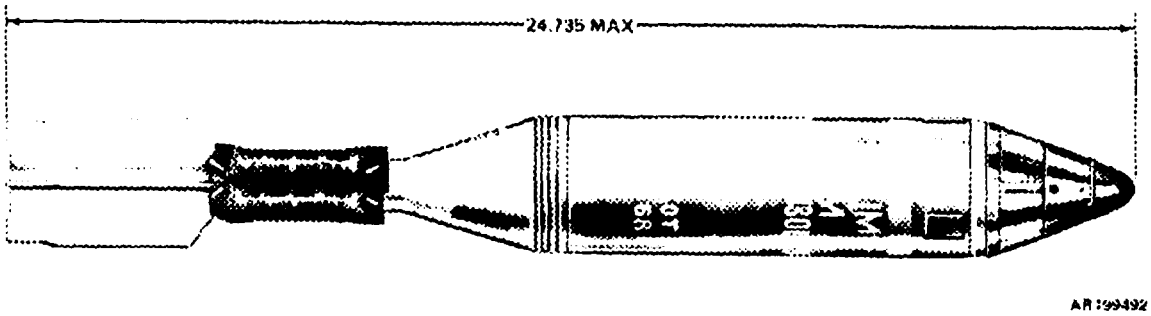
Limitations:

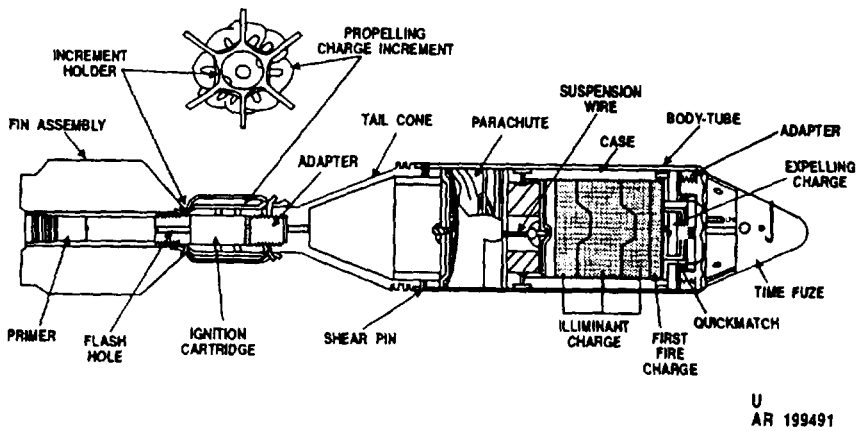
Firing with less than two propellant increment charges (Charge 2) is not authorized.

References:

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

CARTRIDGE, 81 MILLIMETER: 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 ---------- lluminating
- 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 ---------- AMMUNITIONFOR CANNON WITH ILLUMINATING PROJECTILES
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.

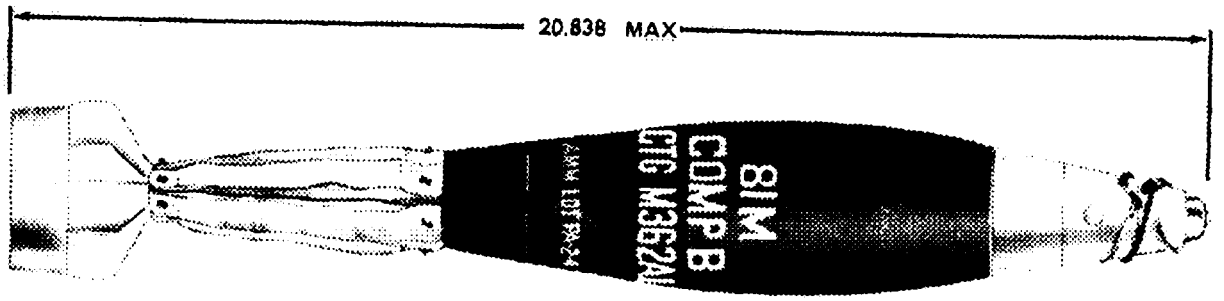
Limitations:

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



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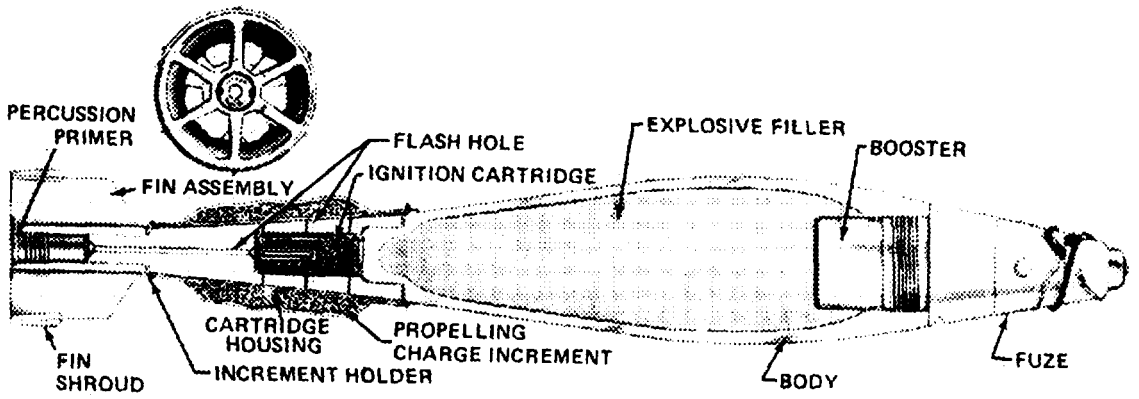


AR199489

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 ---------- M3621, 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 container three containers in wooden box

*Packing Box:
- Weight---------- 51.0 lb
- Dimensions ---------- 25-11/16 x 13-9/16 x 6-11/32 in.
- Cube ---------- l.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 ---------- 1315-C222, 1315-C223
- Drawing number ---------- M362A1, 8838144 M362, 7549034

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (m)	Maximum 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.

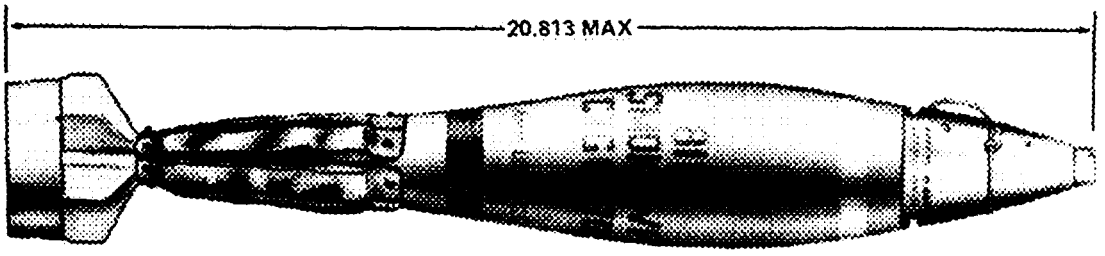
Limitations:

See above chart.

References:

TM 9-1300-251-20
TM 9-7031-1

CARTRIDGE, 81 MILLIMETER: SMOKE, WP, M370



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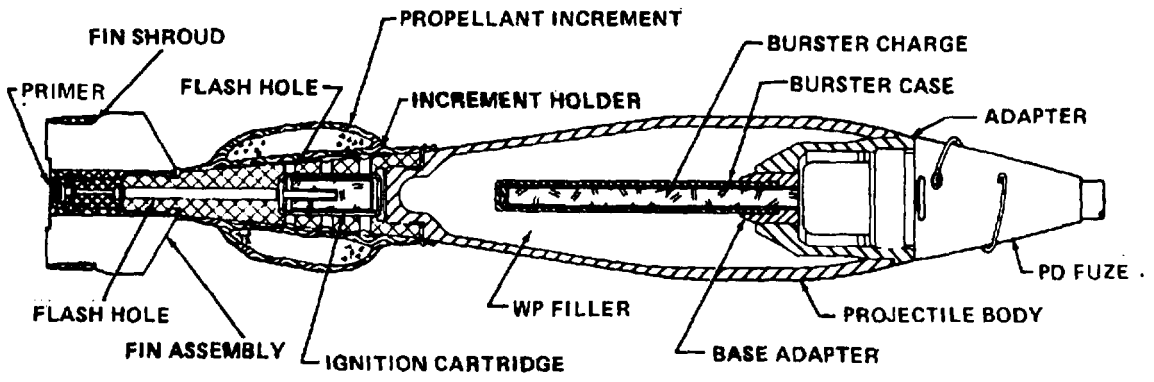


AR199487

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, an 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

Projectile:
- Body material ---------- Steel
- Color:
  - Old ---------- Grey w/yellow band and yellow markings
  - New ---------- Light green w/yellow band and light red markings
- Filler and weight ---------- WP, 1.60 1b
- Burster charge ---------- RDX,0.025 lb

Components:
- Booster assembly ---------- M47
- Ignition cartridge ---------- M66
- Propellant charge ---------- M5
- Percussion primer ---------- M71E1
- Fin assembly ---------- M141
- Fuze ---------- PD,M524A4 PD,M526 series

Temperature Limits:

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 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 ---------- AMMUNITIONFOR CANNON WITH SMOKE PROJECTILES
- DODAC ---------- 1315-C234
- Drawing number ---------- 8848900

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (m)	Maximum 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.

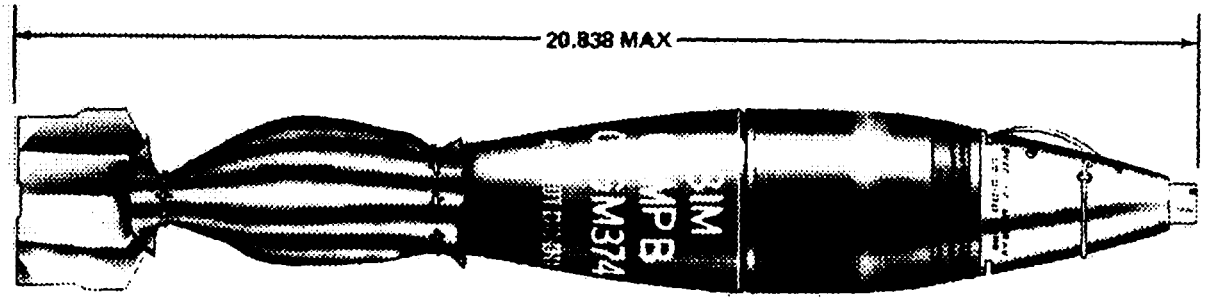
Limitations:

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



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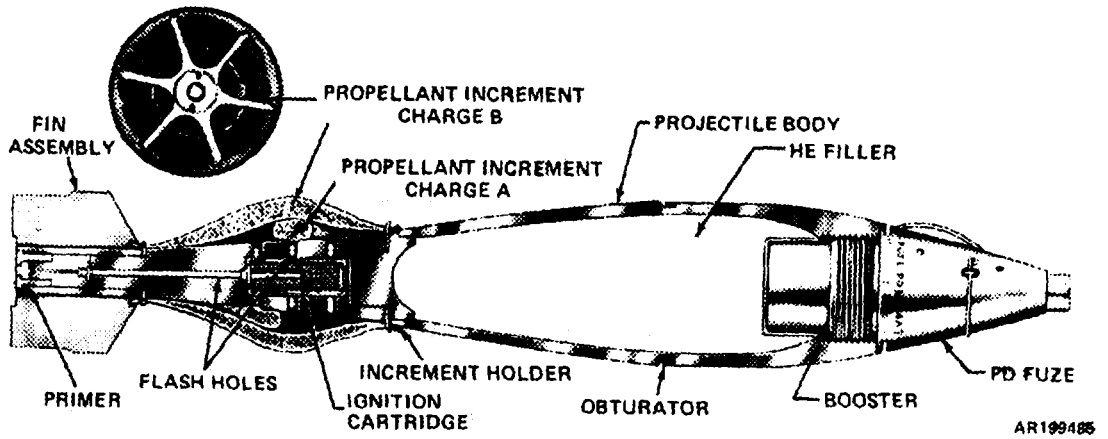

AR199485

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/ignition cartridge M66A1; M170 w/ignition cartridge M285
Fuze	PD, M524 series, PD, M526 series. PD, M567, PD, M716, Prox, M532

Temperature Limits:

Firing:	
Lower limit	-40°F (-40°C)
Upper limit	+125°F (+52.0°C)
Storage:	
Lower limit	-80°F (for period not more than 3 days) (-62.2°C)
Upper limit	+160°F (for period not more than 4 hr/day) (+71.1°C)
*Packing	One round per fiber container in jungle wrap, one round per plastic container in barrier bag; three containers per wooden box
Packing Box:	
Weight	51.0 lb
Dimensions	26-3/16 x 13-15/16 x 6-25/32 in.
Cube	l.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	1315-C236, 1315-C256
Drawing number:	
With fuze	8881026
Without fuze	9225283

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (m)	(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 fining 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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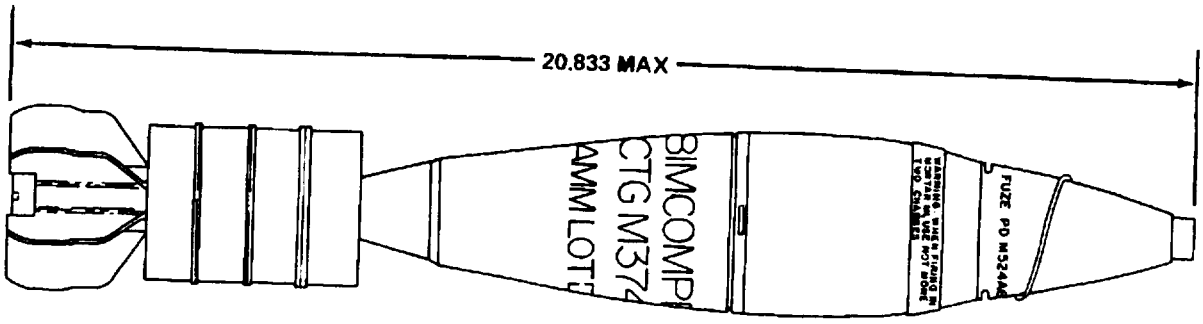
CARTRIDGE, 81 MILLIMETER: HE, M374A3 (M374A2E1)



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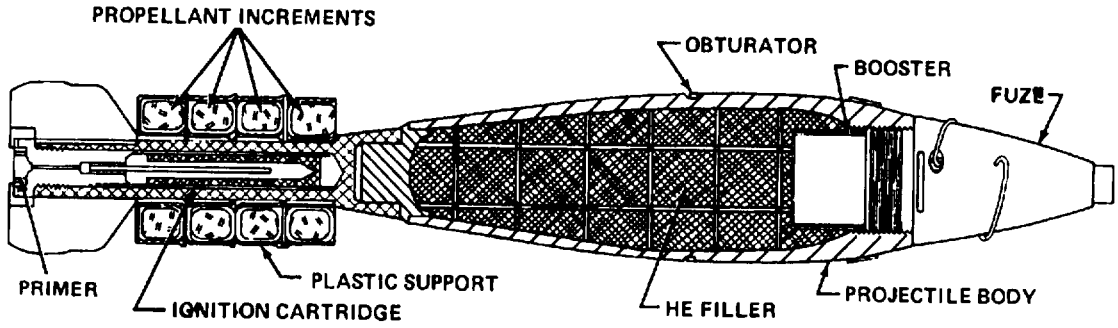


AR199479

Type Classification:

Std MSR-05756028.

Use:

This cartridge is used against personnel and materiel, providing both blast and fragmentation effects.

Description:

The complete round consists of a projectile body, a point-detonating fuze, a fin assembly four propellant charge increments, an ignition cartridge, and a percussion primer. The steel alloy body is threaded internally at the nose to accept the fuze, and threaded externally at the base to accept the fin assembly. The projectile body is filled with Comp B high explosive. The paper and brass ignition cartridge assembly contains a Percussion Primer M35, a black powder pellet, and approximately 115 grains of propellant M9. Surrounding the fin assembly are four horseshoe-shaped propelling charge M205 increments. Each propelling charge M205 increment consists of a nitrocellulose container holding approximately 400 grains of propellant M10. A protective plastic propelling charge support surrounds the four propelling charge increments.

Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer ignites 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

Temperature Limits:

Firing:	
Lower limit	
Upper limit	
Storage:	
Lower limit	-65°F (for period not more than 3 days)
Upper limit	+160°F (for period not more than 4 hr/day)
*Packing	1 round per fiber container in jungle wrap; 3 containers in wirebound box
*Packing Box:	
Weight	49.4 lb
Dimensions	25-1/8 x 15-1/4 x 7-9/16 in.
Cube	1.7 cu ft

*NOTE: See 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 PROJECTILE
DODAC	1315-C256
Drawing number	P9241291

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (m)	Maximum 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

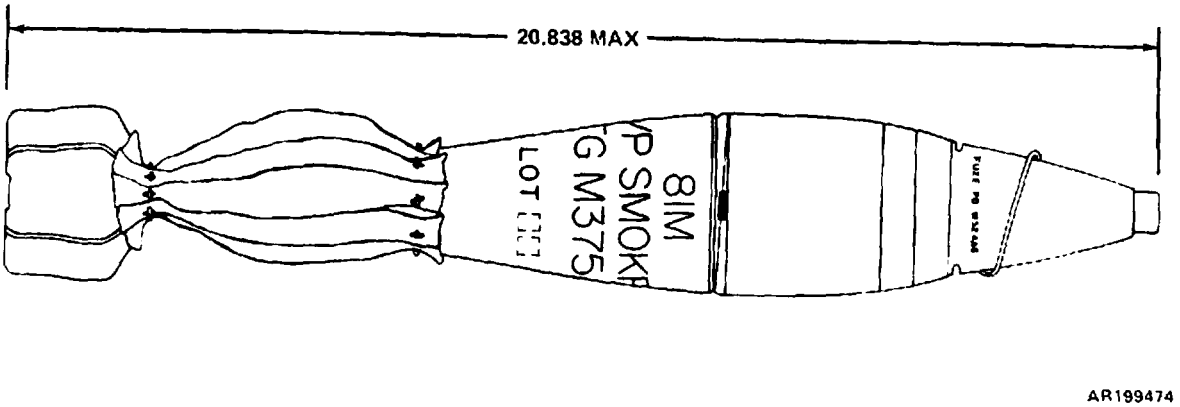
Limitations:

Firing with more that two propellant increments (Charge 2) is not authorized in Mortar M1.

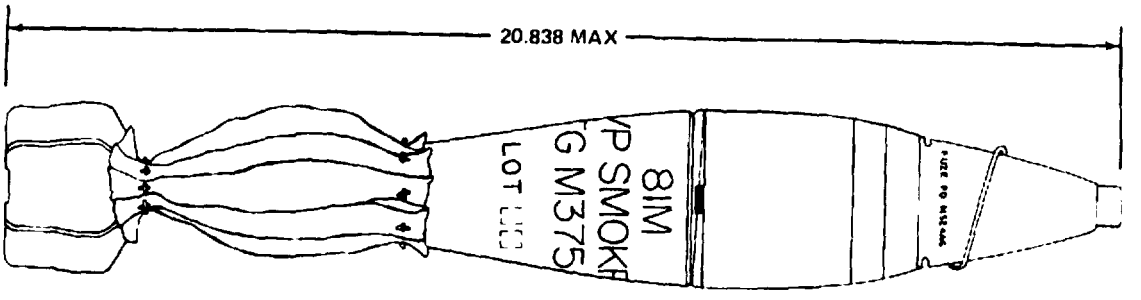
References:

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 pearlitic malleable iron
- Color ---------- Light green w/yellow band and light red markings
- Filler and weight ---------- WP, 1.60 lb
- Fuze ---------- PD, M524 series, PD, M526 series, PD,M567, PD, M716, or Prox, M532
- Fin assembly ---------- M170 (M375A2) M149 (M375A1)

Propelling charge:
- Propellant ---------- M90A1 (A& B)
- Ignition cartridge ---------- M285 (M375A2) M66A1 (M375A1)
- Primer ---------- 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 container in jungle wrap, or 1 round per plastic container in barrier bags; 3 containers in wooden box

*Packing box:
- Weight ---------- 51.0 lb
- Dimensions ---------- 26-13/16 x 13 15/16 x 6-25/32 in.
- Cube ---------- 1.4 cu ft

*NOTE: See 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 ---------- AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
- DODAC ---------- 1315-C276
- Drawing number ---------- 9240953 (M375A2) 9251985 (M375A1)

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (m)	Maximum 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 (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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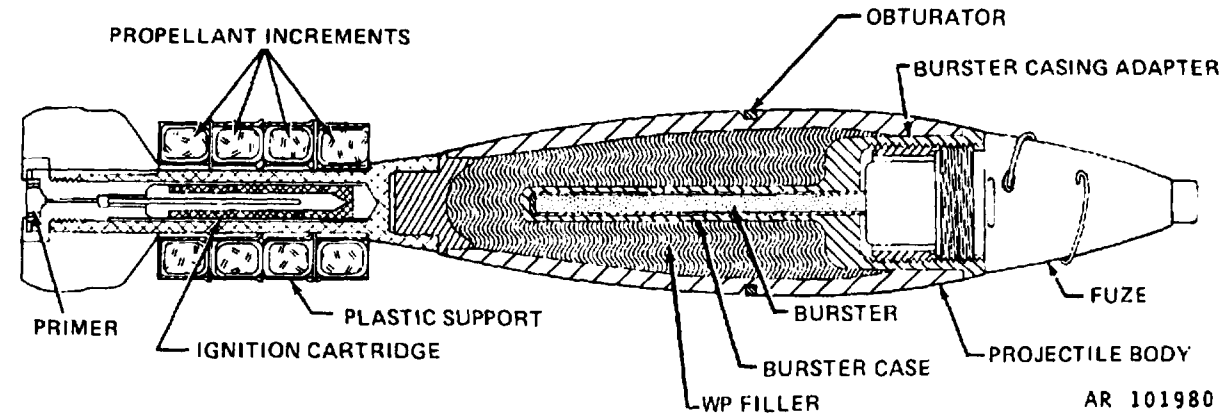
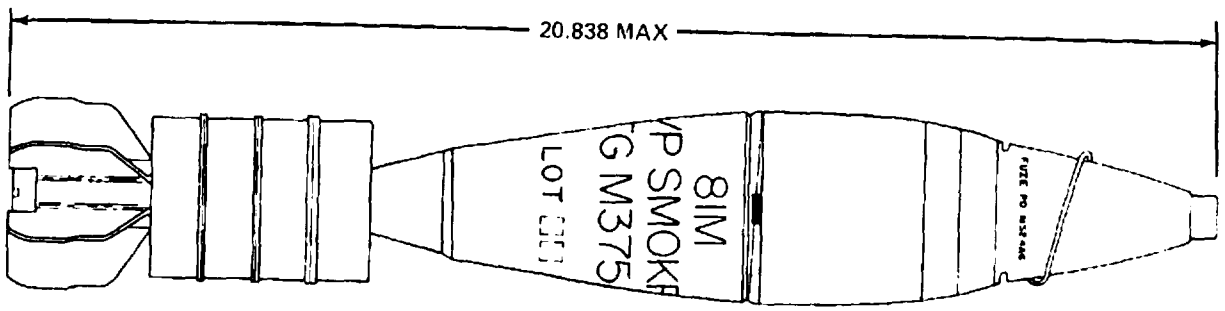
CARTRIDGE, 81 MILLIMETER: SMOKE, WP, M375A3





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 pearlitic malleable iron
Color	Light green w/yellow band and light red markings
Filler andweight	WP, 1.60 lb
Faze	PD, M567; PD,M524A6 (Alternate)
Fin assembly	M24
Propelling charge:	
Propellant	M205
Ignition cartridge	M299
Primer	Percussion, M35

TemperatureLimits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for period not more than 3 days)
Upper limit	+160°F (for period not more than 4 hr/day)
*Packing	1 round per fiber container in jungle wrap, 3 containers in wirebound box
*Packing Box:	
Weight	49.4 lb
Dimensions	25-1/8 x 15-1/4 x 7-9/16 in.
Cube	1.7 cu ft

*NOTE: See 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	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC	1315-C276
Drawing number	9294735 (M375A3)

Ballistics:

Charge	Muzzle Velocity (fps)	Maximum Range (m)	Maximum 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:

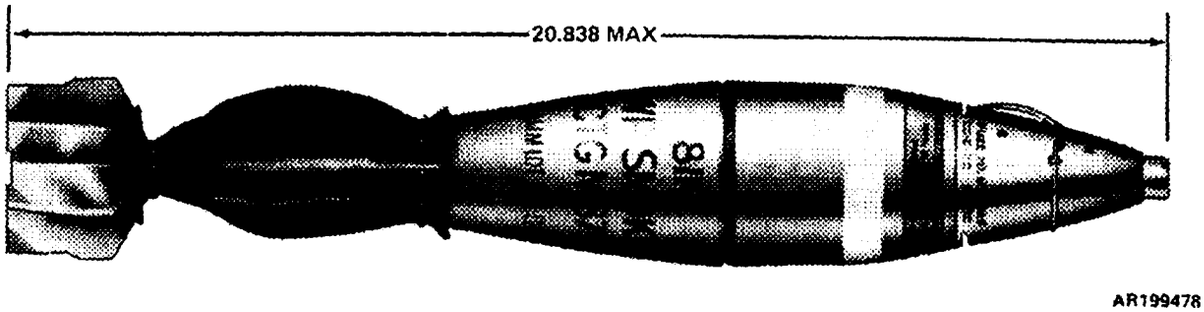
Firing with more than two propellant increments (Charge 2) is not authorized in Mortar M1.

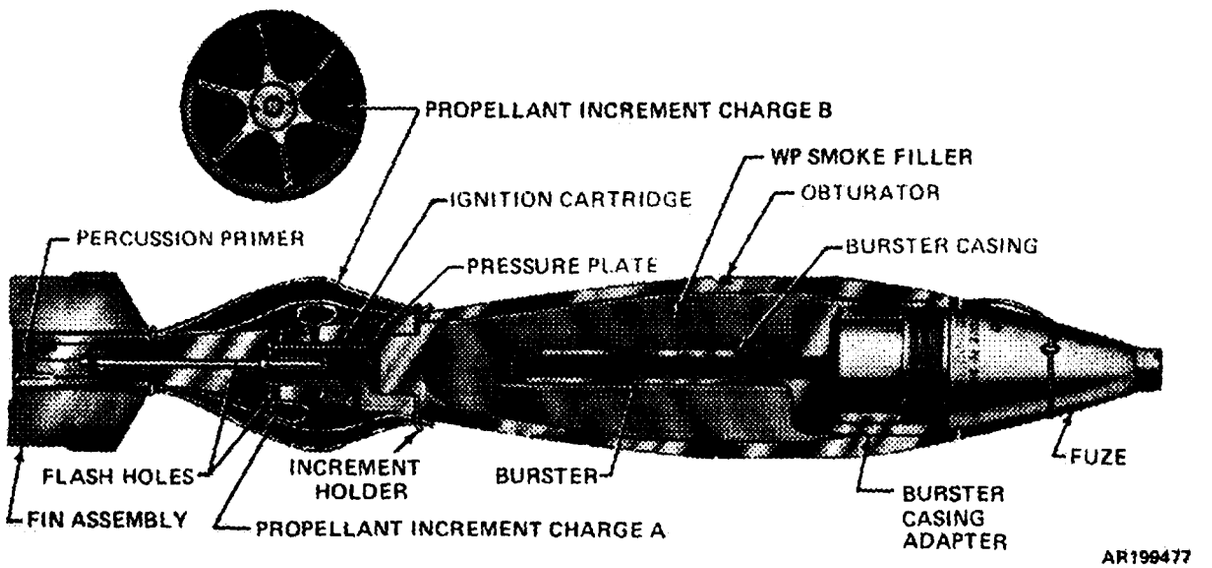
Store and transport WP rounds at temperatures below 111.4°F (melting point of WP). If impractical, store rounds on bases, so that if WP melts it will resolidify with void space innermal position in the nose of the projectile. Erratic performance may occur if voids exist inside of WP filler.

References:

AMC-P 700-3-3
TM 9-1015-215-10
TM 9-3071-1
SB 700-20

CARTRIDGE, 81 MILLIMETER: SMOKE, WP, M375





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)	Maximum 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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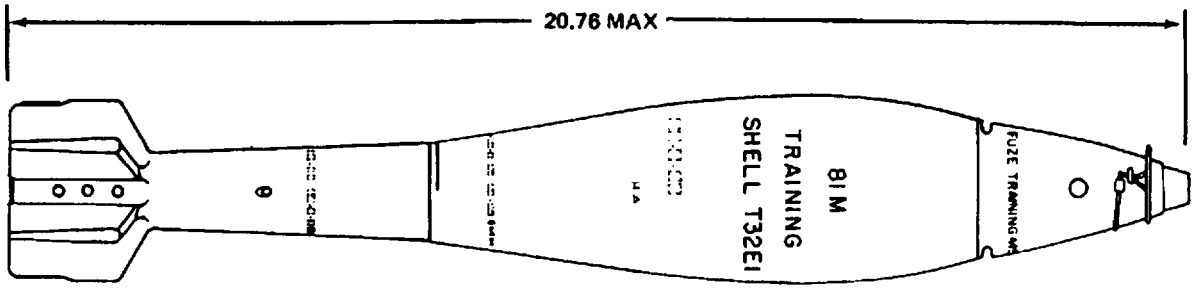
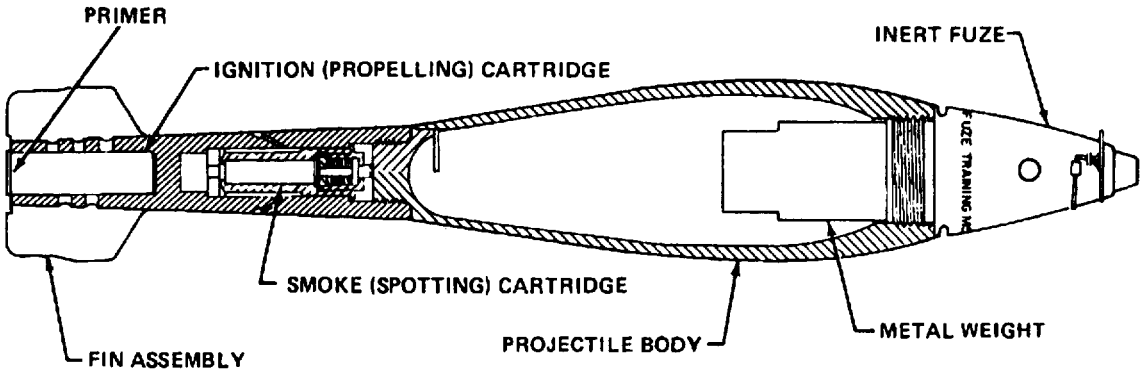
CARTRIDGE, 81 MILLIMETER: TRAINING, M445 (T32E1)



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 firing pin in the base cap of the mortar. The primer ignites the ignition cartridge. Since this round is fired only at Charge 0, the gases from the ignition cartridge expel the projectile from the mortar tube and propel it to the target. The smoke cartridge detonates on impact providing a spotting charge. The ignition and smoke 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)

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 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	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES
DODAC	1315-C228
Drawing No.	P87815

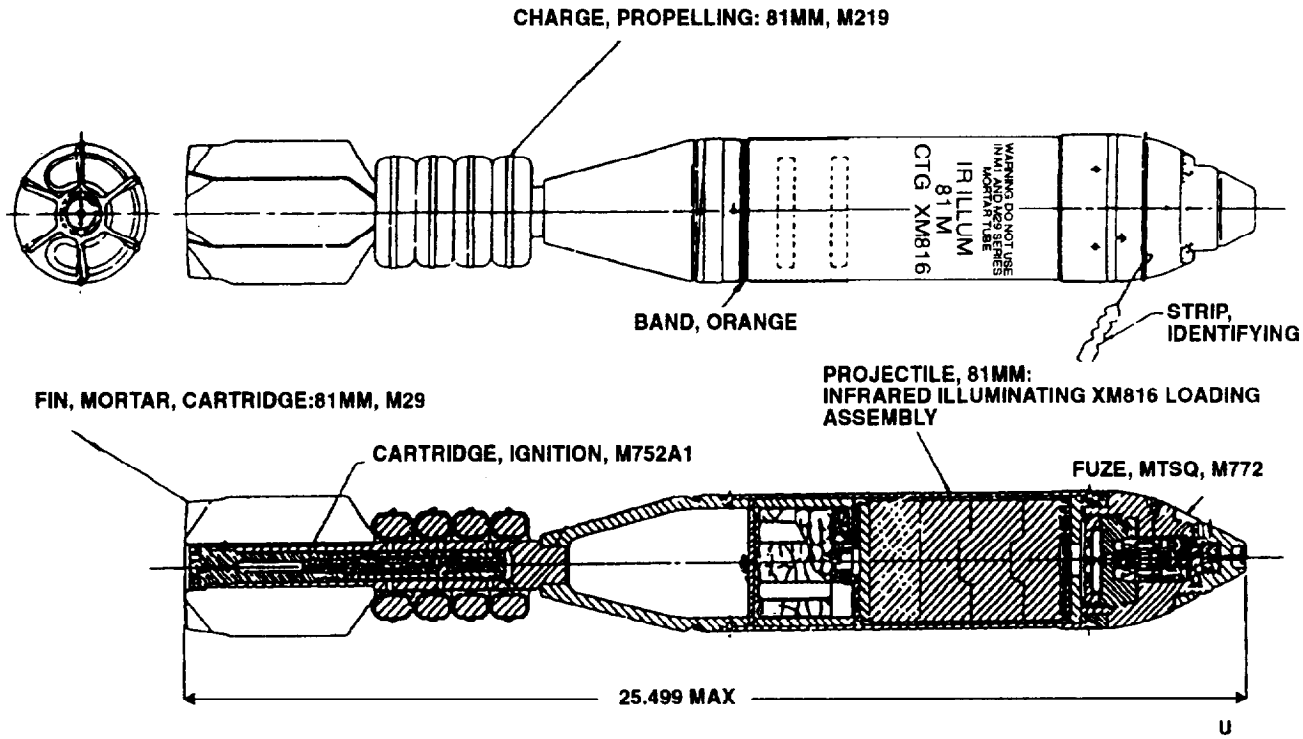
Limitations:

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 Ml and the M29 Series Mortar.

Termperature Limits:

Firing:

Lower limit	-50°F
Upper limit	+145°F

Storage:

Lower limit	-60°F out
Upper limit	+160°F

Packing:

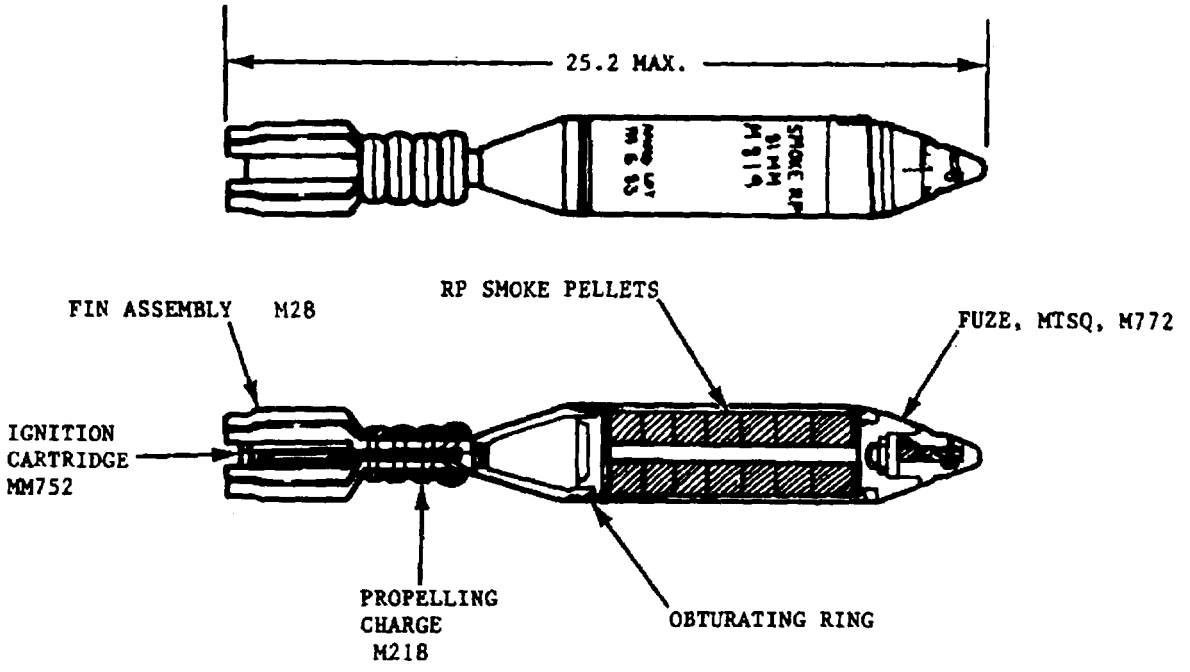
Pack	One round per fiber container and three fiber containers per metal can

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



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 cartridge flashes through the holes in the fin assembly and ignites the propelling charge (horseshoe 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.l°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 ---------- l.65 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	0016
Quantity-distance class	(04) 1.3
Storage compatibility group	G
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH SMOKE PROJECTILE
DODAC	1315-C870
Drawing number	9327839

Limitations:

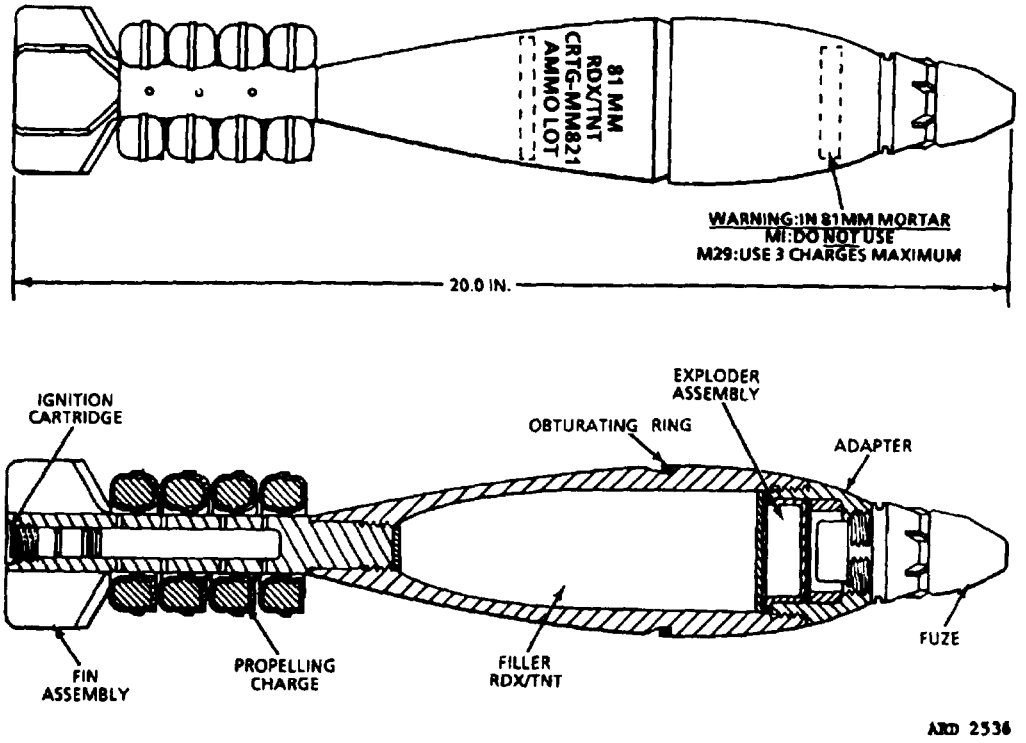
Cartridge cannot be fired at Charge 0 (ignition cartridge only).

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



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 assemblyand 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,
Fin assembly	TV180

Temperature Limits:

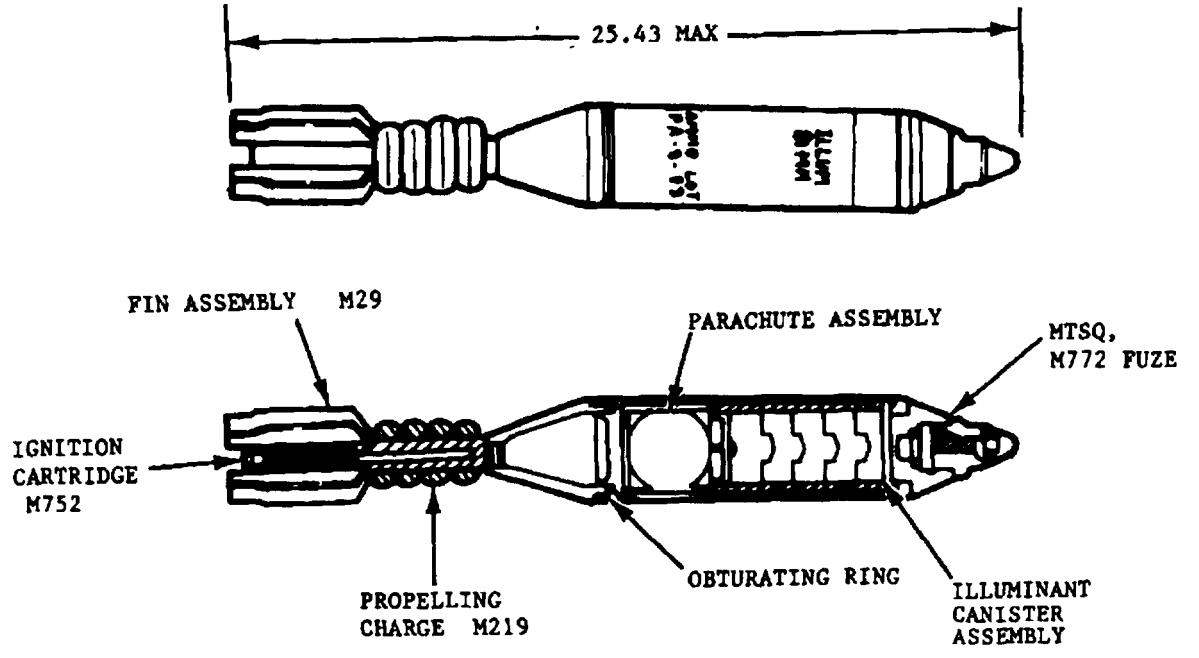
Firing:	
Lower limit	-50°F
Upper limit	+145°F
Storage:	
Lower limit	-60°F (for period not more than 3 days)
Upper limit	+160°F (for period not more than 4 hr/day)
*Packing	1 round per plastic container, 3 containers per metal box
Ammo container	Dwg GD/030P/100954 (British)
Box	C374MK2, steel box Dwg. 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-C868

CARTRIDGE, 81 MILLIMETER: ILLUMINATING, M853A1



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 propelling 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
	White w/black markings
Filler	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)

Temperature Limits:

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 container, 3 containers in wood box
*Packing Box:	
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	AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILE
DODAC	1315-C871
Drawing number	9152621

Limitations:

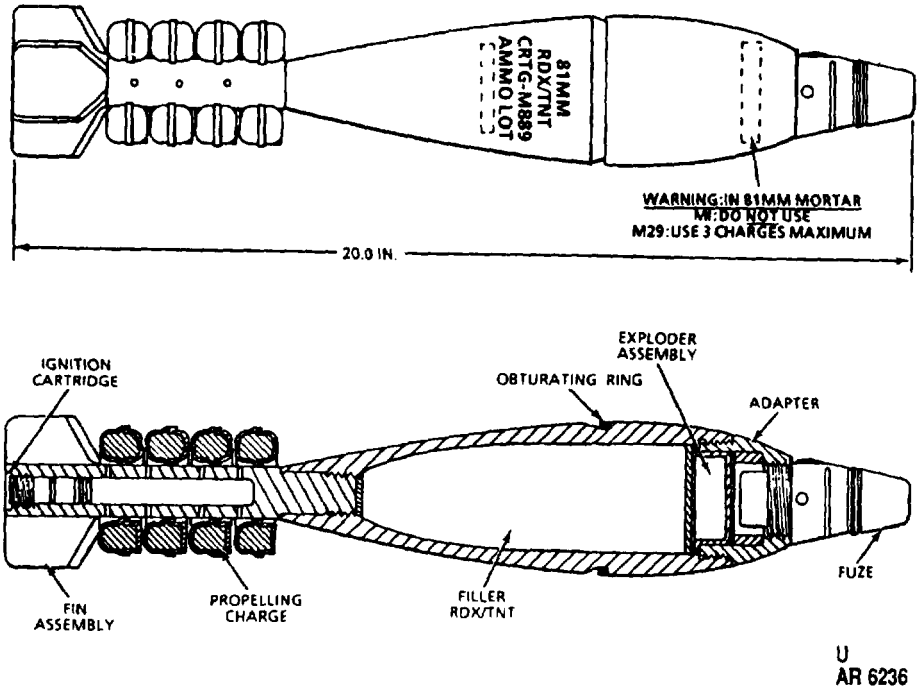
Cartridge cannot be fired at Charge 0 (ignition cartridge only).

Cartridge can not be fired in the M1 mortar or above Charge 3 in the M29 mortar.

References:

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

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 horseshoe 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:

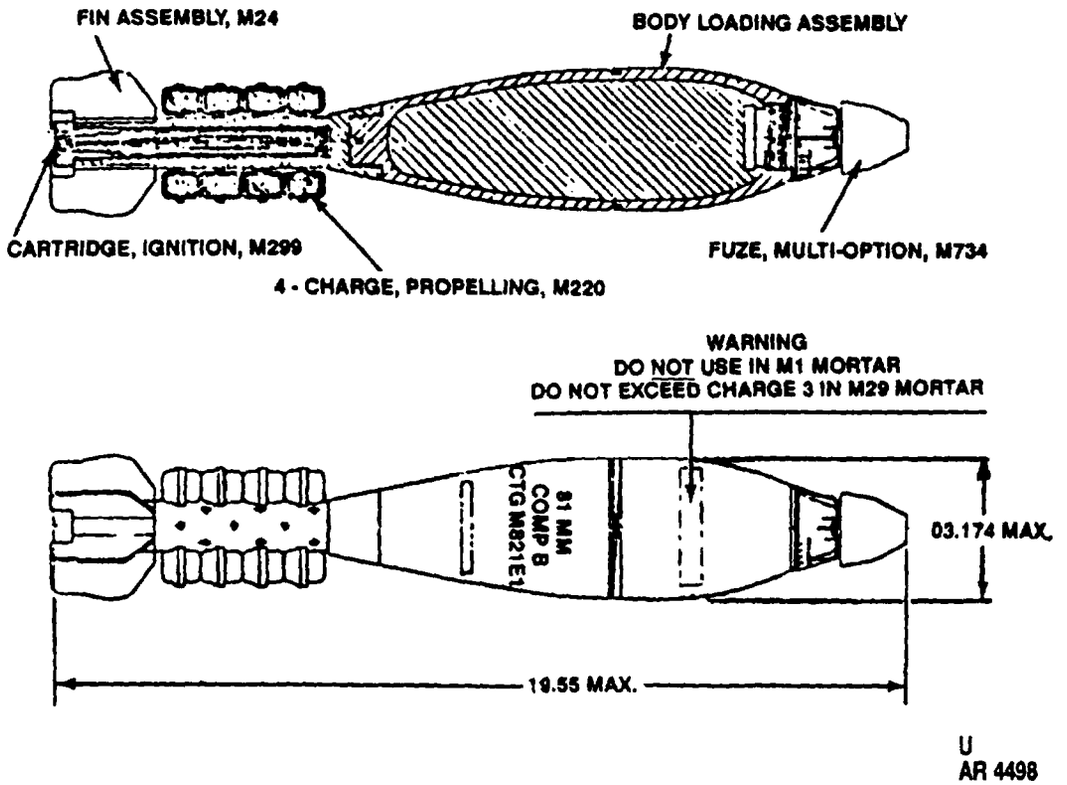
Firing:	
Lower limit	-50°F
Upper limit	+145°F
Storage:	
Lower limit	-60°F (for period not more than 3 days)
Upper limit	+160°F (for period not more than 4 hr/day)
*Packing	1 round per plastic container, 3 containers per metal box
Ammo container	Dwg. GD/030P/100954 (British)
Box	C374 MK2, steel box Dwg. 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.

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 Percussion
Fuze	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 container; 3 containers 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	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC	1315-C868
NSN	1315-01-285-6416
Drawing number	12630672

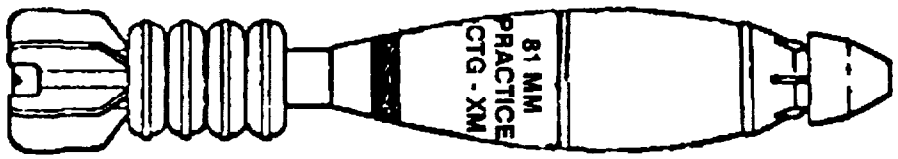
Limitations:

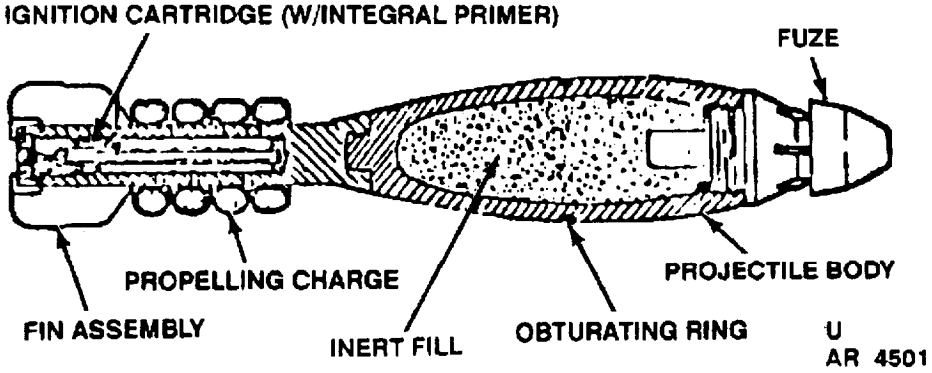
Cartridge can not be fired in the M1 mortar or above Charge 3 in the M29 Mortar.

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 ban
Filler and weight	Hydrocal (inert), 2.05 lb
Components:	
Ignition cartridge	M299 (with integral primer)
Propellant charge	M220
Fuze	PD, M751
Fin assembly	M24
Maximum range	5700 m
Maximum muzzle velocity	305 mps

Temperature Limit

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

Shipping and Storage Data:

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

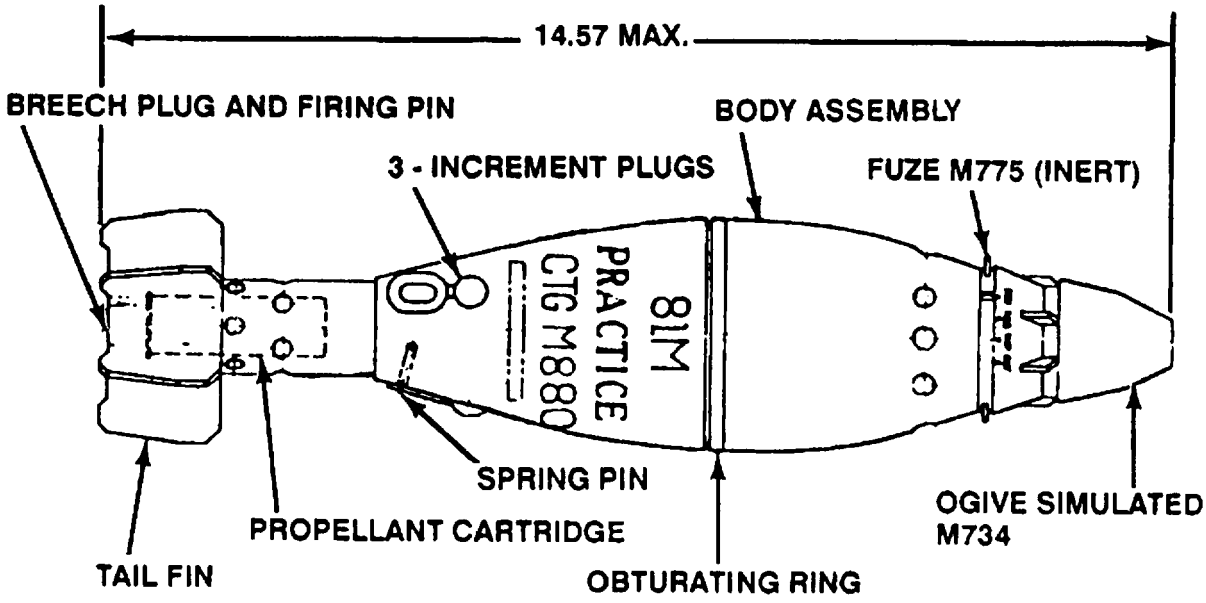
Limitations:

None.

References:

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

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 plastic 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 container; 8 containers 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	AMMUNITION FOR CANNON WITH INERT PROJECTILE
DODAC	1315-C876
NSN	1315-01-216-7071
Drawing number	9381430

Limitations:

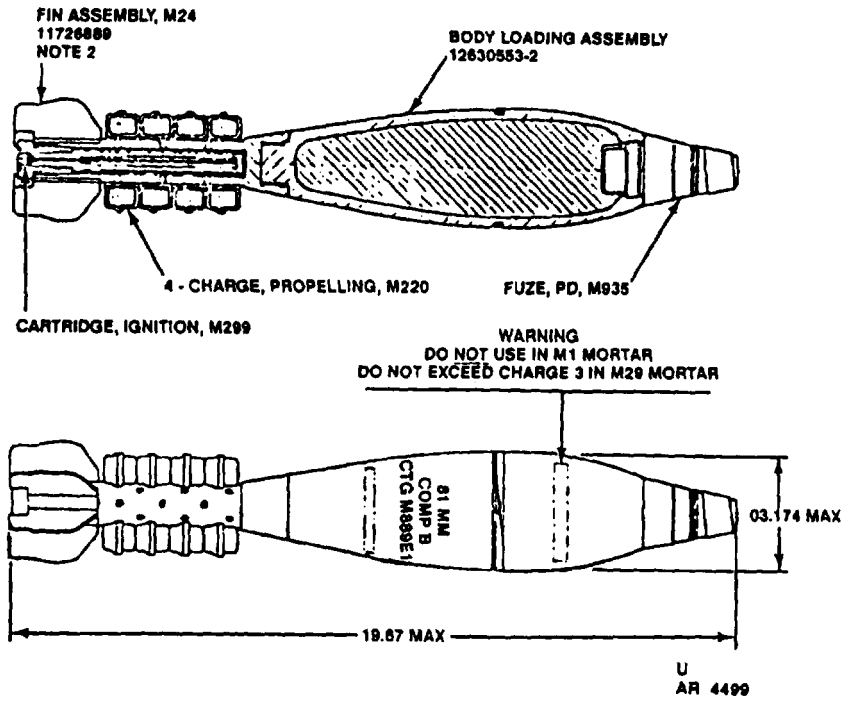
None.

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:	
Type	H E
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 container; 3 containers in wirebound box
Weight ---------- 41 lb
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 compatibilitygroup ---- E
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION 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 mortar or above Charge 3 in the M29 mortar.

Difference Between Models:

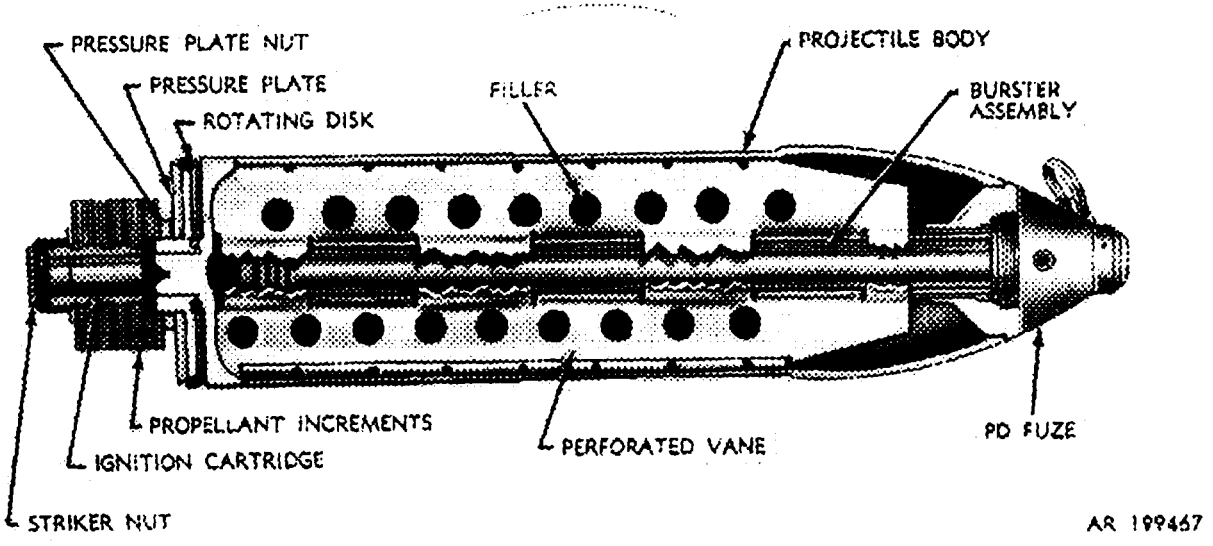
The M889A1 cartridge is produced using the Americanized TDP based on the M889 cartridge.

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- [illegible] 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	0020
Quantity-distance class	(12) 1.2
Storage compatibility group	K
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH GAS PROJECTILES
DODAC	CNB, CNS, CNS-1315-C701 H, HD, HT-1315-C703
Drawing number	75-1-284

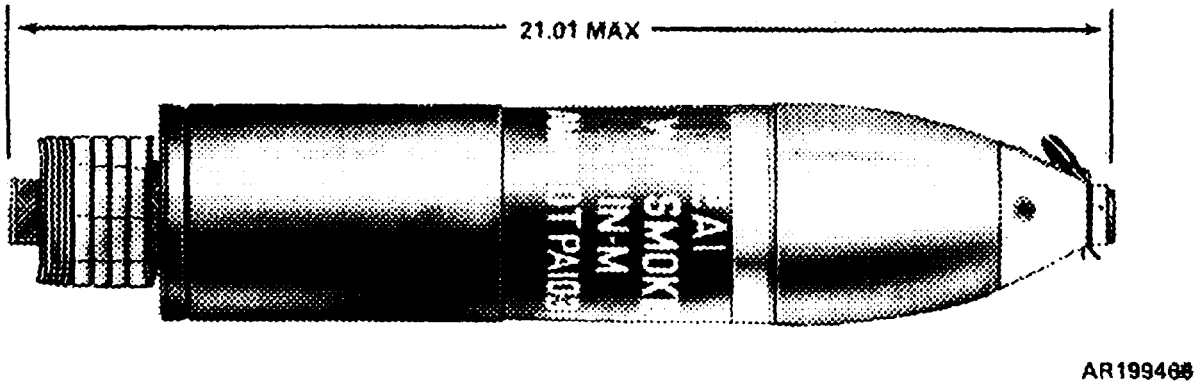
Limitations:

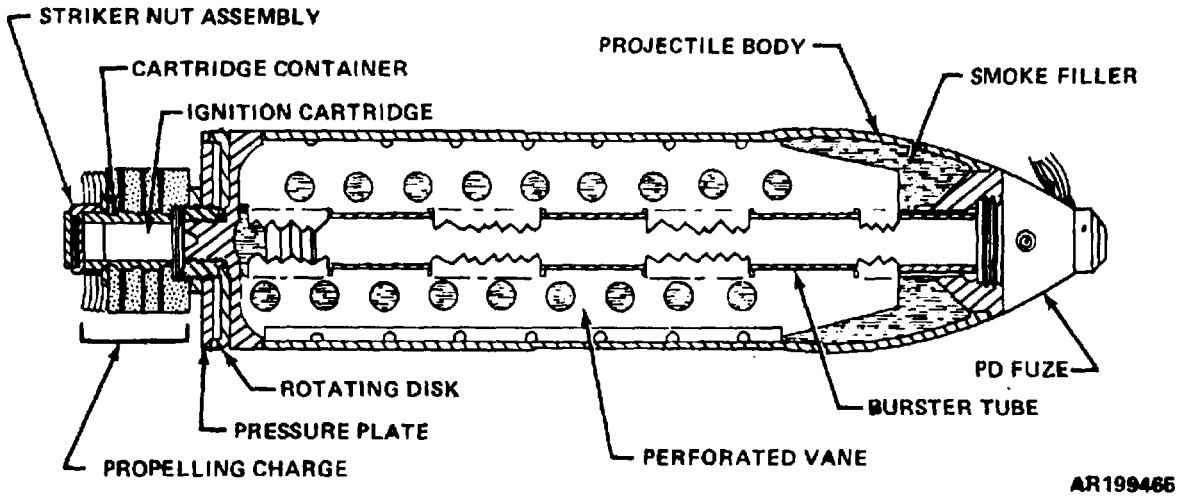
Short rounds may occur when Cartridge M2A1 is fired with fewer than seven increments.

References:

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

CARTRIDGE, 4.2-INCH: SMOKE, PWP OR WP, M2A1 & M2





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

**PackingBox:
- 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:

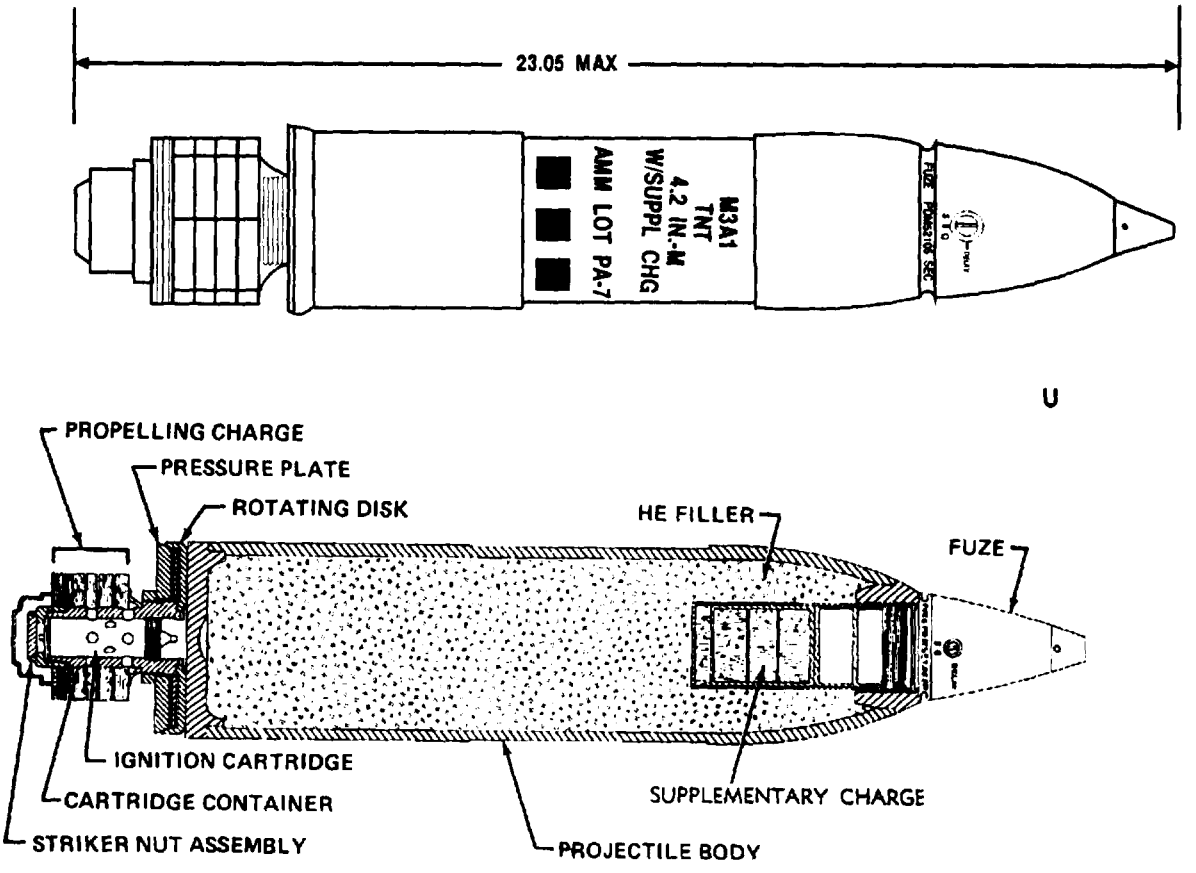
Short rounds may occur when Cartridge M2A1 is fired with fewer than seven increments.

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 innermal 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



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 container; 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 ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC ---------- 1315-C704
Drawing number ---------- 75-l-285

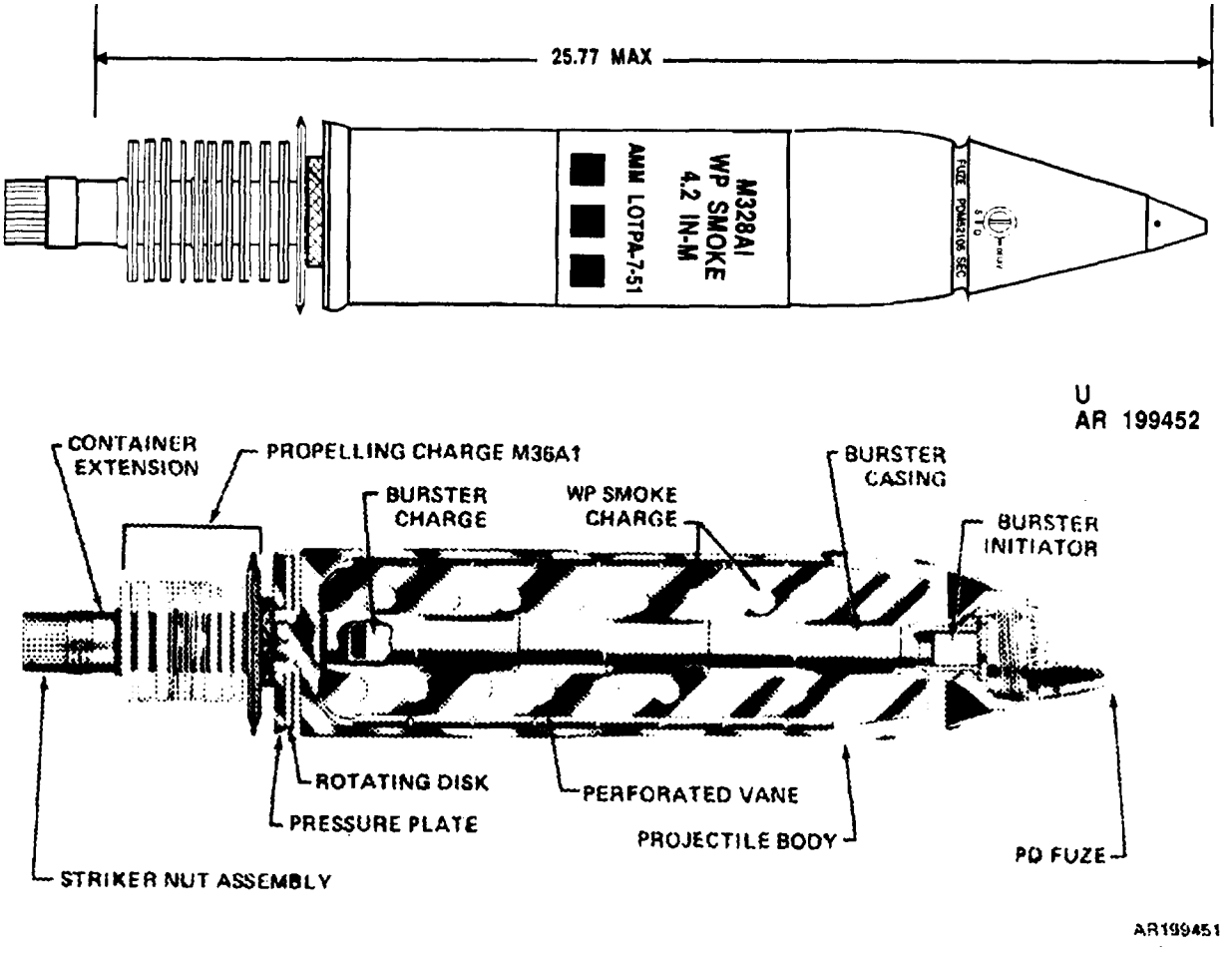
Limitations:

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:

	M328A1	M328
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 container; 1 container in wooden box.

**Packing Box:

Weight	76 lb
Dimensions	31-15/16 x 11-13/16 x 7-3/8 in.
Cube	1.6 cu 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	8797829

Limitations:

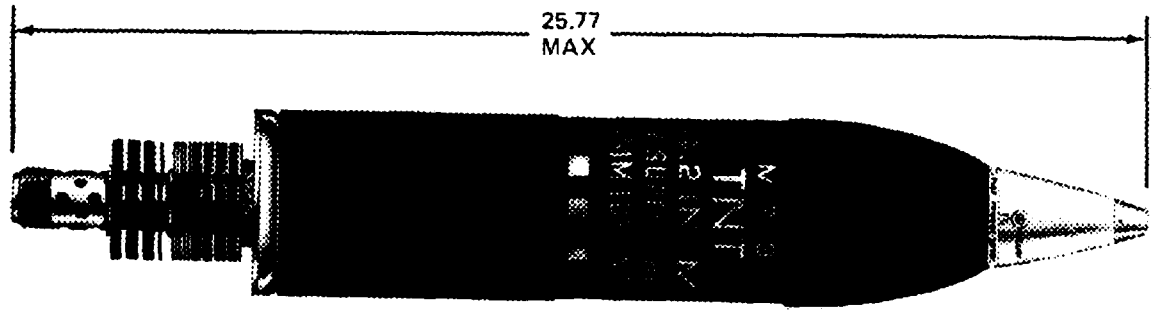
Short rounds may occur when firing with fewer than 10 increments.

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



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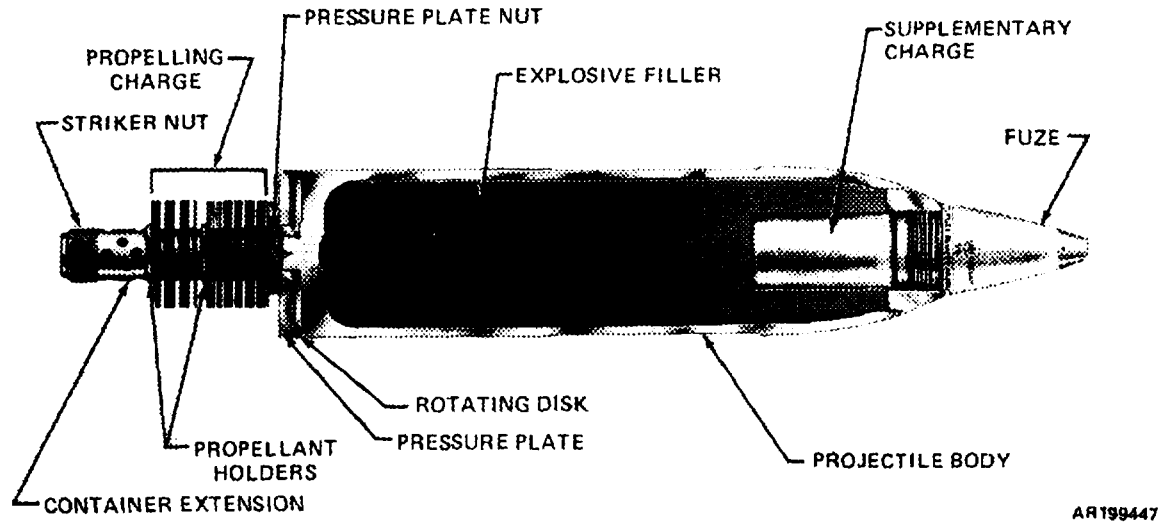


AR199447

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 ---------- l.6 cu ft

**NOTE: See DOD Consolidatd 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 PROJECTILES
DODAC ---------- 1315-C704 w/fuze
DODAC ---------- 1315-C705 w/o fuze
Drawing number ---------- (M329), 8863682 (M329B1)

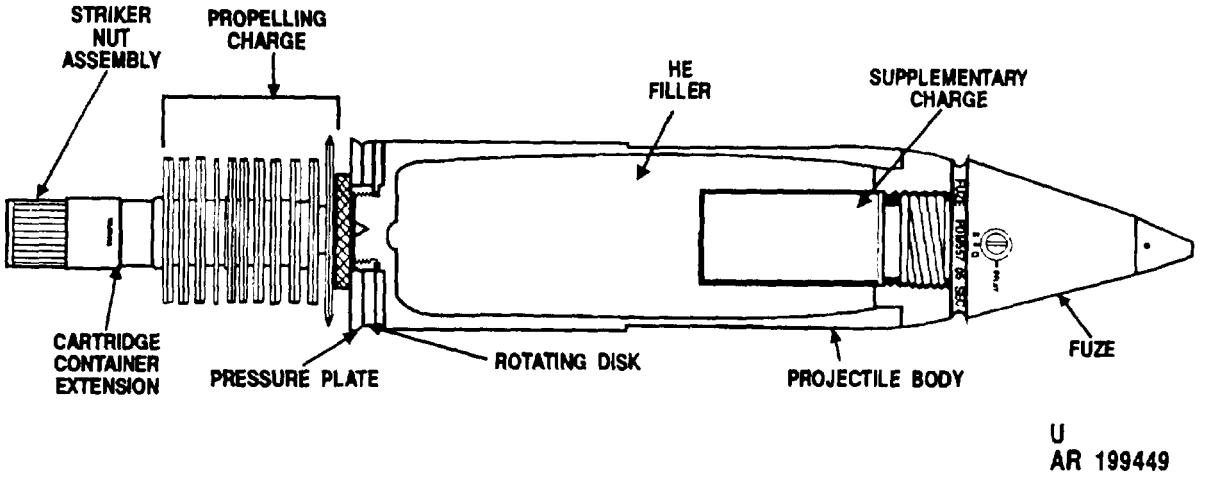
Limitations:

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



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 container; 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 ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
- DODAC ---------- 1315-C704 w/fuze
- DODAC ---------- 1315-C705 w/o fuze
- Drawing number ---------- 5863685

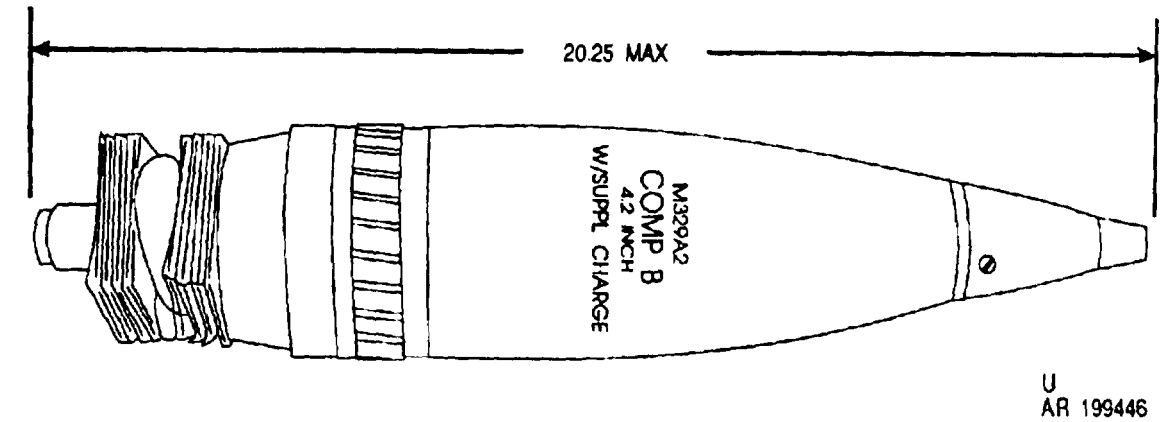
Limitations:

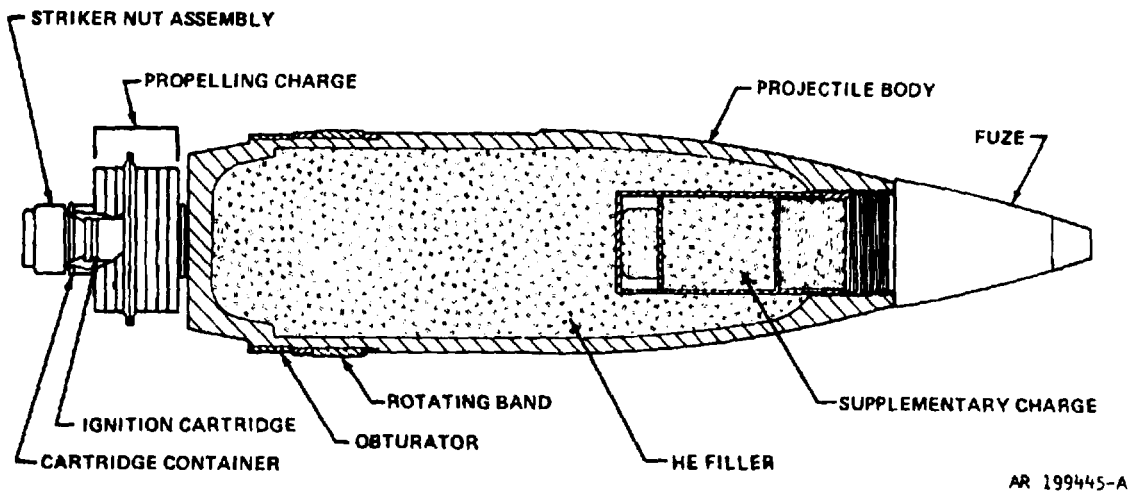
Short rounds may occur when firing with fewer than 10 increments. Minimum charge for firing with a proximity fuze is 10 increments. The Point Detonating Fuze: M739 series with the M329 series cartridges were not qualified during acceptance test. At the present time, the fuze M557 is the only PD fuze 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 container; 2 containers 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	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1315-C704 w/fuze
DODAC	1315-C697 w/o fuze
Drawing number	9235654

Limitations:

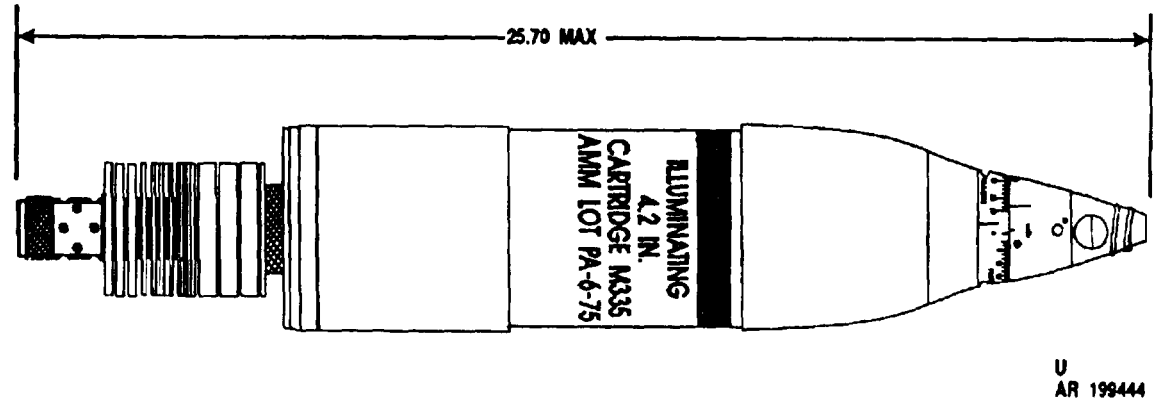
Excessive short rounds may occur when this round is fired at temperatures below 0°F.

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



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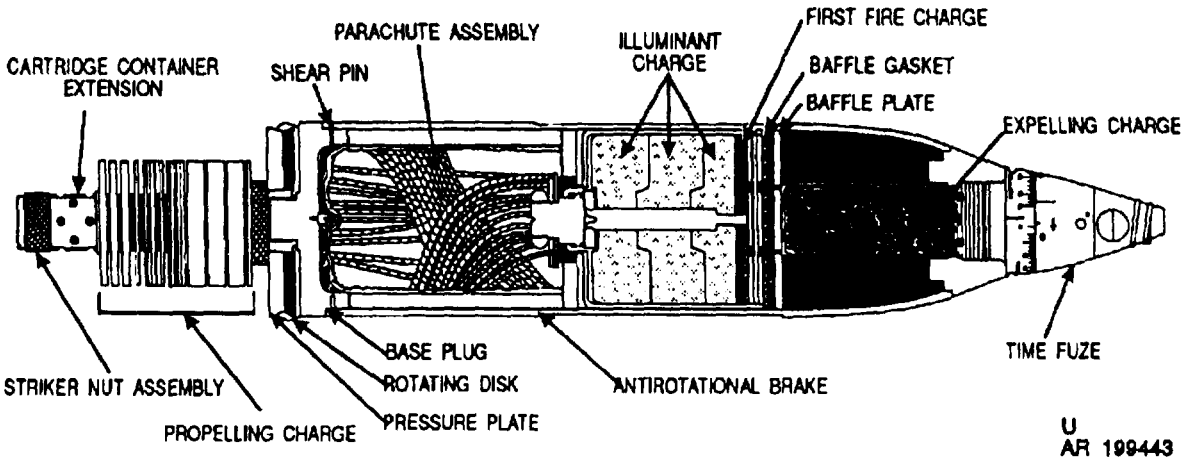
AR 199444



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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 antirotational brakes to reduce canister spin at the time of ejection and prevent twisting of the parachute suspension lines. The tail assembly includes a pressure plate and rotating disc, a propelling charge, a cartridge container and ignition cartridge, and a striker nut assembly.

Functioning

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

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

Difference Between Models:

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

Tabulated Data:

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

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

Components:

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

Performance (full charge):

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

*NOTE: See separate data sheets.

Temperature Limits:

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

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

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

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

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

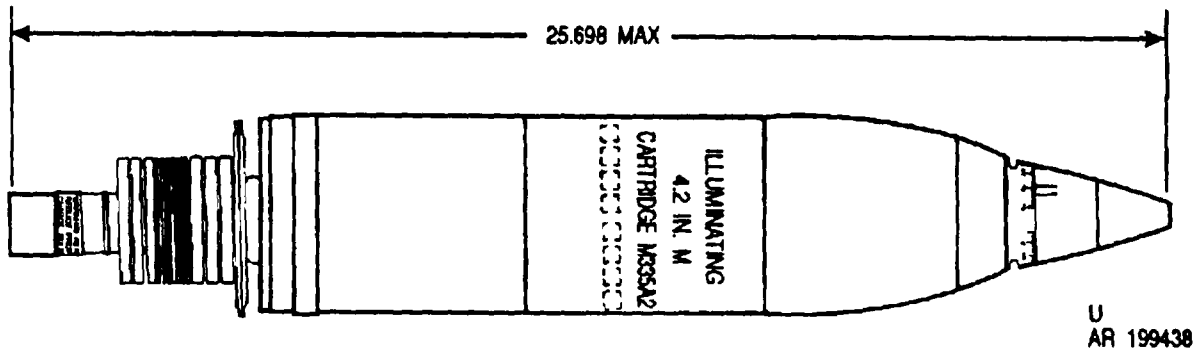
Shipping and Storage Data:

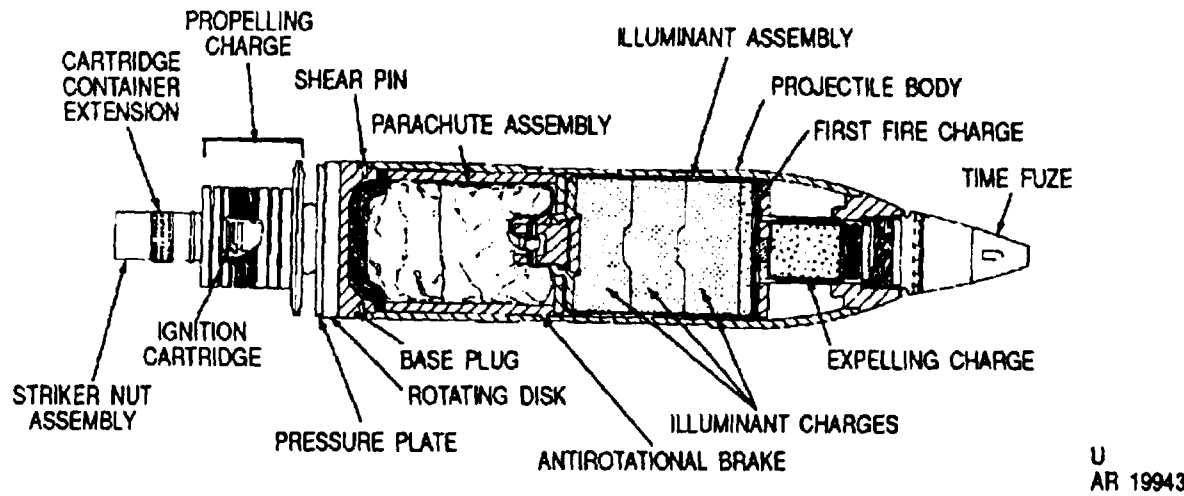
- UNO serial number ---------- 0171
- Quantity-distance class ---------- 1.2 (08)
- Storage compatibility group ----- G
- DOT shipping class ---------- A
- DOT designation ---------- AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES
- DODAC ---------- 1315-C706
- Drawing number ---------- 8833724 (M335A1)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

References:

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

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 parachute suspension lines. The tail assembly includes a pressure plate and rotating disc, a propelling charge, a cartridge container and ignition cartridge, and a striker nut assembly.

Functioning:

When the cartridge is released, it slides down the mortar tube until the percussion primer strikes the firing pin. The flash from the primer ignites the ignition charge. The gases from the propelling charge exert pressure on the pressure plate at the base of the projectile which expands the rotating disc, engaging it in the rifling of the tube. The spin imparted to the projectile as it leaves the weapon stabilizes it in flight. Upon functioning of 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-tire 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)
- Upper limit ---------- +160°F (+71.1°C) (for period not more than 4 hr/day)

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

**Packing Box:
- Weight ---------- 76.0 lb
- Dimensions ---------- 31-5/16 x 11-13/16 x 7-5/8 in.
- Cube ---------- l.6 cu ft

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

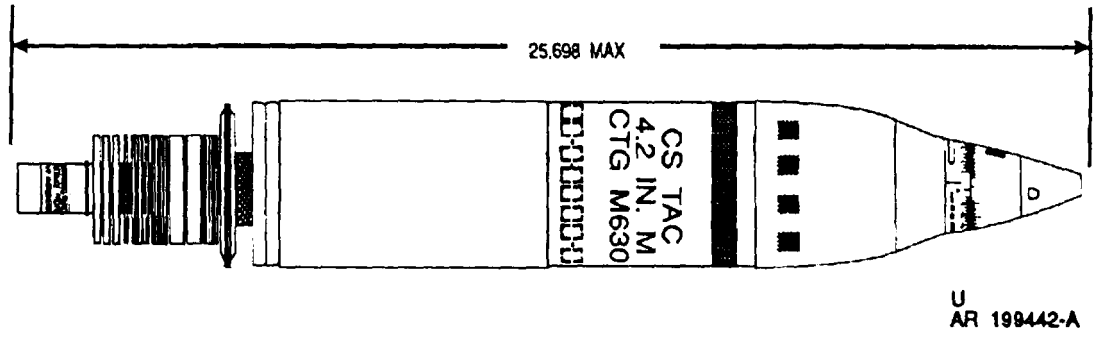
Shipping and Storage Data:

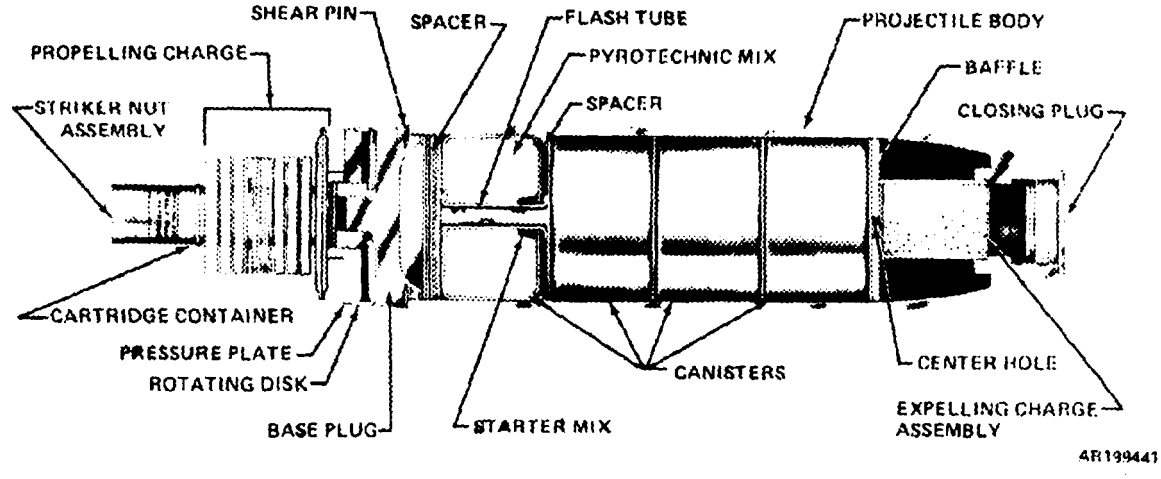
UNO serial number ---------- 0171
Quantity-distance class ---------- 1.2 (08)
Storage compatibility group ---- G
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES
DODAC ---------- 1315-C706
Drawing number ---------- 8886595

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 expelling charge to provide ignition. The tail assembly includes a pressure plate and rotating disc, a propelling charge, a cartridge container and ignition cartridge, and a striker nut assembly.

Functioning:

When the cartridge is released, it slides down the mortar tube until the percussion primer strikes the firing pin. The flash from the primer ignites the ignition cartridge which, in turn, ignites the propelling charge. The gases from the propelling charge exert pressure on the pressure plate at the base of the projectile which expands the rotating 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 7-318 in.
Cube	l.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 PROJECTILES-CLASS B DOT SPECIAL PERMIT NO 5208
DODAC	1315-C710
Drawing number	9220299

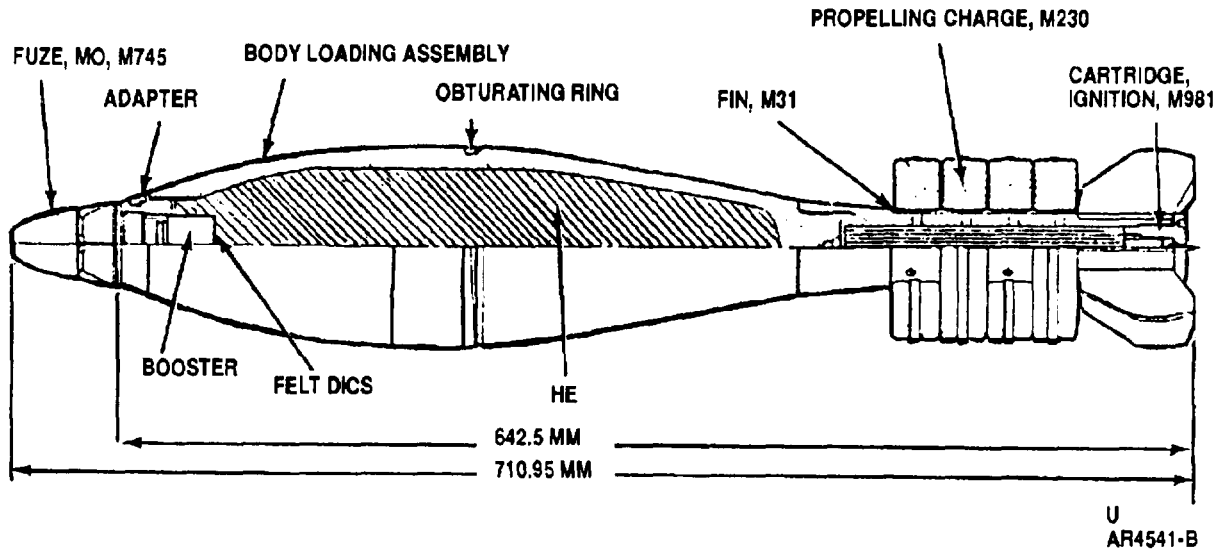
Limitations:

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 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 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
Faze	PD, M745

Temperature Limits:

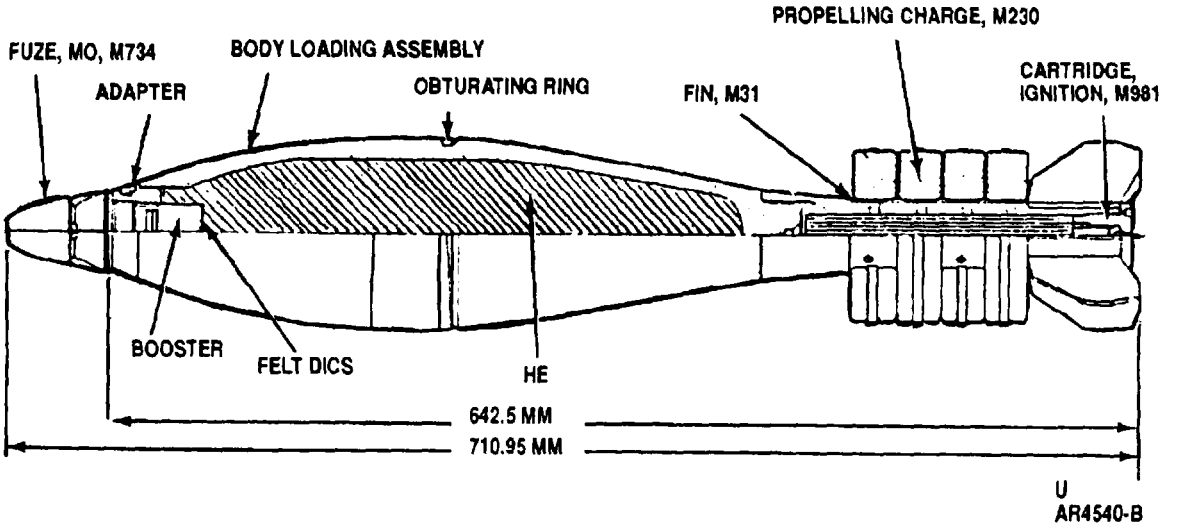
Firing:	
Lower limit	–50°F (-45.6°C)
Upper limit	+145°F (+62.8°C)
Storage:	
Lower limit	-60°F (-51.1°C)
Upper limit	+160°F (+71.1°C)
*Packing	1 round per fiber container w/2 containers per metal container
Fiber container:	
Drawing number	12577551
Metal container:	
Drawing number	12577570

*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	AMMUNITION 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 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, 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
Faze	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.l°C)

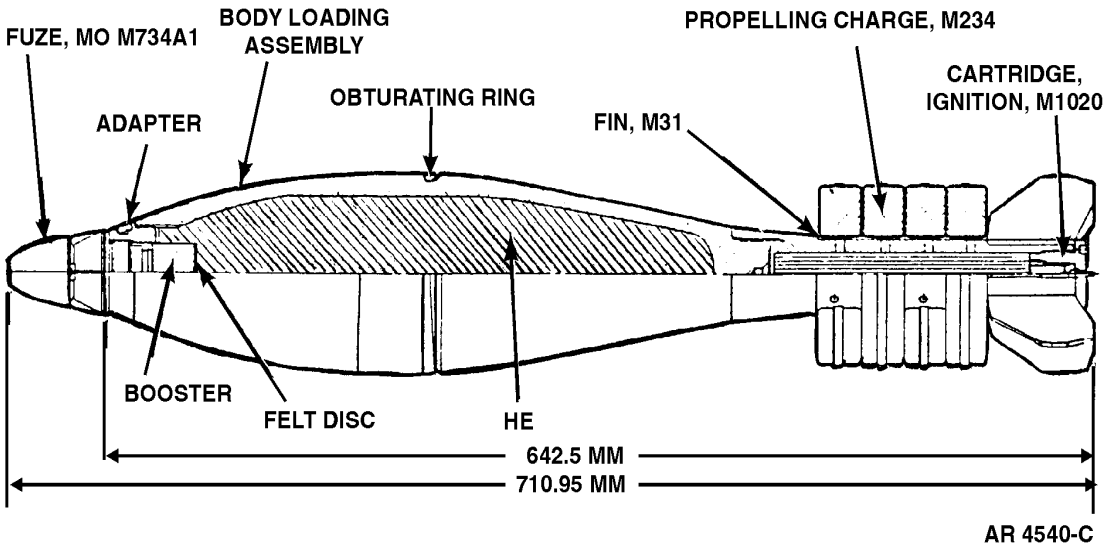
*Packing ---------- 1 round per fiber container w/2 fiber containers per metal container
Fiber container:
Drawing number ---------- 12577551
Metal container:
Drawing number ---------- 12577570

*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including 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 ---------- AMMUNITION 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)
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

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

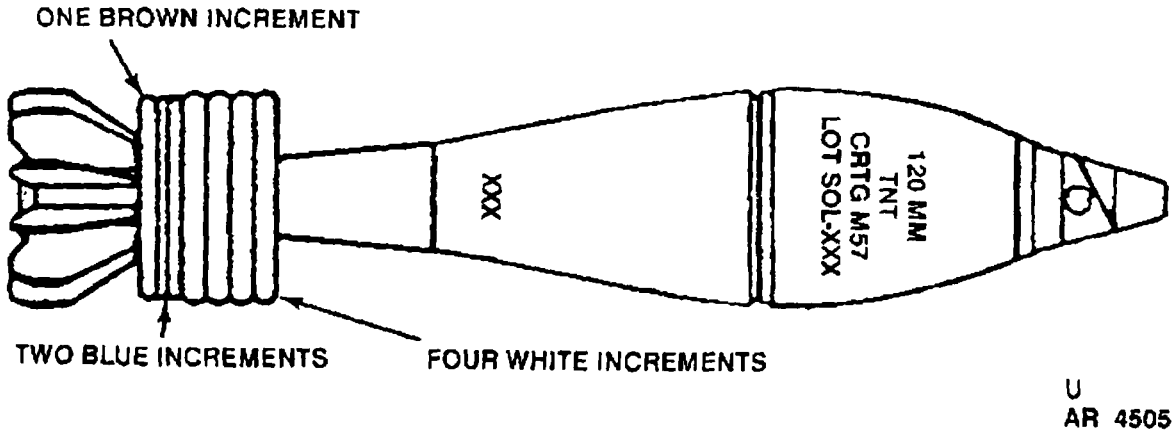
SHIPPING AND STORAGE DATA:

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 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, 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
- Faze ---------- 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)

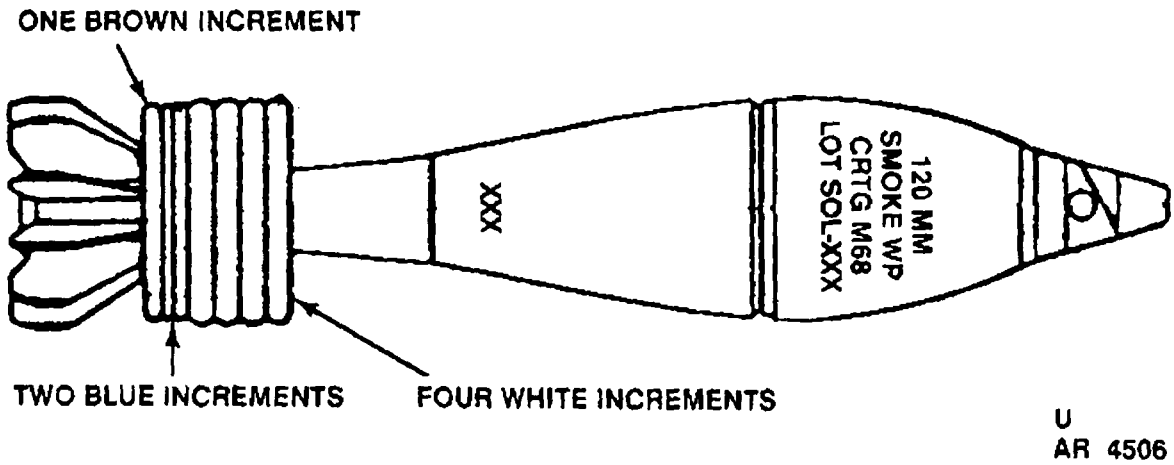
*Packing ---------- 1 round per fiber container; 2 containers per wooden box
Ammo container:
Drawing number ---------- 512-3007-01
Box:
Drawing number ---------- 512-5015-00

*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 ---------- AMMUNITION 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 propelling 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
Faze	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 Consolidate Ammunition Catalog for complete packing data including NSN's.

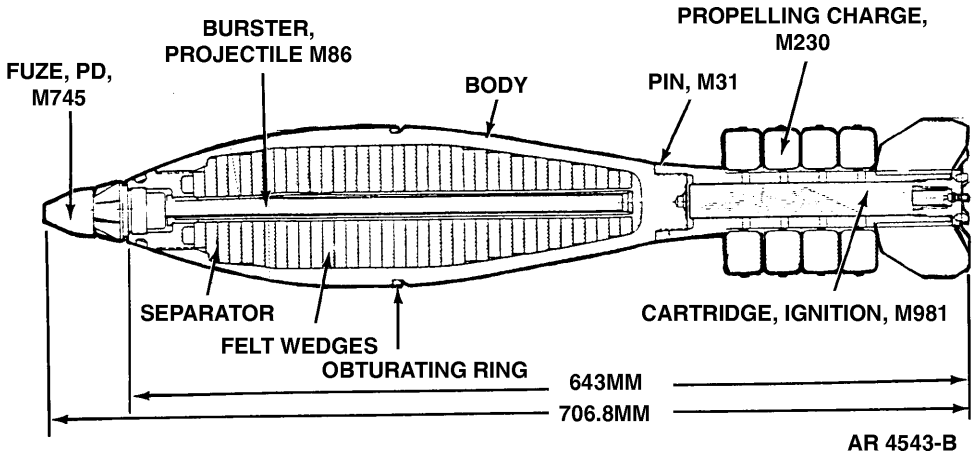
Shipping and Storage Data:

UNO serial number	0245
Quantity-distance class	(04)1.2
Storage compatibility group	H
DOT shipping class	A
DOT designation	AMMUNITIONFOR CANNON WITH SMOKE PROJECTILE
DODAC	1315-C789

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) 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.

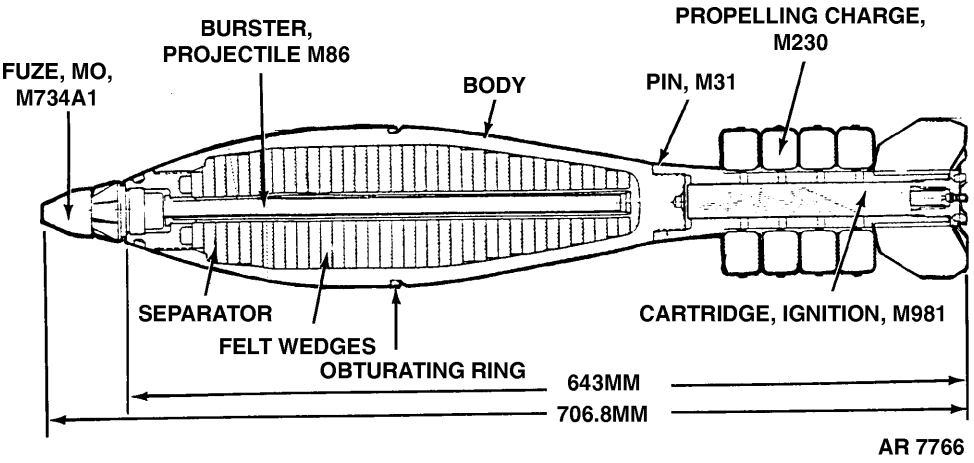
Shipping and Storage Data:

UNO serial number 0245
Quantity-distance class. . .(08) 1.2
Storage compatibility groupH
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 tot he 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.

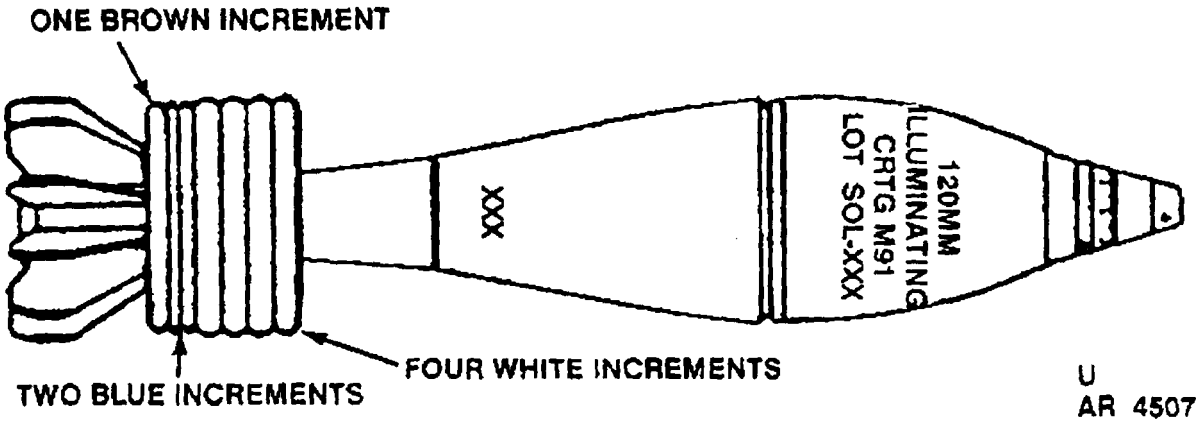
Shipping and Storage Data:

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:

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 ---------- +145F (+62.8°C)

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

Ammo container:
- Drawing number - - - - - - - - - - - - - - - 512-3007-01

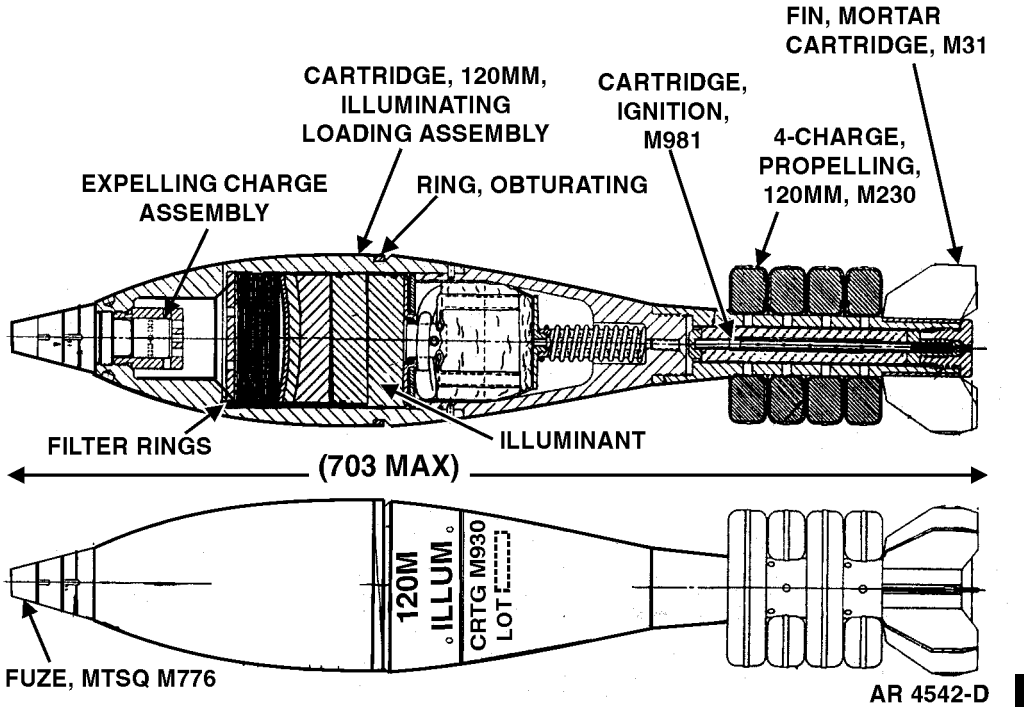
Box:
- Drawing number - - - - - - - - - - - - - 512-5015-00

*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- - - - - - - - - - - - - - - AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILE
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 candlepower/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:

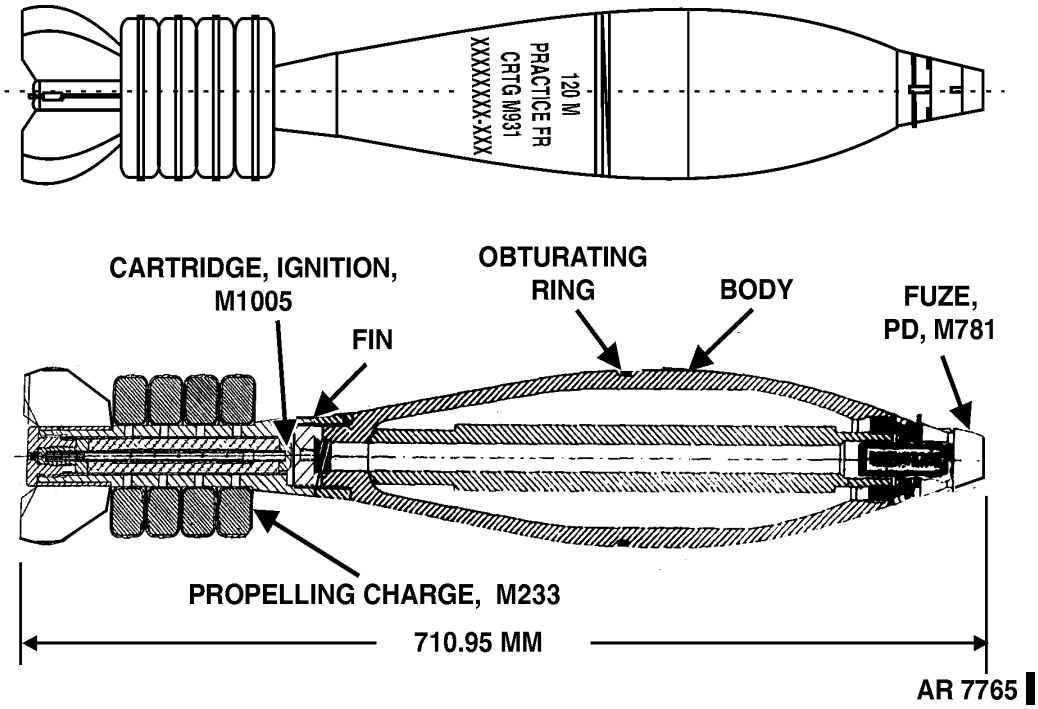
*Packing	1 round per fiber container; 2 containers per metal container

*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 downrange. 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 containers 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

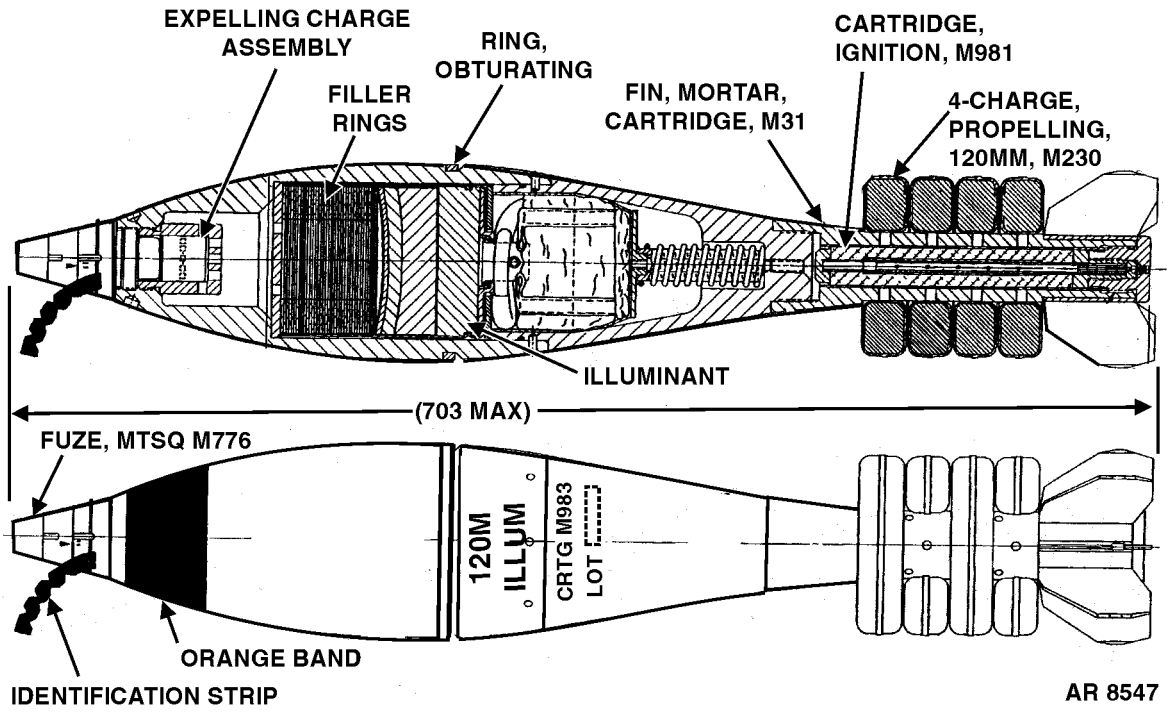
SHIPPING AND STORAGE DATA:

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



Type Classification:

TC - STD (5 Apr 00).

Use:

This car-/tridge 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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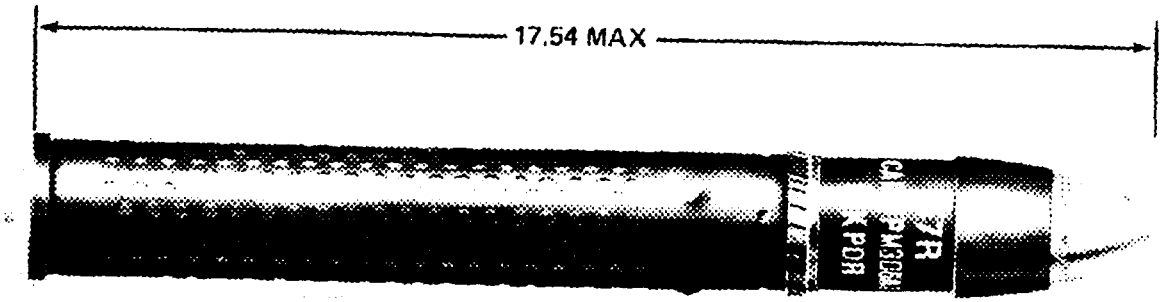
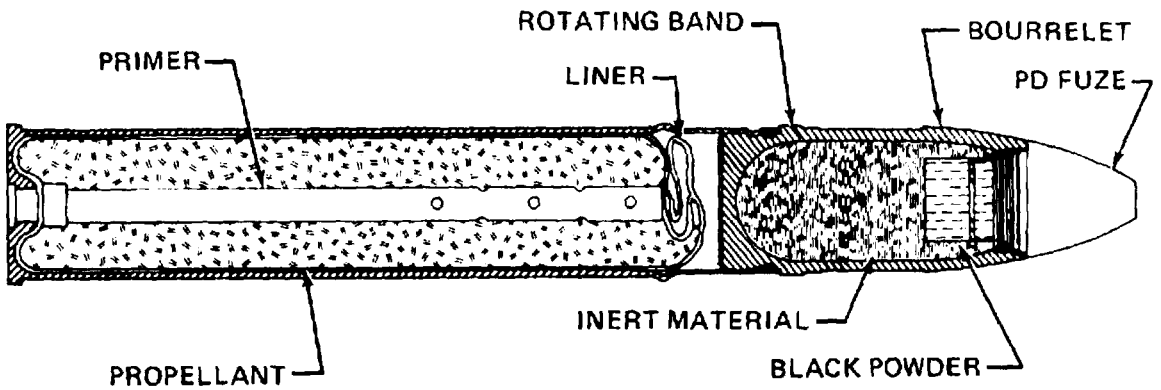
CARTRIDGE 57-MILLIMETER: TP M306A1



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 material, 6.46 oz, Black powder 1.1 oz

Components:
- Cartridge case ---------- M30A1B1
- Propelling charge ---------- M10
- Primer ---------- M60A1
- Fuze ---------- PD, M503A1 or M503

Performance:
- Maximum range ---------- 4508 m
- Muzzle velocity ---------- 1200 fps

TemperatureLimits:

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; 4 containers 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 ---------- AMMUNITION FOR CANNON WITH SOLID PROJECTILES
- DODAC ---------- 1310-B588
- Drawing number ---------- 751252

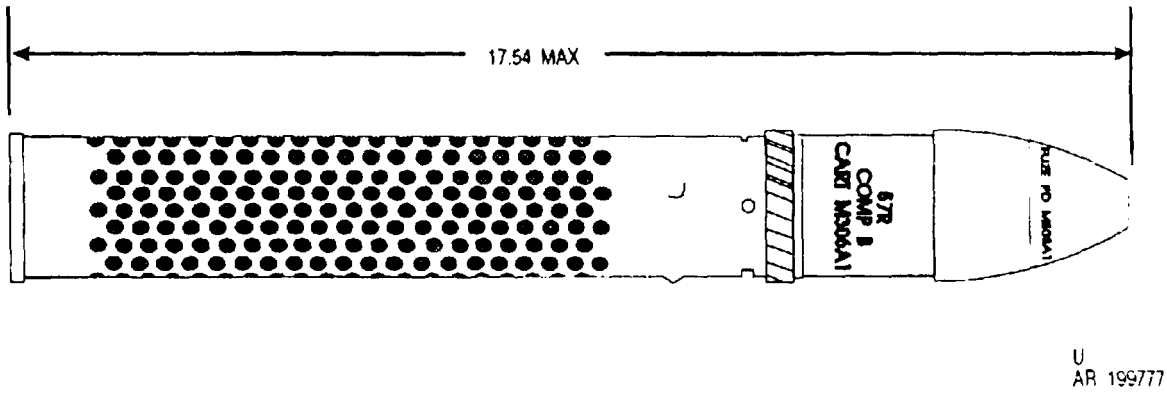
Limitations:

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



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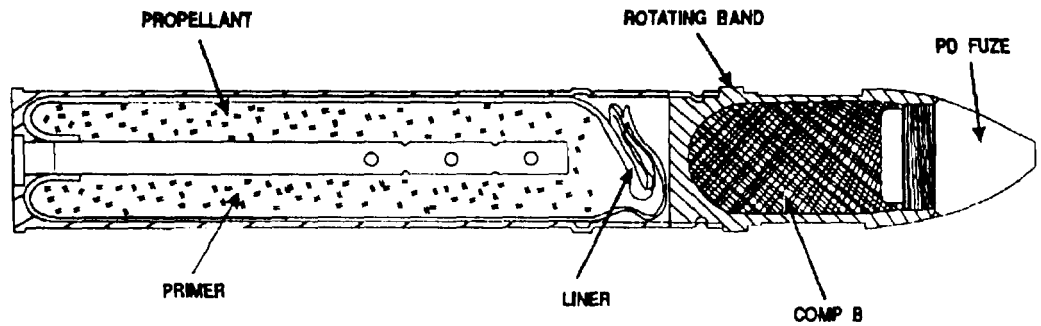
AR 199777



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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 container; 6 fiber container in wooden box
*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	È
DOT shipping class	A
DOT designation	AMMUNI - TION FOR CANNON WITH EX- PLOSIVE PROJEC- TILE
DODAC	1310-B586
Drawing number	9215030

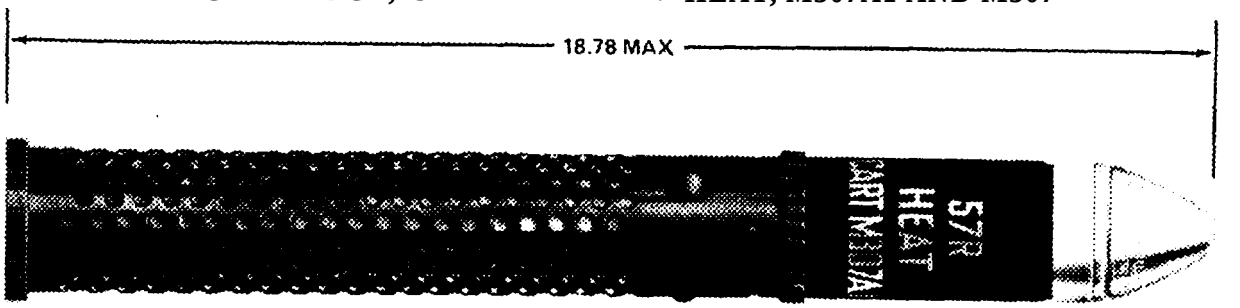
Limitations:

Because M60 primers rupture occasionally, gun bores must be inspected for fragments after each firing.

Reference=

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

CARTRIDGE, 57-MILLIMETER: HEAT, M307A1 AND M307



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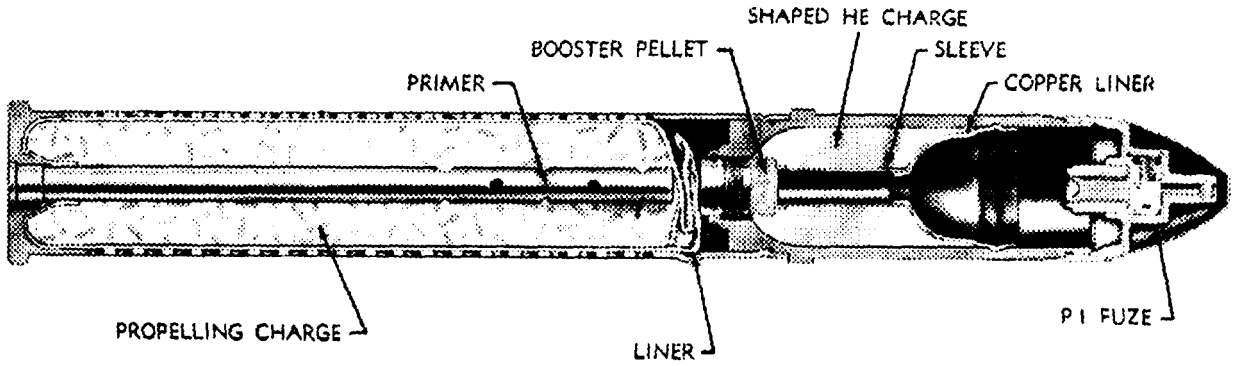


AR 199774-A

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	l,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 container; 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	AMMUNITIONFOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1310-B587
Drawing number	75-1-215

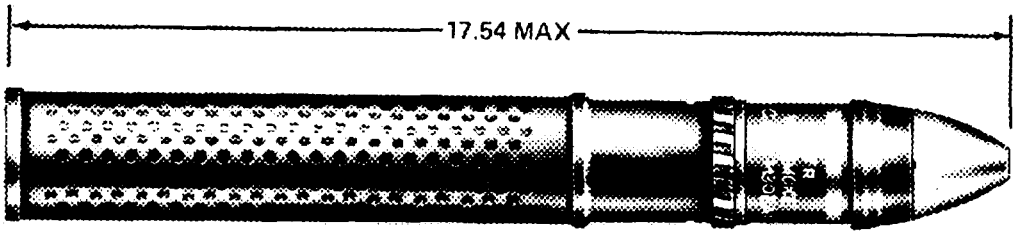
Limitations:

Because M60 primers rupture occasionally, gun bores must be inspected for fragments after each firing.

References:

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

CARTRIDGE, 57-MILLIMETER: SMOKE, WP, M308A1 AND M308



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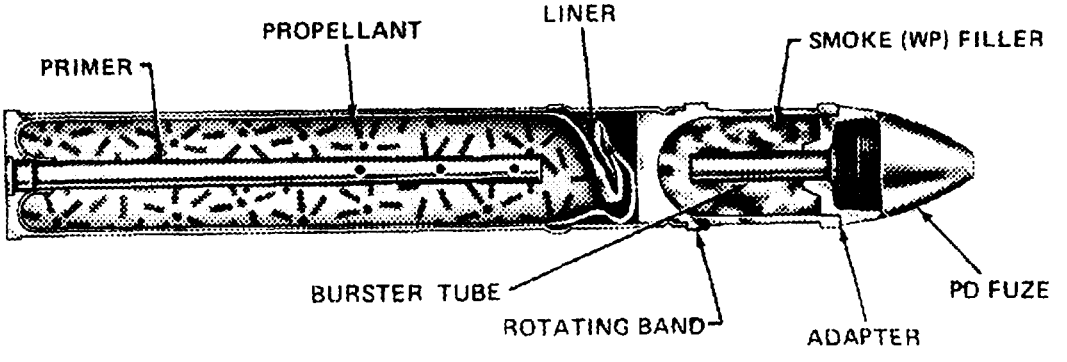


AR199772

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	l,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	l.l 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

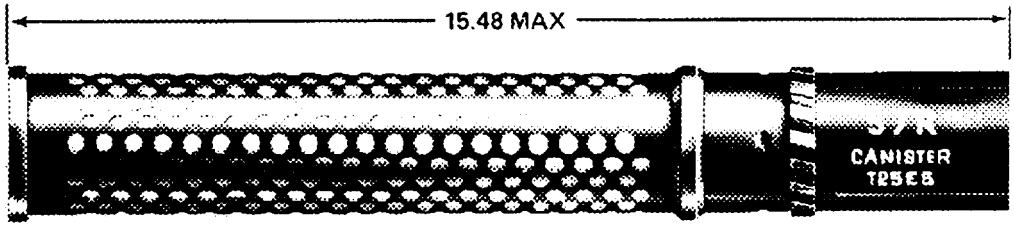
Limitations:

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



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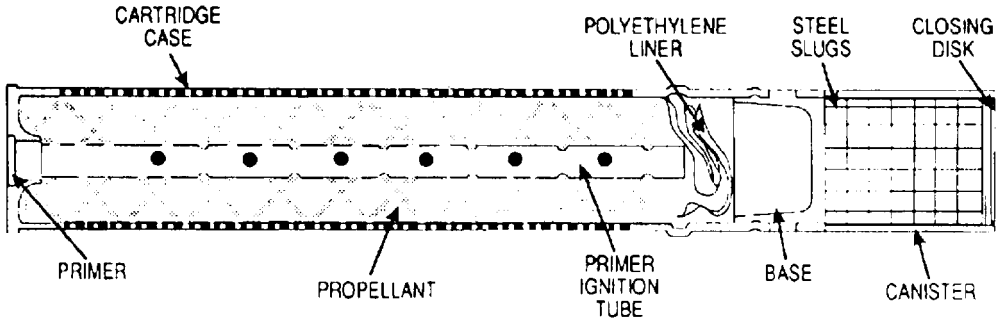

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AR 199770

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 rotating band near the base. The canister is closed at the front by crimping and welding to a steel disk, and at the rear by a heavy steel base.

Functioning:

When the primer is struck by the firing pin of the weapon, flame from the primer black power ignites the propellant. The burning propellant generates gases to propel the canister through the barrel, and spin is provided by the rotating band engaging the barrel rifling. 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	l,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

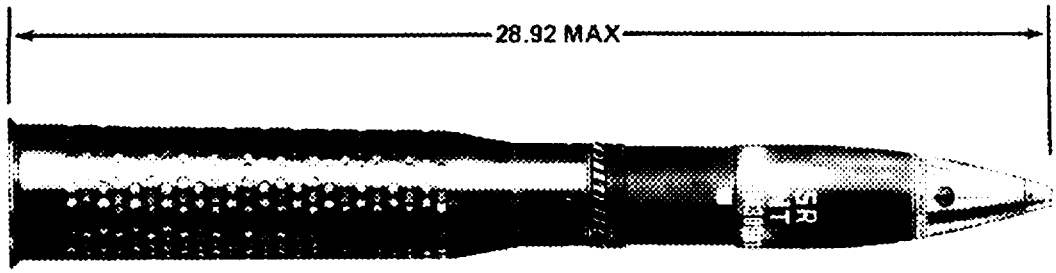
Limitations:

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



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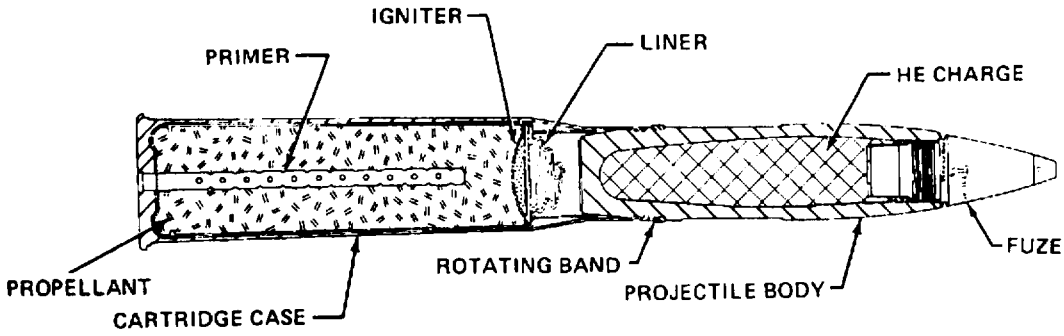


AR199766

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 preengraved 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.

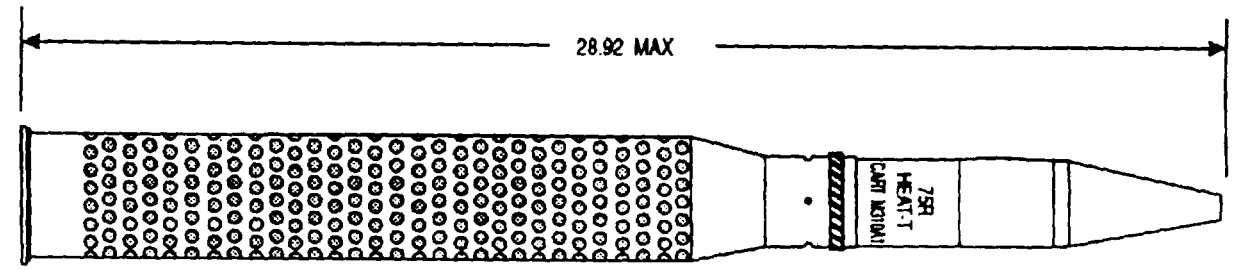
Shipping and Storage Data:

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



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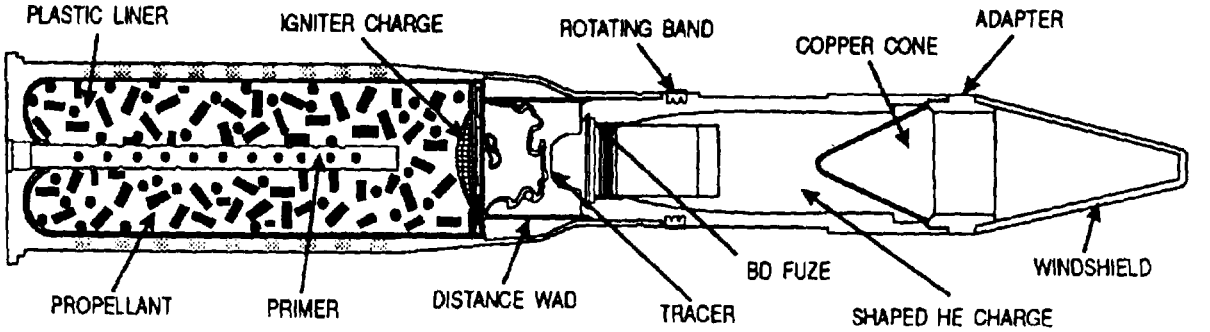

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AR 199762

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 M31OA1 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 rapidely expanding gases to propel the proiectle 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)
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.

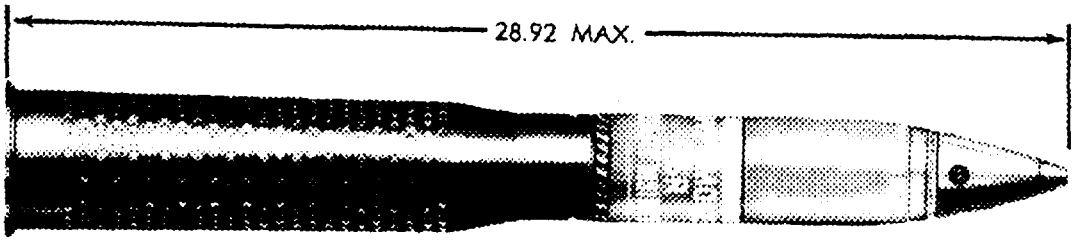
Shipping and Storage Data:

UNO serial number	0006
Quantity-distance class	1.1
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
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



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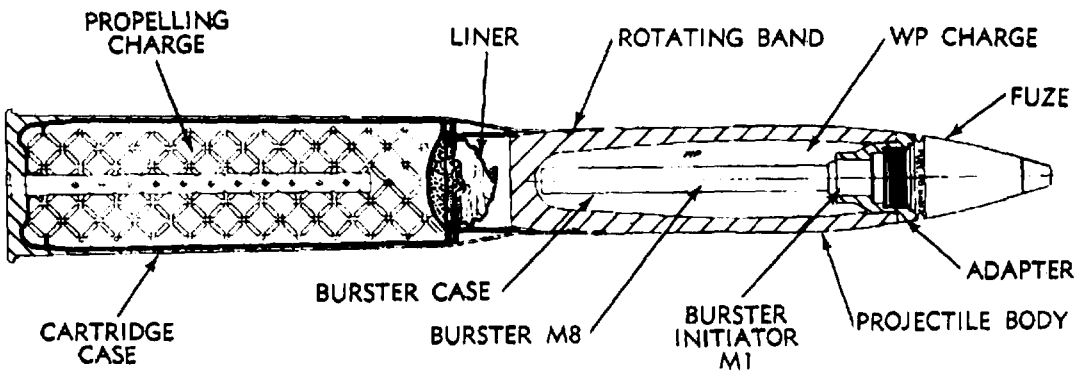


AR 199764

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:

[illegible]	[illegible]
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

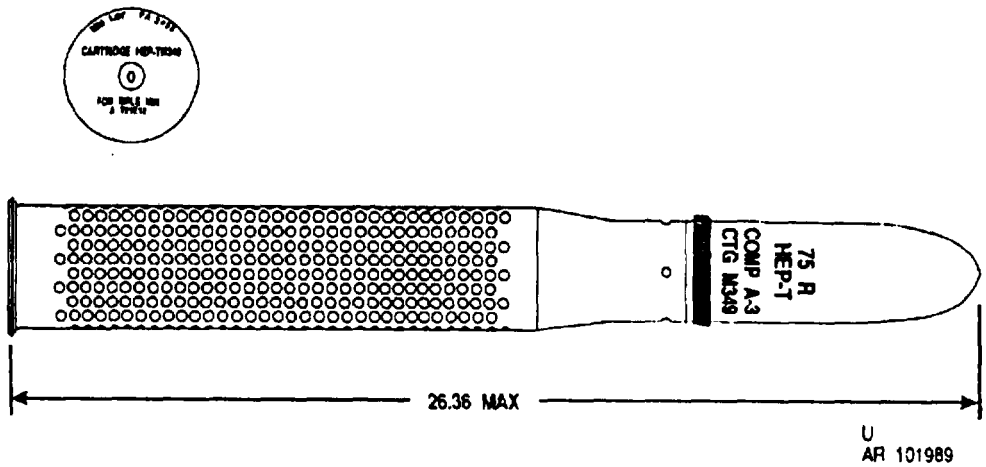
Limitations:

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 periods 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
[b] 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.

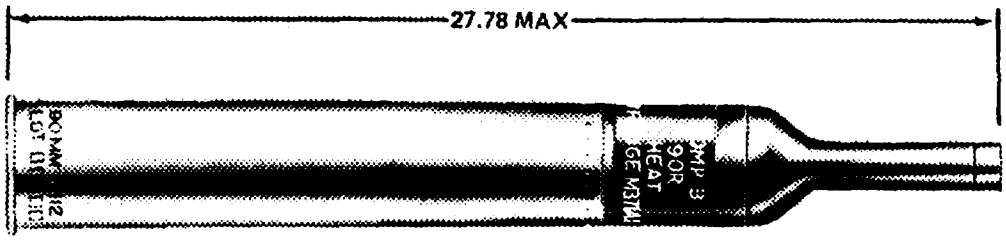
Shipping and Storage Data:

UNO serial number	0006
Quantity-distance class	1.1
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC	1315-C053
Drawing number	75-1-32

References:

AMC-P 700-3-3

CARTRIDGE, 90-MILLIMETER: HEAT M371A1



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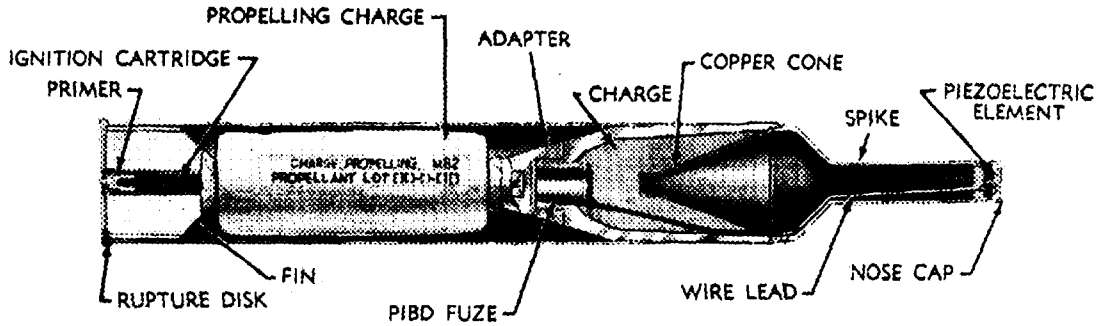


Type Classification:

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 rojectile 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.

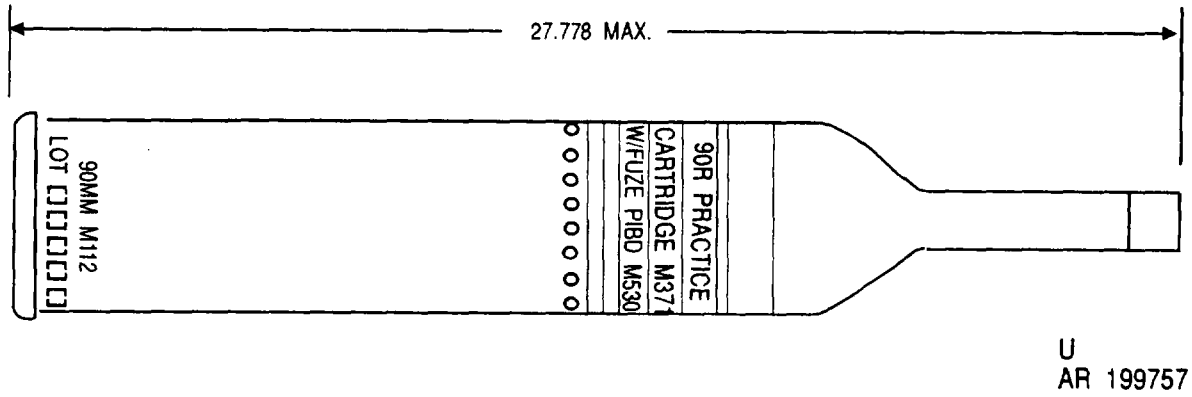
Shipping and Storage Data:

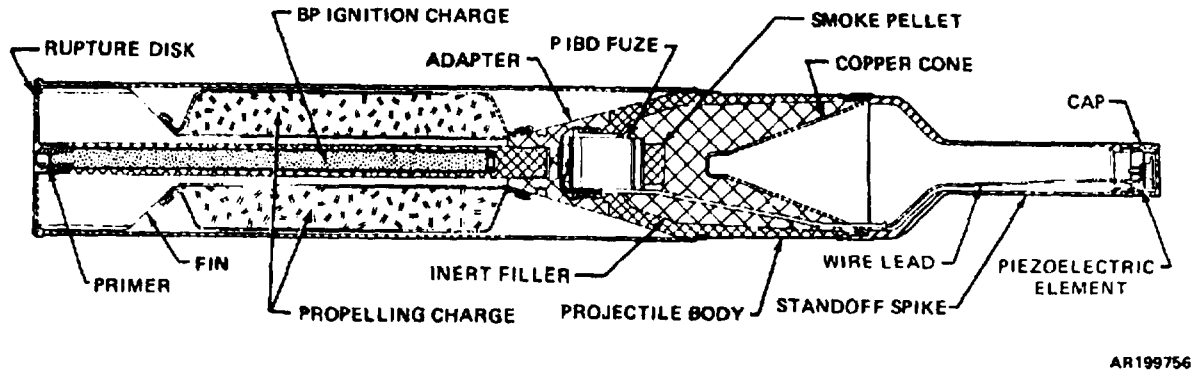
UNO serial number	0321
Quantity-distance class	(12) 1.2
Storage compatibility group	E
DOT shipping class	A
DOT designation	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1315-C282
Drawing number	8863468

References:

SB 700-20
AMC-P 700-3-3
TM 9-1015-223-12
TM 9-1300-251-20

CARTRIDGE, 90-MILLIMETER: PRACTICE, M371





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

TemperatureLimits:

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.

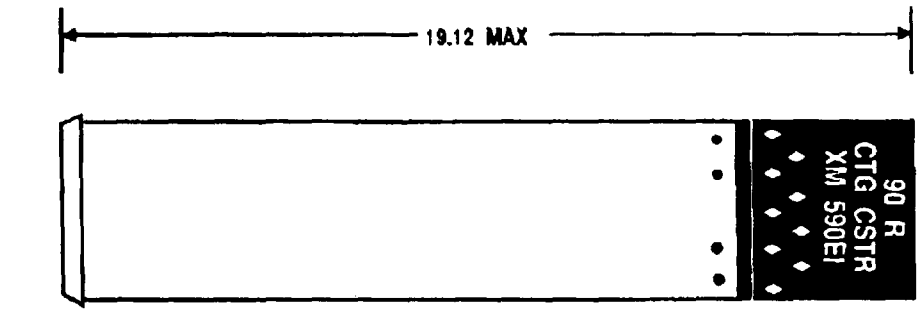
Shipping and Storage Data:

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, ANTIPERSONNEL, M590 (XM590E1)



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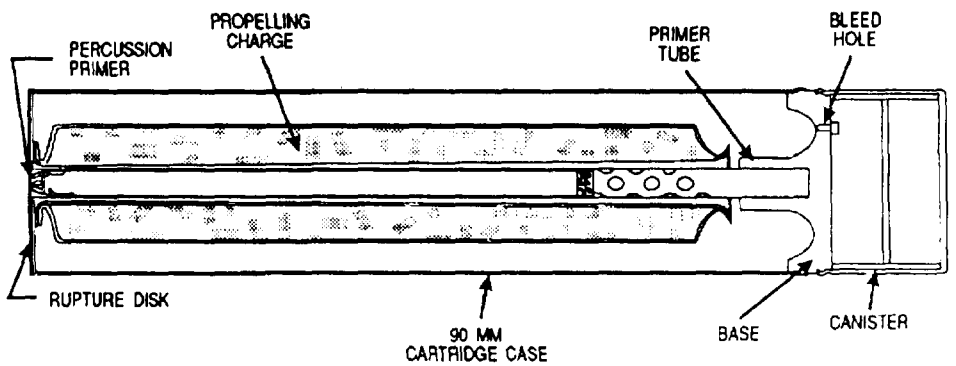

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AR 199760

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 antipersonnel
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
Components:	
Cartridge case	M112
Propelling charge	M178
Primer	M92A1
Performance:	
Effective range	200 m
Muzzle velocity	1200 fps

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for not more that 3 days)
Upper limit	+160°F (for not more than 4 hr/day)
* Packing	1 round in fiber container; 6 containers in wirebound box
*Packing Box:	
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 desigtion	AMMUNITION FOR CANNON WITH SOLID PROJECTILES
DODAC	1315-C410
Drawing number	9214567

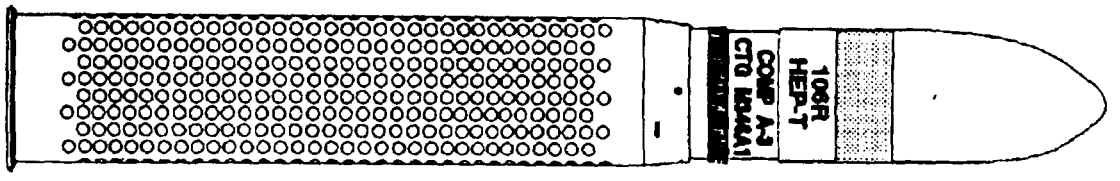
Limitations:

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



U
AR 101983

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

*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.

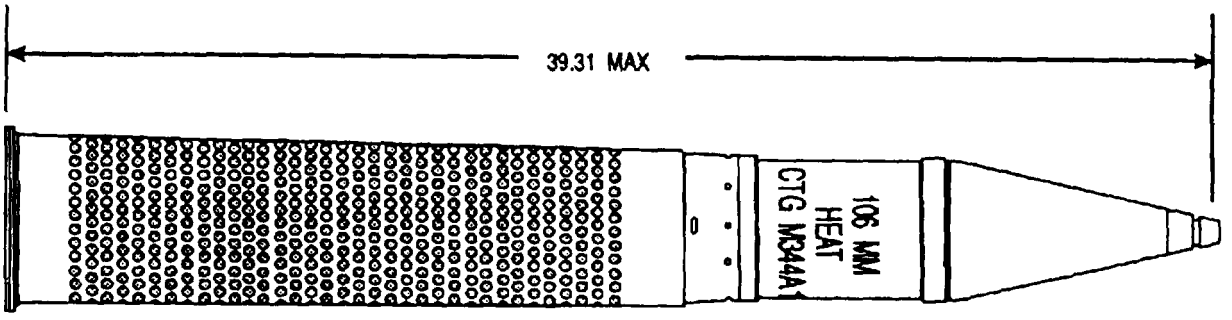
Shipping and Storage Data:

UNO serial number ---------- 0005
Quantity-distance class ---------- 1.1
Storage compatibility group ----- F
DOT shipping class ---------- A
DOT designation ---------- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC ---------- 1315-C651
Drawing number ---------- 8837335

References:

AMC-P 700-3-3

CARTRIDGE. 106-MILLIMETER: HEAT, M344A1 AND M344



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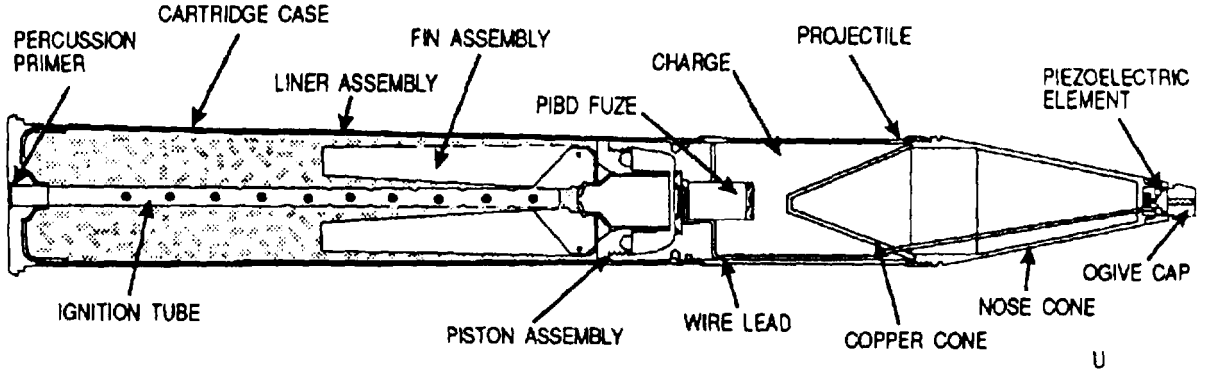
AR 199753



U
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
Lenght	39.31 in.
Cannon used with	M40A1, M40A1C
Projectile:	
Body material	Steel
Color:	
Old mfg	Olive drab w/yellow markings
New mfg	Black w/yellow markings
Filler and weight	Comp B, 2.79 lb
Components:	
Cartridge case:	
M344Al	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 container; 2 containers in wooden box
*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.

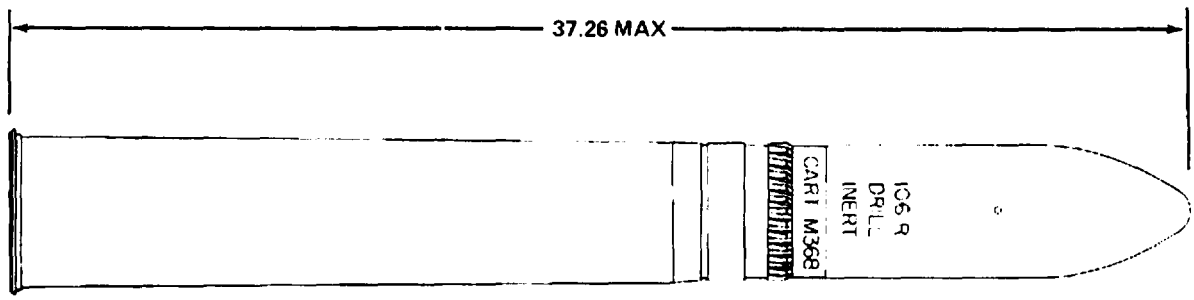
Shipping and Storage Data:

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



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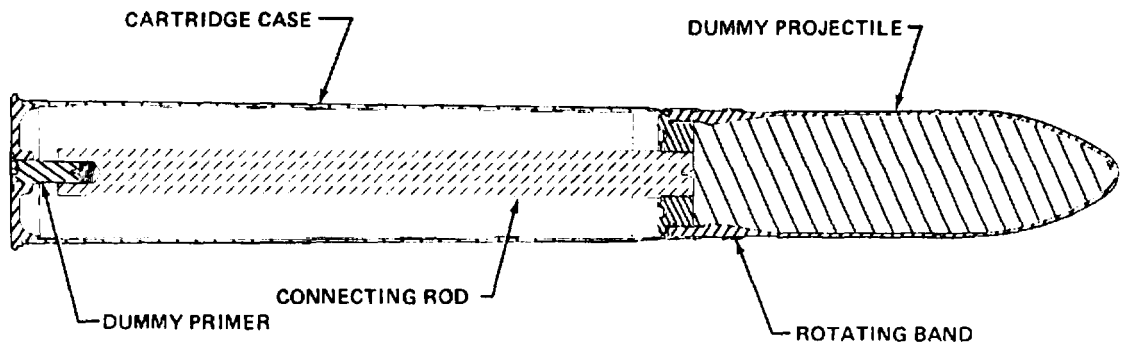


AR199750

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.

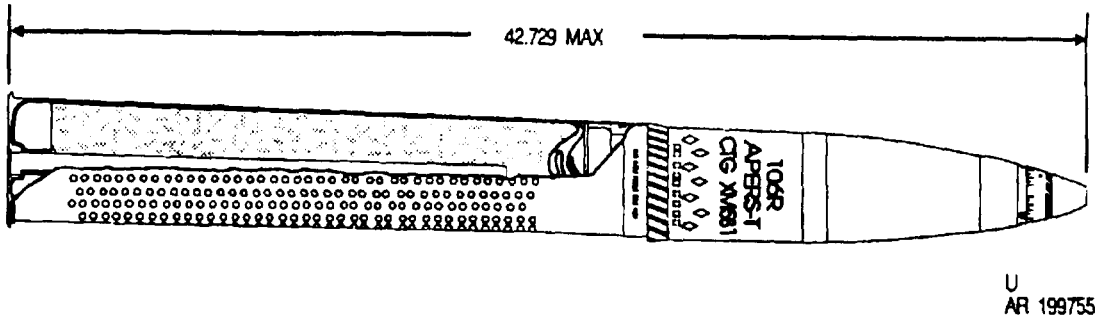
Shipping and Storage Data:

DOT designation	AMMUNITION 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



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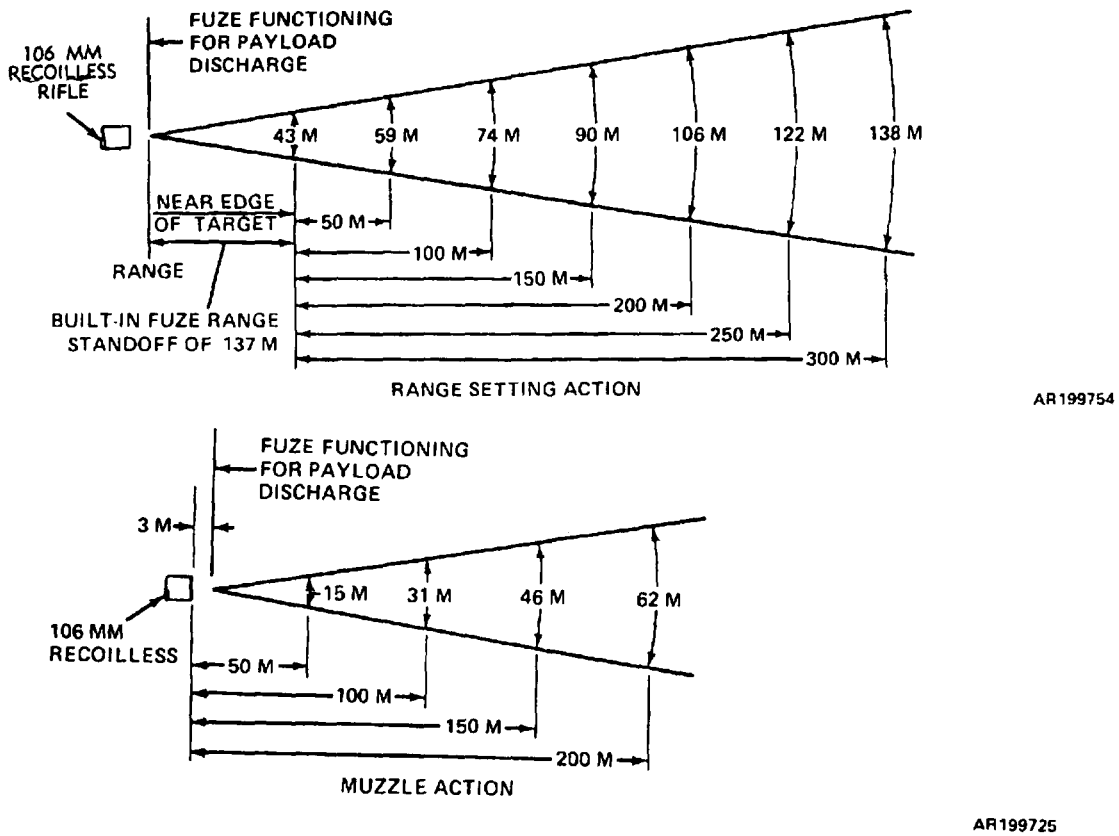


Type Classification:

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 breechblock. The fuze commences arming immediately upon firing, and will function on muzzle action or range, according to the setting. When the fuze functions, the four radial detonators in the adapter rupture the shell case. Simultaneously the axial detonator and relay explode the expelling charge in the base. The combination of forward force and centrifugal force from rotation results in a conical forward dispersion of flechettes. The yellow dye marks the function point.

Tabulated Data:

Complete round:	
Type	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 propellant
Yellow dye	11 grams
Detonators	(4) M86 (XM86); (1) XM87 with relay M7
Components:	
Cartridge case	M94B1
Propelling charge	M26
Primer	M57
Tracer	M13

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
* Packing box:	
Weight	134 lb
Dimensions	49-5/8 x 13 x 8-1/4 in.
Cube	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	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
DODAC	1315-C660
Drawing number	9210603

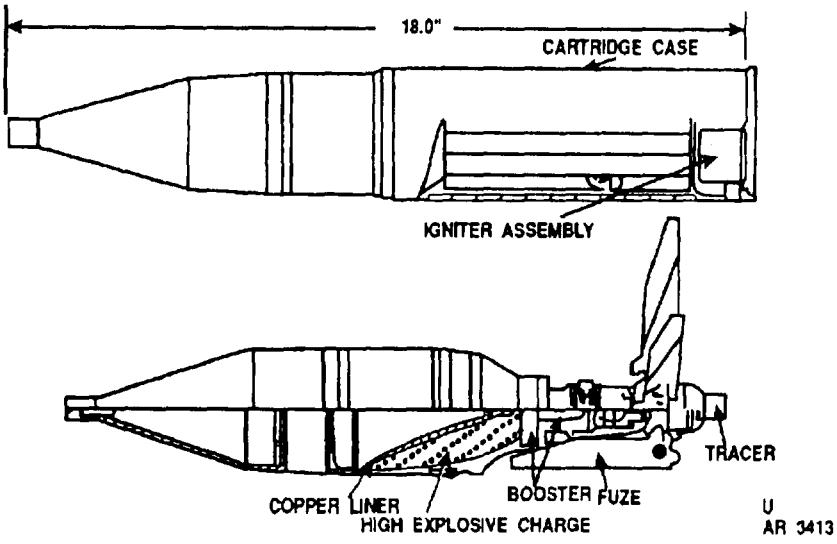
Limitations:

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:	
Explosive	16.4 g
Type	Composition A5
Cartridge case:	
Igniter	15.0 g (0.53 oz)
Propellant	0.78 lb (355 g)
Type (dble base)	AK13204
Configuration	Strips
Number strips	200
Other:	
Electronic detonator	1.57 g (0.06 oz)
Percussion cap	0.13 g (0.005 oz)
Fuze:	
Type	Point Initiating, Base Detonating (Piezoelectric)
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)
Cube	37.7 cu ft (1.07 cu m)

Shipping and Storage Data:

Storage class/SCG (Q-D)	1.1 E
DOT shipping class	A
DOT designation	ROCKET AMMUNITION WITH EXPLOSIVE PROJECTILE
Field storage	Group F
DODAC	1315-C995
Drawings:	
84mm HEAT Round AT4	13229923 (FFV Sweden)/ 28201800 (Honeywell U.S.)
84mm HEAT Shell	13229942 (FFV Sweden)/ 28201817 (Honeywell U.S.)
Box, Packed, Marked	13230240 (FFV Sweden)/ 28202869 (Honeywell U.S.)

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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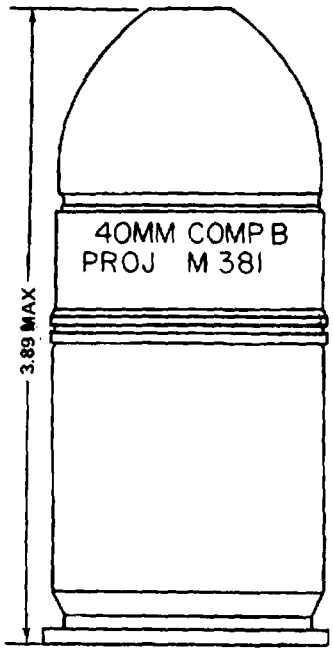
CARTRIDGE, 40-MILLIMETER: HE, M381



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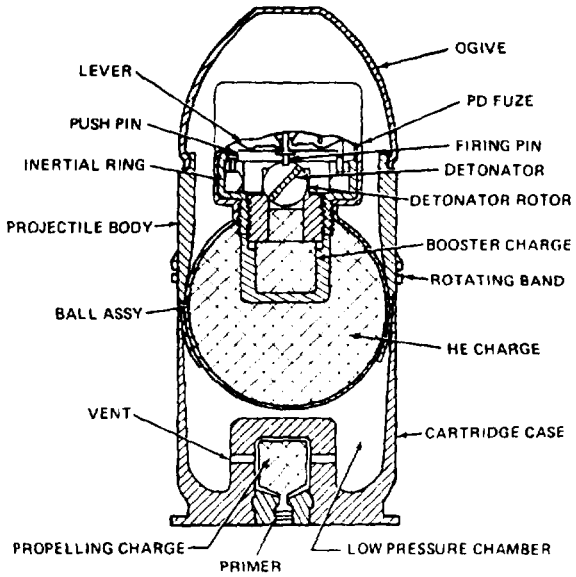


AR199575

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 pro.jectile. 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 f'uze to be withdrawn from the rotor ball detent, and centrifugal force from projectile rotation causes the rotor ball assembly to allign 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:	
Type	HE
Weight	0.503 lb
Length	3.89 in.
Weapons used with	40mm Grenade Launchers M79 and M203 (attached to M16 series rifle)
Proiectile:	
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)

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)

	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.

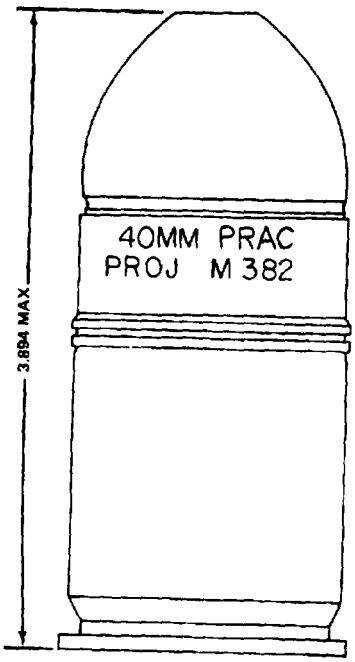
Shipping and Storage Data:

Hazard class/division and storage compatibility group	(04) 1.2 E
UNO serial number	0321
DOT class	Class A Explosive
DOT marking	AMMUNITION FOR CANNON W/ EXPLOSIVE PROJECTILES
DODAC	1310-B568
Cartridge drawing number	8835941
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: PRACTICE, M382



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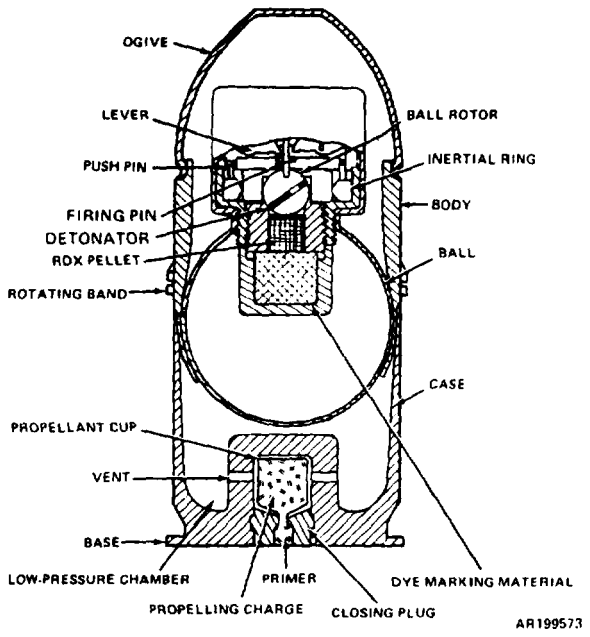


Type Classification:

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 laucher 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.

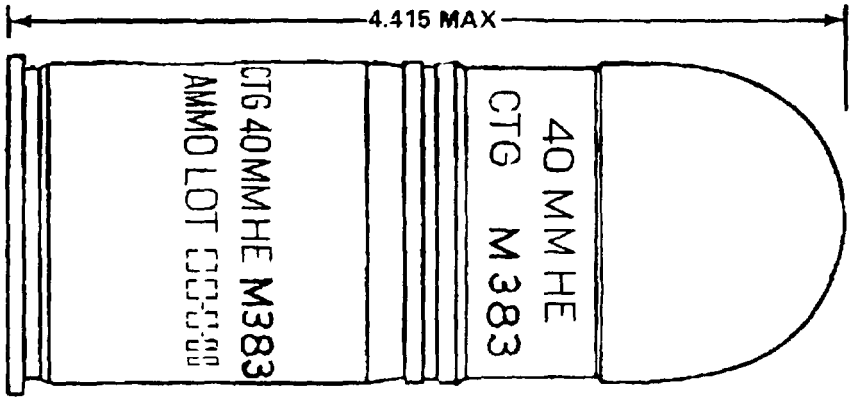
Shipping and Storage Data:

UNO serial number	0328
Hazard class/division and storage compatibility group	(04) 1.2 C
DOT class	Class C Explosive
DOT marking	CARTRIDGES, 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



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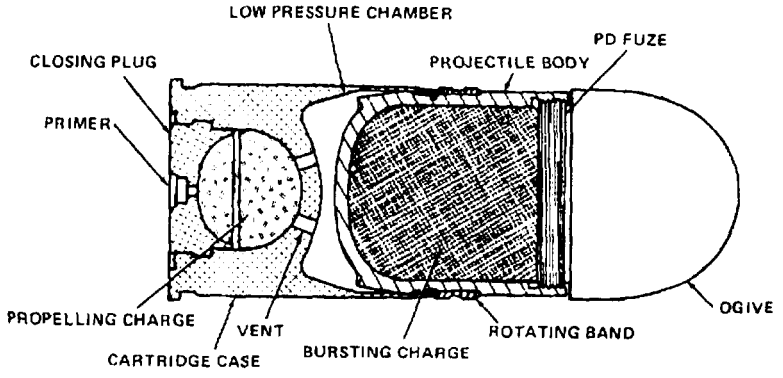


AR199571

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 cartridge case. The case is a hollow bichambered aluminum cylinder with an aluminum closing plug fitted into the open well of the propellant chamber in the cartridge base. The propelling charge is contained in the spherical high pressure propellant chamber. This chamber has vent holes in the top and is sealed at the bottom by the closing plug. The hollow chamber in the upper section of the case acts as a low-pressure chamber. A percussion primer is crimped into the center opening in the closing plug.

Functioning:

The weapon firing pin strikes the percussion primer igniting the propelling charge. Gases from the burning propellant in the high-pressure chamber are forced through the vent holes into the low-pressure chamber. The rotating band around the projectile engages the rifling in the launcher barrel imparting a spin of 12,000 rpm to the projectile. The expanding gases in the low-pressure chamber force the projectile through the barrel with a muzzle velocity of 244 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)
Complete round:	
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
Projectile:	
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
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)

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.

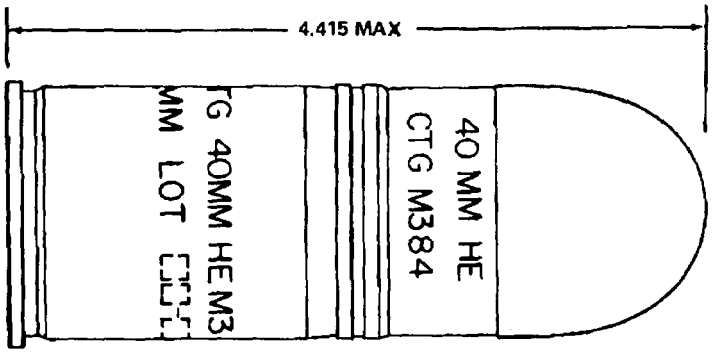
Shipping and Storage Data:

UNO serial number	0006
Hazard class/division and storage compatability group	1.1 E
DOT class	Class A Explosives)
DOT marking	AMMUNITION FOR CANNON W/EXPLOSIVE PROJECTILES
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



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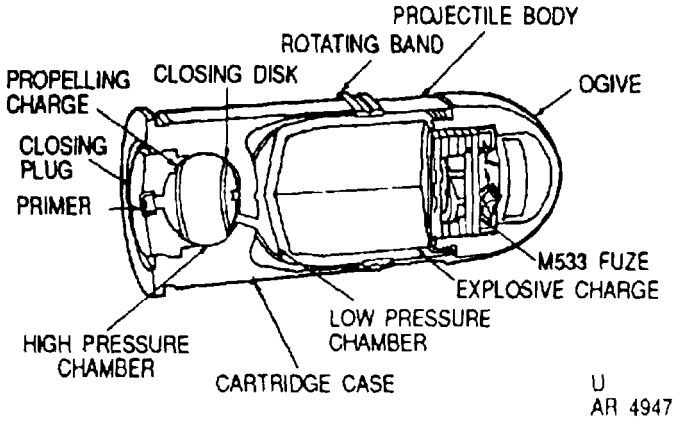


Type Classification:

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-pressue 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

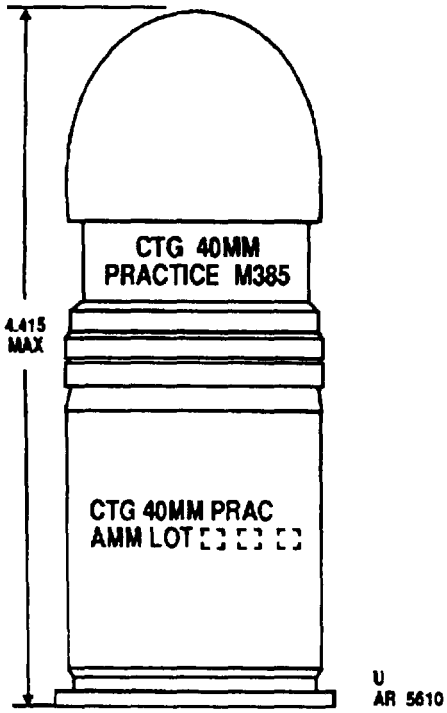
*NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

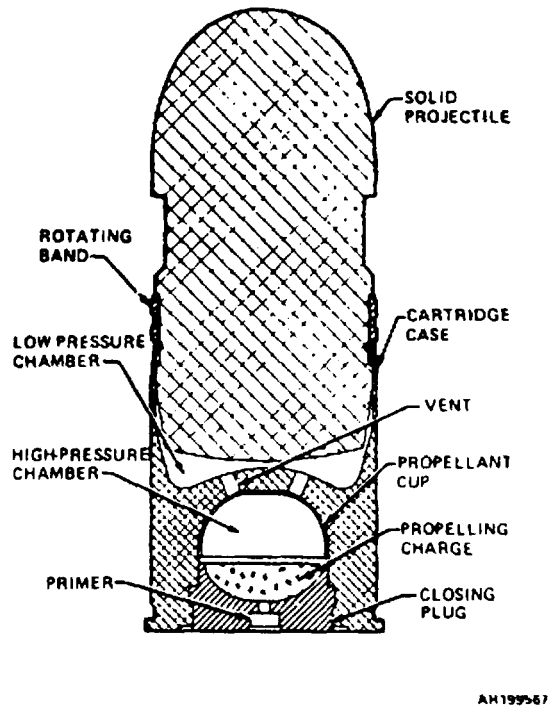
Shipping and Storage Data:

UNO serial number	0006
Hazard class/division and storage compatibility group	1.1 E
DOT class	Class A Explosive
DOT marking	AMMUNITION FOR EXPLOSIVE PROJECTILE
DODAC	1310-B470
Cartridge drawing number	8886397
Packing drawing number	9251995

References:

CARTRIDGE, 40-MILLIMETER: PRACTICE, M385





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 plojectile 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

Projectile:	
Body material	Bar alloy aluminum
Color	Blue w/black markings
Propelling charge:	
Cartridge case	M169
Propellant	M2, 4.2 g
Primer	Percussion, FED 215
Performance:	
Maximum range	2,200 m
Muzzle velocity	244 mps (795 fps)

Temperature Limits:

Firing:	
Lower limit	-25°F (-31.5°C)
Upper limit	+110°F (+43°C)
Storage:	
Lower limit	-30°F (-34°C)
Upper limit	+145°F (+62.5°C)
*Packing	50 rounds in linked belt
*Packing Box:	
Weight	53 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.

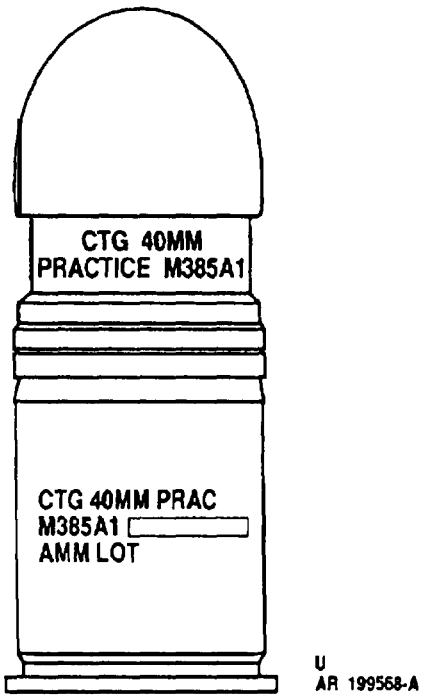
Shipping and Storage Data:

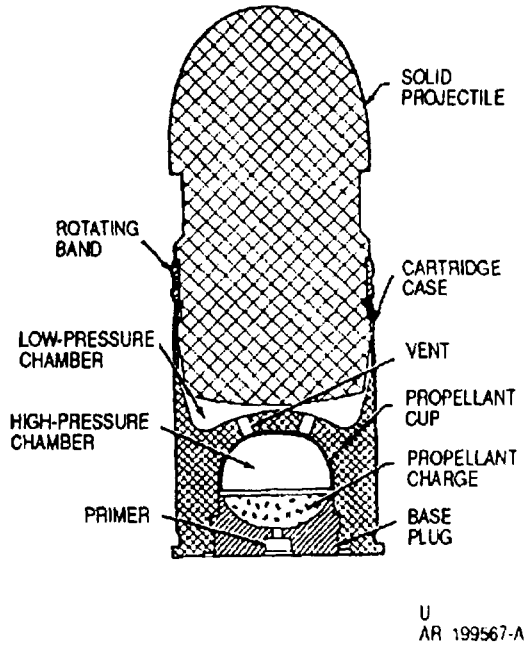
UNO serial number	0328
Hazard class/division and storage compatibility group	(04) 1.2 C
DOT class	Class C Explosive
DOT marking	CARTRIDGES, PRACTICE AMMUNITION
DODAC	1310-B480
Cartridge drawing number	8886326
Packing drawing number	9251995

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





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 chamer. 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 f'rom 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 vith 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
Projectile:	
Body material	Bar alloy aluminum
Color	Blue w/black markings
Propelling Charge:	
Cartridge case	M169
Propellant	M2, 4.2 g
Primer	Percussion, FED 25
Performance:	
Maximum Range	2,200 m (7217.85 ft)
Muzzle velocity	242 mps (795 fps)

Temperaturc Limits:

Firing:	
Lower limit	-25°F (-31.5°C)
Upper limit	+110°F (+43°C)
Storage:	
Lower limit	-30°F (-34°C)
Upper limit	+145°F (+62.5°C)

*NSN: 1310-01-159-3184

Packing	48 rounds in linked belt
Packing Box:	
Weight	59.5 lb (26.99 kg)
Dimensions	18-19/32 x 14-19/32 x 8-19/64 in. (47.23 x 37.07 x 21.07 cm)
Cube	1.3 cu ft (0.04 cu m)
Packing drawing number	9362543

NSN: 1310-01-316-9973

Packing	32 rounds ln linked belt
Packing Box Metal PA-120:	
Weight	42 lb (18.14 kg)
Dimensions	18.76 x 10.39 x 6.36 in. (47.65 x 26.39 x 16.15 cm)
Cube	0.72 cu ft (0.02 cu m)
Packing drawing number	12928042

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

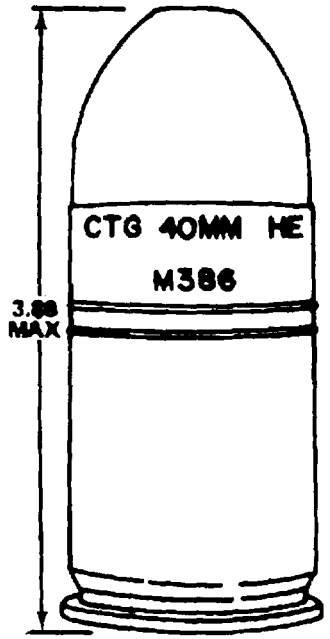
Shipping and Storage Data:

UNO serial number	0338
Hazard class/division and storage compatibility group	(04) 1.4 C
DOT class	Class C Explosive
DOT marking	CARTRIDGES, PRACTICE AMMUNITION
DODAC	1310-B576
Cartrldge drawing number	8886326

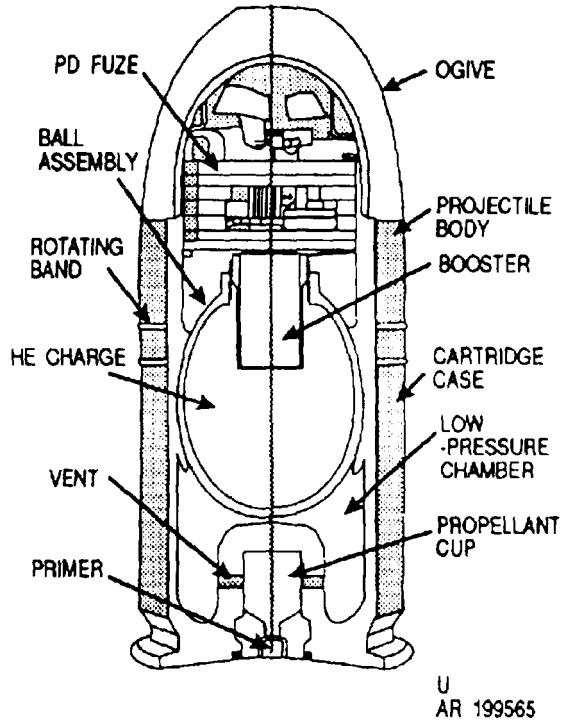
References:

DOD Consolidated Ammunition Catalog 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: HE, M386



AR199566



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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 surrounding the cup acts as a low-pressure chamber.

Functioning

The weapon firing pin strikes the percussion primer igniting the propelling charge in the high-pressure chamber. The burning propelling charge generates sufficient pressure to rupture the propellant cup and force the 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 reward 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.

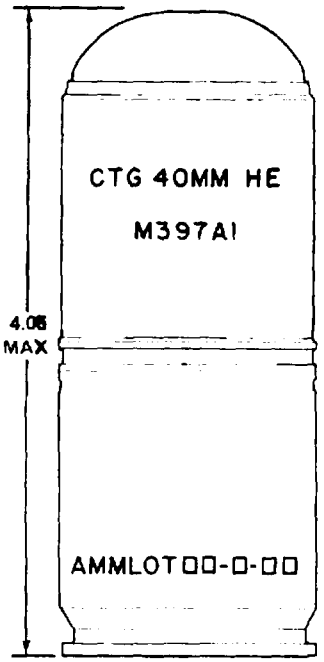
Shipping and Storage Data:

UNO serial number	0321
Hazard class/division and storage compatibility group	(04) 1.2E
DOT class	Class A Explosive
DOT marking	AMMUNITION FOR CANNON W/EXPLOSIVE PROJECTILES
DODAC	1310-B574
Cartridge drawing number	8835951
Packing drawinng 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



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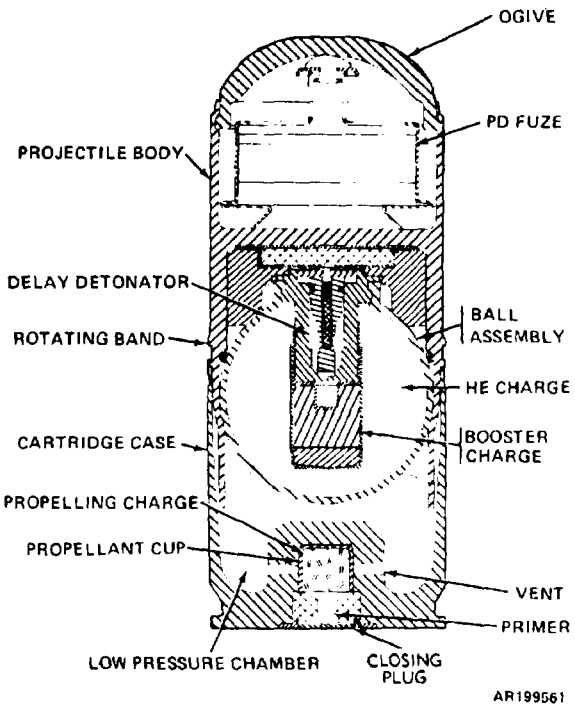


AR199561

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 f'rom 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 escapment 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	H E
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
*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.

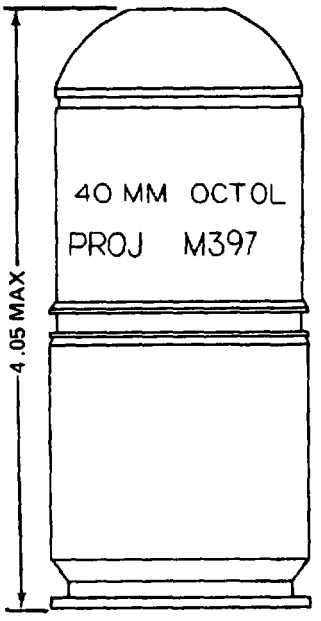
Shipping and Storage Data:

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	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



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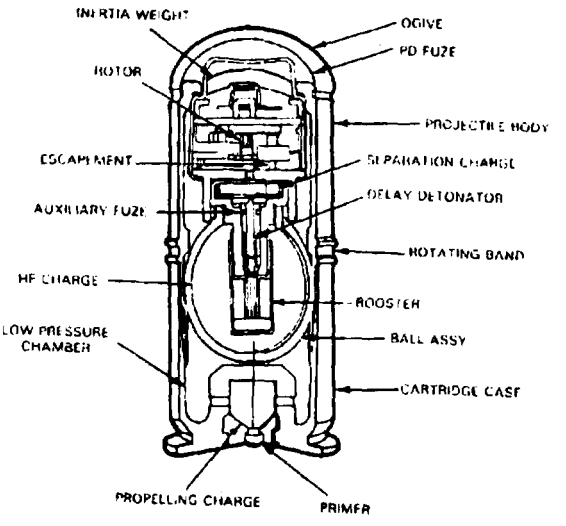


ARD 85-2557

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 in from the rotor and releases a centrifugallock 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)
Upper limit	+165°F (73.9°C)
*Packing	6 rounds packed in plastic bandoleer; 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.

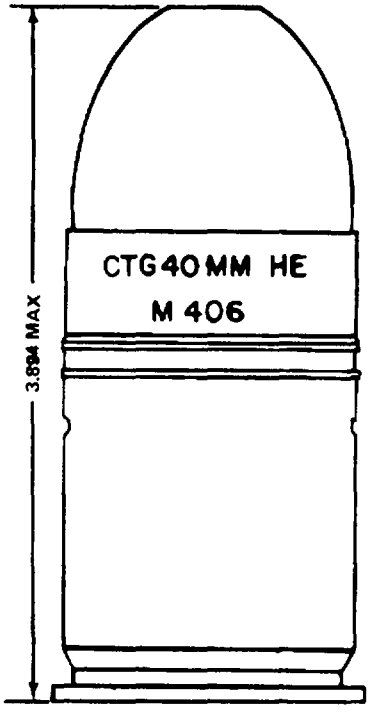
Shipping and Storage Data:

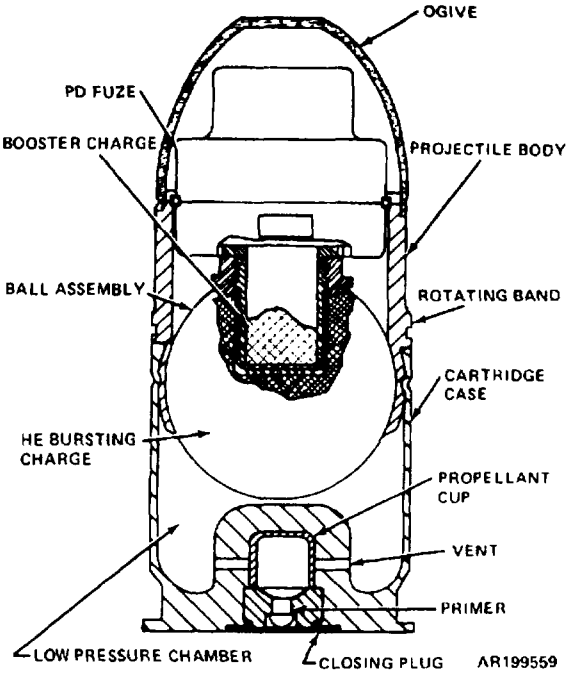
UNO serial number	0006
Hazard class/division and storage compatibility group	1.1 E
DOT class	Class A Explosive
DOT marking	AMMUNITION FOR CANNON W/ EXPLOSIVE PROJECTILES
DODAC	1310-B569
Cartridge drawing number	8883461
Packing drawing number	8882362

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





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)
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.

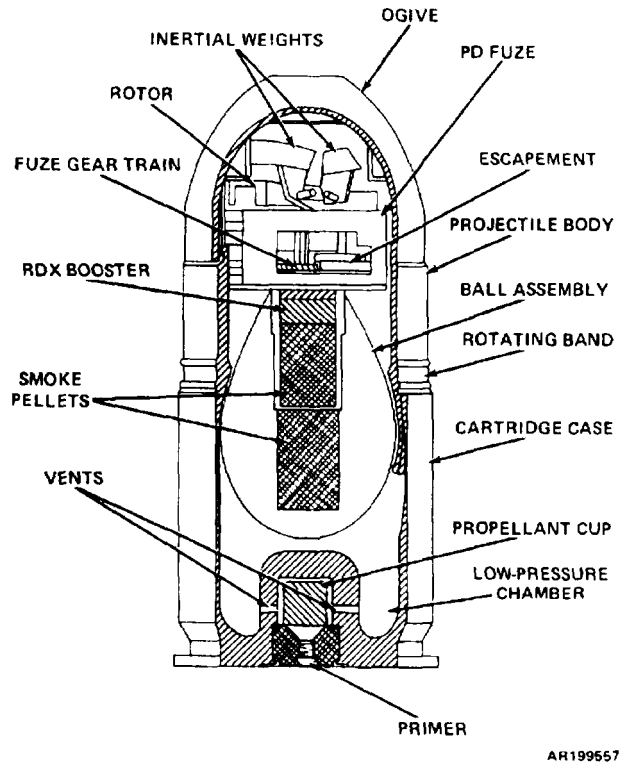
Shipping and Storage Data:

UNO serial number	0321
Hazard class/division and storage compatibility group	(04) 1.2 E
DOT class	Class A Explosive
DOT marking	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 escapement mechanism delays arming. by controlling rotor movement. The fuze arms after the projectile has traveled at least 14 to 27 meters (45 to 90 feet) from the launcher tube. Upon impact

with the target, the firing pin is forced into the detonator. Concurrently, the detonator ignites the RDX booster pellet which fragments the plastic ball and 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)
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.

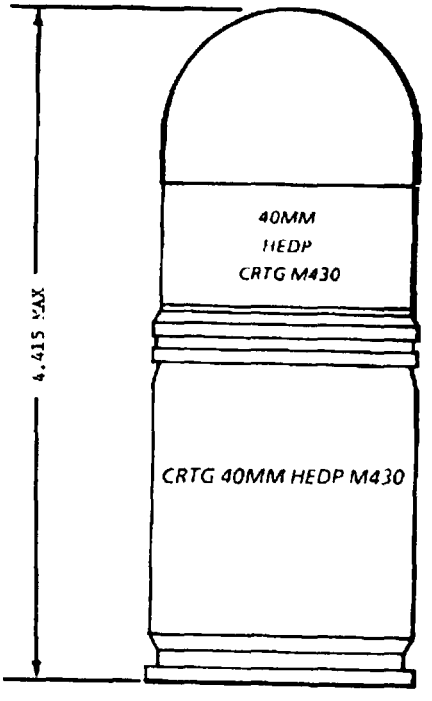
Shipping and Storage Data:

UNO serial number	0328
Hazard class/division and storage compatibility group	(04) 1.2 C
DOT class	Class C Explosive
DOT marking	CARTRIDGES, PRACTICE AMMUNITION
DODAC	1310-B577
Cartridge drawing number	8835952
Packing drawing numbers	8835104, 8835105

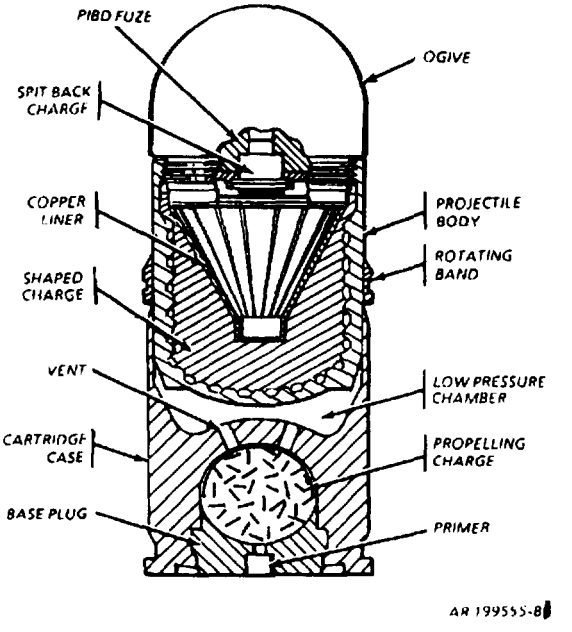
References:

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 PIBD 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 spitback 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 wieght	Comp A5, 38 g (32 g - M430A1)
Faze	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

*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	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
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
DOT marking	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES
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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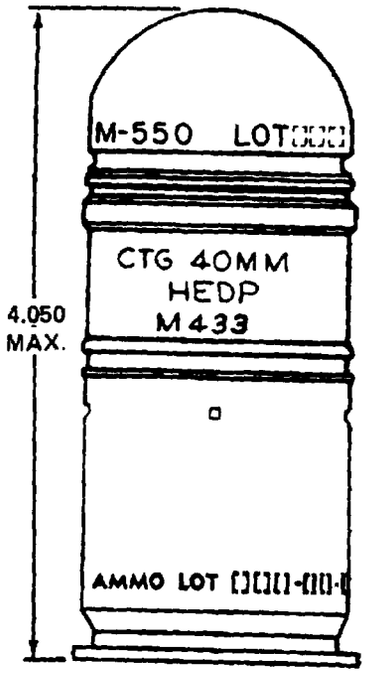
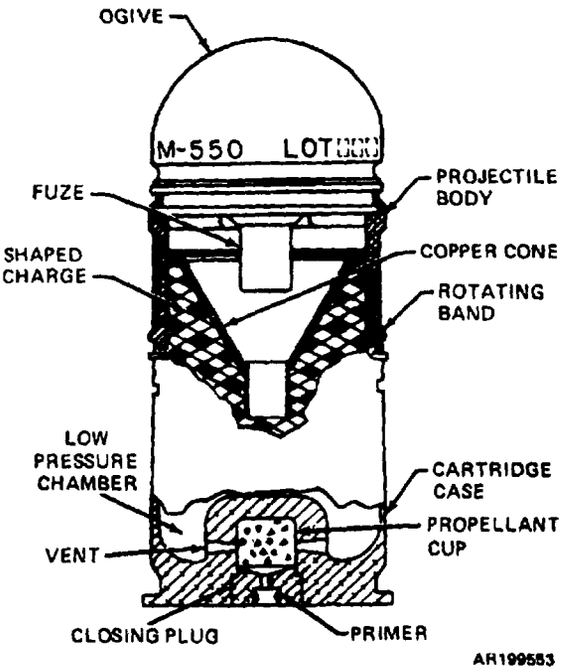
CARTRIDGE, 40-MILLIMETER: HEDP, M433



AR199554



AR199553

Type Classification:

Std AMCTC 8306 dtd 1971

Use:

This cartridige 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
Faze	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)
Upper limit	+125°F (51.6°C)
Storage:	
Lower limit	-65°F (-53.8°C)
Upper limit-	+165°F (73.9°C)
*Packing	6 rounds in bandoleer; 12 bandoleers (72 rounds) per box
*Packing Box	
Weight	53.5 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.

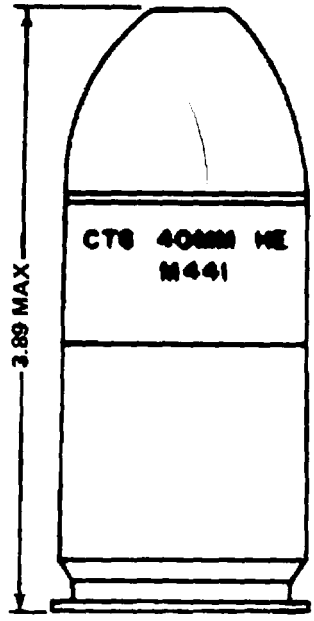
Storage and Shipping Data:

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



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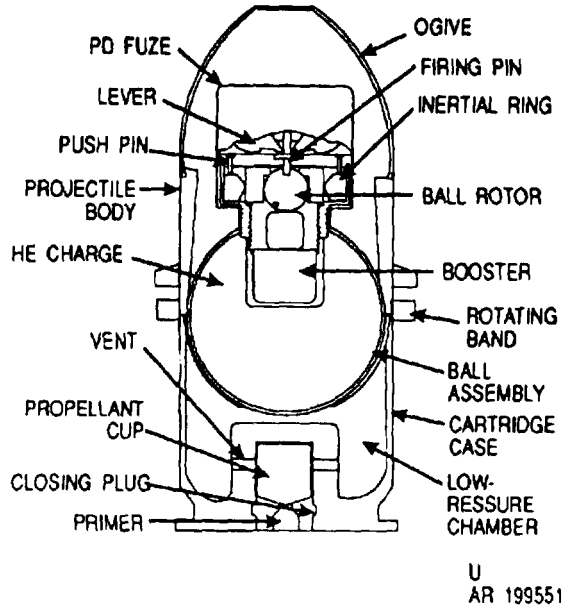


Type Classification:

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 aline 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.

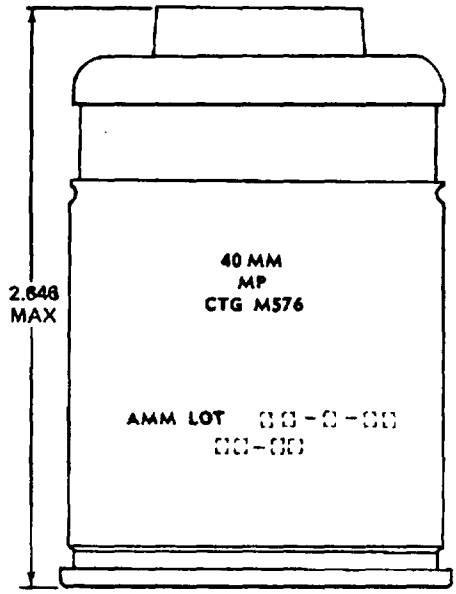
Storage and Shipping Data:

UNO serial number	0321
Hazard class/division and storage compatibility group	(04) 1.2 E
DOT class	Class A Explosive
DOT marking	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



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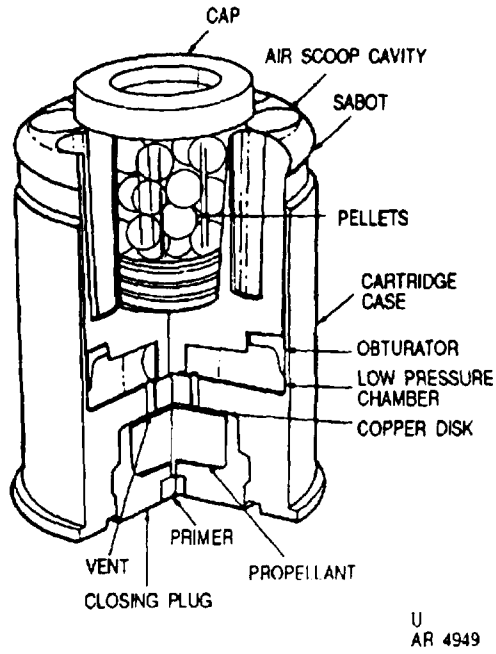

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AR 4949

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)
- 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 ---------- l.3 cu ft

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

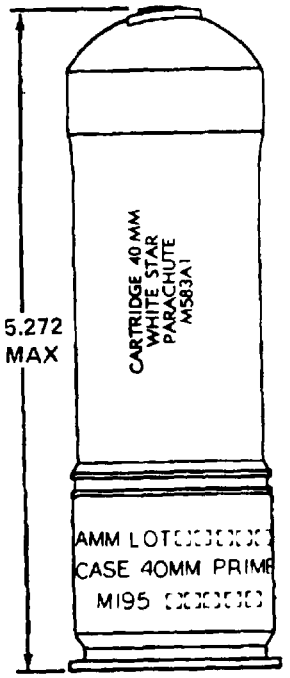
Storage and Shipping Data:

UNO serial number ---------- 0012
Hazard class/division and storage compatibility group-- 1.4 S
DOT class ---------- Class C Explosive
DOT marking ---------- SMALL ARMS AMMUNITION
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



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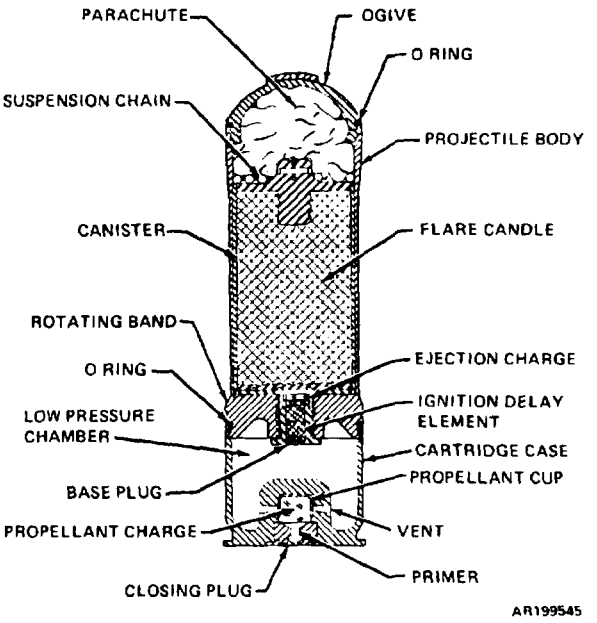


Type Classification:

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 hand-held 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.

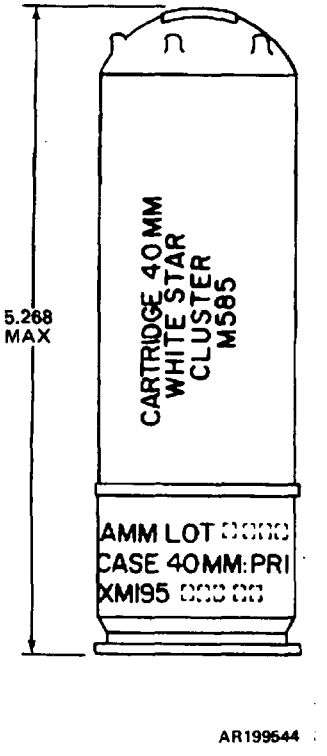
Shipping and Storage Data:

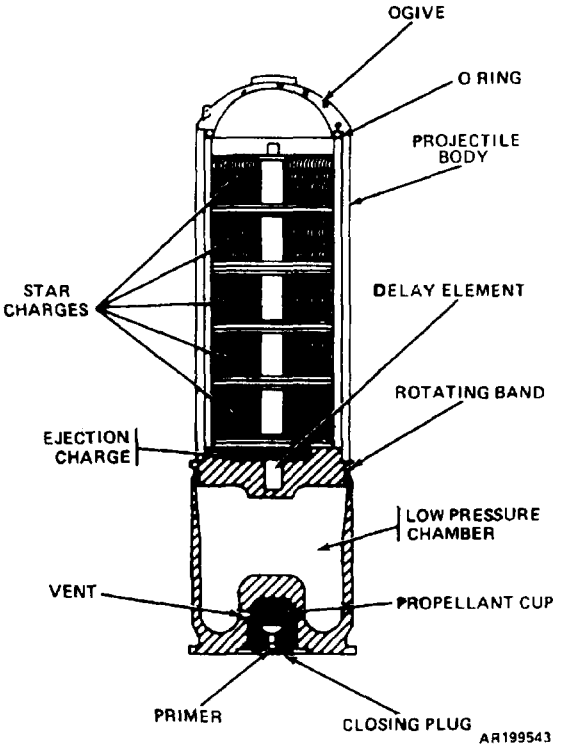
UNO serial number	0312
Hazard class/division and storage compatibility group	1.4 G
DOT class	Class C Explosive
DOT marking	SIGNAL FLARES, HANDLE CARFULLY -KEEP FIRE AWAY
DODAC	131 0-B535 (M583A1) 131 0-B504 (M661) 131 0-B505 (M662)
Cartridge drawing number	9243881
Packing drawing numbers	9209204, 9209205

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





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 ejectlon charge. The ejection charge ignites the star charges and blows the candle assembly out through the top of the projectile body. The indivvidual stars burn for approximately 7 seconds during free fall and produce 55,000 candlepower.

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 ---------- l.0 $_{cu}$ ft

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

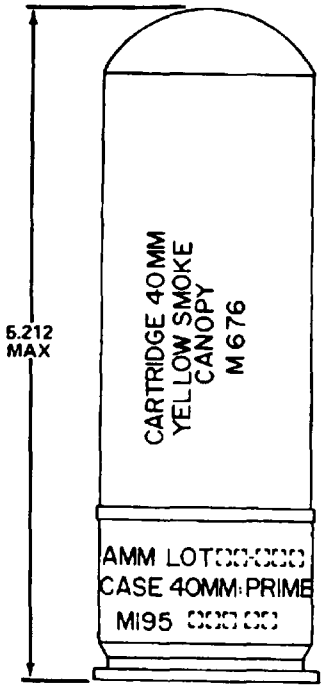
Shipping and Storage Data:

UNO serial number ----------	0312
Hazard class/division and storage compatibility group --	1.4G
DOT class ----------	Class C Explosive
DOT marking ----------	SIGNAL FLARES, HANDLE CAREFULLY -KEEP FIRE AWAY
DODAC ----------	1310-B536
Drawing number ----------	9207987
Packing drawing numbers ------	9209204 9209205

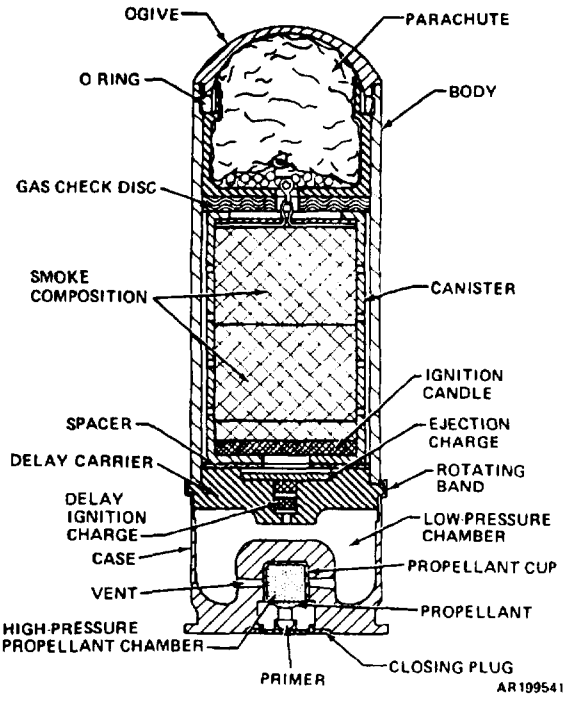
References:

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	Ml95
Propellant	M9, 330 mg
Primer	Perc., 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 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.

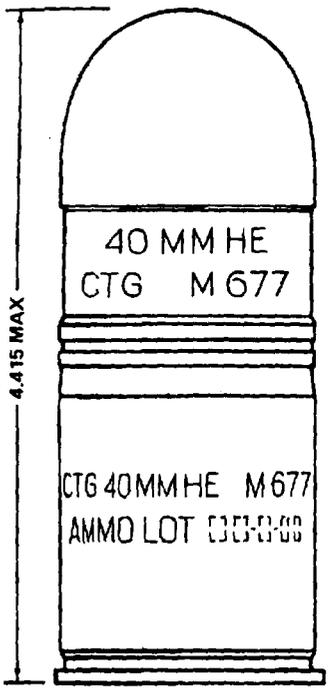
Storage and Storage Data:

UNO serial number	0197
Hazard class/division and storage compatibility group	1.4 G
DOT class	class c Explosive
DOT marking	SMOKE SIGNALS, HANDLE CAREFULLY - KEEP FIRE AWAY
DODAC	1310-B475
Drawing number	9229370
Packing drawing number	9209204, 9209205

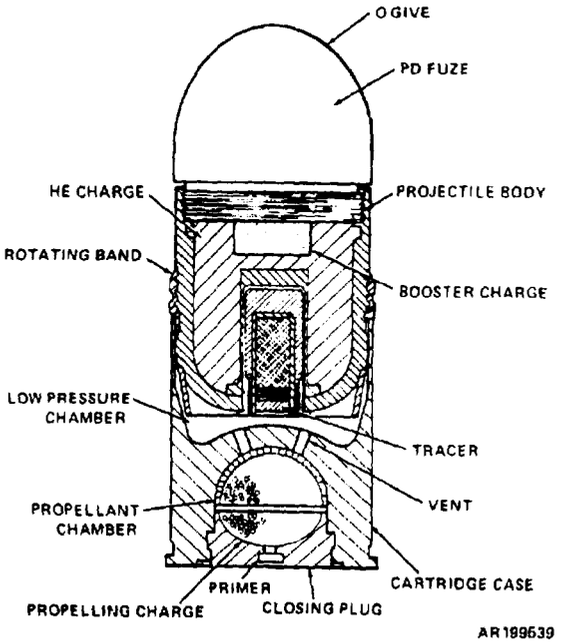
Reference:

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 mental 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 cafe	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.

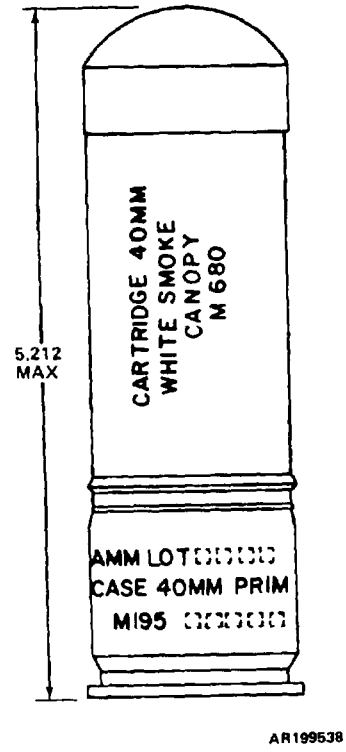
Shipping and Storage Data:

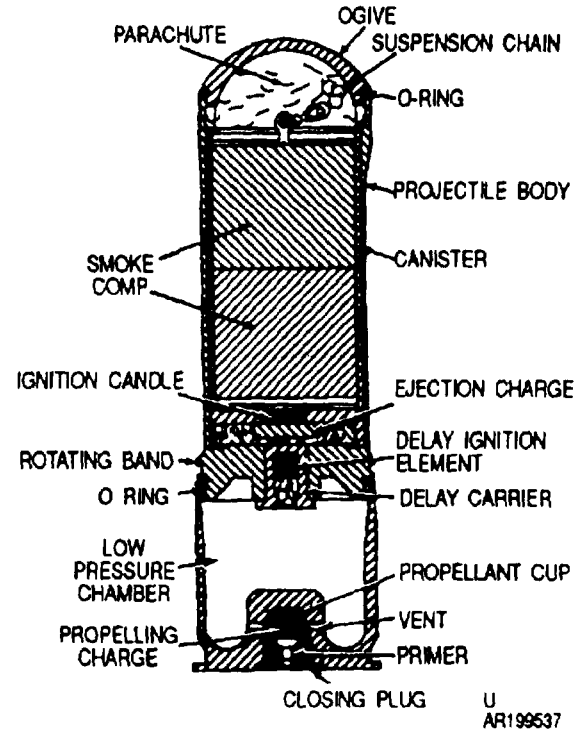
UNO serial number	0006
Hazard class/division and storage compatibility group	1.1 E
DOT class	Class A Explosive
DOT marking	AMMUNITION FOR CANNON W/ EXPLOSIVE PROJECTILES
DODAC:	
M383 and M677 linked 3 to 1	1310-B529
M384 and M677 linked 3 to 1	1310-B527
Drawing number	9234424
Packing drawing number	9251995

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 ($QE=85^0$) (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 in- eluding NSN'S.

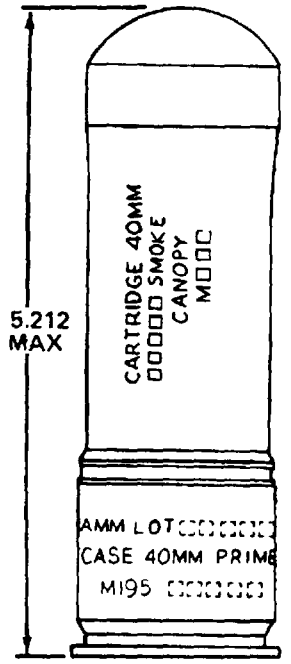
Shipping and Storage Data:

UNO serial number	0197
Hazard class/division and storage compatibility group	1.4 G
DOT class	Class C Explosive
DOT marking	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



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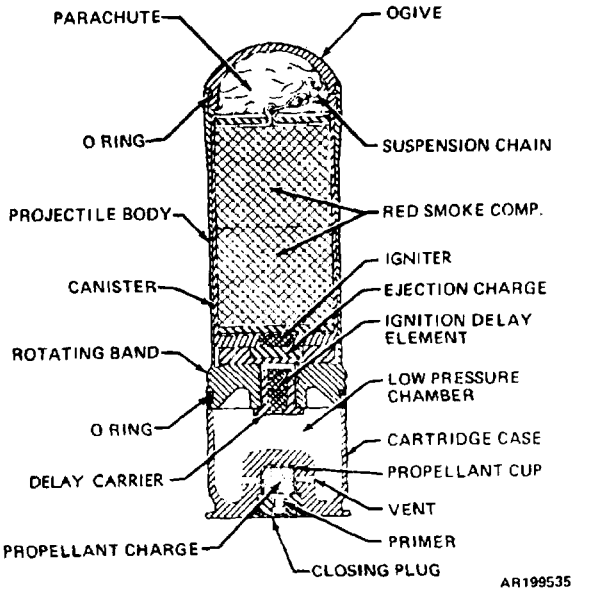


Type Classification:

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 foilage by means of the "X" parachute.

Tabulated Data:

Complete round:	
Type	Canopy red 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	Red smoke composition, 80 g
Propelling charge:	
Cartridge case	M195
Propellant	M9 330 mg
Primer	Perc., 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 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.

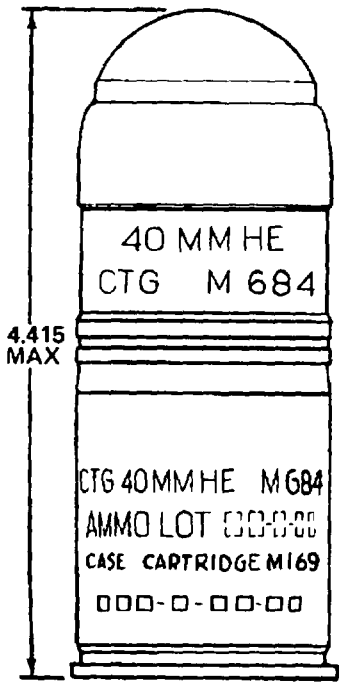
Shipping and Storage Data:

UNO serial number	0197
Hazard class/division and storage compatibility group	1.4 G
DOT class	Class C Explosive
DOT marking	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



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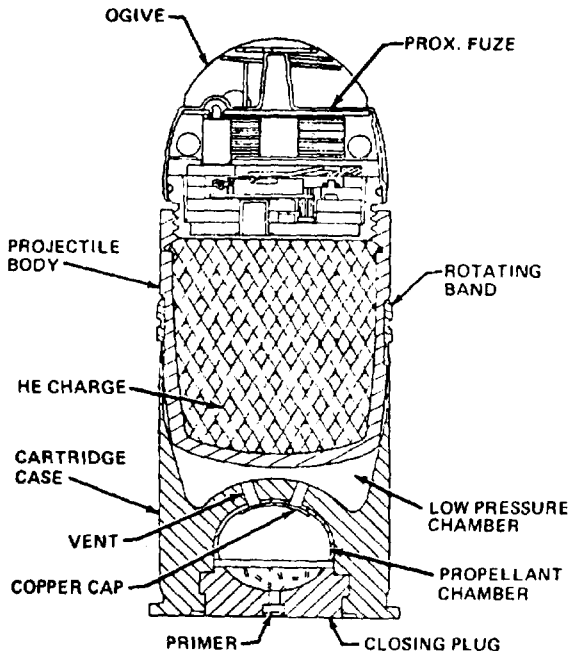


AR199533

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 f'uzes 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 initate 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.

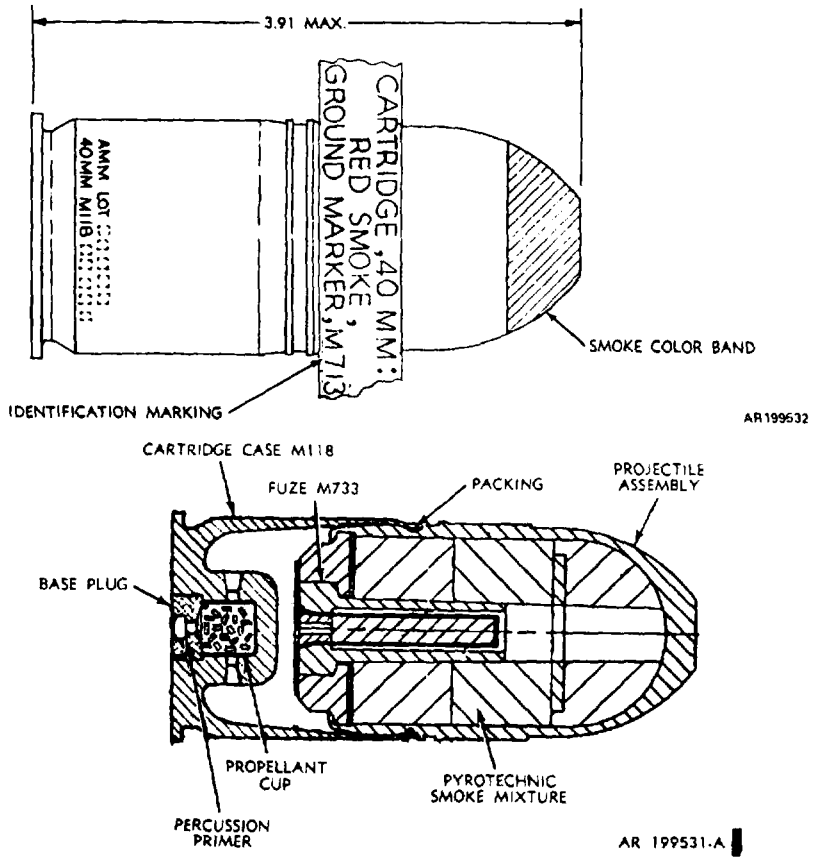
Shipping and Storage Data:

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 projectile and protrudes into the cylindrical cavity of the smoke mixture. The fuze is designed to arm at a minimum of 15 meters and a maximum of 45 meters from the muzzle of the weapon.

Functioning:

Upon firing the primer ignites the propelling charge. In turn, the projectile is accelerated down the launcher barrel where a spin of 3,750 rpm is imparted by the barrel rifling. A muzzle velocity of approximately 250 fps is attained. In addition to launching the projectile, the propellant gases ignite the first fire mixture of the fuze in the base of the projectile. The first fire mixture ignites a high-temperature transfer mixture contained in the steel cup. The transfer mixture burns during the first 15 meters of projectile flight. When the projectile is between 15 and 45 meters from the launcher muzzle, heat transfer through the steel cup ignites the delay mixture. Upon impact, the delay casing breaks and the burning portion flies forward out of the fuze support, contacting and igniting the pyrotechnic smoke mixture. Ignition of the smoke mixture

causes a buildup of pressure which dislodges the fuze support at the aft end of the projectile thus allowing smoke to be emitted at the aft end of the projectile. Projectile impact prior to the minimum arming distance (15 meters) results in a dud. Between 15 and 45 meters from the launcher muzzle, the fuze may or may not function on impact. In the event the fuze fails to function upon impact, the output mixture provided in the front end of the delay casing acts as a backup to the impact feature. When the flame reaches this point (8 to 10 seconds after launch) the output mixture flashes and ignites the smoke mixture. 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	l.0 cu ft

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

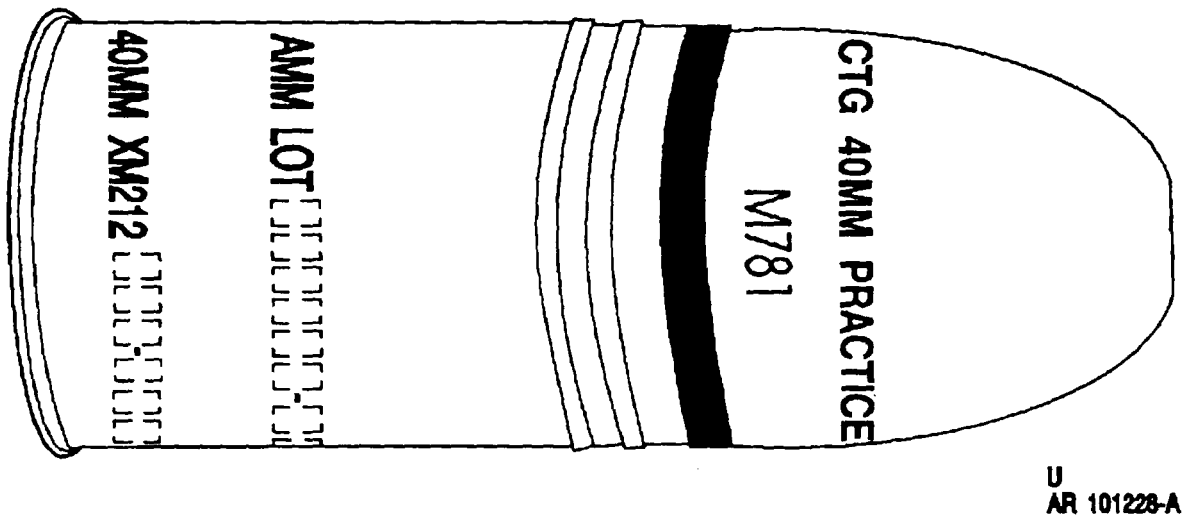
Shipping and Storage Data:

UNO serial number	0197
Hazard class/division and storage compatibility group	1.4 G
DOT class	Class C Explosive
DOT marking	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 ---------- l.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.

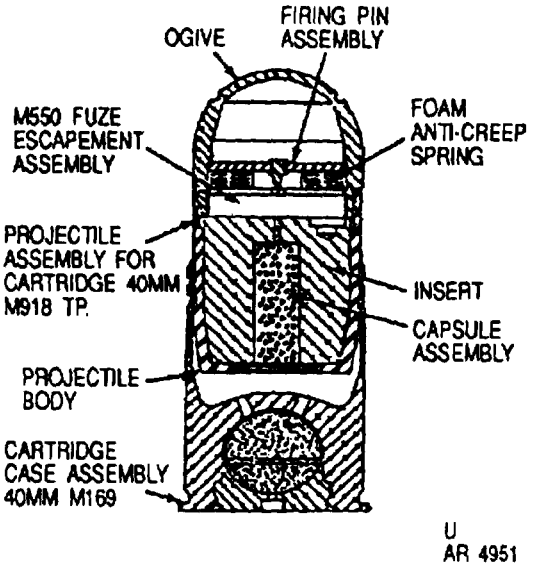
Shipping and Storage Data:

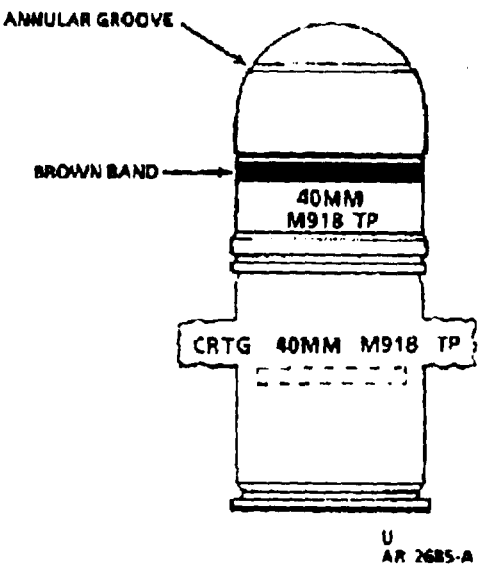
UNO serial number ---------- 0339
Hazard class/division and storage compatibility group -- 1.4 C
DOT class ---------- Class C Explosive
DOT marking ---------- CARTRIDGES, PRACTICE AMMUNITION
DODAC ---------- 1310-B519
Cartridge drawing number ------ 9322240

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





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 escapement
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.

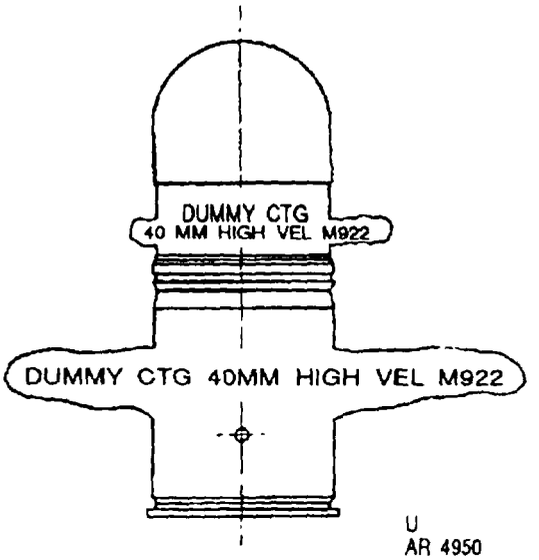
Shipping and Storage Data:

Hazard class/division and storage compatibility group	(04) 1.4 C
UNO serial number	0338
DOT class	Class C Explosive
DOT marking	CARTRIDGE, PRACTICE AMMUNITION
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 nonfunctional.

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 aluminum
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
"Packing 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
M2A1 metal container drawing ----------	7553296

M548 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

PA-120 Pack:

*Packing ----------	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 drawing number ----------	12564414

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

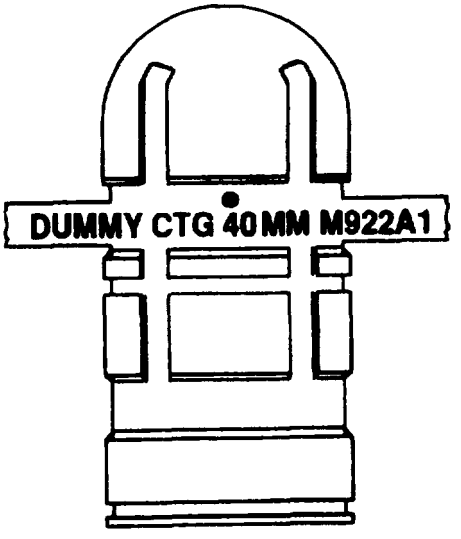
Shipping and Storage Data:

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 ------	9275763

References:

SB 700-20
TM 9-1010-230-23&P
TM 9-1010-230-10
TM 9-1300-251-20
TM 9-1300-251-34

CARTRIDGE, 40-MILLIMETER: DUMMY, M922Al



Type Classification:

Std LCC-A, 31 Mar 93,
MSR 04936031.

Use

This dummy cartridge is used as a drill round to tram 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	350gr(0.77lb)
Length	4.42 in.
Weapons used with	Ml29 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:

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

()uter pack (metal box):
- NSN 8140-00-739-0233
- *Packing box:
  - Weight 60 lb
  - Dimensions l8-19/32 x 14-19/32x 8-19/64 in.
  - Cube 1.3 cu ft
- Total explosive weight N/A
- Field storage category A
- M548 metal container drawing number 7258943

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:

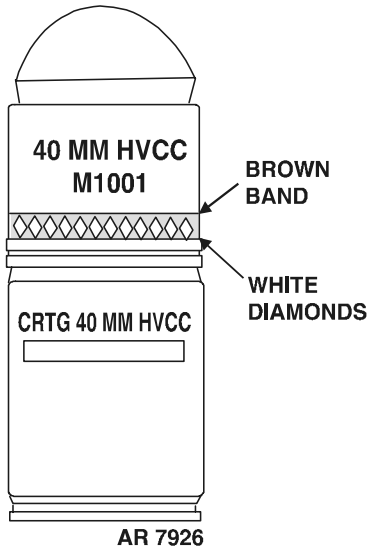
Quantity-distance class.. N/A
Storage compatibility group N/A
DOT shipping class.. N/A
DOT designation N/A
DODAC 1310-B472
Cartridge drawing number 12937903

References:

SB 700-20
DOD Consolidated Ammunition Catalog
TM 9-1010-230-10
TM 9-1010-230-23&P
TM 9-1300-25 l-20
TM 9-1300-251-34

☆U.S. GOVERNMENT PRINTING OFFICE: 1996 - 746-043/40704

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.

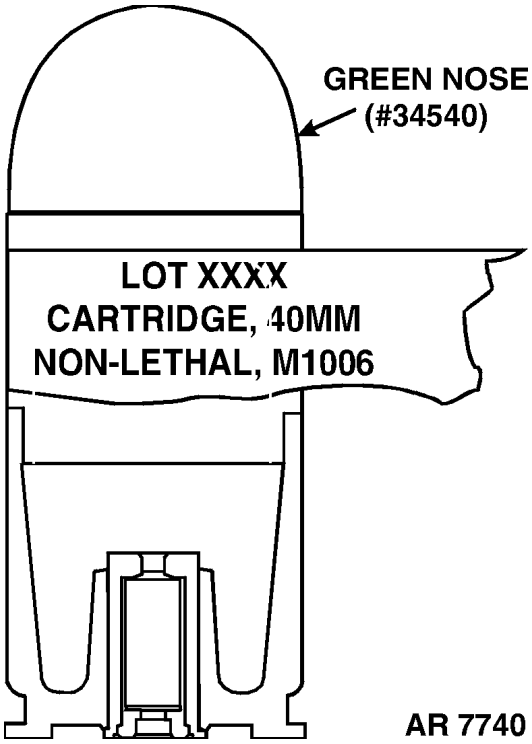
SHIPPING AND STORAGE DATA:

UN identification number	0321
Hazard class/division and storage compatibility group	
DOT class	1.2E
DOT marking	CARTRIDGES FOR WEAPONS
DODAC	1310-BA11

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 PROJECTILES
DODAC 1310-BA06
Cartridge dwg no. 12986143
Packing dwg nos.
- Outer 9209205
- Inner 9209204

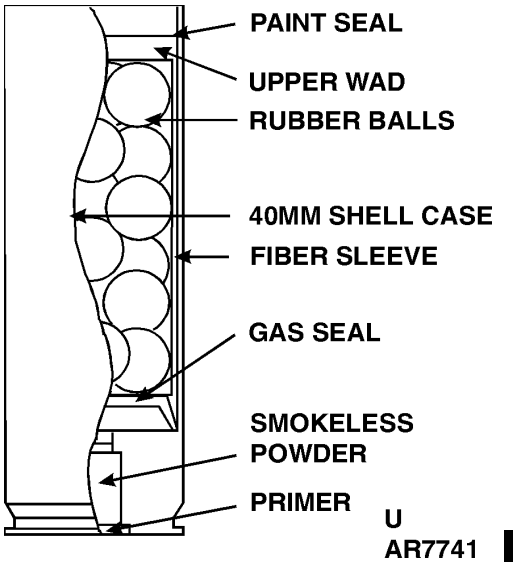
References:

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 container, 2 containers/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 PROJECTILE
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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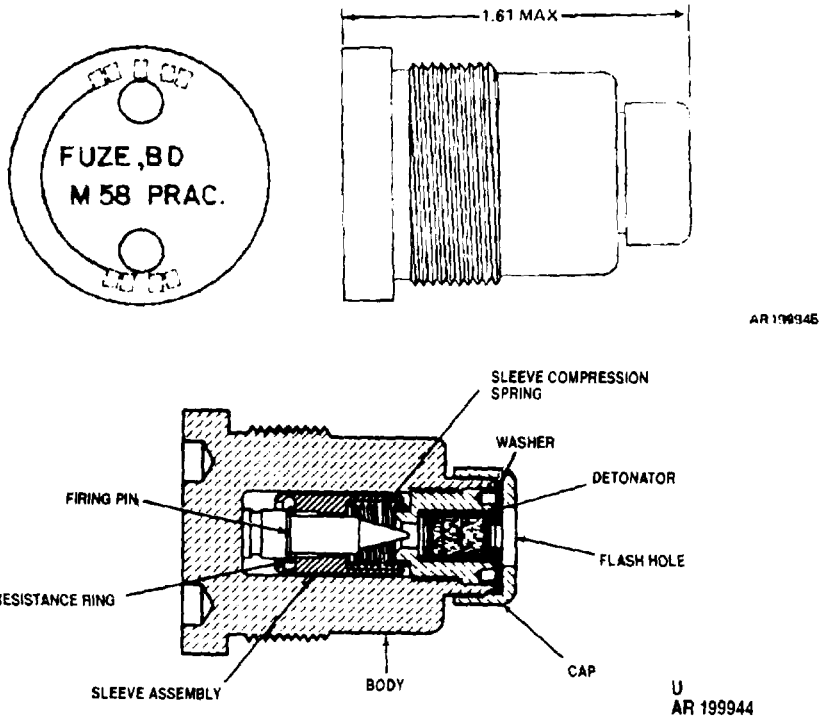
FUZE, BASE DETONATING: M58, PRACTICE



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 tiring 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 detonator by the sleeve compression spring. Upon impact, inertia of the sleeve and firing pin overcomes the spring and drives the pin into the detonator.

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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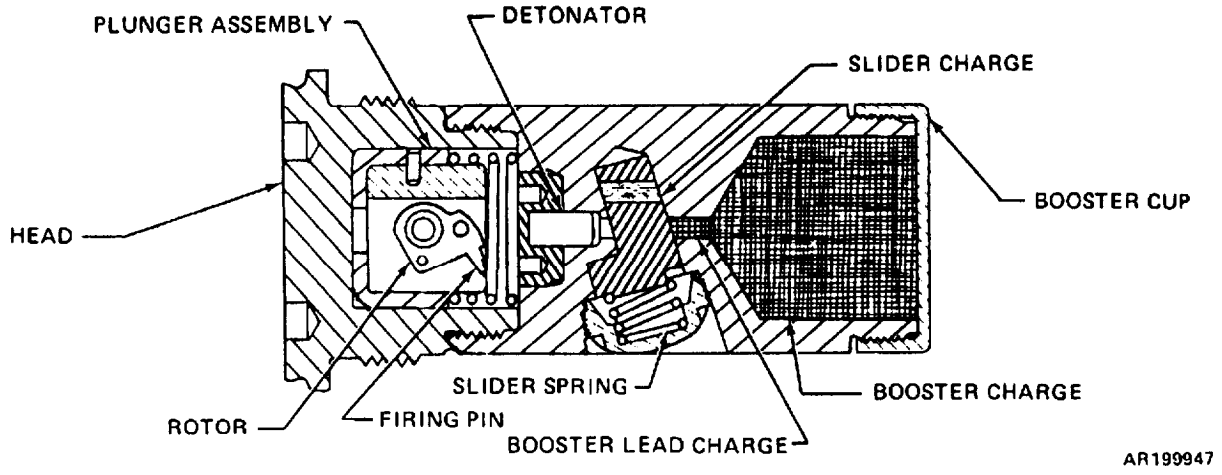
FUSE, BASE DETONATING: M62 SERIES



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 sprin-gloaded 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 tetxyl 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.-l2NS-l (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:

M62A2 ---------- Detonator M58, tetryl slider charge, tetryl booster lead charge, and tetryl booster charge.

M62A1 ---------- Detonator M22, tetryl slider charge, tetryl booster lead charge, and tetryl booster charge.

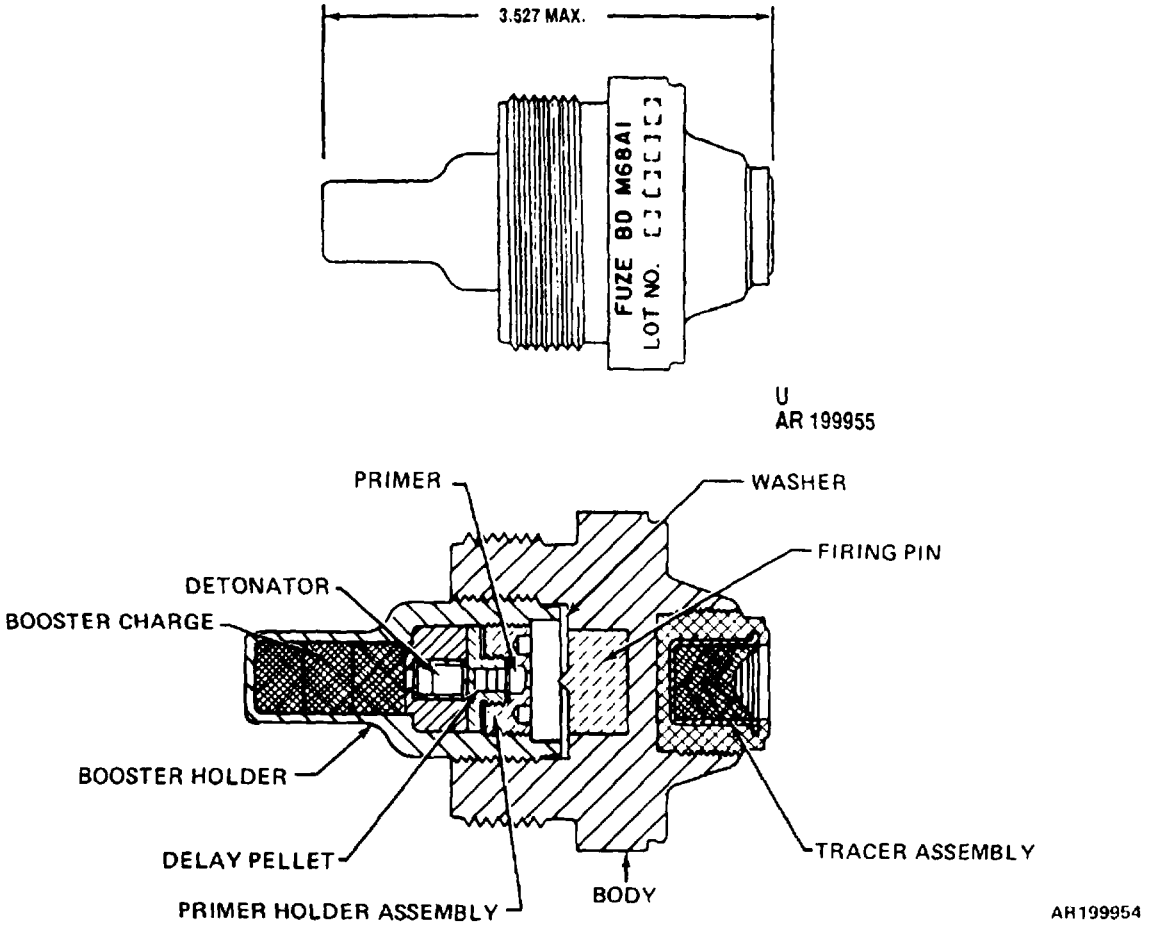
Limitations:

None.

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 the projectile.

Difference Between Models;

Fuze M68A1 is slightly larger but lighter than Fuze M68; otherwise the fuzes are identical in design.

Fuze M68 contains primer No. 26.
Fuze M68A1 contains primer No. 31.
M68 tracer is press fit.
M68A1 tracer is threaded.

Tabulated Data:

Type ---------- BD
Weight:
M68A1---------- 1.44 lb
M68---------- 1.56 lb
Length Overall
M68A1 ---------- 3.527 in.
M68 ---------- 3.46 in.
Thread size ---------- 2.0 in.-1ONS-1 (LH)
Assembly Dwg. No.;
M68 series ---------- 73-2-181

Temperature Limits:

Refer to complete round for upper and lower limits.

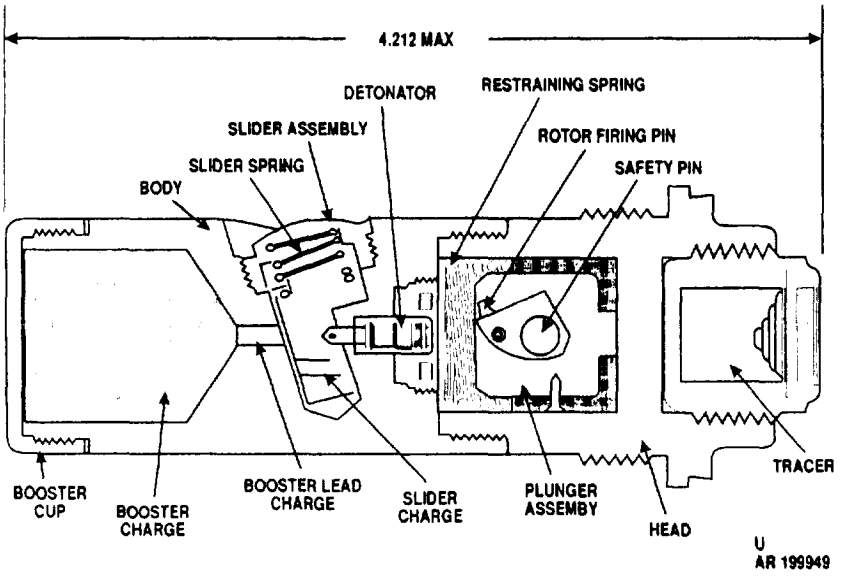
Explosive Components:

Primer No. 26 (M68), No. 31 (M68A1), black powder delay pellet, Detonator M17, tetryl booster Charge, and Tracer Assembly M5.

References:

TM 9-1300-251-20

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.

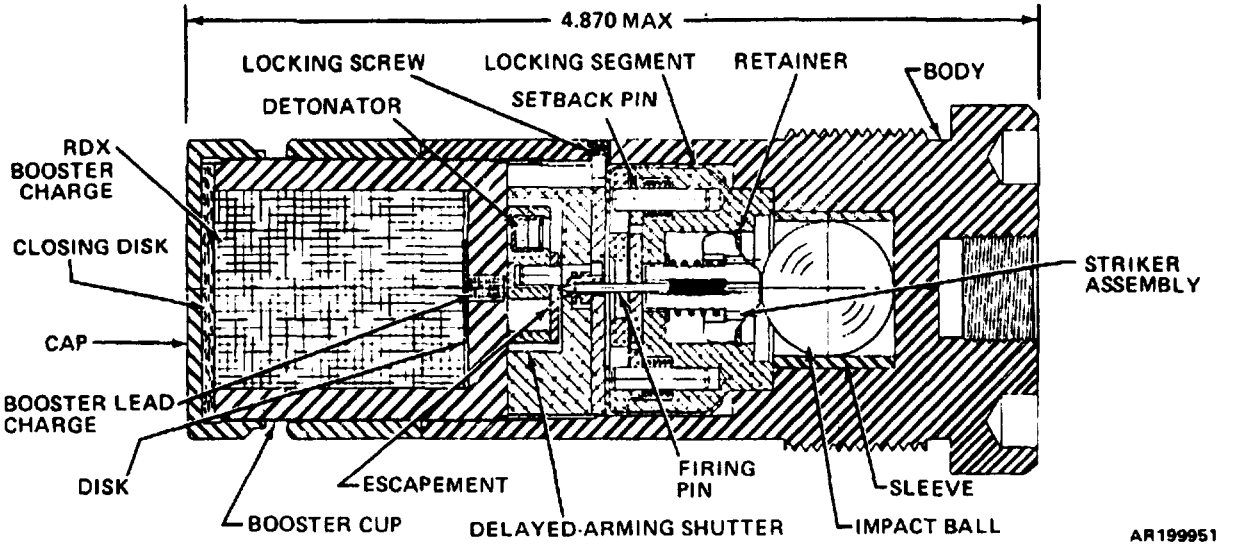
Limitations:

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



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 ins 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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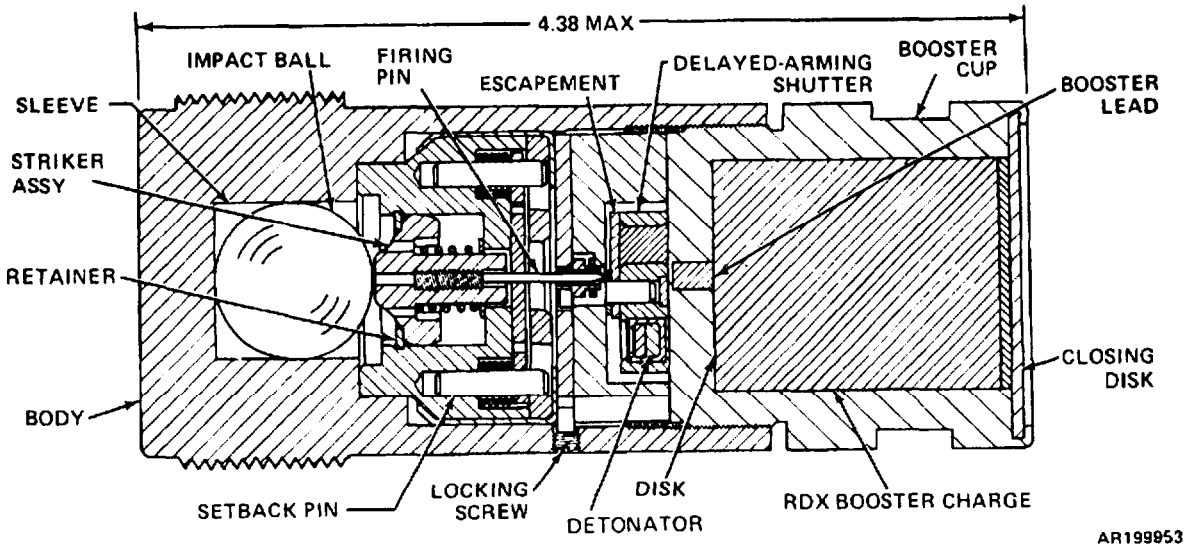
FUZE, BASE DETONATING: M578



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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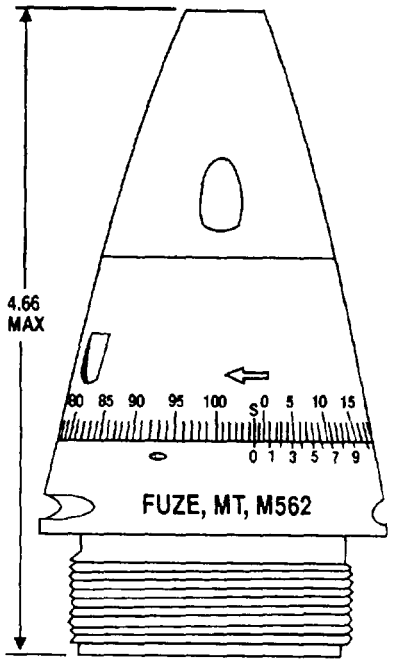
FUZE, MECHANICAL TIME: M562



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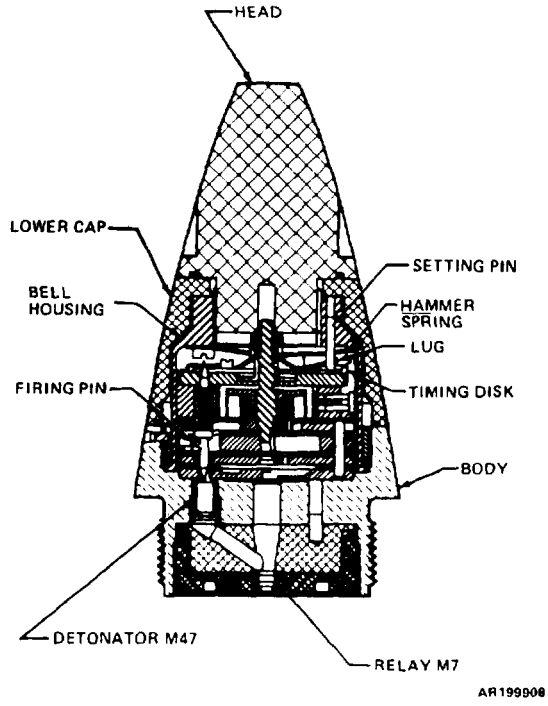


Type Classification:

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 container; 2 containers 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 compatibilty group ------ B, N & E
DOT shipping class ---------- C
DOT designation ---------- TIME FUZES

DODAC ---------- 1390-N283

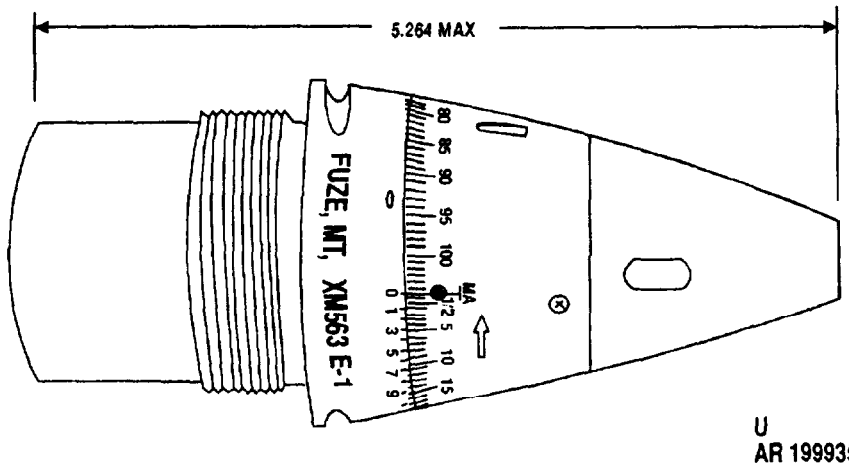
Explosive Components:

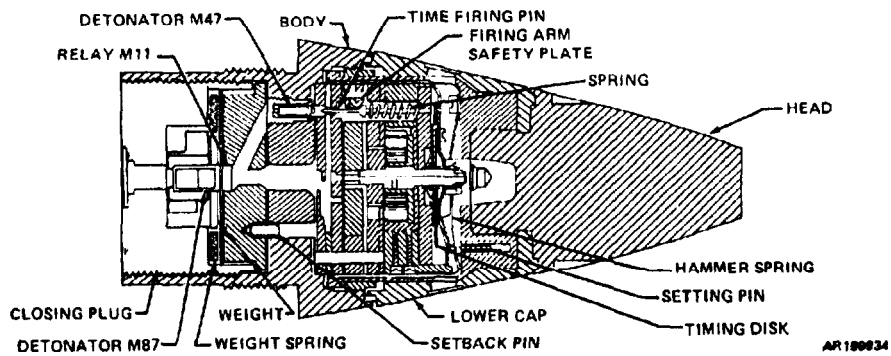
Detonator M47 and Relay M7.

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 preset 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

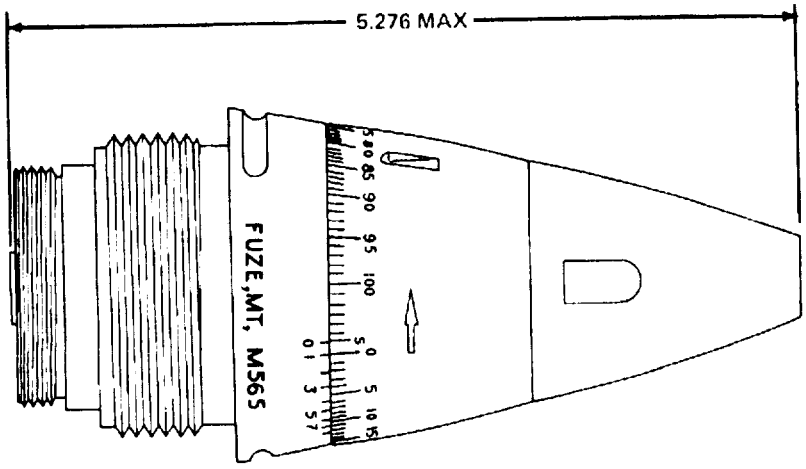
Limitations:

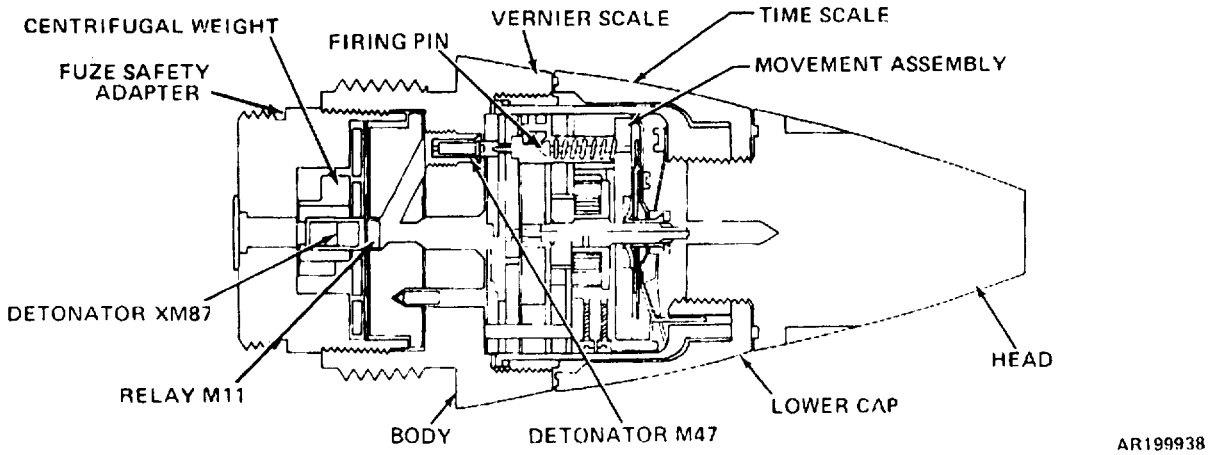
Overhead firing is prohibited,

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
Length:	
Visible	3.77 in.
Overall	5.276 in.
Thread size	2.00 in. -12NS-1 (R)
Assembly Dwg. No.	10522991

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F for not more than 3 days)
Upper limit	+160°F (for not more than 4 hr/day)
*Packing	8 fuzes in metal container; 2 containers in wirebound 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, detonating

Explosive Components:

Detonator M47, Relay M11, and Detonator XM87.

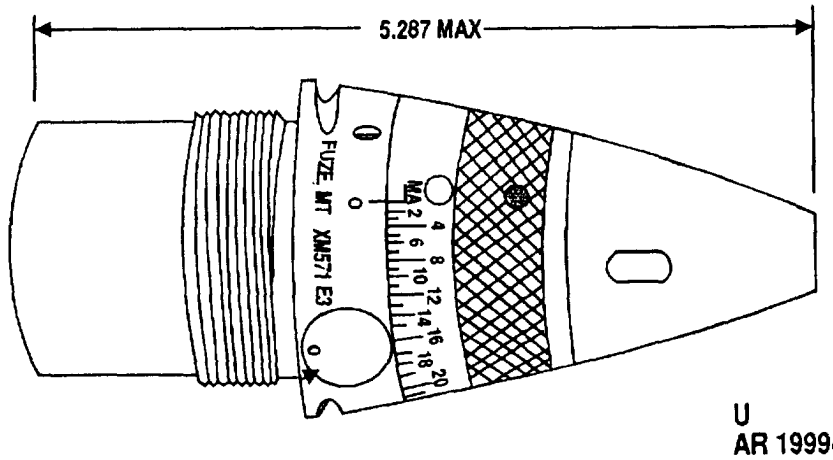
Limitations:

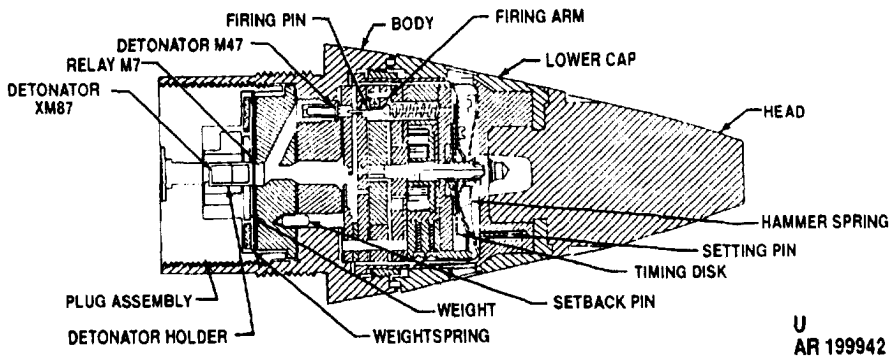
None.

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 es- pecially 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 tlming, simultaneously rotates the timing disk by means of a setting pin lodged in an ug 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-lA
Assembly Dwg. No---------- 10551670

Temperature Limits:

Firing:
  Lower limit ---------- -40°F
  Upper limit ---------- + 125°F
Storage:
  Lower limit ---------- -80°F (for not more than 3 days)
  Upper limit ---------- + 160°F (for not more than 4 hr/day)
Packing ---------- Shipped assembled to round

Shipping and Storage Data:

DODAC ---------- 1390-N247

Explosive Components:

Detonator M47, Relay M7 and Detonator XM87.

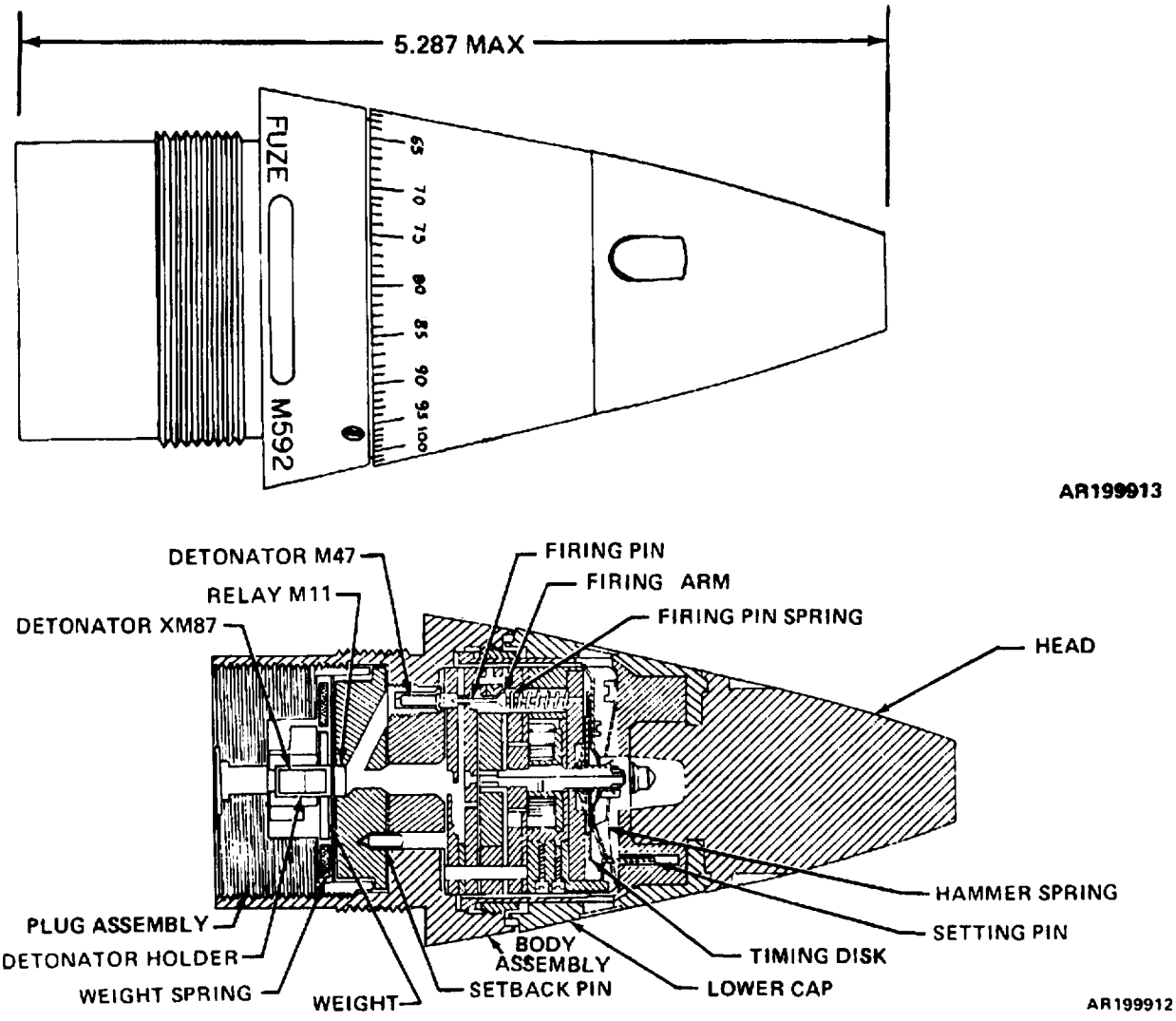
Limitations:

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



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 inscribed 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 detonater as above. If set for range, the fuze will function approximately 125 meters prior to range setting (optimum standoff 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.

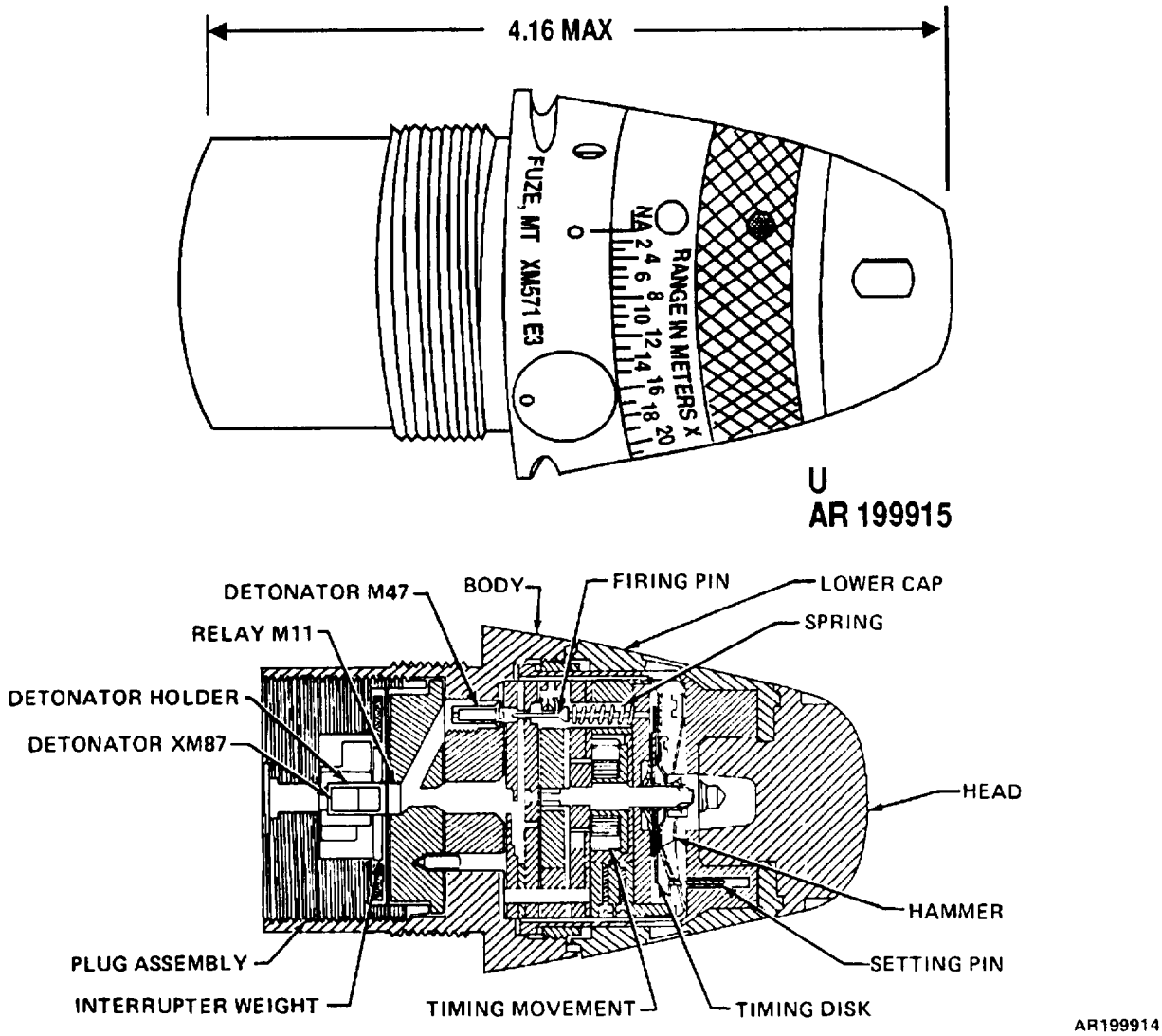
Limitations:

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 Mll 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 centrif'uga] 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 hetween Relay Ml 1

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 timmg simultaneously rotates the timing disk b 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.

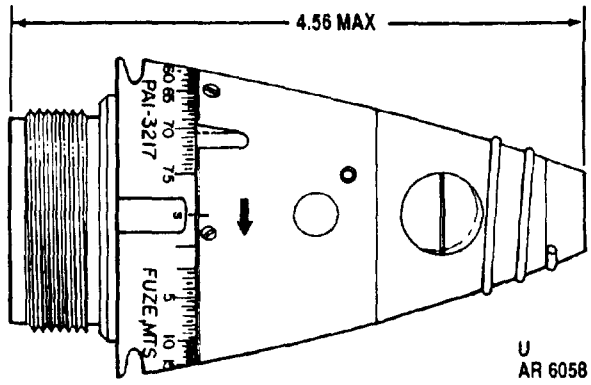
limitations:

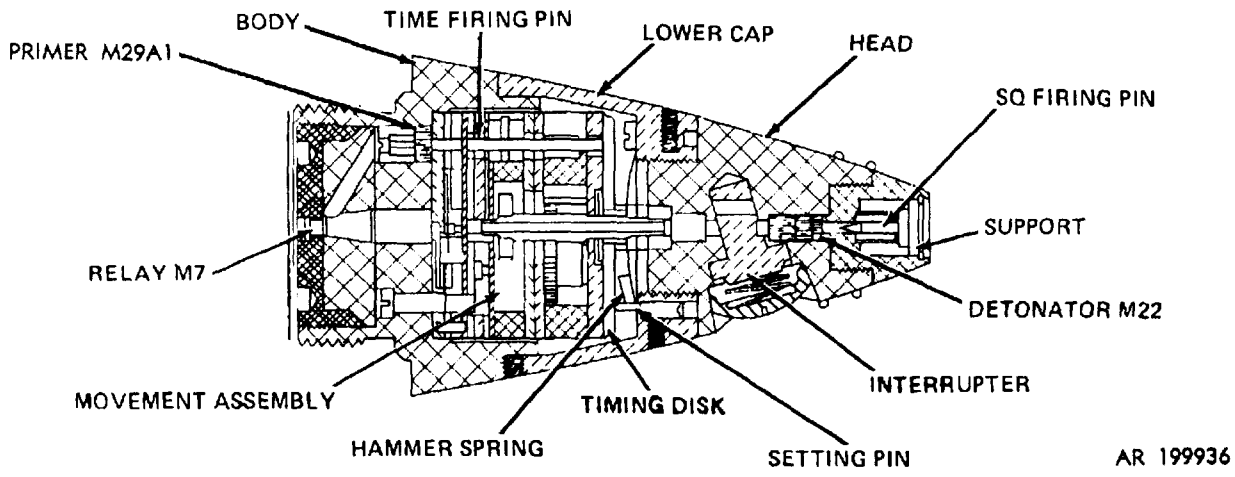
Firing overhead of friendly exposed troops is prohibited. When firing muzzle action, assure that all personnel clear area in front of and immediately to sides of the weapon, and take cover.

References:

TM 9-1300-251-20
SB 700-20

FUZE, MECHANICAL TIME AND SUPERQUICK: M501A1 (OR M501)





Type Classification:

CON--MSR11756003--M501A1.
OBS--MSR11756003--M5O1.

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 container; 2 containers 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	COMBINATION FUZES, HANDLE CAREFULLY
DODAC	1390-N276
UNO serial number	0257
UNO Proper shipping name	Fuze, detonating

Explosive Components:

Detonator M22, tetryl lead charge, and Relay M7.

Limitations:

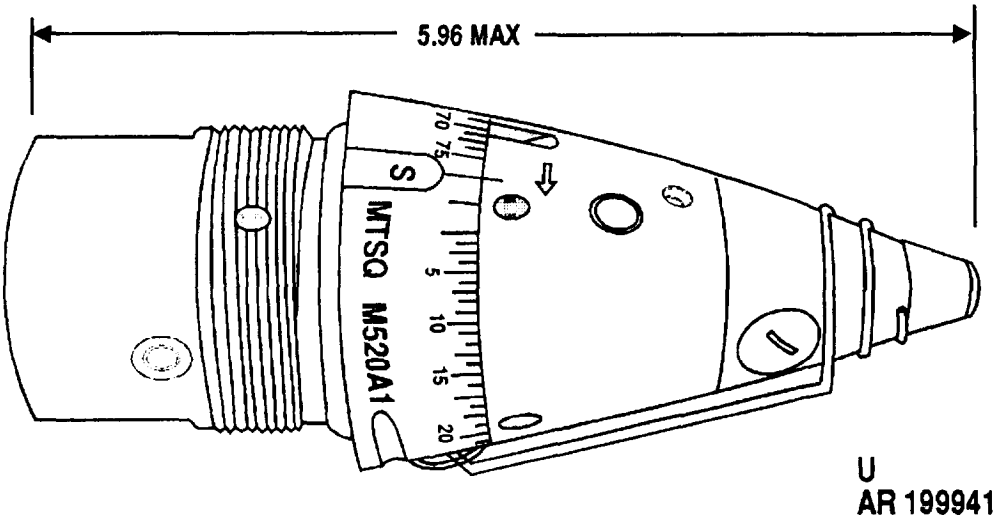
Do not use a fuze with a loose or cocked lower cap. Firing during heavy rainfall may result in premature functioning. When firing for airburst from 155mm Howitzers M1, M1A1, or M45, failures may occur with charges 1 or 2, because of insufficient setback force to release the timing mechanism. However, the fuze will then function on impact.

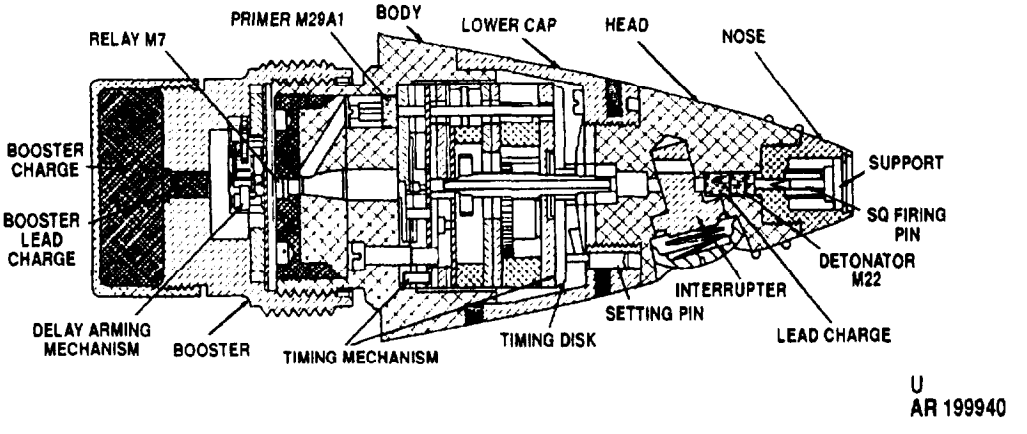
The M501/M501A1 fuze is not dropsafe. Dropping or rough handling of projectile assembled with fuze MTSQ M501/M501A1 can and has resulted in fuze functioning and expulsion of projectile base plate and contents. When handling projectiles assembled with this fuze, exercise extreme care to protect the fuze 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
T'M 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





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 clockwork 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.-l2NS-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.

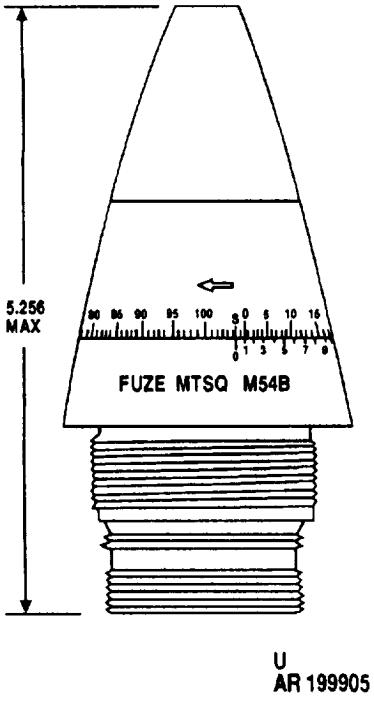
Limitations:

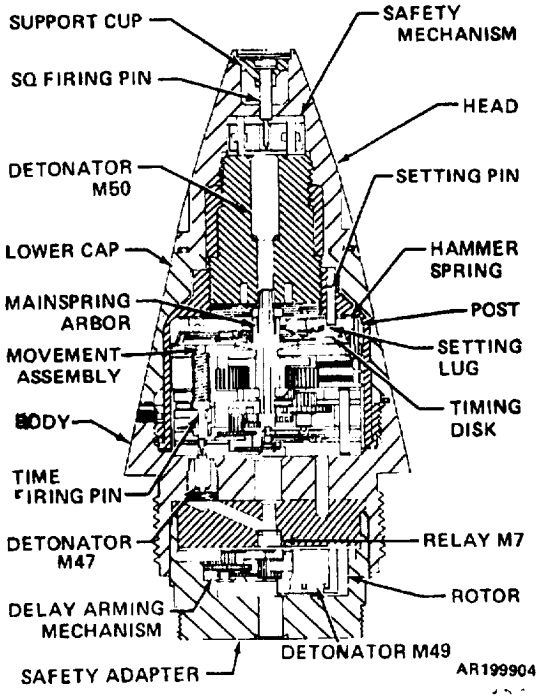
Firing during heavy rain may cause premature functioning of the fuze. Failure may occur when fuzes are set for airburst firing from 155mm Howitzers Ml, MlAl, or M45 with firing charges 1 or 2, because setback may not be sufficient to release the timing mechanism Such projectiles will detonate on impact 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 housin. The fuze body contains a detonator and a relay. The body is inscribed on the exterior with a zero line and vernier scale for time settings. The movement assembly contained in the fuze body and lower cap is a spring-driven clockwork mechanism with a gear train to regulate the fuze timing. The safety adapter is threaded into the base of the fuze body and contains a delayed arming mechanism with a rotor. A detonator is situated in the rotor which holds the detonator out of alignment prior to arming,

Functioning:

Setback upon weapon firing causes the hammer spring to strike an upraised lug on the timing disk and release the disk from the setting 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 initates 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 fiberboard container; 8 containers 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, detonating

Explosive Components:

Timed Action	Detonator M47, Detonator M50, Relay M7 and Detonator M49.

Limitations:

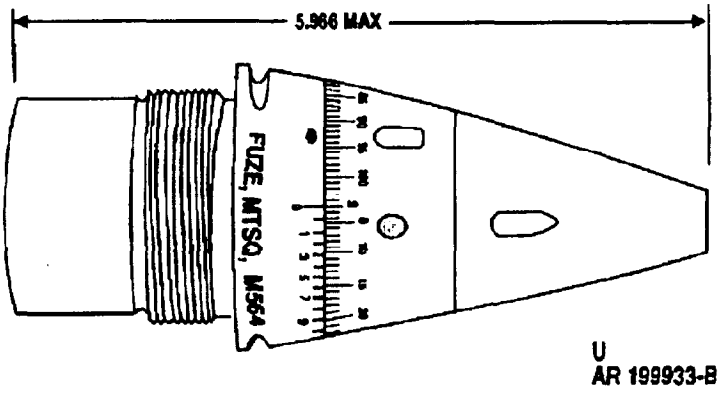
Premature functioning downrange may occur if fuze is fired in rainfall.

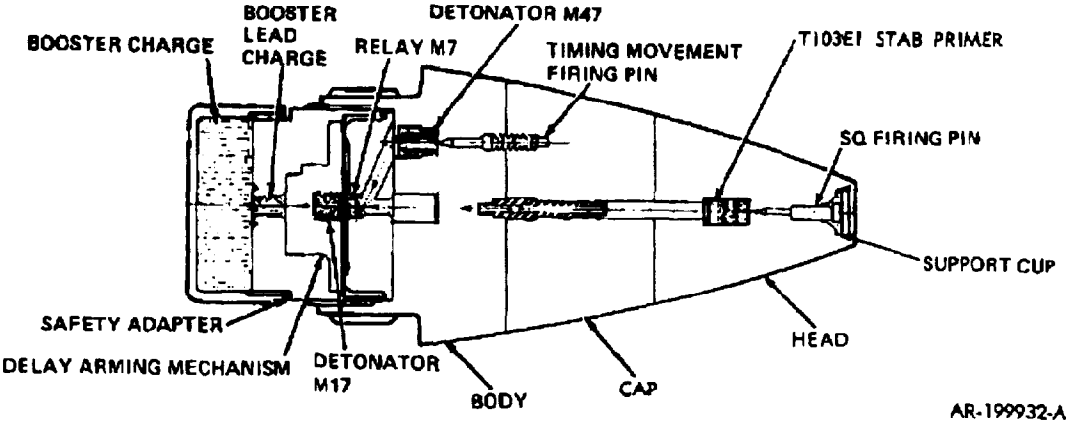
To avoid accidental functioning of PD element, do not drop, roll, or strike fuzes under any circumstances, packaged, unpackaged, or assembled to projectiles; and do not strike fuzed round against breech of weapon.

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 Ml7 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 CARE-FULLY, DO NOT STOKE OK LOAD WITH ANY HIGH EXPLOSIVES.
DODAC	1390-N278
UNO serial number	0408
UNO proper shipping name	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.

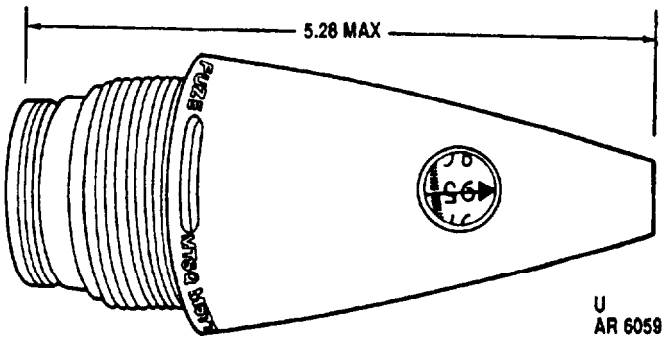
Premature functioning may occur downrange when the fuzes are fired in rainfall.

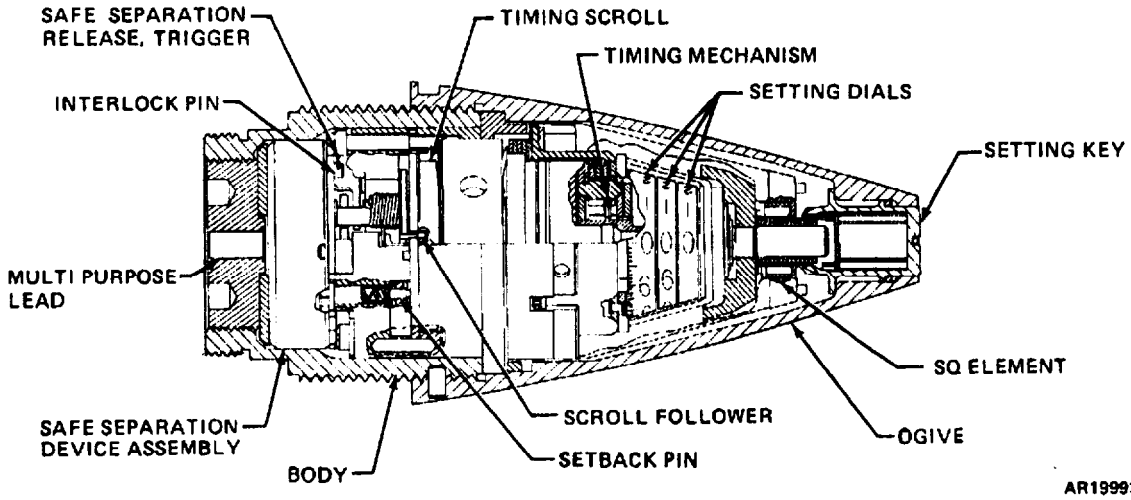
To avoid accidental functioning of PD element, do not drop, roll, or strike fuzes under any circumstances: packaged, unpackaged, or assembled to projectile. and do not strike round against breech of weapon.

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 pa - loads 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 fol- 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 centrigual 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 shale 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 see/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 containers 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 Explosive
DOT designation	COMBINATION FUZES-HANDLE CAREFULLY
DODAC	M577A1/M577-1390-N285
UNO serial number	0410
UNO proper shipping name	Fuzes, detonating

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 l/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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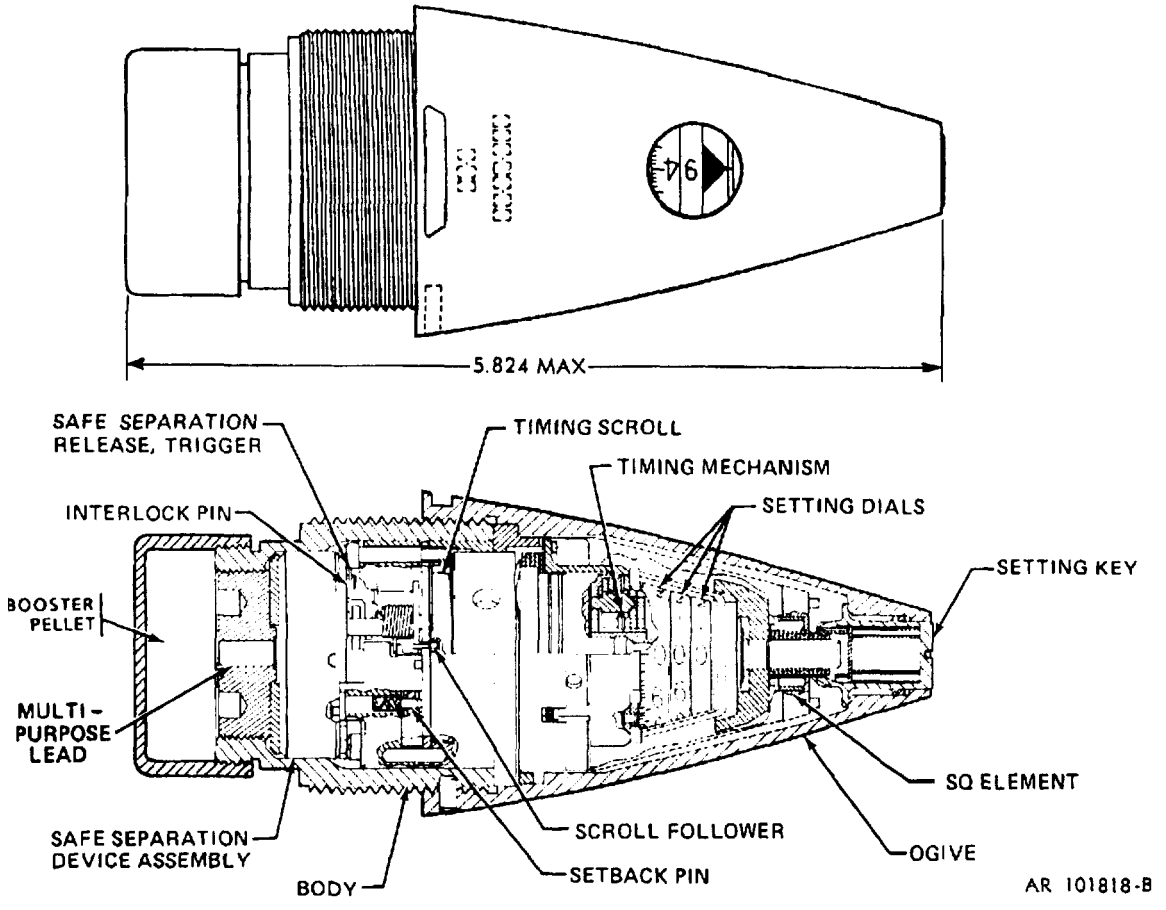
FUZE, MECHANICAL TIME AND SUPERQUICK: M582 SERIES



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 combin-ation.

A difference in functioning must be noted in the point detonating made 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 shale 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 Explosive
DOT designation	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, detonating

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 l/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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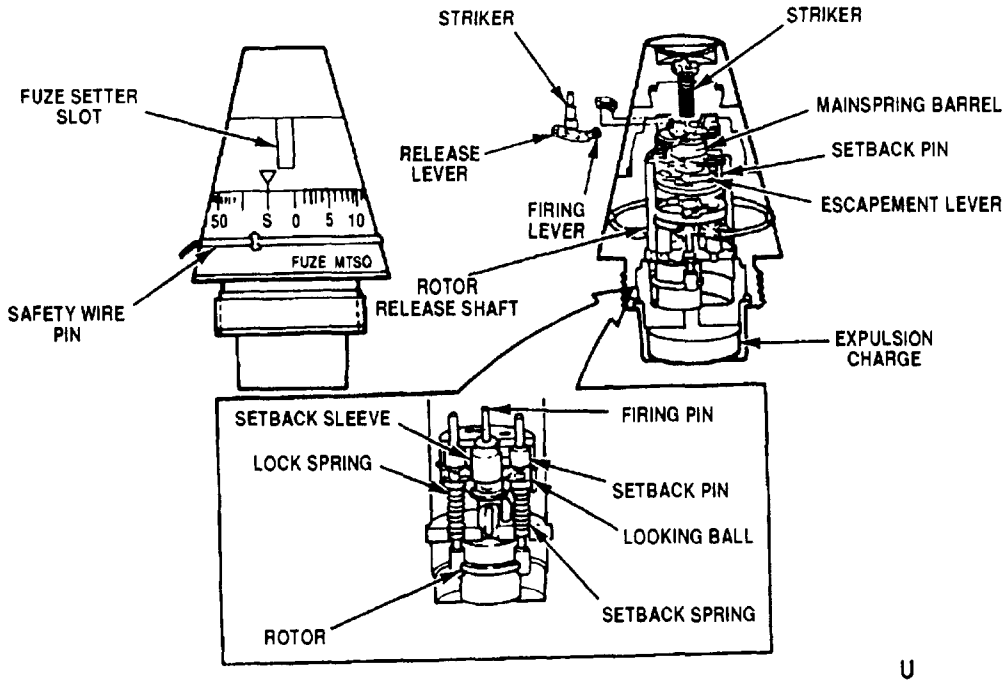
FUZE, MECHANICAL TIME AND SUPERQUICK: M776



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 he set/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-lA
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 (+71.1C°) (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	DETONATING FUZE - CLASS A EXPLOSIVE - HANDLE CAREFULLY, DO NOT STORE OR LOAD WITH ANY EXPLOSIVE
DODAC	1390.T007

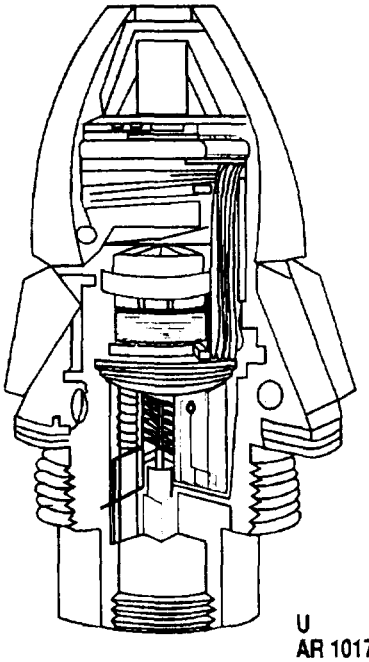
Limitations:

None.

References:

TM 9-1010-223-10

FUZE, MULTI-OPTION: M734



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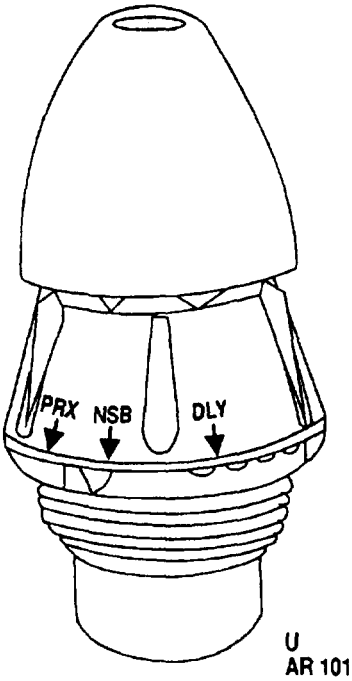
AR 101758



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AR 101757

Type Classification:

Standard, MSR 01786006.

Use:

Multi-Option Fuze M734 is designed to provide a selectable function capability for use with mortar cartridges. The four settings are PRX (Proximity), NSB (Near Surface Burst), IMP (Impact), and DLY (Delay).

Description:

Externally, the fuze consists of a head which may be rotated for option selection relative to a base which is rigidly screwed into the projectile. Markings PRX, NSB, IMP and DLY are on the head and the corresponding index line on the base. The two-piece fuze head consists of a plastic ogive 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 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 ear 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 functionability 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-lA
  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

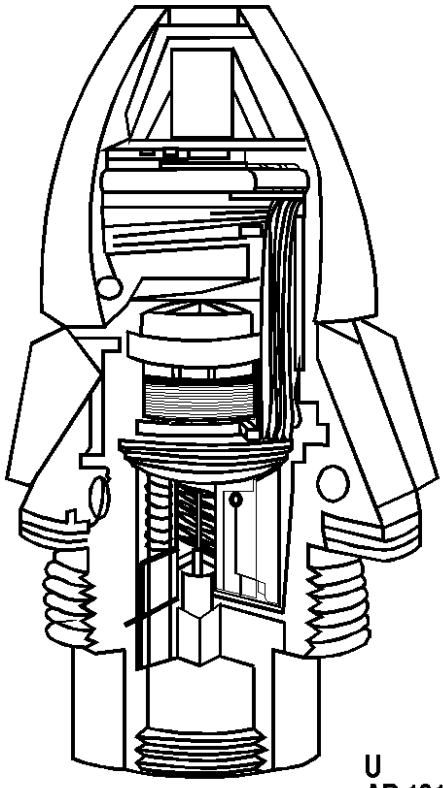
Limitations:

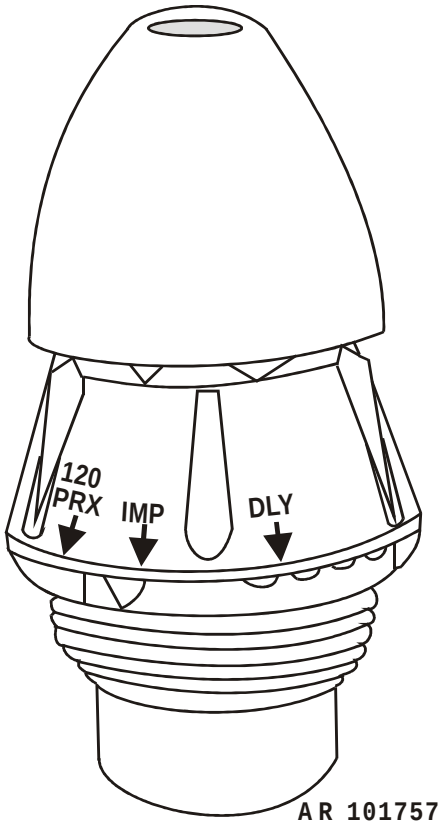
None

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), 120PRX, 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 ear 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 functionability 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

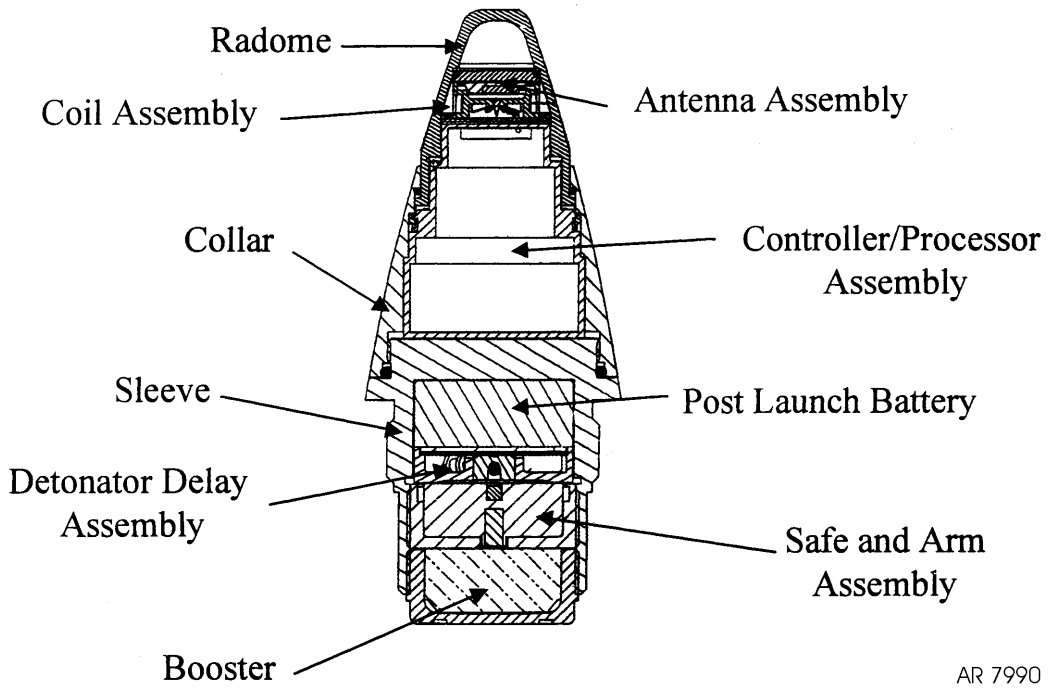
Limitations:

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



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

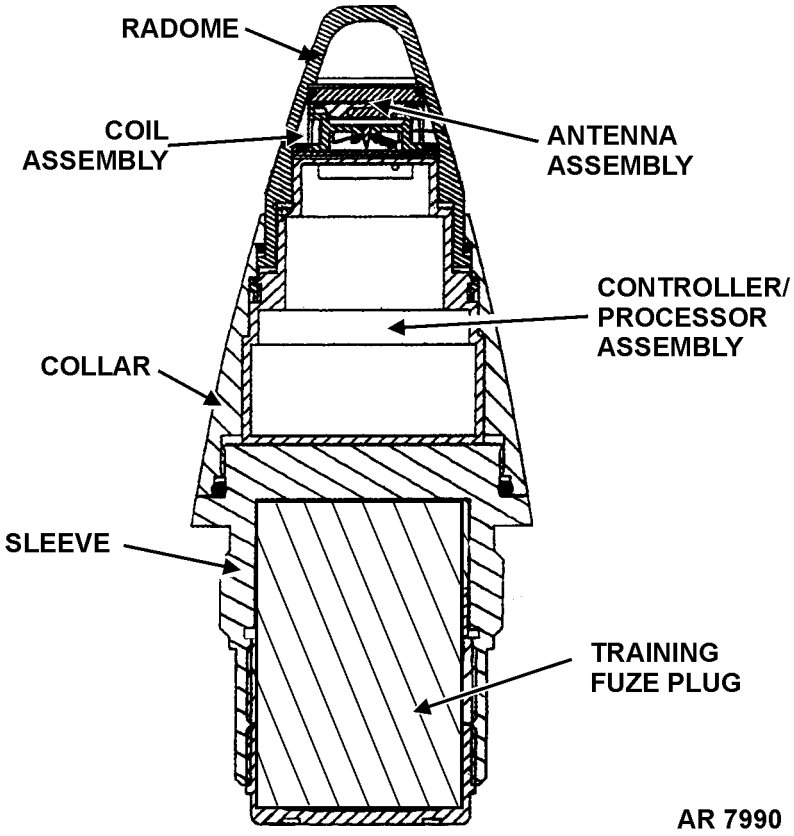
Limitations:

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 containers 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)

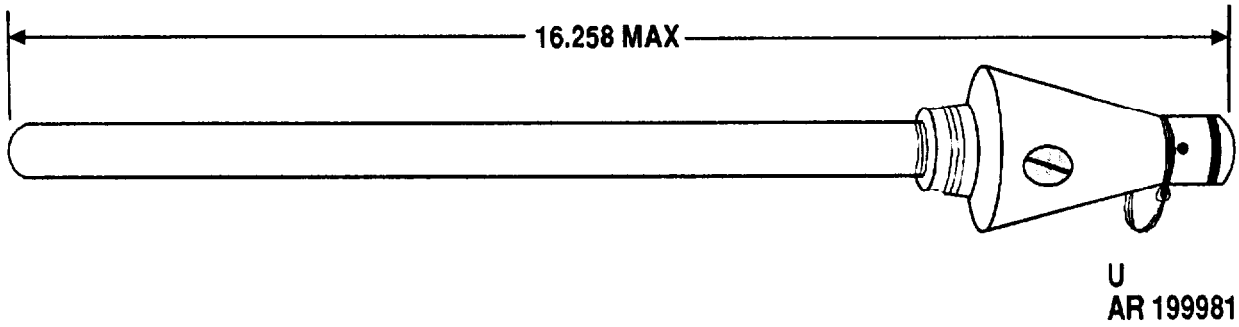
SHIPPING AND STORAGE DATA:

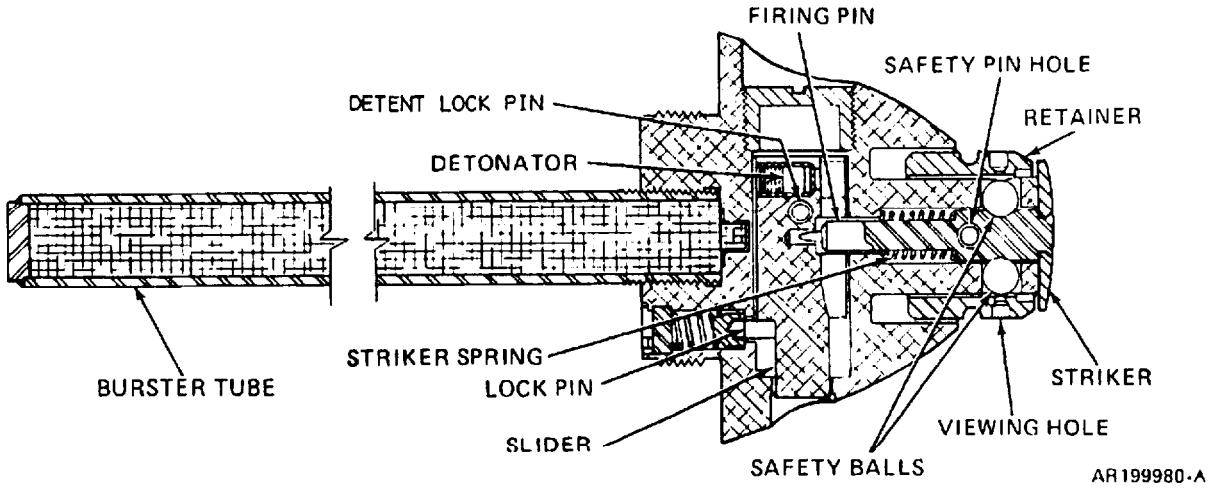
Quantity-distance class	N/A
Storage compatibility group	N/A
DOT shipping class	N/A
DOT designation	N/A

REFERENCES:

TM 9-1290-210-12&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
Length:
Visible ---------- 2.15 in.
Overall ---------- 16.25 in.
Thread size ---------- 1.7-14NS-2A
Assembly Dwg. No---------- 73-2-311

Temperature Limits:

Refer to complete round upper and lower limits.

Shipping and Storage Data:

DODAC ---------- 1390-N335
UNO serial number ---------- 0107
UNO proper shipping name ----- Fuzes, detonating

Explosive Components:

Detonator and tetryl burster tube.

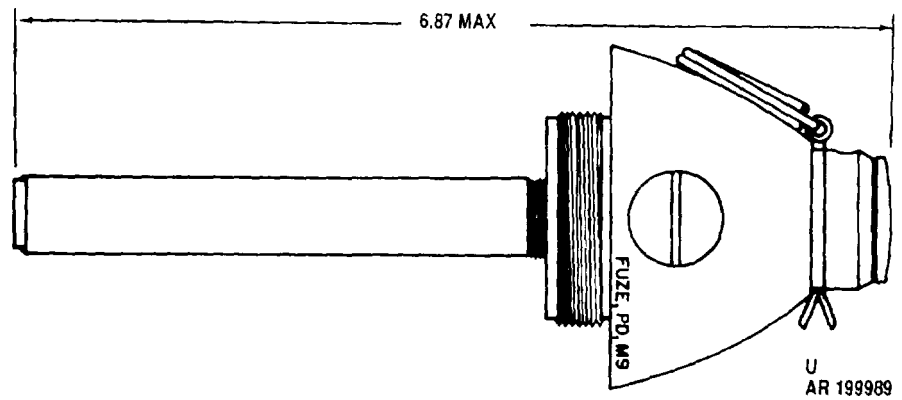
Limitations:

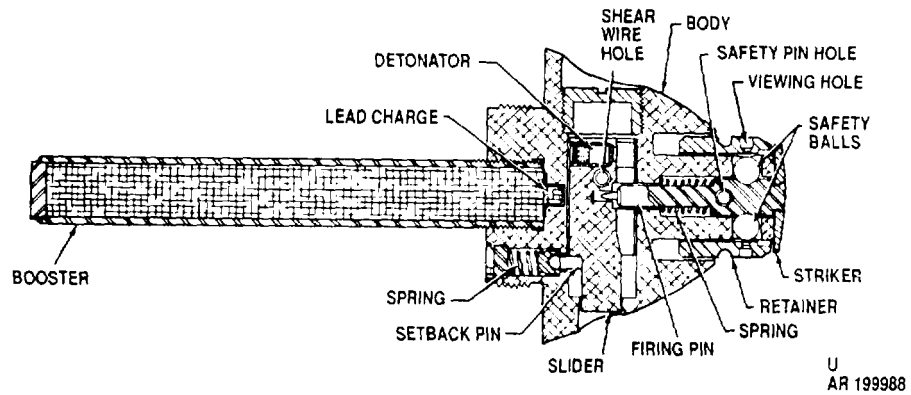
None.

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. actecd 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 l/4-inch into armed position. The firing pin on the lower end of the striker is with - drawn 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 superquick action at impact.

Tabulated Data:

Type	PD
Weight	0.98 lb
Length:	
Visible	2.16 in. max
Overall	6.87 in.
Thread size	1.7-14NS-2A RH
Assembly Dwg. No.	73-2-312

Temperature Limits:

Refer to complete round for upper and lower limits.

Packing:

See DOD Consolidated Ammunition Catalog for complete packing data including NSN'S.

Explosive Components:

Detonator and tetryl booster.

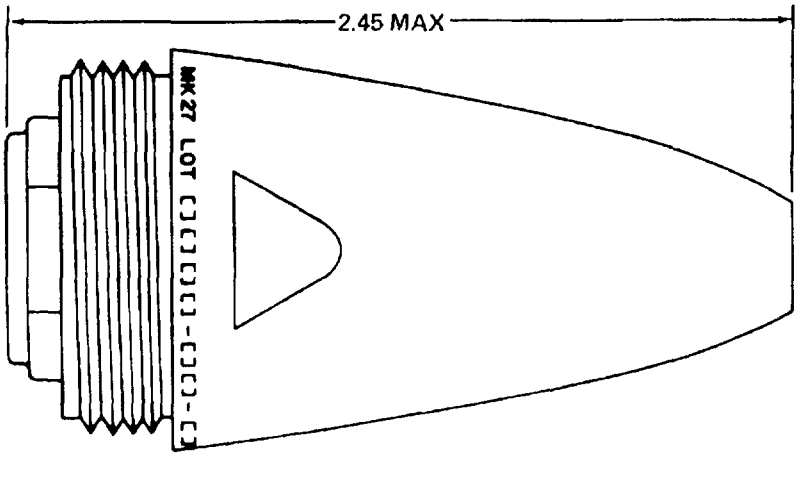
Limitations:

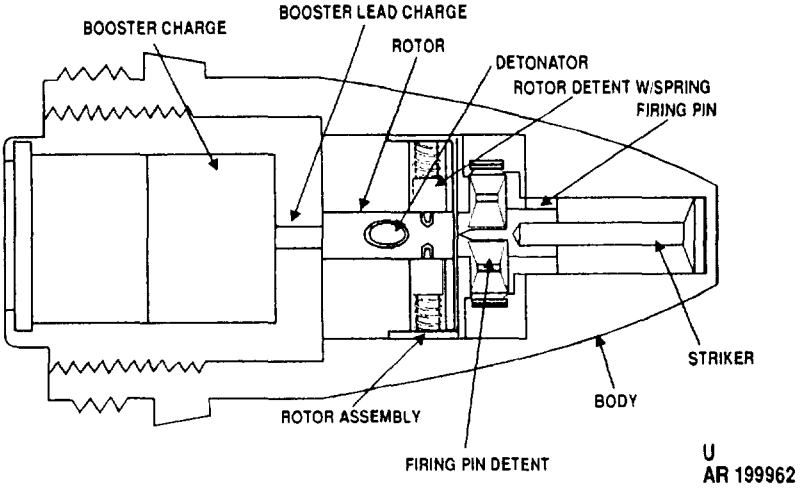
None.

References:

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

FUZE, POINT DETONATING: MK27





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 m 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.

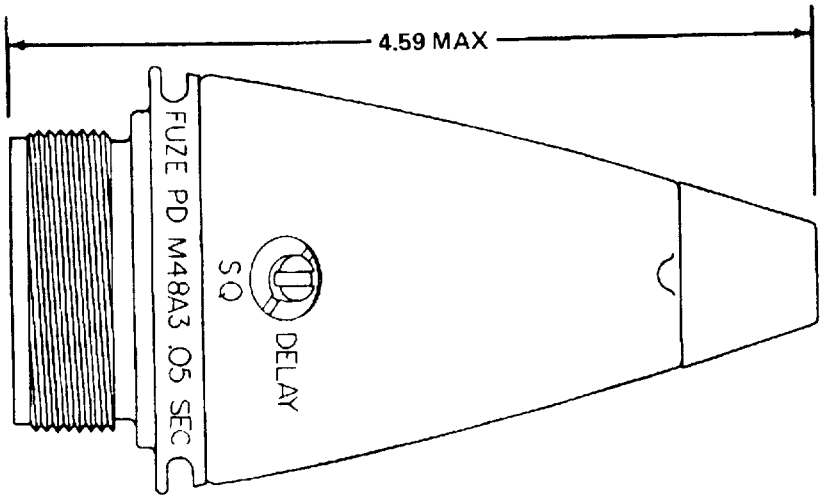
Limitations:

None,

References:

TM 9-1300-251-20
TM 43-0002-33

FUZE, POINT DETONATING: M48 SERIES



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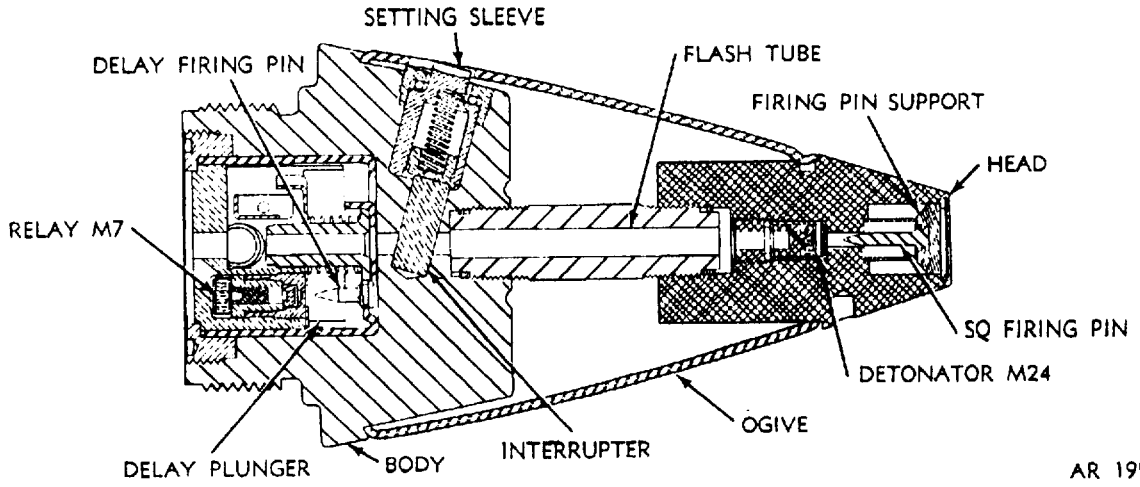


AR 199986

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 solelv 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 wirebound 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 claas	C
DOT designation	PERCUSSION FUZES
DODAC	1390-N318
lJNO serial number	0257
UNO proper shipping name	Fuzes, detonating

Explosive Components:

SQ Action	Detonator M24
Delay Action	Primer, black powder delay charge, Relay M7

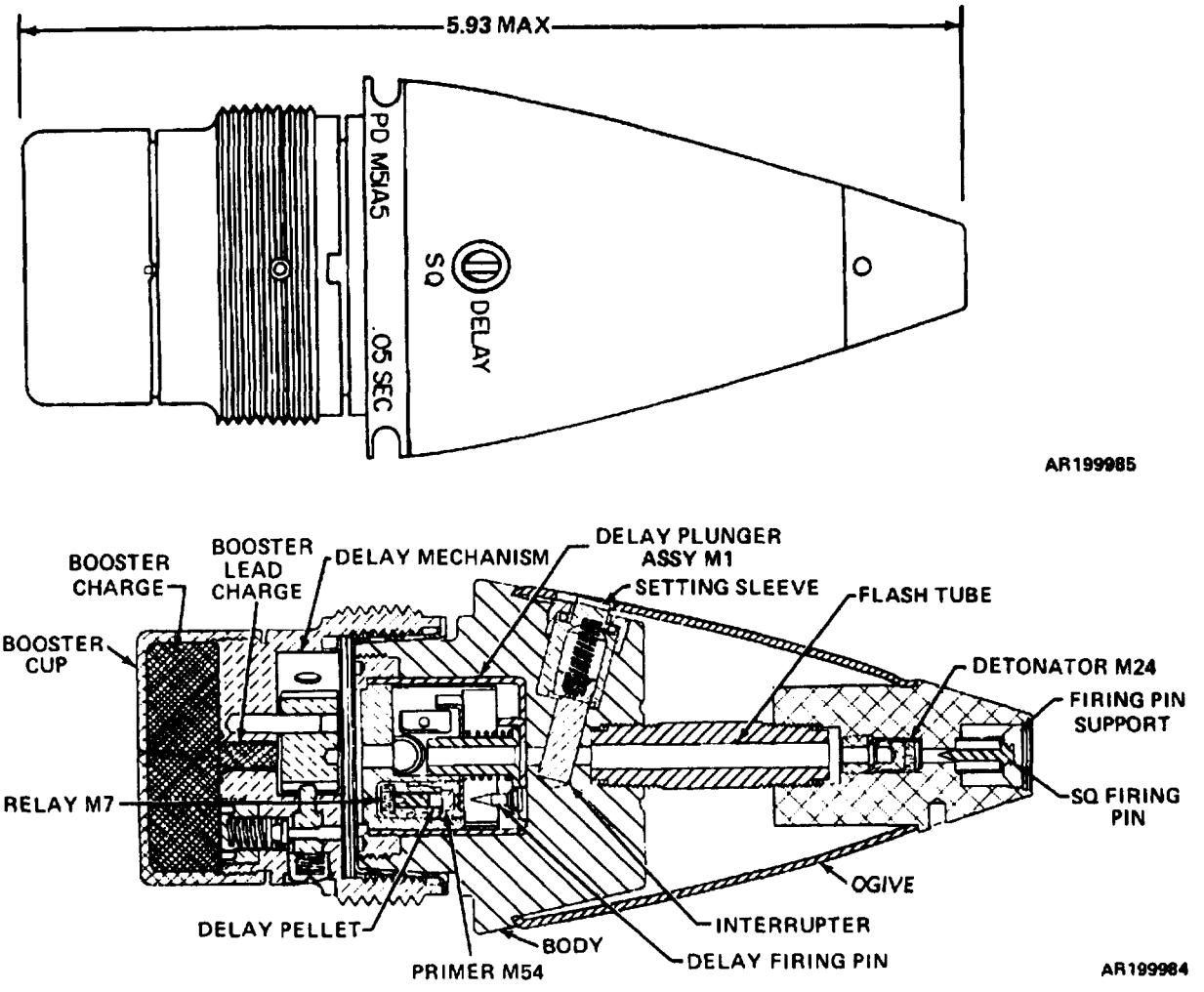
Limitations:

None.

References:

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

FUZE, POINT DETONATING: M51A5



Type Classification:

Std OTCM 36841 dtd 1958.

Use:

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

Description:

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

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

Functioning:

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

Difference Between Models:

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

Tabulated Data:

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

Temperature Limits:

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

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

Shipping and Storage Data:

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

Explosive Components:

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

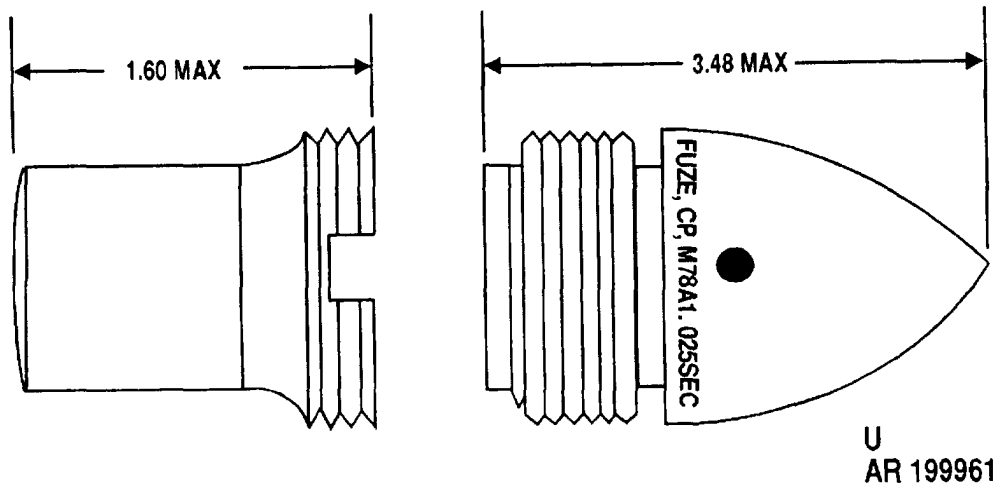
Limitation:

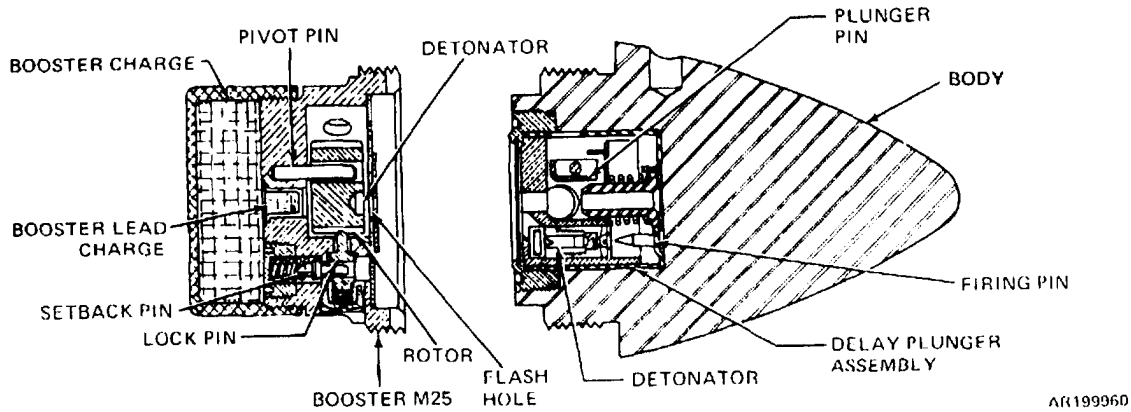
Bore safe only. Premature functioning can occur when fuzes are fired in heavy rainfall.

References:

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

FUZE, POINT DETONATING: M78 SERIES





Type Classification:

Std OTCM 36841 dtd 1958.

Use:

Point detonating fuzes of the M78 series are constructed especially for use in spotting and destruction of concrete targets. The fuzes are used with HE projectiles fired from guns and howitzers in calibers 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 fuzes are equipped with Booster M25, designed solely for this fuze. The booster has an externally threaded body containing a delayed arming mechanism, Detonator M17, and tetryl booster lead charge. The delayed arming mechanism is an eccentric, spin-activated rotor containing the detonator. In the unarmed position, the detonator is out of line with the flash hole and the rotor is locked by a spring-loaded centrifugal lock pin, which is in turn locked by a setback pin. The base of the booster is an aluminum cup threaded onto the body and containing a 340-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 MI in the head of the fuze, thus arming the delay plunger. Simulta neously, 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
Length:
  Visible ---------- 2.68 in
  overall ---------- 3.48 in.
  Thread size ---------- 2-12NS-1
  Assembly Dwg. No. ---------- 73-2-214

Temperature Limits:

Firing:
  Lower limit ---------- -40°F
  Upper limit ---------- +125°F
Storage:
  Lower limit ---------- -80° (for not more than 8 days
  Upper limit ---------- -1600° (for not more than 4 hr/day)
¤Packing ---------- 8 fuzes and 8 boosters in metal container, 2 containers in wirebound box.
¤Packing Box:
  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.

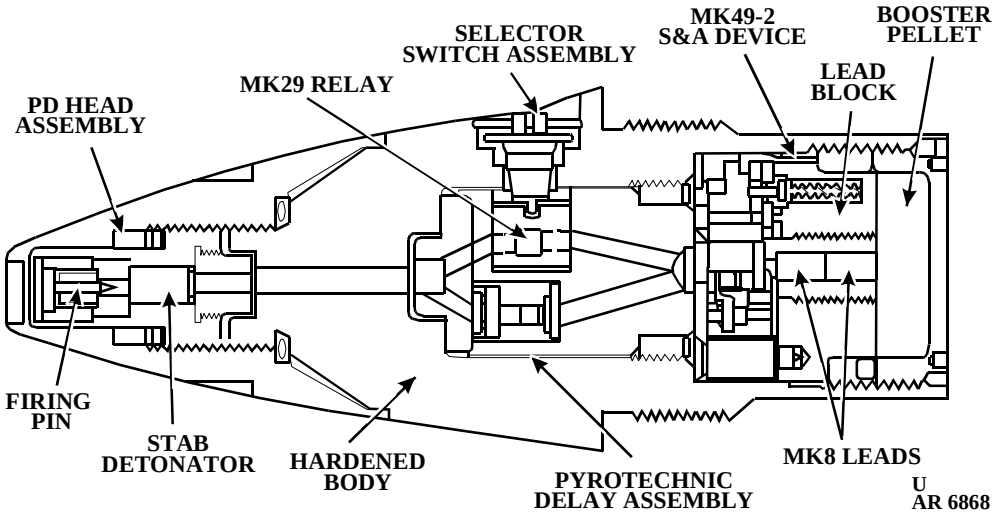
Limitations:

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

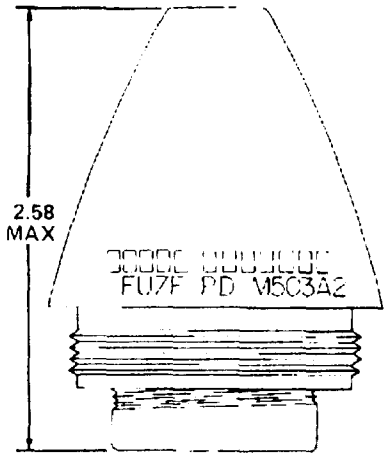
Limitations:

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



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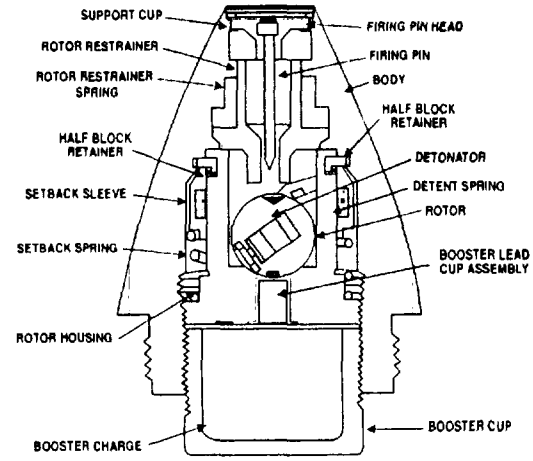

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Type Classification:

Std OTCM 32814 dtd 1949.

Use:

Point Detonating Fuze M503A2 is of the single-action superquick type, functioning on impact or graze. The fuze is designed for use with 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 halfblock 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.

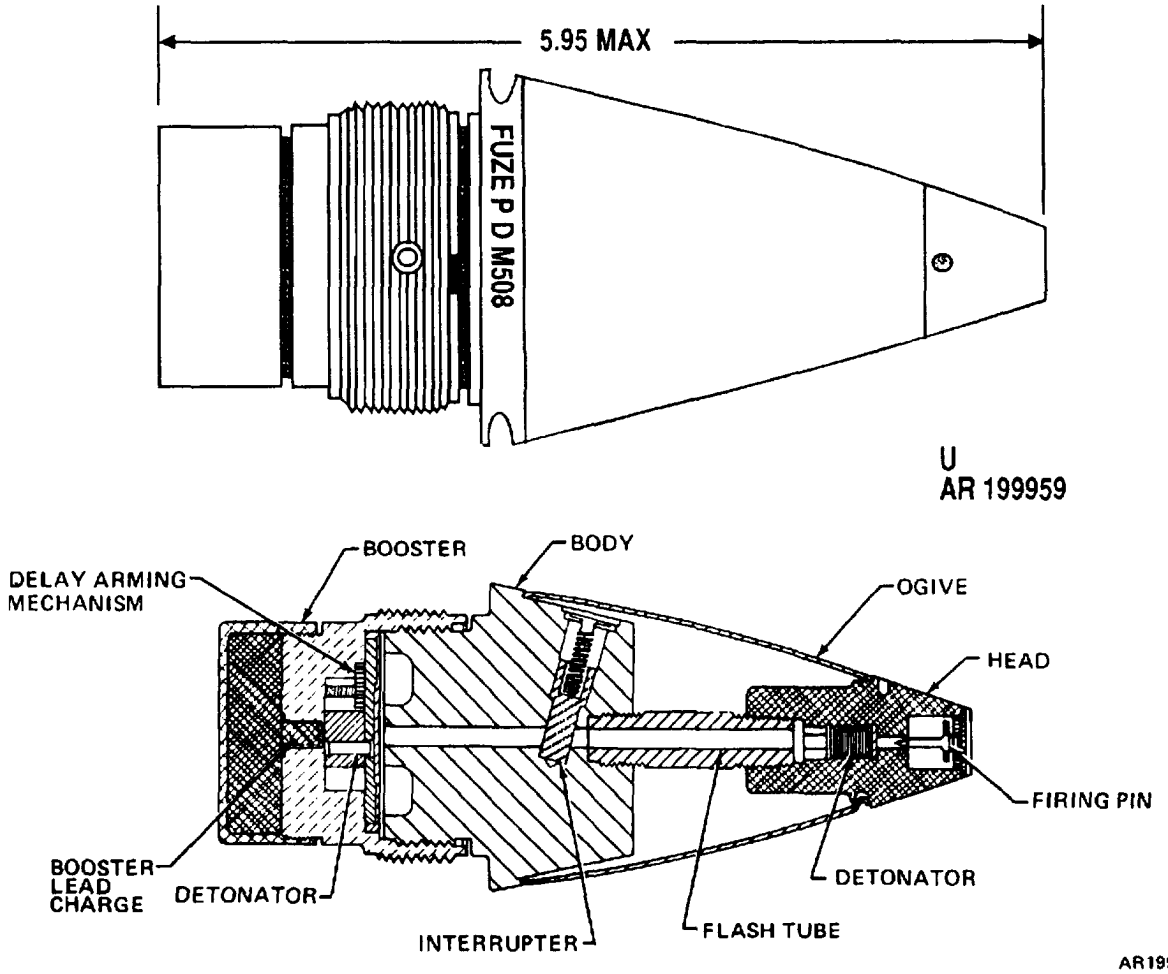
Limitations:

Refer to complete round.

References:

TM 9-1300-251-20

FUZE, POINT DETONATING: M508A1 AND M508 SERIES



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.

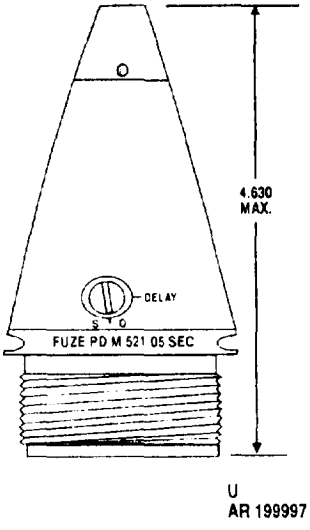
Limitations:

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



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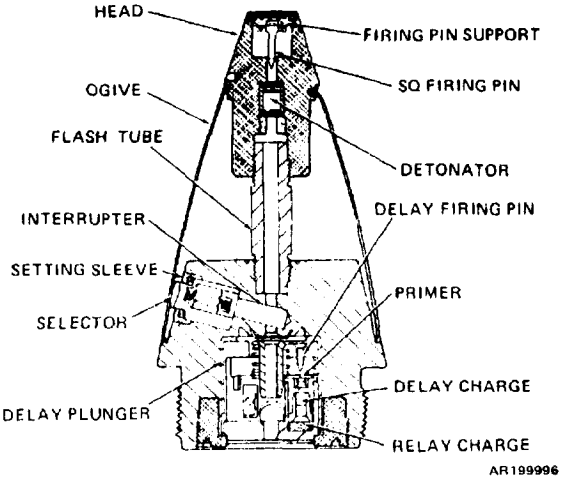


Type Classification:

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 ---------- 4.63 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).

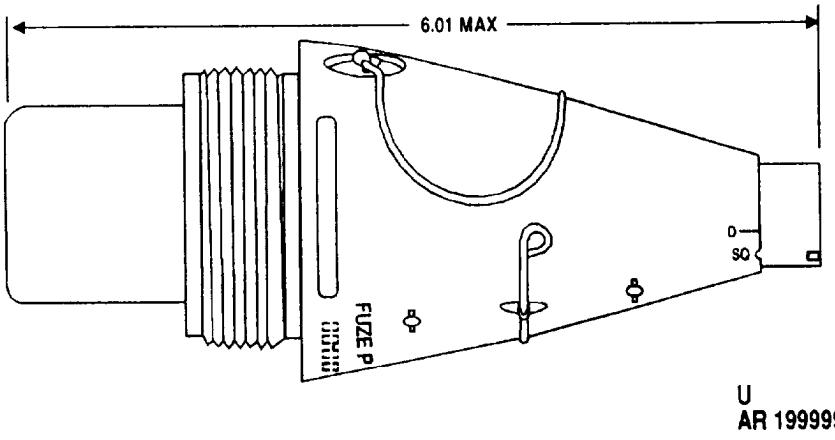
Limitations:

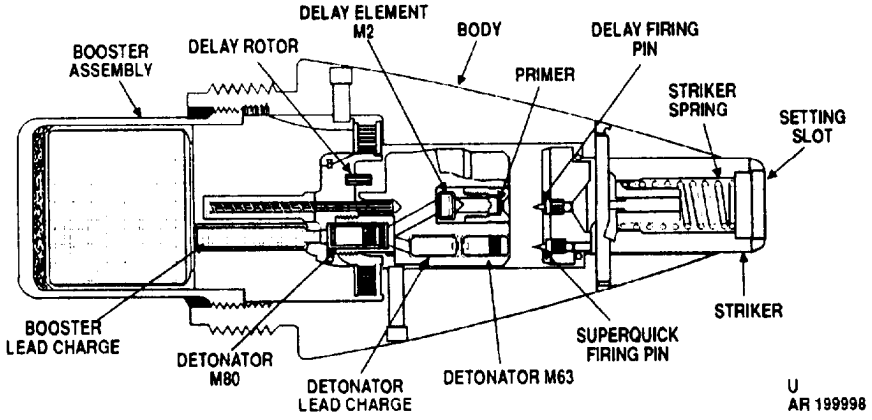
None.

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 superquick action.

Tabulated Data:

Type	PD
Weight	1.27 lb
Length:	
Visible	3.80 in.
Overall	6.01 in.
Thread size	2-12NS-1
Assembly Dwg. No. (M524A6)	9205729

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for not more than 3 days)
Upper limit	+160°F (for not more than 4 hr/day)
*Packing	8 fuzes in metal container; 2 containers in wirebound box
*Packing box:	
Weight	41.8 lb
Dimensions	14 7/8 x 12-13/16 x 9-1/8 in.
Cube	1.0 cu ft

*NOTE: See 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	DETONATING FUZES CLASS A EXPLOSIVES
DODAC	1390-N308
UNO serial number	0408
UNO proper shipping name	Fuzes, detonating

Explosive Components:

SQ action	Detonator M63, tetryl plunger lead charge, Detonator M80, and tetryl booster.
Delay action	Primer, black powder Delay Element M2, Detonator M80, and tetryl booster.

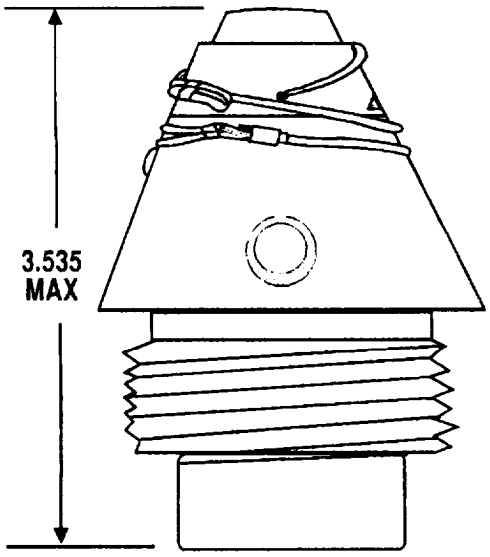
Limitations:

None.

References:

TM 9-1300-251-20
TM 9-2300-257-10
SC 1340/98-IL

FUZE, POINT DETONATING: M525A1 SERIES



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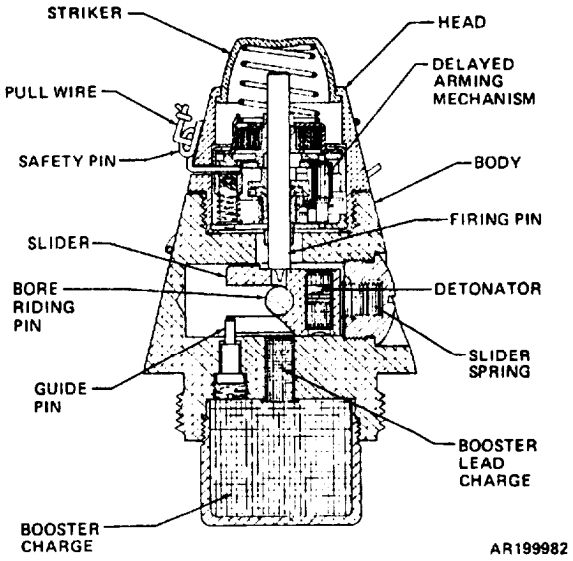


Type Classification:

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:

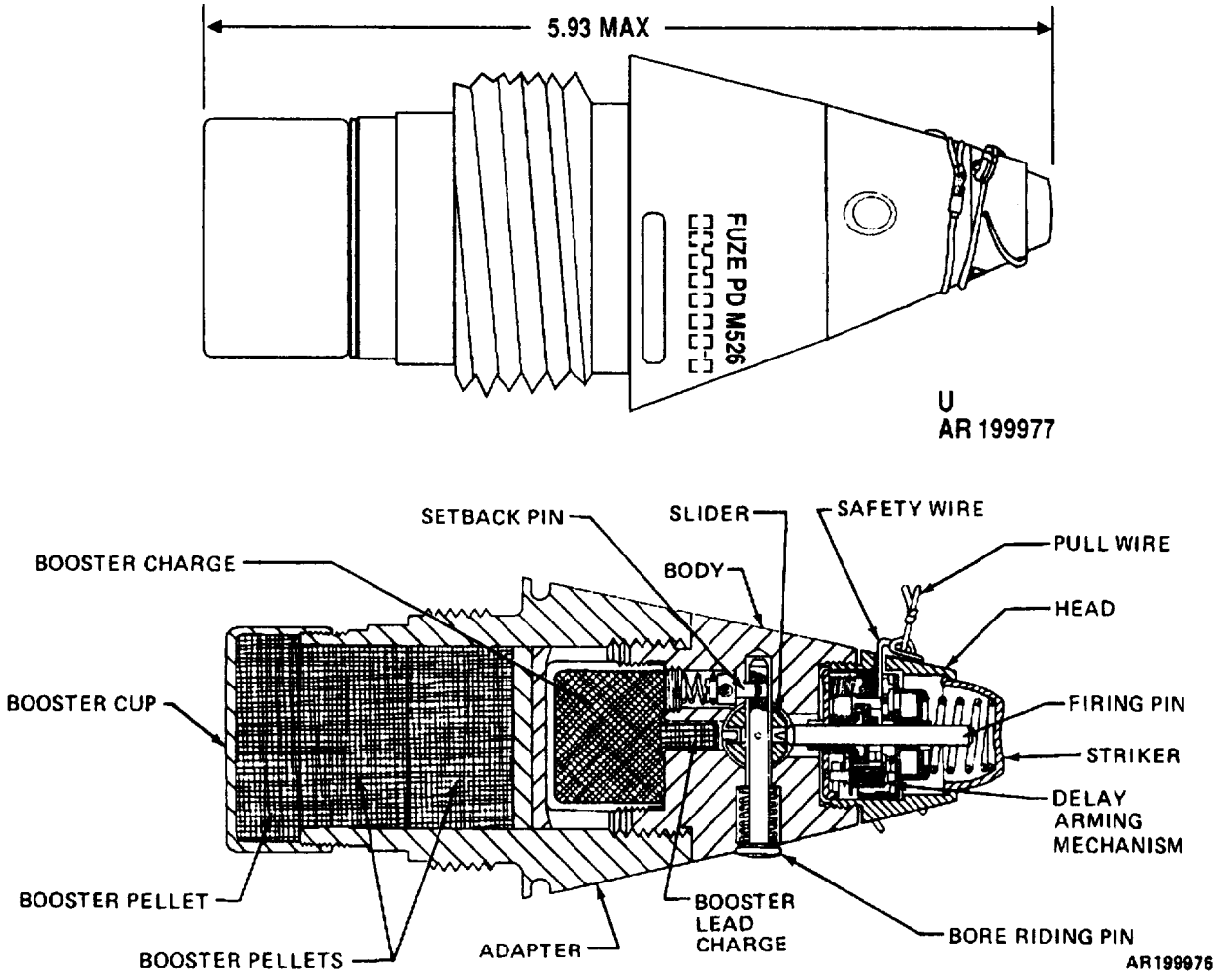
Do not fire in the immediate vicinity of any object which might deflect, obstruct, or damage the cartridge.

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 wirebound 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 group	B
DOT shipping class	A
DOT designation	DETONATING FUZES-CLASS A EXPLOSIVES
DODAC	1390-N309
UNO serial number	0408
UNO proper shipping name	Fuzes, detonating

Explosive Components:

Detonator, tetryl lead charge, and tetryl booster charge.

Limitations:

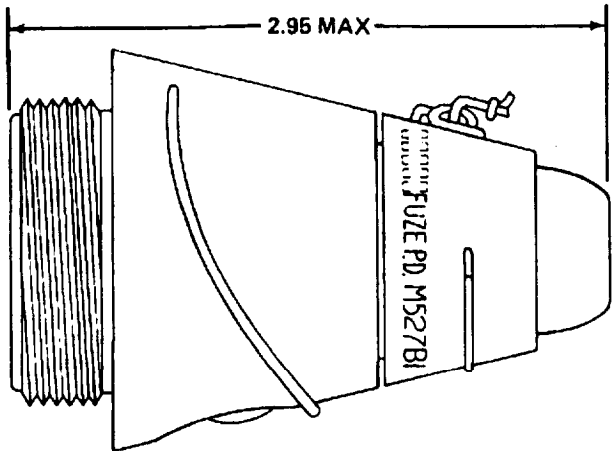
Do not fire in the immediate vicinity of any object which might deflect, obstruct, or damage the cartridge.

M526A1 is authorized for training only.

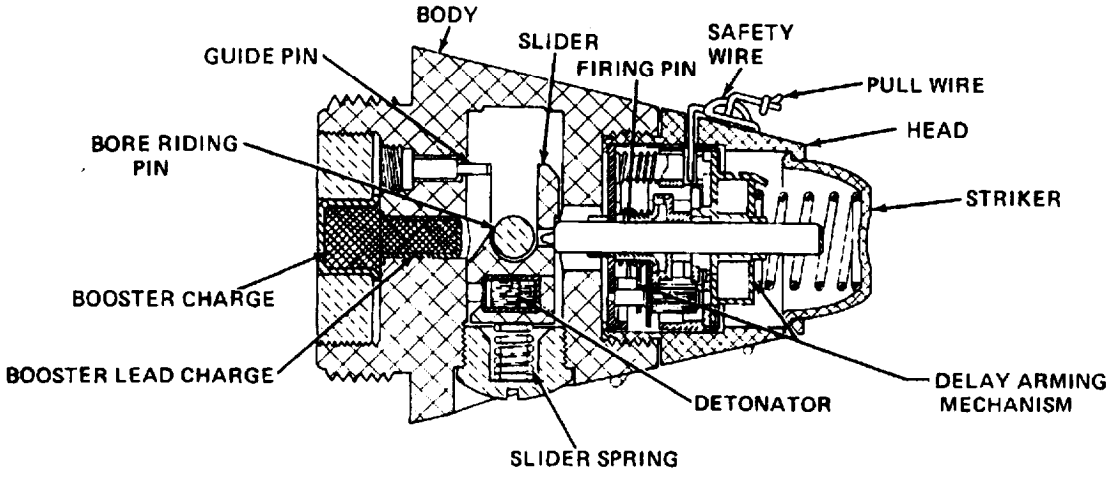
References:

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.

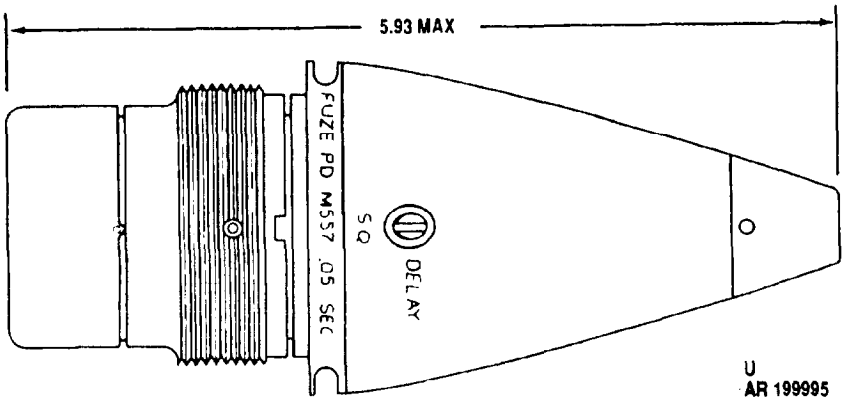
Limitations:

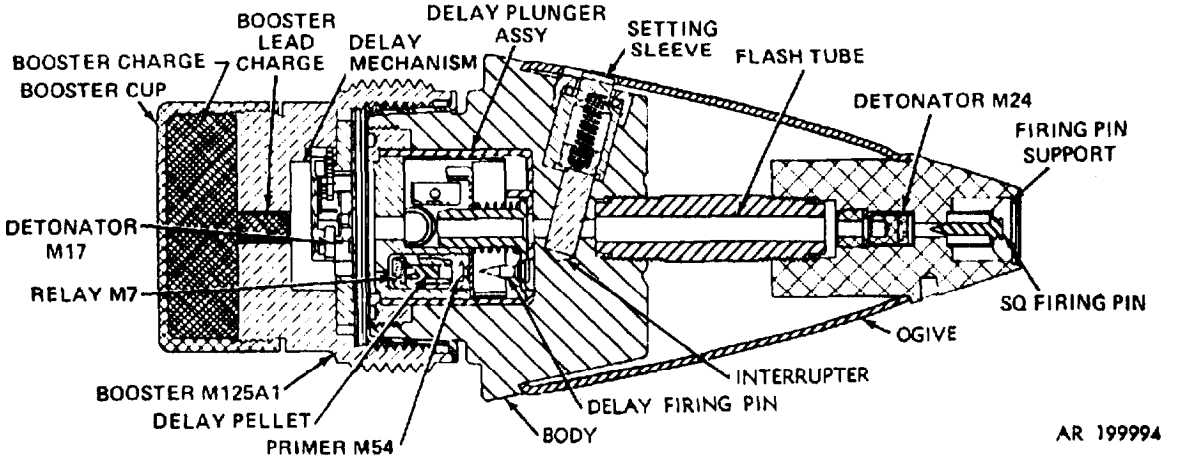
Cartridges utilizing these fuzes will not be fired in the vicinity of any object which might deflect, obstruct, or damage the projectile.

References:

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

FUZE, POINT DETONATING: M557





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
*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 tetyrl 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

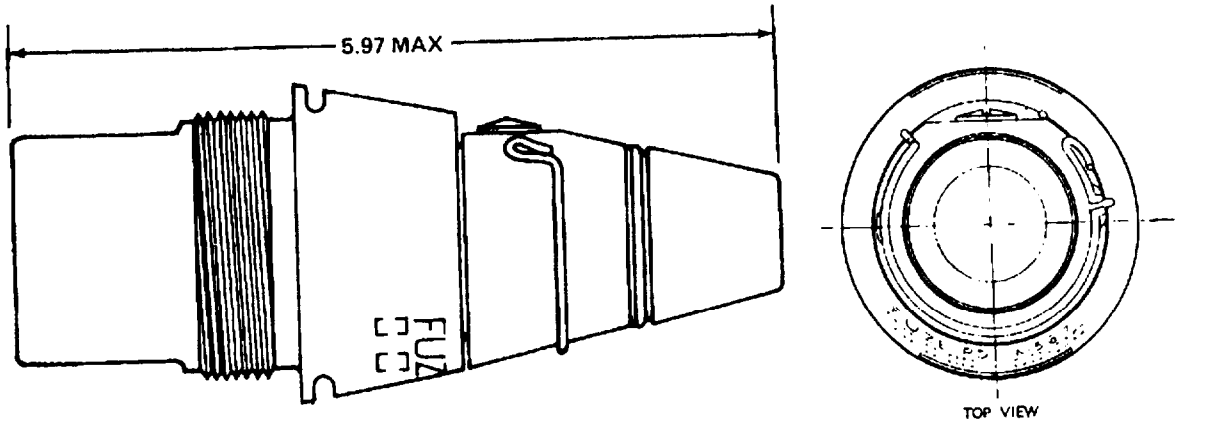
Limitations:

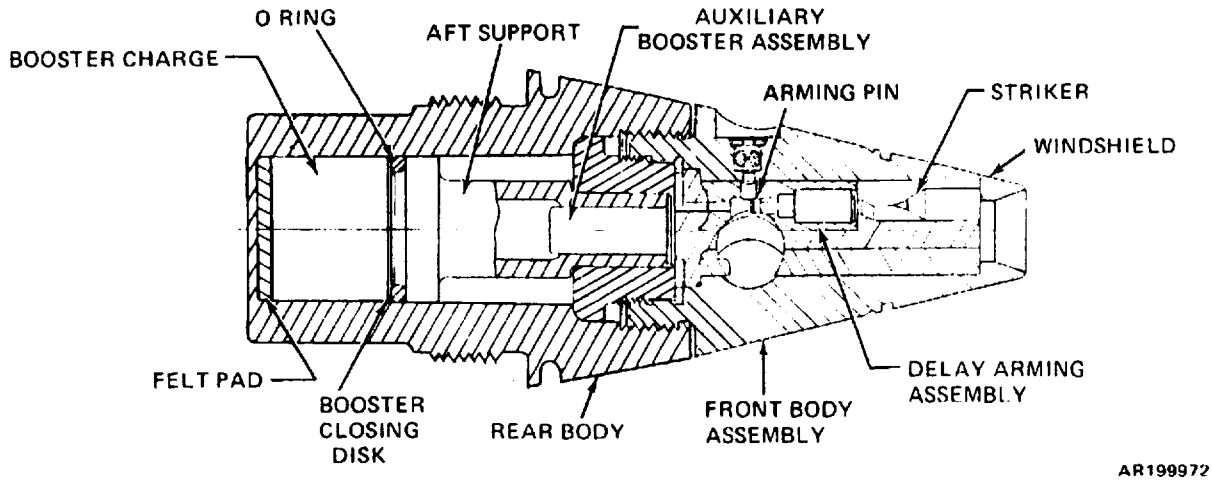
Premature functioning can occur when fuzes are fired in heavy rainfall. Duds may occur when set for delay in low zones of fire (155mm and 8-inch Zones 1 and 2). When set SQ normal functioning can be expected. To prevent duds in 4.2-inch cartridge zones (increments) should not be fewer than seven.

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 13x 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	DETONATING FUZES CLASS A EXPLOSIVES
DODAC	1390-N334
UNO serial number	0106
UNO proper shipping name	Fuzes, detonating

Explosive Components

Detonator, tetryl booster lead charge, tetryl booster charge, primer, black powder delay charge and relay.

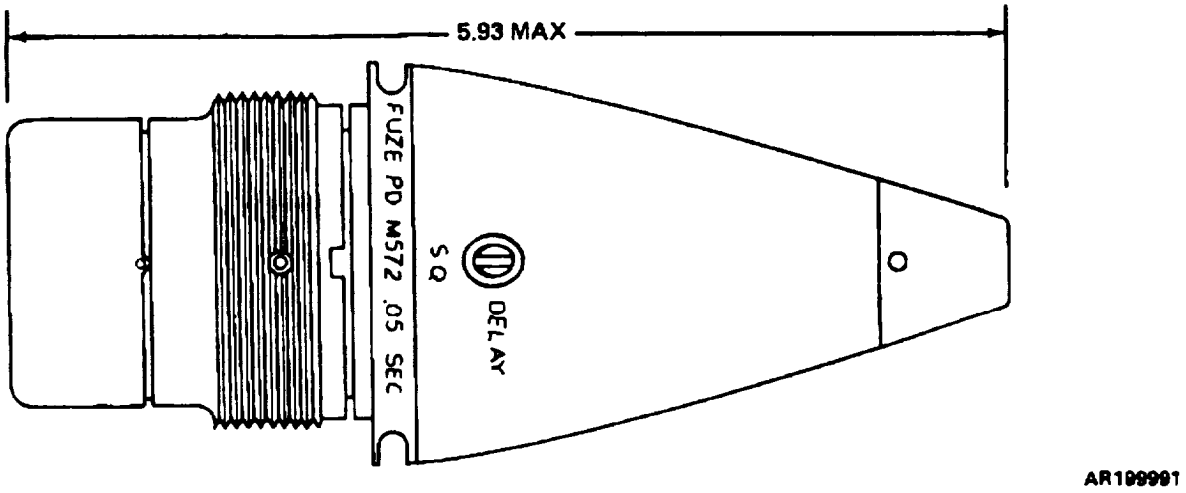
Limitation

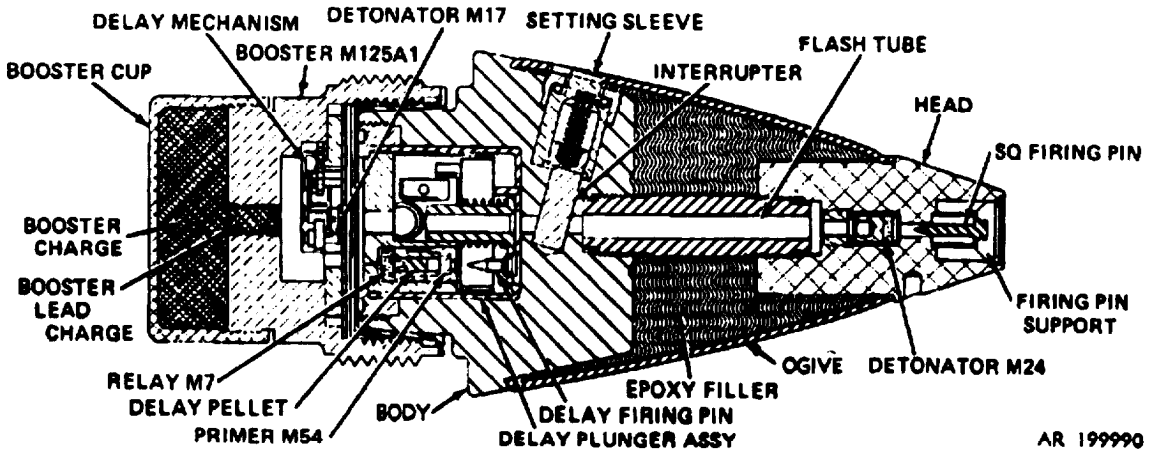
None.

References

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

FUZE, POINT DETONATING: M572





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

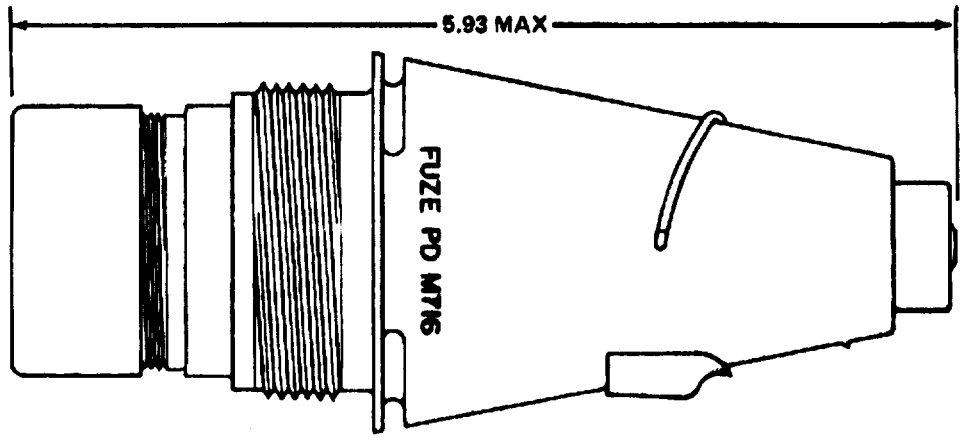
Limitations:

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



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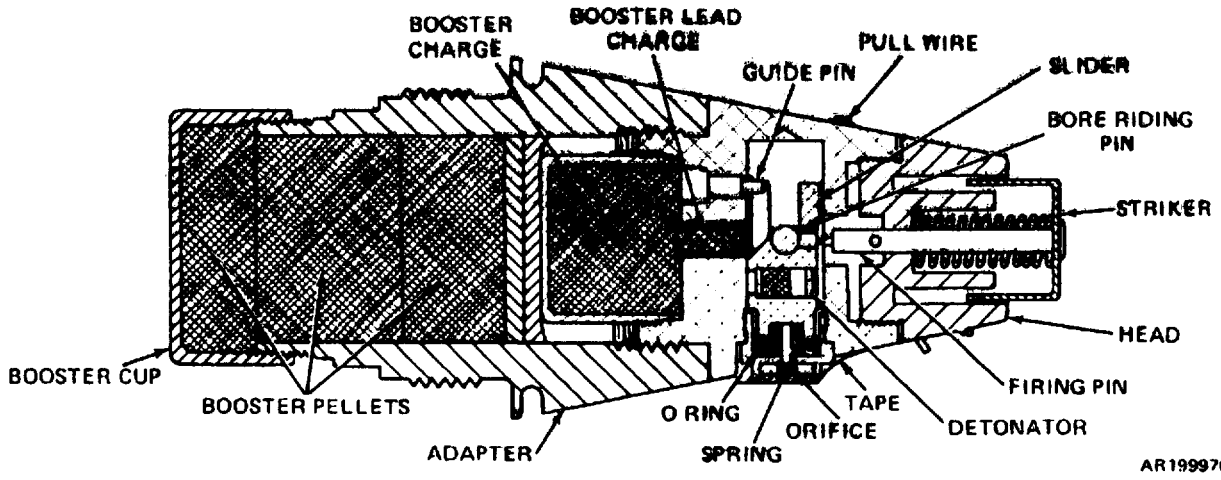


AR199970

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 in- cluding 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

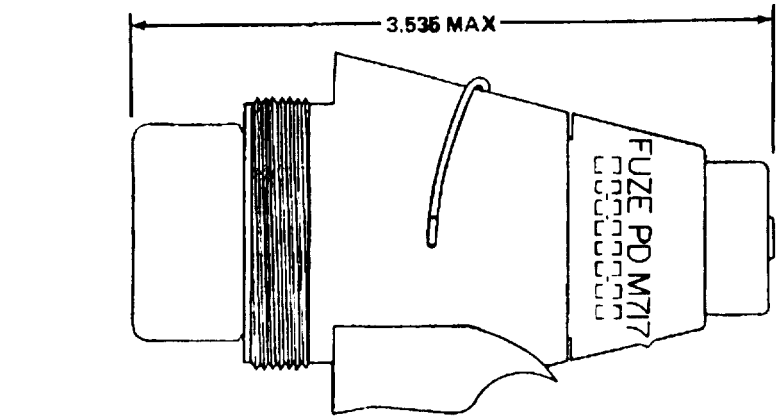
Explosive Component:

Detonator, tetryl booster lead charge, and tetryl booster charge

References:

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

FUZE, POINT DETONATING: M717



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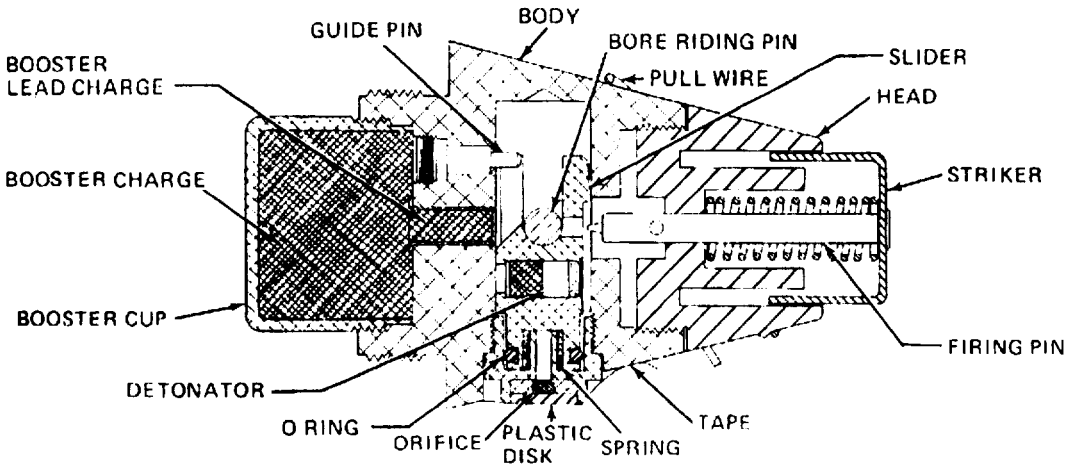


AR199968

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 buse.

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 fuzes in fiberboard container; 6 containers 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	DETONATING FUZES-CLASS C EXPLOSIVES
DODAC	1390-N314
UNO serial number	0409
UNO proper shipping name	Fuzes, detonating

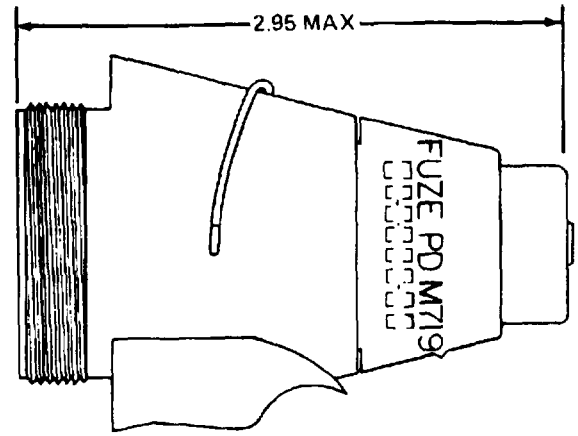
Explosive Components:

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



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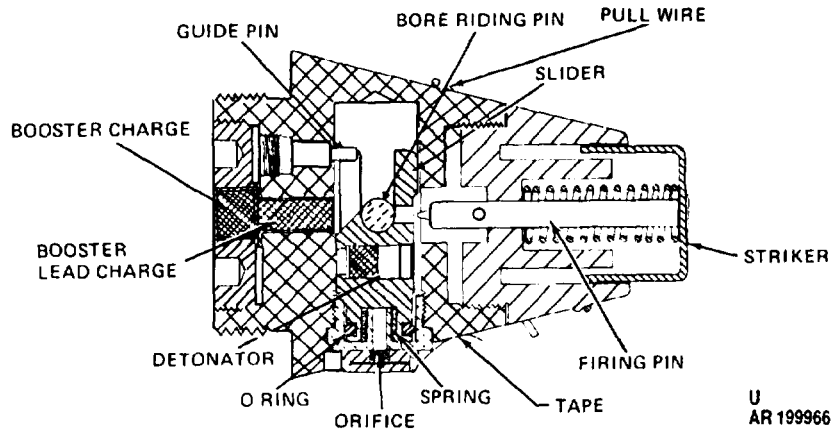


U
AR 199966

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.

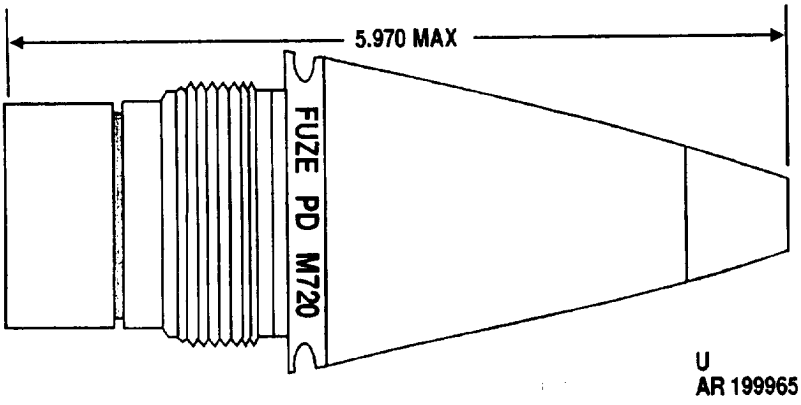
Explosive Components:

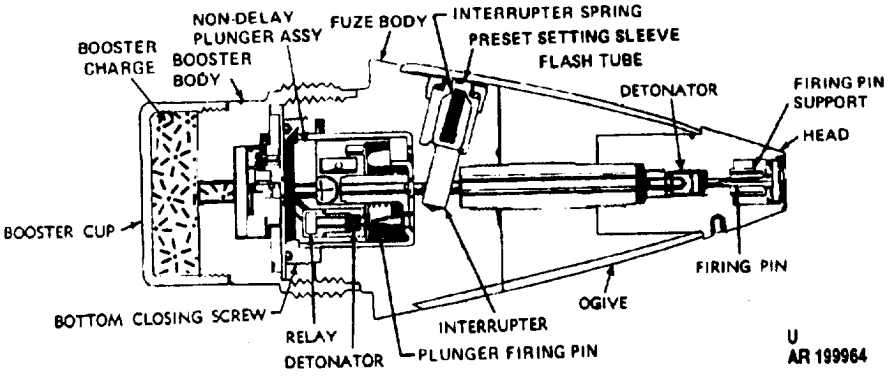
Detonator tetryl booster lead charge, and tetryl booster charge.

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 internally 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 reparation 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.

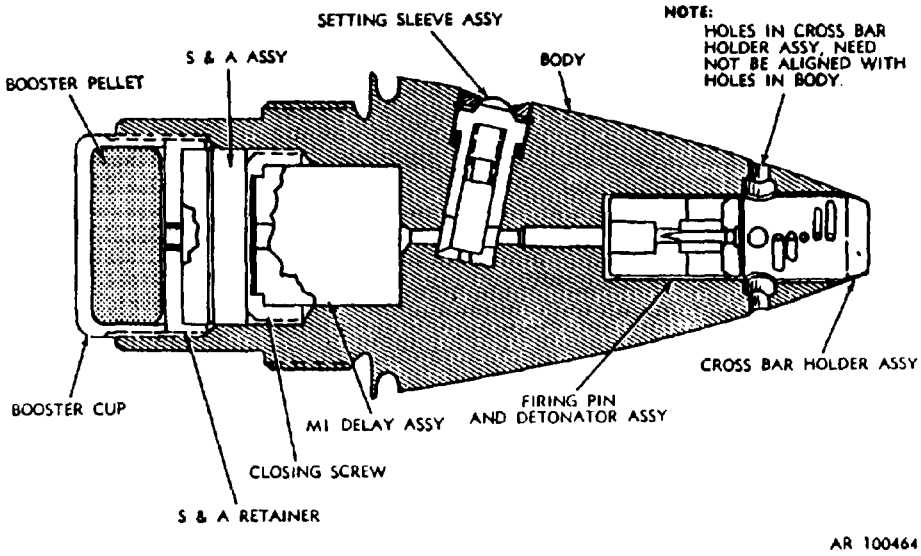
Limitations:

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



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 downrange 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 counterclockwise 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 Ml 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)
- DODAC --- 1390-N340
- UNO serial number --- 0409
- UNO proper shipping name --- Fuzes, detonating
- *Packing --- 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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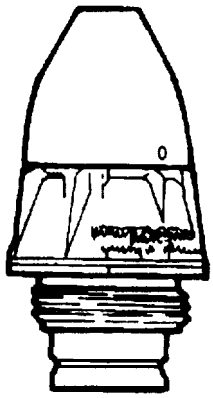
FUZE, POINT DETONATING: M745



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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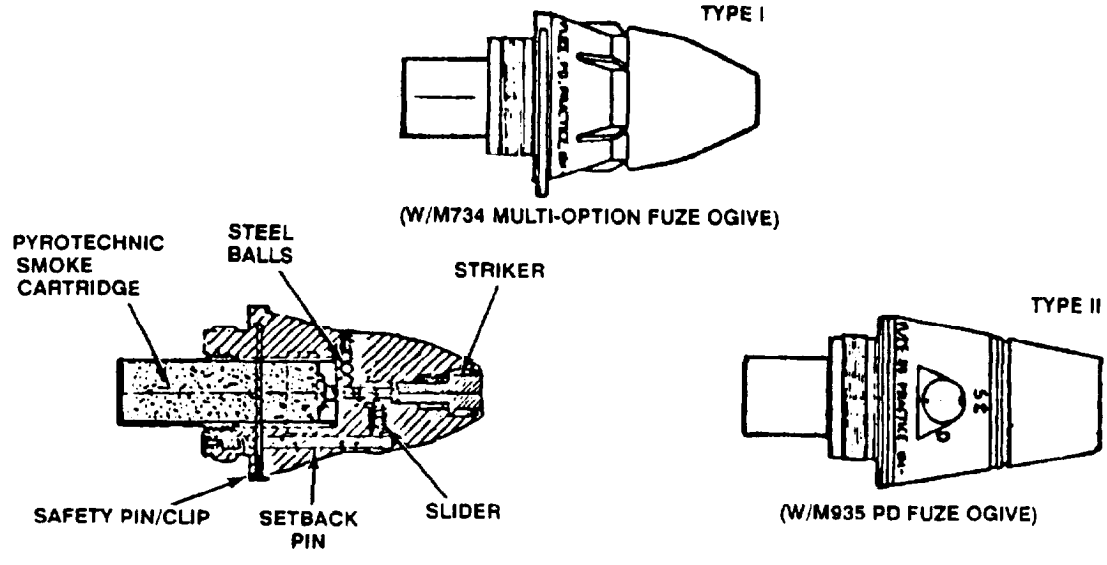
FUZE, POINT DETONATING: M751



Type 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

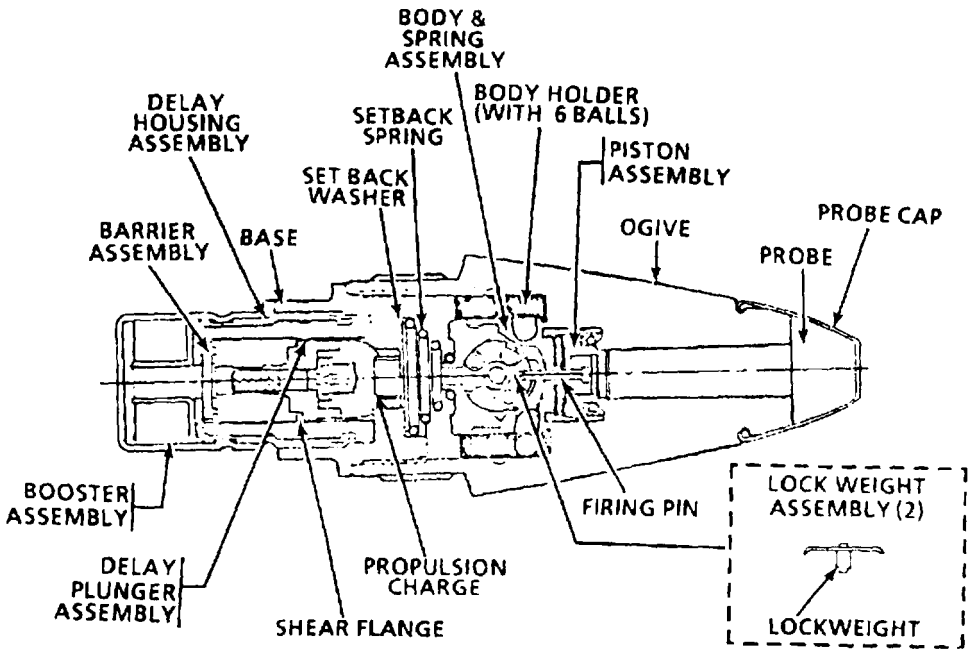
Limitations

None.

References

TM 9-1015-249-10

FUZE, POINT DETONATING: M761



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 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

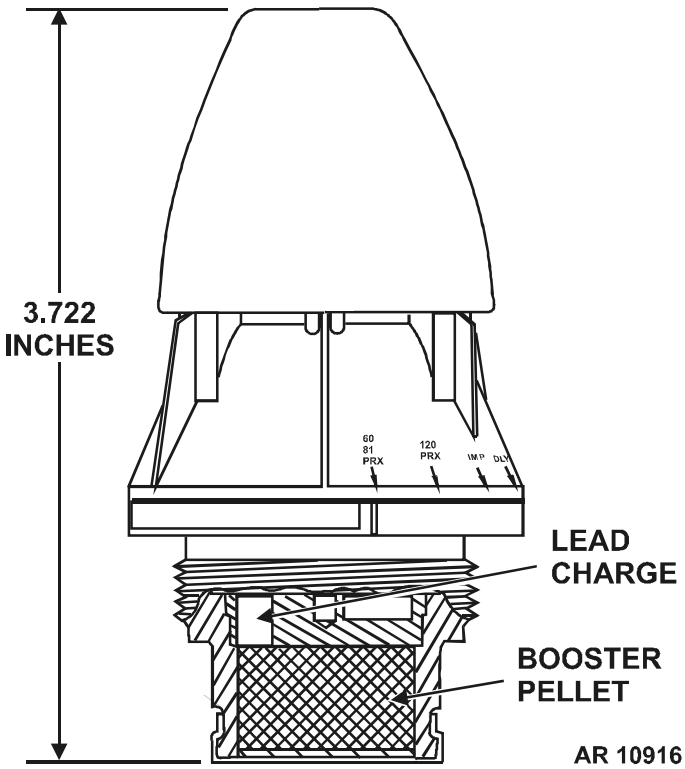
Temperature Limits:

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
Length:	
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.

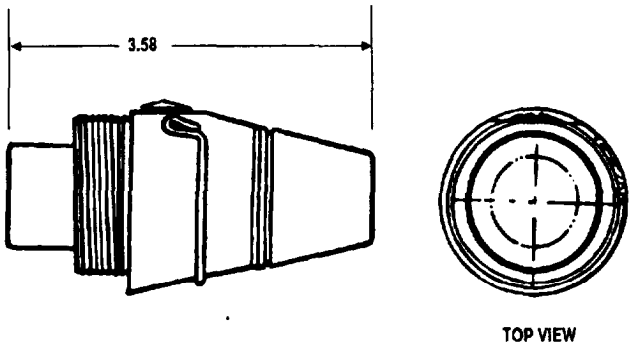
SHIPPING AND STORAGE DATA:

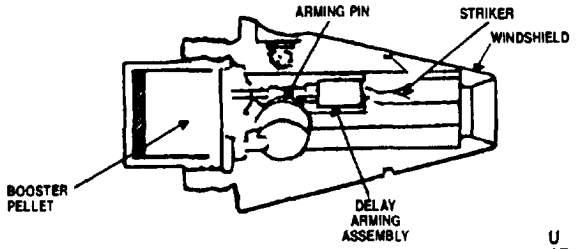
DOD hazard class/division	1.2.2
Storage compatibility group	D
DOT hazard class	1.2D
Proper shipping name	FUZE, DETONATING
UN identification number	0409

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 rear-ward. 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	DETONATING FUZES--CLASS A EXPLOSIVES
DODAC	1390-N342
UNO serial number	0107
UNO proper shipping name	Fuzes, detonating

Explosive Components:

M53 Delay Arming Element; M98 Superquick Detonator; M76 Delay Detonator; RDX Lead Charge and Booster Pellet.

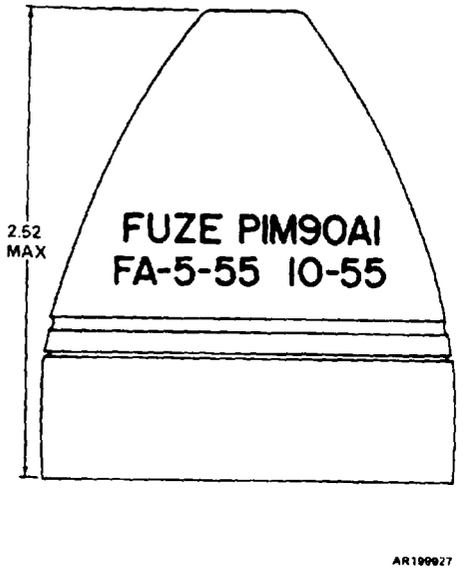
Limitations:

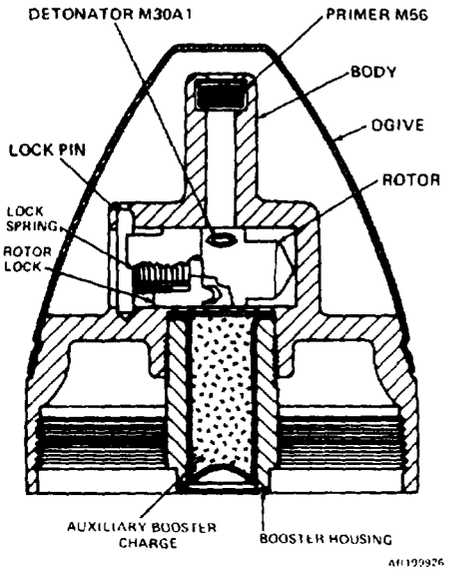
None.

References

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

FUZE, POINT INITIATING: M90A1 or M90





Type Classification:

C & 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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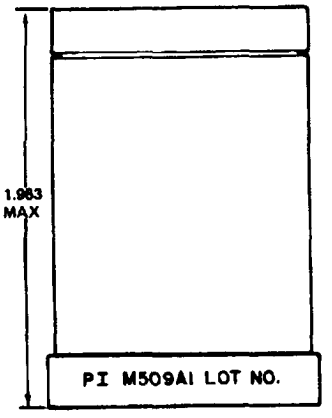
FUZE, POINT INITIATING, BASE DETONATING: M509A1/A2



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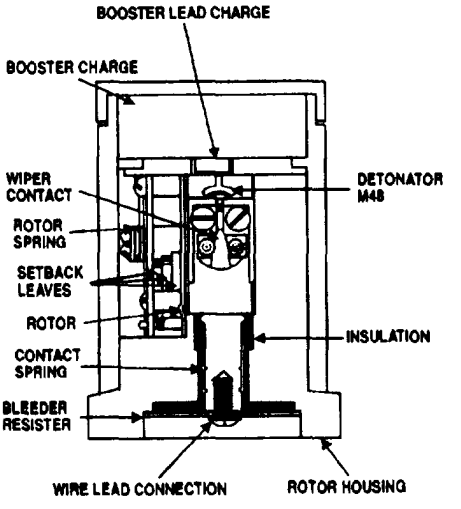

U
AR 199928

Type Classification:

Std AMCTC 4677 dtd 1966.

Use:

Point initiating, base detonating type Fuze M509A1 is used with fin-stabilized HEAT projectiles in calibers from 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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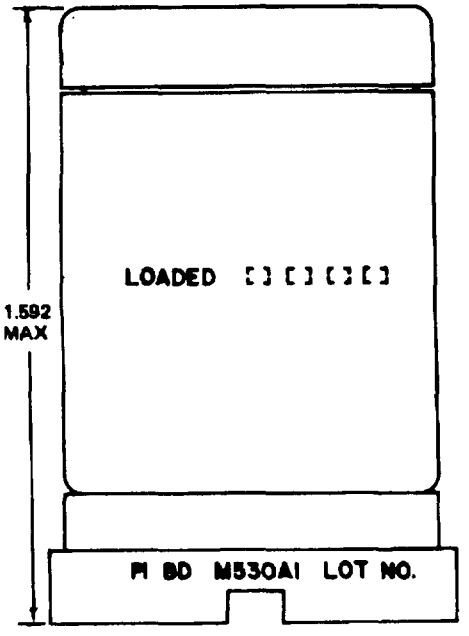
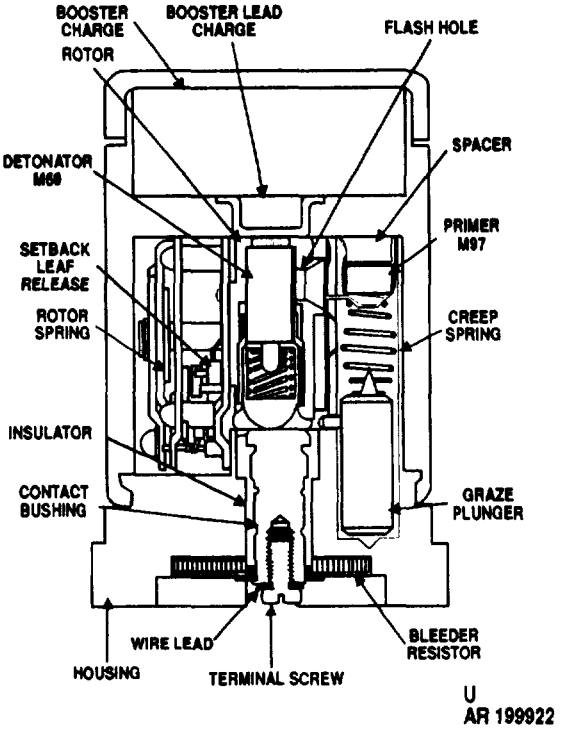
FUZE, POINT INITIATING, BASE DETONATING: M530A1 AND M530



AR199923



U
AR 199922

Type Classification:

Std AMCTC 4265 dtd 1966.

Use:

Point initiating, base detonating type Fuzes M530A1 and M530 are designed for use in low-velocity HEAT projectiles.

Description:

The fuze is essentially an aluminum housing containing a spring-loaded brass rotor and an electrically fired detonator. In the unarmed position, the rotor is restrained by three metal leaves, so arranged as to be displaced sequentially by inertia from setback. The power source is a polarized piezoelectric ceramic disk (not shown) in the nose of the projectile connected by a wire lead to the fuze. A separate inertial plunger with firing pin is provided to act on the primer for graze impact.

Functioning:

When the weapon is fired, setback force acts sequentially on the individual leaves of the leaf arming assembly. When the third leaf has been displaced to the rear, the rotor is released and can rotate, powered by a pre-loaded spring, 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 move 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.

Limitiations:

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

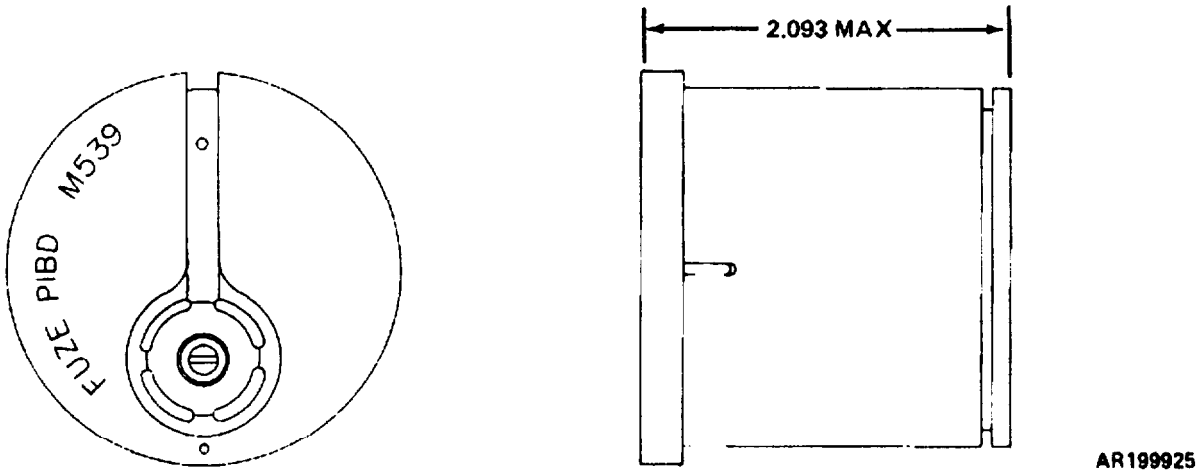
Shipping and Storage Data:

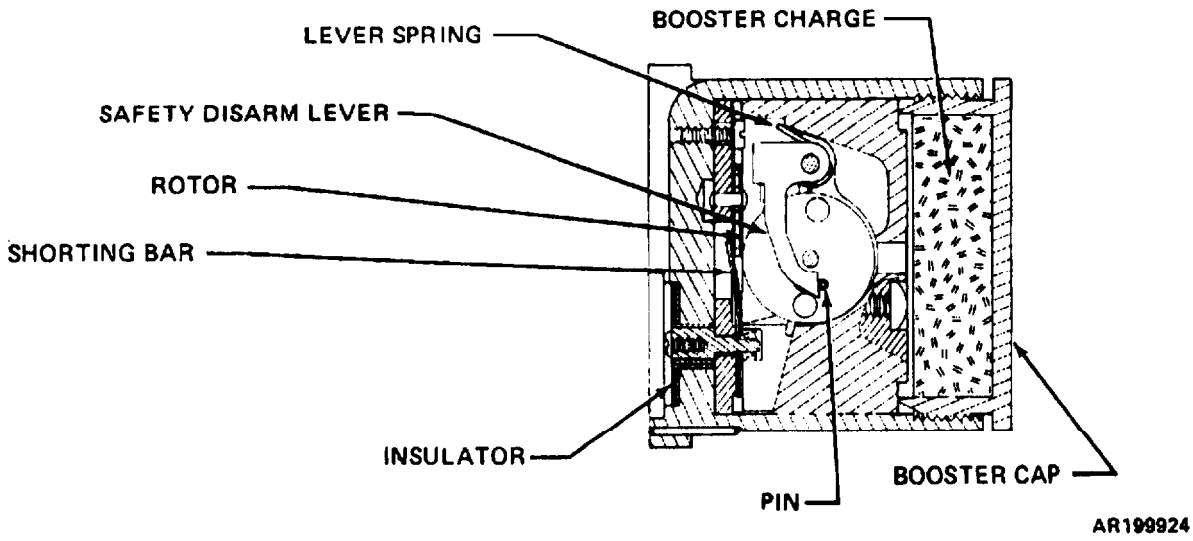
DODAC ---------- 1390-N268

References

TM 9-1015-223-12
TM 9-1300-251-20

FUZE, POINT INITIATING, BASE DETONATING: M539A1





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 setback 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, an 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.

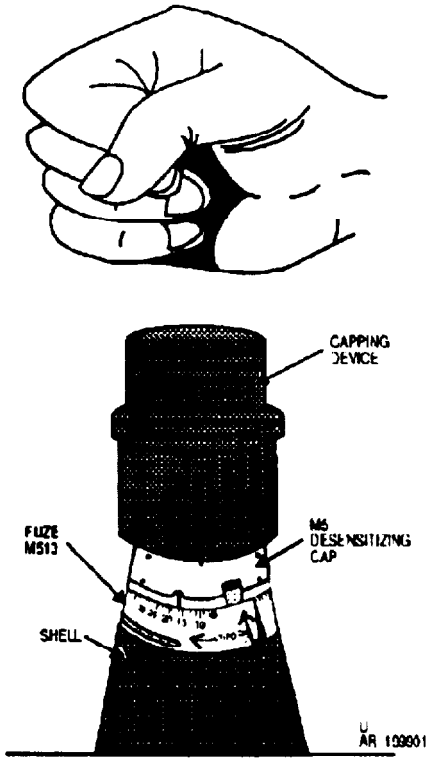
Limitations:

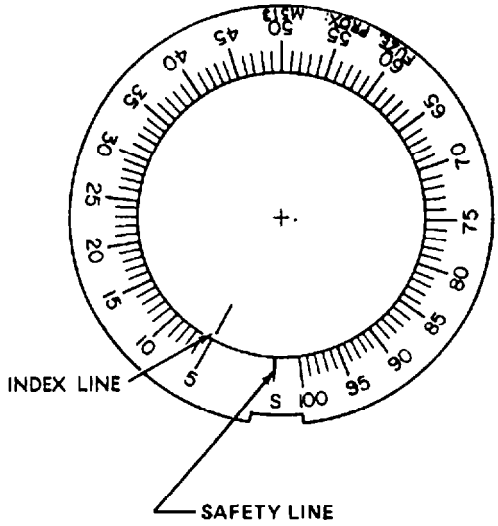
None.

References:

TM 9-1300-251-20

FUZE, PROXIMITY: M513 AND M513B1





METAL SLEEVE TIME GRADUATIONS FOR FUZE M513 AND M513B1

Type Classification:

C & 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 wirebound 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.

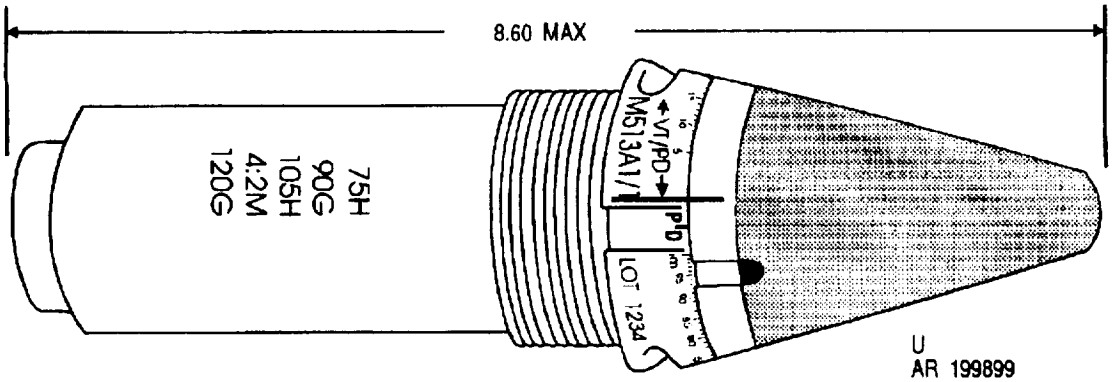
Fuze may not be fired at Charge 7 in 105mm howitzers, except under combat emergency conditions .

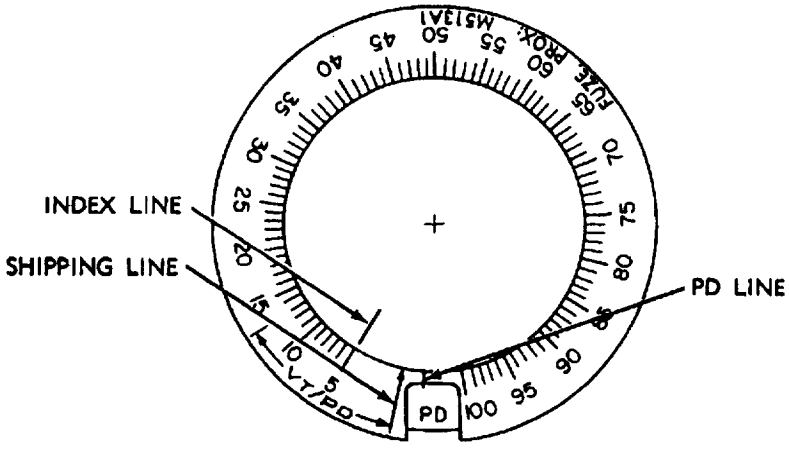
Proximity of other masses to the target area, such as crests or ridges, air observation posts, nearby bursts or fragments experienced when firing volley, salvo, or rapid fire from adjacent weapons, may cause early fuze initiation.

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





Type Classification:

C&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 target, are inscribed around the shoulder of the 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
Length:	
Visible	3.795 in.
Overall	8.60 in.
Thread size	2.00 in. 12NS-1
Assembly Dwg. No.	1310371

Temperature Limits:

Firing:

	M513A2	M513A1
Lower limit	-40°F	-20°F
Upper limit	+160°F	+130°F
Storage:		
Lower limit	-60°F	-40°F
Upper limit	+160°F	+130°F

*Packing	1 fuze per metal container; 12 containers per metal box; 2 metal boxes per wirebound box.
* Packing Box:	
Weight	63 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 EMERGENCY 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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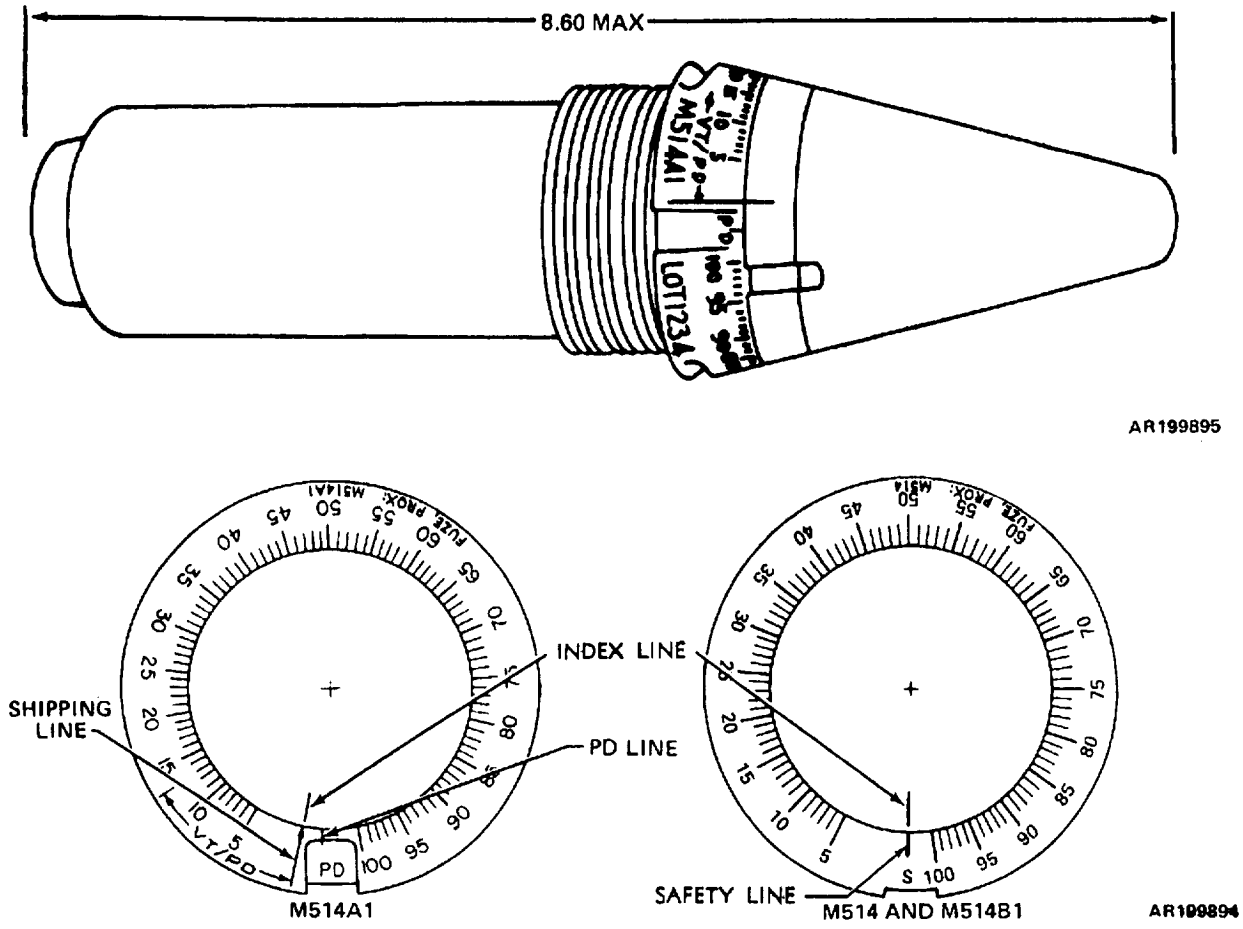
FUZE, PROXIMITY: M514, M514B1, M514A1



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 fuzes are of the adjustable delayed-arming type which are activated by the receipt of reflected radio transmissions emitted from the fuze upon target approach. The fuzes contain radio transmitters, antennas and receivers and are energized upon firing. Certain models of this fuze provide for impact functioning (PD action) or the option for a PD setting, but this characteristic is not common to all models. The fuzes have a windshield/nose cone of plastic attached to a metal setting ring. The ring and fuze sleeve are made of steel or aluminum. The shoulder of the sleeve is marked with a PD setting where applicable and time graduations from 5 to 100 seconds representing the time of flight to the target. The setting index mark is located on the plastic nose cone. The M514A1 series nose cones identified as KEL-F are authorized for use in the 175mm gun system at all charges (refer to Difference 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 combinations:			
155mm	Chg 3 & above GB Chg 5 & above WB	Chg 3 & Above GB Chg 5 & above WB	PD mode Chg 4 & above GB Chg 6 & above WB
175mm			Chg 1 & 2 (KEL-F) All chgs
8 in.	Chg 3 & above GB All chgs WB	Chg 3 & above GB All chgs WB	Chg 3 & above GB All chgs WB (PD mode: chg 4 & above GB Chg 6 & above WB)

*NOTE: Model M514A3 (M514A1E1) on separate data sheet.

Tabulated Data:

Type ---------- Proximity
Weight ---------- 2.35 lb
Length:
  Visible ---------- 3.74 in.
  Overall ---------- 8.60 in.
  Assembly Dwg. No. ---------- 795245

Temperature Limits:

Firing:
  Lower limit ---------- 0°F (-18°C)
  Upper limit ---------- +120°F (+49°C)
Storage:
  Lower limit ---------- -20°F (-29°C)
  Upper limit ---------- +130°F (+54.4°C)
  *Packing ---------- 8 fuzes in metal container; 2 containers in wirebound 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 ---------- DETONATING FUZES-CLASS A EXPLOSIVES, 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:

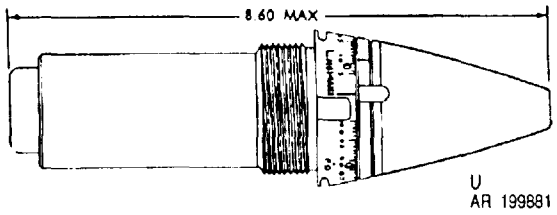
Do not use these fuzes for firing at targets closer than 731 meters (800 yards) to friendly positions. Use the highest charge commensurate with range for maximum fuze reliability. Fuzes are not fully effective against airborne targets. After proximity arming, fuzes may function under influence of nearby 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.)

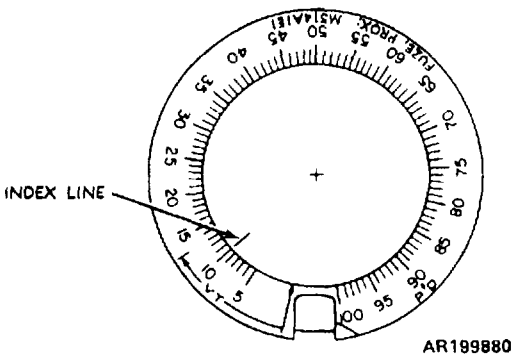
The M514A1 fuze should be used only under ballistic conditions above 3,800 G's setback force. Burst heights with this VT fuze will be higher than with the Standard A VT fuzes (M728 and M732).

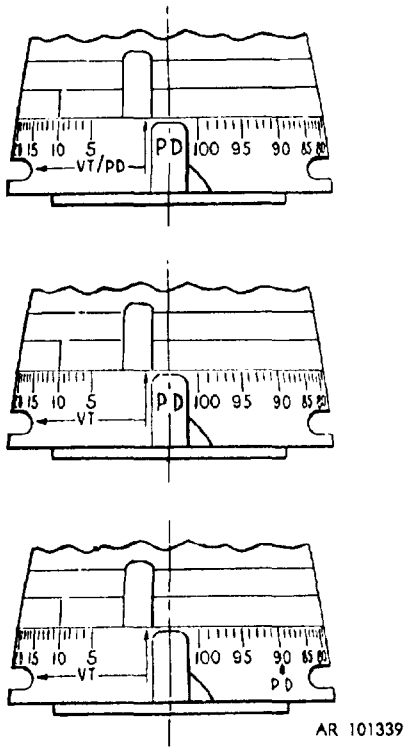
References:

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 tar et 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 alined 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 container; 2 containers in 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	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 ANY HIGH EXPLOSIVES
DODAC	1390-N462
UNO serial number	0408
UNO proper shipping name	Fuzes, detonating
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.

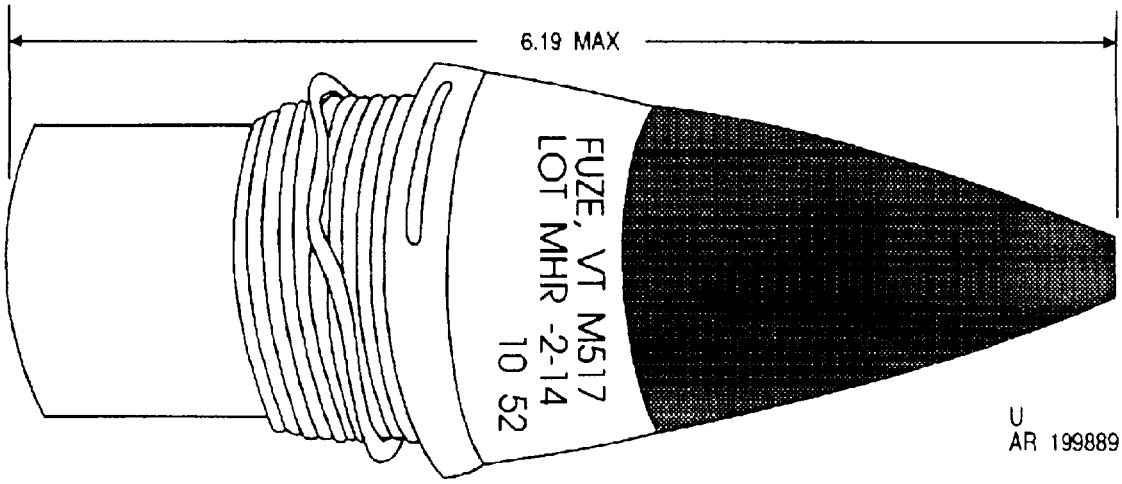
The M514A3 fuze is limited in authorized weapon/propelling charge combinations, as follows:

Weapons	Propelling charge(s)
4.2-inch mortar	10 and above.
105mm howitzer (all models)	1-6; Charge 7 under emergency conditions for proximity mode only For PD firings at Charge 7, use Fuze PD M557 or Fuze MTSQ M564.
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 ---------- DETONATING FUZES-CLASS A EXPLOSIVES
DODAC ---------- 1390-N417
UNO serial number ---------- 0107
UNO proper shipping name ----- Fuzes, detonating

Limitations:

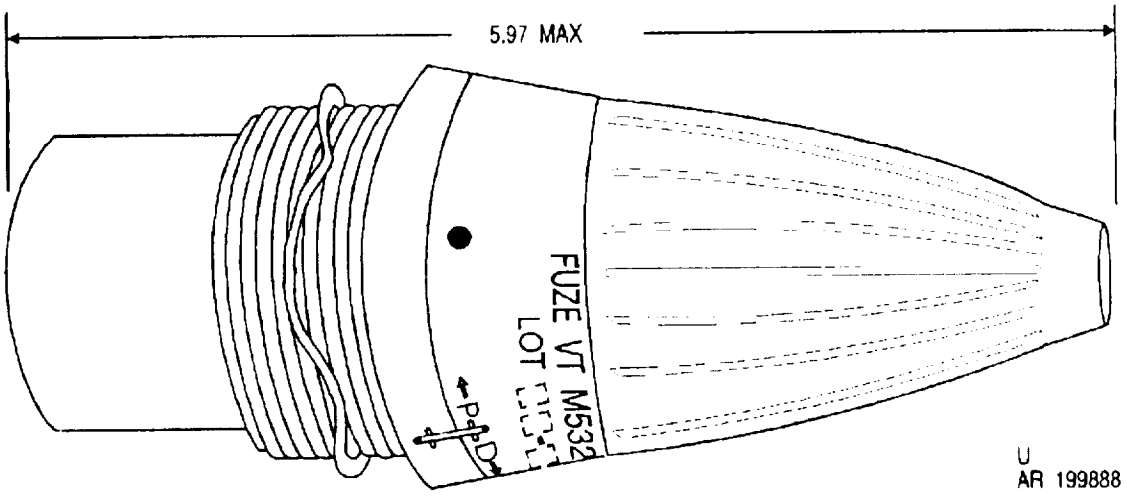
Clearance of at least 100 feet over obstacles should be allowed for maximum reliability and effect.

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 wirebound 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

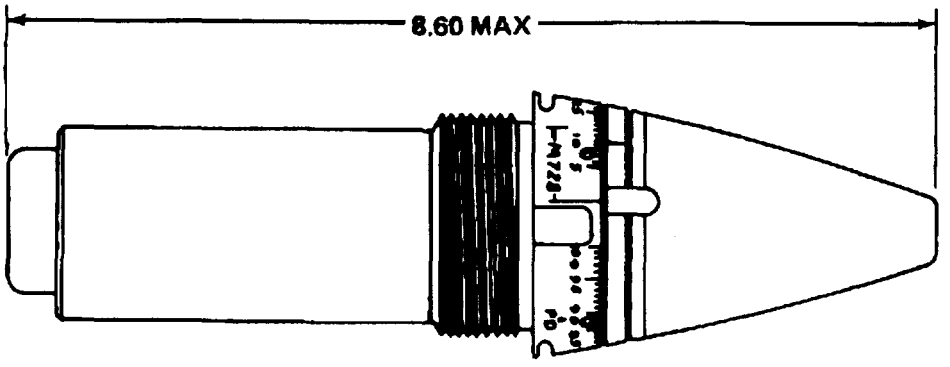
Limitations:

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.

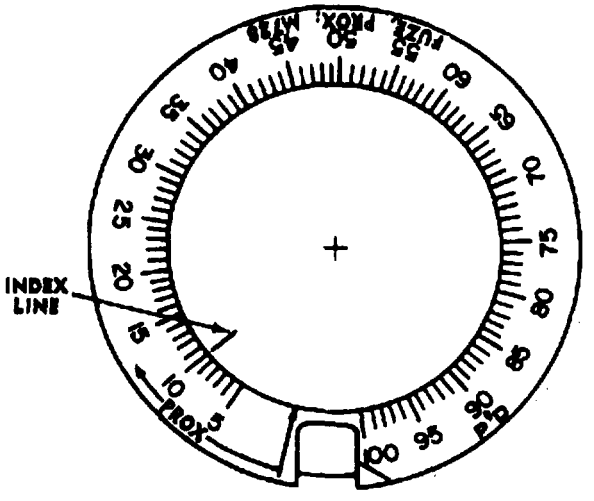
References:

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 mar alined 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 wirebound box
*Packing Box:	
Weight	63.0 lb
Dimensions	14-5/8 x 12-13/16 x 12 in.
Cube	1.3 cu ft

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

Shipping and Storage Data:

Quantity-distance class	1.1
Storage compatibiltiy 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 tiring 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)

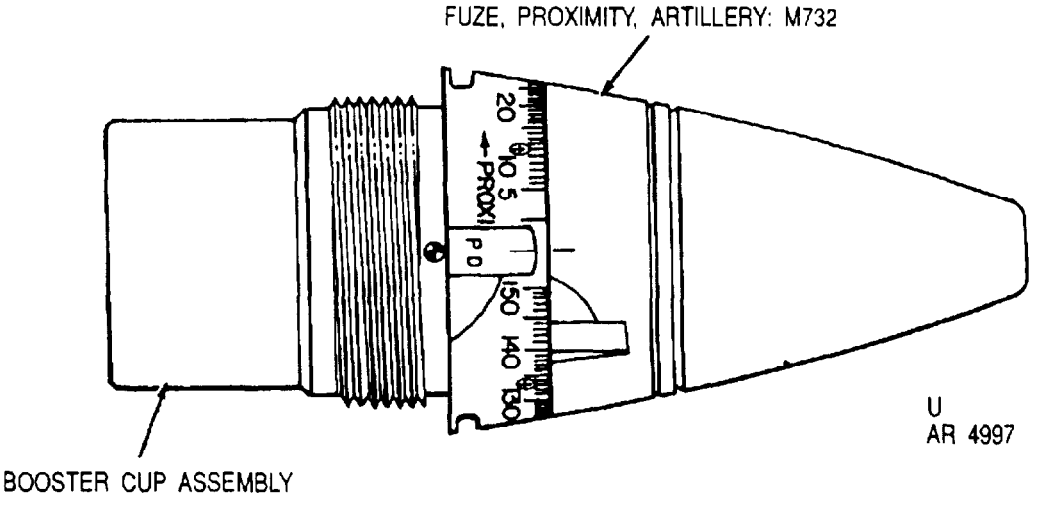
Premature bursts may occur when firing over ridges with clearance of less than 64 meters.

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 alined 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, if 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 of angle of fail.

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 elemment 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:	Min	Max
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.

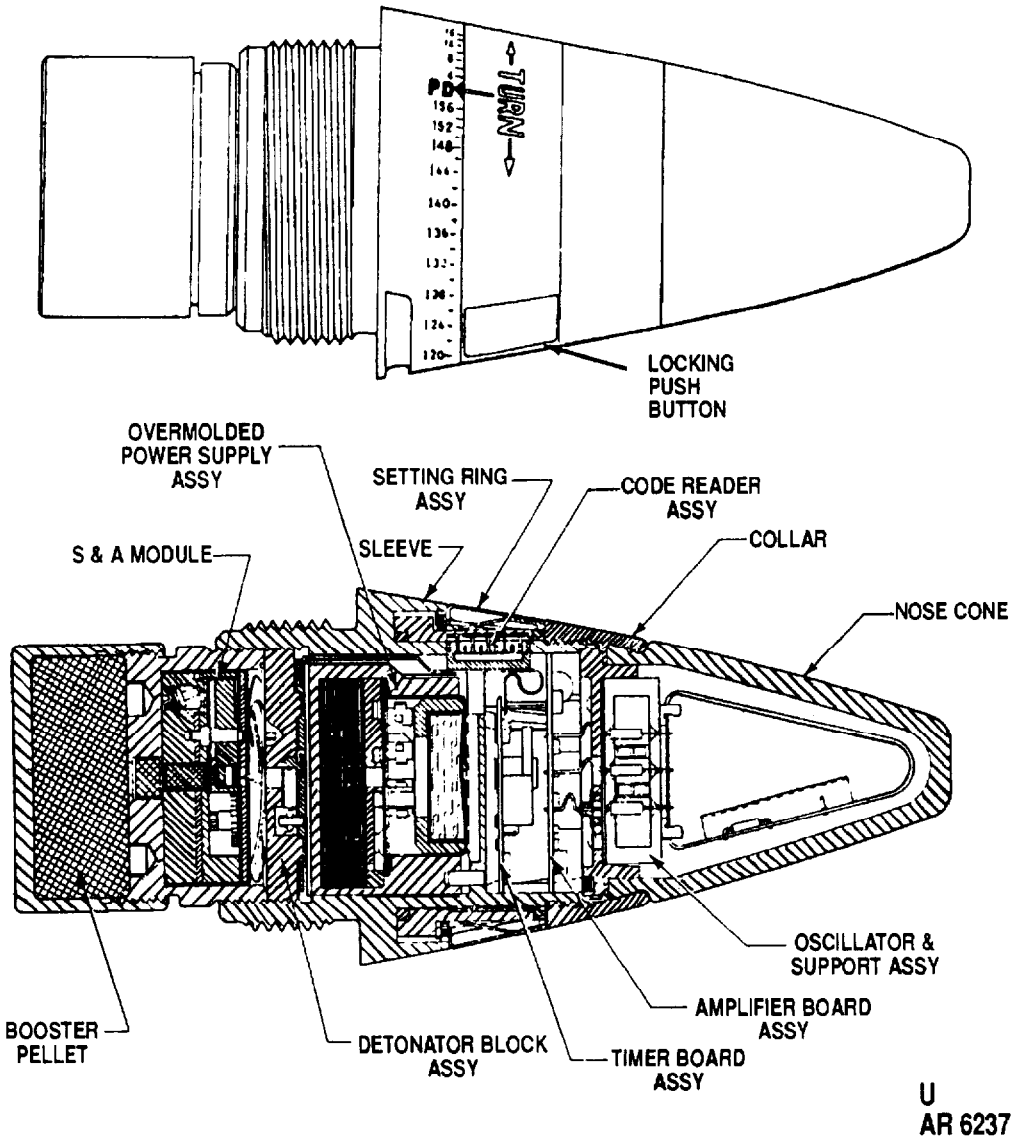
Shipping and Storage Data

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 the ("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 Explosive
DOT designation ---------- 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

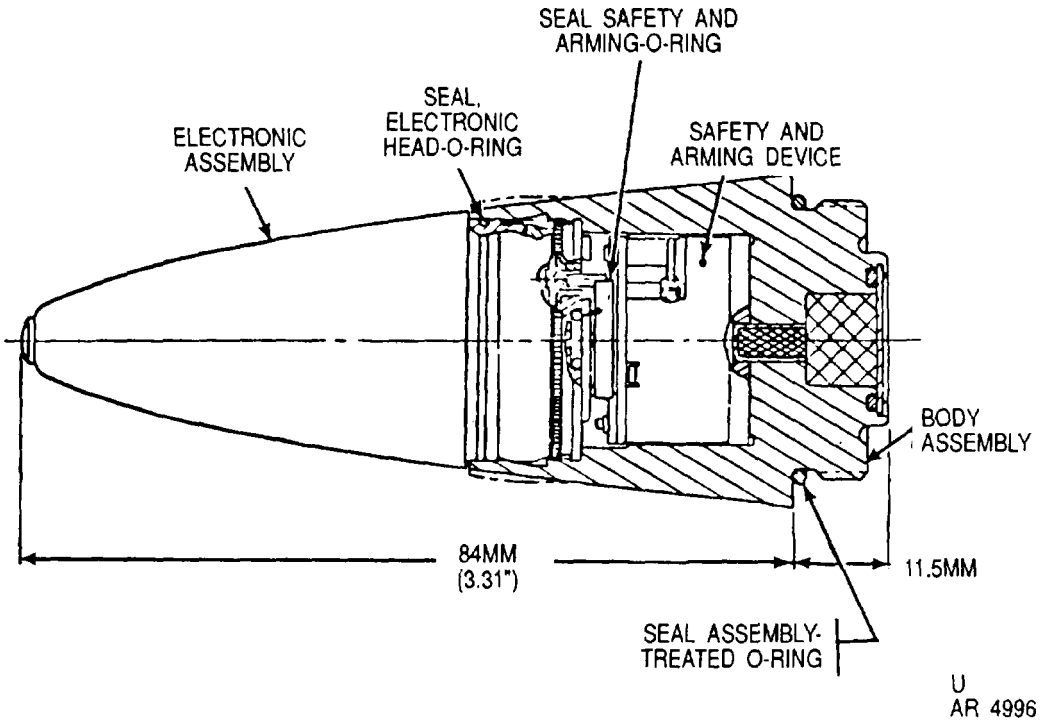
Limitations:

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 sensi - tivity 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 conies 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 ± 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.

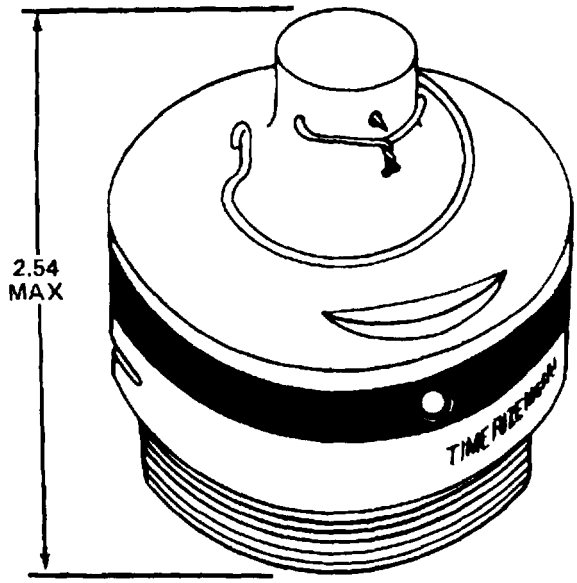
Explosive Components:

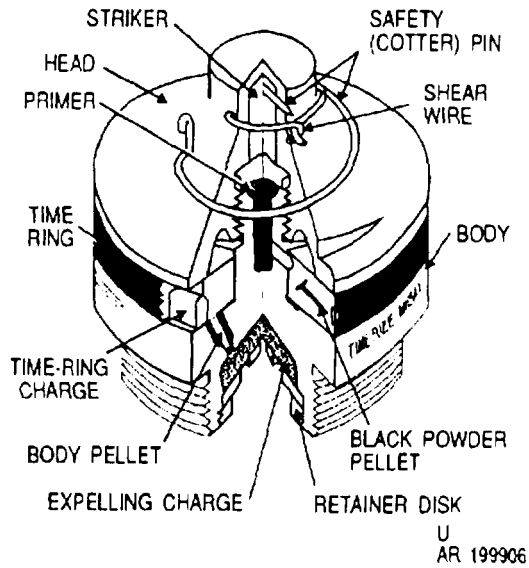
Igniter	2 mg
Initiator:	
Silver Azide	2 mg
Explosive Detonator:	
Lead Azide	135 mg
Explosive Lead:	
Plastic B	120 mg

Limitations:

None.

FUZE, TIME: M65A1 OR M65





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-t 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.

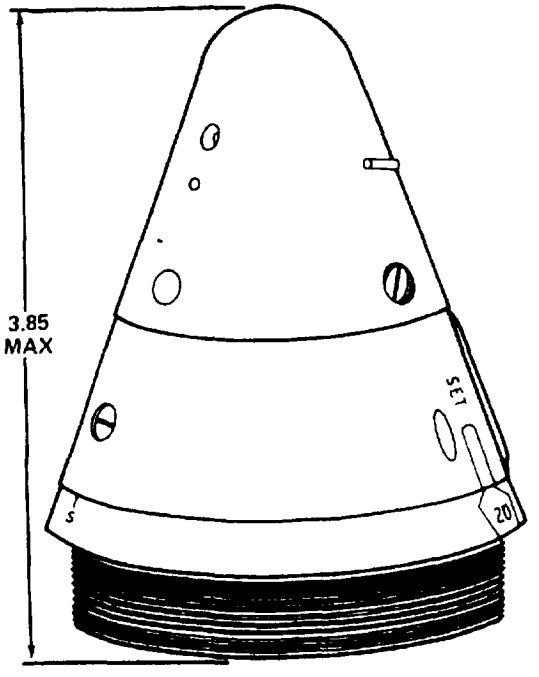
Explosive Components:

Primer; black powder time-ring charge; black powder pellet, and black powder expelling charge.

Reference:

FM 23-90

FUZE, TIME: M84 AND M84A1



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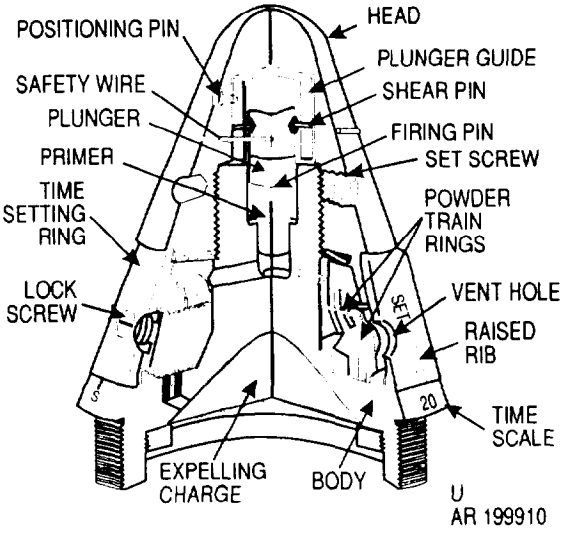


Type Classification:

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 expelin charge. An outer adjustment ring on the body has six vent holes and six raise 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

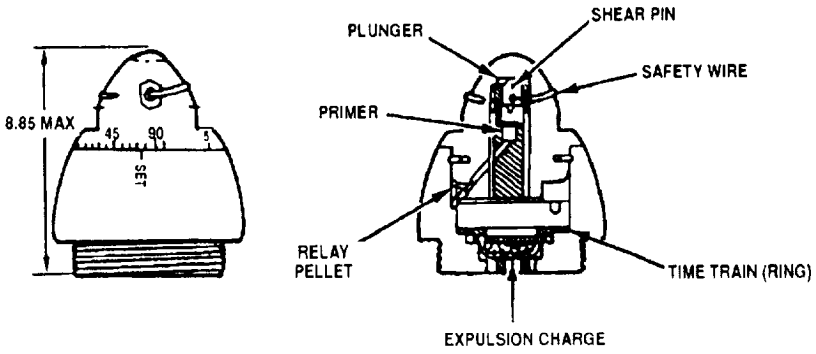
Dummy, BD, M553:
- Weight ---------- 1.007 lb

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



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AR 4028

Type Classification:

Use:

This fuze is a variable time fuze developed for use on the illuminating and smoke cartridges of the M252 improved 8l 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 he 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 he 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

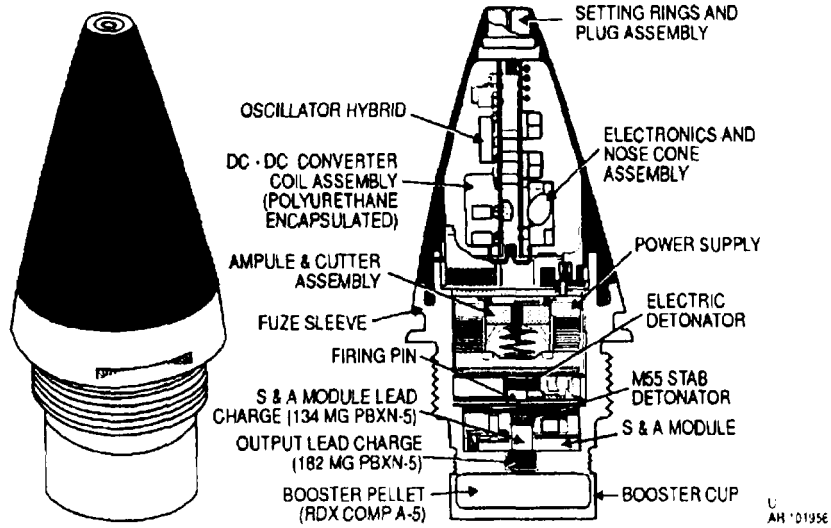
Quantity-distance class ---------- 1.4
Storage compatibility group ----- D
DOT shipping class ---------- C
DOT designation ---------- TIME FUZE--
HANDLE
CAREFULLY

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 re-mainder 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&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 containers; 2 containers 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 ---------- DETONATING FUZES CLASS A EXPLOSIVES-HANDLE CAREFULLY - DO NOT STORE OR LOAD WITH ANY HIGH EXPLOSIVES

NSN (M587) ---------- 1390-01-062-4574

DODAC (M587) ---------- 1390-N600

UNO serial number ---------- 0408

UNO proper shipping name ----- Fuzes, detonating

NSN (Fuze Setter) ---------- 1290-01-038-2035

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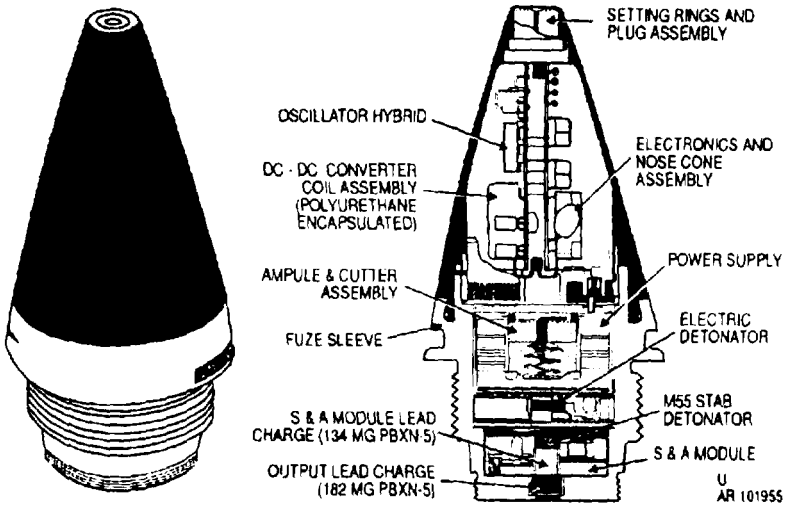
FUZE, ELECTRONIC TIME: M724



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 s in 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 wirebound box

*Packing Box:
(in wirebound box):
Weight ---------- 55.8 lb
Dimensions ---------- 14-5/8 x 12-13/16 x 9-1/8 in.
Cube ---------- 1.04 cu ft

*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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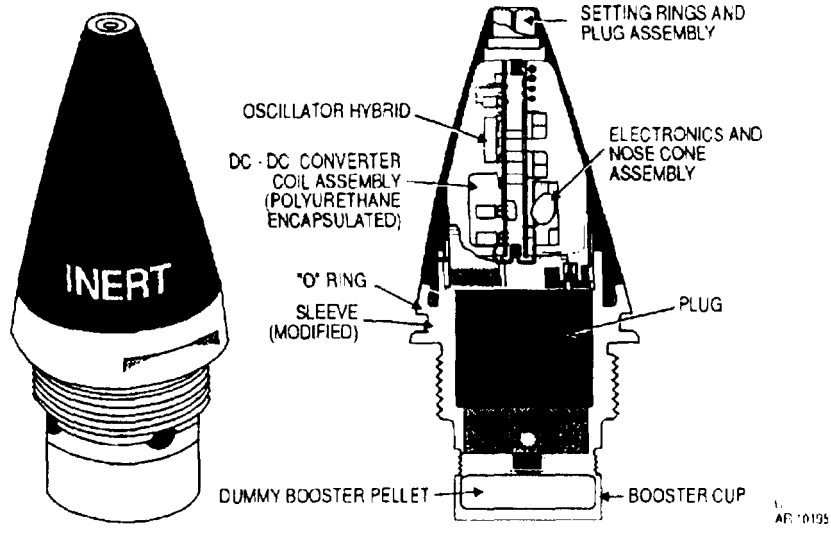
FUZE, ELECTRONIC TIME: TRAINING, M744



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 time sets the fuze in less than 1 second. It allows test setting and verification readout of the M744.

Tabulated Data:

Type	Electronic Time (ET) Training
Weight	1.81 lb
Length:	
Visible	3.758 in.
Overall	5.968 in.
Thread size	2.00-12 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 wirebound 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.

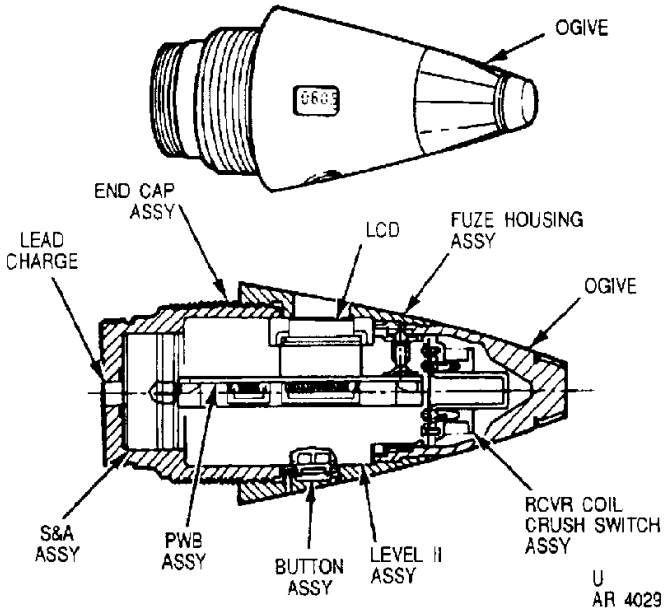
Shipping and Storage Data:

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 l05mm 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 bidirectionally 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 ..... 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 containers in wirebound 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 CAREFULLY

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)

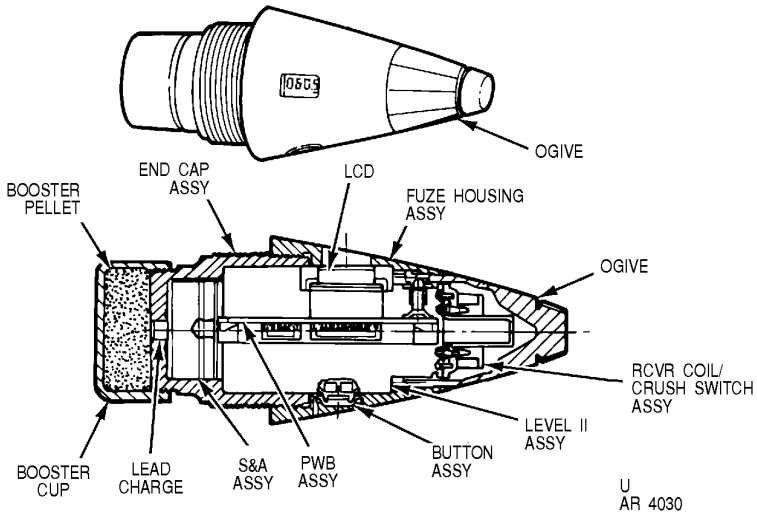
Limitations:

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 containers 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 CAREFULLY. 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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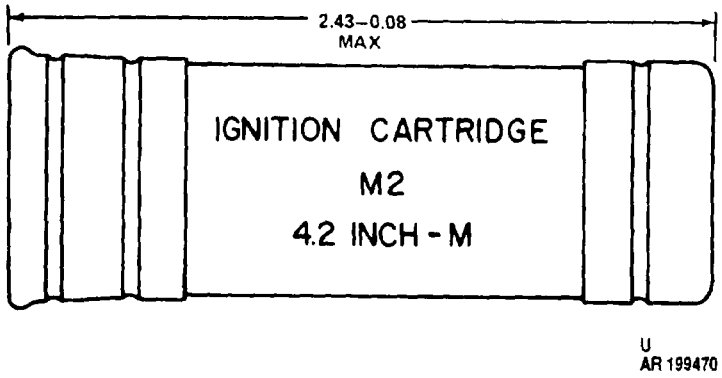
CARTRIDGE, IGNITION: M2, M2A1, & M2A2



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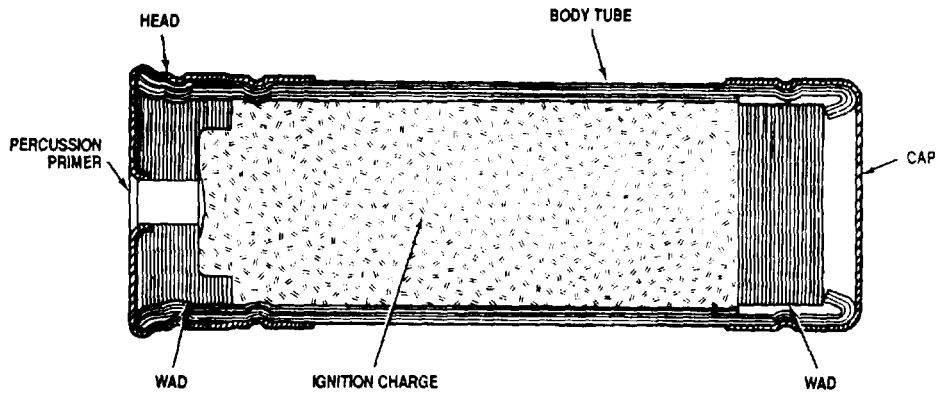
AR 199470



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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.

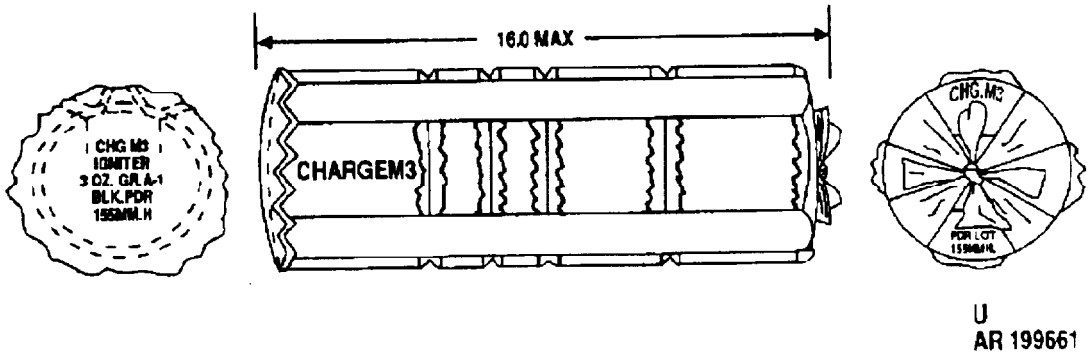
Tabulated Data:

Complete round:	
Type	Ignition cartridge
Weight:	
M2	
M2A1, M2A2	
Length:	
M2	2.45-.05 in.
M2A1, M2A2	2.43-.08 in.
Color	Red w/black markings
Ignition charge:	
M2	Propellant, M9, Type II, 120.0 ± 2. 5 grains
Class and div dwg. No.	75-19-81
M2A1, M2A2	Black powder, Class 3, 170.0 ± 5 grains
Drawing No.	8863425-(M2A1) 9252205-(M2A2)
M2A2	Black powder, Class 3, 133.0 ± 5 grains
Drawing No.	8882287
Primer	Percussion

References:

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

CHARGE, PROPELLING, 155-MILLIMETER: M3 SERIES



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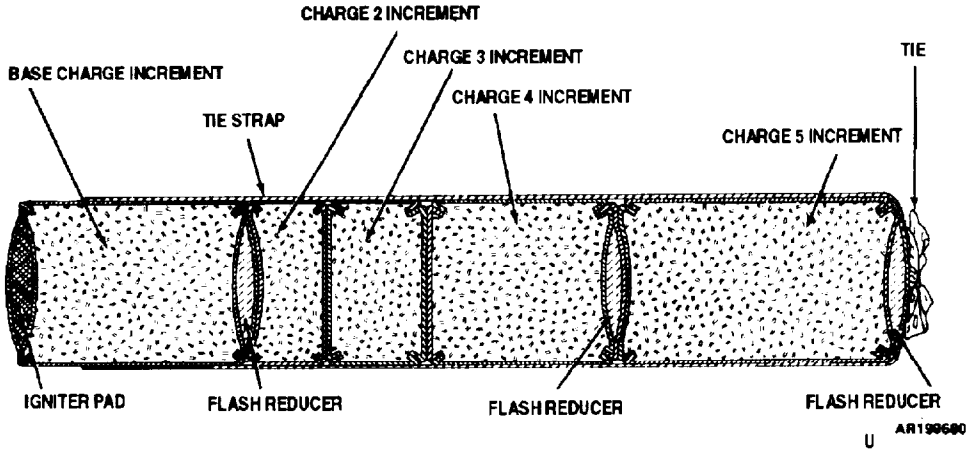

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Type Classification:

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 I55mm 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 potassium sulphate. A 2 ounce pad is assembled forward of the base charge and there are two l-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	Ml (5.6 lb explsive)
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 Ml4
*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	PROPELLANT 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.

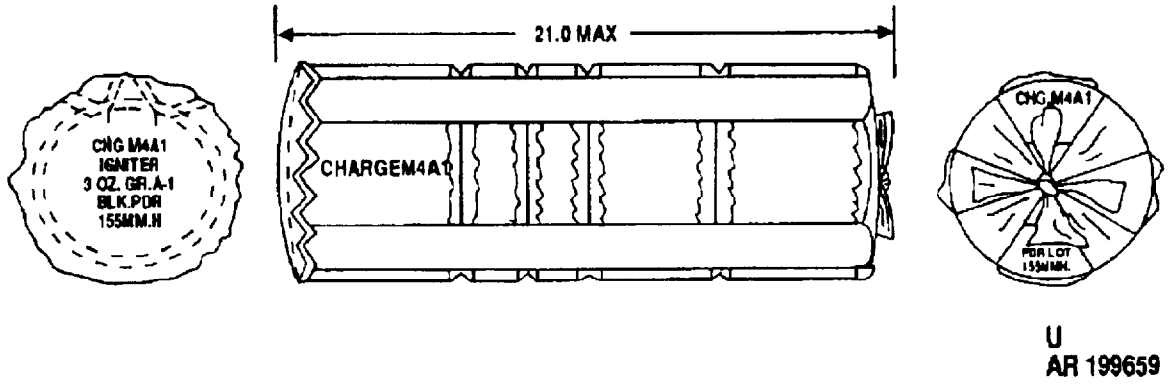
Limitations:

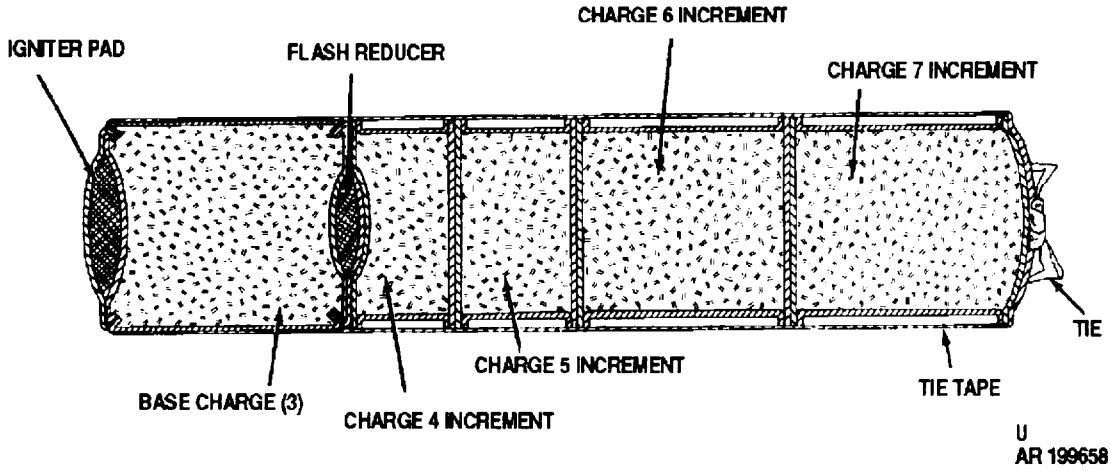
Increments of green bag charges may not be mixed with white bag increments.

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





Type 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.

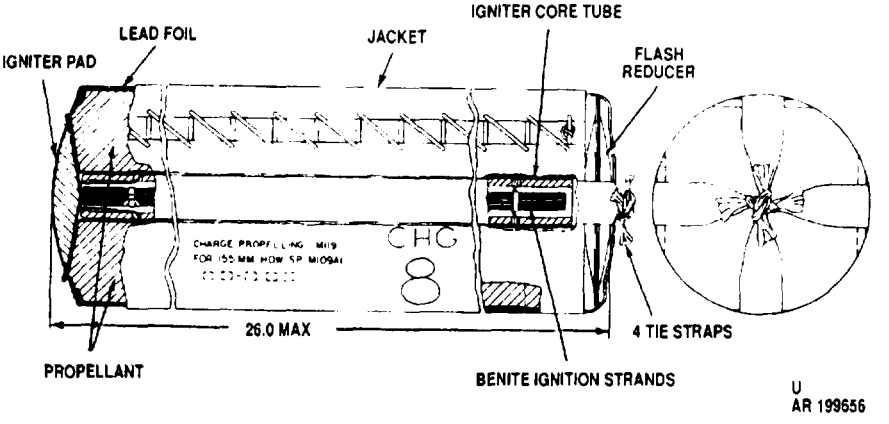
Limitations:

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 Ml19/Ml19Al 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 Ml 19A1 models is that the M 119A1 has a donut shaped flash reducer that precludes non-ignition of the rocket motor of the M549/M549Al Projectile, The M119A1 has a new tnolded 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 (Ml98)
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 palletized 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	PROPELLANT EXPLOSIVE SOLID CLASS B
DODAC	1320-D533
Assembly Dwg. No.	9226436 (M119); 9325852 (M119A1)
Container Dwg. No.	9234357

Preparation For Firing:

No preparation is required.

Limitations:

M119 not to be fired with M549/M549A1 Projectile.

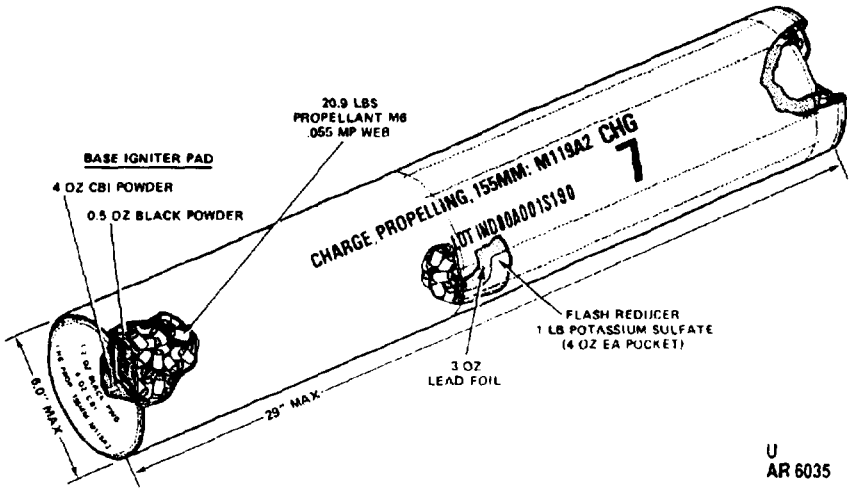
Use only the M119A1 with the M549/M549A1 Projectile.

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 Ml19A2 is to be used in the M185 and M199 gun tubes only. The M119A2 does not have the outer lacing 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	PROPELLANT 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."

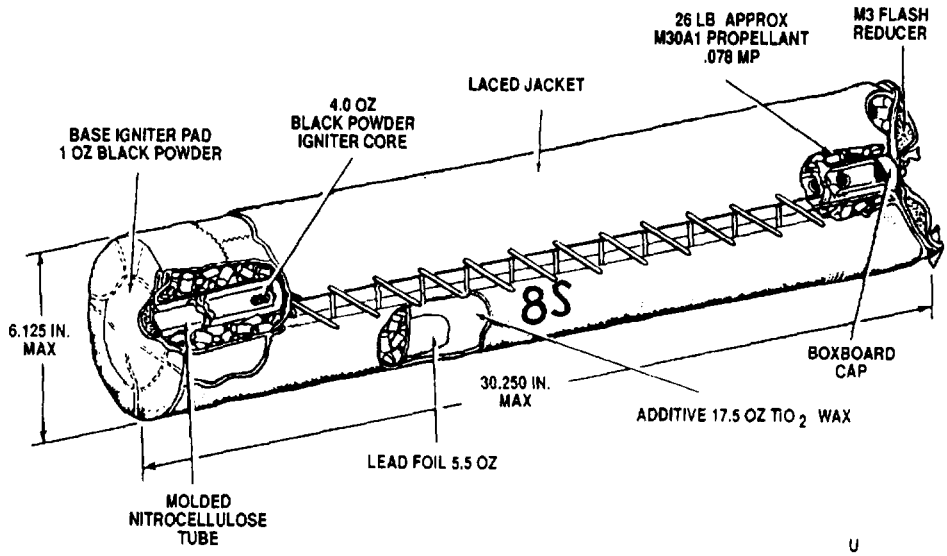
Limitations:

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



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 Ml19/Ml19Al 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	30-1/4 in. (76.84 cm)
Color	Red w/black markings
Cannon used with	M199 (M198) system
Propellant:	
M30Al	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 (-62C°) (for periods not more than 3 days)
Upper limit	+160°F (+71°C) (for periods not more that 4 hr/day)
Packing	1 propelling charge in metal container 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	PROPELLANT EXPLOSIVE SOLID CLASS B
DODAC	1320-D532
Assembly Dwg. No.	9281897 (M203)
Container Dwg. No.	9293303 (M203)

Preparation For Firing:

No preparation is required.

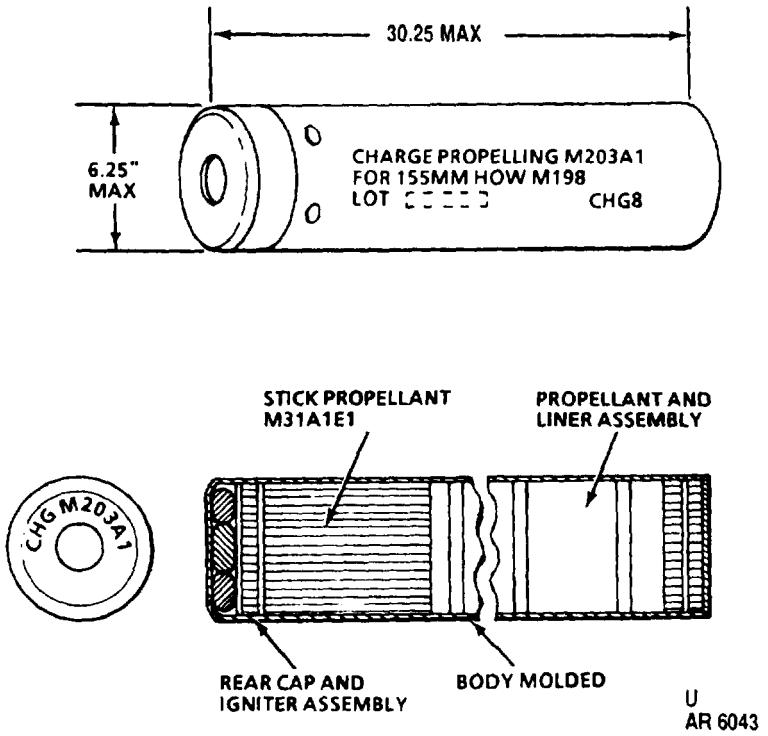
Limitations:

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 30¼ 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 periods 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

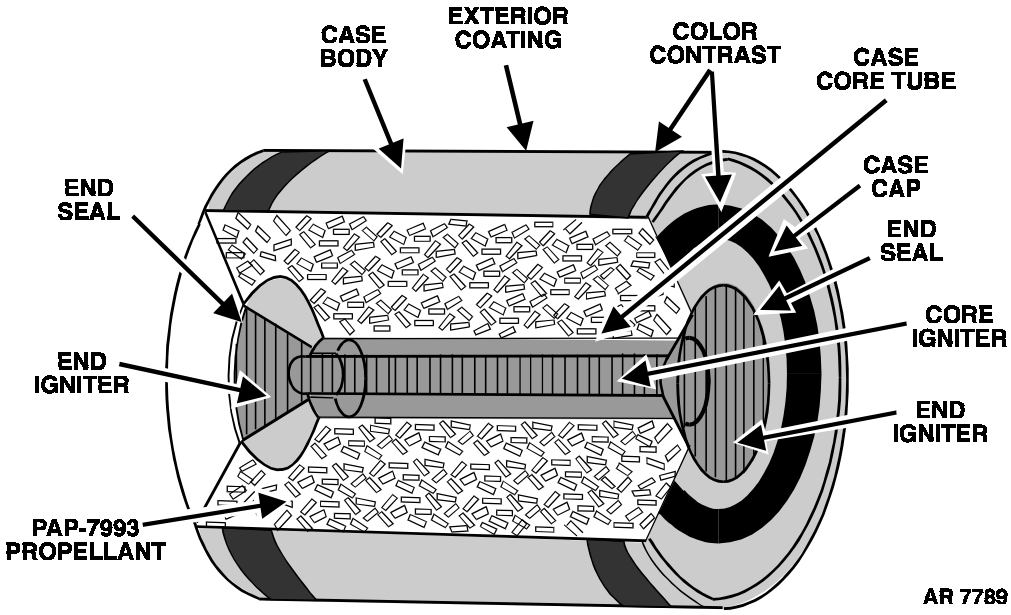
Preparation For Firing:

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)

Propellant:

PAP-7993	3.5 lb

Ignitor:

Primer	M82 or Laser Ignition System
Performance	Charges 1 and 2 only

Temperature Limits:

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)

Packaging:

Two M231 increments per plastic extraction sleeve. Two plastic extraction sleeves per PA161E1 metal ammunition can.

Propelling charge container: PA161E1

Weight	18 lb
Length	31.38
Width	7.49 in.
Height	7.49 in.
Cube	1.02 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-DA12
UNO	0242
Assembly Dwg No.	12972389
Container Dwg No.	12972583

Limitations:

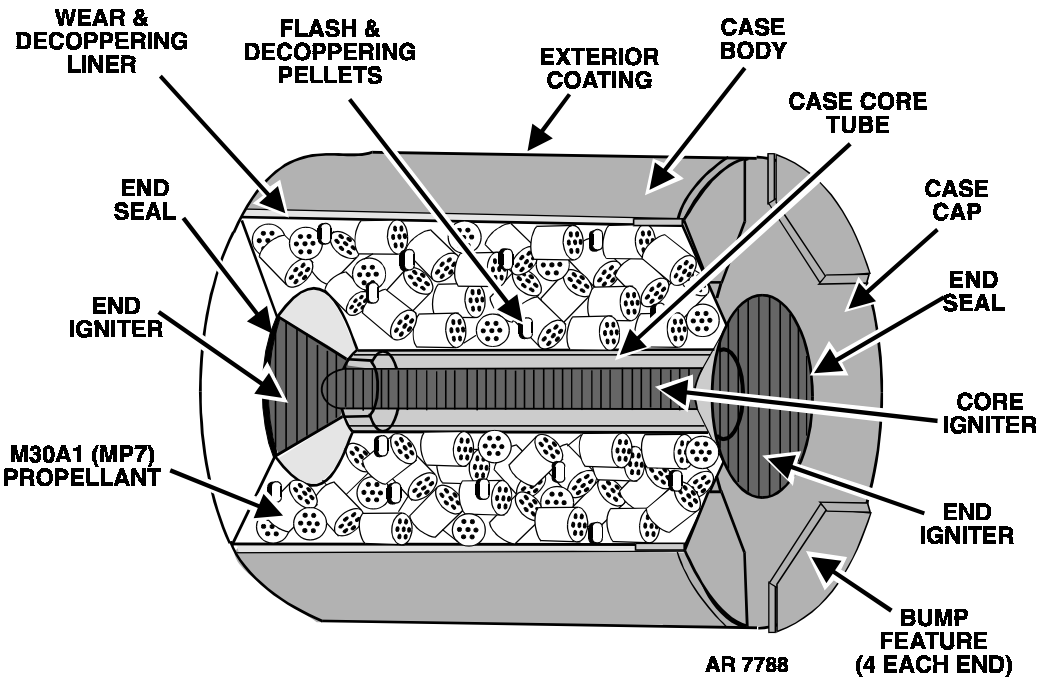
Do not load or fire more than two M231 charges per shot.

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, 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)

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

Temperature Limits:

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)

Packaging:

Five M232 increments per plastic extraction sleeve. One plastic extraction sleeves per PA103E2 metal ammunition can.

Propelling charge container: PA103E2

Weight	21 lb
Length	37.99
Width	7.49 in.
Height	7.49 in.
Cube	1.23 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-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 ina 39 caliber tube length cannon.

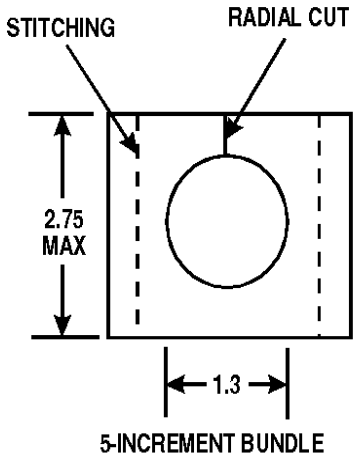
Do not load or fire more than six M232 charges ina 56 caliber tube length cannon.

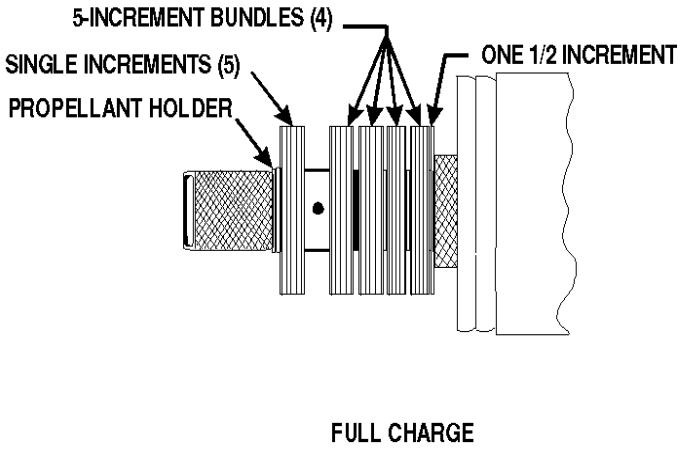
Do not load or fire M231 charges in combination with M232 charges.

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





FULL CHARGE

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	-40ºF (-40°C)

When using Cartridges M2, M2Al, 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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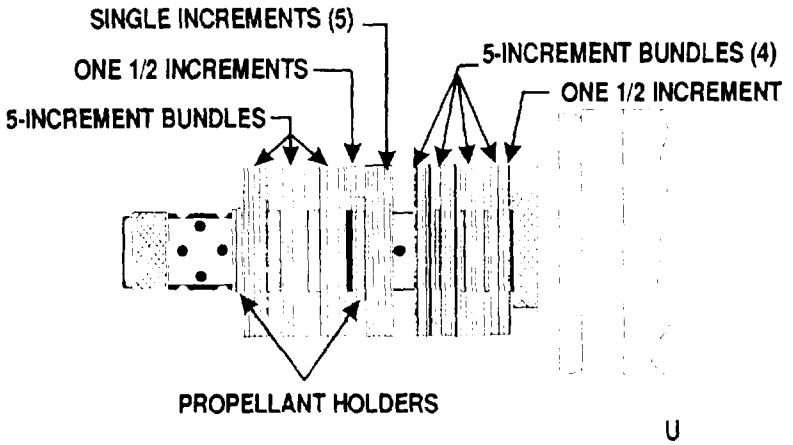
CHARGE, PROPELLING, 4.2-INCH: M36



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	+60ºF
20-22-1/2 increments	+20°F
17-19-1/2 increments	0ºF
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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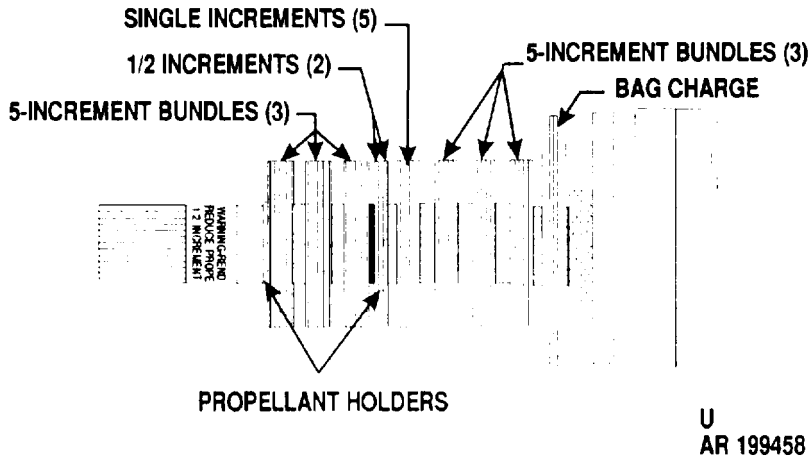
CHARGE, PROPELLING, 4.2-INCH: M36A1



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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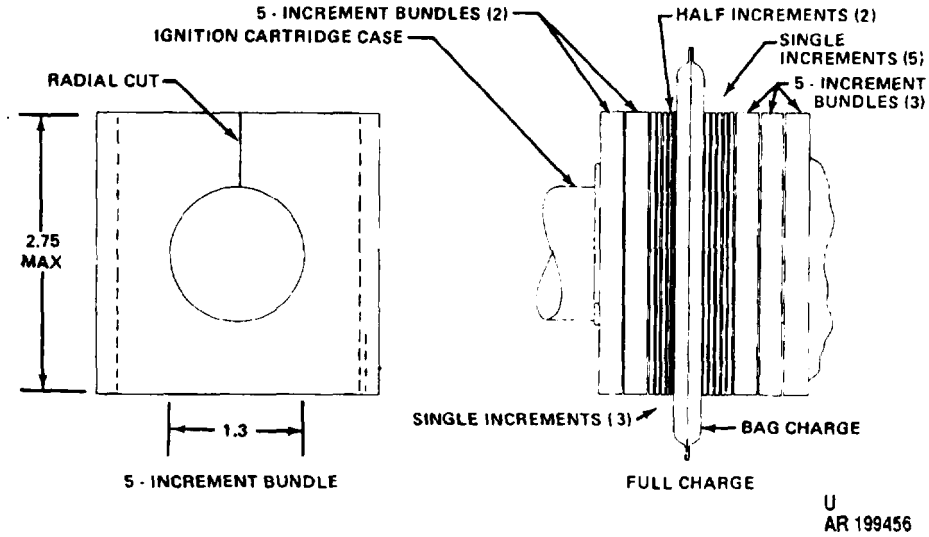
CHARGE, PROPELLING, 4.2-INCH: M36A2



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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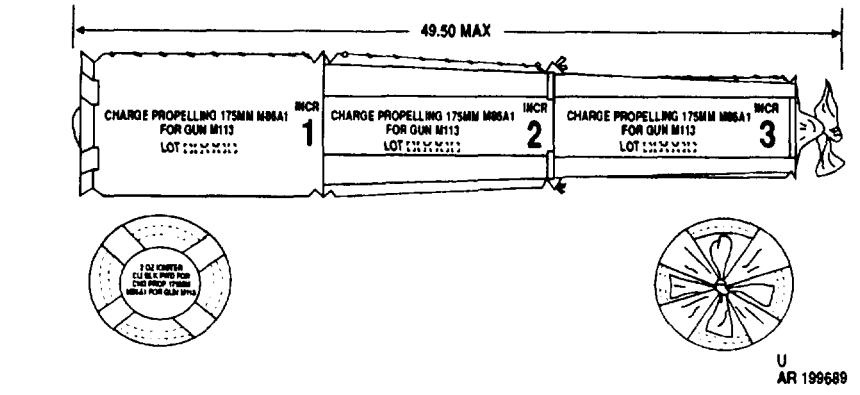
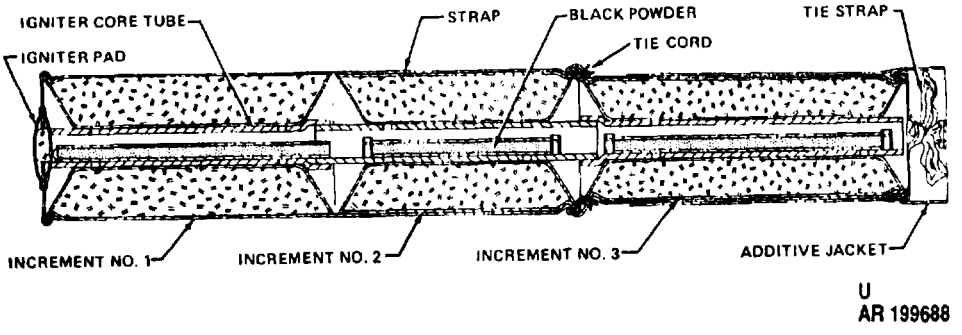
CHARGE PROPELLING, 175-MILLIMETER: M86 SERIES





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 Ml 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 M86AI when fired at Zone 3 only.

Bore-wear-reducing Additive Jacket Ml 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 l/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 breechblock 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	PROPELLANT EXPLOSIVES SOLID CLASS B
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
Weight	80 lb
Dimensions	23-3/8 x 15-3/16 x 15-9/32 in.
Cube	2.72 cu ft

Shipping and Storage Data:

Quantity-distance class	N/A
Storage compatibility	N/A
DOT shipping class	N/A
DOT designation	AMMUNITION NONEXPLOSIVE
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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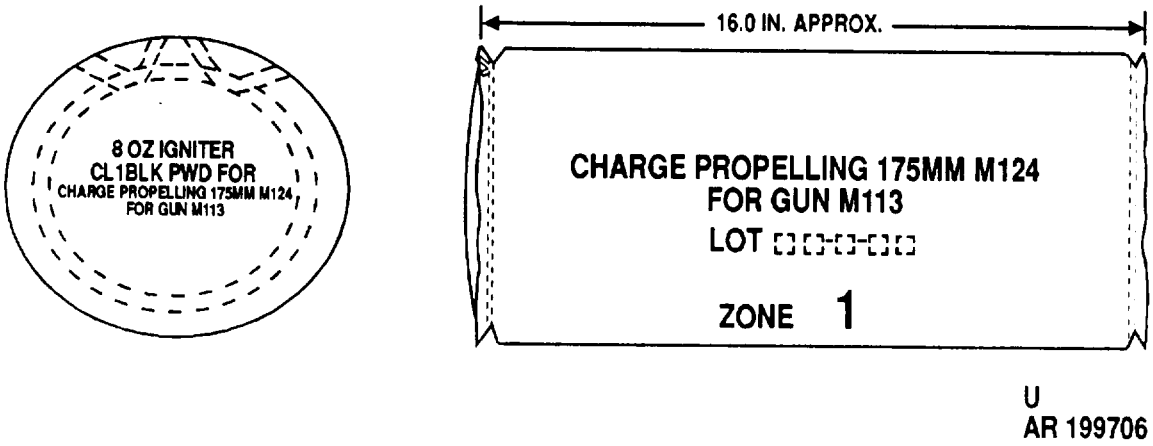
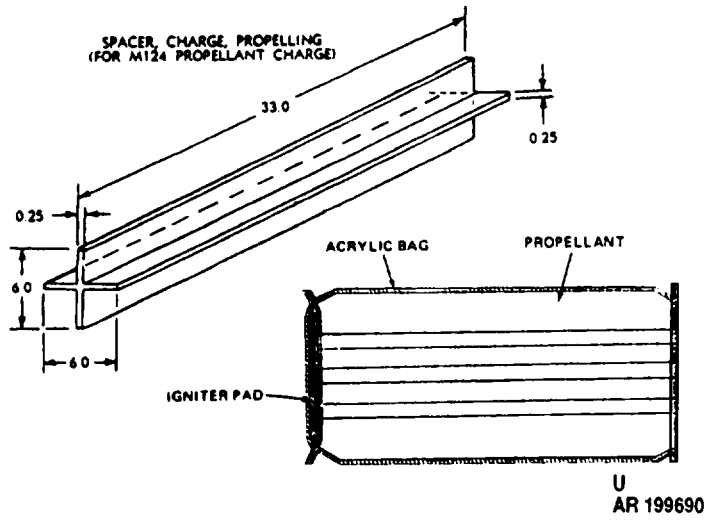
CHARGE, PROPELLING, 175-MILLIMETER: M124





Type Classification:

Standard AMCTC 7622 dtd 1970.

Use:

Propelling charge M124 is used with gun cannons Ml13 and Ml13A1 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 fall-back of the projectile on top of the propelling charge.)

Tabulated Data:

Charge, Propelling M124:	
Type	Green bag
Weight	17.5 lb
Length	16 in.
Propellant:	
Composition	M6
Grain type	7 perforated; L/O= 2.35
Weight	17 lb
Web	0.37in.
Igniter	8 oz black powder base pad
Primer	M82
Cannon used with	M113, M113A1
Assembly Dwg No.	9223106
Color	Green w/black
*Packing	3 charges and 3 primers in metal container
*Packing Box:	
Weight	95 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	PROPELLANT EXPLOSIVE SOLID B-CLASS B
DODAC	1320-D536

Limitations:

The charge must be used with a spacer which is a separate item of issue.

CruciformSpacer:

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
Packing Box:	
Weight	111 lb
Dimensions	32-7/8 x 24-3/4 x 35-3/8 in.
Cube	16.2 cu ft

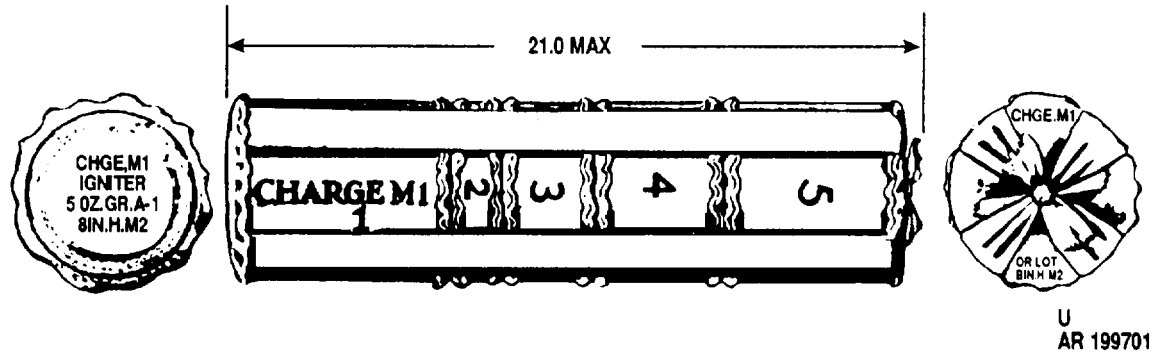
Shipping and Storage Data:

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: Ml



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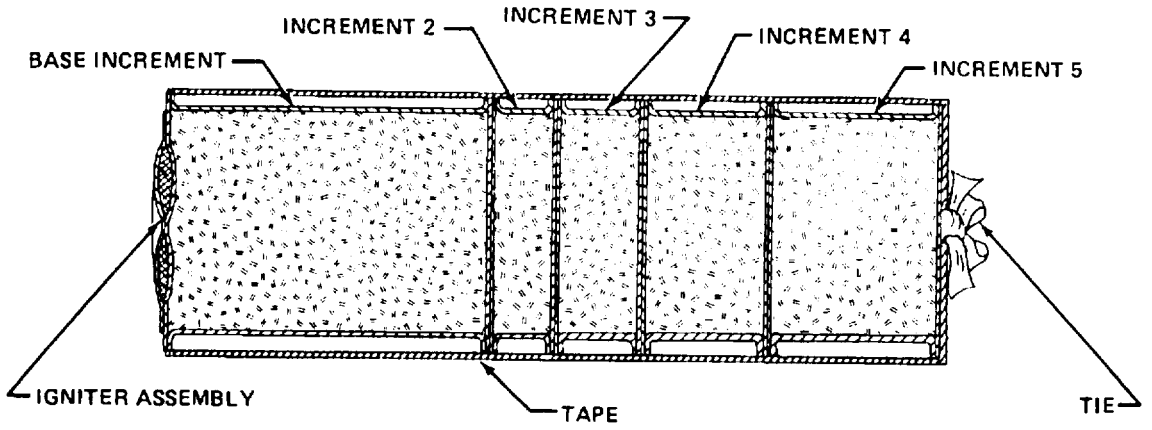

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AR 199700

Type Classification:

Std OTCM 36841 dtd 1958.

Use:

8-Inch Green Bag Propelling Charge Ml 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 Ml 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 ignlites the Ml propellant in" the charge, The burning propellant generates gases which force the pro: jectile out of the gun tube at a velocity required to reach the target.

Tabulated Data:

Type	Green Bag, separate loaded propelling charge
Weight	15.0 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 container; 50 metal containers 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 ---------- PROPELLANT EXPLOSIVES SOLID CLASS B
- DODAC ---------- 1320-D675

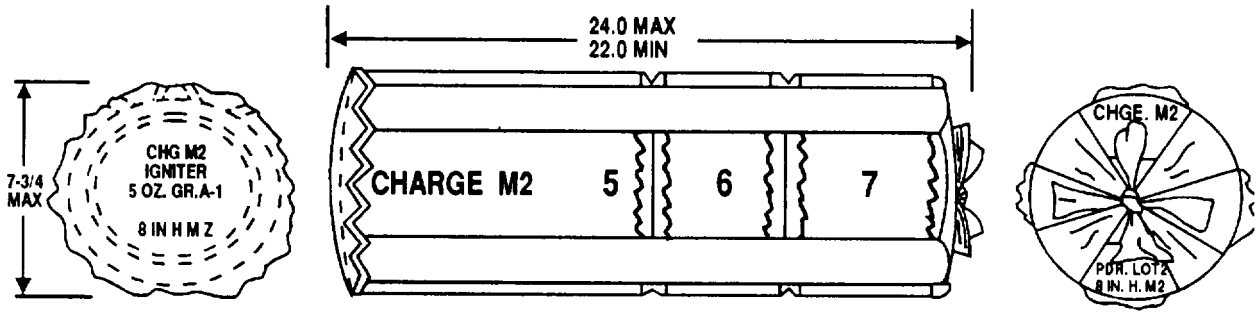
Limitations:

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



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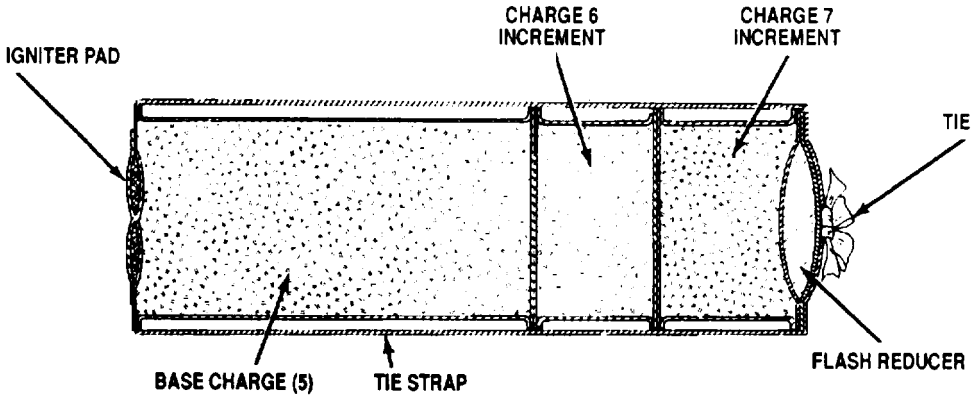

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AR 199698

Type Classification:

Std OTCM 36841 dtd 1958.

Use:

8-Inch White Bag Propelling Charge M2 is used for zone firing with Charges 5 through 7 in 8-inch howitzer cannons.

Description:

The charge consists of a base section (Charge 5) and two unequal increments (Charges 6 and 7) for zone firing . The increments are assembled end to enf 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 potasium sulfate and black powder.

Functioning:

The flash from the primer ignites the black powder igniter pad, which in turn ignites the Ml 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 reclucer increases the quantity of smoke, it must be used in daylight firing as well as night firing unless it is tactically impossible.

Tabulated Data:

Type	White Bag, separate loading propelling charge
Weight	30 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 Mods 2 & 3	M47 (M55); M2A2 (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 container; 32 metal containers 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	PROPELLANT 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

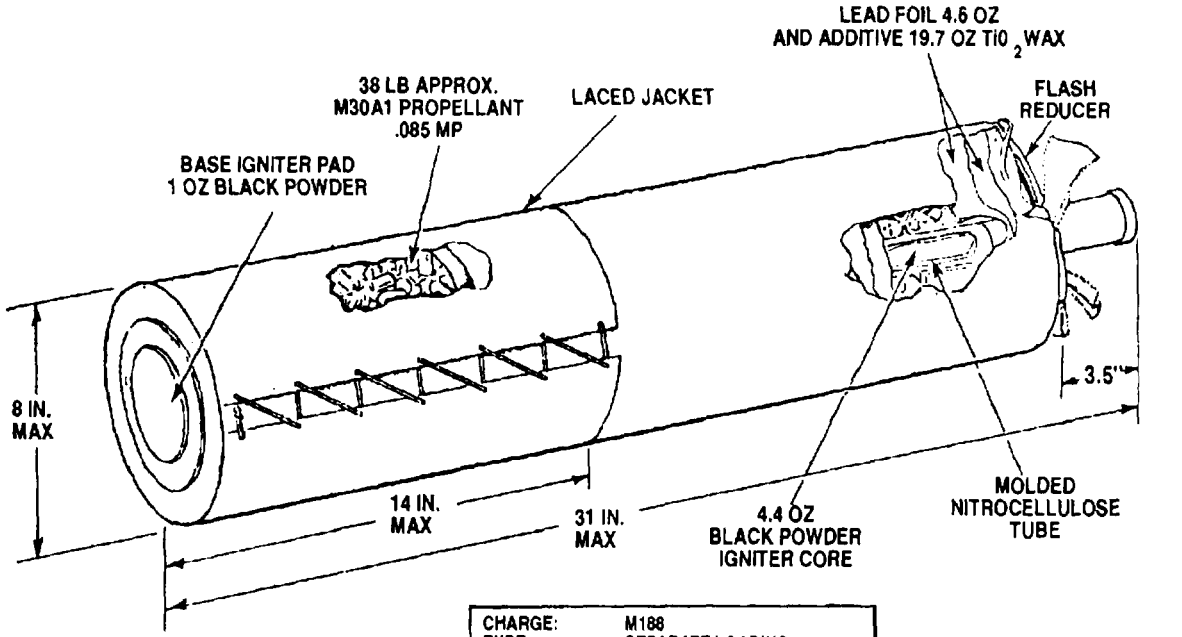
Limitations:

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



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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 powder

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	PROPELLANT EXPLOSIVES CLASSB SOLID
DODAC	1320-D661

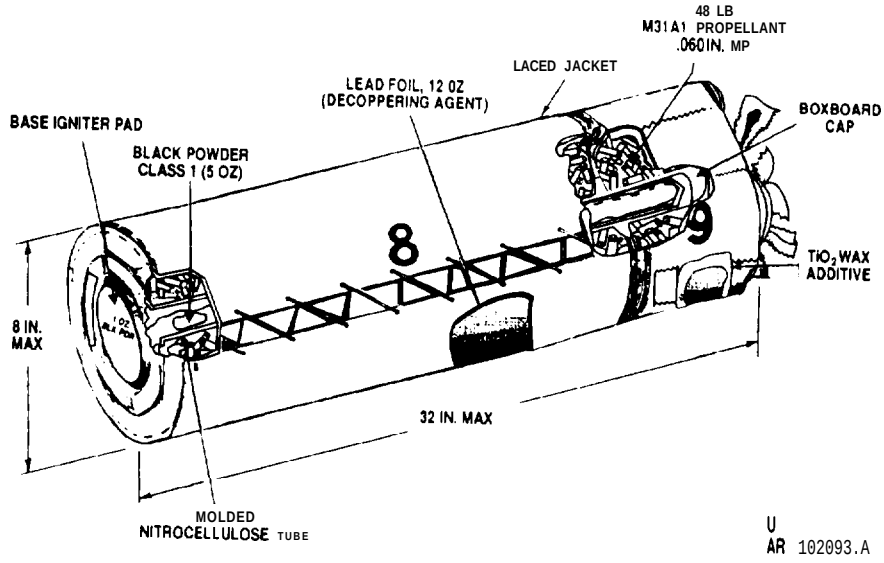
Limitations:

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



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: Ml 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 interlapping square knots at the forward end of increment 9. A paper igniter protector cap is placed over the igniter pad at the base of the charge when it is packed for shipment. This igniter protector cap must be removed before firing.

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:

Type	Separate loaded Propelling charge, white bag
Model	M188A1
Weight	50 lb (22,7 kg)
Length	32.0 in. (81.3 cm)
Color	White w/black markings

Propellant:	
Composition	M31A1 (48.0 lb) (21.7 kg)
Green type Multi-perf web	0.060 in. (0.153 cm)
Weight:	
Increment 8	42 lb (19.05 kg)
Increment 9	6 lb (2.27 kg)
Igniter:	
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^2)
Chamber pressure	(Zone 9) 39,600 psi (27,842,760 kg/m^2)

Temperature Limits:

Firing:	
Lower limit	-50°F (-45.5°C)
Upper limit	+145°F (+63°C)
Storage:	
Lower limit	-80°F (-62.2°C) (3 days or less)
Upper limit	+160°F (+71.1°C) (4 hr or less per day)
Packing	1 charge per metal container; 20 containers per pallet
Container: PA66	
Weight	76 lb (34.7 kg)
Dimensions	37-3/4 in. x 10-15/32 in., dia (95.9 cm x 26.6 cm)
Cube	2.4 cu ft (0.068 cu m)
Pallet:	
Weight	1730 lb (784.7 kg)
Dimensions	49 x 53-1/2 x 40-3/4 in. (1.24 x 1.36 x 1.04 m)
Cube	61.8 cu ft (1.75 cu m)

Shipping and Storage Data:

Storage class/SCG	1.3 C
DOT shipping class	B
DOT designation	PROPELLANT EXPLOSIVES CLASS B SOLID
DODAC	1320-D662
Drawing No. (M188A1)	11829092

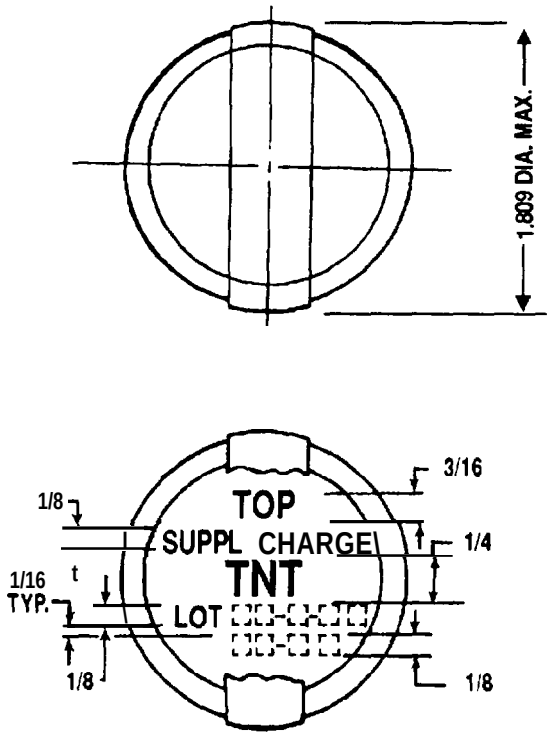
Limitations:

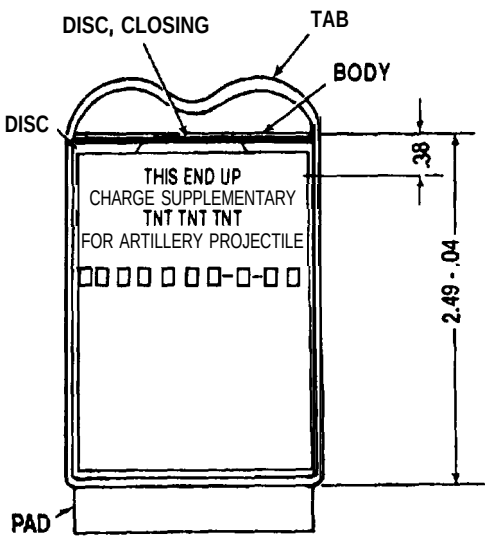
The M188A1 propelling charge cannot be stored or shipped in the vertical position.

NOTE

Yellow discoloration of charge bags is not a defect as all M188A1 charges containing stabilizer 2NDPA will discolor. The amount of stabilizer leeching to discolor the cloth is not an indication of stabilizer unservicebility, 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 approximately .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)

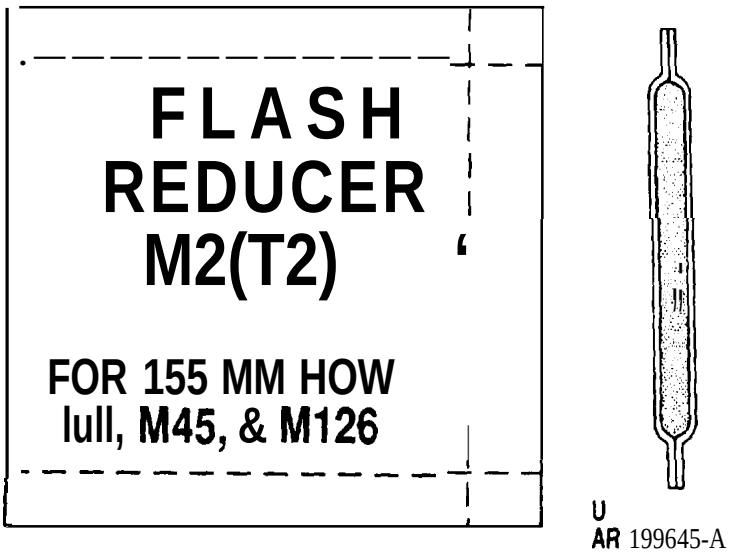
Packing:

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)



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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 causesareduction 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	Ml, 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

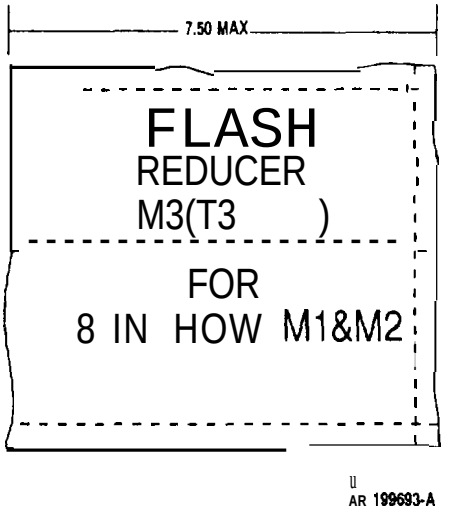
Prepmation for Firing:

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 Ml 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

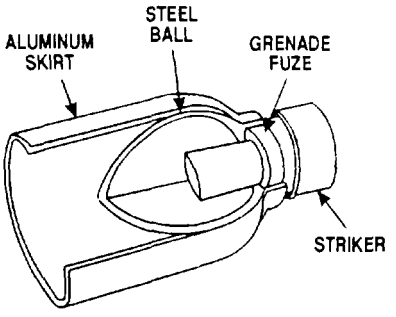
Limitations:

None.

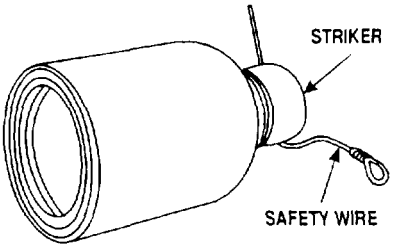
References:

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, orients 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 attac'heel to the spacer plate.

This starts a mechanical action within the grenade fuze which alines the explosive train.

The aluminum skirt of the grenade contains two streamer ribbons which unf'url 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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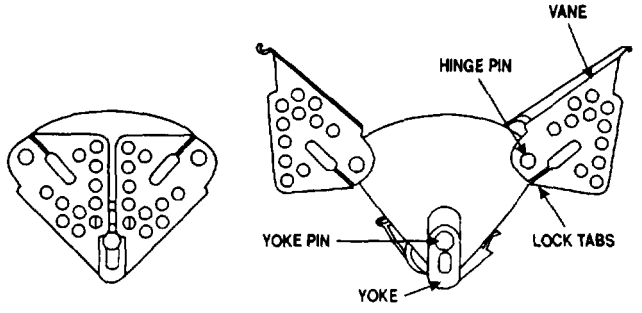
GRENADE: GENERAL PURPOSE, M36



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, permittmg 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-fire 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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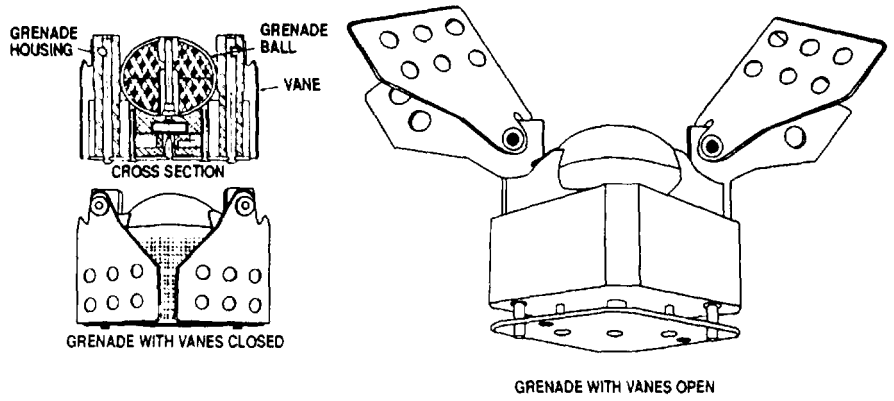
GRENADE: GENERAL PURPOSE, M39



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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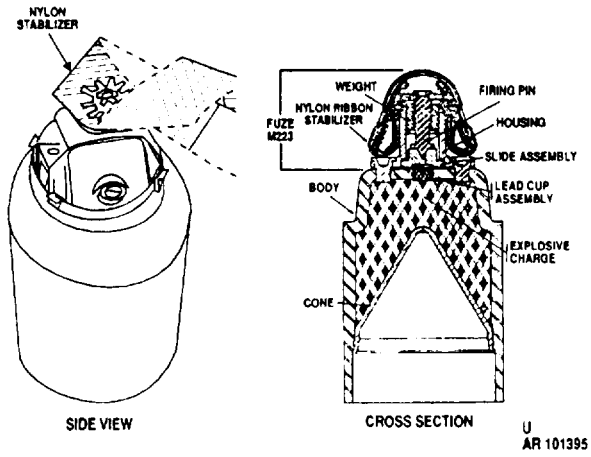
GRENADE: GENERAL PURPOSE, M42



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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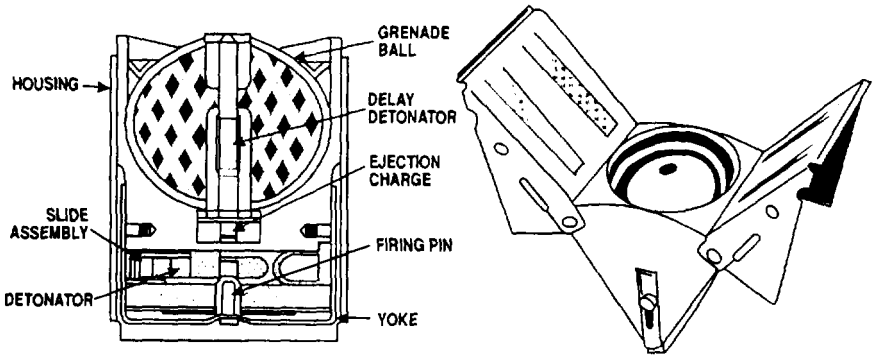
GRENADE: GENERAL PURPOSE, M43A1



CROSS SECTION

GRENADE WITH VANES OPEN

U
AR 101397

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 tiring pin into the detonator which initiates the ejection charge. The ejection charge forces the steel ball up and away from the housing, ignites the first-fire mixture in the delay detonator, and forces the detonator into the in-line positon. 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 glenacles)
M404 <104 grenades)

References:

TM 9-1300-251-20

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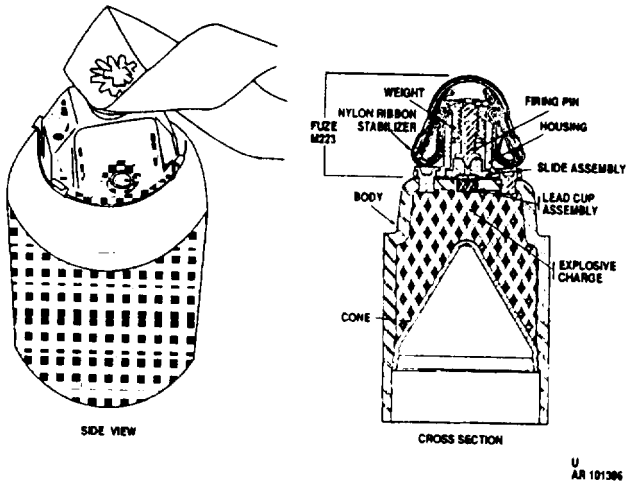
GRENADE: GENERAL PURPOSE, M46



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 approxi. mately 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 Comp A5
Length ---------- 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 tiring pin from the weight (semi-armed), and pulls the tiring 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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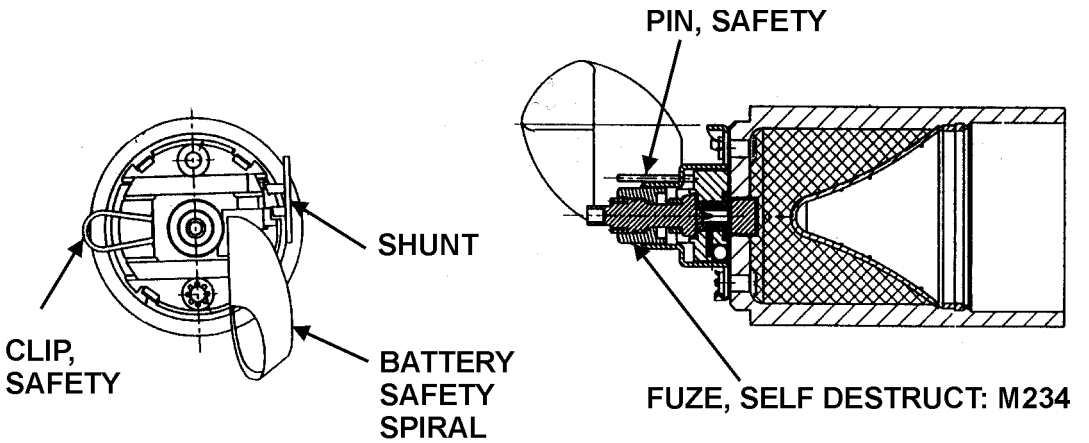
GRENADE: DUAL PURPOSE ICM, M80



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.

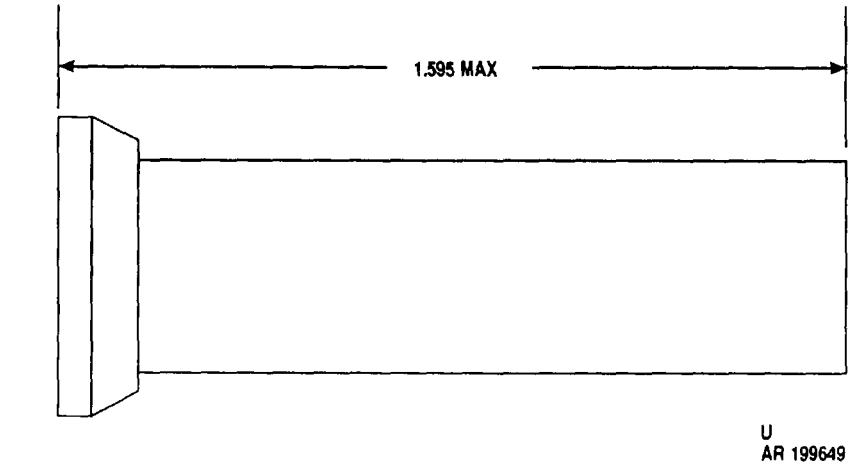
TABULATED DATA:

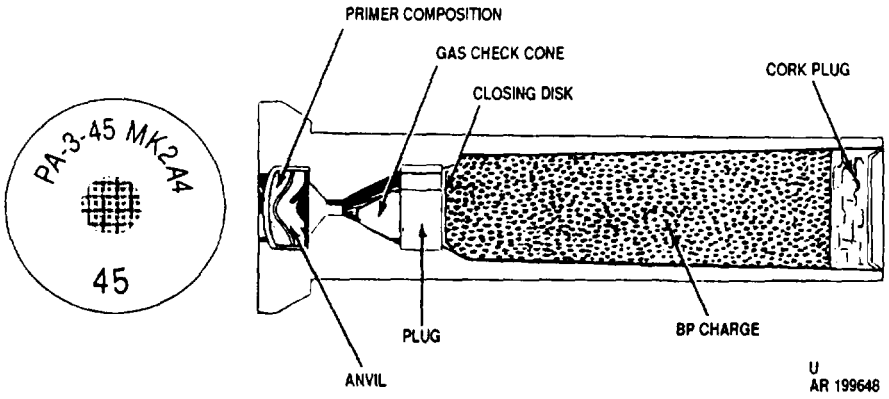
Explosive	15.9 g of Comp PAX-2A
Length	2.75 in.
Width	1.22 in.
Fuze, self destruct	M234
Self destruct time	Approx 3 minutes
Ribbon parachute	Fluorescent pink

DRAWINGS:

Grenade	9388101

PRIMER, PERCUSSION: MK2A4





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 initates 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 container; 2 containers 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.

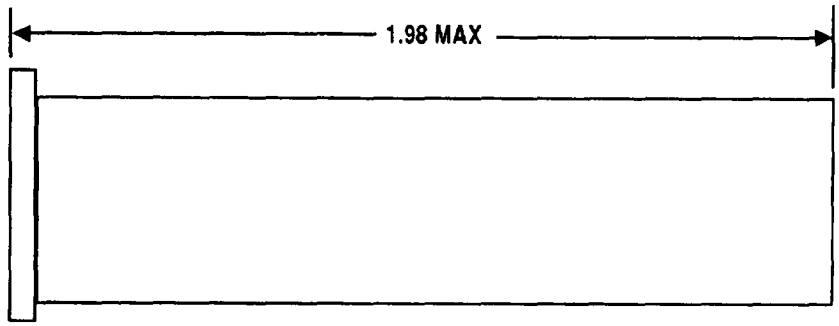
Limitations:

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



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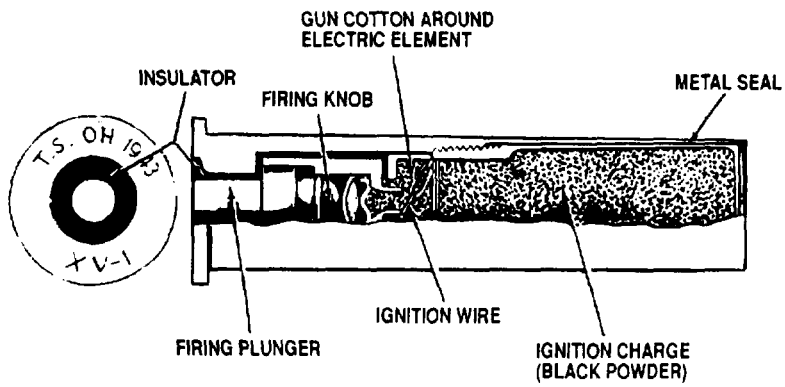
AR 199647



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 tiring 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.

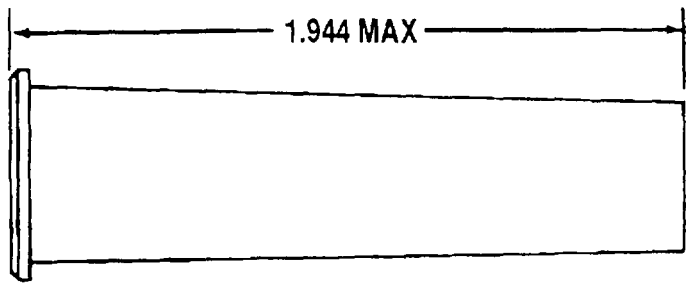
Limitations:

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



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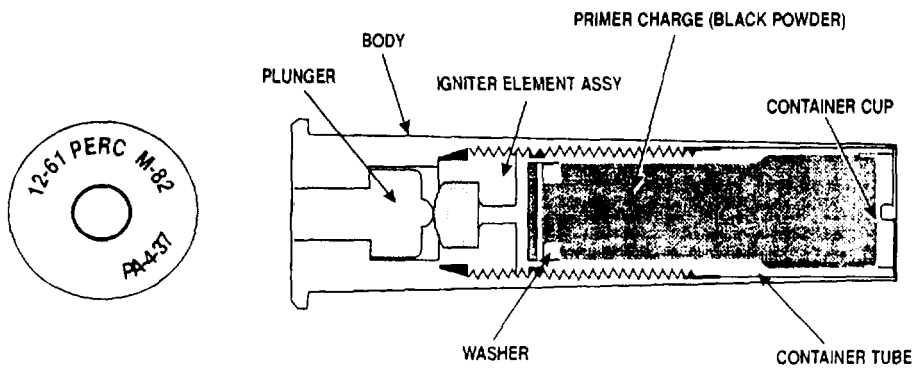
AR 199651



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 f'rom 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 mixture, 0.55 grains

Temperature Limits:

Firing:	
Lower limit	-40°F
Upper limit	+125°F
Storage:	
Lower limit	-80°F (for periods of not more than 3 days)
Upper limit	+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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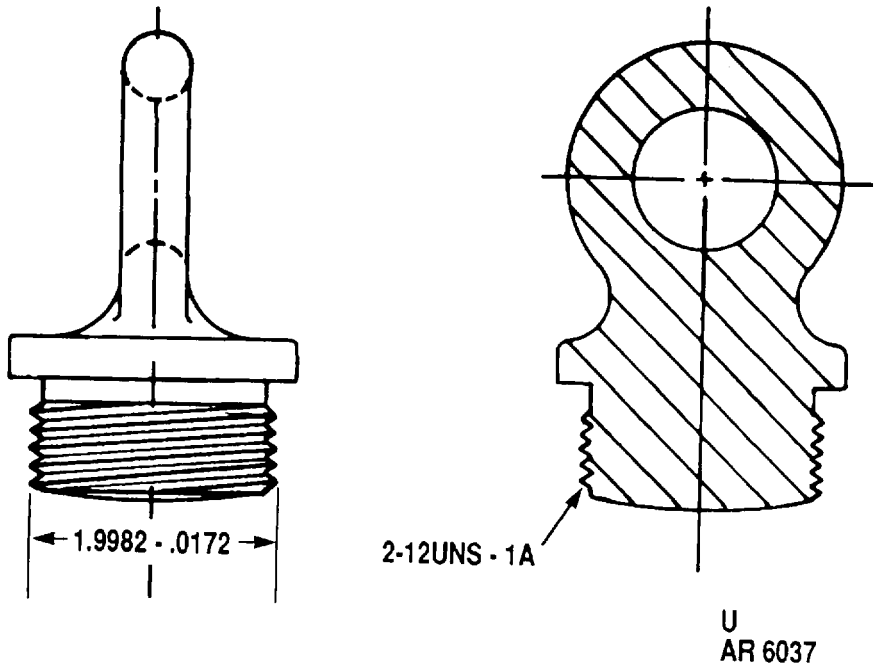
PLUG, LIFTING - TYPE G



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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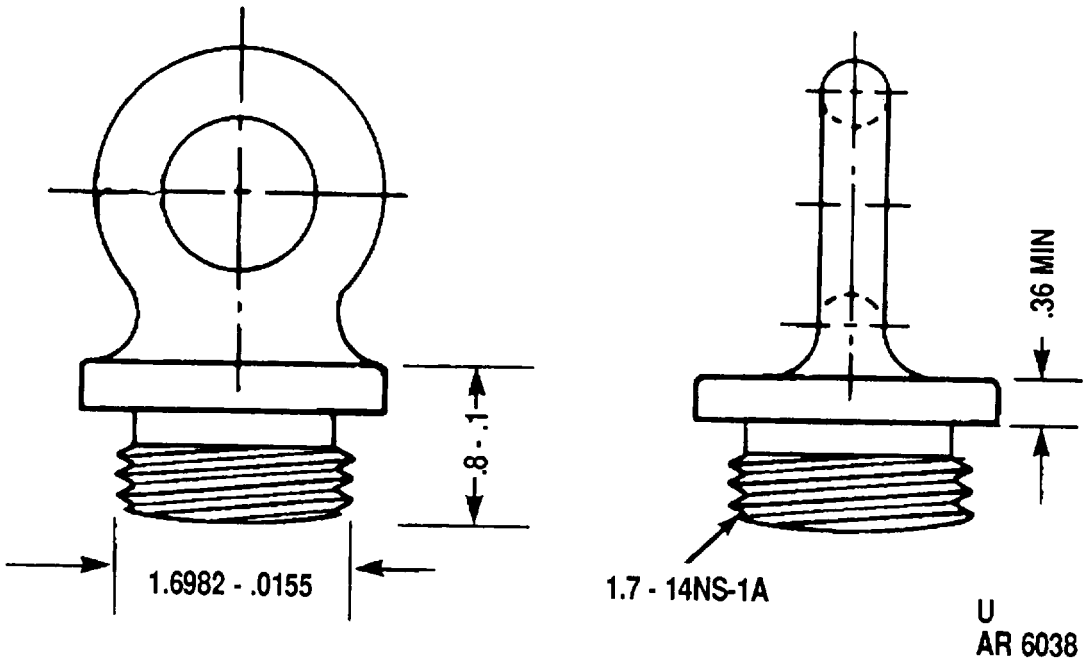
PLUG, LIFTING - TYPE C



Description:

Lifting plug type C is for the older 155mm projectiles that have the fuze well thread size of 1.7-14NS-lA major diameter 1.6982 -.0155.

steel casting. Or malleable iron casting

Drawing number ---------- 75-14.42B

NSN l320-00-861-2098

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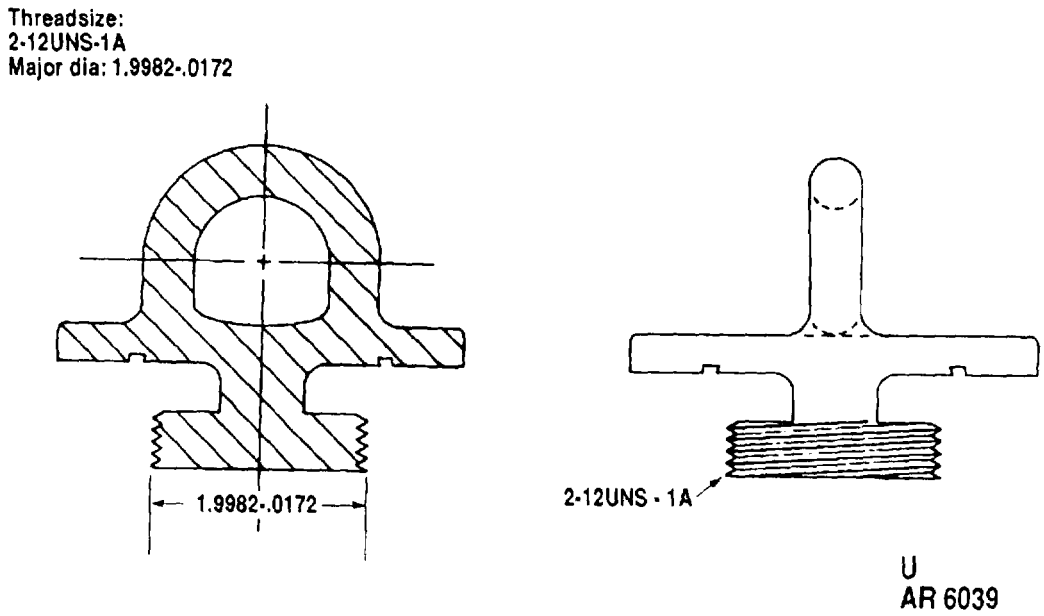
PLUG, LIFTING: ENERGY-ABSORBING FOR THE 155MM PROJECTILES M549/M549Al



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
N S N	1320-01-065-9830

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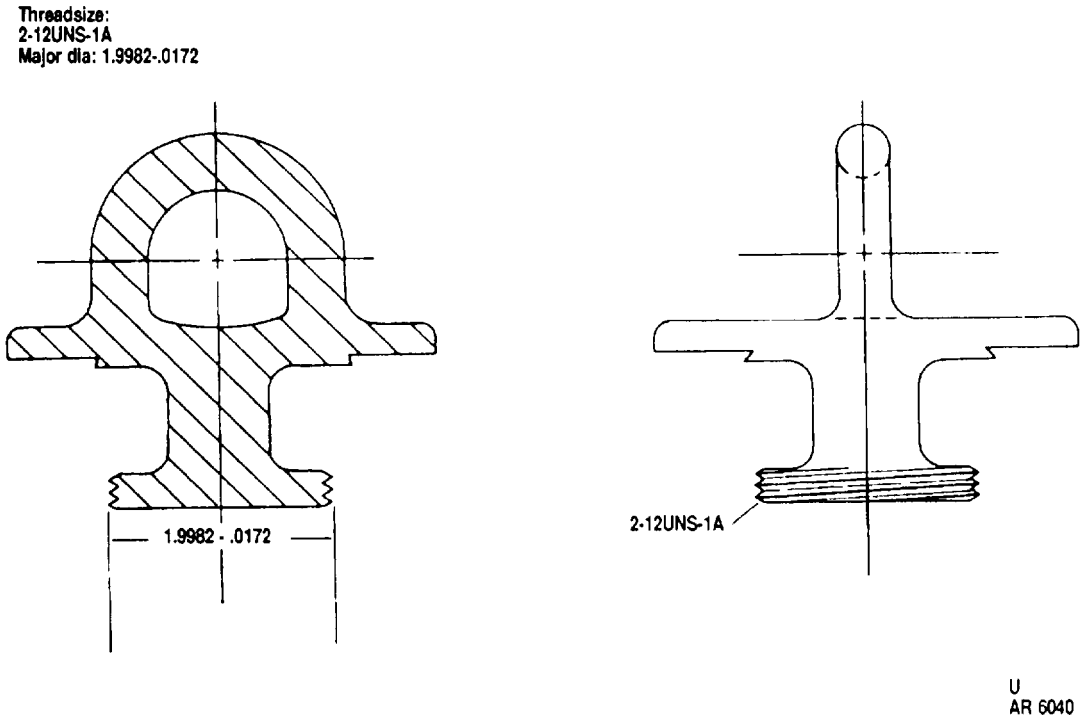
PLUG, LIFTING: SHOCK ATTENUATING FOR 155MM PROJECTILES M549A1 AND M795 AND THE 8-INCH PROJECTILE M106



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	l320-01-10-l08-7826
Gasket Lifting Plug	5330-0l-354-6972

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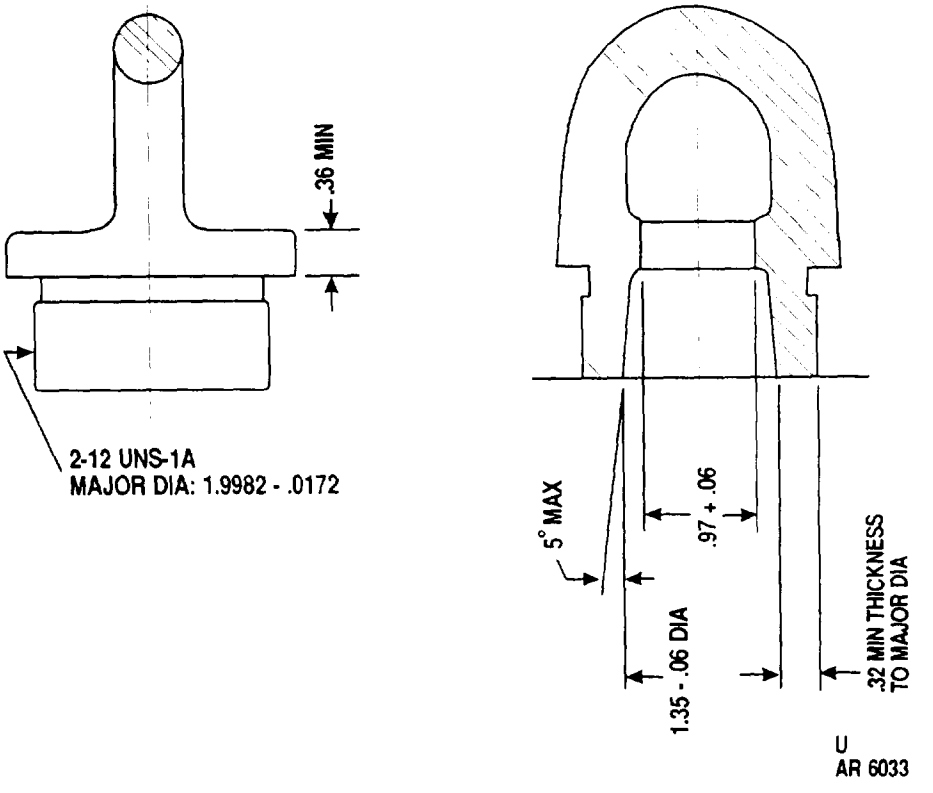
PLUG, LIFTING: FUSIBLE FOR 155MM AND 8-INCH PROJECTILES



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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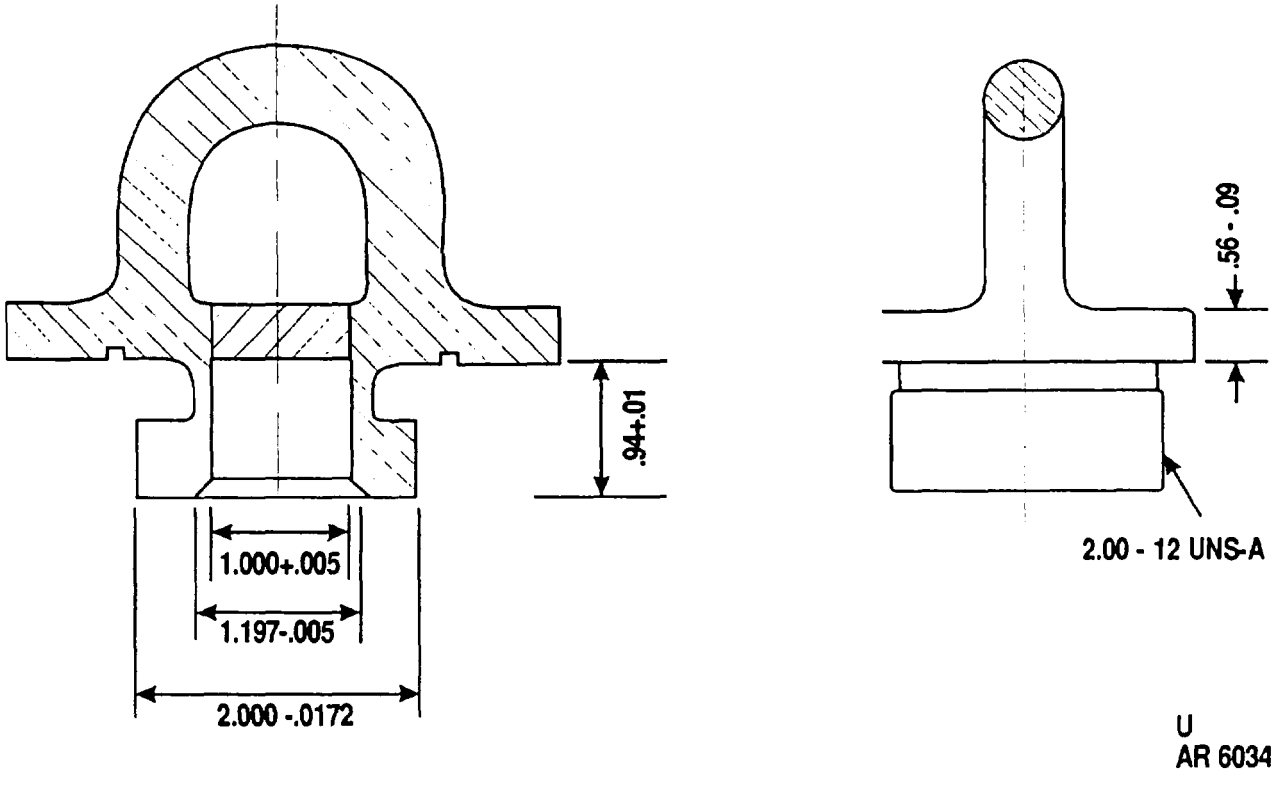
PLUG, LIFTING: UNIVERSAL



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 expelling 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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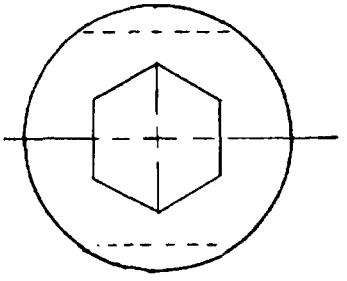
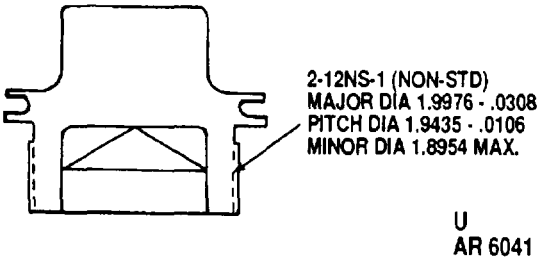
CLOSING PLUGS





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:

Closing Plug	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
Closing Plug	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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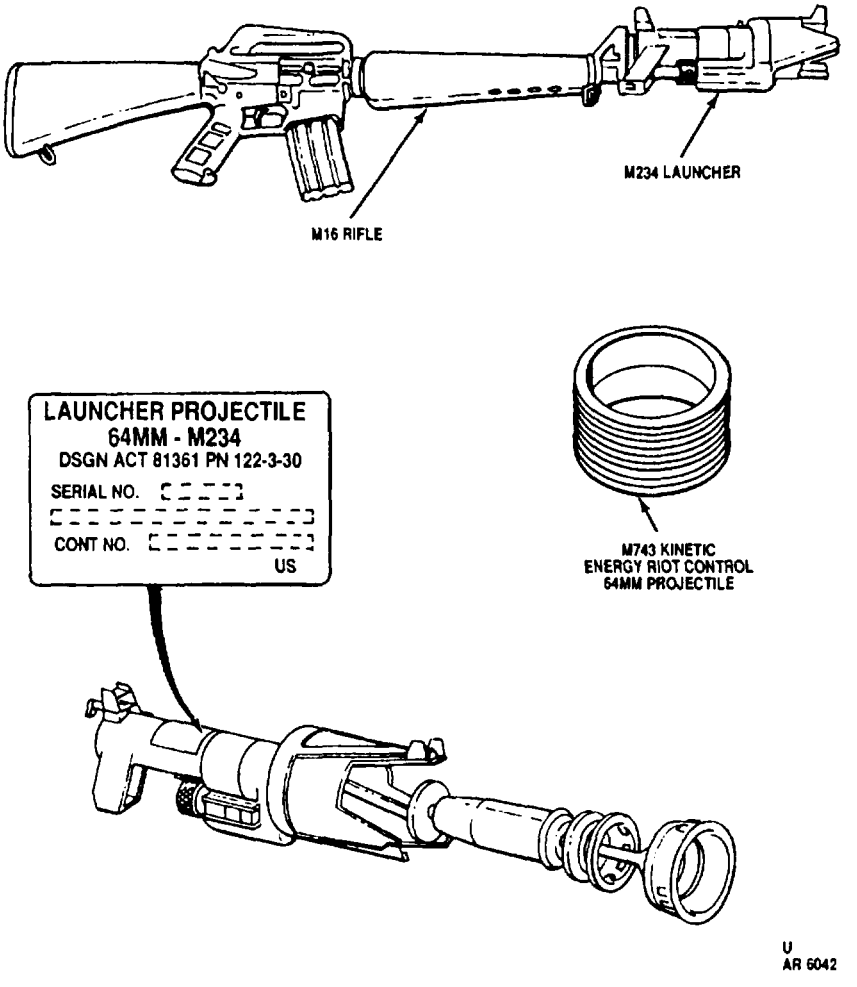
PROJECTILE 64MM: CS M742, KE M743, WITH LAUNCHER M234



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 rubher-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 u on 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 s in to the projectile as it is propelled from the launcher.

The M755 blank cartridge, with its tip painted a bright yellow, is used 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 M7433 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 AMMUNITION IRRITATING (TEAR GAS) CARTRIDGES

Projectile 64mm: M743

Storage class	1.4S
DOT class	C
DOT designation	SMALL ARMS AMMUNITION

Reference:

TM 9-1010-224-10

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APPENDIX A

REFERENCES

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 M113Al . . . . . 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

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 Combina tions 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 MlA2 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).

g. 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 indicated 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
llum	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			
CANNON (Weapon)	Cartridge/Projectile	M48A3	M51A5	M64A1	M78 Series (CP)	M557	M572	MK27 MOD 1*	M720	M739	M761	M509 Series	M539	M764	M571	M711	M501 Series	M564	M582 Series	M62 Series	M534 Series	M578	M513 Series	M728/M514A3	M732	M766
40 Millimeter Ml, M2 (M42, M42A1)	HE-T, HEI-T, MK2, SD MK11, M3A1							X																		
	HE-T, MK2, SD, M3			X																						
40 Millimeter DIVADS HE, M822 (Sgt York)	HE-I, M811										X															
	HE, M822																									X
90 Millimeter 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									
105 Millimeter M68 (M60A1 Tank)	APERS-T, M494														X											
	HEAT-T, M456 SERIES											X														
	HEP-T, M393 SERIES																				X	X				
	SMOKE,WP-T M416																				X					
120 Millimeter	HEAT-MP-T, M830													X												
152 Millimeter M81, M162 (M60A2 Tank M551 Recon)	HE-T, M657								X																	
	HEAT-T-MP, M409 SERIES												X													
	TP-T, M411 (XM411E3)					X																				
165 Millimeter M135 (M728)	HEP, M123A1																			X						
175 Millimeter 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 Fuzes is not authorized.

SECTION III
CARTRIDGE/PROJECTILE-FUZE COMBINATIONS FOR 75MM, 105MM AND 8 INCH HOWITZER

		Fuze																						
		PD					MT			MTSQ						BD		PROX			ET		MOFA
CANNON (Weapon)	Cartridge/Projectile	MK339 MOD 1	M78 Series (CP)	M557	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**	M767 Series**	M782
75 Millimeter M3 (for M1A1)	HE, M48 (Normal Cavity)			X																			
	HE, M48 (Deep Cavity)			X														P					
105 Millimeter M2A1 M2A2 (Towed M101/A1) M137 (Towed M102) M49 (SP M52)	APERS-T, M546						X																
	BE, M84, M84B1									X													
	BE, HC, M84A1							X				X		X							X		
	GB, M360			X		X																	
	HE, M1 (Normal Cavity)	X	X	X		X							X		X					X		X	X
	HE, M1 (Deep Cavity)	X	X	X		X							X		X			P	P	X		X	X
	HE, M444							X		X													
	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
105 Millimeter M20A1 (Towed M119A1)	APERS-T, M546						X																
	BE, M84, M84B1									X													
	BE, HC, M84A1							X				X		X							X		
	GB, M360			X		X																	
	HE, M1 (Normal Cavity)	X	X	X		X							X		X					X		X	X
	HE, M1 (Deep Cavity)	X	X	X		X							X		X			P	P	X		X	X
	HE, M444							X		X													
	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, M915													X							X		
	DPICM, M916													X							X		
	HERA, M913			X		X									X					X		X	X
	HERA, M927			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	M762	M767
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

		FUZE												
			PD		MT	MTSQ				PROX			ET		MOFA
CANNON (Weapon)	Projectile	MK399 MOD 1	M557/M572	M739 Series	M565	M501 Series	M564	M577	M582 Series	M728	M732 Series	M514 Series	M762 Series	M767 Series	M782
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, 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			X	
	HE,M107 (Deep Cavity)	X	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		
	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	
	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)

		FUZE												
			PD		MT	MTSQ				PROX			ET		MOFA
CANNON (Weapon)	Projectile	MK399 MOD 1	M557/M572	M739 Series	M565	M501 Series	M564	M577	M582 Series	M728	M732 Series	M514 Series	M762 Series	M767 Series	M782
M185 (for M109A2, M109A2, M109A4 SP Howitzer) M284 (for M109A5, M109A6 SP Howitzer) M199 (for M198 Towed 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	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					X							X																
	HE M720																												X
	HE M888												X																
	Illum, M83 Series																							X					
	Illum, M721																						X						
	Smoke. WP 1432/A							X																					
	Smoke, WP MJ302A													X															
	TP, M50A3														X														
	TP, M840					X							X																
												X																		
81 Millimeter M1, M29, M29A1 M252	HE, M362 Series				X		X																					X	
	HE, M374 Series				X		X			X																		X	
	HE, M821																												X
	HE, M889												X																
	HE, M983												X																
	HE, 984																												X
	Illum, M301 Series																								X				
	Illum, M853A1																									X			
	Smoke, WP, M57 Series					X																							
	Smoke, WP, M375 Series				X		X			X																		X	
	Smoke, RP, M819																					X							
	TP, M43 Series					X																							
	TP, (FR), M879										X																		
	TP, (SR), M880											X																	
4.2 Inch M2, M30	CS, M630																			X									
	GAS, M2 Series	X																											
	HE, M329, M329A1								X										X		X						P		
	HE, M329A2								X												X								
	Illum, M335A1															X													
	Illum, M335A2																X	X											
	Smoke, WP, M328 Series		X	X																									
120 Millimeter, M120, M121	HE, M57												X																
	HE, M933														X														
	HE, M934																												X
	Illum, M91																						X						
	Illum, XM930																						X						
	Smoke, WP, M68												X																
	Smoke, WP, XM929														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	M91Series
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 (Green Bag) M3 & M3A1 Zone 1	2	3	4	5	Propelling Charge (White Bag) M4A1 & M4A2 Zone 3	4	5	6	7	Firing Limitations
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)

	Propelling Charge											
	(Green Bag) M3 & M3A1						(White Bag) M4A1&M4A2					
	Zone						Zone					
Projectiles	1	2	3	4	5		3	4	5	6	7	Firing Limitations
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 (Green Bag) M3&M3A1 Zone 1	2	3	4	5	Propelling Charge (White Bag) M4A1&M4A2 Zone 3	4	5	6	7	M119 Zone 8	M119A1, M119A2 Zone 8	M119A2 Zone 7***	M203 and M203A1 Charge 8	Propelling Charge M231[6] Charge 1	2	M232[6] Charge 3	4	5	Firing Limitations
HE, M107	No	x	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	x	No	x	x	x	x	No	
HE, M483A1, ICM	No	No	x	x	x	x	x	x	x	x	x	x	x	No	x	x	x	x	No	Firing below charge three may result in stickers[8]
HE, M692/M731	No	No	x	x	x	x	x	x	x	x	x	x	x	No	x	x	x	x	No	Firing below charge three may result in stickers[8]
AT, M718/M741	No	No	x	x	x	x	x	x	x	x	x	x	x	No	x	x	x	x	No	Firing below charge three may result in stickers[8]
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 temperatures 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	x	No	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	x	x	x	x	x	x	x	x	x	No	No	No	No	x	x	x	x	No	**Overhead Fire Restriction
SMOKE, BE, HC, M116A1	No	x	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	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[3]	No	x	x	x	x	x	x	x	x	x	x	x	x	x[7]	No	No	x	x	x[7]	Rocket on firing only[5]
PRACTICE, M804, M804A1	No	x	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[8]
HEAT, M712 (Copperhead) M109A2/A3/A4/A5/A6 Howitzer	No	No	x	x	x	No	x	x	x	x	x	x	x	No	No	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 (Green Bag) M3&M3A1 Zone 1	2	3	4	5	Propelling Charge (White Bag) M4A1&M4A2 Zone 3	4	5	6	7	M119 Zone 8	M119A1, M119A2 Zone 8	M119A2 Zone 7***	M203 and M203A1 Charge 8	Propelling Charge M231[6] Charge 1	2	M232[6] Charge 3	4	5	Firing Limitations
SMOKE, WP, M825, M825A1[1,3]	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.[8]
EXTENDED RANGE, M864[3]	No	No	No	No	No	No	No	No	No	x	No	x	x	x	No	No	x	x	x	[4]
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[8]

*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.

[1]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.

[2]The M203/M203A1 charges are to be fired by the M284 cannon only.

[3]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.

[4]The M864 will be fired to achieve ranges beyond the capabilities of the M483A1 projectile or when the M483A1 is not available.

[5]This restriction does not apply when firing the M732 series fuze with the M549/M549A1 projectile.

[6]Do not load or fire M231 charges with the M232 charges. Critical malfunction could result.

[7]Only the M549A1 should be fired at this zone.

[8]For bag charges only.

SECTION X
AUTHORIZED PROJECTILE/PROPELLING CHARGE COMBINATIONS FOR M199 CANNON TUBE (155MM)

Projectiles	Propelling Charge (Green Bag) M3 & M3A1 Zone 1	2	3	4	5	Propelling Charge (White Bag) M4A1&M4A2 Zone 3	4	5	6	7	M119 Zone 8	M119A1 Zone 8	M119A2 Zone 7***	M203/M203A1 M8S**	Firing Limitations
HE, M107	No[1]	x	x	x	x	x	x	x	x	x	x	x	x	No	
HE, M449, M449A1, ICM	No[1]	x	x	x	x	x	x	x	x	x	x	x	x	No	
HE, M483A1, ICM	No[1]	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[1]	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[1]	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[1]	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[1]	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[1]	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[1]	x	x	x	x	x	x	x	x	x	x	x	x	No	
AGENT (GB or VX) M121A1	No[1]	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[1]	No	x	x	x	x	x	x	x	x	x	x	x	x	Firing below charges may result in stickers

* Ml16 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 he 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

[1] Firing at charge 2 may result in sticker occasionally

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SECTION X
AUTHORIZED PROJECTILE/PROPELLING CHARGE COMBINATIONS FOR M199 CANNON TUBE (155MM) continued

Projectiles	Propelling Charge (Green Bag) M3&M3A1 Zone 1	2	3	4	5	Propelling Charge (White Bag) M4A1&M4A2 Zone 3	4	5	6	7	M119 Zone 8	M119A1 Zone 8	M119A2 Zone 7***	M203/M203A1 M8S**	Firing Limitations
HERA, M549	No[1]	No	No	No	No	No	No	No	No	x	No	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	M549 must never be fired with M203 charge****
PRACTICE, M804	No[1]	x	x	x	x	x	x	x	x	x	x	x	x	No	
HE, M795	No[1]	No	x	x	x	x	x	x	x	x	x	x	x	x	
HEAT, M712 (Copperhead)	No[1]	No	No	x	x	No	x	x	x	x	x	x	x	No	
SMOKE, WP,[2] M825/M825A1	No[1]	No	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	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.
[1]Firing at Chg 2 may result in sticker occasionally.
[2]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	M188A1	
			Zone					Zone			Zone	Zone	
			1	2	3	4	5	5	6	7	8	8	9
M110 & M115	M2A2 & M2A1	AGENT, GB or VX M426	x	x	x	x	x	x	x	x	No	No	No
		HE, M106	x	x	x	x	x	x	x	x	No	No	No
		HE, M404	x	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	x	No
		HE, M106	x	x	x	x	x	x	x	x	x	x	No
		HE, M404	x	x	x	x	x	x	x	x	No	No	No
M110A2	M201A1	HE, M106	x	x	x	x	x	x	x	x	x	x	x*
		HE, M404	x	x	x	x	x	x	x	x	No	No	No
		HERA, M650 Rocket On								x	x	x	x
		HERA, M650 Rocket Off	x	x	x	x	x	x	x	x	x	x	x
		HE, M509A1	x	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	x

*M106 Projectile can be fired w/M557, M739, M572, M728, M732. MS82 and MS87 Fuzes at this zone. The MS64 can only be fired with the M106 Projectile with zones 1 through 8.

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APPENDIX C

DODAC LISTING

DODAC	ITEM
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)

DODAC	ITEM
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

DODAC	ITEM
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, 105mm: TP-TM490A1
1315-C512	Cartridge, 105nmmun: Smoke, WP-T, M416
1315-C513	Cartridge, 105mm: 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

DODAC	ITEM
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

DODAC	ITEM
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

DODAC	ITEM
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

* U.S. G.P.O.: 1994-546-043:80740

By Order of the Secretary of the Army:

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General, United State Army
Chief of Staff

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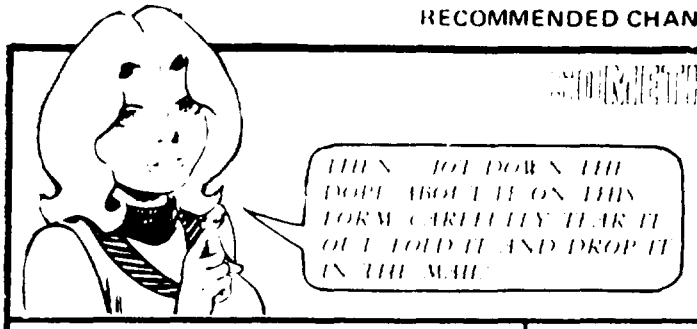

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