
0640-LP-108-4114

TECHNICAL MANUAL
SMALL ARMS AND SPECIAL
WARFARE AMMUNITION



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This Manual Supersedes NAVSEA SW010-AD-GTP-010,
Dated 02 MAY 2003

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Published by Direction of Commander, Naval Sea Systems Command

0640-LP-108-4114

25 March 2009



SW010-AD-GTP-010

List of Effective Pages

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5-1 – 5-26	0	TMDER 4160/1 (3-copies)	0

*Zero in this column indicates an original page

NAVSEA TECHNICAL MANUAL CERTIFICATION SHEET 1 OF 1

Certification Applies to: New Manual Revision Change

Applicable TMINS/PUB. NO: SW010-AD-GTP-010 Fifth Revision

Publication Date (Da, Mo, Yr) 25 March 2009

Title: SMALL ARMS AND SPECIAL WARFARE AMMUNITION

TMCR/TMSR/Specification No: _____

CHANGES AND REVISIONS:

Purpose: Incorporate new and updated source data.

Equipment Alteration Numbers Incorporate: _____

TMDER/ACN Numbers Incorporate: _____

Continue on reverse side or add pages as needed.

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Authority	Name	Signature	Organization	Code	Date
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Printing Release	Mike Brzegowy	<i>Mike Brzegowy</i>	NAVSURFWAR- CENDIV CRANE	JXML	3/23/09

NAVSEA 4160/8 (5/89)

RECORD OF CHANGES

CHANGE NO.	DATE	TITLE AND/OR BRIEF DESCRIPTION	ENTERED BY

FOREWORD

Technical manual NAVSEA SW010-AD-GTP-010 (Fifth Revision), describes small arms and special warfare ammunition used by the Navy and provides instructions for their safe and effective use. SW010-AD-GTP-010 (Fifth Revision) supersedes SW010-AD-GTP-010 (Fourth Revision) dated 09 April 2007.

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SAFETY SUMMARY

This publication describes physical and chemical processes which may require the use of chemicals, solvents, paints, or other commercially available material. The user of this publication should obtain the material safety data sheets (Occupations Safety and Health Act (OSHA) Form 20 or equivalent) from the manufacturers or suppliers of materials to be used. The user must become completely familiar with the manufacturer/supplier information and adhere to the procedures, recommendations, warnings and cautions of the manufacturer/supplier for the safe use, handling, storage and disposal of these materials. The following are general safety precautions and instructions that people must understand and apply during many phases of operation and maintenance to ensure personal safety and health and the protection of DOD property. Portions of this may be repeated elsewhere in this publication for emphasis.

WARNING AND CAUTION STATEMENTS

WARNING and CAUTION statements have been strategically placed throughout this text to operating or maintenance procedures, practices or conditions considered essential to the protection of personnel (WARNING) or equipment and property (CAUTION). A WARNING or CAUTION will apply each time the related step is repeated. Prior to starting any task, the WARNINGS or CAUTIONS included in the text for that task will be reviewed and understood. Refer to the materials list figure at the beginning of the appropriate manual section for material used during maintenance of this equipment. The detailed warnings for hazardous material only are listed separately in the safety summary as the "Hazardous Materials Warnings" section.

HAZARDOUS MATERIALS WARNINGS

Warnings for hazardous material in this manual are designed to warn personnel of hazards associated with items when they come in contact with them during actual use. For each hazardous material used, a material safety data sheet is required to be provided and available for review by users. Consult your local safety and health staff concerning any questions on hazardous chemicals, MSDSs, personal protective equipment requirements, and appropriate handling and emergency procedures.

GENERAL SAFETY PRECAUTIONS

The following general safety precautions are not related to any specific procedure. They are recommended safety precautions that personnel must understand and apply during many of the phases of operation and maintenance.

UNAUTHORIZED USES OF AMMUNITION

No ammunition or explosive assembly shall be used in any gun or equipment for which it is not designated, nor shall any explosive or pyrotechnic device be manufactured, purchased, or assembled for use in displays, demonstrations, tests, or for any other purpose unless authorized by the Naval Sea Systems Command.

STANDARD GOOD PRACTICE

Observe all standard practices in installing, replacing, operating, and testing equipment. This includes dry hands and clothing, removing personal jewelry the use of rubber mats or other insulating devices.

CHAPTER 1

INTRODUCTION

1-1 SCOPE

NAVSEA SW010-AD-GTP-010 describes small arms and special warfare ammunition, and certain associated mechanisms and equipment used by the Navy. It provides instructions, technical information, and safety precautions relative to their use.

1-1.1 General. The ammunition described is intended for use by all Navy and Naval Special Warfare Units. The information in this manual describes how to identify, handle, and use these items in a correct and safe manner to achieve maximum effectiveness from their use.

WARNING

UNDER NO CIRCUMSTANCES SHALL UNTRAINED PERSONNEL ATTEMPT TO USE THIS MANUAL AS A TEXT FOR SELF-TEACHING. SERIOUS INJURY OR LOSS OF LIFE COULD RESULT.

1-1.1.1 Limitations On The Use Of This Manual. All personnel who use small arms and special warfare ammunition and related weapons require special training. They must be fully acquainted with the types of ammunition, the weapons used, and the proper care and handling procedures.

1-1.1.2 Unauthorized Uses of Ammunition. No ammunition or explosive assembly shall be used in any gun or equipment for which it is not designated, nor will any explosive or pyrotechnic device be manufactured, purchased, or assembled for use in displays, demonstrations, tests or for any other purposes unless authorized by the Naval Sea Systems Command.

1-2 FORMAT

This manual is divided into chapters, sections, paragraphs, and subparagraphs, with every subdivision being numbered for easy reference. As an

example, the number 4-2.3.5 is applied to the fifth subparagraph of the third paragraph of the second section of Chapter 4.

1-2.1 Arrangement of Content. The major divisions of this publication are arranged in chapters:

1-2.1.1 Chapter 1 - Introduction. Information of a general nature pertaining to all items called out in this technical manual, except reporting and disposition information. This information is covered in Chapters 2 and 9, respectively.

1-2.1.2 Chapter 2 - Reporting Accidents and Malfunctions. Regulations for reporting explosive accidents or malfunctions involving small arms and special warfare munitions.

1-2.1.3 Chapter 3 - Propellants and Explosives. Information pertaining to modern propellants and explosives used in small arms and special warfare ammunition.

1-2.1.4 Chapter 4 - Small Arms Ammunition. Information of a general and technical nature concerning ammunition .22 through .50 caliber.

1-2.1.5 Chapter 5 - 40 Millimeter Cartridges. Information of a general and technical nature related to 40 millimeter cartridges.

1-2.1.6 Chapter 6 - Mortar Ammunition. Information of a general and technical nature related to mortar type ammunition.

1-2.1.7 Chapter 7 - Shoulder Launched Weapon Systems. Information of a general and technical nature related to shoulder launched weapon systems.

1-2.1.8 Chapter 8 - Land Mines. Information of a general and technical nature related to land mines.

1-2.1.9 Chapter 9 - Hand and Rifle Grenades. Information of a general and technical nature related to hand and rifle grenades.

1-2.1.10 Chapter 10 - Disposal. Information related to general, technical, and expedient means to be used in the destruction and disposition of ammunition.

1-2.1.11 Chapter 11 - Obsolete Items. Information of a general and technical nature related to obsolete items.

1-2.2 Individual Item Descriptions. Within each of the substantive chapters of this manual, individual devices are covered regarding intended use, external and internal design characteristics, functioning, and packaging. If there is special equipment associated with the installation, attachment, or detonating of the device being described, such equipment is identified and described. Make-ready procedures, handling, and safety precautions which apply exclusively to individual items are included in the appropriate individual item description.

1-2.3 Warning, Cautions, And Notes. The following definitions apply to the “Warnings,” “Cautions,” and “Notes” found throughout the manual:

WARNING

AN OPERATING PROCEDURE, PRACTICE, ETC., WHICH IF NOT CORRECTLY FOLLOWED, COULD RESULT IN PERSONAL INJURY OR LOSS OF LIFE.

CAUTION

AN OPERATING PROCEDURE, PRACTICE, ETC., WHICH, IF NOT STRICTLY OBSERVED, COULD RESULT IN DAMAGE TO, OR DESTRUCTION OF EQUIPMENT.

NOTE

An operating procedure, conditions etc., which is essential to highlight.

1-3 IDENTIFICATION AND MARKING

Navy-adopted ammunition items that have been type classified per Technical Manual TW010-AA-ORD-010/11-1-116A are officially identified

by logistical terms. This facilitates supplying the fleet. Each ammunition item is identified by an approved nomenclature, identification number, lot number, and net weight. Additionally, some items are marked with contract number, place and date of manufacture. The information is stenciled on the item, the shipping container, or both. A new identification number is assigned when a basic change in design is made. A new Mod number is assigned when a minor alteration or modification is made.

1-3.1 Navy Item Identification. Ammunition items designed and produced for the Navy are identified by Mark (MK) and Modification (MOD). An example is Signal Cartridge MK 121 MOD 0. A minor modification to this item results in the identification being MK 121 MOD 1.

1-3.2 Army Item Identification. When the Navy procures ammunition items that were designed and produced for the Army, the original assigned Army identification number remains with the item; for example, Cartridge, .50 Caliber, Spotter/Tracer M48A1. The M corresponds to Mark, and the A1 corresponds to MOD. A minor modification to that cartridge would result in the identification being M48A2.

1-3.3 Items Without Identification Numbers. Some ammunition items have neither Navy nor Army item identification numbers. Those items are identified by their nomenclature and drawing number; for example, Cartridge, .22 Caliber, Ball, Short (10523992).

1-3.4 Standard Department of Defense Nomenclature and Numbering. A standard nomenclature and numbering system has been established in the Department of Defense (DoD) and is mandatory for record keeping and ordering purposes. The National Stock Number (NSN) has replaced the Federal Stock Number, and there is a different NSN for each item in supply. The first four digits of the NSN are the Federal Supply Class number that groups similar type items into classes. The next two digits are the National Codification Bureau (NCB) code number that designates the North Atlantic Treaty Organization (NATO) country that catalogs the item. The last seven digits combined with the NCB code number (two digits) are designated as the National Item Identification

Number (NIIN). All currently available NSN and DoD code numbers for each item or component are included in this technical manual. Appendix A, Department of Defense Identification Code/Naval Ammunition Logistic Code Index (DODIC/NALC Index), contains a numerical listing of assigned DoD codes, ammunition nomenclature, and the appropriate paragraph under which that ammunition is identified. The lead DODIC/NALC number is also listed in parenthesis () after each item paragraph.

1-3.5 Ammunition Lot Numbers. When ammunition is manufactured, an ammunition lot number is assigned in accordance with specifications. As an essential part of the lettering, the lot number is stamped or marked on the item, size permitting, as well as on all packing containers. There are presently two ammunition lot numbering systems in the ammunition inventory. The newest lot numbering system was implemented by the Navy in 1978, so there is considerable ammunition inventory still identified by the old numbering system. Both systems are described in the following paragraphs.

1-3.5.1 Current Ammunition Lot Numbering System. For all ammunition end items and their components, the ammunition lot number consists of a manufacturer's identification symbol; a numeric code showing the year of production; an alpha code representing the month of production; a lot interfix number followed by a hyphen; a lot sequence number; and, when necessary, an alpha character used as an ammunition lot suffix to denote a reworked lot. The ammunition lot number will not exceed 14 characters in length, and no characters are separated by spaces. The minimum number of characters used will be 13. If a one or two character manufacturer's identification code is used, the remaining position(s) of the three character field is filled by a dash(es) (-); e.g., AB- and A--. The following illustrates the construction of an ammunition lot number:

WCC85E001-004B

WCC = Manufacturer's identification symbol
85 = A two digit numeric code identifying the year of production (1985)

E = A single alpha code signifying the month of production (May)
001 = Lot interfix number
004 = Lot sequence number
B = Ammunition lot suffix (the alpha suffix).

Exceptions to the foregoing system for numbering ammunition lots are given in MIL-STD-1168, Section 5.

1-3.5.2 Old Ammunition Lot Numbering System. This numbering system consists of the Ammunition Lot Number (ALN) symbol followed by a two or three letter prefix, a sequential lot number, a one to three letter manufacturer's symbol, a two number group, and possibly a lot suffix. An example of an ALN is:

GH-221-HAW-72

GH = Cartridge, Caliber .50

221 = 221st lot

HAW = NAD Hawthorne (assembly activity)

72 = Assembled during the year of 1972.

1-3.5.3 Prefix Designation. The two or three letter prefix designation identifies the size and type of ammunition item. A prefix designation having the final letter R denotes renovated items.

1-3.5.4 Sequential Lot Number. The one to four character group following the prefix indicates the sequential lot number of that particular type produced by an activity during the calendar year. This group consists of numbers 1 through 9999.

1-3.5.5 Manufacturer's Letters and Numbers. From one to three letters identify the ordnance activity that assembled the ammunition item. Following the symbols is the final numerical group, indicating the last two digits of the calendar year of assembly.

1-3.5.6 Lot Suffix. An alpha character, following the year of assembly, indicates some type of special screening was performed.

1-3.5.7 Grand Lot Designation. A Grand Lot (GL) designation may be assigned to serviceable remnant ammunition items of the same type after depot inspection. These remnant lots are consolidated and reissued with a new ammunition lot number having a GL designation.

1-3.5.8 Uniformity of Functioning. To provide for the most uniform functioning, all of the components in any one lot are manufactured under as nearly identical conditions as practicable.

1-3.5.9 Ammunition Data Cards. The ammunition data card is a basic reference document prepared in accordance with MIL-STD-1168 for each lot of accepted ammunition. These cards are used to record the lot and serial numbers of each major component, applicable drawings, and other pertinent data such as date of manufacture, NSN, and applicable instructions or remarks. Data cards may be supplied with each shipment of ammunition. Data cards are available by accessing the Worldwide Ammunition Data Repository Program (WARP) which is located on the Army Electronic Product Support (AEPS) website at <http://aeprs.ria.army.mil>.

1-3.6 Lettering. Stenciled or stamped lettering on the ammunition includes all the information necessary for complete identification and is marked in compliance with NATO standards and Department of Transportation (DOT) regulations. In addition to standard nomenclature and lot numbers, lettering may include such information as the Mark and Mod, the fuze type, and the weapon in which the item is fired.

1-4 PAINTING

1-4.1 Purpose. Ammunition is painted to prevent rust and to provide, by the color, a means of identification or camouflage. A color code system is used to indicate the primary use of the ammunition, the presence of a hazardous (explosive, flammable, irritant, or toxic) filler, and/or the color of tracers, dye loads, and signals.

1-4.2 Color Coding. Color coding for ammunition 20mm and larger is contained in MIL-STD-709, latest revision. Color coding for ammunition smaller than 20mm is contained in this manual.

1-5 PACKING

Ammunition containers are designed to withstand conditions normally encountered in handling, storage, and transportation to comply with DOT regulations. The ammunition is packed, and the containers are lettered in accordance with pertinent drawings and specifications to include all content information.

1-6 INSPECTION

Ammunition is manufactured to rigorous specifications and thoroughly inspected before acceptance. Ammunition in storage is periodically inspected and tested in accordance with specific instructions of the Naval Sea Systems Command.

1-7 GRADING

Small arms ammunition is graded per SB 700-1300-1 which assigns functional condition codes. For example, lots formerly assigned grade R and AC will be converted to functional code A, unless otherwise restricted or suspended.

1-7.1 Reference Data.

1-7.2 Reference Publications. Appendix C lists references publications used in conjunction with this publication.

1-7.3 Acronyms and Abbreviations. Appendix D lists acronyms and abbreviations used in this publication.

1-7.4 Metric Conversion. Appendix E lists the approximate English to metric conversions.

CHAPTER 2

REPORTING ACCIDENTS AND INCIDENTS

2-1 GENERAL REQUIREMENTS

All mishaps, accidents, incidents, and unsatisfactory performance, i.e., malfunctions, involving small arms and special warfare ammunition shall be reported as required by OPNAVINST 5102.1 B, Mishap Investigation and Reporting and OPNAVINST 5100.21A, Afloat Safety Program. U.S. Marine Corps activities are exempted if reports are submitted in accordance with USMC Technical Instruction TI-8010-15/1A.

2-1.1 Definitions. The principal terms of concern in this chapter are defined and interpreted in Paragraphs 2-1.1.1 through 2-1.1.6

2-1.1.1 Explosive Materials. All military explosive or combustible chemicals in bulk or loose state, used in small arms and special warfare ammunition.

2-1.1.2 Explosive Mishap. Any unplanned or unexpected event causing personnel injury, occupational illness, death, or material loss or damage or an explosion of any kind whether damage occurs or not.

2-1.1.3 Explosive Accident. An explosive accident is any accidental explosion or fire involving small arms and special warfare ammunition, including in-bore, close aboard, and premature detonations that result in explosion and/or fire and damage to property.

2-1.1.4 Explosive Incident. An explosive incident is any occurrence involving small arms and special warfare ammunition that creates a potentially hazardous situation. Such incidents include but are not limited to:

a. Human errors in processing, assembling, testing, loading, storing, transporting, handling, using, or disposing of small arms and special warfare ammunition materials.

b. Unusual or unexpected occurrences, unnatural phenomena, unfavorable environments (e.g., RADHAZ), or instances of equipment failure which may damage or affect the safety and reliability of small arms and special warfare ammunition.

c. Loss or abandonment of small arms and special warfare ammunition resulting in potential hazard to untrained personnel who may find the item so lost or abandoned.

d. Misuse or unauthorized alteration of explosive demolition materials.

2-1.1.5 Malfunction. A malfunction is a failure of small arms or special warfare ammunition to function when intentionally launched, actuated or fired. Malfunctions may be catastrophic, major or minor.

a. **Catastrophic Malfunction.** A catastrophic malfunction is a malfunction resulting in fatality (ies), severe injury (ies), or major equipment damage.

b. **Major Malfunction.** A major malfunction is a failure which results in, or is potentially capable of resulting in, personnel injury and/or material casualty.

c. **Minor Malfunction.** A minor malfunction is a failure which does not result in injury or casualty and for which the potential for injury or material casualty is remote.

2-1.1.6 Dangerous Defective Items. Small arms and special warfare ammunition that on visual examination or local test are found to be capable of resulting in an accident or a malfunction shall be considered dangerously defective items and shall be handled accordingly.

2-2 DISCUSSION

All small arms and special warfare ammunition are designed with as much safety and reliability potential as possible. Prior to release for service use, tests are conducted at all stages of development, fleet evaluation, and production. After availability in service, tests continue for safety and reliability to determine effects of aging in storage. As in any accident-prevention program, in order to improve safety and reliability of explosive demolition materials, auxiliary equipment, and pertinent instructions, causes of accidents, inci-

dents, and malfunctions must be rapidly and accurately determined, and appropriate corrective action must be taken immediately.

2-3 ACTION

All Navy and Naval Special Warfare Units experiencing accidents, incidents, or malfunctions involving small arms and special warfare ammunition as defined in this manual shall take appropriate action as described in the following paragraphs.

2-3.1 Discontinue Use Of The Item. Discontinue use of the item involved pending local inspection, interrogation, and assessment of probable cause. Depending on the degree of damage or casualties (accidents), the degree of potential hazard (incidents), the ability to attribute causes with some assurance, and operational necessity such as acceptance of calculated risk in combat emergency, usage may be resumed. Severe damage, casualties, potential hazard, inability to determine cause, and other factors prevailing should govern the decision to discontinue local use of the entire type of explosive demolition material or to suspend the specific lot involved, pending a complete technical evaluation and/or an on-site investigation by technically trained personnel.

2-3.2 Report All Occurrences. Report all occurrences to NAVSEA, PM Navy 2T Conventional Ammunition Systems (NCAS), Buffington Road, B171 Annex, Picatinny Arsenal, NJ 07806-5000 and Naval Operational Logistics Support Center (NOLSC) Mechanicsburg, Pennsylvania. To insure that reports are complete and concise, the form at set forth in OPNAVINST 5102.1B shall be used.

2-3.3 Collect All Available Evidence. The difficulty of positively determining cause is magnified because explosive accidents and major malfunctions that involve small arms and special warfare ammunition are usually characterized by destruction or loss of the offending item. All fragments and remains of the item should be collected for examination and tests. Photographs of damage to equipment and to the area of occurrence, if practicable, are desirable. There have been cases in which minor malfunctions or incidents have resulted in the unnecessary disposal of the ordnance item involved. In most cases, the hazard associated with an incident or minor malfunction is

at the instant of occurrence or immediately thereafter. Accordingly, after an approved interval has passed, a misfire or minor malfunction should be suitably tagged, set aside, and returned to the nearest issuing activity ashore for investigation or tests or for such disposition as may be directed by NAVSEA, PM NCAS or NOLSC Mechanicsburg. However, nothing in this paragraph is to be construed as prohibiting the immediate disposal of any item which, in the judgment of the Commanding Officer, constitutes a hazard.

NOTE

If it is determined to take disposal action, photographs of the item should be taken provided safety is not compromised.

2-3.4 Actions For Investigations.

NAVSEAINST 8025.1D details actions for investigations of 2T cognizant material managed by NAVSEA, PM NCAS. Action responsibilities are assigned for PM NCAS, Design Agent (DA) activities, the Inventory Control Point (ICP), and In-Service Engineering Agent (ISEA) as listed in NAVSEAINST 5400.57A and Surveillance Coordinating Center (SCC) as listed in NAVSEAINST 3967.2. Mishaps involving 2T cognizant ammunition developed by another service shall be assigned to the developing service for investigation per DoD 5160.65-M.

2-4 RESPONSIBILITY OF AMMUNITION PROGRAM OFFICE, NAVSEA, PM NCAS.

As program manager for Navy conventional ammunition and based on an analysis of the mishap circumstances, comments and recommendations from the DA(s), SCC, ISEA or factors of supply and Fleet readiness, NAVSEA, PM NCAS shall:

- a. Carry out an Emergency Reaction Plan as outlined in NAVSEAINST 8025.1D to respond to a catastrophic mishap.
- b. Review U.S. Army, U.S. Marine Corps and U.S. Air Force reclassifications affecting Navy stocks and direct NOLSC Mechanicsburg to include reclassifications in the U.S. Navy Notices of Ammunition Reclassification (NARS) when required.
- c. Review and investigate all reported mishaps.

d. Tell the reporting activity to release the ammunition type, lot strata or individual lot from local suspension with a recommendation for continued use or;

e. Direct NOLSC Mechanicsburg to withdraw the lot, lot strata or type permanently from service use without an investigation or;

f. Direct NOLSC Mechanicsburg to reclassify the lot, lot strata or type to a proper condition code pending an investigation.

g. Assign a Naval Sea Systems Command Surface Ammunition Malfunction Control (SAMC) number on mishaps which warrant full investigation into cause. All activities will use this control number in related correspondence.

h. Coordinate SAMC investigation with the ISEA, DA(s) and SCC.

i. Direct and coordinate the development and preparation of a Malfunction Investigation Plan (MIP) with the ISEA, DA(s) and SCC.

j. Approve the overall MIP for use and send MIP to the proper ISEA, DA(s) and SCC for support.

k. Fund ISEA, DA(s) and SCC for support.

l. Coordinate the development and preparation of a final malfunction investigation report with the ISEA, DA(s) and SCC.

m. Take appropriate action based on analysis of reports and recommendations.

2-5 RESPONSIBILITY OF NOLSC MECHANICSBURG

As Inventory Control Point (ICP) for Navy conventional ammunition, NOLSC Mechanicsburg shall:

a. Ensure PM NCAS, ISEA, DA(s) and SCC are aware of all mishaps reported per OPNAVINST 5102.1B.

b. Issue NARs per SPCCINST 8010.12D to change condition code of the item under investigation as directed by PM NCAS.

c. Arrange for shipment of test samples and related items with MILSTRIP and shipping data as requested by DA. Provide copies to PM NCAS, ISEA, DA(s) and test activities.

d. Send disposition instructions to activities that hold suspended lots and that have sent NAVSEA Form 8012/2 (Rev 2-81), Ammunition Disposition Request and Authorization (ADRA) to NOLSC Mechanicsburg.

e. Keep a permanent file of all ammunition reclassifications.

f. Send reclassification of U.S. Navy common items to other user services.

g. Include U.S. Army reclassifications in the U.S. Navy NARs only when approved by PM NCAS.

h. Send a list of all quantities of reclassified ammunition resulting from NARs quarterly to PM NCAS with a copy to the ISEA and SCC.

2-6 RESPONSIBILITY OF NAVSEA CRANE, JOINT SPECIAL OPERATIONS RESPONSE DEPARTMENT, MUNITIONS DIVISION AS DESIGN AGENT (DA)/IN-SERVICE ENGINEERING AGENT (ISEA)

NAVSEA Crane, Joint Special Operations Response Department, Munitions Division has been assigned DA/ISEA for small arms and special warfare ammunition. As such, NAVSEA Crane, Joint Special Operations Response Department, Munitions Division is responsible for action as follows:

a. Evaluate initial reports of catastrophic occurrences following NAVSEAINST 8025.1D.

b. Review mishap reports. Give recommendations on reclassification and the need for investigation to PM NCAS when requested.

c. Coordinate with the PM NCAS, ICP, SCC, DA(s) and other activities when a full investigation into causes is assigned by PM NCAS.

d. Upon direction by PM NCAS, develop a MIP with the DA(s) and SCC and send it to PM NCAS for approval.

e. Upon direction by PM NCAS, Monitor DA(s) or SCC tests defined in the MIP to include reviewing test procedures and test data.

f. Develop, execute and manage an automated data processing system to track and cross reference all mishaps by DoD code, NAR number, SAMC number, lot number and category, lead investigator and status.

g. Send progress reports every 60 days to PM NCAS on MIP. When investigation exceeds six months, send monthly reports until completed.

h. Summarize investigations in a Malfunction Investigation Status Report to be published semi-annually or as directed by PM NCAS with information copies to DA(s) and SCC.

i. Keep a data base of all completed SAMC files for retrieval and further use.

2-7 MESSAGE REPORT

Reports are to be submitted in accordance with the format described in OPNAVINST 5102.1B. Information copy of reporting message should be sent to NAVSEA Crane, Joint Special Operations Response Department, Munitions Division.

CHAPTER 3

PROPELLANTS AND EXPLOSIVES

3-1 INTRODUCTION

This chapter covers propellants and explosives used in small arms and special warfare ammunition. It describes the classification, characteristics, and uses of low and high explosives.

3-2 SOLID PROPELLANTS

3-2.1 General. Solid propellants are low explosives that propel projectiles and rockets. Nitrocellulose, although basically unstable, is used as a propellant ingredient. Certain stabilizers are added to the composition to counteract the nitrocellulose acid breakdown products.

3-2.2 Classifications. Propellants are classified from a composition viewpoint. A composition may be suitable for use in several different applications, but it is not practical to classify propellants on the basis of use.

3-2.2.1 Single-Base Propellant. The first nitrocellulose propellant standardized by the U.S. Army and Navy was termed as pyrocellulose powder. It consisted only of carefully purified nitrocellulose gelatinized in a mixture of ether and ethanol and was extruded in cord form with one or more perforations.

a. Another early nitrocellulose composition developed was known as E. C. Powder. Data indicated that composition was sufficiently sensitive and powerful to be used as a high explosive as well as a propellant. It has been used in hand grenades as well as blank ammunition.

b. Modern single-base compositions contain nitrocellulose as the chief ingredient. They may contain inorganic nitrates, nitrocompounds, and nonexplosive materials such as metallic salts, metals, carbohydrates, dyes, and certain stabilizers.

3-2.2.2 Double-Base Propellant. Prior to World War II, double-base propellants were used for mortar and small arms ammunition but not in cannon. They have since been standardized for use in small arms. Requirements for rocket propellants have resulted in standardization of a number of double-base compositions.

Modern double-base compositions contain nitrocellulose and a liquid organic nitrate such as nitroglycerine that is capable of gelatinizing nitrocellulose. They frequently contain other additives and a stabilizer.

3-2.2.3 Composite Propellant. Composite propellants contain neither nitrocellulose nor an organic nitrate. They consist of a physical mixture of an organic fuel (such as ammonium picrate), an inorganic oxidizing agent (such as potassium nitrate), and an organic binding agent.

3-2.3 Propellant Use. The ballistic and physical requirements rather than composition determine the choice of a propellant for a specific use. Small arms, grenades, and cannon may use single-base propellants. Small arms, cannon, mortars, rockets, and jet propulsion units may use double-base propellants.

3-2.3.1 Cannon Powders. Perforated grain form is the form used in standard double-base cannon powders. Double-base mortar powders include those used for propellant charges and in ignition cartridges. The high nitroglycerine content gives double-base mortar propellant compositions very high ballistic potential values. They are however, the least stable of the standard propellants.

3-2.3.2 Small Arms Powders. Double-base propellants for small arms have been used for many years. The ballistic type, flake, disk, and grain forms that were once used, have been replaced by a double-base composition containing less nitroglycerine. The single perforated grains of that composition are coated with dinitrotoluene or centralite and glazed with graphite. Although they have a somewhat less ballistic potential, they are more stable, cause less bore erosion, and have less tendency to flash. A double-base composition in the form of tiny spheres, 0.02 or 0.03 inch in diameter, is used instead of flakes or grains.

One example called Ball Powder® is a composition produced by dissolving wet nitrocellulose in a solvent (for example, ethyl acetate) and adding diphenylamine, chalk, and nitroglycerine. Upon

agitation and the addition of a protective colloid, the solution is dispersed in the form of small globules. When the volatile solvent is removed by heating, the powder solidifies in the form of small spherical pellets. A wide variety of single or double-base compositions is produced by this process.

3-2.4 PROPELLANT CHARACTERISTICS.

The characteristics of modern propellants are described in the following paragraphs.

3-2.4.1 Propellant Form. Propellant grains vary in size and form depending upon the weapon that will be used. Different forms of propellant grains include: strings; balls; sheets or cords; single or multi-perforated cylinders; and cruciform; star perforated, or rosette cylinders, Figure 3-1. Small grains may require no perforation or a single perforation. To provide a greater burning surface, larger grains require more and equally spaced perforations (usually seven). Figure 3-2 depicts relative grain sizes used in some artillery propellants.

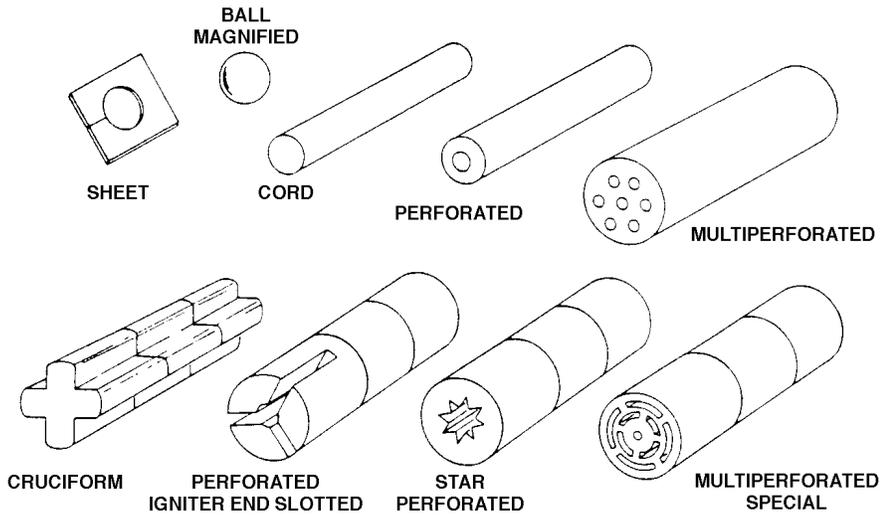


Figure 3-1 Shapes of Propellant Grains

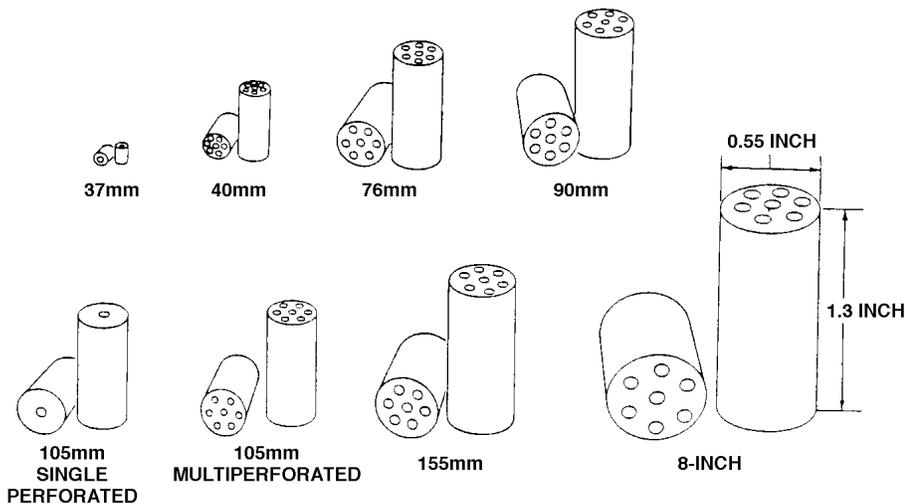


Figure 3-2 Relative Sizes of Propellant Grains

3-2.4.2 Propellant Burning. Nitrocellulose propellant burns relatively slow and smooth when unconfined. However when confined, its rate of burning increases with temperature and pressure. The burning rate is proportional to the propellant free to burn. Therefore, propellants are made into accurate sizes and definite shapes so as not to exceed the permissible chamber pressure of the weapon to be used. Degressive, Neutral and Progressive Burning are as illustrated in Figure 3-3. The following subparagraphs explain the burning of propellant.

a. **Regressive Burning.** As strips and cords burn, the burning surface decreases continuously until the grain is consumed.

b. **Neutral Burning.** A single perforated grain burns in opposite directions. By controlling the initial diameter of the perforation, the total burning surface changes very little during burning.

c. **Progressive Burning.** It is possible to design a triple-perforated grain so burning surface actually increases until burning is nearly completed and slivers are formed. It is possible to make the characteristic more pronounced if the grain is multi-perforated. Figure 3-4 illustrates the progressive burning of multi-perforated propellant grains. When a multi-perforated grain is not completely consumed, the slivers that remain are ejected from

the weapon. The scalloped periphery of the rosette (Walsh) grain reduces the amount of slivers produced by the multi-perforated grain.

3-2.4.3 Deflagration. When an explosive particle reaches a significant temperature, deflagration (spattering) of the particles from the surface occurs prior to decomposition. Heat output is sufficient for the reaction to proceed and be accelerated. At the temperature (called ignition temperature) deflagration begins. The mass of finely divided explosives occurs almost simultaneously. The final effect under confinement is explosion. Low explosives (such as loose black powder and pyrotechnic compositions) cause a violent deflagration (explosion). If confinement is sufficient, nitrocellulose propellants can burn and deflagrate so rapidly as to detonate.

3-2.4.4 Qualifications. To qualify for military use, a low explosive (propellant) must evidence a controlled burning rate and have a capability for instant ignition and combustion. The propellant must be stable over extended periods of storage under normal conditions. There must be a balance for complete combustion, producing a minimum amount of residue, weapon bore erosion, minimal toxic and explosive hazard. The propellant must be capable of withstanding mechanical shock incident to loading, handling, and land transportation by commercial and military carriers.

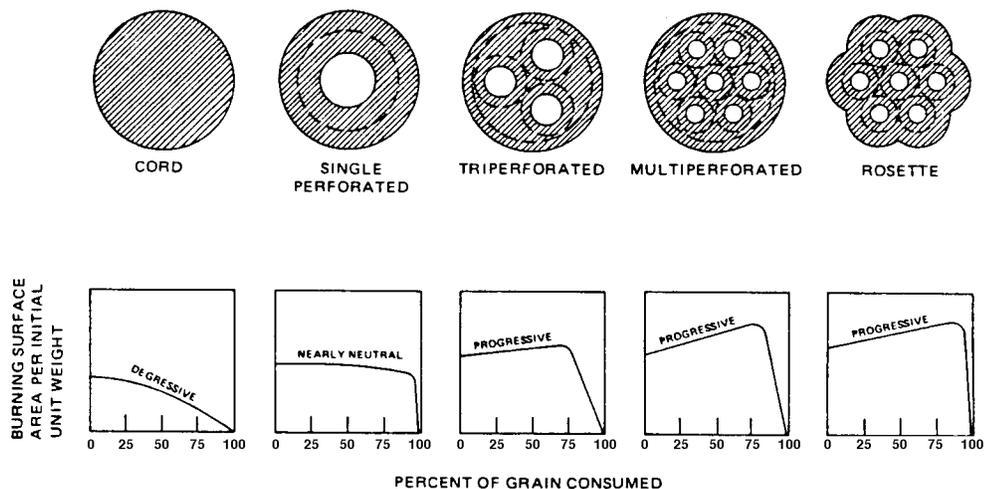


Figure 3-3 Burning of Propellant Grains

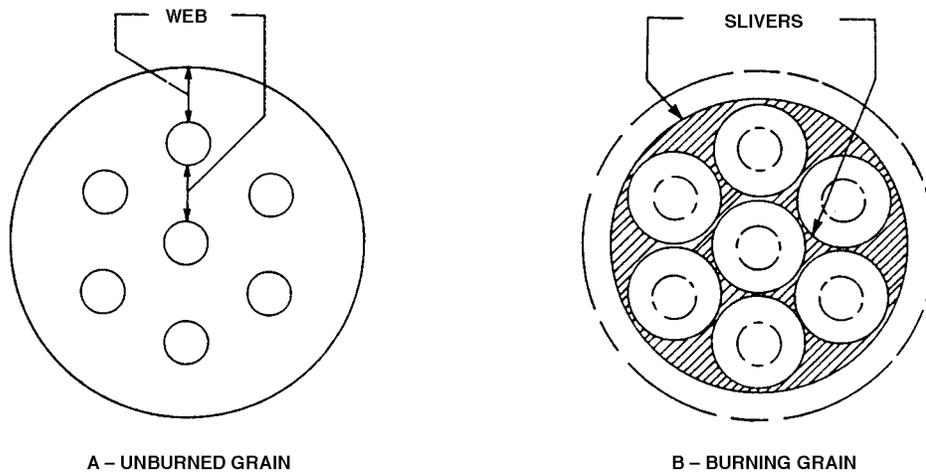


Figure 3-4 Progressive Burning of Propellant Grains

3-3 EXPLOSIVES

3-3.1 General. An explosive is a material that can undergo a very rapid self-propagating decomposition or a varied self-propagating decomposition with the formation of more stable materials. It produces the liberation of heat and the development of a sudden pressure effect. An explosive may be solid, liquid, or gaseous; a chemical compound; a mixture of compounds; or a mixture of compounds and one or more elements. Military explosives are chiefly solids or mixtures formulated to be solid at normal temperatures.

3-3.2 Low Explosives. Rates of explosive transformation have been found to vary greatly. One group, known as low explosives, includes smokeless and black powder. Low explosives have been found to undergo combustion rates that vary from a few centimeters (one inch) per minute to approximately 400 meters (1,312 feet) per second. By physical conditioning, some high explosives (such as nitrocellulose) can be rendered capable of functioning as low explosives when ignited.

3-3.3 High Explosives. A high explosive is characterized by the extreme rapidity under which decomposition (detonation) occurs. High explosives are usually nitration products of such organic substances as toluene, pherol, pentaerythritol, amines, glycerin, and starch. Some high explo-

sives may be nitrogen containing inorganic substances or mixtures. A high explosive may be a pure compound or an intimate mixture of several compounds with additives [such as powdered metal (aluminum), plasticizing oils, wax, etc.] that impart desired stability and performance characteristics.

When initiated by a blow or shock, a high-explosive decomposition will be almost instantaneous, either in a manner similar to extremely rapid combustion or with rupture and molecule rearrangement. In either case, the gaseous and solid products of reaction are produced. The disruptive effect of the reaction makes some explosives valuable as a bursting charge but precludes their use as propellants. This is because the gases that form would cause development of excessive pressure and burst the weapon barrel.

3-3.3.1 Explosive Train Booster. Figure 3-5 is an example of the detonating wave amplified by use of a booster. When initiated by firing pin stab action or a flame, the detonator sets up a high explosive wave. If that wave is too small and weak, it will not initiate the high-order detonation in the bursting charge. When a booster is placed between the detonator and bursting charge, it picks up the small explosive wave from the detonator. The booster amplifies the wave and initiates the bursting charge, resulting in a high order detonation.

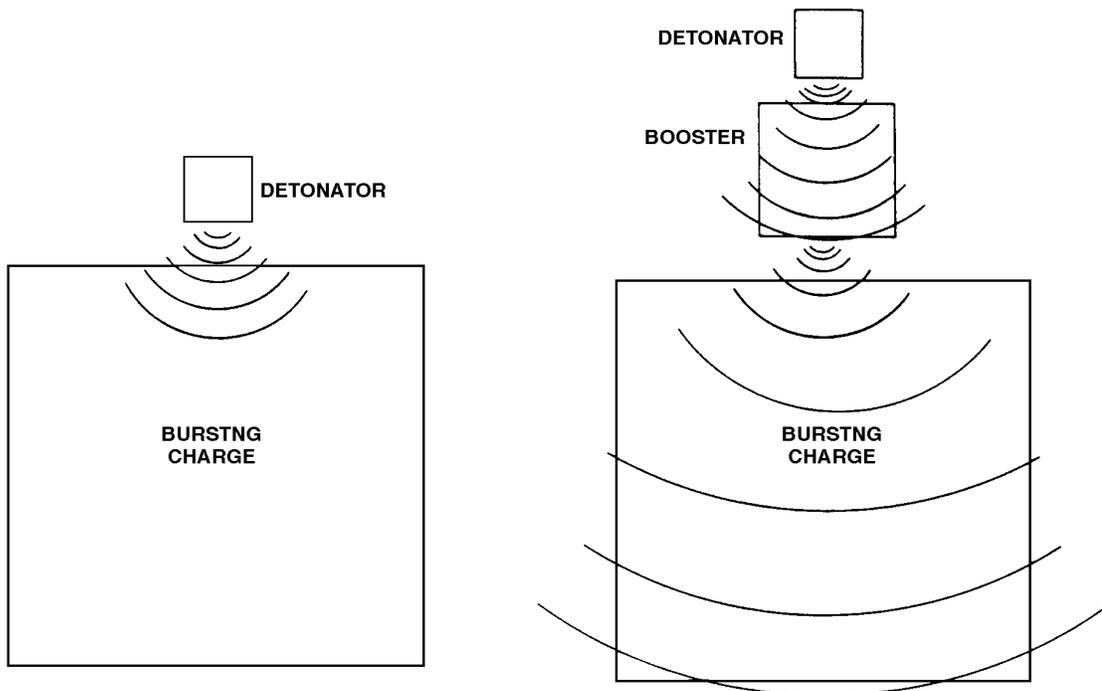


Figure 3-5 Detonating Wave Amplified by Use of a Booster

3-3.3.2 High-Explosive Classification. Initiation sensitivity determines the classification of high explosives. The classifications are initiating, booster, or bursting explosives as described in the following paragraphs.

a. **Initiating Explosives.** Under normal conditions, initiating explosives will not burn. They are however, extremely sensitive to shock, friction, and heat, and will detonate if ignited. Due to their sensitivity, they are used for initiating and intensifying high order explosions. Types of initiating explosives include, but are not limited to mercury fulminate, lead azide, lead styphnate, and DDNP.

b. **Booster Explosive.** Examples of explosives of the booster type include tetryl and cyclotrimethylenetetramine (RDX). They have an intermediate sensitivity between initiating explosives and bursting charge explosives. Booster explosives are sensitive to shock, friction, and heat, and may detonate when burned in large quantities.

c. **Bursting Explosives.** Bursting explosives include ammonium picrate (explosive D), Trinitrotoluene (TNT), tetryl, pentolite, Composition B (Comp B), and others in that class.

3-3.3.3 Explosive Train Components. Figure 3-6 illustrates the various arrangements of explosive train components. The basic propellant train is shown in Example A. To gain control of the time and place of the explosion, it is necessary to incorporate other components in the explosive train. The desired action may be a burst in the air, a burst instantly upon impact with the target, or a burst shortly after the projectile has penetrated the target. The components giving the various actions may be a primer, a black powder delay pellet or train, an upper detonator, or any combination of those components. Arrangement of the components does not change the basic chain. The other components are simply placed in front of the basic chain.

a. Example B and C illustrate that placing a primer and a black powder time-train in front of the basic chain causes the projectile to burst in the air. When the projectile leaves the weapon (or the bomb is dropped), the primer ignites the time-train rings. After the time-train rings burn the required time, the primer initiates action of the detonator-booster and bursting charge.

b. When initiating the projectile simultaneously with target impact, an instantaneous action is necessary. Example D illustrates how this is accomplished. The effect is obtained by placing an upper detonator in the extreme front of the flash tube. Combined with that is a lower detonator in the body near the booster charge. This transmits the detonating wave instantly to the bursting charge.

c. For the projectile to penetrate the target and then burst requires a delay action. That action occurs by placing a primer and a delay element ahead of the detonator as shown in Example E.

d. A variation of the high explosive train is found in chemical projectiles. In that train there is no large bursting charge because it is only necessary to rupture the projectile. When the projectile is ruptured the chemical contents simply escape. The actual bursting of the projectile is accomplished by an enlarged booster called a bursting charge. The charge is contained in a tube running through the center of the projectile.

3-3.4 Explosive Train. An explosive train consists of combustibles and explosives arranged so a small amount of energy is built up to transform a small impulse into one sufficiently large to function as a main charge or assure a high-order detonation for a bursting charge. A fuze explosive train may consist of a primer, a detonator, a delay, a relay, and a lead and booster charge. Depending upon the needs, one or more of those may be omitted or combined.

3-3.4.1 Bursting Charge. The addition of a bursting charge makes the explosive train into a bursting charge explosive train. Another explosive train is the propelling charge explosive train. This explosive train may consist of a primer, an igniter, or ignition charge, (usually black powder) and some type of propellant. Figure 3-7 illustrates the explosive trains. They are depicted as: explosive arrangement in a cartridge before firing; the propelling charge explosive train upon firing; and the bursting charge explosive train upon impact.

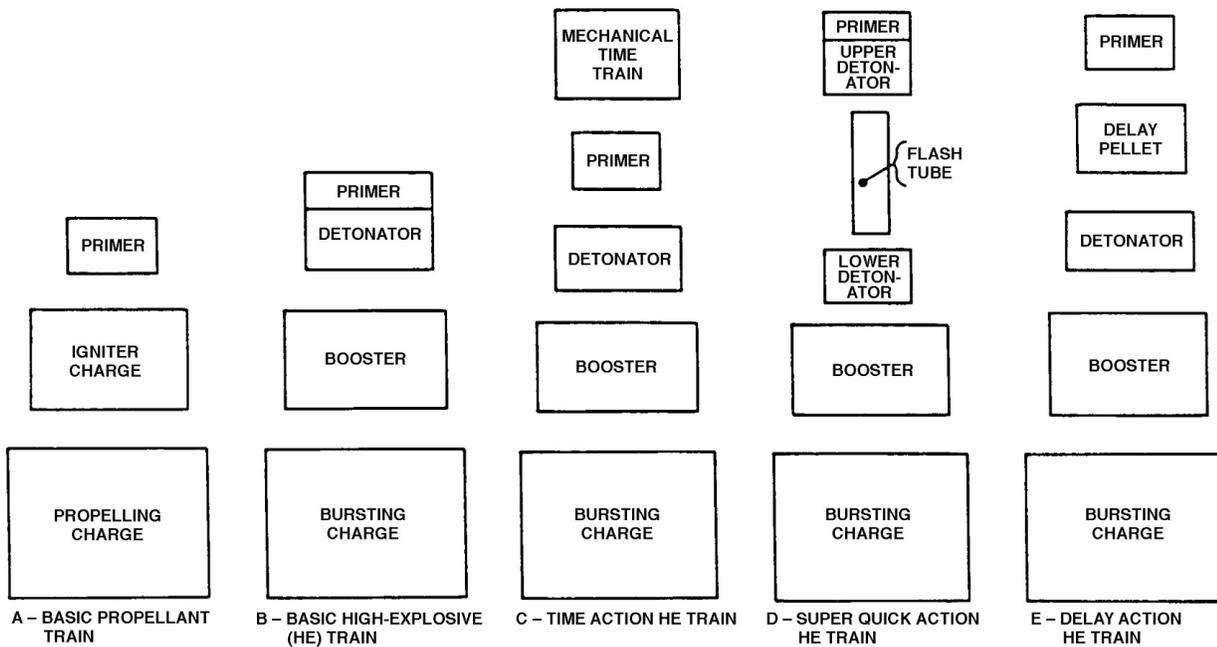


Figure 3-6 Schematic Arrangement of Explosive Train Components

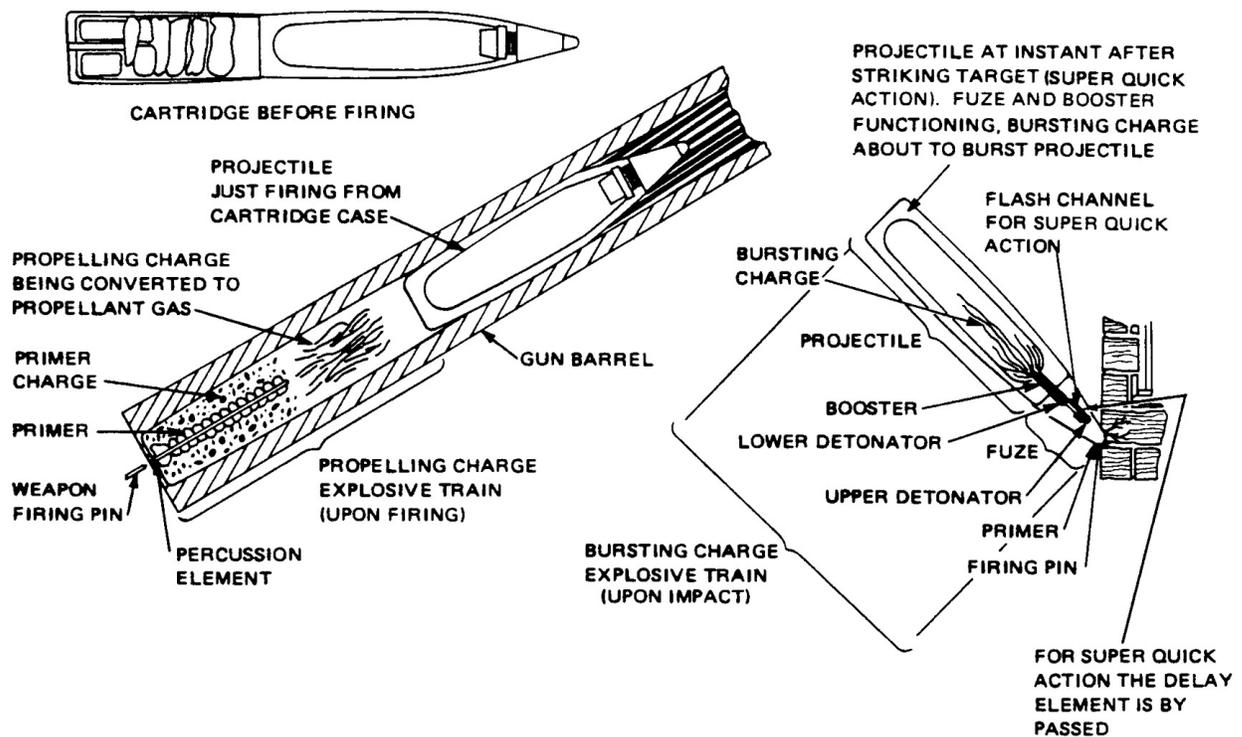


Figure 3-7 Explosive Trains

3-3.4.2 Small Arms Ammunition. In small arms ammunition, explosive trains consist of a percussion primer and a relatively small propelling charge. The weapon firing pin explodes the primer. The resulting flame passes through the vent leading to the powder chamber and ignites the propelling charge. The expansion of the resultant gasses propels the bullet.

3-3.4.3 Artillery Ammunition. The low-explosive train in artillery ammunition includes an auxiliary charge of black powder referred to as the primer charge or igniter charge. This charge is located between the primer and propelling charge. It is necessary to intensify the small flame produced by the primer composition sufficiently to initiate combustion of the large quantity of propellant. The primer (igniter charge) is contained in the body of the primer to make one assembly of the primer and the primer charge percussion element. In some instances the primer or igniter charge may be divided between the primer body and the igniter pad that is attached to separate loading propelling charges.

3-3.5 Definitions. The definitions of the explosive train components are briefly described in the following paragraphs.

3-3.5.1 Primer. A relatively small and sensitive initial explosive train component. Upon being actuated, the primer initiates functioning of the explosive train. The primer by itself will not reliably initiate high-explosive charges. Primers are classified by the method of initiation: percussion, stab, electric, friction, or chemical.

a. A primer composition is an explosive that is sensitive to a blow such as that imparted by a firing pin. It transmits shock or flame to another explosive, a time element, or a detonator. Most military primer compositions consist of mixtures of one or more initial detonating agents, oxidants, fuels, sensitizers, and binding agents.

b. Many primer compositions contain potassium chlorate, lead thiocyanate, calcium silicide, antimony sulfide, lead azide, lead styphnate, mercury fulminate, and a binding agent. The potassium chlorate acts as an oxidizing agent. The lead

thiocyanate and calcium silicide act as the fuel and a desensitizer to the chlorate. The explosive acts as the detonating agent. Other materials, such as ground glass and carborundum, may be added to increase the sensitivity to friction.

c. Priming compositions for electric primers and squibs may contain barium nitrate as the oxidizing agent instead of potassium chlorate, and lead styphnate or diazodinitrophenol (DDNP) as the initiating explosive. Primer mixtures are used in percussion elements of artillery primers, in fuzes, in small arms primers, and as the upper layer of a detonator assembly.

3-3.5.2 Igniter. A device containing a composition (usually a form of black powder) that readily burns. An igniter is used to amplify initiation of a primer in the functioning of a fuze.

3-3.5.3 Detonator. An explosive train component that can be activated by a nonexplosive impulse or primer action. A detonator is capable of reliably initiating secondary high-explosive charges. When activated by a nonexplosive impulse, a detonator incorporates the function of a primer. Detonators are classified as percussion, stab, electric, friction, flash, or chemical, according to their method of initiation.

3-3.5.4 Delay. An explosive train component that introduces a controlled time delay in the functioning of the train.

3-3.5.5 Relay. An element of a fuze explosive train that amplifies an otherwise inadequate output of a prior explosive component. Also called a booster. A relay reliability initiates a succeeding train component. Relays contain a small single-explosive charge (such as lead azide) and are not usually employed to initiate high-explosive charges.

3-3.5.6 Lead. An explosive train component that consists of a column of high explosives, usually small in diameter. It transmits detonation from one detonating component to a succeeding high-explosive component. It is generally used to transmit detonation from a detonator to a booster charge.

3-3.5.7 Booster Charge. The final high-explosive component of an explosive train that amplifies the detonation from the lead or detonator. A booster charge reliably detonates the main high-explosive charge of the munition.

3-3.5.8 Bursting Charges. An encased high explosive designed to break the casing into small fragments.

3-4 BLACK POWDER

WARNING

BLACK POWDER IS VERY SENSITIVE TO FRICTION, HEAT, AND SHOCK. IT IS ONE OF THE MOST DANGEROUS EXPLOSIVES TO HANDLE. IT RETAINS ITS EXPLOSIVE PROPERTIES INDEFINITELY IF KEPT DRY. BLACK POWDER DETERIORATES RAPIDLY WITH ABSORPTION OF MOISTURE AND MAY BE DESENSITIZED BY WATER. HOWEVER, SEPARATING THE WATER FROM THE RESIDUE PERMITS THAT POWDER TO DRY AND REGAIN EXPLOSIVE PROPERTIES. COMBUSTIBLE MATERIAL THAT HAS ABSORBED LIQUIDS LEACHED FROM BLACK POWDER CONSTITUTES A SEVERE FIRE HAZARD AND MAY BE EXPLOSIVE. TO AVOID SERIOUS INJURY OR LOSS OF LIFE, EXERCISE EXTREME CARE WHEN HANDLING BLACK POWDER.

3-4.1 General. Black powder is the name originally applied to a mixture of charcoal, sulfur, and potassium nitrate. Now it applies to compositions containing bituminous coal (instead of charcoal) and sodium nitrate (instead of potassium nitrate).

Standard black powder contains 74.0 ± 1.0 percent potassium nitrate, 15.6 ± 1.0 percent sulfur, and 10.4 ± 1.0 percent charcoal. Its principal combustion products are CO_2 , CO , N_2 , K_2CO_3 , K_2SO_4 ,

and K_2S . The sodium nitrate black powder that is used for military purposes and blasting operations is composed of 72 ± 2 percent sodium nitrate, 16 ± 2 percent bituminous coal, and 12 ± 2 percent sulfur. The powder grains are glazed with graphite.

3-4.1.1 Characteristics. The appearance of black powder varies from a very fine powder to dense pellets. This is because of the graphite glazed surface.

a. **Burning Rate.** The burning rate of black powder is reflected by the type of charcoal used in the manufacturing process. Black powder made from willow or alder charcoal burns much more rapidly than that made from oak charcoal. Confining black powder results in an increase in the burning rate. A decrease in the burning rate is caused by:

(1) an increase in the percentage of nitrate with corresponding decrease in the percentage of charcoal;

(2) the presence of more than 0.02 percent moisture;

(3) simple mixing of ingredients rather than milling of ingredients; and,

(4) Substitution of sodium nitrate for potassium nitrate.

b. **Granulations.** Military black powder is manufactured in a range of grain sizes from coarser than 4 mesh to finer than 200 mesh. Sodium nitrate black powder for military use is granulated in three classes according to particle size. The three classes are:

(1) A – saluting charges;

(2) B – practice bombs;

(3) C – torpedo impulse charges.

c. **Sensitivity.** Black powder is very sensitive to ignition by flame, incandescent particles or electric spark. Black powder ignites spontaneously at approximately 540°F (282°C) and is less sensitive than tetryl. Sodium nitrate black powder is slightly less sensitive to impact than potassium nitrate black powder.

d. **Stability and Moisture Absorption.** Black powder is highly stable in the absence of moisture. Its ingredients are nonreactive with each other,

even at a temperature of 250°F (116°C). Heating black powder above 160°F (71°C) tends to vaporize the sulfur, resulting in a change of composition or composition uniformity. Black powder picks up moisture more because of the charcoal present than because of the moisture absorbing nitrate. While moisture does not cause black powder to become unstable, it can react with and corrode such metals as steel, brass and copper. When sodium nitrate is substituted for potassium nitrate in the composition of black powder it will readily pick up moisture. Both black powders are comparable in stability.

3-4.1.2 Applications. Black powder is used in ignition of rocket and missile propulsion units. Other uses include primers, delay elements, bursting charges, saluting charges, spotting charges, expelling charges, bursters, ignites, smoke-puff charges, and catapult charges. Other uses are:

a. **Ignition.** Ignition charges for smokeless powder may use black powder grains glazed with graphite, particularly in artillery and Navy gun ammunition. Because the burning of black powder produces many finely divided incandescent solid particles, it is a better igniting material than finely divided smokeless powder.

b. **Fuzes.** The material for loading the time-train fuze rings may be black Powder. Because standard composition fuze powder burns too rapidly for use in some fuzes, a slow burning black powder composition is used. This composition consists of:

(1) Potassium nitrate – 70.0 ± 1.0 percent;

(2) Semibituminous coal – 14.0 ± 1.0 percent;

(3) Sulfur – 16.0 ± 1.0 percent.

Like fuze powder of the standard composition, slow burning fuze powders are not glazed with graphite.

c. **Special Fuzes.** The most common fuze type burns at a rate of approximately 1 foot (30 centimeters) in 40 seconds. Black powder used in the manufacture of time blasting or safety fuzes may have the standard black powder composition. It may be a modification of the proportions of those ingredients and may contain such inert diluents as graphite, brick dust, or borax.

d. Squibs. Squibs for military use function by heat developed by an electrical resistance wire. The squib ignites a potassium nitrate black powder, a sodium nitrate black powder, or an ignition composition. That, in turn, ignites the main charge of black powder. In some cases, the black powder charge is ignited by a matchhead composition.

3-5 DEMOLITION AND FRAGMENTATION EXPLOSIVES

3-5.1 General. A variety of explosives can be used in the application of demolition and fragmentation explosives. The following paragraphs give a brief description of the characteristics and uses.

3-5.2 Composition A. Originally, Composition A was a semiplastic mixture that contained 91 percent RDX and 9 percent beeswax. That designation was changed to Composition A-2 when the beeswax was replaced by a wax derived from petroleum and the method of adding the desensitizer was changed. Because of changes in the method of manufacture and in granulation of RDX, the composition has been redesignated as Composition A-3. It is a granular form resembling tetryl and usually buff colored.

3-5.2.1 Composition A-3. Composition A-3 is 91.0 percent RDX, 9.0 percent desensitizer. Military Specification MIL-C-440 is the controlling document for its formulation and characteristics. This composition is 30 percent stronger than TNT. Composition A-3 is press-loaded in 20mm, 37mm, and 40mm cartridges. It is also used as a filler in high-explosive plastic rounds.

3-5.2.2 Composition A-4. Composition A-4 is 97.0 percent RDX, 3.0 percent desensitizer. Military Specification MIL-C-440 is the controlling document for its formulation and characteristic. This composition is utilized in the MK 211 MOD 0 .50 caliber cartridge.

3-5.3 Composition B. A mixture of 60 percent RDX, 39 percent TNT, and 1 percent desensitizer. Its use is as an authorized filler for Army-Navy standard mines, antitank ammunition, and demolition charges. Its color varies from dirty white to light yellow to brownish yellow. It is less sensitive than tetryl but more sensitive than TNT. With

respect to initiation and sensitivity, it ranks between TNT and RDX. With respect to blast effect, it is inferior only to tritonal and torpex. Composition B is prohibited from use in new development.

3-5.3.1 Composition B-2. Changing the composition to 60 percent RDX, 40 percent TNT, and excluding the wax, yields Composition B-2. This is a nonstandard explosive. Composition B-4 is a composition of 60 percent RDX, 39.5 percent TNT, and 0.5 percent calcium silicate and used as a burster in chemical projectiles.

3-5.4 Composition C. A plastic explosive consisting of a mixture of 88 percent RDX and 12 percent nonexplosive plasticizer composition. It is brown in color, plastic in form, and about the consistency of putty. It has a tendency to leak (sweat) out the plasticizing oils, leaving pure RDX, which is too sensitive for use in the field.

3-5.4.1 Composition C-2. A putty-like composition consisting of 80 percent RDX and a 20 percent explosive plasticizer composition. It is about 35 percent stronger than TNT and was developed as a demolition charge replacement for Composition C.

3-5.4.2 Composition C-3. Changing the composition to 77 percent RDX and 23 percent explosive plasticizer yields Composition C-3. As an explosive for producing blast effect, it is slightly inferior to Comp B and considerably less sensitive than TNT.

a. Composition C-3 was designed to replace Composition C-2. Its principal use is as a commando and demolition explosive or as a filler in some types of munitions. It may not always be detonated by a No. 8 blasting cap, but it can be detonated by the special Corps of Engineers blasting cap. If its plasticity is lost by long storage at low temperatures, it may be restored to satisfactory plasticity by immersing in warm water and molding with the hands.

b. It must not be exposed to open flame as it ignites easily and burns with an intense flame. If it is burned in large quantities, it may explode and produce poisonous gases in such quantities that its

use in closed spaces is dangerous. Composition C-3 is hygroscopic, volatile at high temperatures and hardens at temperatures below -20°F (-29°C).

3-5.4.3 Composition C-4. A mixture of 91 percent RDX and 9 percent plastic nonexplosive composition. It is a semi-plastic, putty-like material that is dirty white to light brown in color. It is less sensitive, more stable, less volatile, and more brisant than Composition C-3. It is a non-hygroscopic material that is used in demolition blocks and has specialized uses. It will exude when stored above 170°F (77°C) and harden below -70°F (-57°C).

3-5.5 Octol. An explosive composed of cyclo-tetramethylene tetranitramine (HMX) and TNT in varying proportions. It is almost as powerful an explosive as RDX and is the high-explosive filler in 40mm grenade projectiles as well as the M72 LAW and AT-4. OCTOL is prohibited as an explosive for new applications. Variations of the composition are as follows:

- a. OCTOL 70/30: 70 percent HMX, 30 percent TNT; and
- b. OCTOL 75/25: 75 percent HMX, 25 percent TNT.

3-5.6 Pentolite. Pentolite is a 50/50 mixture of pentaerythrotol tetranitrate (PETN), and TNT. In Germany it is known as pentritol and pentol. Pentolite has mostly been replaced by Comp B.

3-5.7 Plastic Bonded Explosive (PBX). PBXs are relatively insensitive formulations of high explosives and binder(s). The advantage with these types of explosives is shipboard safety in transportation. The following formulations were developed in the USN Insensitive Munitions Program for new applications.

- a. PBXN-5 is a booster explosive material which is a pressable PBX composed of RDX, Aluminum and binder.
- b. PBXN-110 is a bursting explosive material which is a castable PBX composed of HMX and an inert polyurethane binder.

3-5.8 RDX. RDX, a white crystalline solid, is one of the most powerful explosives. It has a melting point of 397°F (203°C) and is very stable. It is more easily initiated by mercury fulminate than tetryl. RDX is commonly known in the U.S. as Cyclonite, Hexogen in Germany; T4 in Italy; and Tanoyaku in Japan. It has been used mainly in mixtures with other explosives, but can be used alone as a sub-booster, booster, or bursting charge. To permit case loading, it is combined with nitrohydrocarbon and with waxes or oils for press loading. When properly stored, it has a high stability.

WARNING

AMMUNITION OR EXPLOSIVES THAT SHOW SIGNS OF EXUDATION ARE HAZARDOUS AND HAVE THE POTENTIAL TO CAUSE INJURY OR DEATH. ONLY QUALIFIED EOD PERSONNEL CAN HANDLE AND DISPOSE OF THESE ITEMS.

3-5.9 Tetryl. Tetryl (2, 4, 6-trinitrophenylmethylnitramine) is a fine yellow crystalline material. It melts, decomposes, and finally explodes when heated. It burns rapidly, is more easily detonated than TNT or explosive D, and is more sensitive than picric acid.

- a. Tetryl is detonated by friction, shock, or spark and is insoluble in water (practically nonhygroscopic). It is stable at all temperatures encountered in proper storage and toxic when taken internally. On contact, it discolors skin tissue (resembles tobacco stain) and causes dermatitis.
- b. Brisance tests show tetryl to have a very high shattering power, greater than TNT and exceeded only by RDX in the standard military explosives. It is the standard booster explosive.
- c. When compressed, it is sufficiently insensitive to be used as a booster explosive. The violence of its detonation assures a high-order bursting charge detonation.

d. Used in the form of pressed pellets, tetryl is the standard bursting charge for 20mm and 37mm projectiles. Although it readily detonates in small caliber cartridges, it withstands the force of setback in the weapon.

e. When tetryl is used in detonators, it is pressed into the bottom of the detonator shell and covered with a small priming charge of mercury fulminate, lead azide, or other priming initiators.

3-5.10 TNT. TNT (2, 4, 6-trinitrotoluene) is a constituent of such explosives as amatol, pentolite, tetrytol, tritonal, picratol, and Comp B. In a refined form, it is one of the most stable high explosives. In the pure state, it is crystalline and nearly white, resembling a light brown sugar.

a. TNT is relatively insensitive to shock or friction and can be stored indefinitely. When unconfined and ignited by a flame, it burns slowly and does not explode. It does however, emit a heavy, oily, black smoke. The burning or rapid heating of large quantities in a closed vessel may cause a violent detonation.

b. TNT is non-hygroscopic and does not form sensitive compounds with metals. When exposed to alkalies it forms unstable compounds that are very sensitive to heat and shock.

c. The melting point of standard grade 1 TNT is 176°F (80°C). When melted and poured into a projectile or bomb, TNT forms a solid crystalline explosive charge. To assure complete detonation, cast TNT requires a booster charge of compressed tetryl or an explosive of similar brisance. As a military explosive it is very satisfactory. Ammunition loaded with TNT can be stored, handled, and shipped with comparative safety.

3-5.10.1 Exudation. Ammunition loaded with TNT and stored where the temperature is approximately 160°F (71.11°C) or above, may exude an oily brown liquid. The exudate can ooze out around the threads on the projectile nose and the seams of packaged dynamite, forming pools on the floor. It may contain particles of TNT and is highly flammable. Handling and removing is only by qualified personnel.

3-5.10.2 Used as Bursting Charge. High explosive rounds, bombs, mines, and parts of certain rounds and bomb clusters may use TNT as a bursting charge. The TNT is either the sole explosive or sometimes it is in a mixture such as tritonal or Composition B. Hand grenades may use flake TNT as the bursting charge.

3-5.10.3 Used as Demolition. TNT is used to demolish bridges, railroads, fortifications, and other structures. It is used in the form of a large charge or a small, highly compressed block enclosed in a waterproof fiber container that protects the TNT from crumbling during handling.

3-5.10.4 Used as Blasting Charge. TNT is suitable for all types of blasting. It produces about the same effect as an equal weight of 50- to 60-percent grade dynamite. It is also used as a surround in some amatol-loaded ammunition.

3-6 INITIATING AND PRIMING EXPLOSIVES

3-6.1 DDNP. This explosive is used in military primer compositions, detonators, and extensively in commercial blasting caps. It is nonhygroscopic and greenish-yellow to brown in color. It is extremely sensitive to impact; however, its sensitivity to friction is about the same as lead azide. DDNP is a better initiator of less sensitive high explosives (such as explosive D and cast TNT). For the more sensitive high explosives, lead azide is superior to DDNP. If pressed into a blasting cap shell with a reinforcing cap and a black powder safety fuze crimped in the shell, a charge of DDNP will undergo detonation when ignited. It is also used in loading fuze detonators and manufacturing priming compositions.

3-6.2 Lead Azide. One of the most stable high explosives used to detonate high explosives. It has replaced mercury fulminate because it flashes at much higher temperatures, stands up better in storage, and is less hazardous to manufacture. To detonate an equal amount of TNT requires a smaller amount of lead azide than mercury fulminate. Lead azide must be hermetically sealed if used in conjunction with copper or brass components.

Otherwise, cuprous azide, a highly sensitive compound could be formed with possibly dangerous consequences.

3-6.2.1 Dextrinated Lead Azide. Dextrinated lead azide a mixture of 93 percent lead azide, 4 percent lead hydroxide, and 3 percent dextrin and impurities. This is in contrast to crystalline (pure) lead azide. Dextrinated lead azide is a white to beige powder-like material that can be compressed and used in primer mixtures, detonators, and fuzes.

3-6.3 Lead Styphnate. Lead styphnate (2, 4, 6-trinitronesorcinat) is widely used commercially as an initiator for both foreign and domestic explo-

sives. It is pale straw, deep yellow, orange yellow, or reddish-brown in color. Lead styphnate is slightly less sensitive to impact than mercury fulminate and has about the same strength and stability as lead azide. It is more easily ignited by an electric spark than mercury fulminate, lead azide, or DDNP. In primer compositions, it offers sensitivity, stability, and ample flame. As a primer, it produces a very good flame. It is incapable of initiating the detonation of any military high explosive except PETN. Store lead styphnate in conductive rubber containers under water.

CHAPTER 4

SMALL ARMS AMMUNITION

4-1 INTRODUCTION

This chapter covers the various small arms ammunition available to the fleet for service use. The small Arms ammunition described is a cartridge or a family of cartridges. Their intended use is in various types of mounted, hand-held, or shoulder fired weapons, .22 through .50 caliber.

4-2 CARTRIDGES

4-2.1 General. A small arms cartridge is an assembly consisting of a cartridge case, a primer, a quantity of propellant, and a bullet. A paper closure disk instead of a bullet seals rifle grenade and blank cartridges. Dummy cartridges consist of a cartridge case and a bullet. Some dummy cartridges use an inert granular material to simulate the weight and balance of live cartridges. Figure 4-1 illustrates a typical cartridge and its component terminology.

WARNING

SMALL ARMS AMMUNITION IS A FIRE HAZARD AND CAN BE A MISSILE HAZARD RESULTING IN INJURY OR DEATH.

WARNING

EVEN WHEN FIRING BLANK AMMUNITION, BORE OBSTRUCTIONS CAUSE EXCESSIVE PRESSURE TO DEVELOP. THIS MAY RESULT IN DAMAGE TO EQUIPMENT, SURROUNDING AREA, POSSIBLE INJURY OR DEATH.

4-2.1.1 Case. Steel, aluminum, zinc, and plastic materials were experimentally used for manufacturing cartridge cases. However, a brass composition of 70 percent copper and 30 percent zinc is the most commonly used material for mili-

tary cartridge cases. 12 gauge shot-shell hulls use brass, paper or plastic. Military-type .410 bore shotshell hulls use aluminum or plastic.

Based upon the case type, small arms cartridges are classed as center-fire or rimfire, Figure 4-2. In the rimfire cartridge, the priming mixture is loaded (spun) in the flat rim at the case base. The rim serves to locate the cartridge in the chamber properly and enables extraction of the case. In the center-fire cartridge, the primer is in a small well (pocket) in the center of the case head. The identification nomenclature for center-fire cartridges are either rimless, semi-rimmed, or rimmed class.

4-2.1.2 Propellant. Cartridges are loaded with various propellant weights that impart sufficient velocity, within safe pressure, to obtain the required ballistic projectile performance. The propellants are either a single-base (nitrocellulose) or double-base (nitrocellulose and nitroglycerine) composition. The propellant may be a single-cylindrical or multiple-perforation, a ball, or a flake. Most propellants are coated to assist the control of the combustion rate. A final graphite coating facilitates propellant flow and eliminates static electricity in loading the cartridges.

4-2.1.3 Primer. Center-fire small arms cartridges contain a percussion primer assembly. The assembly consists of a brass or gilding metal cup. The cup contains a pellet of sensitive explosive material secured by a paper disk and a brass anvil. The weapon firing pin striking the center of the primer cup base compresses the primer composition between the cup and the anvil. This causes the composition to explode. Holes or vents located in the anvil or closure cup allow the flame to pass through the primer vent, igniting the propellant.

Rimfire ammunition (such as .22 caliber cartridges) does not contain a primer assembly. The primer composition is spun into the case rim and is in direct contact with the propellant. The firing pin strikes the cartridge case rim and initiates the primer explosion.

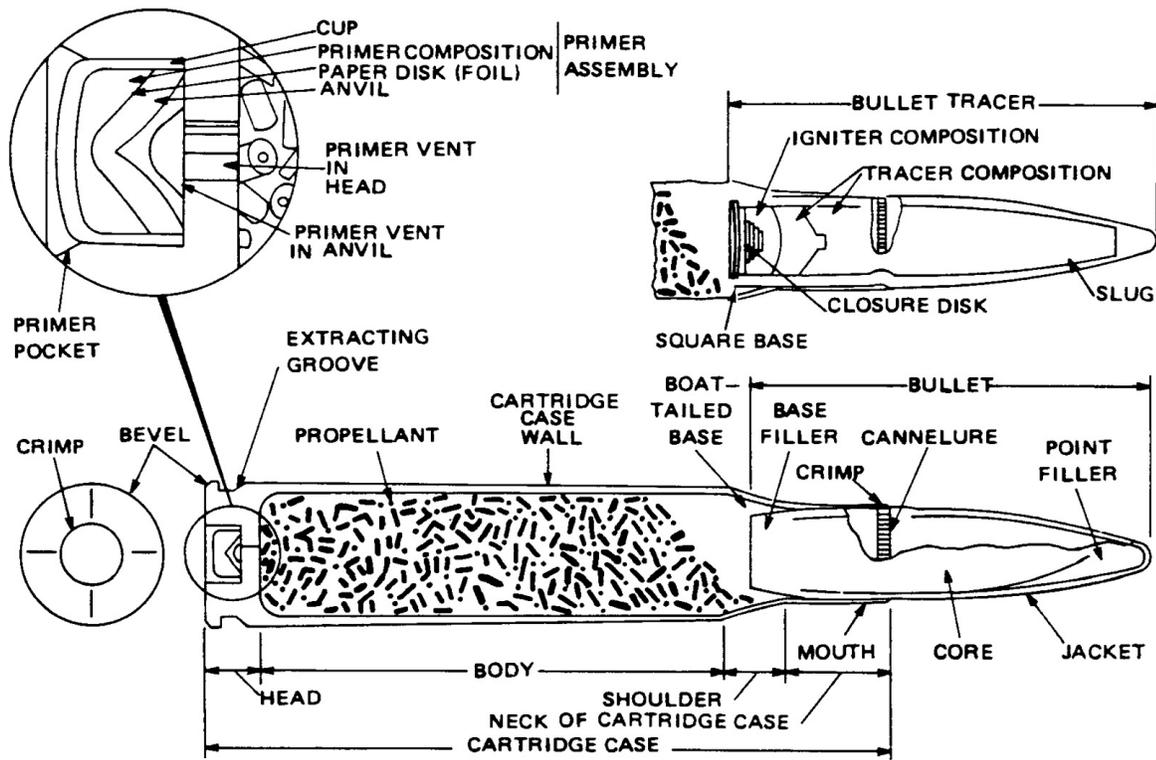


Figure 4-1 Typical Cartridge

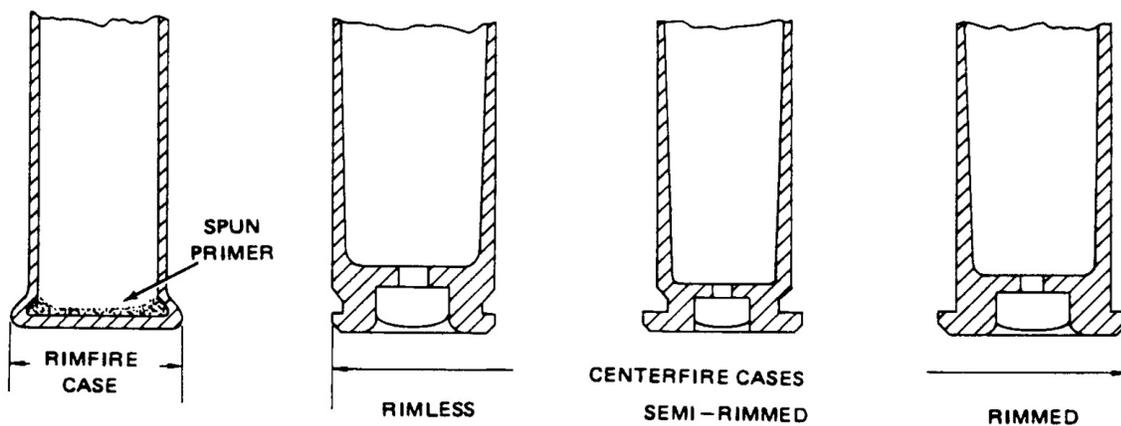


Figure 4-2 Types of Cartridge Cases

4-2.1.4 Bullet. Lead bullets were originally manufactured in the shape of a ball. With the advent of rifling in weapons, the ball was replaced by a cylindrically shaped lead bullet that engaged the rifling. Except in special cases, .22 through .50 caliber bullets are either lead (lead alloy) or assemblies of a jacket and a lead or steel core. The lead used in lead-alloy bullets is combined with tin, antimony or both for bullet hardness. The alloying reduces barrel leading and helps prevent the bullet from stripping (jumping) the rifling. Jacketed bullets are used to obtain high velocities and are better suited for automatic and semiautomatic weapons because the lead bullet may be damaged by the loading. A bullet jacket may be either gilding metal, gilding metal-clad steel, or copperplated steel. In addition to a lead or steel core, they may contain other components or chemicals that provide a terminal ballistic characteristic for that bullet type. Some projectiles may be manufactured from plastic, wax or plastic binder and metal powder, two or more metal powders, or various combinations thereof.

Shotgun cartridges contain a charge of small pellets (balls) of lead alloy. The pellets vary in size from 0.08 inch to 0.33 inch (.20 to .84 centimeters) in diameter.

4-2.2 Cartridge Classification. The following subparagraphs classify small arms cartridges depending upon their case type and purpose.

4-2.2.1 Ball Cartridges. The ball cartridge is for use in rifles, pistols, carbines, revolvers, machine guns, and sub-machine guns against personnel and unarmored targets. The bullet (normally a metal jacket and a lead slug) is for general-purpose combat and training purposes. The .50 caliber ball bullet and 7.62mm ball bullet contain soft steel cores. The M855 5.56mm ball bullet contains a lead core with a steel tip.

4-2.2.2 Tracer Cartridges. The primary purpose of the tracer cartridge is to see the line of fire by means of a flame and smoke trail. It permits visible observation of the bullet's in-flight path or trajectory to the point of impact. Other uses include pinpointing enemy targets, igniting flammable materials and for signaling purposes. The tracer element consists of a compressed, flamma-

ble, pyrotechnic composition in the base of the bullet. Upon firing the cartridge, the burning propellant ignites the composition. The base of the bullet emits a bright flame. Depending upon the caliber of the ammunition, the trace burnout will occur between 400 (365 meters) and 1,600 yards (1,463 meters) range.

4-2.2.3 Armor Piercing (AP) Cartridges.

The AP cartridge is for use in machine guns or rifles against personnel, light armored targets, unarmored targets, concrete shelters, and similar bullet resisting targets. The bullets have a jacket and a core of hardened steel alloy (such as tungsten-chromium, tungsten carbide, manganese-molybdenum or tungsten alloy). In addition, the cartridge may have a base filler and/or a lead point filler.

4-2.2.4 Armor Piercing Incendiary (API) Cartridge. The API is a single combination instead of a combination of separate armor piercing and incendiary cartridges for machine guns. The bullets have a jacket and a core of hardened steel alloy (such as tungsten-chromium, tungsten carbide, manganese-molybdenum, or tungsten alloy) and a pointfiller of incendiary mixture instead of lead. Upon impact, the incendiary mixture bursts into flame and ignites the flammable materials.

4-2.2.5 Armor Piercing Incendiary-Tracer (API-T) Cartridge. The API-T cartridge is only for use in the .50 caliber weapon. It can replace the AP and the API cartridges. The bullets have a jacket and core of hardened steel alloy (such as tungsten-chromium, tungsten carbide, manganese-molybdenum, or tungsten alloy). There is a compressed pyrotechnic mixture in the core base cavity. An incendiary mixture between the core point and jacket covers the core.

4-2.2.6 API MK 211 MOD 0 (Multipurpose).

The MK 211 MOD 0 cartridge is a product improvement of the M8-API. It's intended for use in .50 caliber machine guns and other .50 caliber weapons. The projectile has the same ballistic characteristics as the M8-API projectile but differs in internal construction and parts. The MK 211 MOD 0 projectile consists of a copper-alloy jacket housing a steel inner body, a tungsten carbide penetrator core, and a lead sealing disc in the base.

Explosive/incendiary components consist of approximately 9.2 grains (.60 gram) of zirconium particles, 13.1 grains (.85 gram) of I-136 incendiary mix, and 15.4 grains (1.0 gram) of Composition A-4. This Pyrotechnically Initiated Explosive (PIE)-type explosive provides penetration, fragmentation and fire starting capabilities upon functioning.

4-2.2.7 Spotter Tracer Cartridge. The spotter tracer cartridge is for use in coaxially-mounted .50 caliber spotting rifles. The bullet trajectory is approximately the same as that of the 106mm recoilless rifle. It serves as a fire control device to verify weapon sight setting before firing the 106mm recoilless rifle. The bullet contains an impact detonator and an incendiary composition that will identify the point of impact by flash and smoke.

4-2.2.8 Match Cartridge. The match cartridge for use in National and International Match Shooting Competitions. The bullet consists of a copper alloy jacket over a lead slug. The initials NM (National Match) or the word Match on the head face identifies the center-fire match cartridge. A 360° cannellure on the exterior of the cartridge case near the base identifies 7.62mm Match (M852) cartridges. Markings on the cartridge boxes identify rimfire match cartridges.

4-2.2.9 Blank Cartridge. The absence of a bullet distinguishes and identifies the blank cartridge. The purpose of the blank cartridge is to simulate fire, gun salutes, and training maneuvers. Rifles and machine guns equipped with blank firing attachments are the weapons used to fire the blank cartridge, as well as revolvers and pistols.

4-2.2.10 Grenade Cartridge. The purpose of the grenade cartridge is to propel rifle grenades, line throwing projectiles, and ground signals from launchers attached to rifles. The distinguishing features of rifle grenade cartridges are the rosette crimp closure of the case mouth and the absence of a bullet. However, in 5.56mm, the M200 Blank, and the M195 Grenade Cartridge both use a rosette crimp. Assure that the M195 Grenade Cartridge is not substituted for the M200 blank intentionally, or accidentally.

4-2.2.11 Incendiary Cartridge. The incendiary cartridge bullet contains a core of incendiary mixture with a lead-antimony slug at the base end. A hollow steel cylindrical body or clad steel container may be inserted within the jacket. The purpose of the incendiary cartridge is for aircraft and ground weapon use to ignite combustible targets such as vehicles and aircraft fuel tanks. The compressed incendiary mixture ignites upon impact with the target.

4-2.2.12 Dummy Cartridge. The dummy cartridge consists of a cartridge case and a ball bullet. Distinguishing features are: two or more holes drilled in the case; longitudinal corrugations in the case; and, an empty primer pocket. The purpose of the dummy cartridge is for training personnel in the operation of loading, unloading, and, firing the weapon. The dummy cartridge is completely inert.

4-2.2.13 Signal Cartridge. The purpose of the signal cartridge is primarily for ground-to-air signalling purposes. It consists of a cartridge case and a bullet filled with pyrotechnic composition. The ballistic characteristics make it unsuitable for use as a defensive weapon at ranges exceeding 50 yards (45 meters).

4-2.2.14 High-Pressure Test Cartridge. Specially loaded high-pressure test ammunition is producing pressures substantially higher than the maximum average or individual pressure of the corresponding service cartridge. The high-pressure test cartridge is not for field issue. Its only purpose is for proof-firing of weapons such as rifles, pistols, and machine guns at the place of manufacture, test, and repair. Only authorized personnel proof-fire weapons. This is due to the excessive pressures developed by this type of ammunition and the potential danger involved in firing. Personnel conduct tests from fixed and shielded rests with a lanyard or other remote control methods.

4-3 HANDLING AND STORAGE

When handled properly, small arms ammunition is comparatively safe. Packaging provides protection to withstand transportation, handling, and storage conditions normally met during service use. Moisture resistant containers and suitable packing boxes are used to provide protection dur-

ing shipping and storage. Immediately repair any damaged containers and packing boxes, with all markings transferred to the new parts. If materials and equipment is available, seal and air test metal cans and metal liners.

4-3.1 Safety Precautions. The following safety precautions shall be observed when handling and storing small arms ammunition:

a. Do not open ammunition containers until required for use. Open carefully to avoid damage. Reuse boxes as long as they are serviceable.

b. Ammunition removed from airtight containers is susceptible to corrosion, particularly in damp climates. These conditions render the ammunition unserviceable. Protect all cartridges from high temperatures and prolonged periods of exposure to direct sun rays. A combination of high temperature and humid atmosphere is detrimental to the stability of the propellant and the tracer mixture.

c. Protect cartridges from sand, mud, snow, frost, moisture, ice, oil, grease, and other foreign matter. Do not polish cartridges; wipe them with a clean, dry cloth if they get wet or dirty, have light corrosion, or if verdigris forms (a blue or greenish deposit on round).

d. Do not use oil or grease on small arms cartridges. Oil and grease may cause harmful abrasives to collect in automatic weapons, producing excessive and hazardous chamber pressure when fired.

e. Whenever practicable, store small arms ammunition (particularly tracer and shotgun ammunition) under cover. Tracer ammunition is subject to rapid deterioration if it becomes damp. When this ammunition is in open storage, place it on dunnage at least 6 inches from the deck. Cover it with a double thickness of tarpaulin, leaving enough space for air circulation. When practicable, place dunnage strips under each layer of ammunition boxes. This combats mildew and rot. When storing ammunition in the field, dig suitable trenches to prevent water from running under the pile.

f. When storing ammunition segregate it by caliber, type, and lot. When issuing or using only a part of a box of ammunition, protect the remainder by firmly fastening the cover.

g. Preserve ammunition lot numbers by tagging or marking ammunition removed from the original packing. This prevents otherwise serviceable ammunition from becoming unserviceable through loss of identity (ammunition lot number).

h. Complete information pertaining to proper handling and storage of ammunition is contained in NAVSEA OP 4 and OP 5.

4-4 FIRING

WARNING

WHEN USING CONVENTIONAL AMMUNITION (PARTICULARLY AP), REMEMBER THAT THE CORE OF A BULLET THAT FAILS TO PENETRATE THE TARGET MAY RICOCHET. THE RANGE OF RICOCHET FOR BULLETS AND THE ANGLE OF RICOCHET RELATIVE TO THE LINE OF FIRE DEPEND ON SEVERAL FACTORS. ALWAYS EXERCISE EXTREME CARE TO ENSURE THAT RICOCHETS DO NOT PRESENT A SAFETY HAZARD TO PERSONNEL ENGAGED IN TRAINING OR TO BY-STANDERS.

4-4.1 Safety Precautions. Observe the following safety precautions when firing small arms ammunition.

a. Do not fire ammunition until it has been identified by ammunition lot number and Technical Manual P-801 has been checked to determine whether that lot number has been suspended or restricted.

CAUTION

PROTECT BRASS CARTRIDGES FROM HARD KNOCKS AND BLOWS AS THEY ARE EASILY DENTED. DENTED CARTRIDGE CASES MAY CAUSE INCOMPLETE CHAMBERING, JAMMING IN THE CHAMBER, AND DIFFICULTY IN EXTRACTION.

b. Do not fire cartridges that have been dented, mashed, perforated, or have loose bullets. Never load cartridges into the magazine of a weapon unless it is free of sand, mud, oil, grease, frost, snow, ice, moisture, or other foreign matter.

c. Do not fire cartridges that have been exposed for prolonged periods of time to direct sun radiation or other sources of heat. Dangerously high chamber pressure can result. After returning to lower temperatures, those cartridges are safe for firing.

d. It is dangerous to fire blank cartridges toward personnel at distances less than 20 yards (18 meters). The wad or paper cup may fail to break up and the propellant may not be completely consumed.

e. Never use AP, API, and API-T ammunition in training demonstrations utilizing manned vehicles for transport or as firing platforms.

f. When firing is interrupted, do not let a cartridge remain in the chamber of a very hot weapon. Remove the round promptly to prevent a cookoff.

4-5 MISFIRE, HANGFIRE, AND COOKOFF

WARNING

AFTER A FAILURE TO FIRE, KEEP THE WEAPON TRAINED ON THE TARGET FOR THE PRESCRIBED TIME INTERVAL. ENSURE ALL PERSONNEL STAND CLEAR OF THE MUZZLE.

4-5.1 Misfire. A misfire is a complete failure to fire. The danger associated with a misfire is that it cannot be distinguished immediately from a hangfire or a delay in the functioning of the firing mechanism. Consider a possible delay in firing until such a possibility has been eliminated. A delay in the functioning of the firing mechanism could be the result of improper or excessive oil or grease, or the presence of some other foreign matter. Continued force being applied by the spring eventually overcomes this matter. The firing pin is then driven into the primer in the normal manner. After a failure to fire and before opening the bolt, observe the time interval prescribed in the operation manuals of the specific weapon. The time intervals, based on experience and safety considerations, have been established to minimize the danger associated with a hangfire and to prevent the occurrence of a cookoff.

4-5.2 Hangfire. A hangfire is a delay in the functioning of a propelling charge at the time of firing. The amount of delay is unpredictable, but in most cases will be from a split second up to several minutes. Since a hangfire cannot be distinguished immediately from a misfire, the principal danger is assuming that a misfire has occurred when in fact it is a hangfire. Observe the prescribed time interval before opening the bolt after a failure to fire.

4-5.3 Cookoff. A cookoff is a condition of heat from a very hot weapon causing the functioning of any or all of the chambered round components. To prevent a cookoff, a round of ammunition that has been loaded into a very hot gun should be fired immediately or removed after a lapse of from 5 to 10 seconds. In such a case, there may be uncertainty whether or when the round will fire. If the cartridge propellant should cook off, the projectile will be propelled from the weapon with normal velocity even though there was no attempt to fire the primer by actuating the firing mechanism.

NOTE

Misfire, hangfire, and cookoff precautions in this publication pertain to noncombat and training situations only. Appropriate commands must establish combat clearing techniques and policies. Refer to NAVSEA SW300-BC-SAF-010 for further guidance.

4-6 .22 CALIBER AMMUNITION

The only rimfire type ammunition is the cartridge, .22 caliber ball, long rifle and ball, short. The Hornet .22 caliber cartridge is the center-fire type. Figure 4-3 illustrates .22 caliber cartridges and bullets. See Table 4-1 for packaging and identification data.

4-6.1 Cartridge, .22 Caliber Ball, Long Rifle Match, Match Grade-Reduced Velocity for Small Bore Match Rifle (A097).

4-6.1.1 Intended Use. This cartridge is procured from various manufacturers for use in small bore match rifles chambered for .22 caliber long rifle ammunition.

4-6.1.2 Description. The cartridge is 1.00 inch (2.54 centimeters) long, loaded with smokeless powder, and weighs approximately 52 grains (3.36 grams).

a. Cartridge Case. The brass cartridge case is 0.6125 inch (1.55 centimeters) long, is the rimfire type, and weighs approximately 10 grains (.65 gram).

b. Bullet. This bullet is lead or lead alloy, is 40 grains (2.59 grams) nominal weight, and is coated with a moisture proof lubrication material.

4-6.1.3 Ballistic Data. The ballistic data for the .22 caliber match grade-reduced velocity cartridge are as follows:

a. Velocity. The velocity is below the speed of sound at the muzzle (subsonic).

b. Pressure. The average chamber pressure is 17,500 psi (1,230 kilograms/centimeters² [120.1 MP_a]) with a maximum variation of 6,500 psi (457 kilograms/centimeters² [44.8 MP_a]).

c. Accuracy. The average spread center-to-center of the target shall not exceed 0.40 inch (1.01 centimeters) at 55 yards (50 meters).

4-6.2 Cartridge, .22 Caliber Ball, Long Rifle (A086), (A106).

4-6.2.1 Intended Use. This cartridge is an item of issue for use in all .22 caliber rifles and pistols that are chambered for .22 caliber long rifle cartridges.

4-6.2.2 Description. This cartridge has no model designation. It is of commercial design and procured from several commercial manufacturers. The cartridges are similar in appearance, differing slightly in bullet shape, primer composition, propellants used, and ballistic qualities. The cartridge is approximately 1.00 inch (2.54 centimeters) long and weighs approximately 52 grains (3.37 grams).

a. Cartridge Case. The cartridge case is made of brass, copper, or gilding metal. Cartridges of recent manufacture may have zinc-plated or phosphatized and oiled cases. The case is 0.613 inch (1.55 centimeters) in length and weighs approximately 10 grains (.65 gram).

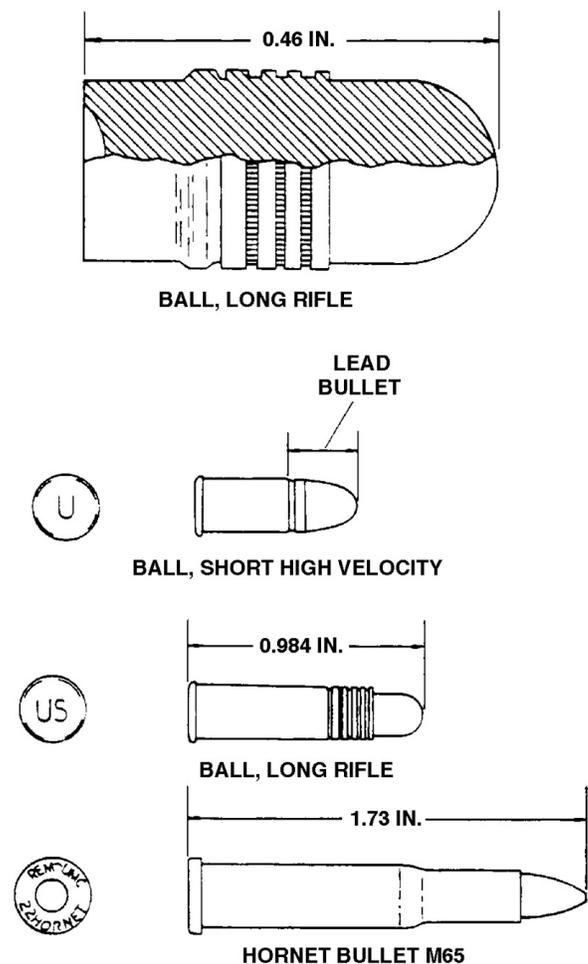


Figure 4-3 .22 Caliber Cartridges and Bullets

Table 4-1 .22 Caliber Ammunition

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, .22 Caliber Ball, Long Rifle	A086	4-6.2	1305-00-305-0890	7641016	50 per cardboard box, 10 boxes per carton, 10 cartons (5,000 cartridges) per fiberboard container
	A086		1305-00-322-6389	7553931	50 per cardboard box, 10 boxes per carton, 20 cartons (10,000 cartridges) per cardboard box
	A086		1305-00-892-5005	7553931	50 per cardboard box, 10 boxes per carton, 20 cartons (10,000 cartridges) per fiberboard box with metal strapping
	A086		1305-00-028-6137	7553931	50 per cardboard box, 10 boxes per carton, 20 cartons (10,000 cartridges) per cardboard box
	A086		1305-00-305-0902	9329523	50 per cardboard box, 10 boxes per carton, 8 cartons plus 22 cardboard boxes per metal box M2A1, 2 metal boxes (10,200 cartridges) per wirebound box
	A086		1305-00-818-3795	7553931	5,000 cartridges per commercial cardboard box
	A086		1305-00-819-6017	11820430	50 per commercial carton, 10 cartons per container, 8 containers plus 22 cartons per metal box M2A1, 2 metal boxes (10,200 cartridges) per wirebound box
Cartridge, .22 Caliber Ball, Long Rifle Match, Match Grade-Reduced Velocity for Small Bore Match Rifle	A097	4-6.1	1305-01-018-1543	WS20070 Rev B	50 per commercial box, 10 boxes (500 cartridges) per carton
Cartridge, .22 Caliber Ball, Long Rifle	A106	4-6.2	1305-01-257-2559	12551637	5,000 cartridges per fiberboard box

b. Bullet. The bullet is made of lead or lead alloy. For lubrication in the weapon bore, the bullet contains grease or wax in its cannellures. The bullet weighs approximately 40 grains (2.59 grams) and is 0.460 inch (1.16 centimeters) long.

4-6.2.3 Ballistic Data. The ballistic data for this cartridge are as follows:

a. Velocity. The basic velocity shall not be less than 1,135 feet per second (345 meters per second) at 15 feet (4.5 meters) from the muzzle of the

weapon. The average velocity shall not vary from the basic velocity by more than 40 fps (12 meters per second).

b. Pressure. The average chamber pressure shall not exceed 24,000 pounds per square inch (psi) or (1688.3 kilograms/centimeters² [165.5 MP_a]).

c. Accuracy. The average extreme spread of all the targets at the time of acceptance is not greater than 2.00 inches (5.08 centimeters) at 100 yards (91 meters) range.

4-7 SHOTGUN AMMUNITION

WARNING

ONLY FIRE SHOTGUN CARTRIDGES IN AUTHORIZED SHOTGUNS. UNDER NO CIRCUMSTANCES IS THE FIRING OF SHOTGUN CARTRIDGES IN SHOTGUNS HAVING DAMASCUS OR OTHER TWIST STEEL BARRELS PERMITTED. INJURY OR DEATH CAN RESULT.

4-7.1 General. Shotgun ammunition is procured commercially for use in various gauge shotguns. All shotgun cartridges have the same general appearance. A stamping on the head, body, and closing wad identifying the cartridge. There are also markings on the packing containers and boxes. The purpose of shotgun cartridges is training, combat, guard, and survival. Shotgun cartridges, except the 10 gauge blank cartridge and the Non-Lethal cartridges (4-7.25), contain a charge of small pellets (ball shot) instead of a single bullet. All shotgun cartridges use noncorrosive metal primers. Gauge is the term used for identifying shotgun cartridge size with exception of .410 bore shotshells which are identified by bore diameter. See Table 4-4 for packaging and identification data.

4-7.2 12 Gauge Shotgun Ammunition. Some 12 gauge shotguns of earlier manufacture have 2-5/8 inch chambers. It is permissible to fire cartridges made for firing in 2-5/8 inch chamber shotguns in standard 2-3/4 inch chamber shotguns. However, do not fire shotgun cartridges in shotguns that have a chamber length less than designed for the cartridge. This is because dangerously high chamber pressure can develop.

4-7.2.1 Description. Shotgun cartridges consist of a case, primer, propellant, wads, and payload. The case may be waterproofed paper or plastic with a metal case head or may be all metal. The primer is located in the base of the metal case or case head. The case contains the propellant, two or more wads, and the payload (Figure 4-4 illustrates a typical shotgun cartridge). Wads are made

of cardboard, plastic, or felt. The case contains at least one overpowder wad and one top wad. The case may have additional wads as separators. The payload is typically a load of lead shot contained between the top wad and the overpowder or filler wads.

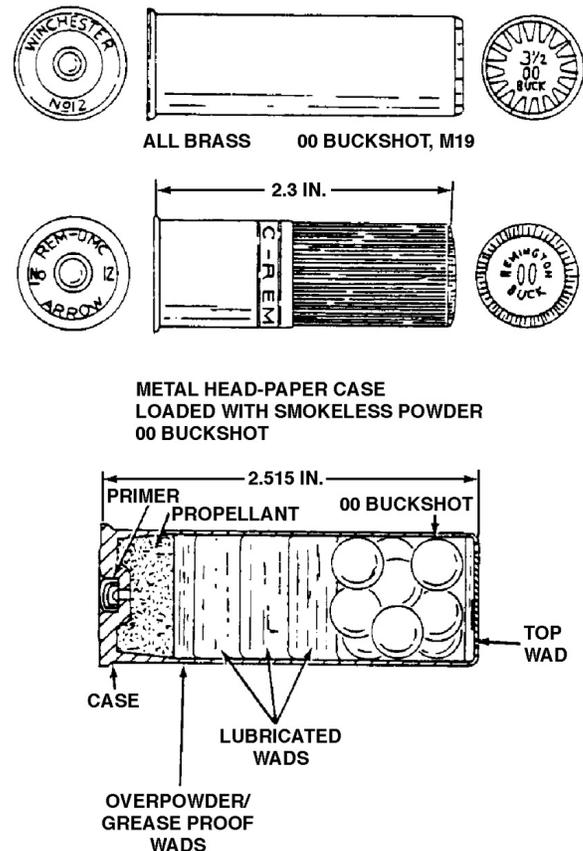


Figure 4-4 12 Gauge Shotgun Cartridges

a. Case. Cartridges have waterproofed paper or plastics cases and metal heads, or may be all brass. Most cartridges for guard and combat use have metal heads 0.80 inch (2.03 centimeters) or more in length. Some have low metal heads that are 0.35 inch (0.88 centimeters) long. The 12 gauge case is 0.797 inch (2.02 centimeters) in diameter at the mouth and 0.880 inch (2.23 centimeters) in diameter at the rim. The trade name and type of load may be stamped on the case.

b. Wads. Numerals and letters marked on the top wad or case indicate the quantity of propellant, the shot load weight, and the shot size; for example 3-1-1/8 - 6C indicates 3 drams equivalent of bulk

propellant and 1-1/8 ounces (31.89 grams) of No. 6 chilled shot. The name or symbol of the manufacturer of the cartridge and propellant may be stamped on the top wad or case. The interior wads consist of (1) an overpowder one-piece plastic wad, or (2) an overpowder grease proof wad adjacent to the propellant, followed by one or more lubricated wads. The interior wads provide a separator between the propellant and the ball shot, as discussed in the following paragraphs.

c. Propellant. The weight and granulation of the propellant composition is in accordance with ballistic requirements. The weight is not constant but is adjusted for each lot to give the required muzzle velocity with the associated chamber pressure within prescribed limits.

d. Shot. With the exception of blanks and door breaching cartridges, the cartridge contains a charge of small lead pellets (shots) instead of a single bullet. The shot is classed as soft or drop shot if it is lead, and chilled shot if it is lead-antimony alloy.

e. Metal Head and Primer. The stamping on the metal head consists of manufacturer initials or symbols, gauge size, and trade name for the type of cartridge. The primer assembly is a brass or gilding metal cup that contains a composition pellet of sensitive explosive, a paper disk (foil), and a brass anvil. Holes or vents in the anvil let the flame pass through to ignite the propellant.

4-7.2.2 Packing Containers. The design of packing containers allow them to withstand all conditions normally met in handling, storing and transporting shotgun ammunition. Different types of packing containers include: watertight metal liners; plain or wax-sealed cartons; metal foil envelopes; hermetically sealed cans; and, metal boxes with hinged covers sealed with a rubber gasket. The containers come in cleated or wirebound wooden boxes illustrated in Figure 4-5. Shotgun ammunition cases and cartons have the commercial markings of the manufacturer, the lot number, type of load. In some cases, the phrase U.S. PROPERTY may be marked on the container. The markings may have the manufacturer's name and address, ammunition type and quantity, gauge size, gun chamber length, propellant type, and trade names.

4-7.2.3 Ballistic Data. Shotguns and shotgun cartridges are designed or chosen to produce a desired pellet pattern at a specific distance. Patterns are expressed as a percentage of the total shot within a 30 inch (76.2 centimeters) circle at 40 yards (36 meters) from the muzzle. The type of weapon barrel bore is classified according to the pellet pattern. See Figure 4-2.

a. The type of weapon barrel bore is classified by the percentage of shot in a shotgun cartridge that hits within a 30 inch (76.2 centimeter) diameter circle. Up to approximately 20 feet (6.09 meters) from the muzzle there is little difference in patterns for any type of barrel bore or degree of choke. When the shot has traveled approximately 10 to 15 yards (9 to 13 meters), the pattern begins to spread rapidly and shows the effects of the barrel bore type

b. Table 4-3 indicates the pattern (dispersion) as a percentage of the total numbers of No. 00 buckshot hitting within a circle diameter of 30 inches (7.62 centimeters) at ranges of 5 to 60 yards (4 to 54 meters). The values are approximate because there is considerable variation in shotgun ballistics due to variations in loadings and atmospheric conditions.

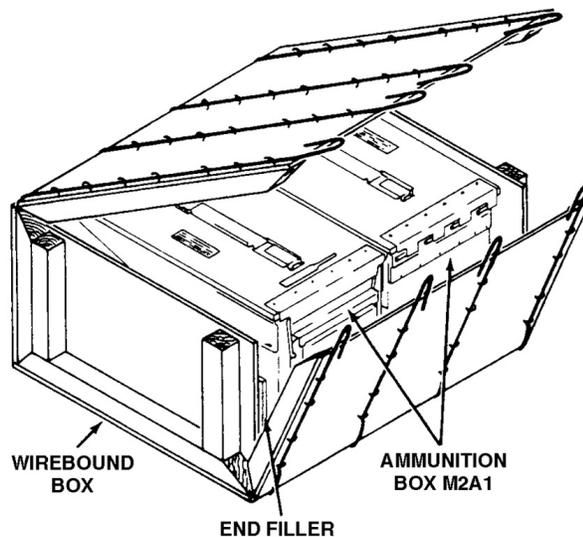


Figure 4-5 Ammunition Box

Table 4-2 Type of Barrel Boring Used In Shotgun

Barrel Boring	Pattern Percentage in 30-In. Circle at 40 Yd.
Full Choke	70%
Modified Choke	60%
Improved Cylinder	50%
Cylinder	40%

Table 4-3 Percentage of Shot in 12 Gauge Shotgun Cartridge/Hitting Within a 30-inch Diameter Circle

Range Yards	Guard or Combat Load 9 (1-1/8 oz.) No. 00 Buckshot	
	30-In. Full Choke Barrel	26-In. Cylinder Bore Barrel
5	100%	100%
10	100%	100%
15	100%	100%
20	100%	100%
25	100%	100%
30	100%	100%
35	90%	70%
40	75%	60%
50	50%	38%
60	35%	25%
Maximum Effective Range	60-70 Yd.	60-70 Yd.

Table 4-4 Shotgun Ammunition

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 12 Gauge Shotgun, No. 9 Shot, Plastic Case	A001	4-7.3	1305-01-018-1549	PS7043C7449-1	25 per box, 20 boxes (500 cartridges) per commercial carton
Cartridge, 12 Gauge Shotgun, No. 7-1/2 Shot, Plastic Case	A002	4-7.4	1305-01-018-1550	PS7043C7449-2	25 per box, 20 boxes (500 cartridges) per commercial carton

Table 4-4 Shotgun Ammunition (Continued)

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 12 Gauge Shotgun, No. 8 Shot, Plastic Case	A003	4-7.5	1305-01-018-1551	PS7043C7449-3	25 per box, 20 boxes (500 cartridges) per commercial carton
Cartridge, 12 Gauge Shotgun, No. 8-1/2 Shot, Plastic Case	A004	4-7.6	1305-01-018-1552	PS7043C7449-4	25 per box, 20 boxes (500 cartridges) per commercial carton
Cartridge, 12 Gauge Shotgun, No. 9 Shot, Plastic Case	A005	4-7.7	1305-01-018-1553	PS7043C7449-5	25 per box, 20 boxes (500 cartridges) per commercial carton
Cartridge, 12 Gauge Shotgun, No. 8 Shot, Plastic Case	A006	4-7.8	1305-01-018-1554	PS7043C7449-6	25 per box, 20 boxes (500 cartridges) per commercial carton
Cartridge, 12 Gauge Shotgun, No. 8 Shot, Plastic Case	A007	4-7.9	1305-01-018-1555	PS7043C7449-7	25 per box, 20 boxes (500 cartridges) per commercial carton
Cartridge, 12 Gauge Shotgun, 00 Buckshot, M19	A011	4-7.10	1305-00-096-3155	7640981	10 per carton, 24 cartons per M21 can, 2 cans (480 cartridges) per M23 wooden box
	A011		1305-00-096-3156	7640981	25 per carton, 20 cartons (500 cartridges) per wooden box
	A011		1305-00-301-1700	7640981	25 per carton, 27 cartons (675 cartridges) per metal-lined wooden box M1917
	A011		1305-00-096-3158	7640981	25 per carton in waterproof envelope, 27 cartons (675 cartridges) per metal-lined wooden box M1917
Cartridge, 12 Gauge Shotgun, 00 Buckshot, Paper Case	A011	4-7.11	1305-00-028-6642	7553929	10 per carton, 24 cartons per M21 can, 2 cans (480 cartridges) per M23 wooden box
	A011		1305-00-540-9213	7553929	25 per carton, 20 cartons (500 cartridges) per fiberboard box
	A011		1305-00-096-3159	7553929	25 per carton, 20 cartons (500 cartridges) per wooden box
	A011		1305-00-096-3160	7553929	25 per carton, 27 cartons (675 cartridges) per metal-lined wooden box M1917
	A011		1305-00-301-1703	7553929	25 per carton, 20 cartons (500 cartridges) per metal-lined wooden box M1917

Table 4-4 Shotgun Ammunition (Continued)

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 12 Gauge Shotgun, 00 Buckshot, XM162, Plastic Case	A011	4-7.12	1305-00-892-4254	10522423	10 per carton in waterproofed envelope, 12 envelopes in metal 00 box M2A1, 2 boxes (240 cartridges) per wirebound box
			1305-01-232-8338	10522423	5 per carton, 32 cartons per metal box M2A1, 2 boxes per wirebound box
Cartridge, 12 Gauge Shotgun, No. 8 Chilled Shot, Paper Case	A015	4-7.13	1305-00-301-1709	T3AGC	25 per carton, 27 cartons (675 cartridges) per metal-lined wooden box
Cartridge, 12 Gauge Shotgun, No. 8 Shot, Plastic Case	A015	4-7.14	1305-00-096-3162	F123	25 per carton, 20 cartons (500 cartridges) per wooden box
Cartridge, 12 Gauge Shotgun, No. 9 Chilled Shot, Plastic Case	A017	4-7.15	1305-00-096-3164	7553057	25 per carton, 20 cartons (500 cartridges) per wooden box
Cartridge, 12 Gauge Shotgun, No. 9 Chilled Shot, Trap and Skeet, Plastic Case	A017	4-7.16	1305-00-928-4485	7690573	25 per cardboard box, 20 boxes (500 cartridges) per wooden box
	A017		1305-00-232-7415	12551626	25 per carton, 20 cartons (500 cartridges) per fiberboard box
Cartridge, 12 Gauge Shotgun, No. 4B Buckshot, M257	A020	4-7.17	1305-00-143-7007	10542446	25 per carton in waterproof envelope, 7 envelopes per metal box M2A1, 2 boxes (350 cartridges) per wirebound box
	A020		1305-00-782-9616	10542446	10 per carton in waterproof envelope, 12 envelopes per metal box M2A1, 2 boxes (240 cartridges) per wirebound box
Cartridge, 12 Gauge, Slug	(A023	4-7.18	1305-01-386-5604	53711-6665096	5 cartridges per fiberboard box, 24 fiberboard boxes (120 cartridges) per metal M2A1 can, 2 M2A1 cans (240 rounds) per wirebound box
Cartridge, 12 Gauge Shotgun, Door Breaching, MK 246 MOD 0	A024	4-7.19	1305-01-431-5624	HS/2024/C94/834	5 per carton, 32 carton per metal box M2A1, 2 boxes (320 cartridges) per wirebound box

Table 4-4 Shotgun Ammunition (Continued)

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 12 Gauge, Breaching, M1030	AA54	4-7.20	1305-01-475-7440	19200-9396206	5 cartridges per fiberboard box, 32 fiberboard boxes (160 cartridges) per metal M2A1 can, 2 M2A1 cans (320 rounds) per wirebound box
Cartridge, 12 Gauge, Dummy, MK 242 MOD 0	AA55	4-7.21	1305-01-380-3255	TBD	25 cartridges per fiberboard box, 10 fiberboard boxes (250 cartridges) per fiberboard case
Cartridge, 12 Gauge, Flash-Bang,	AY04	4-7.22	1370-01-507-0749	53711-7546868	25 cartridges per inner box, 4 inner boxes (100 cartridges) per metal M2A1 can
Cartridge, 12 Gauge, 100-Meters Warning Signal, MK 290 MOD 0	LA51	4-7.23	1370-01-530-6486	53711-7624816	25 cartridges per inner box, 4 inner boxes, (100 cartridges) per metal M2A1 can, 2 M2A1 cans (200 cartridges) per wirebound box
Cartridge, 12 Gauge, 200-Meters Warning Signal, MK 291 MOD 0	LA52	4-7.24	1370-01-530-6571	53711-7624816	25 cartridges per inner box, 4 inner boxes, (100 cartridges) per metal M2A1 can, 2 M2A1 cans (200 cartridges) per wirebound box
Cartridge, 12 Gauge Bean Bag, Non-Lethal	AA29	4-7.25.1	1305-01-454-0191	925011 201030	5 cartridges per fiberboard box, 32 fiberboard boxes (160 cartridges) per M2A1 metal box, 2 metal boxes (320 cartridges) per wirebound box
Cartridge, 12 Gauge, Launching, For Grenade, Non-Lethal	AA30	4-7.25.2	1305-01-454-0187	925011 201030	5 cartridges per fiberboard box, 32 fiberboard boxes (160 cartridges) per M2A1 metal box, 2 metal boxes (320 cartridges) per wirebound box
			1305-01-464-8389	925011 201030	5 cartridges per fiberboard box, 32 fiberboard boxes (160 cartridges) per M2A1 metal box, 2 metal boxes (320 cartridges) per wirebound box
			1305-01-504-3529	925011 201030	5 cartridges per fiberboard box, 32 fiberboard boxes (160 cartridges) per M2A1 metal box, 2 metal boxes (320 cartridges) per wirebound box

Table 4-4 Shotgun Ammunition (Continued)

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 12 Gauge, Rubber, Fin Stabilized, Non-Lethal	AA31	4-7.25.3	1305-01-454-0189	925011 201030	5 cartridges per fiberboard box, 32 fiberboard boxes (160 cartridges) per M2A1 metal box, 2 metal boxes (320 cartridges) per wirebound box
Cartridge, 12 Gauge, Rubber, Fin Stabilized, Non-Lethal (Coast Guard)	AA80	4-7.25.3	1305-01-502-7718	925011 201030	5 cartridges per fiberboard box, 32 fiberboard boxes (160 cartridges) per M2A1 metal box, 2 metal boxes (320 cartridges) per wirebound box
Cartridge, 20 Gauge Shotgun, No. 9 Shot, Skeet Load, Plastic Case	A046	4-7.26	1305-01-018-1556	PS7043C7449-8	25 per box, 20 boxes (500 cartridges) per commercial carton
Cartridge, 28 Gauge Shotgun, No. 9 Shot, Skeet Load, Plastic Case	A057	4-7.27	1305-01-018-1557	PS7043C7449-9	25 per box, 20 boxes (500 cartridges) per commercial carton
Cartridge, .410 Bore Shotgun, Skeet Load, Plastic Case	A052	4-7.28	1305-01-018-1558	PS7043C7449-10	25 per box, 20 boxes (500 cartridges) per commercial carton

4-7.3 Cartridge, 12 Gauge Shotgun, No. 9 Shot, Plastic Case (A001).

4-7.3.1 Intended Use. This cartridge is procured from commercial sources for use in the 12 gauge autoloading weapon with a skeet bore barrel.

4-7.3.2 Description. The cartridge has an all-weather, plastic case with an inseparable brass head. The load is 1-1/8 ounces (31.89 grams) No. 9 shot and 2-3/4 drams equivalent smokeless powder. At acceptance, this cartridge produced a patterning criteria of 70 percent of shot within a 30-inch (76.2 centimeters) circle at 25 yards (22 meters) range.

4-7.4 Cartridge, 12 Gauge Shotgun, No. 7-1/2 Shot, Plastic Case (A002).

4-7.4.1 Intended Use. This cartridge is procured from commercial sources for use in the 12 gauge autoloading weapon with a skeet bore barrel.

4-7.4.2 Description. The cartridge has an all-weather, plastic case with an inseparable brass head. The load is 1-1/8 ounces (31.89 grams) No. 7-1/2 shot and 3 drams equivalent smokeless powder. At acceptance, this cartridge produced a patterning critical of 70 percent of shot within a 30-inch (76.2 centimeters) circle at 25 yards (22 meters) range.

4-7.5 Cartridge, 12 Gauge Shotgun, No. 8 Shot, Plastic Case (A003).

4-7.5.1 Intended Use. This cartridge is procured from commercial sources for use in the 12 gauge autoloading weapon with a skeet bore barrel.

4-7.5.2 Description. The cartridge has an all-weather, plastic case with an inseparable brass head. The load with 1-1/8 ounces (31.89 grams) No. 8 shot and 3 drams equivalent smokeless powder. At acceptance, this cartridge produced a patterning criteria of 70 percent of shot within a 30-inch (76.2 centimeters) circle at 25 yards (22 meters) range.

4-7.6 Cartridge, 12 Gauge Shotgun, No. 8-1/2 Shot, Plastic Case (A004).

4-7.6.1 Intended Use. This cartridge is procured from commercial sources for use in the 12 gauge autoloading weapon with a skeet bore barrel.

4-7.6.2 Description. The cartridge has an all-weather, plastic case with an inseparable brass head. The load with 1-1/8 ounces (31.89 grams) No. 8-1/2 shot and 3 drams equivalent smokeless powder. At acceptance, this cartridge produced a patterning criteria of 70 percent of shot within a 30-inch (76.2 centimeters) circle at 25 yards (22 meters) range.

4-7.7 Cartridge, 12 Gauge Shotgun, No. 9 Shot, Plastic Case (A005).

4-7.7.1 Intended Use. A cartridge with No. 9 shot skeet load procured from commercial sources for use in the 12 gauge auto-loading weapon with skeet bore barrel.

4-7.7.2 Description. The cartridge has an all-weather, plastic case with an inseparable brass head. The load with 1-1/8 ounces (31.89 grams) No. 9 shot and 3 drams equivalent smokeless powder. At acceptance, this cartridge produced a patterning criteria of 70 percent of shot within a 30-inch (76.2 centimeters) circle at 25 yards (22 meters) range.

4-7.8 Cartridge, 12 Gauge Shotgun, No. 8 Shot, Plastic Case (A006).

4-7.8.1 Intended Use. This cartridge is procured from commercial sources for use in the 12 gauge autoloading trap and over/under trap gun.

4-7.8.2 Description. The cartridge has an all-weather, plastic case with an inseparable brass head. The load is 1-1/8 ounces (31.89 grams) No. 8 shot and 3-1/4 drams equivalent smokeless powder. At acceptance, this cartridge produced a patterning criteria of 80 percent of shot within a 30-inch (76.2 centimeters) circle at 40 yards (36 meters) range.

4-7.9 Cartridge, 12 Gauge Shotgun, No. 8 Shot, Plastic Case (A007).

4-7.9.1 Intended Use. This cartridge is procured from commercial sources for use in the 12 gauge autoloading trap and over/under trap gun.

4-7.9.2 Description. The cartridge has an all-weather, plastic case with an inseparable brass head. The load with 1-1/4 ounces (38.88 grams) No. 8 shot and 3-1/4 drams equivalent smokeless powder. At acceptance, this cartridge produced a patterning criteria of 80 percent of shot within a 30-inch (76.2 centimeters) circle at 40 yards (36 meters) range.

4-7.10 Cartridge, 12 Gauge Shotgun, 00 Buckshot, M19 (A011).

4-7.10.1 Intended Use. This cartridge was procured from commercial sources for guard and combat use only.

4-7.10.2 Description. The cartridge has an all brass case, is 2.5 inches (6.35 centimeters) long, and weighs approximately 930 grains (60.26 grams). It is loaded with nine No. 00 buckshot and has a propellant charge of approximately 26 grains (1.68 grams) of smokeless powder.

4-7.11 Cartridge, 12 Gauge Shotgun, 00 Buckshot, Paper Case (A011).

4-7.11.1 Intended Use. This cartridge was procured from commercial manufacturers. It is used for training, combat, and guard purposes.

4-7.11.2 Description. The cartridge has a water-proofed paper case and metal head. It is 2.5 inches (6.35 centimeters) long and weighs approximately 800 grains (51.84 grams). The cartridge is loaded with nine No. 00 shot with a propellant charge of approximately 26 grains (1.684 grams) smokeless powder.

4-7.12 Cartridge, 12 Gauge Shotgun, 00 Buckshot, XM162, Plastic Case (A011).

4-7.12.1 Intended Use. A plastic case cartridge procured from commercial manufacturers for training, combat, and guard purposes.

4-7.12.2 Description. The cartridge has a plastic case and a brass or plated steel head. It is 2.41 inches (6.12 centimeters) long and weighs approximately 800 grains (51.84 grams). The load is nine No. 00 shot with a propellant charge of approximately 26 grains (1.68 grams) equivalent smokeless powder.

4-7.13 Cartridge, 12 Gauge Shotgun, No. 8 Chilled Shot, Paper Case (A015).

4-7.13.1 Intended Use. This cartridge is procured from commercial sources for clay target shooting in training purposes and use in the Navy Competitive Match Programs.

4-7.13.2 Description. The cartridge has a paper case and brass head. The load is 1-1/8 ounces (31.89 grams) of No. 8 shot and has a propellant charge of approximately 26 grains (1.68 grams) of smokeless powder. The cartridge is 2.41 inches (6.12 centimeters) long and weighs approximately 720 grains (46.66 grams).

4-7.14 Cartridge, 12 Gauge Shotgun, No. 8 Shot, Plastic Case (A015).

4-7.14.1 Intended Use. A cartridge with No. 8 shot procured from commercial sources for clay target shooting in training purposes and use in the Navy Competitive Match Programs.

4-7.14.2 Description. The cartridge has a plastic case and brass head. It is loaded with 1-1/8 (31.89 grams) ounces of No. 8 shot and a propellant charge of approximately 26 grains (1.68 grams) of smokeless powder. The cartridge is 2.41 inches (6.12 centimeters) long and weighs approximately 720 grains (46.66 grams).

4-7.15 Cartridge, 12 Gauge Shotgun, No. 9 Chilled Shot, Plastic Case (A017).

4-7.15.1 Intended Use. This cartridge is procured from commercial sources for clay target shooting in training purposes and use in the Navy Competitive Match Programs.

4-7.15.2 Description. The cartridge has a plastic case and brass head. The load is 1-1/8 ounces (31.89 grams) of No. 9 shot and a propellant charge

of smokeless powder. The cartridge is 2.51 inches (6.37 centimeters) long and weighs approximately 730 grains (47.30 grams).

4-7.16 Cartridge, 12 Gauge Shotgun, No. 9 Chilled Shot, Trap and Skeet, Plastic Case (A017).

4-7.16.1 Intended Use. This cartridge is procured from commercial sources for trap and skeet target shooting in training purposes and use in the Navy Competitive Match Programs.

4-7.16.2 Description. The cartridge has a plastic case and brass head. The load is 1-1/8 ounces (31.89 grams) of No. 9 chilled shot and has a propellant charge of approximately 26 grains (1.68 grams) of smokeless powder. The cartridge is 2.53 inches (6.42 centimeters) long and weighs approximately 730 grains (47.30 grams).

4-7.17 Cartridge, 12 Gauge Shotgun, No. 4B Buckshot, M257 (A020).

4-7.17.1 Intended Use. This cartridge is procured from commercial sources for guard and security purposes.

4-7.17.2 Description. The cartridge has a waterproofed plastic case and brass or steel head (gray). It is 2.41 inches (6.12 centimeters) long and weighs approximately 800 grains (51.84 grams). A cartridge loaded with 27 No. 4B buckshot pellets made of a hard lead-antimony alloy that weigh approximately 20 grains (1.296 grams) each with a propellant charge of approximately 26 grains (1.684 grams) of smokeless powder. Green lettering stating "No. 4B SPECIAL M257" on the case and star or fold-type case mouth crimps identified this cartridge.

4-7.18 Cartridge, 12 Gauge, Slug (A023).

4-7.18.1 Intended Use. This cartridge is used for training, combat, and guard purposes. The cartridges are shoulder-fired with military 12 gauge shotguns with either a 2 3/4-inch or 3-inch chamber.

4-7.18.2 Description. The cartridge has an all-weather plastic case and metal head. The cartridge is a 12 gauge 2 3/4-inch cartridge, with a maximum length of 2.45 inches, and a maximum

diameter of 0.886-inch at the metal head. The primer is a commercial percussion primer. The propellant is approximately 40 grains of smokeless powder. The cartridge contains a 1-ounce lead slug with a muzzle velocity of 1,590 to 1,770 fps.

4-7.18.3 Operation. Cartridges are shoulder-fired with military 12 gauge shotguns.

4-7.18.4 Packaging. Packaging drawing 53711-6665096. NSN 1305-01-386-5604. 5 rounds per fiberboard box, 120 rounds per metal M2A1 can, 240 rounds per wirebound box.

4-7.19 Cartridge, 12 Gauge Shotgun, Door Breaching, MK 246 MOD 0 (A024).

WARNING

WHEN USING THE 12 GAUGE DOOR BREACHING CARTRIDGE, ENSURE THE MUZZLE OF THE WEAPON IS AT LEAST 2 INCHES FROM THE INTENDED TARGET UNLESS THE FIREARM IS FITTED WITH A MUZZLE ATTACHMENT SPECIFICALLY DESIGNED FOR USE WITH THE 12 GAUGE DOOR BREACHING CARTRIDGE. FAILURE TO DO SO COULD RESULT IN INJURY AND/OR DEATH TO THE GUNNER AND SURROUNDING PERSONNEL.

4-7.19.1 Intended Use. This cartridge is procured from commercial sources for use in 12 gauge autoloading and pump action shotguns chambered for 2-3/4 inch shotshell cartridges with cylinder bore barrels. The 12 gauge door breaching cartridge is intended to destroy locks and fixtures on doors and automobiles with little or no collateral damage to the interior.

4-7.19.2 Description. The cartridge conforms with a conventional 2-3/4 inch shotshell outside profile. At acceptance, the projectile develops not less than 1,400 ft./pounds of energy at the muzzle of the weapon.

4-7.20 Cartridge, 12 Gauge, Breaching, M1030 (AA54).

4-7.20.1 Intended Use . This cartridge is used to penetrate and unlock wood doors up to 1 3/4-inch thick. The projectile is designed to break apart upon impact to minimize ricochet and behind-target effects.

4-7.20.2 Description . The cartridge has an all-weather plastic case and metal head. The cartridge is a 12 gauge 2 3/4-inch cartridge, with a maximum length of 2.45 inches, and a maximum diameter of 0.886-inch at the metal head. The primer is a commercial percussion primer. The propellant is 23.9 grains of smokeless powder. The cartridge contains a frangible slug designed to break apart upon impact. The slug weighs 625 grains nominal and is constructed with micronized steel and wax binder in a plastic shotcup. The projectile has a nominal muzzle velocity of 1,050 fps.

4-7.20.3 Operation. Cartridges are shoulder-fired with military 12 gauge shotguns. Upon contact with a solid target, the frangible projectile breaks into small steel particles to minimize behind target effects, and to minimize ricochet hazards.

4-7.20.4 Packaging. Packaging drawing 19200-9396206. NSN 1305-01-475-7440. 5 rounds per fiberboard box, 160 rounds per metal M2A1 can, 320 rounds per wirebound box.

4-7.21 Cartridge, 12 Gauge, Dummy, MK 242 MOD 0 (AA55).

4-7.21.1 Intended Use. Dummy cartridges are inert cartridges for action proving with 12 gauge shotguns.

4-7.21.2 Description. These cartridges are inert with no primer and no propellant. The cartridge has a plastic case and metal head. The case color is white or translucent with "DUMMY" marked on the plastic tube. The cartridge is a 12 gauge 2-3/4-inch cartridge, with a maximum length of 2.45 inches, and a maximum diameter of 0.886-inch at the metal head. The cartridge contains 1 ounce of shot.

4-7.21.3 Packaging. NSN 1305-01-380-3255. Commercial Packaging: 25 rounds per fiberboard carton, 250 rounds per fiberboard case.

4-7.22 Cartridge, 12 Gauge, Flash-Bang, (AY04).

4-7.22.1 Intended Use. This cartridge is used for security and birdscares purposes. The cartridges provide the capability to project clear, unambiguous warning signals out to 100 meters.

4-7.22.2 Description. The cartridge has an all-weather plastic case and metal head. The plastic case is translucent. The cartridge is a 12 gauge 2-3/4-inch cartridge, which is 2.45 inches long maximum, and is 0.886-inch diameter maximum at the metal head. The primer is a commercial percussion primer. The propellant is smokeless powder. The cartridge contains a projectile with a black powder delay and approximately 1.25 grams of flash charge. The projectile is 1.67 inches long and is constructed with a fiberboard tube.

4-7.22.3 Operation. Cartridges are shoulder-fired with military 12 gauge shotguns. The operator elevates the shotgun muzzle approximately 15 degrees above horizontal, and aims the shotgun in the vicinity of the target area. When the cartridge is fired, the burning propellant ignites the delay and launches the projectile. The delay burns for approximately 0.8 to 4.6 seconds, and then ignites the flash charge. The projectile airbursts at 60 to 140-meters downrange to produce a light flash, loud report (bang), and smoke.

4-7.22.4 Packaging. Packaging drawing 53711-7546868. NSN 1370-01-507-0749. 25 rounds per inner box, 100 rounds per metal M2A1 can.

4-7.23 Cartridge, 12 Gauge, 100-Meters Warning Signal, MK 290 MOD 0 (LA51).

4-7.23.1 Intended Use. This cartridge is used for guard and security purposes. The cartridges provide the capability to project clear, unambiguous warning signals out to 100 meters.

4-7.23.2 Description. The cartridge has an all-weather plastic case and metal head. The plastic case is translucent. The cartridge is a 12 gauge 3-inch cartridge, which is 2.76 inches long maximum, and is 0.886-inch diameter maximum at the metal head. The primer is a commercial percussion primer. The propellant is smokeless powder.

The cartridge contains a projectile with a black powder delay and approximately 2.5 grams of flash charge. The projectile is 1.76 inches long and is constructed with a metal tube and plastic base.

4-7.23.3 Identification. The cartridge is marked "100 METERS" on the plastic case. The case has one black band marked around the circumference near the case mouth. The case mouth wad is red, and has one raised ring for tactile identification of projectile range.

4-7.23.4 Operation. Cartridges are shoulder-fired with military 12 gauge shotguns with a 3-inch chamber. The operator elevates the shotgun muzzle approximately 4 degrees above horizontal, and aims at an area that is a minimum of 20-meters from the target. When the cartridge is fired, the burning propellant ignites the delay and launches the projectile. The delay burns for approximately 0.8 seconds, and then ignites the flash charge. The projectile airbursts at 100-meters nominal to produce a light flash, loud report (bang), and smoke.

4-7.23.5 Packaging. Packaging drawing 53711-7624816. NSN 1370-01-530-6486. 25 rounds per inner box, 100 rounds per metal M2A1 can, 200 rounds per wirebound box.

4-7.24 Cartridge, 12 Gauge, 200-Meters Warning Signal, MK 291 MOD 0 (LA52).

4-7.24.1 Intended Use. This cartridge is used for guard and security purposes. The cartridges provide the capability to project clear, unambiguous warning signals out to 200 meters.

4-7.24.2 Description. The cartridge has an all-weather plastic case and metal head. The plastic case is translucent. The case mouth has one black band marked around the circumference and a red case mouth wad with two raised rings. The cartridge is a 12 gauge 3-inch cartridge, which is 2.76 inches long maximum, and is 0.886-inch diameter maximum at the metal head. The primer is a commercial percussion primer. The propellant is smokeless powder. The projectile has a black powder delay and approximately 2.5 grams of flash charge. The projectile is 1.76 inches long and is constructed with a metal tube and plastic base.

4-7.24.3 Identification. The cartridge is marked “200 METERS” on the plastic case. The case has two black bands marked around the circumference near the case mouth. The case mouth wad is green, and has two raised rings for tactile identification of projectile range.

4-7.24.4 Operation. Cartridges are shoulder-fired with military 12 gauge shotguns with a 3-inch chamber. The operator elevates the shotgun muzzle approximately 8 degrees above horizontal, and aims at an area that is a minimum of 20-meters from the target. When the cartridge is fired, the burning propellant ignites the delay and launches the projectile. The delay burns for approximately 2.1 seconds, and then ignites the flash charge. The projectile airbursts at 200-meters nominal to produce a light flash, loud report (bang), and smoke.

4-7.24.5 Packaging. Packaging drawing 53711-7624816. NSN 1370-01-530-6571. 25 rounds per inner box, 100 rounds per metal M2A1 can, 200 rounds per wirebound box.

4-7.25 Non-Lethal 12 Gauge Cartridge.

4-7.25.1 Cartridge, 12 Gauge Bean Bag, Non-Lethal (AA29).

4-7.25.1.1 Intended Use. This cartridge is in-tended for use in crowd control situations where the use of non-lethal force is desired. This cartridge is used in the Mossberg 500 shotgun.

4-7.25.1.2 Description. The 12 Gauge Bean Bag Cartridge consists of a cartridge case, primer, propellant, over powder wad, projectile, and end wad. The cartridge weighs 770 grains (49.90 grams) and is 2.45 inches (6.23 centimeters) long. The cartridge is manufactured in accordance with industry standards and with a commercial color finish.

a. Cartridge Case. The cartridge case is a standard 12 ga 2-3/4 inch shotshell hull composed of a copper alloy metal head and plastic shell body. The cartridge is assembled with a roll crimp.

b. Primer. The primer is a standard model 209 shotshell primer. This percussion primer contains approximately 0.87 grains (57 milligrams) of lead styphnate and tetracene.

c. Propellant. The cartridge contains approximately 5 grains (0.32 gram) of double base smokeless propellant.

d. Projectile. The projectile consists of a single fabric bag filled with lead shot. The projectile weighs between 585 and 685 grains (37.9 and 44.4 grams) and has a minimal frontal area of 3.0 square inches (19.36 square centimeters).

e. Wads. The cartridge has two wads. The over powder wad is between the propellant and the projectile. The end wad is between the projectile and the roll crimp. The end wad is marked for low light identification.

4-7.25.2 Cartridge, 12 Gauge, Launching, For Grenade, Non-Lethal (AA30).

4-7.25.2.1 Intended Use. This cartridge is in-tended for use as part of the Non-Lethal Rubber Ball Grenade Launching System. This launching system is used to launch Non-Lethal Rubber Ball Grenades (GG04). For training, this launching system is used to launch Non-Lethal Practice Grenades (GG05) with M201A1-1 Grenade Fuzes (G874) installed. The launching system consists of four components: (1) a Mossberg 500 A2 shotgun; (2) a Non-Lethal Rubber Ball Grenade Launch Cup (designated TBD); (3) Non-Lethal Rubber Ball Grenades (GG04), or Non-Lethal Practice Grenades (GG05) with M201A1-1 Fuzes (G874) installed; and (4) 12 Gauge Launching Cartridges (AA30).

CAUTION

PERSONNEL WILL FOLLOW INSTRUCTIONS FOR ATTACHING LAUNCHING CUP, LOADING GRENADES OR PRACTICE GRENADES AND CHAMBERING AND FUNCTIONING 12 GAUGE LAUNCHING CARTRIDGES. FAILURE TO FOLLOW INSTRUCTIONS FOR SYSTEM OR MISUSE OF NON-LETHAL HAND GRENADE LAUNCHING SYSTEM OR ITS COMPONENTS MAY RESULT IN DAMAGE TO PROPERTY OR INJURY TO PERSONNEL.

The launching system is intended for use in crowd control situations where the use of Non-Lethal force is desired.

4-7.25.2.2 Description. The 12 Gauge Launching Cartridge consists of cartridge case, primer, propellant, and end wads. The cartridge weighs approximately 210 grains (13.61 grams) and is 2.00 inches (5.08 centimeters) long. The cartridge is manufactured in accordance with industry standards and with commercial color finish.

a. Two Versions. There are two versions of the 12 Gauge Launching cartridge for the Non-Lethal Rubber Ball Grenade Launching System. The only difference between the two versions is the propellant and the number of end wads: NSN 1305-01-454-0187 has a mix of smokeless powder and black powder for propellant and one end wad. NSN 1305-01-464-8389 has black powder only for propellant and has two end wads. There is no visible difference between the two versions of this cartridge. The markings on packaging and packing material are the only way to differentiate between these versions.

b. Cartridge Case. The cartridge case is a standard 12 ga 2-3/4 inch shotshell hull composed of a copper alloy metal head and plastic shell body. The cartridge is assembled with a roll crimp.

c. Primer. The primer is a standard model 209 shotshell primer containing approximately 0.87 grain (0.06 gram) of lead styphnate and tetracene.

d. Propellant.

(1) NSN 1305-01-454-0187: This version of the cartridge contains approximately 37.6 grains (2.45 grams) of propellant. The propellant in this cartridge consists of smokeless powder and black powder in a ratio of approximately 3:1. The cartridge contains approximately 28.2 grains (1.83 grams) of smokeless powder and 9.4 grains (0.61 gram) of black powder. There is one end wad between the propellant and the roll crimp.

NOTE

NSN 1305-01-454-0187 is for **TRAINING USE ONLY**.

(2) NSN 1305-01-464-8389: This version of the cartridge contains approximately 46.29 grains (3.00 grams) of 3F black powder. There are two felt end wads between the propellant and the roll crimp.

e. Projectile. This cartridge does not have a projectile. It is designed to create a buildup of gas pressure in the shotgun bore. This gas pressure forces the ejection of the grenade or practice grenade from the launching cup and propels the grenade toward the target.

f. End Wad Marking. The side of the end wad exposed by the roll crimp is marked for low light identification.

4-7.25.3 Cartridge, 12 Gauge, Rubber, Fin Stabilized, Non-Lethal (AA31).

4-7.25.3.1 Intended Use. This cartridge is intended for use in crowd control situations where the use of non-lethal force is desired. This cartridge is used in the Mossberg 500 shotgun.

4-7.25.3.2 Description. The 12 Gauge Rubber Fin Stabilized Cartridge consists of a cartridge case, primer, propellant, over powder wad, projectile, and end wad. The cartridge weighs 140 grains (9.08 grams) and is 2.45 inches (6.23 centimeters) long. The cartridge is manufactured in accordance with industry standards and with commercial color finish.

a. Cartridge Case. The cartridge case is a standard 12 ga 2-3/4 inch shotshell hull composed of a copper alloy metal head and plastic shell body. The cartridge is assembled with a roll crimp.

b. Primer. The primer is a standard model 209 shotshell primer. This percussion primer contains approximately 0.87 grains (57 milligrams) of lead styphnate and tetracene.

c. Propellant. The cartridge contains approximately 5 grains (0.32 gram) of double base smokeless propellant.

d. Projectile. The projectile consists of a single molded rubber projectile with a hardness of 70 to 80 on the Durometer "A" scale. It has a mass of 80 to 115 grains (5.19 to 7.46 grams) 110 to 120 grains (7.13 to 7.78 grams). It is molded with canted fins to spin stabilize the projectile.

e. Wads. The cartridge has two wads. The over powder wad is between the propellant and the projectile. The end wad is between the projectile and the roll crimp. The end wad is marked for low light identification.

4-7.26 Cartridge, 20 Gauge Shotgun, No. 9 Shot, Skeet Load, Plastic Case (A046).

4-7.26.1 Intended Use. This cartridge is procured from commercial sources for use in the 20 gauge autoloading skeet bore gun.

4-7.26.2 Description. This cartridge has a plastic case and brass head. The load is 7/8 ounce (24.80 grams) of No. 9 shot and 2-1/2 dram of smokeless powder. At acceptance, this cartridge produced a patterning criteria of 70 percent of shot within a 30-inch (76.2.) circle at 25 yards (22 meters) range.

4-7.27 Cartridge, 28 Gauge Shotgun, No. 9 Shot, Skeet Load, Plastic Case (A057).

4-7.27.1 Intended Use. This cartridge is procured from commercial sources for use in the 28 gauge autoloading weapon with a skeet bore barrel.

4-7.27.2 Description. The cartridge has a plastic case with an inseparable brass head. The load with 3/4 ounce (23.33 grams) of No. 9 shot and 2 dram equivalent of smokeless powder. At acceptance, this cartridge produced a patterning criteria of 65 percent of shot within a 30-inch (76.2 centimeters) circle at 25 yards (22 meters) range.

4-7.28 Cartridge, .410 Bore Shotgun, Skeet Load, Plastic Case (A052).

4-7.28.1 Intended Use. A plastic case cartridge procured from commercial sources for training and use in the .410 bore skeet gun, Figure 4-6.

4-7.28.2 Description. The cartridge is 2.5 inches (6.35 centimeters) long. The load is 1/2 ounce (14.175 grams) No. 9 shot and a maximum dram equivalent powder charge. At acceptance, this cartridge produced a patterning criteria of 60 percent shot within a 20-inch (50.8 centimeters) circle at 25 yards (22 meters) range.

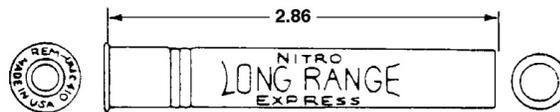


Figure 4-6 .410 Bore Shotgun Cartridge

4-8 .32 CALIBER AMMUNITION

Once used as a police caliber, the .32 Caliber Long Cartridge was replaced by the .38 Special Cartridge. While the .32 cartridge has an accuracy potential of the .38 caliber and produces a lower muzzle blast with a minimum recoil, it is not as versatile. See Table 4-5 for packaging and identification data.

4-8.1 Cartridge, .32 Caliber, Smith And Wesson Long, Match, Wadcutter (A348).

4-8.1.1 Intended Use. This cartridge, Figure 4-7, is procured from commercial sources for the .32 Caliber International Centerfire Pistol. This cartridge is not adapted for pistols chambered for the .32 caliber Short Cartridge.

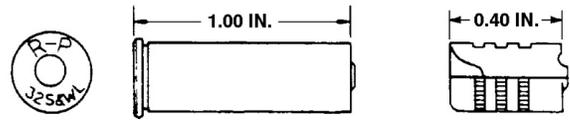


Figure 4-7 .32 Caliber Long Wadcutter

4-8.1.2 Description. The cartridge is approximately 1 inch (2.54 centimeters) long and is used primarily for target practice. A cartridge case encloses the lead alloy bullet which has a blunt but sharp shoulder for cutting a clean hole through target paper. At acceptance, the extreme spread of all targets is not greater than 1.0 inch (2.54 centimeters) at 27.33 yards (25 meters).

Table 4-5 .32 Caliber Ammunition

ITEM	DODIC/NA LC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, .32 Caliber, Smith And Wesson Long, Match, Wadcutter	A348	4-8.1	1305-01-018-1540	PS7043C7567	50 rounds per box, commercially packaged

4-9 .38 CALIBER AMMUNITION

The caliber, .38 Special cartridge fires from all revolvers and pistols chambered for .38 Special or .357 Magnum ammunition. Cartridges and bullets for caliber .38 Special weapons are shown in Figure 4-8. All those cartridges use small pistol primers weighing 3.065 grains (.198 gram) and 0.175 inch (.044 centimeter) in diameter. See Table 4-6 for packaging and identification data.

4-9.1 Cartridge, .38 Caliber, Special, Ball, M41, 130-Grain Bullet (A400).

4-9.1.1 Intended Use. This cartridge is procured from commercial sources for issue and use in .38 caliber Special revolvers.

4-9.1.2 Description. The cartridge is 1.55 inches (3.93 centimeters) long and weighs approximately 203 grains (13.15 grams). The cartridge case head diameter is 0.430 inch (1.09 centimeters) and the mouth is 0.377 inch (0.95 centimeters). The bullet consists of a gilding metal jacket and a lead-antimony slug. It is 0.593 inch (1.50 centimeters) long and weighs approximately 130 grains (8.42 grams). The cartridge case crimps into a cannelure in the bullet and contains about 4.8 grains (.311 gram) of propellant.

4-9.1.3 Ballistic Data. The ballistic data for the .38 caliber M41 cartridge are as follows:

a. Velocity. The basic velocity will not be less than 950 fps (289 meters per second) at 15 feet (4.57 meters). The average will not vary from the basic velocity by more than 25 fps (7.6 meters per second).

b. Pressure. The average chamber pressure will not exceed 16,000 psi (1,124 kilograms/centimeters² [110.3 MP_a]).

c. Accuracy. The mean radii average of all targets at time of acceptance is not greater than 2.0 inches (5.08 centimeters) at 50 yards (45 meters) range.

4-9.2 Cartridge, .38 Caliber Special, Ball, Lead, 158-Grain Bullet (A401).

4-9.2.1 Intended Use. This cartridge is procured from commercial sources for general use by the Military Police.

4-9.2.2 Description. The cartridge is 1.53 inches (3.88 centimeters) long and weighs approximately 231 grains (14.97 grams). The lead bullet weighs approximately 158 grains (10.24 grams), has a round tip, and a cup base end. It is inside lubricated with one cannelure containing a lubricant below the neck of the case that is crimped into a groove in the bullet.

4-9.2.3 Ballistic Data. This cartridge has a basic average muzzle velocity of 870 fps (265 meters per second) and produces an average maximum chamber pressure of 18,000 psi (1,265 kilograms/centimeters² [124.1 MP_a]).

4-9.3 Cartridge, .38 Caliber, Special, Ball, Steel Jacket, Copper-Plated, 158-Grain Bullet (A402).

4-9.3.1 Intended Use. This cartridge is procured from commercial sources for operational use by the Military Police and activities using .38 caliber revolvers.

4-9.3.2 Description. The cartridge is 1.55 inches (3.937 centimeters) long, weighs approximately 231 grains (14.97 grams), and is loaded with 4.5 grains (0.291 gram) of propellant. The bullet is 0.69 inch (1.75 centimeters) long, weighs 158 grains (10.24 grams), has a copper-plated steel jacket, and a lead slug. The bullet is inside lubricated and has one cannelure containing a lubricant that is crimped into a groove in the bullet below the neck of the cartridge case.

4-9.3.3 Ballistic Data. The cartridge has a basic average muzzle velocity of 879 fps and 850 fps (267 to 259 meters per second) at 25 feet (7.6 meters) from the muzzle. The average chamber pressure shall not exceed 18,000 psi (1,265 kilograms/centimeters [124.1 MP_a]).

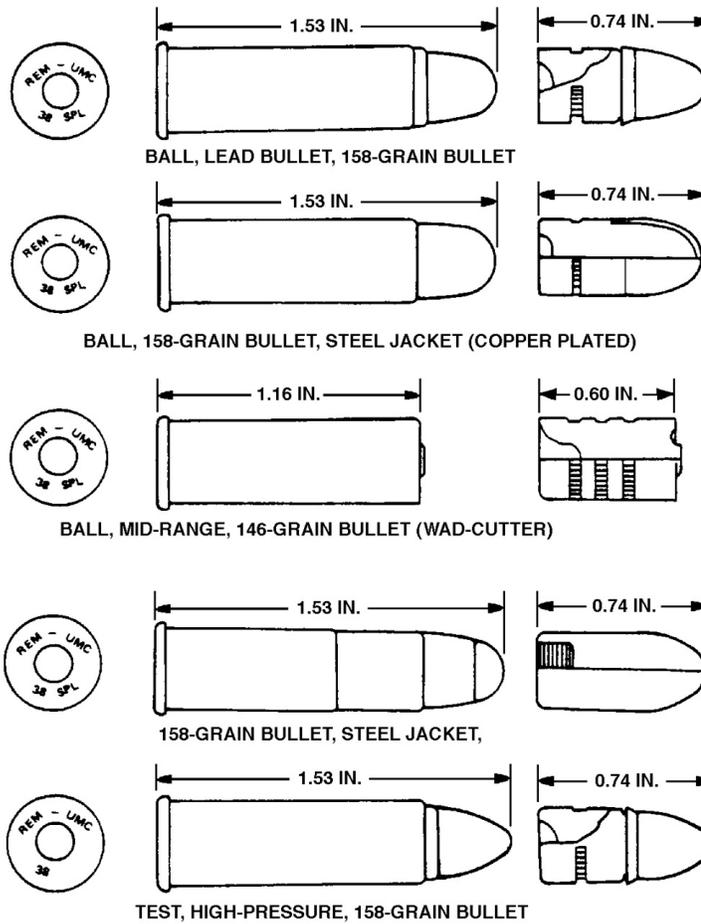


Figure 4-8 .38 Special Cartridges and Bullets

Table 4-6 .38 Caliber Ammunition

ITEM	DODIC/NAL C	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, .38 Caliber, Special, Ball, M41, 130-Grain Bullet	A400	4-9.1	1305-00-028-6629	7553580	50 per carton, 12 cartons per can M20, 2 cans (1,200 cartridges) per wooden box M22
	A400		1305-00-322-6391	7553580	50 per carton, 24 cartons per metal box, M2A1, 2 boxes (2,400 cartridges) per wirebound box
Cartridge, .38 Caliber Special, Ball, Lead, 158-Grain Bullet	A401	4-9.2	1305-00-028-6625	1520246	50 per carton, 40 cartons, (2,000 cartridges) per wooden box

Table 4-6 .38 Caliber Ammunition (Continued)

ITEM	DODIC/NAL C	PARA	NSN	REFERENCE NO.	PACKAGING
	A401		1305-00-699-1790	538T2BAX	50 per carton, 40 cartons (2,000 cartridges) per metal-lined wooden box
Cartridge, .38 Caliber, Special, Ball, Steel Jacket, Copper-Plated, 158-Grain Bullet	A402	4-9.3	1305-00-028-6623	10520245	50 per carton, 50 cartons (2,500 cartridges) per metal-lined wooden box
Cartridge, .38 Caliber, Blank	A403	4-9.4	1305-00-301-1689	T2UDA	50 per carton, 40 cartons (2,000 cartridges) per wooden box
Cartridge, .38 Caliber, Special, Ball, Steel Jacket With Tracer	A406	4-9.5	1305-00-301-1692	MIL-C-3030	50 per carton, 15 cartons per can M10, 2 cans (1,500 cartridges) per wooden box M12
	A406		1305-01-289-1949	7553082	50 per carton, 24 cartons per M2A1 container
Cartridge, .38 Caliber, Special +P, Lead Semi-Wadcutter Hollow Point Bullet	A413	4-9.6	1305-01-262-5008	WS27286	50 per box, 10 or 20 boxes per carton, commercial package

4-9.4 Cartridge, .38 Caliber, Blank (A403).

4-9.4.1 Intended Use. A blank cartridge procured from commercial sources and used for simulated firing and signaling in weapons that are chambered for the .38 caliber service round.

4-9.4.2 Description. The blank cartridge is 0.76 inch (1.9 centimeters) long. It uses the same case and primer as the service cartridge except it has no bullet. A crimped-in wad closes the cartridge mouth.

4-9.5 Cartridge, .38 Caliber, Special, Ball, Steel Jacket With Tracer (A406).

4-9.5.1 Intended Use. This cartridge is procured from commercial sources for use in most caliber .38 Special weapons. Its main purpose is illuminating the trajectory path of the bullet. Other uses include incendiary, and signaling purposes. There are no plans to procure additional quantities of this item once current inventories are depleted.

4-9.5.2 Description. The cartridge is 1.53 inches (3.8 centimeters) long, and weighs approximately 231 grains (14.96 grams). The load is 4.5 grains (.291 gram) of propellant. The bullet is 0.74 inch (1.87 centimeters) long, weighs approximately 158 grains (10.24 grams), and is lead with a steel jacket. The base of the bullet contains the tracer composition and the tip (point) is red for identification.

4-9.5.3 Ballistic Data. The ballistic data for his caliber, .38 Special Cartridge are as follows:

a. Velocity. The average velocity is 870 fps (265 meters per second) at the muzzle and 850 fps (259 meters per second) at 25 feet (7 meters) from the muzzle.

b. Pressure. The average chamber pressure shall not exceed 16,000 psi (1,124 kilograms/centimeters² [110.3 MP_a]).

c. Tracer. The range of the tracer is 353 yards (322 meters).

4-9.6 Cartridge, .38 Caliber, Special +P, Lead Semi-Wadcutter Hollow Point Bullet (A413).

WARNING

DO NOT FIRE CALIBER, .38 SPECIAL CARTRIDGES WITH A +P OR +P+ HEAD STAMP IN SMALL FRAME DESIGN REVOLVERS WITHOUT THE WRITTEN CONSENT OF THE COGNIZANT COMMAND. ALSO, DO NOT FIRE THE CARTRIDGES IN REVOLVERS WITH ALLOY OR ALUMINUM FRAMES OF ANY MANUFACTURER OR STEEL FRAMES MANUFACTURED PRIOR TO 1957.

4-9.6.1 Intended Use. A cartridge is procured from commercial sources for law enforcement use only. Use this cartridge only in caliber .38 Special and .357 Magnum Double Action Service Revolvers.

NOTE

This cartridge is approved for Naval Security Investigative Command use only. It is illegal for use in uniformed forces combat.

4-9.6.2 Description. The cartridge consists of a nickel plated cartridge case with a 158-grain (10.24 grams) lead semi-wadcutter, hollow point bullet.

4-9.6.3 Ballistic Data. This cartridge produces a minimum velocity of 1,005 fps (306 meters per second) from a test barrel and has an average maximum chamber pressure of 21,900 psi (1,539 kilograms/centimeters² [151 MP_a]).

4-9.7 Cartridge, .38 Caliber Signal, MK 140 (Green-Red) MOD 0 (L337).

4-9.7.1 Intended Use. This signal cartridge, Figure 4-9, fires from standard caliber .38 Special revolvers. It is for signaling purposes, particularly ground to air from jungle areas. See Table 4-7 for packaging and identification data.

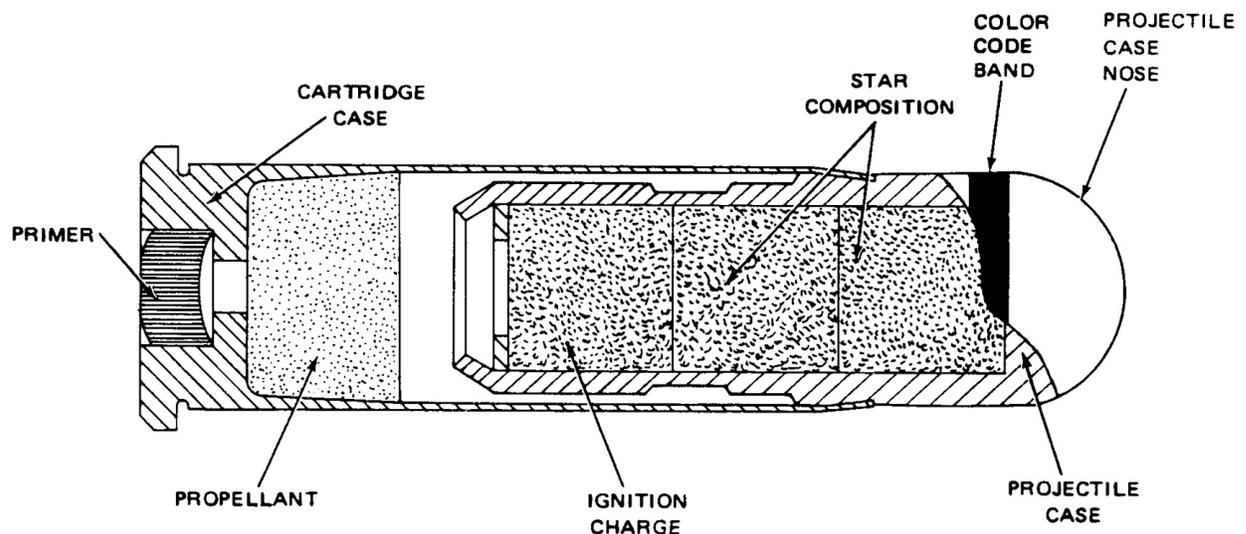


Figure 4-9 Signal Cartridge MK 140

Table 4-7 Signal Cartridge

ITEM	DODIC/NA LC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, .38 Caliber Signal, MK 140 (Green-Red) MOD 0	L337	4-9.7	1370-00-105-6658	2113414	50 per cardboard box, 24 boxes per metal container, 2 metal containers (2,400 cartridges) per wirebound wooden box

WARNING

THIS SIGNAL CARTRIDGES CONTAINS LEAD OXIDE. USE ADEQUATE VENTILATION AND AVOID BREATHING THE DUST OR FUMES. AFTER HANDLING OR EXPOSURE BY CONTACT, THOROUGHLY WASH HANDS BEFORE EATING OR SMOKING. KEEP AWAY FROM FOOD OR FOOD PRODUCTS. SERIOUS ILLNESS OR DEATH COULD RESULT.

NOTE

The MKs 130, 138, and 139 are obsolete (see Chapter 11). Do not use any of these cartridges found in the supply system.

4-9.7.2 Description. This signal cartridge consists of a brass cartridge case that contains a propellant charge and a projectile case that contains an ignition charge and the star composition. Fitted into the base of the cartridge is a percussion-type primer (Primer 116M-282A). A 3/16 inch (0.47 centimeter) red band, around the circumference of the projectile case, identifies the color display of the signal. The nose of the MK 140 is green. The colored band is to distinguish the signaling rounds from the ball rounds. The signaling cartridge is 1.55 inches (3.93 centimeters) long and 0.379 inch (0.96 centimeter) in diameter. The propellant charge is capable of projecting the display to an average height of 1,700 feet (518.16 meters) when there is no obstruction. It penetrates all jungle canopy except tree limbs and obstructions of considerable size.

4-9.7.3 Operation. This signal cartridge loads into the revolver chamber and fires the same way as ball ammunition. Because of the relatively high muzzle velocity, aim it at an angle of 90° from the horizontal.

4-9.7.4 Ballistic Data. The ballistic characteristics of the signal cartridge make it suitable for use as a defensive weapon at ranges not exceeding 50 yards (45 meters). An ignition delay in the MK 140 signal causes its display to become visible only after it has traveled 50 to 80 feet (15 to 24 meters). The MK 140 display is green for 3.3 seconds and then burns red for 3.6 seconds.

4-9.7.5 Safety Precautions. Observe the following safety precautions:

- a. This signal cartridge has a percussion type primer and easily initiates if struck with a hard object. Take care not to drop the cartridge or strike the primer with a hard object.
- b. Do not under any circumstances point a loaded sidearm toward friendly personnel.

4-9.7.6 Lodged Cartridge. If a signal cartridge ignites and lodges in the barrel, do not throw the gun down. Keep the gun pointed upward and let the cartridge burn out. Pressure buildup in the barrel may dislodge the projectile. (Heat build-up will not be excessive.) When the cartridge has burned out, allow the barrel to cool and clean it with a suitable tool. In an emergency situation, use another signal cartridge as clearing round. Exercise caution and self-protection. Firing another cartridge may render the weapon unserviceable.

4-10 .380 CALIBER AMMUNITION

The .380 cartridge is a widely used cartridge and is also known as 9mm Browning Short, 9 x 17mm, 9mm Corto, 9mm Kurz, and .380 ACP. It is primarily a self-defense cartridge. It has more stopping power than the .32 caliber cartridge but less than the .38 Special or the 9mm Parabellum. Do not fire this cartridge in the Colt .38 caliber automatic pistol. See Table 4-8 for packaging and identification data.

4-10.1 Cartridge, .380 Caliber Ball, 95 Grain Bullet (A415).

4-10.1.1 Intended Use. This cartridge, Figure 4-10, is for firing in pistols and submachine guns chambered for the .380 cartridge.

4-10.1.2 Description. The .380 caliber cartridge, Table 4-11, is 0.93 inch (2.36 centimeters) long and weighs approximately 146 grains (9.46 grams). The cartridge has a small pistol primer 0.175 inch (0.45 centimeter) in diameter that weighs 3.65 grains (.237 gram).

4-10.1.3 Cartridge Case. The cartridge case is 0.68 inch (1.72 centimeters) long, weighs approximately 48 grains (3.11 grains), is the rimless type, and has a case head and body diameter of 0.372 inch (0.94 centimeter). It contains a 2.5 grain (.162 gram) propellant charge.

4-10.1.4 Bullet. The bullet consists of a gilding metal jacket and a lead-alloy slug. It has no cannelure, is 0.46 inch (1.16 centimeters) long, and weighs approximately 95 grains (6.16 grams).

4-10.1.5 Ballistic Data. The ballistic data are as follows:

- a. Velocity. The average velocity is 860 fps (262 meters per second) at the muzzle and 830 fps (252 meters per second) at 25 feet (7 meters) range.
- b. Pressure. The average chamber pressure will not exceed 15,000 psi (1,054 kilograms/centimeters² [103.4 MP_a]).

Table 4-8 .380 Caliber Ammunition

ITEM	DODIC/NA LC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, .380 Caliber Ball, 95 Grain Bullet	A415	4-10.1	1305-00-068-2006	1238	Packaged commercially 50 per carton, 40 cartons (2,000 cartridges) per metal-lined wooden box
	A415		1305-00-344-2404	T2BGC	

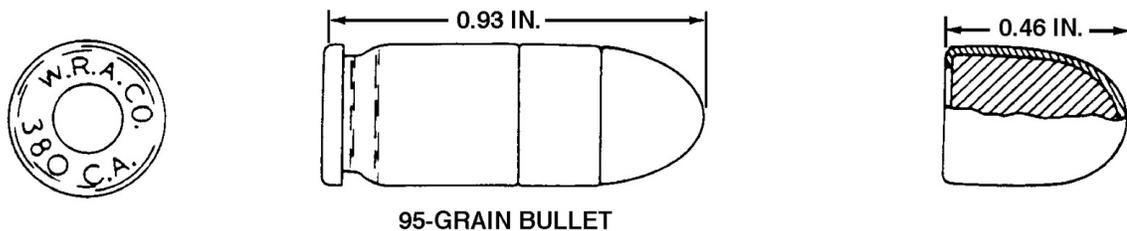


Figure 4-10 .380 Caliber Cartridge with 95-Grain Bullet

4-11 9 MILLIMETER AMMUNITION

The 9mm cartridge is known as 9mm Parabelum, 9mm Luger, and 9 x 19mm. It is for firing in all revolvers, pistols, and sub-machine guns chambered for 9mm. See Table 4-10 for packaging and identification data.

4-11.1 Cartridge, 9 Millimeter, Jacketed, Hollow Point, MK 243 MOD 0 (A260).

4-11.1.1 Intended Use. This cartridge produces a subsonic velocity and may be used in pistols and submachine guns chambered for 9mm cartridges. The cartridge should not be used in MP5SD sub-machine guns due to low velocities and poor terminal performance. The cartridge should not be used in UZI submachine gun due to poor feeding reliability. There are two cartridges which were produced to a different specifications. See Table 4-9.

4-11.1.2 Description. The cartridges are approximately 1.155 inches (2.94 centimeters) long and weigh approximately 210 grains (136.08 grams).

4-11.1.3 Cartridge Case. The brass cartridge case is 0.754 inches (1.91 centimeters) long and weighs approximately 57 grains (36.94 grams).

4-11.1.4 Bullet. The bullet consists of a copper alloy jacket and a lead-antimony slug, weighs 145 to 150 grains (90.72 to 97.20 grams), and is of a jacketed hollow point configuration.

4-11.1.5 Ballistic Data. The cartridge has a nominal velocity of 975 fps (297.18 mps) at 15 feet (4.57 meters) from the muzzle of the test barrel (4 inch) (10.16 centimeter). The muzzle energy is approximately 310 foot-pounds of energy, and an average maximum chamber pressure of 33,000 Copper Units of Pressure (CUP).

4-11.2 Cartridge, 9 Millimeter, Training Practice Tracer, M939 (A358).

4-11.2.1 Intended Use. This cartridge is intended for use in the M287 target practice launcher for training on the M136 (AT-4) Anti-armor weapon.

4-11.2.2 Description. This cartridge is the only authorized ammunition for use in the M287 Target Practice Launcher. The M287 Target Practice Launcher is a subcaliber training device for the M136 Antiarmor Weapon. There is no backblast simulator associated with the M939 training cartridge or the M287 target practice launcher. This cartridge has a lighter propellant charge than other 9 x 19mm small arms cartridges which enables it to duplicate the ballistic trajectory of the M136 High Explosive Anti-Tank (HEAT) round to 436 yards (400 meters). The projectile of the 9mm M939 has a tracer element which allows the user to visually observe the flight of the projectile to the impact point. The cartridge is visually distinguished from other 9 x 19mm cartridges by its unique color identification marks. The M939 cartridge has a red tip, a white band around the case mouth and one half of the cartridge base is painted black.

Table 4-9 MK 243 MOD 0 Specifications

Characteristic	NSN 1305-01-333-3929	NSN 1305-01-357-8488
Headstamp	9MM S	9MM L
Cartridge Case	Cannelure	No Cannelure
Velocity	865 ± 25 fps	975 ± 25 fps
Velocity Minimum After Waterproof Testing	625 fps	850 fps
Compressive Force Test	Information Only	Requirement
Function Test Weapons	MP5-N, MP5K-N, and M9	MP5-N, MP5K-N, and Sig P226
Function Requirement	M9 Information Only	All Weapons Required

Table 4-10 9mm Ammunition

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 9 Millimeter, Jacketed, Hollow Point, MK 243 MOD 0	A260	4-11.1	1305-01-357-8488	555727/WS33 257	50 per cardboard box, 20 boxes per M2A1 metal box, 2 metal boxes per wirebound box, 36 wirebound boxes per wooden pallet (72,000 rounds)
Cartridge, 9 Millimeter, Training Practice Tracer, M939	A358	4-11.2	1305-01-214-8684	13230107	50 cartridges per cardboard box, 5 boxes per sealed plastic bag, 12 bags per wooden box (3,000 rounds)
	A358		1305-01-307-5036	12913958	50 per carton, 20 cartons per metal can M2A1, 2 cans per wirebound box (2,000 rounds)
	A358		1305-01-307-5536	12913958	100 per carton and box, 20 cartons per wirebound wooden box, 48 boxes per pallet (96,000 rounds)
Cartridge, 9 Millimeter, Dummy, M917	A359	4-11.3	1305-01-206-8351	9386953	50 per cardboard container, 20 containers per M2A1 metal box, 2 boxes per wirebound box (2,000 rounds)
Cartridge, 9 Millimeter, Ball M1, 116-Grain Bullet, Parabellum	A360		1305-00-308-5810	6257589	64 per carton, 60 cartons (3,840 cartridges) per metal-lined wooden box
	A360		1305-00-308-5811	6257589	3,000 per wooden box
Cartridge, 9 Millimeter, Ball 115-Grain Bullet, Parabellum	A360	4-11.5	1305-00-855-5991	10542448	72 per carton, 20 cartons per metal box M2A1, 2 metal boxes (2,880 cartridges) per wirebound box
	A360		1305-00-935-6164	7553728	64 per carton, 24 cartons per metal box M2A1, 2 metal boxes (3,072 cartridges) per wirebound box
Cartridge, 9 Millimeter MK 144 MOD 0	A362	4-11.6	1305-01-157-2462	2502094	64 per carton, 24 cartons per metal box M2A1, 2 boxes (3,072 cartridges) per wirebound box
Cartridge, 9 Millimeter, MK 144 MOD 1	A362	4-11.7	1305-01-370-9432	6649932	50 per carton, 20 cartons per metal box M2A1, 2 boxes (2,000 cartridges) per wirebound box
Cartridge, 9 Millimeter, Ball, NATO, M882	A363	4-11.8	1305-01-172-9558	9354343	50 per carton, 20 cartons per metal box M2A1, 2 boxes (2,000 cartridges) per wirebound box
Cartridge, 9 Millimeter, Subcaliber, Marking	AA12-R ed Marking	4-11.9	1305-01-439-9717	TBD	50 per carton, 76 cartons (3,800 cartridges) per M548 Shipping and Storage Container

Table 4-10 9mm Ammunition (Continued)

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 9 Millimeter, Subcaliber, Marking	AA21-BI ue Marking	4-11.9	1305-01-449-3208	TBD	50 per carton, 76 cartons (3,800 cartridges) per M548 Shipping and Storage Container
Cartridge, 9 Millimeter, Frangible, MK 254 MOD 0	AA16		1305-01-442-8717	HS/4083/C02/ 1266	Packed 50 rounds per cartridge tray per cardboard box; 20 cardboard boxes (1,000 cartridges total) per M2A1 metal ammunition box; M2A1 metal ammunition boxes (2,000 cartridges) per wirebound box

TBD: To Be Determined

WARNING

DO NOT ATTEMPT TO USE THIS CARTRIDGE IN ANY WEAPON OTHER THAN THE M287 TARGET PRACTICE LAUNCHER. DUE TO THE LIGHT PROPELLANT CHARGE IN THE M939, OTHER WEAPONS WILL EXPERIENCE FUNCTION FAILURES AND OPERATORS MAY EXPERIENCE MINOR BURNS.

4-11.2.3 Ballistic Data. The M939 cartridge is specifically loaded to duplicate the ballistic trajectory of the M136 HEAT projectile to a range of 436 yards (400 meters). The M939 has a muzzle velocity of 950 fps (290 mps) at 70°F. The tracer of the M939 projectile has a burn range of approximately 490 yards (450 meters). The maximum range of the M939 cartridge is 1750 yards (1,600 meters).

4-11.3 Cartridge, 9 Millimeter, Dummy, M917 (A359).

4-11.3.1 Intended Use. This cartridge is completely inert and is intended for use in weapons familiarization and maintenance of 9mm weapons.

4-11.3.2 Description. The cartridge simulates service ammunition in detail to meet drill requirements. It is approximately 1.165 inches (2.96 centimeters) long, weighs approximately 180 grains (11.66 grams), and contains neither a primer nor propellant composition.

4-11.3.3 Cartridge Case. The brass cartridge case weighs approximately 55 grains (3.56 grams) and has two 0.213 inch (.54 centimeter) diameter holes 180° apart, approximately midway between the case mouth and the case rim.

4-11.3.4 Bullet. The bullet consists of a copper alloy jacket and a lead antimony core, is approximately 0.610 inches (1.55 centimeters) long and weighs approximately 124 grains (8.03 grams).

4-11.4 Cartridge, 9 Millimeter, Ball M1, 116-Grain Bullet, Parabellum (A360).

4-11.4.1 Intended Use. This cartridge is for firing in revolvers, pistols, and sub-machine guns chambered for the 9mm cartridge.

NOTE

Most inventories of M1 Ball appear on the suspended or restricted for usage list. Consult technical manual P-801 prior to use.

4-11.4.2 Description. The cartridge is 1.169 inches (2.96 centimeters) long, weighs approximately 182 grains (11.79 grams) and contains approximately 6 grains (.388 gram) of propellant composition.

4-11.4.3 Cartridge Case. The cartridge case is 0.754 inch (1.9 centimeters) long and weighs approximately 57 grains (3.69 grams). The diameter of the case at the head is 0.394 inch (1.0 centimeter) and 0.377 inch (0.95 centimeter) at the neck.

4-11.4.4 Bullet. The bullet consists of a gilding metal jacket and a lead-antimony slug, is 0.60 inch (1.5 centimeters) long, and weighs approximately 116 grains (7.52 grams).

4-11.4.5 Ballistic Data. The ballistic data are as follows:

a. Velocity. The average muzzle velocity is 1,400 fps (426 meters per second) and 1,390 fps (423 meters per second) at 25 feet (7 meters) range.

b. Pressure. The average chamber pressure shall not exceed 40,000 psi (2,812 kilograms/centimeters² [275.8 MP_a]).

4-11.5 Cartridge, 9 Millimeter, Ball 115-Grain Bullet, Parabellum (A360).

4-11.5.1 Intended Use. This cartridge is for firing in revolvers, pistols, and submachine guns chambered for 9mm cartridges.

4-11.5.2 Description. The cartridge is 1.555 inches (3.9 centimeters) long, weighs approximately 180 grains (11.66 grams), and contains approximately 6 grains (.388 gram) of propellant composition.

4-11.5.3 Cartridge Case. The brass cartridge case is 0.754 inch (1.9 centimeters) long and weighs approximately 57 grains (3.69 grams). The diameter of the case at the head is 0.394 inch (1.00 centimeter) and 0.377 inch (0.95 centimeter) at the mouth.

4-11.5.4 Bullet. The bullet consists of a gilding metal jacket and a lead-antimony slug, is 0.60 inch (1.5 centimeters) long, and weighs approximately 115 grains (7.54 grams).

4-11.5.5 Ballistic Data. The ballistic data for this cartridge are as follows:

a. Velocity. The average velocity is 1,225 to 1,290 fps (373 to 393 meters per second) at 15 feet (4.5 meters) from the muzzle of the test barrel 4-inch (10.16 centimeters).

b. Pressure. The average chamber pressure shall not exceed 37,000 psi (2,601 kilograms/centimeters² [255.1 MP_a]).

4-11.6 Cartridge, 9 Millimeter MK 144 MOD 0 (A362).

4-11.6.1 Intended Use. This cartridge produces a subsonic velocity and will fire from any pistols and sub-machine guns chambered for a 9mm cartridge. It is specially manufactured for use in the 9mm Pistol MK 22 MOD 0 designed for use with 9mm Pistol Noise Suppressor MK 3 MOD 0.

4-11.6.2 Description. The cartridge has a 158-grain (10.24 grams), fully jacketed, round nose bullet with a green tip for positive identification. The cartridge has a waterproof sealant on the case mouth and a crimped primer pocket.

4-11.6.3 Ballistic Data. The cartridge has a nominal muzzle velocity of 965 fps (294 meters per second). The addition of the noise suppressor reduces the velocity approximately 25 fps (7.6 meters per second). The muzzle energy is approximately 300 foot-pounds (406.8 Newton-Meters), and the maximum average chamber pressure is 35,700 Copper Units of Pressure (CUP).

4-11.7 Cartridge, 9 Millimeter, MK 144 MOD 1 (A362).

4-11.7.1 Intended Use. The MK 144 MOD 19 Millimeter Cartridge produces a subsonic velocity and is designed to function in the H&K MP5-N and MP5K-N submachine guns (suppressed). This cartridge is also designed to function in the H&K P9S pistol (suppressed) and in the Sig Sauer P226 pistol with reduced reliability.

4-11.7.2 Description. The cartridge has a 147 grain (9.52-gram), full metal jacket and a round nose bullet with a green tip for positive identification. The cartridge contains 4.2 grains (0.27 gram) of Hercules "Bullseye 84 Type" Propellant. The cartridge is waterproofed to 29 psig for up to 2 hours.

4-11.7.3 Ballistic Data. The cartridge has a nominal muzzle velocity of 975 fps (297 meters per second) at 15 feet (4.57 meters). The average chamber pressure does not exceed 37,000 psi.

4-11.8 Cartridge, 9 Millimeter, Ball, NATO, M882 (A363).

4-11.8.1 Intended Use. This cartridge is intended for use in all 9mm weapons. It is a round that can be NATO qualified.

4-11.8.2 Description. The cartridge is approximately 1.155 inches (2.93 centimeters) long, weighs approximately 190 grains (12.312 grams), and contains approximately 6 grains (.388 gram) of propellant composition.

4-11.8.3 Cartridge Case. The brass cartridge case is 0.754 inch (1.9 centimeters) long and weighs approximately 57 grains (3.69 grams). The diameter of the case at the head is 0.392 inch (0.99 centimeter) and 0.375 inch (0.95 centimeter) at the mouth.

4-11.8.4 Bullet. The bullet consists of a gilding metal jacket and a lead-antimony core, is 0.610 inch (1.54 centimeters) long, and weighs approximately 124 grains (8.04 grams).

4-11.8.5 Ballistic Data. The ballistic data for this cartridge are as follows:

a. Velocity. The average velocity is 370 to 400 meters per second (1,214 to 1,312 fps) at 16 meters (52.5 feet) from the muzzle of a test barrel, NATO 8-inch (20.32 centimeters).

b. Pressure. The average chamber pressure shall not exceed 33,400 psi (2,349 kilograms/centimeters² [230.3 MP_a]) when measured at the case mouth.

c. Accuracy. The average mean radius of all ten 10-round targets fired at a range of 50 meters (164 feet) from the muzzle of a test barrel shall not exceed 3.8 centimeters (1.5 inches).

4-11.9 Cartridge, 9 Millimeter, Subcaliber, Marking (AA12-Red Marking), (AA21-Blue Marking).

WARNING

COMMAND STANDARD OPERATING PROCEDURES FOR FORCE-ON-FORCE TRAINING SHALL BE FOLLOWED AT ALL

TIMES. ALL WEAPONS, MAGAZINES AND PERSONNEL SHALL BE SEARCHED FOR LIVE (NON-TRAINING) AMMUNITION TO PREVENT THE MIX-UP OF SERVICE ROUNDS WITH TRAINING ROUNDS. THE MARKING AMMUNITION SHALL NOT BE FIRED AT THE HEAD OR UNPROTECTED AREAS OF ANY PERSONNEL AS INJURY COULD RESULT.

WARNING

THE SOP REQUIRES ALL STANDARD CARTRIDGES TO BE REMOVED FROM THE TRAINING AREA AND THAT THE USE OF WSESRB APPROVED FACE MASK AND OTHER SAFETY EQUIPMENT MUST BE WORN BY ALL PERSONNEL.

CAUTION

DO NOT FIRE THE SUBCALIBER TRAINING AMMUNITION IN WEAPONS WHICH HAVE NOT BEEN FITTED WITH THE APPROPRIATE TRAINING ADAPTER. AN OBSTRUCTION OF THE BORE COULD RESULT WHICH MAY CAUSE A HAZARDOUS SITUATION.

4-11.9.1 Intended Use. The subcaliber 9mm Marking cartridges are procured for use in pistols, submachine guns, rifles, and carbines. The intended use for the cartridge is for force-on-force training of personnel in Close Quarter Battle (CQB). Weapons will not fire the subcaliber 9mm Marking Cartridge without the installation of a Marking Cartridge Adapter Kit, designed for that weapon type or model. When the plastic projectile impacts personnel, a mark is made on their clothing by the encapsulated marking material, indicating a hit. Weapons fitted with the subcaliber adapter kits will operate in the semi-auto or

full-auto mode thus simulating live fire. The recommended temperature range for the most effective reliability is between 32°F (0°C) and 105°F (40.5°C). The service life of the marking cartridge is approximately ten (10) years.

4-11.9.2 Description. The cartridge consists of a modified standard brass 9mm cartridge case, a primer, propellant, and a plastic sabot. The plastic sabot is loaded with a plastic projectile filled with either a red or blue, detergent based, nontoxic, washable, inert marking material. The overall cartridge length is approximately 1.120 inches (2.84 centimeters), and the weight is approximately 68.7 grains (4.45 grams). A conventional lead styphnate small pistol primer propels the projectile. The propellant load is required to function the weapon.

4-11.9.3 Cartridge Case. The modified 9mm brass/plastic cartridge is approximately 0.780 inches (1.98 centimeters) long and weighs approximately 62.0 grains (4.02 grams).

4-11.9.4 Projectile. The subcaliber is approximately 0.300 inches (0.76 centimeters) in diameter, 0.480 inches (1.22 centimeters) in length, and weighs no more than 6.6 grain (0.43 gram). DODIC AA12 is assigned to the "Red" Marking Cartridge, and DODIC AA21 is assigned to the "Blue" Marking Cartridge.

4-11.9.5 Ballistic Data.

a. **Velocity.** The average muzzle velocity of the plastic shall not exceed 550 fps (167.6 meters per second), measured 5 feet (1.5 meters) from the muzzle. The muzzle velocity decays very rapidly due to lack of projectile mass.

b. **Maximum Effective Range.** The maximum effective range for training will vary depending upon which weapon type is being utilized. For most pistols the effective range is approximately 35 feet (10 meters). For most long guns (MP5N submachine gun, M4 Carbine and M16 rifles) the effective range will be approximately 80 feet (25 meters). In all cases, the projectile will travel a much greater distance; however, accuracy will deteriorate rapidly.

4-11.9.6 Approved Adapter Kits. All Weapon System Explosives Safety Review Board (WSESRB) approved Adapter Kits will prevent the chambering and firing of a standard 9mm or 5.56mm cartridge or prevent a potentially lethal projectile from exiting the muzzle, and shall be painted NATO blue to provide a visual that the weapon has been modified for training.

a. **Sig Sauer P226 Pistol.** The Sig Sauer P226 Pistol adapter kit consists of a replacement barrel only. It is painted NATO blue and is marked "FOR TRAINING USE ONLY", "NO STANDARD AMMO". NSN: 1005-LL-L99-5748.

b. **H&K MP5N Submachine Gun.** The adapter kit consists of a barrel sleeve insert, a holding block, and replacement bolt locking piece. The holding block is painted NATO blue and is marked "FOR TRAINING USE ONLY", "NO STANDARD AMMO". NSN: 1005-LL-L99-5899.

c. **H&K MP5K Submachine Gun.** The MP5K Adapter Kit is identical to the MP5N Adapter Kit except for the length for the barrel sleeve. The holding block is painted NATO blue and is marked "FOR TRAINING USE ONLY", "NO STANDARD AMMO". NSN: 1005-LL-L99-5899

d. **M4A1 Carbine Adapter Kit.** The adapter kit consists of a replacement upper receiver, two clear plastic magazines, and a padded carry case. The adapter kit upper receiver is delivered with no hand guards or any sight mounted on the M4A1 Carbine flat top receiver. The barrel is painted NATO blue and is marked "FOR TRAINING USE ONLY", "NO STANDARD AMMO". NSN: 1005-01-454-9283.

e. **M16A2 Rifle Adapter Kit.** The adapter kit consists of a replacement upper receiver, two clear plastic magazines, a replacement buffer, and a padded carry case. The barrel is painted NATO blue and is marked "FOR TRAINING USE ONLY", "NO STANDARD AMMO". NSN: 1005-01-457-4015.

f. **M9 Berretta Adapter Kit.** The adapter kit consists of a replacement barrel only. It is painted NATO blue and is marked "FOR TRAINING USE ONLY". "NO STANDARD AMMO". NSN: 1005-01-457-4016.

g. USMC .45 MEUSOC Pistol Adapter Kit.

The adapter kit consists of a replacement barrel and slide, training slide lock lever, training feed ramp and two magazines. The barrel is painted NATO blue and is marked "FOR TRAINING USE ONLY", "NO STANDARD AMMO". NSN: 1005-01-457-4018.

4-11.10 Cartridge, 9 Millimeter, Frangible, MK 254 MOD 0 (AA16).

4-11.10.1 Intended Use. This cartridge is authorized for use in the M9 pistol by Chief of Naval Education and Training (CNET) for indoor training. This cartridge is also authorized for use in P226 pistol, P228 pistol and H&K MP5 series of sub-machine guns for training purposes by NAVSPECWAR, both within CONUS and OCONUS.

4-11.10.2 Description. The 9mm Frangible consists of a frangible projectile, brass cartridge case, small arms propellant and a lead free primer. The projectile, which weights approximately 81.95 grains (5.31 grams), consists of copper and tungsten powder with a nylon polymer binder. The cartridge is loaded with approximately 6.36 grains (0.412 grams) WPR 289 propellant. WPR 289 propellant is a smokeless and double case propellant.

4-11.10.3 Ballistic Data. This cartridge has a nominal muzzle velocity of 445.9 meters per second (1,463 feet per second) at 4.6 meter (15 feet). The average chamber pressure does not exceed 31,200 psi (215.1 MP_a).

4-11.11 Cartridge, 9mm Signal MODs (MK 121 L331-Red) (MK 122 L332-Green) (MK 123 L333-Yellow).

4-11.11.1 Intended Use. These signal cartridges, Figure 4-11, are for nighttime signaling and fired from a 9mm, semiautomatic pistol. They were specially designed for use by Sea-Air-Land (SEAL) teams. However, any personnel equipped with a 9mm semiautomatic pistol may use them for appropriate nighttime signaling. See Table 4-11 for packaging and identification data.

WARNING

THESE SIGNAL CARTRIDGES CONTAIN LEAD OXIDE. USE ADEQUATE VENTILATION AND AVOID BREATHING THE DUST OR FUMES. AFTER HANDLING OR EXPOSURE BY CONTACT, THOROUGHLY WASH HANDS BEFORE EATING OR SMOKING. KEEP AWAY FROM FOOD OR FOOD PRODUCTS. SERIOUS ILLNESS OR DEATH COULD RESULT.

4-11.11.2 Description. The three cartridges are the same, physically. The differences are the chemical elements of the pyrotechnic composition, the display color, the band color, and the nomenclature.

4-11.11.3 Color Band. A 3/16 inch (0.47 centimeter) band of the display color painted around the projectile nose identifies each signal cartridge display. The band distinguishes the signal round from the ball round used in the same pistol.

4-11.11.4 Compositions. The projectile case contains an ignition charge and a pyrotechnic composition. Centered in the base of the cartridge case is a primer (Primer 116M-282A). The Ball Powder® propellant charge projects the signal cartridge to approximately 1,650 feet (502 meters). This ensures an effective display above most jungle foliage.

4-11.11.5 Operation. The signal cartridge loads into the 9mm pistol magazine the same as ball rounds, or it loads singly into the pistol breech. An empty magazine must be in the weapon when loading a single round into the breech or it will not fire. The propellant charge in the signal cartridge is not powerful enough to force the slide back to eject the empty case of the fired round, so, it is necessary to recock the weapon after each shot of the signal cartridge.

4-11.11.6 Display. The display produced by the signal cartridge appears as a continuous streak of colored light beginning a few feet above the firing point. The average burning time of the signal is approximately 4 seconds.

4-11.11.7 Safety Precautions. Avoid dropping the signal cartridge or striking the primer with any hard object. Do not, under any circumstances point a loaded pistol toward friendly personnel.

4-11.11.8 Lodged Cartridge. If a signal cartridge ignites and lodges in the weapon barrel, do not throw the gun down. Point the gun upward and let the cartridge burn out. The pressure buildup in the barrel may dislodge the projectile. Heat buildup will not be excessive. After the cartridge has burned out, immediately remove the magazine clip, let the barrel cool, and clean it with a suitable cleaning tool. In an emergency situation, a signal cartridge works as a clearing round, although the act may render the weapon unserviceable.

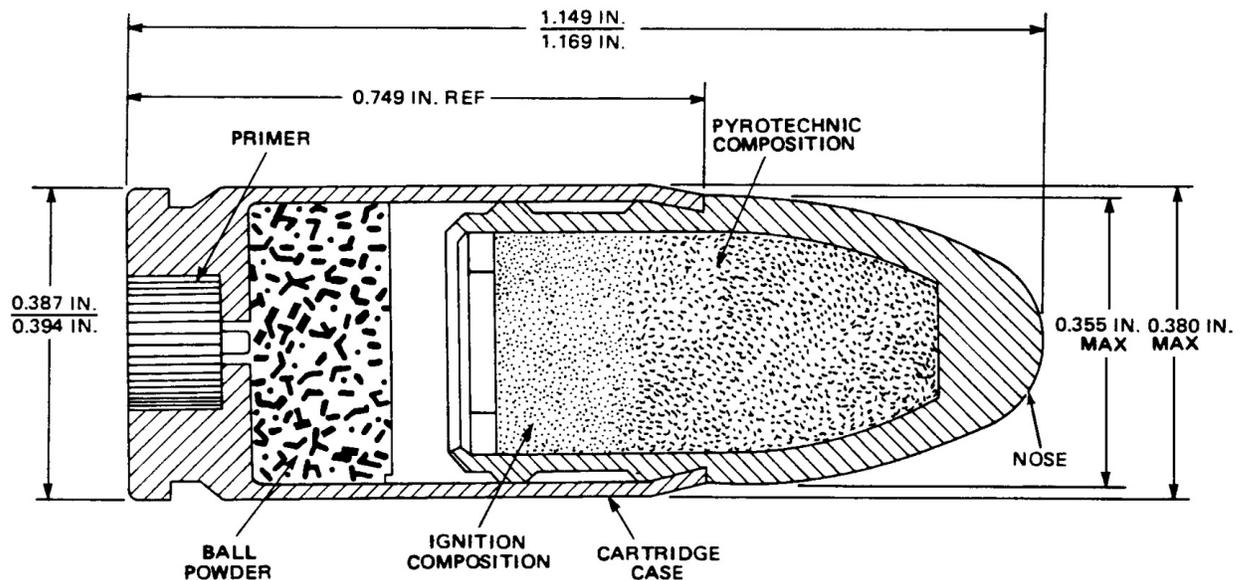


Figure 4-11 Signal Cartridge MK 121, 122, and 123

Table 4-11 9mm Signal Cartridges

ITEM	DODIC/NAL C	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 9mm Signal MODs	MK 121 L331-Red	4-11.11	1305-00-804-4466	2150811 WS 3011A	MK 121, 122, and 123 Signal Cartridges are packaged 50 per cardboard box, 25 boxes (1,250 cartridges) per metal container
Cartridge, 9mm Signal MODs	MK 122 L332-Green	4-11.11	1370-00-804-4468	2113198 WS 3011A	
Cartridge, 9mm Signal MODs	MK 123 L333-Yellow	4-11.11	1370-00-804-4409	2113199 WS 3011A	

4-12 5.56 MILLIMETER AMMUNITION

The 5.56mm cartridges are for use in the M16 Series Rifles, Colt Model 727 Carbine, M4 Carbine, MK 23 Light Machine Gun (Stoner), and the M249 Squad Automatic Weapon (SAW). Figure 4-13 illustrates the various 5.56mm cartridges. See Table 4-12 for packaging and identification data.

4-12.1 Cartridge, 5.56 Millimeter, Ball, M855 (A059), (A064).

4-12.1.1 Intended Use. This cartridge is procured for use in the M16A2 rifle, 727 carbine, M4 carbine and M249 SAW for combat, antipersonnel, and light material targets. It has improved penetration performance over the Cartridge, 5.56mm, Ball, M193.

NOTE

Do not use this cartridge in M16 series rifles and carbines with a 1-in-12 inch (1 turn in 30.48 centimeters) rate of rifling twist or the MK 23 Light Machine gun (Stoner). The slower rate of rifling twist in those weapons will not stabilize the M855 projectile, resulting in poor accuracy and performance.

4-12.1.2 Description. The cartridge, Figure 4-12, is 2.26 inches (5.74 centimeters) long, weighs approximately 190 grains (12.31 grams), and contains a percussion-type primer. The load

with 26.1 grains (1.69 grams) of type WC 844 propellant with a projectile weight of approximately 62 grains (4.017 grams).

4-12.1.3 Ballistic Data. The cartridge ballistic data are as follows:

a. Velocity. The average velocity is 3,025 fps (922 meters per second) at 78 feet (23 meters) from the muzzle.

b. Pressure. The average chamber pressure shall not exceed 55,000 psi (3,868 kilograms/centimeters² [379.3 MP_a]).

4-12.2 Cartridge, 5.56 Millimeter, Tracer, M856 (A063), (A064).

4-12.2.1 Intended Use. This cartridge is used in the M16A2 rifle, 727 and M4 carbines, and the M249 SAW for illuminating the trajectory path, incendiary, and signaling purposes.

NOTE

Do not use this tracer cartridge in M16 series rifles and carbines with a 1-in-12 inch rate (2.54 in 30.48 centimeters) of rifling twist or the MK 23 Light Machine gun (Stoner). The slower rate of rifling in those weapons will not stabilize the M856 projectile. This results in poor accuracy and performance.

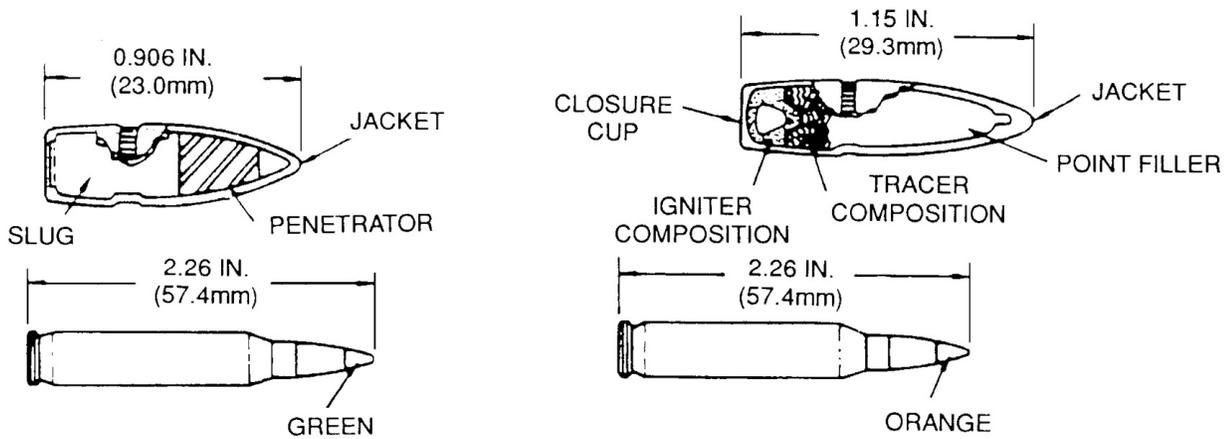
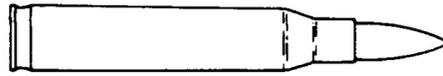
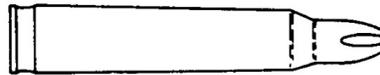


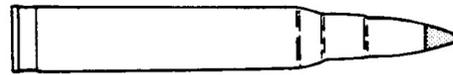
Figure 4-12 5.56mm M855 (left) and M856 (right) Cartridges



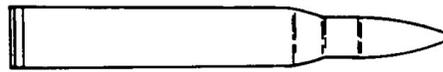
BALL



RIFLE GRENADE



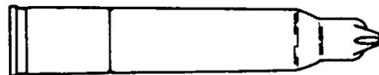
TRACER



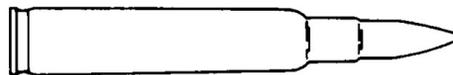
HIGH PRESSURE TEST (HPT)



DUMMY



BLANK



DUMMY, INERT LOADED

Figure 4-13 5.56mm Cartridges

Table 4-12 5.56mm Ammunition

ITEM	DODIC/N ALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 5.56 Millimeter, Ball, M855	A059	4-12.1	1305-01-155-5459	9354626	10 rounds per clip, 12 clips per M8 bandoleer, 7 bandoleers per M2A1 metal box (840) rounds, 2 boxes per wirebound wooden box (1,680 rounds)
	A059		1305-01-155-5462	9357724	10 rounds per clip, 14 clips per M3 bandoleer, 6 bandoleers per M2A1 metal box, (840 rounds) 2 boxes (1,680 cartridges) per wirebound box (1,680 rounds)
Cartridge, 5.56 Millimeter, Dummy, M199	A060	4-12.3	1305-00-764-8437	10534021	20 per carton, 41 cartons per metal box M2A1, 2 boxes (1,640 cartridges) per wirebound box
Cartridge, 5.56 Millimeter, Tracer, M856	A063	4-12.2	1305-01-155-5457	9342865	20 per cartons, 41 cartons per M2A1 metal box, 2 boxes (1,640 cartridges) per wirebound box
Cartridge, 5.56 Millimeter, Ball, M855 Cartridge, 5.56 Millimeter, Tracer, M856	A064	4-12.1 4-12.2	1305-01-131-5246	9349300	Linked 4 Ball M855 to 1 tracer M856 with M27 links, 200 per plastic ammo magazine with bandoleer, 2 magazines per metal box, 2 boxes (800 M2A1 cartridges) per wirebound box
	A064		1305-01-252-0153	9342863	Linked 4 Ball M855 to 1 tracer with M27 links, 200 per plastic ammo magazine with bandoleer, 4-bandoleer per M2A1 metal box, 2 boxes (860 cartridges) per wirebound box
Cartridge, 5.56 Millimeter, Ball, M855	A064		1305-01-156-7584	9354587	Linked 4 Ball M855 to 1 tracer M856, 200 per belt with M27 links and feedstrap per plastic ammo magazine in M3 bandoleer, 2 magazines/bandoleers per M2A1 metal box, 2 metal boxes (800 cartridges) per wirebound box
Cartridge, 5.56 Millimeter, M862 Short Range Training Ammunition (SRTA)	A065	4-12.9	1305-01-287-9659	MIL-C-70725A	Commercial pack: packed 30 cartridges per carton; 40 cartons per fiberboard box in barrier bag, 2 battier bags (total 2,400 cartridges) per fiberboard box
Cartridge, 5.56 Millimeter, Ball, M193	A066	4-12.4	1305-00-064-6549	10523632	20 per carton, 50 cartons (1,000 cartridges) per fiberboard container

Table 4-12 5.56mm Ammunition (Continued)

ITEM	DODIC/N ALC	PARA	NSN	REFERENCE NO.	PACKAGING
	A066		1305-00-069-0869	10523632	20 per carton, 36 cartons per metal box M2A1, 2 metal boxes (1,440 cartridges) per wirebound box
	A066		1305-00-926-3970	10523632	20 per carton, 42 cartons per metal box M2A1, 2 metal boxes (1,680 cartridge) per wirebound box
Cartridge, 5.56 Millimeter, Ball, M193	A066	4-12.4	1305-00-773-1257	10523632	20 per carton, 7 cartons per M3 bandoleer, 4 bandoleers per metal box M2A1, 2 metal boxes (1,120 cartridges) per wirebound box
Cartridge, 5.56 Millimeter, Tracer, M196	A068	4-12.5	1305-00-965-0832	10534193	20 per carton, 36 cartons per metal box M2A1, 2 metal boxes (1,440 cartridges) per wirebound box
	A068		1305-00-914-4719	10534193	20 per carton, 41 cartons per metal box M2A1, 2 metal boxes (1,640 cartridges) per wirebound box
Cartridge, 5.56 Millimeter, Test, High-Pressure, M197	A070	4-12.6	1305-00-063-0319	10533839	20 per carton, 50 cartons (1,000 cartridges) per fiberboard box; special markings in red lettering NOT FOR SERVICE USE
Cartridge, 5.56 Millimeter, Ball, M193	A071	4-12.4	1305-00-926-3930	7553296	10 per clip, 14 clips per band, 6 bands w/6 mag filler per metal box M2A1, 2 metal boxes (1,680 cartridges) per wirebound box
	A071		1305-01-255-6276	10523632	10 per clip, 3 clips per carton, 4 cartons per M8 bandoleer, 7 bandoleers per M2A1 metal box, 2 boxes (1,680 cartridges) per wirebound box
Cartridge, 5.56 Millimeter, Ball, M193 Cartridge, 5.56 Millimeter, Tracer, M196	A073	4-12.4 4-12.5	1305-00-935-9253	10523632/ 10534193	Linked 4 ball M193, 1 tracer M196, 150 cartridges per belt, 6 belts per metal box M2A1, 2 boxes (1,800 cartridges) per wirebound box
Cartridge, 5.56 Millimeter, Blank, M200	A080	4-12.7	1305-00-764-8436	7553347	20 per carton, 52 cartons per metal box M2A1, 2 boxes (2,080 cartridges) per wirebound box
	A080		1305-00-926-9302	10534344	20 per carton, 47 cartons per metal box M2A1, 2 boxes (1,880 cartridges) per wirebound box

Table 4-12 5.56mm Ammunition (Continued)

ITEM	DODIC/N ALC	PARA	NSN	REFERENCE NO.	PACKAGING
	A080		1305-00-182-3217	7553347	20 per carton, 57 cartons per metal box M2A1, 2 boxes (2,280 cartridges) per wirebound box
Cartridge, 5.56 Millimeter, Semi-Jacketed Frangible	AA40	4-12.10	1305-01-463-8232	HS/4083/C01/1240	Packed 20 cartridges per carton; 41 cartons (820 cartridges) per M2A1 metal ammunition box; 2 M2A1 metal boxes per wirebound box
	AA40	4-12.10	1305-01-492-8575	HS/4083/C01/1240	Packed 10 cartridges per clips; 3 clips per carton; 28 cartons (840 cartridges) per M2A1 metal ammunition box; 2 M2A2 metal boxes per wirebound box
Cartridge, 5.56 Millimeter Special Ball, Long Range, MK 262 MOD 0	AA53		1305-01-497-9996	53711-752078 2	20 rounds per carton, 41 cartons (820 rounds) per M2A1 metal ammunition can. Two (2) M2A1 metal ammunition boxes (1,640 rounds) per wirebound box
	AA53		1305-01-507-7511	53711-752078 2A	20 rounds per carton, 41 cartons (820 rounds) per M2A1 metal ammunition can. Two (2) M2A1 metal ammunition boxes (1,640 rounds) per wirebound box.
Cartridge, 5.56 Millimeter, M862 Short Range Training Ammunition (SRTA)	AA68	4-12.9	1305-01-493-3653	MIL-C-70725A	Military pack; packed 20 cartridges per cardboard carton; 41 cartons per M2A1 metal ammunition box; 2 M2A1 boxes (total 1,640 cartridges) per wirebound box
Cartridge, 5.56 Millimeter, (AP), M995	AA69	4-12.12	1305-01-493-3632	7553347	10 rounds per clip, 3 clips per carton (30 cartridges), 4 cartons per M8 Bandoleer (120 cartridges) 7 bandoleers per M2A1 Container (840 cartridges), 2 M2A1 Containers per wirebound box, (1680 cartridges)
Cartridge, 5.56 Millimeter, M995	AA01	4-12.12	1305-01-393-7050	12590218	1 plastic magazine per bandoleer (200 cartridges) 4 bandoleers per PA108 Ammunition Can (800 cartridges), 2 PA108 Ammunition Cans per wirebound box (1600 cartridges)

Table 4-12 5.56mm Ammunition (Continued)

ITEM	DODIC/N ALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 5.56 Millimeter, M995	AA02	4-12.12	1305-01-393-7052	12590218	1 plastic magazine per bandoleer (200 cartridges) 4 bandoleers per PA108 Ammunition Can (800 cartridges), 2 PA108 Ammunition Cans per wirebound box (1600 cartridges)
Cartridge, 5.56 Millimeter, Grenade, Rifle, M195	G841	4-12.8	1330-00-926-4011	10534926	20 per carton, 47 cartons per metal box M2A1, 2 boxes (1,880 cartridges) per wirebound box
	G841		1330-00-764-8435	10534926	20 per carton, 52 cartons per metal box M2A1, 2 boxes (2,080 cartridges) per wirebound box

4-12.2.2 Description. The cartridge, Figure 4-13, is 2.26 inches (5.74 centimeters) long, weighs 1.91 grains (12 gram), and contains a percussion-type primer. It contains a load of approximately 24.7 grains (1.600 grams) type WC 844 propellant and a projectile weighing 63.7 grains (4.127 grams). The projectile base contains an igniter composition and a pyrotechnic tracer composition.

4-12.2.3 Ballistic Data. The cartridge ballistic data are as follows:

a. Velocity. The average velocity is 2,870 fps (874 meters per second) at 78 feet (23 meters) from the muzzle.

b. Pressure. The average chamber pressure shall not exceed 55,000 psi (3,866 kilograms/centimeters² [379.3 MP_a]).

4-12.3 Cartridge, 5.56 Millimeter, Dummy, M199 (A060).

4-12.3.1 Intended Use. A cartridge used in the M16 rifle series for training personnel in loading or unloading, simulated fire, and rifle inspection.

4-12.3.2 Description. The cartridge is 2.260 inches (5.7 centimeters) long, weighs 150.0 grains (9.72 grams), and contains neither primer nor propellant.

4-12.3.3 Cartridge Case. The cartridge case has six longitudinal corrugations impressed upon the case for identification. It is 1.760 inches (4.47 centimeters) long and weighs 94.0 grains (6.09 grams).

4-12.3.4 Bullet. The bullet is 0.890 inch (2.26 centimeters) long and weighs 56.0 grains (3.63 grams).

4-12.4 Cartridge, 5.56 Millimeter, Ball, M193 (A066), (A071), (A073).

4-12.4.1 Intended Use. A cartridge used for combat purposes in the M16 series rifles, M177 Carbine, MK 23 Light Machine gun, and the M249 SAW.

4-12.4.2 Description. The cartridge is 1.9 inches (4.82 centimeters) long, weighs approximately 107 grains (6.93 grams), is loaded with 7.0 grains (.45 gram) of propellant, and contains a primer of 4.0 grains (.26 gram) of lead styphnate.

4-12.4.3 Cartridge Case. The cartridge case is 1.760 inches (4.47 centimeters) long and weighs approximately 94 grains (6.09 grains).

4-12.4.4 Bullet. The bullet is 0.755 inch (1.9 centimeters) long and weighs approximately 56 grains (3.63 grams).

4-12.4.5 Ballistic Data. The ballistic data for the M193 cartridge are as follows:

a. Velocity. The average velocity is 3,250 fps (990 meters per second) at 15 feet (4.5 meters) from the muzzle.

b. Pressure. The average chamber pressure shall not exceed 52,000 psi (3,656 kilograms/centimeters² [358.6 MP_a]).

c. Accuracy. The average mean radii of all targets at the time of acceptance are not greater than 2.0 inches (5 centimeters) at 200 yards (1.82 meters) range.

4-12.5 Cartridge, 5.56 Millimeter, Tracer, M196 (A068), (A073).

4-12.5.1 Intended Use. A tracer cartridge used for illuminating the trajectory path, incendiary, and signal purposes.

4-12.5.2 Description. This cartridge is 2.260 inches (5.7 centimeters) long, weighs approximately 177 grains, contains 25.3 grains (1.64 grams) of propellant, and has a primer of 4.0 grains (.26 gram) of lead styphnate.

4-12.5.3 Cartridge Case. The cartridge case is 1.760 inches (4.4 centimeters) long and weighs approximately 94 grains (6.09 grams).

4-12.5.4 Bullet. The bullets 0.895 inch (2.27 centimeters) long, weighs 54.0 grains (3.50 grams), contains 2.7 grains (.17 gram) of tracer composition, and the tip is red for identification.

4-12.5.5 Ballistic Data. The ballistic data for the cartridge as are as follows:

a. Velocity. The average velocity is 3,200 fps (975 meters) at 15 feet (4.5 meters) from the muzzle.

b. Pressure. The average chamber pressure shall not exceed 52,000 psi (3,656 kilograms/centimeters² [358.6 MP_a]).

c. Range. The trace shall be visible beginning from 75 yards (68.58 meters) from the muzzle and lasting not less than 500 yards (457 meters) from the muzzle.

WARNING

**UNAUTHORIZED PERSONNEL
MAY NOT USE HIGH-PRESSURE
TEST CARTRIDGES. SERIOUS
INJURY OR DEATH MAY
RESULT.**

4-12.6 Cartridge, 5.56 Millimeter, Test, High-Pressure, M197 (A070).

4-12.6.1 Intended Use. The M197 cartridge is not for service use. Only authorized personnel may use this round to proof-test barrels and weapons.

4-12.6.2 Description. This cartridge is 2.260 inches (5.7 centimeters) long, weighs approximately 174 grains (11.28 grams), is loaded with 20.0 grains (1.30 grams) of propellant, and contains a 4.0 grain (.259 gram) lead-styphnate primer.

4-12.6.3 Cartridge Case. The cartridge case is 1.760 inches (4.4 centimeters) long, weighs 94.0 grains (6.09 grams), and is stannic stained or nickel plated for identification.

4-12.6.4 Bullet. The bullet is 0.895 inch (2.27 centimeters) long and weighs 56.0 grains (3.63 grams).

4-12.6.5 Ballistic Data. The cartridge has a maximum high chamber pressure of 70,000 ± 3,000 psi (4,921 ± 210 kilograms/centimeters² [482.7 ± 20.6 MP_a])

4-12.7 Cartridge, 5.56 Millimeter, Blank, M200 (A080).

4-12.7.1 Intended Use. A cartridge used in the M16 rifle series for simulating fire during maneuvers, signaling purposes, and for firing salutes. Use of the blank firing attachment is necessary when firing this blank cartridge.

4-12.7.2 Description. The cartridge is 1.9 inches (4.82 centimeters) long, weighs approximately 107 grains (6.93 grams), is loaded with 7.0 grains (.45 gram) of propellant, and contains a primer of 4.0 grains (.26 gram) of lead styphnate. The cartridge has a cannellure approximately 1/2 inch (1.27 centimeter) from the head, and a seven petal rose crimp closes the mouth.

4-12.8 Cartridge, 5.56 Millimeter, Grenade, Rifle, M195 (G841).

4-12.8.1 Intended Use. A cartridge for use in M16 series rifles and carbines for projecting grenades and ground signals. It is also used to launch the MK 87 Line-Throwing Rifle Adapter Kit (SW350-A1-MMO-010) projectile.

WARNING

DO NOT USE THE M195 RIFLE GRENADE CARTRIDGE AS A SUBSTITUTE FOR THE M200 BLANK CARTRIDGE. SERIOUS INJURY OR LOSS OF LIFE COULD RESULT.

4-12.8.2 Description. This cartridge is 1.9 inches (4.82 centimeters) long, weighs approximately 126 grains (8.164 grams), contains a 4.0 grain (.259 gram) lead-styphnate primer and a propellant load of approximately 25.0 grains (1.62 grams). The M195 cartridge can be identified by the seven petal rose crimp on the mouth and the absence of a bullet.

4-12.8.3 Ballistic Data. The cartridge propels a 1.56 pound (.708 kilogram) grenade at 140 to 165 fps (42.6 to 50.29 mps) [measured at 5.6 feet (1.70 meter) beyond the forward end of the grenade] when fully positioned for launching.

4-12.9 Cartridge, 5.56 Millimeter, M862 Short Range Training Ammunition (SRTA) (A065), (AA68).**WARNING**

DO NOT USE SHORT RANGE TRAINING AMMUNITION (SRTA) IN FORCE-ON-FORCE TRAINING. SEVERE INJURY OR DEATH MAY RESULT IF PEOPLE ARE STRUCK BY SRTA CARTRIDGE PROJECTILES.

4-12.9.1 Intended Use. These cartridges will be used to provide a realistic restricted range training alternative to 5.56mm service cartridges. **The 5.56mm M862 SRTA cartridges will not be used in force-on-force training.**

4-12.9.2 Description. The M862 cartridge has a blue projectile and is sometimes referred to as the "blue bullet". The M862 cartridge is 57.2mm (2.25 inches) in length and weighs 108 grains (7.00 grams). The M2 training bolt (NSN 1005-01-184-4041), which is powder-coated blue to indicate training use, converts the M16 series rifle and the M4A1 carbine into blowback-operated weapons to function the M862 cartridges.

4-12.9.3 Cartridge Case. The cartridge consists of a brass case with a percussion primer, approximately 8.6 grains (0.56 grams) of propellant composition, and a plastic combination case liner/projectile.

4-12.9.4 Bullet. The bullet is a blue polycarbonate blend. It weighs 3.52 grain (0.23 gram).

4-12.9.5 Ballistic Data. The ballistic data for the 5.56mm M862 cartridge is as follows:

a. Velocity. The average velocity obtained during tests is 3,999 feet per second (1,218.9 meters per second).

b. Pressure. The average chamber pressure obtained during tests is 11,609 psi (80.04 MP_a).

c. Accuracy. The maximum average mean radius allowed for M862 cartridges is 30mm (1.18 inches) measured at 25 meters (27.3 yards).

d. The maximum range is 250 meters (273.4 yards).

4-12.10 Cartridge, 5.56 Millimeter, Semi-Jacketed Frangible (AA40).

4-12.10.1 Intended Use. This cartridge is authorized for use in the M4A1 carbine for indoor/outdoor and Close Quarter Combat (CQB) training by NAVSPECWAR, both within CONUS and OCONUS.

4-12.10.2 Description. The 5.56mm Semi-Jacketed Frangible consists of semi-jacketed frangible projectile, brass cartridge case, small arms propellant and a lead free primer. The projectile, which consists of copper and tungsten powder with a nylon polymer binder, is semi-jacketed with a copper jacket and weighs approximately 45.1 grains (2.92 grams). The cartridge is loaded with approximately 27.5 grains (1.78 grams) of WC 732 propellant.

4-12.10.3 Ballistic Data. This cartridge has a nominal muzzle velocity of 938.5 meters per second (3,079 feet per second), and the average chamber pressure does not exceed 55,000 psi (379.2MP_a) at ambient temperature.

4-12.11 Cartridge, 5.56 Millimeter Special Ball, Long Range, MK 262 MOD 0 (AA53).

4-12.11.1 Intended Use. The original purpose for the development of the MK 262 MOD 0 Cartridge was for a long range, accurate, 5.56mm cartridge for use in the USSOCOM MK 12 SPR (Special Purpose Rifle). Throughout the developmental testing phase of the program, it became obvious that the MK 262 MOD 0 provided enhanced accuracy, range and terminal ballistic performance when used in any M16 family of weapon systems with 1:7 twist rifling. This would include the M16A2, M16A4, M4 Carbine, M4A1 Carbine and the MK 12 SPR weapon systems.

4-12.11.2 Description. This cartridge is 2.260 inches (5.7 centimeters) long, weighs approximately 190 grains (12.31 grams), and is loaded with approximately 26.0 grains (1.68 grams) of Navy qualified double base propellant. The cartridge utilizes a standard M855 (No. 41) lead styphnate primer (approximately 4.0 grains or

0.259 grams), and the 77gr. Sierra Matchking™ 0.224-inch (0.5698 centimeter) diameter Hollow Point Boat Tail (HPBT) projectile. The projectile is not a “hollow point” in the classic handgun projectile terminology. The projectile does not, nor is it designed to expand or mushroom. The lead slug is inserted into the jacket from the front and in the final projectile pressing operation, the opening is pressed shut all except a small (approximately 0.25 inch) hole. (The Judge Advocate General Office classifies the projectile more correctly as an “open tip”). The cartridge case used is the standard military M855 hardened and annealed 5.56 cartridge case.

4-12.11.3 Ballistic Data. The cartridge ballistic data are as follows:

a. Velocity. The average velocity is 2,720 fps (829 meters per second) measured at 78 feet (23 meters) from the muzzle when fired out of a standard 20 inch long test barrel.

b. Chamber Pressure. The average chamber pressure shall not exceed 58,700 psi when measured at 70° ± 5° F.

c. Accuracy. The average extreme spread shall not exceed 3.5 inches at 300 yards when fired from a standard 20 inch 1:7 RH twist test barrel. Five each ten-round groups are fired from 2 each test barrels. No individual 10 round group shall exceed 4.5 inch extreme spread.

4-12.12 Cartridge, 5.56 Millimeter, Armor Piercing (AP), M995 (AA69), (AA01), (AA02)

4-12.12.1 Description. The 5.56mm AP cartridge consists of a projectile, brass cartridge case, smokeless propellant and a lead styphnate primer. The projectile, which weighs approximately 53 grains, consists of a gilding metal jacket, tungsten carbide penetrator and an aluminum cup. The cartridge is loaded with approximately 28 grains of double base propellant, WCR 845. The 5.56mm AP Cartridge is designed for use in weapons systems chambered to fire the standard NATO 5.56mm cartridge. No modification is necessary to the weapon systems to function the 5.56mm AP M995 Cartridge.

4-13 7.62 MILLIMETER AMMUNITION

Ammunition 7.62mm weapons. Figure 4-14, developed with the intention of replacing the .30 caliber carbine and rifle ammunition. The intent was to standardize the use and ease the supply and interchangeability with all North Atlantic Treaty Organization (NATO) countries. This ammunition

is commonly called 7.62mm NATO ammunition. Table 4-13 contains the component parts of the 7.62mm cartridge using Primer No. 36 or equivalent. See Table 4-14 for packaging and identification data.

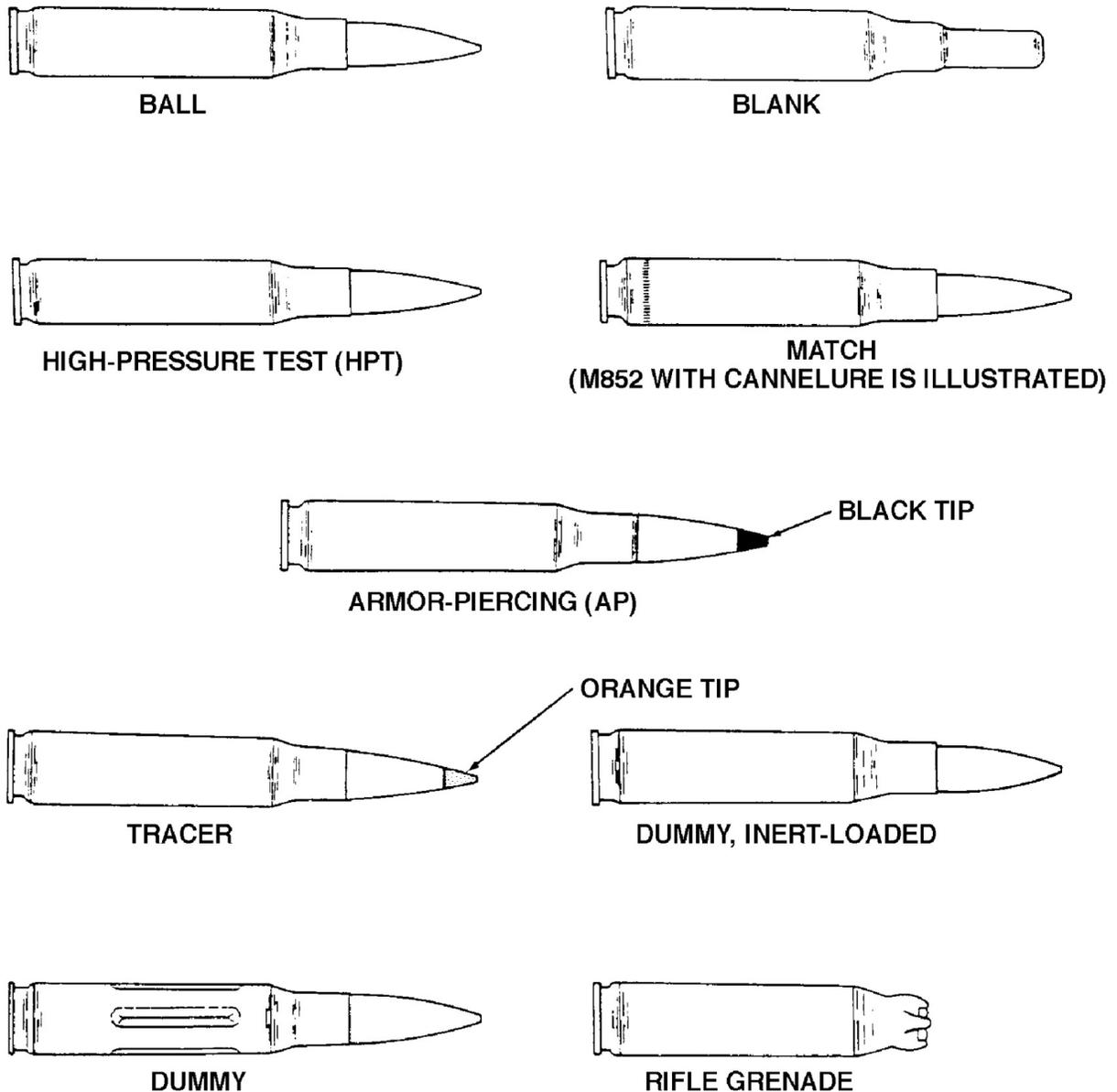


Figure 4-14 7.62mm Ammunition

Table 4-13 7.62mm Cartridge Components

CARTRIDGE	CASE	PROPELLANT	BULLET
Ball, M59	Brass	WC-846	Gilding metal jacket, steel core, lead-antimony filler
Ball, M80	Brass	WC-846	Gilding or gilding metal-clad steel jacket, lead-antimony slug
Ball, M80E1 (Suppressed Flash)	Brass	WC-846-6	Gilding or gilding metal-clad steel jacket, lead-antimony slug
Match/Special Ball, M118	Brass	WC-846/IMR-4895	Gilding metal jacket, lead-antimony slug
Tracer, M62	Brass	WC-845	Gilding metal-clad steel jacket, lead-antimony slug, tracer
Blank, M82	Brass	SR-4759	
Dummy, M63	Brass	Inert	Gilding metal-clad steel
Grenade, M64	Brass	IMR-8079/HPC-4/WC-830	
Dummy Inert Loaded, M712	Brass	Inert Granular Material	Copper-Alloy jacket, lead-antimony slug
Dim Tracer, M276	Brass	WC 846-3	Gilding or gilding metal-clad steel jacket, lead-antimony slug
Match, M852	Brass	IMR-4895	Gilding metal jacket, lead-antimony slug
Match, Short Range Load, (A169)	Brass	WC-846/IMR-4895	Gilding metal jacket, lead-antimony slug
Match, Long Range Load, (A170)	Brass	WC-846/IMR-4895	Gilding metal jacket, lead-antimony slug
High-Pressure Load, Test, M60	Brass	IMR-4475	Annealed, copper-alloy jacket, lead-antimony slug
Armor Piercing, M993	Brass	Bofors NC 1290	Tombac (gilding metal) clad steel jacket, with a tungsten penetrator core
Tracer, Training, 553B	Brass	Single Base	Tracer
Ball, Intermediate, for AK47 (A102)	Brass	See paragraph 4-13.1	See paragraph 4-13.1

Table 4-14 7.62mm Ammunition

ITEM	DODIC/NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 7.62 Millimeter, Ball, Intermediate, Designed For AK47 Rifle	A102	4-13.1	1305-00-182-3096	11731648	20 per carton, 50 cartons per wooden box
Cartridge, 7.62 Millimeter, NATO, Blank, M82	A112	4-13.2	1305-00-882-5677	8597283	20 per carton, 23 cartons per metal box M2A1, 2 boxes (920 cartridges) per wirebound box
	A112		1305-00-990-5594	8597283	20 per carton, 30 cartons per metal box M2A1, 2 boxes (1,200 cartridges) per wirebound box

Table 4-14 7.62mm Ammunition (Continued)

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 7.62 Millimeter, NATO, Ball, M80	A122	4-13.3	1305-00-892-4152	10521998	Grade R and MG, 20 per carton, 23 cartons per metal box M2A1, 2 boxes (920 cartridges) per wirebound box
Cartridge, 7.62 Millimeter, NATO, Ball, M80	A130	4-13.3	1305-00-752-8837	10521998	Grade R, 5 per clip, 12 clips per bandoleer M2, 7 bandoleers w/magazine filler per metal box M2A1, 2 boxes (840 cartridges) per wirebound box
	A130		1305-00-914-4675	10521998	5 per clip, 12 clips per bandoleer M2, 7 bandoleers w/magazine filler per metal box M2A12 boxes (840 cartridges) per wirebound box
Cartridge, 7.62 Millimeter, NATO, Ball, M80	A149	4-13.3	1305-00-965-0601	10521998	8 per clip, 6 clips per bandoleer M1, 9 bandoleers per metal box M2A1, 2 boxes (864 cartridges) per wirebound box
Cartridge, 7.62 Millimeter, NATO, Ball, M80	A168	4-13.3	1305-00-965-0812	10521998	8 per clip, 6 clips per bandoleer M1, 8 bandoleers per metal box M2A1, 2 boxes (768 cartridges) per wirebound box
Cartridge, 7.62 Millimeter, NATO, Ball, M59	A122	4-13.4	1305-00-305-0909	7553702	20 per carton, 12 cartons per metal box M19 or M19A1, 4 boxes (960 cartridges) per wirebound box
Cartridge, 7.62 Millimeter, NATO, Tracer, M62	A124	4-13.5	1305-00-882-5678	7553705	20 per carton, 23 cartons per metal box M2A1, 2 boxes (920 cartridges) per wirebound box
			1305-00-301-1679	7553705	20 per carton, 12 cartons per metal box M19 or M19A1, 4 boxes (960 cartridges) per wirebound box
Cartridge, 7.62 Millimeter, NATO, Test, High-Pressure, M60	A129	4-13.6	1305-00-580-0131	7553703	20 per carton, 12 cartons per metal box M19 M19A1, 4 boxes (960 cartridges) per wirebound box

Table 4-14 7.62mm Ammunition (Continued)

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 7.62 Millimeter, NATO, Dummy, M63	A135	4-13.7	1305-00-512-1272	7553706	20 per carton, 23 cartons per metal box M2A1, 2 boxes (920 cartridges) per wirebound box
Cartridge, 7.62 Millimeter, NATO, Match/Special Ball, M118	A136	4-13.8	1305-00-064-2896	8597555	20 per carton, 23 cartons per metal box M2A1, 2 boxes (920 cartridges) per wirebound box
Cartridge, 7.62 Millimeter, NATO, Tracer, M62	A140	4-13.5	1305-00-926-4017	10522000/ 7553705	20 per carton, 23 cartons per metal box M2A1, 2 boxes (920 cartridges) per wirebound box
Cartridge, 7.62 Millimeter, NATO, 5 Round Clip	A160	4-13.10	1305-00-914-7912	7790130	5 rounds packaged as required
Cartridge, 7.62 Millimeter, NATO, Dummy, M172	A162	4-13.11	1305-00-943-0448	10522688	20 rounds per carton, 23 cartons per metal box, 2 boxes per wirebound box, 48 boxes per pallet (44,160 count)
Cartridge, 7.62 Millimeter, Match, Long Range Load	A170	4-13.12	1305-01-018-1541	PS7043 C7565	29 per box commercially packaged
Cartridge, 7.62 Millimeter, Match, M852	A171	4-13.13	1305-01-120-0970	9341551/93449 81	20 per carton, 23 cartons per metal box, 2 boxes (920 cartridges) per wirebound box
Cartridge, 7.62 Millimeter, Tracer, Training 553B	A254	7-5.4, 4-13.16	1305-01-379-1539	590230	20 rounds per cardboard container, 8 cardboard containers per sub-pack; 8 sub-packs per wooden box
Cartridge, 7.62 Millimeter, Grenade, Rifle, NATO, M64	G839	4-13.17	1330-00-085-4110	755370	5 per carton in a heat-sealed envelope, 48 envelopes per can M13, 2 cans (480 cartridges) per wooden box M23
	G839		1330-00-892-4106	7553707	5 per carton, 1 carton per water proofed envelope, 58 envelopes per box M2A1, 2 boxes (580 cartridges) per wirebound box
Cartridge, 7.62 Millimeter, Grenade, Rifle, NATO, M64/for use in Dragon M54 Launch Effects Trainer	G839	4-13.17	1330-01-077-4291	9329599	20 per carton, 33 cartons per metal box M2A1, 2 boxes (1,320 cartridges) per wirebound box
Cartridge, 7.62 Millimeter, NATO, Special Ball, Long Range, M118	AA11	4-13.9	1305-01-41-8202	TBD	20 per carton, 23 cartons per metal box M2A1, 2 boxes (920 cartridges) per wirebound box

4-13.1 Cartridge, 7.62 Millimeter, Ball, Intermediate, Designed For AK47 Rifle (A102).

4-13.1.1 Intended Use. The cartridge is specifically designed for use in the AK47 rifle.

4-13.1.2 Description. The cartridge (M43) is 2.50 inches (6.35 centimeters) long with a brass cartridge case 1.525 inches (3.87 centimeters) long and weighing approximately 180 grains (11.66 grams). The primer is secured in the pocket by a circular crimp. The 0.308 inch (0.78 centimeter) diameter bullet is crimp in the neck and weighs approximately 110 to 130 grains (7.13 to 842 grams).

4-13.1.3 Ballistic Data. The ballistic data are as follows:

a. Bullet = 110 grains (7.13 grams); powder = 30.0 grains (1.94 grams); muzzle velocity = 2,559 fps (779 meters per second).

b. Bullet = 110 grains (7.13 grams); powder = 27.0 grains (1.75 grams); muzzle velocity = 2,405 fps (733 meters per second).

c. Bullet = 130 grains (8.42 grams); powder = 30.0 grains (1.94 grams); muzzle velocity = 2,370 fps (722 meters per second).

4-13.2 Cartridge, 7.62 Millimeter, NATO, Blank, M82 (A112), (A111).

4-13.2.1 Intended Use. This cartridge is procured for use in rifles and machine guns for training programs with 7.62mm weapons.

WARNING

DO NOT USE THE 7.62MM M64 GRENADE CARTRIDGE AS A SUBSTITUTE FOR THE M82 BLANK CARTRIDGE. SERIOUS INJURY OR LOSS OF LIFE COULD RESULT.

NOTE

Use the appropriate blank firing attachments when firing the M82 blank cartridge.

4-13.2.2 Description. The cartridge consists of a 2.61 inch (6.63 centimeters) long brass cartridge case loaded with 14.5 grains (.94 gram) of propellant composition (SR 8231) and a primer. The case is shaped approximately to the configuration of the combat cartridge with no bullet. The propellant is held in the case by a wad, and the mouth is sealed with purple lacquer and crimped (with more than five petals) for protection against air and moisture. The M82 blank cartridge weighs approximately 235 grains (15.23 grams), 2.595 inches (6.59 cm) long, loaded with 16.7 grains (1.08 grams) of WC 818 Propellant. Old configuration of cartridge consisted of a double taper neck cartridge vice a rosette crimp, using same model number, DODIC and NSN.

NOTE

The M82 blank cartridge is sealed with purple lacquer and crimped with more than five petals to distinguish it from the M64 grenade cartridge. The M64 grenade cartridge is identified by a five petal rose crimp and red sealing lacquer.

4-13.3 Cartridge, 7.62 Millimeter, NATO, Ball, M80 (A019), (A122), (A127), (A130), (A131), (A143), (A149), (A165), (A168).

4-13.3.1 Intended Use. This cartridge is procured for use in the M60 Series, MK 43, MK 25 (GAU-2B/A), GAU-17 and M240 machine guns and the 7.62mm M14 rifle against personnel and unarmored targets.

4-13.3.2 Description. The cartridge consists of a brass cartridge case and an unpainted bullet. The cartridge is 2.80 inches (7.1 centimeters) long, weighs approximately 392 grains (25.40 grams), contains a 5.4-grain (.35 gram) lead-styphnate primer, and is loaded with approximately 46 grains (2.98 grams) of propellant composition (WC 846).

4-13.3.3 Cartridge Case. The cartridge case is 2.015 inches (5.11 centimeters) long and weighs approximately 190 grains (9.66 grams).

4-13.3.4 Bullet. The bullet is either gilding metal or gilding metal-clad steel jacket with a lead-antimony slug weighing approximately 149 grains, and is 1.140 inches (2.89 centimeters) long.

4-13.3.5 Ballistic Data. The ballistic data for the cartridge are as follows:

a. Velocity. The basic velocity shall be 2,750 fps (838 meters per second) at 78 feet (23 meters) from the muzzle.

b. Pressure. The average chamber pressure shall not exceed 50,000 psi (3,515 kilograms/centimeters² [344.9 MP_a]) at a temperature of approximately 70°F (21°C).

c. Accuracy. The average mean radii of all targets at the time of acceptance at 600 yards (548 meters) are not greater than 7.5 inches (19 centimeters).

4-13.4 Cartridge, 7.62 Millimeter, NATO, Ball, M59 (A122).

4-13.4.1 Intended Use. This cartridge is procured for use in 7.62mm rifles and machine guns, M60 Series, MK 25 (GAU/2B/A) GAU-17, and M240 machine guns, and M14 rifles against personnel and unarmored targets.

NOTE

The M59 ball cartridge has been replaced by the M80 ball cartridge.

4-13.4.2 Description. The cartridge is 2.8 inches (7.11 centimeters) long, weighs approximately 393 grains (25.466 grams), contains a 5.4 grain (.349 gram) lead styphnate primer (No. 36). It contains a propellant composition (WC 846) weighing approximately 46 grains (2.98 grams).

4-13.4.3 Cartridge Case. The brass cartridge case is 2.015 inches (5.11 centimeters) long and weighs approximately 185 grains (11.99 grams).

4-13.4.4 Bullet. The boat-tailed bullet consists of a gilding metal jacket, a steel core, and a lead-antimony point and base filler. It is 1.28 inches (3.25 centimeters) long and weighs 150.5 grains (9.75 grams).

4-13.4.5 Ballistic Data. The ballistic data for the cartridge are as follows:

a. Velocity. The basic velocity shall be 2,750 fps (838 meters per second) at 78 feet (23 meters) from the muzzle.

b. Pressure. The average chamber pressure shall not exceed 50,000 psi (3,515 kilograms/centimeters² [344.8 MP_a]) at a temperature of approximately 70°F (21°C)

c. Accuracy. The average of the mean radii of all targets at the time of acceptance at 600 yards (548 meters) is not greater than 7.5 inches (19 centimeters).

4-13.5 Cartridge, 7.62 Millimeter, NATO, Tracer, M62 (A124), (A127), (A140), (A131), (A165), (A168).

4-13.5.1 Intended Use. This cartridge is procured for use in M60 series, MK 43 and MK 25 (GAU-2B/A), GAU-17 and M240 machine guns and M14 rifles for signaling, incendiary, target designation, and range estimation.

4-13.5.2 Description. The cartridge consists of a brass cartridge case and a bullet with an orange tip for identification. The cartridge is 2.80 inches (7.11 centimeters) long, weighs approximately 383 grains (24.818 grams). It contains approximately 47.0 grains (3.04 grams) of propellant composition (WC 846) and a 5.4-grain (.349 gram) lead-styphnate primer.

4-13.5.3 Cartridge Case. The brass cartridge case is 2.015 inches (5.11 centimeters) long and weighs approximately 185 grains (11.99 grams).

4-13.5.4 Bullet. The boat-tailed bullet has a gilding metal-clad steel jacket, a lead-antimony point with a 6.5-grain (.42 gram) tracer (R-284) composition, subigniter and igniter compositions, and a closure cup. It is 1.35 inches (3.42 centimeters) long and weighs approximately 141 grains (9.14 grams).

4-13.5.5 Ballistic Data. The ballistic data for the cartridge are as follows:

a. Velocity. The basic velocity shall be 2,750 fps (838 meters per second) at 78 feet (23 meters) from the muzzle.

b. Pressure. The average chamber pressure shall not exceed 50,000 psi (3,515 kilograms/centimeters² [34.8 MP_a]).

c. Accuracy. The average mean radii of all targets at the time of acceptance at 600 yards (548 meters) are not greater than 12 inches (30.48 centimeters).

d. Range. A requirement calls for the tracer visibility to begin approximately 100 yards (91.44 meters) from the muzzle and lasting approximately 750 yards (685.8 meters).

4-13.6 Cartridge, 7.62 Millimeter, NATO, Test, High-Pressure, M60 (A129).

4-13.6.1 Intended Use. This cartridge is procured for proof-firing rifles, machine guns, and barrels. The propellant composition load results in a higher chamber pressure than other 7.62mm cartridges. The excessive chamber pressure and the consequent danger when firing the M60 cartridge require certain safety precautions. These include test firing guns under a hood, from a fixed rest with a mechanical firing device. Only authorized personnel carry out these tests.

WARNING

UNAUTHORIZED PERSONNEL MUST NOT USE HIGH-PRESSURE TEST CARTRIDGES. THIS CARTRIDGE IS NOT FOR USE IN FIELD WEAPONS. IT'S ONLY USED FOR HIGH-PRESSURE TESTING OF WEAPONS. UNAUTHORIZED USE CAN RENDER THE WEAPONS USELESS AND RESULT IN SERIOUS INJURY OR DEATH.

4-13.6.2 Description. The cartridge is 2.80 inches (7.11 centimeters) long and weighs approximately 412 grains (2.70 grams). The case is stannic stained (tinned) for identification. The cartridge propellant consists of approximately 42 grains (2.721 grams) of propellant composition (IMR 4475). A circular crimp secures the primer (10522626-2) in the pocket and the joint is waterproof. The unpainted bullet, a copper alloy, annealed jacket with a lead-antimony slug, is 1.23 inches (3.12 centimeters) long and weighs 171.5 grains (11.11 grams).

4-13.6.3 Pressure. The average chamber pressure shall not be less than 65,000 psi (4,567 kilograms/centimeters² [448.2 MP_a]) nor exceed 70,000 psi (4,921 kilograms/centimeters² [482.7 MP_a]).

4-13.7 Cartridge, 7.62 Millimeter, NATO, Dummy, M63 (A135).

4-13.7.1 Intended Use. The M63 dummy cartridge is completely inert and is used to train personnel in handling and loading 7.62mm rifles and machine guns.

4-13.7.2 Description. The cartridge simulates service ammunition in detail to meet drill requirements. It is 2.80 inches (7.11 centimeters) long, weighs approximately 250 grains (16.20 grams), and contains neither primer nor propellant composition.

4-13.7.3 Cartridge Case. The brass cartridge case weighs approximately 190 grains (12.31 grams) and has six longitudinal impressed corrugations for identification.

4-13.7.4 Bullet. The bullet is 1.35 inches (3.4 centimeters) long and weighs 68.0 grains (4.41 grams).

4-13.8 Cartridge, 7.62 Millimeter, NATO, Match/Special Ball, M118 (A136).

4-13.8.1 Intended Use. This cartridge is used in the M14 rifle, Remington 700 and McMillan M86 sniper rifles for target practice and the Navy Competitive Match Programs.

4-13.8.2 Description. The cartridge is 2.830 inches (7.18 centimeters) long, weighs approximately 390 grains (25.27 grams). It has a propellant composition of approximately 42 grains (2.72 grams) and contains a 5.4 grain (.349 gram) lead styphnate primer.

4-13.8.3 Cartridge Case. The brass cartridge case is 2.015 inches (5.11 centimeters) long and weighs approximately 190 grains (12.31 grams).

NOTE

Revision K of Drawing No. 8597555 eliminated the requirement to stamp the case head with the word MATCH or the letters NM, mandatory for cartridges manufactured for the National Matches.

4-13.8.4 Bullet. The bullet consists of a gilding metal jacket and a lead antimony slug. It is 1.312 inches (3.33 centimeters) long and weighs 175.5 grains (11.37 grams).

NOTE

The listed nominal charge weight may be varied to comply with the ballistic requirements.

4-13.8.5 Ballistic Data. The ballistic data for the cartridge are as follows:

a. Velocity. The basic velocity will be 2,550 fps (777 meters per second) at 78 feet (23 meters) from the muzzle.

b. Pressure. The average chamber pressure shall not exceed 50,000 psi (3,515 kilograms/centimeters² [344.8 MP_a]).

c. Accuracy. The average mean radii of all targets at the time of acceptance at 600 yards (548 meters) are not greater than 3.5 inches (8.8 centimeters).

4-13.9 Cartridge, 7.62 Millimeter, NATO, Special Ball, Long Range, M118 (AA11).

4-13.9.1 Intended Use. This cartridge is used in the M14 rifle, Remington 700 and McMillan M86 sniper rifles. The cartridge is intended for sniper use and long range match firing.

4-13.9.2 Description. The cartridge is 2.830 inches (7.18 centimeters) long, weighs approximately 390 grains (25.27 grams). It has a propellant composition of approximately 44 grains (2.85 grams) of WC-750 and contains a 5.4 grain (.349 gram) lead styphnate primer.

4-13.9.3 Cartridge Case. The brass cartridge case is 2.015 inches (5.11 centimeters) long and weighs approximately 190 grains (12.31 grams).

4-13.9.4 Bullet. The bullet consists of a gilding metal jacket and a lead antimony slug. It is 1.24 inches (3.15 centimeters) long and weighs 175 grains (11.33 grams). The bullet is the Sierra 175 grain MatchKing™ projectile.

4-13.9.5 Ballistic Data. The ballistic data for the cartridge are as follows:

a. Velocity. The velocity will be 2,580 fps (777 meters per second) at 78 feet (23 meters) from the muzzle.

b. Pressure. The average chamber pressure shall not exceed 52,000 psi (3,515 kilograms/centimeters² [344.8 MP_a]).

c. Accuracy. The average extreme horizontal spread shall not exceed 10.3 inches (26.16 cm) at 1,000 yards (914.4 meters). The average extreme vertical spread shall not exceed 14.0 inches (35.56 cm) at 1,000 yards (914.4 meters).

4-13.10 Cartridge, 7.62 Millimeter, NATO, 5 Round Clip (A160).

4-13.10.1 Intended Use. Cartridges for the 7.62mm M14 rifles are assembled in 5-round clips. All cartridges are packed in bandoleers with separate magazine fillers. This clip, which consists of a channel shaped body containing a spring, facilitates loading of magazines. Loaded clips are fitted into the top of the rifle receiver and cartridges are pressed into the magazine assembly. A magazine filler, which adapts clips to the magazine, allows individual magazines to be loaded with clipped ammunition.

4-13.10.2 Description. This clip is 2.36 inches (5.99 centimeters) long.

4-13.11 Cartridge, 7.62 Millimeter, NATO, Dummy, M172 (A162), (A159).

4-13.11.1 Intended Use. The filler is an inert granular material to simulate the weight and balance of a live cartridge. Its purpose is to train personnel in handling and loading 7.62mm weapons.

4-13.11.2 Description. The cartridge is 2.80 inches (7.1 centimeters) long and loaded with approximately 46 grains (2.98 grams) of inert material. The brass cartridge case contains a

primer pocket in the head but no primer. The copper-alloy bullet jacket contains a lead-antimony slug. The bullet is 1.140 inches (2.89 centimeters) long and weighs approximately 149 grains (9.65 grams). The bullet and cartridge case are black for identification.

4-13.12 Cartridge, 7.62 Millimeter, Match, Long Range Load (A170).

4-13.12.1 Intended Use. This cartridge is hand-loaded by NAVSURFWARCENDIV Crane for use in the M14 Match Conditioned Rifle. Production of this cartridge is as directed by the Naval Sea Systems Command Conventional Ammunition Program Office. Issue of this cartridge limited to the Navy Match Rifle Team only.

4-13.12.2 Description. The cartridge is 2.90 inches (7.366 centimeters) long, produces 2,540 to 2,650 fps (774.19 to 807.72 mps). It has a ballistic coefficient of 0.530 to 0.570 and has a 168 to 190 grain (10.88 to 12.312 grams) hollow point boat-tailed bullet with an accuracy consistent with match requirements.

4-13.12.3 Cartridge. The cartridge case dimensions are in accordance with SAAMI requirements. The propellant type, propellant weight and velocity are established to meet performance standards.

4-13.12.4 Accuracy. The extreme spread average of all groups fired shall not exceed 3.0 inches (7.6 centimeters) at 300 meters (984 feet) range.

4-13.13 Cartridge, 7.62 Millimeter, Match, M852 (A149), (A171).

4-13.13.1 Intended Use. This cartridge is prepared for use in the M14 Match Conditioned and other service issue 7.62mm match grade rifles.

NOTE

Cartridge lots of M852 assembled with the 168 Sierra MatchKing™ Hollow Point Boat Tail (HPBT) bullet are approved for combat use by snipers. The US Army Judge Advocate General issued a MEMORANDUM OF LAW authorizing the use of this cartridge in combat by snipers on 12 October 1990.

The US Navy Judge Advocate General issued a concurrence to that decision on 17 December 1990.

4-13.13.2 Description. The cartridge is 2.83 inches (7.18 centimeters) long, weighs approximately 385 grains (29.948 grams). It contains a percussion primer and the propellant composition is approximately 42 grains (2.72 grams) of IMR-4895. This cartridge has a 360° cannellure approximately 1/4 inch (.635 centimeter) above the base of the cartridge case.

4-13.13.3 Ballistic Data. The cartridge ballistic data are as follows:

a. Velocity. The cartridge produces a 2,600 fps (792 meters per second) velocity at 78 feet (23 meters) from the muzzle.

b. Pressure. The 7.62mm M852 cartridge shall produce a 50,000 psi (3,515 kilograms/centimeters² [344.8 MP_a]) chamber pressure.

c. Accuracy. The average extreme spread of all targets, each target containing 14 shots fired at 600 yards (548.6 meters), shall not exceed 9.5 inches (35.6 cm).

4-13.14 Cartridge, 7.62 Millimeter, Dim Tracer, M276 (A255), (A257), (A258).

4-13.14.1 Intended Use. This cartridge is procured to be used with Night Vision Devices (NVD) where the use of a standard tracer cartridge would cause “blooming”, rendering the NVDs ineffective for a short time. The cartridge is designed for use in M60 Series, MK 43, and M240 machine guns, and GAU-17 and (GAU-2/B) minigun for signaling, target designation, and range estimations.

4-13.14.2 Description. The cartridge consists of a brass cartridge case and a bullet with identifying markings. On the older cartridge the bullet has a green tip above a white band. On the newer cartridge the bullet has a purple band superimposed on a pink tip. The cartridge is 2.80 inches (7.11 centimeters) long, weighs approximately 383 grains (24.82 grams), contains a 5.4 grain (.35 gram) lead-styphnate primer, and is loaded with 47.0 grains (3.05 grams) of propellant composition (WC 846). The cartridge is used linked with a modified

M80 Ball cartridge. The M80 Ball cartridge is loaded with a Special Suppressed Flash Propellant (WC 846-6) which reduces the muzzle flash.

4-13.14.3 Cartridge Case. The brass cartridge case is approximately 2.015 inches (5.12 centimeters) long and weighs approximately 185 grains (11.99 grams).

4-13.14.4 Bullet. The boattailed bullet has a gilding metal-clad steel jacket, a lead-antimony point with a 12.5 grain (.81 gram) tracer (R440) composition, and an I-136 composition igniter, and a gilding metal closure cup. The R440 is a lower burning temperature mix which produces light in a spectrum visible only to NVDS. It is 1.35 inches (3.43 centimeters) long and weighs approximately 141 grains (9.14 grams).

4-13.14.5 Ballistic Data. The ballistic data for the cartridge are as follows:

a. Velocity. The basic velocity shall be 2,680 fps (817 m/s) at 78 feet (24 meters) from the muzzle.

b. Pressure. The average chamber pressure shall not exceed 50,000 psi (3,517 Kg/cm²) (344.7 MP_a).

c. Accuracy. The average mean radii of all targets at the time of acceptance at 600 yards (549 meters) are not greater than 15 inches (38.10 centimeters).

d. Range. The tracer shall be visible, only with the aid of NVDS, beginning at 100 yards (91.44 meters) from the muzzle and lasting approximately 850 yards (780 meters).

4-13.15 Cartridge, 7.62 Millimeter, Flash Suppressed, M80E1 (A255), (A257), (A258).

4-13.15.1 Intended Use. This cartridge is procured to be used with Night Vision Devices (NVD) where the use of a standard M80 ball cartridge would cause “blooming”, rendering the NVDs ineffective for a short time. The cartridge is designed for use in M60 Series, MK 43 and M240 machine guns, and GAU-17 and (GAU-2/B) mini-gun.

4-13.15.2 Description. The cartridge consists of a brass cartridge case and an unpainted bullet. The cartridge is 2.80 inches (7.11 centimeters) long, weighs approximately 392 grains (25.40 grams), contains a 5.4 grain (.35 gram) lead-styphnate primer, and is loaded with 46.0 grains (2.98 grams) of (SFP) propellant composition (WC 846-6). The cartridge is used only when linked with the M276 Dim Tracer cartridge. The Suppressed Flash Propellant composition (WC 846-6) is the same propellant composition used in the M276 Dim Tracer, except it is coated with Potassium salt to reduce the flash.

4-13.15.3 Cartridge Case. The brass cartridge case is approximately 2.015 inches (5.12 centimeters) long and weighs approximately 190 grains (12.31 grams).

4-13.15.4 Bullet. The bullet is either gilding metal or gilding metal-clad steel jacket with a lead-antimony slug weighing approximately 149 grains (9.66 grams), and is 1.140 inches (2.90 centimeters) long.

4-13.15.5 Ballistic Data. The ballistic data for the cartridge are as follows:

a. Velocity. The basic velocity shall be 2,750 fps (838.2 m/s) at 78 feet (24 meters) from the muzzle.

b. Pressure. The average chamber pressure shall not exceed 52,940 psi (3,224 Kg/cm²) (365.0 MP_a).

c. Accuracy. The average mean radii of all targets at the time of acceptance at 600 yards (548.64 meters) are not greater than 7.5 inches (19.05 centimeters).

4-13.16 Cartridge, 7.62 Millimeter, Tracer, Training 553B (A254).

4-13.16.1 Intended Use. The 7.62mm Tracer Training Cartridge 553B is intended for use in the 84mm Sub-Caliber Adapter (see paragraph 7-5.4), which is used with the M3 84mm Carl-Gustaf Recoilless Rifle (see paragraph 7-4.). The 7.62mm Tracer Training cartridge is placed in the bolt of the Adapter. It is used with either or both of the following components: the Backblast Simulator

Charge (L612) and the Percussion Cap with Holder (L498). The 7.62mm Tracer Training cartridge is used in conjunction with the 84mm Sub-Caliber Adapter and its components to simulate the trajectory and backblast of the 84mm HEAT round during training with the M3 rifle.

4-13.16.2 Description. The 7.62mm Tracer Training Cartridge 553B consists of a brass cartridge case, primer, propellant, and tracer projectile. The cartridge is 2.80 inches (7.10 centimeters) long and contains approximately 27.3 grains (1.76 grams) of propellant/pyrotechnic composition. The brass cartridge case contains a percussion primer. See paragraph 7-5.4 for additional information.

4-13.17 Cartridge, 7.62 Millimeter, Grenade, Rifle, NATO, M64 (G839).

4-13.17.1 Intended Use. This cartridge is used in M14 rifles. When assembled with the M76 Grenade Launcher it projects high-explosive, fragmentation, illuminating, smoke, and chemical grenades. Another use is to launch ground signals and the projectile contained in the MK 87 Line-Throwing Rifle Adapter Kit.

WARNING

DO NOT USE THE 7.62MM M64 GRENADE CARTRIDGE AS A SUBSTITUTE FOR THE M82 BLANK CARTRIDGE. SERIOUS INJURY OR LOSS OF LIFE COULD RESULT.

4-13.17.2 Description. The cartridge is 2.0 inches (5.08 centimeters) long, weighs approximately 233 grains (15.09 grams), is loaded with 37.0 grains (2.39 grams) of propellant composition, and contains a 5.43 grain (3.52 gram) lead-styphnate primer. A five petal rose crimp on the mouth and the absence of a bullet are its identifying characteristics.

4-13.17.3 Ballistic Data. The cartridge propels a 1.56 pound (0.70 kilogram) grenade at 160 fps (48 meters per second) to 5.6 feet (1.7 meters) beyond the forward end of a fully launcher-positioned grenade.

4-13.18 Cartridge, 7.62 Millimeter, Armor Piercing, M993 (AA04), (AA34), (AA35), (AA36).

4-13.18.1 Intended Use. The M993 Cartridge is loaded with flash suppressed propellant is designed for use with Night Vision devices. Flash suppressed propellants reduce "blooming", which renders Night Vision devices ineffective for a short time. The M993 Cartridge is designed for use in M60 Series, M240 Series, MK 43 machine guns, and GAU-17/A and GAU-2B/A aircraft "minigun" machine guns.

4-13.18.2 Description. The Cartridge consists of a cartridge case, primer, propellant, and bullet. The bullet has a black band that is approximately 0.5 inch (1.27 centimeters) wide and starts approximately 2.80 inches (7.12 centimeters) in length, weighs approximately 363 grains (23.5 grams), contains a 5.2 grain (0.34 gram) lead-styphnate primer, and is loaded with 45.0 grains (2.9 grams) of Bofors NC1290 propellant. The M993 Cartridge is linked with the M62 Tracer in 4:1 and 9:1 ratios and with the M276 Dim Tracer in 4:1 and 9:12 ratios.

4-13.18.3 Cartridge Case. The cartridge case is approximately 2.015 inches (5.12 centimeters) long and weighs approximately 185 grains (12 grams).

4-13.18.4 Bullet. The projectile weighs 137 grains (8.7 grams) and consists of Tungsten core penetrator, which weighs 95 grains (6.0 grams). The projectile is covered by a Tombac (gilding metal) clad steel jacket which weighs 42 grains (2.6 grams).

4-13.18.5 Ballistic Data. The ballistic data for the cartridge are as follows:

a. Velocity. The basic velocity shall be 2,986 fps (910 m/s) at 78 feet (24 meters) from the muzzle.

b. Pressure. The average chamber pressure shall not exceed 55,115 psi, (380 MP_a).

c. Accuracy. The average of the mean radii of all targets at the time of acceptance, measured at 600 yards (549 meters), shall not exceed 6.0 inches (15.2 cm).

4-13.19 Cartridge, 7.62 Millimeter, M973 Ball Short Range Training Ammunition (SRTA), M974 Tracer Short Range Training Ammunition-Tracer (SRTA-T), LINKED 4:1 Configuration (AA37), (AA39) .

WARNING

DO NOT USE SHORT RANGE TRAINING AMMUNITION (SRTA) IN FORCE-ON-FORCE TRAINING. SEVERE INJURY OR DEATH MAY RESULT IF PEOPLE ARE STRUCK BY SRTA CARTRIDGE PROJECTILES.

4-13.19.1 Intended Use. The 7.62mm M973/M974 cartridges are intended for use in the M60 and M240B machine guns to provide a realistic restricted-range alternative to M80/M62 service ammunition. The M973/M974 cartridges will not be used in force-on-force training.

4-13.19.2 Description. The M973 Ball and M974 Tracer cartridges are linked 4:1 with 7.62mm M13 links. The M973/M974 cartridges contain lead free components, which allow for a clean training environment. The M973 Ball cartridge is approximately 71.12mm (2.80 inches) in length and weighs approximately 63.7 grains (4.13 grams). The M974 Tracer cartridge is approximately 71.12mm (2.80 inches) in length and weighs approximately 61.5 grains (3.99 grams). These cartridges have a cannelure approximately 12.7mm (0.5inch) from the head and a seven petal rose crimp closes the mouth.

4-13.19.3 Cartridge Case. The cartridge case is brass and is approximately 51.18mm (2.015 inches) long. It contains 45 grains (2.92 grams) of propellant plus a primer with approximately 0.54 grains (35 milligrams) of energetic material.

4-13.19.4 Bullet. The M973/M974 SRTA cartridges have lead free bullets that are composed of an injection molded, brass-filled Nylon 11 material. The bullet has a unique fin design feature that despins the projectile. The resulting instability and increased drag causes the bullet to fall within the desired 600 meters (656.2 yards) maximum range. The M974's bullet contains approximately 1.85 grains (120 milligrams) of trace composition.

4-13.19.5 Ballistic Data. The M973 Ball and M974 Tracer cartridges are ballistically comparable to the M80 Ball and M62 Tracer cartridges, respectively, out to 100 meters (109.4 yards), with a maximum range of 600 meters (656.2 yards).

a. Velocity. At 23.8 meters (78 feet) from the muzzle, the average velocity is 791.15 meters per second (2596 feet per second) for M973 cartridges and 835.12 meters per second (2740 feet per second) for M 974 cartridges.

b. Pressure. The average pressure is approximately 52,940 psi (365 MP_a).

c. Accuracy. The maximum average mean radius for the M973/M974 cartridges is 78.0mm (3.07 inches) measured at 100 meters (109.4 yards) when fired from a test barrel.

4-13.19.6 Release. The 7.62mm SRTA cartridges are being tested by NSWC Crane and will be submitted for WSESRB review. Release is anticipated in CY 2003.

4-13.19.7 Two Packing Versions. DODIC AA37 uses the M2A1 metal ammunition box for packaging cartridges. AA39 uses the M19A1 metal ammunition box for packaging the cartridges. DODIC AA39 is used by the U.S. Army. AA37 will be used when this cartridge is released by CY 2003 to the U.S. Navy.

4-13.20 Cartridge, 7.62 Millimeter, Belts And Clips.

4-13.20.1 Belts. The unit issue for ammunition used in machine guns is metallic link. Ammunition packed in web belts is no longer used. The makeup of the metallic link belt is unit cartridge links and cartridges, one link for each cartridge. Each link has two loops fitting around one cartridge and a third loop fitting around one adjacent cartridge. A process applied at manufacture of the steel links prevent rusting. The 7.62mm M13 belt links, Figure 4-15, have partially open loops and a positioning finger on one side. The positioning finger snaps into the extractor groove of the cartridge. This permits the weapon bolt to push the cartridge forward out of the link and into the chamber. Weapons using this type link come from the manufacturer with a short receiver.

4-13.20.2 Clips. The 5-round 7.62mm cartridge clip consists of a channel-shaped body containing a spring and holding five cartridges. The purpose of the clip is to facilitate loading the magazine of the 7.62mm M14 rifle. The loaded clip fits into the top

of the rifle receiver. Use the thumb to press the cartridges into the magazine assembly. See Table 4-15 for packaging and identification data.

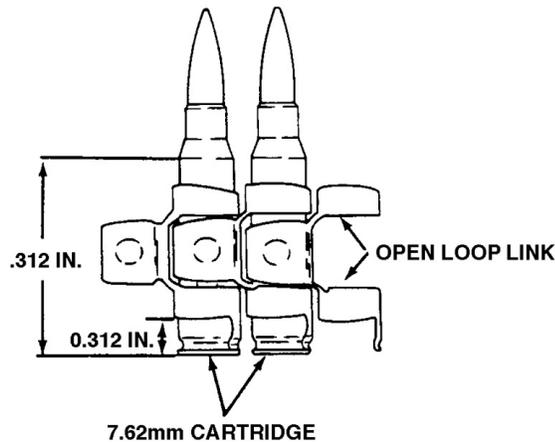


Figure 4-15 7.62mm Link Cartridge M13

Table 4-15 7.62mm Ammunition Linked Configuration

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 7.62 Millimeter, NATO, Blank, M82	A111	4-13.2	1305-00-752-8087	8597283	Linked blank M82, Grade MG, 100 per belt M13, 1 belt per carton, 1 carton per bandoleer T4, 2 bandoleers per metal box M19A1, 4 boxes (800 cartridges) per wirebound box
	A111	4-13.2	1305-01-181-1750	9381581	Linked blank M82, Grand MG, 100 per carton, 8 cartons per wirebound wooden box, 40 wirebound boxes per wooden pallet (32,000 rounds/pallet)
Cartridge, 7.62 Millimeter, NATO, Ball, M80 Cartridge, 7.62 Millimeter, NATO, Tracer, M62	A127	4-13.3	1305-00-542-1196	10521998/ 7553705	Linked 4 ball, M80 and 1 tracer M62 for MG M60, 100 per belt M13, 1 belt per carton, 1 carton per bandoleer T4, 2 bandoleers per metal box M19A1, 4 boxes (800 cartridges) per wirebound box

Table 4-15 7.62mm Ammunition Linked Configuration (Continued)

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 7.62 Millimeter, NATO, Ball, M80 Cartridge, 7.62 Millimeter, NATO, Tracer, M62	A131	4-13.3 4-13.5	1305-00-892-2150	8595543/ 7553705	Linked 4 ball M80 and 1 tracer M62 for MG M60 or M73, 100 per belt M13, 1 belt per carton, 1 carton per bandoleer T4, 2 bandoleers per metal box M19, 4 boxes (800 cartridges) per wirebound box
Cartridge, 7.62 Millimeter, NATO, Ball, M80	A143	4-13.3	1305-00-892-2330	15221998/ 8595543	Linked ball M80 for MG M60 or M73, 100 per belt, 1 belt per carton, 1 carton per bandoleer, 2 bandoleers per metal box M19, 4 boxes (800 cartridges) per wirebound box
Cartridge, 7.62 Millimeter, NATO, Dummy, M172	A159	4-13.11	1305-00-926-4009	10522688	M172 dummy, right-hand link, M13, 100 per belt, 1 belt per carton, 1 carton per bandoleer M4, 2 bandoleers per metal box M19A, 4 boxes (800 cartridges) per wirebound box
Cartridge, 7.62 Millimeter, NATO, Ball, M80 Cartridge, 7.62 Millimeter, NATO, Tracer, M62	A165	4-13.3 4-13.5	1305-00-926-3942	8595543/ 7553705	Linked 4 ball M80, 1 tracer M62 for MG, GAU-2B/A, GAU-17, M134, 750 per belt M13, 2 belts (1,500 cartridges) per metal box M548
Cartridge, 7.62 Millimeter, Dim Tracer, M276 Cartridge, 7.62 Millimeter, Flash Suppressed, M80E1	A255	4-13.14 4-13.15	1305-01-380-9975	10521998 10542714 12960871	4 ball, M80E1 and 1 dim tracer, M276; linked w/M13 links: packed 100 rounds/belt, 1 belt/10 rounds cardboard cartons/bandoleer, 2 carton/bandoleer per box ammunition, M19A 4 box ammunition M19A1 per wirebound box
Cartridge, 7.62 Millimeter, Dim Tracer, M276 Cartridge, 7.62 Millimeter, Flash Suppressed, M80E1	A257	4-13.14 4-13.15	1305-01-380-9803	10521998 10542714 10545780 12960873	9 ball, M80E1 and 1 dim tracer, M276; linked w/M13 links: packed 750 rounds belt, 2 belt/15 rounds shipping and storage container, M548 (functional)
Cartridge, 7.62 Millimeter, Flash Suppressed, M80E1	A258	4-13.15	1305-01-980-9804	10521998 10542714 10545780 12960873	14 ball, M80E1 and 1 dim tracer, M276; linked w/M 13 links: packed 750 rounds belt 2 belt/15 rounds shipping and storage container, M548 (functional)

Table 4-15 7.62mm Ammunition Linked Configuration (Continued)

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 7.62 Millimeter, Armor Piercing, M993	AA04	4-13.18	1305-01-398-1449	7308308A	4 AP M993 and 1 tracer M62 linked w/M13 links, for MG M60, M240: packed 100 per belt, 1 belt per carton, 1 carton per bandoleer T4, 2 bandoleers (200 cartridges) per wirebound box
Cartridge, 7.62 Millimeter, Armor Piercing, M993	AA34	4-13.18	1305-01-458-6826	7308302A	9 AP M993 and 1 dim tracer M276 linked w/M13 links: packed 750 per belt, 2 belts per shipping and storage container M548 (functional), 1,500 cartridges per M548 container
Cartridge, 7.62 Millimeter, Armor Piercing, M993	AA35	4-13.18	1305-0-458-6825	7308305A	4 AP M993 and 1 dim tracer M276 linked w/M13 links, for MG M50, M240: packed 100 per belt, 1 belt per carton, 1 carton per bandoleer T4, 2 bandoleers (200 cartridges) per metal box M19A1, 4 boxes (800 cartridges) per wirebound box
Cartridge, 7.62 Millimeter, Armor Piercing, M993	AA36	4-13.18	1305-01-458-6823	7308300A	9 AP M993 and 1 tracer M62 linked w/M13 links, for MG M60, M240: packed 750 per belt, 2 belts per shipping and storage container M548 (functional), 1,500 cartridges per M5648 container
Cartridge, 7.62 Millimeter, M973 Ball Short Range Training Ammunition (SRTA), M974 Tracer Short Range Training Ammunition-Tracer (SRTA-T), LINKED 4:1 Configuration	AA37	4-13.19	1305-01-459-9535	19200- 12982954	Linked, 4 M974 ball SRTA, 1 M974 tracer SRTA-T, with M13 links: packed 100 cartridges per belt, 1 belt per carton, 1 carton per bandoleer M4, 3 bandoleers per container M2A1 metal box, 2 M2A1 boxes (600 cartridges) per wirebound box (U.S. Army and U.S. Navy)

4-14 .30 CALIBER AMMUNITION

See Table 4-16 for packaging and identification data.

4-14.1 Cartridge, .30 Caliber, Blank, M1909 (A222), (A224).

4-14.1.1 Intended Use. This cartridge is intended for use in ceremonial and training purposes in M1903 or M1 rifles chambered for .30-06 (.30 cal).

4-14.1.2 Description. This cartridge, Figure 4-16, is identified by the absence of a bullet and it has a crimped cartridge case mouth. The cartridge is loaded with 12 grains (.78 gram) of SR 4990

propellant. The cartridge is 2.49 inches (6.32 centimeters) in length and weighs approximately 218 grains (14.13 grams).

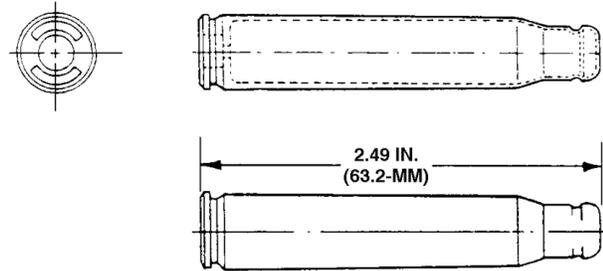


Figure 4-16 .30 Caliber Blank Cartridge M1909

Table 4-16 .30 Caliber Ammunition

ITEM	DODIC/N ALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, .30 Caliber, Blank, M1909	A222	4-14.1	1305-00-028-6237	6006152	20 per carton, 38 cartons per T5 waxed container, 2 containers per T1 wooden box (1,520 rounds)
	A222		1305-00-028-6238	6006152	20 per carton, 100 cartons per M1917 metal lid wooden box (2,000 rounds)
	A222		1305-00-028-6239	6006152	20 per carton, 30 cartons per T1 waxed container, 2 containers per T1 wooden box (1,200 rounds)
	A222		1305-00-028-6553	6006152	20 per carton, 36 cartons per M21 can, 2 cans per M23 wooden box (1,200 rounds)
	A222		1305-00-028-6554	6006152	20 per carton, 34 cartons per M21 can, 2 cans per M23 wooden box (1,360 rounds)
	A222		1305-00-028-6559	6006152	20 per carton, 30 cartons per M2A1 metal box, 2 boxes per wirebound box (1,200 rounds)
	A222		1305-00-047-3871	6006152	20 per carton, 31 cartons per M2A1 metal box, 2 boxes per wirebound box (1,240 rounds)
	A222		1305-00-819-3693	6006152f	20 per carton, 125 cartons per MK 1 MOD 0 box (2,500 rounds)

Table 4-16 .30 Caliber Ammunition (Continued)

ITEM	DODIC/N ALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, .30 Caliber, Blank, M1909	A224	4-14.1	1305-00-028-6561	6006152	8 per clip, 6 clips per band, 12 bands per M21 can, 2 cans per M23 wooden box (1,152 rounds)
	A224		1305-00-301-1670	6006152	8 per clip, 6 clips per band, 10 bands per M2A1 metal box, 2 boxes per wirebound box (960 rounds)
	A224		1305-00-542-0420	6006152	8 per clip, 6 clips per band, 5 bands per M1 or M19 series metal box, 4 boxes per wirebound box (960 rounds)

4-15 .300 CALIBER AMMUNITION

This type of cartridge is used for long-range match firing. See Table 4-17 for packaging and identification data.

4-15.1 Cartridge, .300 Caliber, Winchester Magnum, MK 248 MOD 0 (A191).

4-15.1.1 Intended Use. The MK 248 MOD 0 cartridge is intended for sniper use and long range match firing.

4-15.1.2 Description. The cartridge is 3.50 inches (8.00 cm) long, weighs approximately 500 grains (32.4 grams). It has a propellant composition of approximately 74 grains (4.79 grams) of Bofors Rp 15 propellant and contains a 5.4 grain (.349 gram) lead styphnate primer.

4-15.1.3 Cartridge Case. The brass cartridge case is 2.62 inches (6.65 cm) long and weighs approximately 230 grains (14.9 grams).

4-15.1.4 Bullet. The bullet consists of a gilding metal jacket and a lead antimony slug. The bullet is the Sierra MatchKing™ projectile.

4-15.1.5 Ballistic Data. The ballistic data for the cartridge are as follows:

a. Velocity. The velocity will be a nominal 3,000 fps (914.4 meters per second) at 15 feet (4.57 meters) from the muzzle.

b. Pressure. The average chamber pressure shall not exceed 68,100 psi.

c. Accuracy. The average extreme spread of ten 10-shot groups shall not exceed 3.93 inches (9.98 cm) at 300 yards (274 meters).

Table 4-17 .300 Caliber Ammunition

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, .300 Caliber, Winchester Magnum, MK 248 MOD 0	A191	4-15.1	1305-01-018-1547	DS/4083/C03/1312 Rev D	20 per carton, 12 cartons/M2A1 can, 2 M2A1 cans/wirebound box (480 cartridges)

4-16 .45 CALIBER AMMUNITION

The .45 caliber ammunition is a centerfire cartridge. The primer assembly consists of a brass or gilding metal cup that contains a sensitive explosive pellet composition, a paper or foil disk, and a brass anvil. Unless specified, the propellant is type SR7970 and the bullet has a lead or steel core cov-

ered by an outside jacket of gilding metal or gilding metal-clad steel. Figure 4-17 shows ammunition for .45 caliber weapons (except for the wadcutter and blank line-throwing cartridges). See Table 4-18 for packaging and identification data.

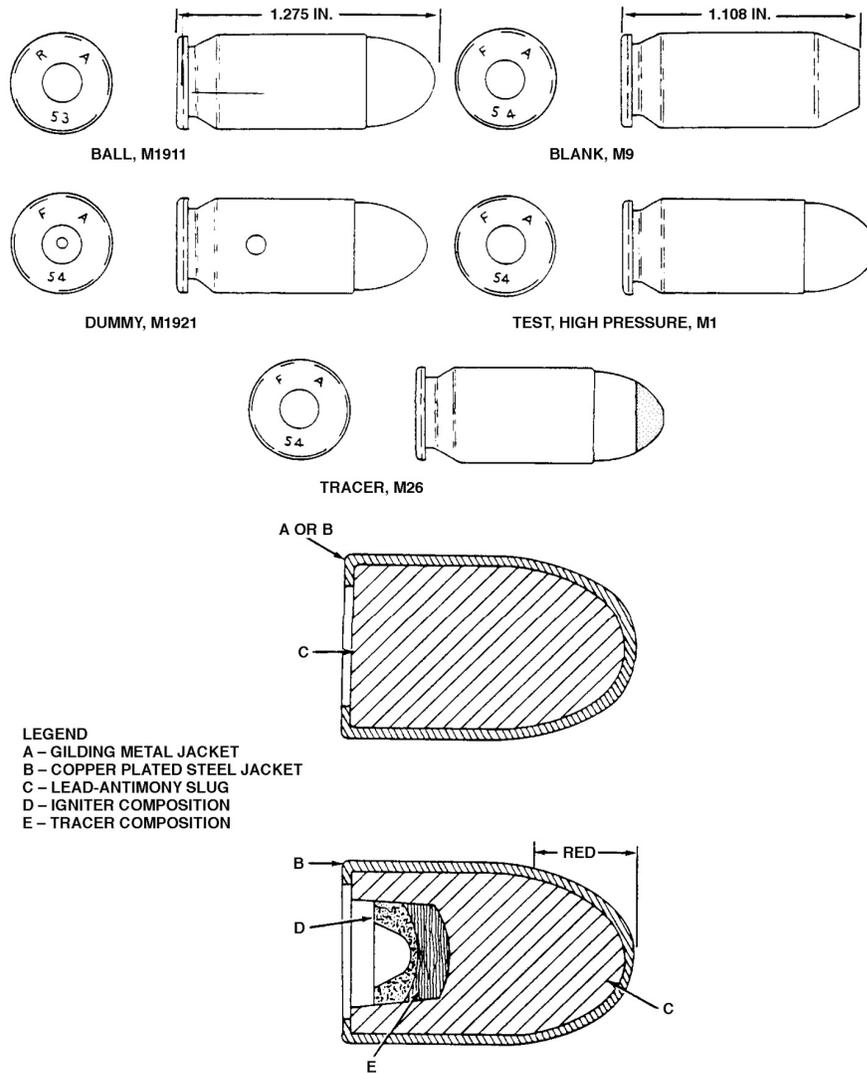


Figure 4-17 .45 Caliber Cartridges and Bullets

Table 4-18 .45 Caliber Ammunition

ITEM	DODIC/N ALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, .45 Caliber, Ball, ACP, M1911	A475	4-16.1	1305-00-555-7077	6000503	Commercially packaged
	A475		1305-00-028-6613	6000503	20 per carton, 100 cartons (2,000 cartridges) per metal-lined wooden box
	A475		1305-00-555-1225	6000503	20 per carton, 50 cartons per metal box M2A1, 2 boxes (2,000 cartridges) per wirebound box
	A475		1305-00-028-6616	6000503	50 per carton, 12 cartons per metal can M5, 2 cans (1,200 cartridges) per wooden box M12
	A475		1305-00-028-6617	6000503	50 per carton, 12 cartons per metal can M5, 2 cans (1,200 cartridges) per wooden box M12
	A475		1305-00-028-6619	6000503	50 per carton, 12 cartons per metal can M20, 2 cans (1,200 cartridges) per wooden box
	A475		1305-00-301-1683	6000503	50 per carton, 40 cartons (2,000 cartridges) per metal-lined wooden box
	A475		1305-00-301-1685	6000503	50 per carton, 20 cartons per metal box M2A1, 2 boxes (2,000 cartridges) per wirebound box
	A475		1305-00-540-9227	6000503	As required in MK 1 MOD 0 box
Cartridge, .45 Caliber, ACP, Blank, M9	A476	4-16.2	1305-00-028-6635	7635291	50 per carton, 12 cartons per can M5, 2 cans (1,200 cartridges) per wooden box M3
	A476		1305-00-753-2304	7635291	50 per carton, 20 cartons per metal box M2A1, 2 boxes (2,000 cartridges) per wirebound box
Cartridge, .45 Caliber, Tracer, ACP, M26	A479	4-16.3	1305-00-028-6631	7636733	20 per carton in waterproof envelope, 81 envelopes (1,620 cartridges) per wooden box
	A479		1305-00-905-6788	10534359	50 per carton, 20 cartons per metal box M2A1, 2 boxes (2,000 cartridges) per wirebound box

Table 4-18 .45 Caliber Ammunition (Continued)

ITEM	DODIC/N ALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, .45 Caliber, Ball, ACP, 185-Grain Wadcutter, Match Grade	A482	4-16.4	1305-00-892-4230	10521458	50 per carton, 20 cartons (1,000 cartridges) per wooden box
	A482		1305-00-752-7910	10521458	50 per carton, 20 cartons per metal box M2A1, 2 boxes (2,000 cartridges) per wirebound box
	A482		1305-00-540-7862	MIL-C-3030-1	50 per carton, 30 cartons per commercial wooden box
Cartridge, .45 Caliber, Ball, ACP, Match Grade, M1911	A483	4-16.5	1305-00-892-2526	8596136	50 per carton, 20 cartons per ball, metal box M2A1, 2 boxes (2,000 cartridges) per wirebound box
	A483		1305-00-052-7459	RA6845	Packaged Commercially
Cartridge, .45 Caliber, ACP, Dummy, M1921	A501	4-16.6	1305-00-028-6639	6006253	20 per carton, 100 cartons (2,000 cartridges) per metal-lined wooden box
	A501		1305-00-028-6641	6006253	50 per carton, 12 cartons per can M5, 2 cans (1,200 cartridges) per wooden box M3
	A501		1305-00-516-5234	6006253	For Pistol M1911, 50 per carton, 20 cartons per metal box, 2 boxes (2,000 cartridges) per wooden box
Cartridge, .45 Caliber (.45-70), Line-Throwing, Blank, M32	A477	4-16.7	1305-00-301-1696	7553068	10 per can, 33 cans (330 cartridges) per wooden box M9
	A477		1305-00-301-1697	7553068	10 per can, 100 cans (1,000 cartridges) per box MK 1
	A477		1305-00-542-0015	7553068	20 per carton, 50 cartons per waterproof bag, 1 bag (2,000 cartridges) per wooden box
	A477		1305-00-353-6742	7553068	360 per metal box M2A1, 2 boxes (720 cartridges) per wooden box
Cartridge, .45 Caliber, ACP Match 185 Grain, Metal Case Wadcutter	A470	4-16.8	1305-01-018-1537	PS/7043/C74/47 Rev 2 Chg 1	50 per carton, 20 cartons (1,000 cartridges) per M2A1 metal box, 2 boxes (2,000 cartridges) per wirebound box
Cartridge, .45 Caliber, Auto +P, Full Metal Jacket, Truncated Cone	AA18	4-16.9	1305-01-443-1891		50 per carton. 20 cartons (1,000 cartridges) per M2A1 metal box, 2 boxes (2,000 cartridges) per wirebound box

4-16.1 Cartridge, .45 Caliber, Ball, ACP, M1911 (A475).

4-16.1.1 Intended Use. This cartridge is design-ed and procured for use in .45 caliber automatic pistols and submachine guns for guard and combat duty.

4-16.1.2 Description. The cartridge is 1.275 inches (3.238 centimeters) long, weighs approximately 331 grains (21.448 grams), contains a 4.5 grain (.291 gram) primer and 5.0 grains (.324 gram) of propellant composition.

4-16.1.3 Cartridge Case. The cartridge case is made of brass or steel, is 0.898 inch (2.28 centimeters) long, and weighs approximately 87 grains (5.64 grams).

4-16.1.4 Bullet. The bullet is 0.68 inch (1.72 centimeters) long and weighs approximately 234 grains (15.16 grams). It has either a gilding metal-clad steel or copper-plated steel jacket and a lead-antimony slug.

4-16.1.5 Ballistic Data. The ballistic data for the cartridge are as follows:

a. Velocity. The average velocity shall be 855 fps (260 meters per second) at 25.5 (7.7 meters) feet from the muzzle.

b. Pressure. The average chamber pressure shall not exceed 19,000 psi (131 MP_a)

c. Accuracy. The average of the mean radii of all targets at the time of acceptance shall not be greater than 2 inches (5.08 centimeters) at 50 yards (45 meters) range.

4-16.2 Cartridge, .45 Caliber, ACP, Blank, M9 (A476).

4-16.2.1 Intended Use. This cartridge is design-ed and procured for use in all .45 caliber semiautomatic pistols for training programs requiring simulated firing for realism. The blank cartridge fires in automatic pistols only by manual slide operation.

4-16.2.2 Description. The cartridge is 1.108 inches (2.814 centimeters) long, weighs approximately 91 grains (5.896 grams), contains a lead-styphnate primer and approximately 7 grains

(.453 gram) of smokeless propellant. The absence of a bullet and the tapered case mouth sealed with a recessed red-lacquered disk (wad) readily identifies the M9 blank cartridge. The cartridge case head has a stamp with the last two digits of the year of manufacture. A circular crimp secures the primer in the pocket. The primer is waterproofed with a lacquer seal.

4-16.3 Cartridge, .45 Caliber, Tracer, ACP, M26 (A479).

4-16.3.1 Intended Use. This cartridge is designed and procured for use in all .45 caliber weapons for firing observation, incendiary, and signaling. There are no plans to purchase additional quantities once current inventories become depleted.

4-16.3.2 Description. The cartridge is essentially the same as the .45 caliber, M1911 cartridge, except for the tracer-filled bullet. The M26 tracer cartridge is 1.275 inches (3.238 centimeters) long, weighs approximately 291 grains (18.856 grams). It contains a lead-styphnate primer and approximately 6 grains (.3888 gram) of propellant composition.

4-16.3.3 Cartridge Case. The brass cartridge case is 0.898 inch (2.28 centimeters) long and weighs approximately 87 grains (5.64 grams). A crimp holds the bullet in the mouth with the primer secured in the pocket by a circular crimp. Additionally the cartridge is waterproofed.

4-16.3.4 Bullet. The bullet has either a copper-plated steel or a gilding metal-clad steel jacket with a lead-antimony slug. Located in the slug base are a tracer composition (R-256) of approximately 3 grains (.1944 gram) and an igniter composition (I-276) of 2.5 grains (.162 gram). The bullet weighs approximately 208 grains (13.48 grams) and is 0.68 inch (1.72 centimeters) long. The bullet tip is red for identification.

4-16.3.5 Ballistic Data. The cartridge ballistic data are as follows:

a. Velocity. The average velocity is 885 fps (269.75 meters per second) at 25.5 feet (7.7 meters) from the muzzle.

b. Pressure. The average chamber pressure shall not exceed 19,000 psi (131 MP_a).

c. Accuracy. The average of the mean radii of all targets at the time of acceptance is not greater than 5 inches (12.7 centimeters) at 50 yards (45 meters) range.

d. Trace. The trace range is between 15 and 150 yards (13.72 and 137.16 meters) range minimum.

4-16.4 Cartridge, .45 Caliber, Ball, ACP, 185-Grain Wadcutter, Match Grade (A482).

4-16.4.1 Intended Use. This cartridge is designed and procured for use in semiautomatic pistols for target practice and Navy Competitive Match Programs.

4-16.4.2 Description. The cartridge is 1.256 inches (3.19 centimeters) long, contains a lead-styphnate primer and approximately 4.8 grains (.311 gram) of propellant composition.

4-16.4.3 Cartridge Case. The brass cartridge case weighs approximately 87 grains (5.64 grams).

4-16.4.4 Bullet. The bullet profile conforms to individual manufacturer's practices and weighs approximately 185 grains (11.99 grams). The blunt bullet has a sharp shoulder that cuts a clean hole through the target paper, making a hit easier to spot and score. It is lead alloy enclosed in a metal jacket.

4-16.4.5 Ballistic Data. The cartridge ballistic data are as follows:

a. Velocity. The average velocity is 765 fps (233 meters per second) at 15 feet (4.5 meters) from the muzzle.

b. Pressure. The average chamber pressure shall not exceed 18,000 psi (124.1 MP_a).

c. Accuracy. The average extreme spread of five 5-shot targets at 50 yards (45.72 meters) range shall not exceed 3.0 inches (7.62 centimeters).

4-16.5 Cartridge, .45 Caliber, Ball, ACP, Match Grade, M1911 (A483).

4-16.5.1 Intended Use. This cartridge is designed and procured for use in semiautomatic pistols for target practice and Navy Competitive Match Programs.

4-16.5.2 Description. The cartridge is 1.275 inches (3.238 centimeters) long, weighs approximately 334 grains (21.64 grams), contains a 4.0 grain (.259 gram) primer and 5.0 grains (.324 gram) of propellant composition.

4-16.5.3 Cartridge Case. The brass cartridge case weighs approximately 87 grains (5.64 grams) and is 0.898 inch (2.28 centimeters) long. The word MATCH or NM (National Match) stamped on the case head identifies this cartridge. This stamp is mandatory for cartridges manufactured for National Matches.

4-16.5.4 Bullet. The gilding metal jacketed bullet has a lead-antimony slug. It is 0.68 inch (1.72 centimeters) long and weighs approximately 234 grains (15.16 grams).

4-16.5.5 Ballistic Data. The ballistic data for the cartridge are as follows:

a. Velocity. The average velocity shall be 855 fps (260 meters per second) at 25.5 feet (7.7 meters) from the muzzle.

b. Pressure. The average chamber pressure shall not exceed 19,000 psi (131 MP_a).

4-16.6 Cartridge, .45 Caliber, ACP, Dummy, M1921 (A501).

4-16.6.1 Intended Use. This cartridge is design-ed and procured for use to train personnel in the handling, loading, and unloading operations of .45 caliber weapons.

4-16.6.2 Description. The cartridge is 1.275 inches (3.238 centimeters) long, weighs approximately 313 grains (20.282 grams), and has a brass case. An empty primer pocket and two 0.120 inch (.304 centimeter) holes drilled 180° apart in the sides of the case identifies the cartridge. The M1921 dummy cartridge with a steel case has no holes drilled in the sides of the case. It has no

primer, and is zinc plated and chromate treated. The bullet used is the same as the one used in the M1911 ball cartridge.

4-16.7 Cartridge, .45 Caliber (.45-70), Line-Throwing, Blank, M32 (A477).

4-16.7.1 Intended Use. This cartridge, Figure 4-18, is designed and procured for use to project a line-carrying projectile from the MK 1 MOD 1 .45-70 line-throwing gun. There are no plans to purchase additional quantities once current inventories become depleted.

4-16.7.2 Description. The cartridge has a standard commercial cartridge case (.45-70 Government) fitted with a noncorrosive primer secured in the pocket by a crimp and waterproofed. It has a smokeless propellant composition contained in the case by commercial grade (No. 3) felt wads. Waterproofing compound applied to the wad secures it in place and seals the cartridge against moisture. The mouth has a slight roll crimp to prevent the end of the line-carrying projectile from entering the case. The cartridge projects a 1/2-pound (226.8 grams) projectile attached to a standard Navy line for a minimum of 75 yards (68.58 meters) at a 30° elevation.

4-16.8 Cartridge, .45 Caliber, ACP Match 185 Grain, Metal Case Wadcutter (A470).

4-16.8.1 Intended Use. This cartridge is design-ed and procured for use in semiautomatic pistols for target practice and Navy Competitive Match Programs.

4-16.8.2 Description. The cartridges 1.256 inches (3.19 centimeters) long, contain a lead-styphnate primer and approximately 4.4 grains (0.285 gram) of propellant composition.

4-16.8.3 Cartridge Case. The brass cartridge case weighs approximately 87 grains (5.64 grams).

4-16.8.4 Bullet. The bullet profile conforms to individual manufacturer's practices and weighs approximately 185 grains (11.99 grams). The blunt bullet has a sharp shoulder that cuts a clean hole through the target paper, making a hit easier to spot and score. It is lead alloy enclosed in a metal jacket.

4-16.8.5 Ballistic Data. The cartridge ballistic data are as follows:

- a. Velocity. The average velocity is 765 feet per second (233 meters per second) at 15 feet (4.5 meters) from the muzzle.
- b. Pressure. The average chamber pressure shall not exceed 22,000 psi (151.7 MP_a)
- c. Accuracy. The average extreme radius of ten 5-shot targets at 50 yards (45.72 meters) range shall not exceed 1.7 inches (4.32 centimeters).

4-16.9 Cartridge, .45 Caliber, Auto +P, Full Metal Jacket, Truncated Cone (AA18).

4-16.9.1 Intended Use. The .45 caliber Auto +P Full Metal Jacket (FMJ) Truncated Cone (TC) cartridge is designed and procured for use in the MK 23 MOD 0 .45 caliber Offensive Handgun. Figure 4-19 is a photograph of the .45 Caliber Auto +P FMJ-TC Cartridge and the fiberboard box it is packaged in.

4-16.9.2 Description. The .45 caliber Auto +P FMJ-TC cartridge is 1.256 inches (3.19 centimeters) long and contains a large pistol lead styphnate primer, brass cartridge case, 185 grain FMJ-TC cartridge, and approximately 6.7 grains of smokeless small arms propellant (Bullseye 84®).

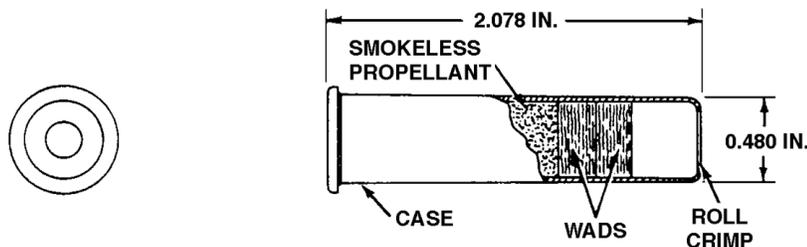


Figure 4-18 .45 Caliber Line-Throwing Cartridge



Figure 4-19 .45 Caliber Auto +P FMJ-TC Cartridge

4-16.9.3 Cartridge Case. The brass cartridge case weighs approximately 87 grains (5.64 grams) and is 0.898 inches (2.28 centimeters) long. "+P" stamped on the case head identified this cartridge. This stamp is mandatory for the +P cartridges.

4-16.9.4 Bullet. The bullet contains a lead alloy core encased in a metal jacket. The bullet's profile conforms to individual manufacturer's practices and weighs approximately 185 grains (11.99 grams).

4-16.9.5 Ballistic Data. Ballistic data for this cartridge are as follows.

a. Velocity. The average velocity is 1,130 fps (344.4 meters per second) at 15 feet (4.5 meters) from the muzzle.

b. Pressure. The average corrected chamber pressure shall not exceed 24,000 psi (165.5 MP_a).

c. Accuracy. The average extreme spread of any five-round group shall not exceed 3.5 inches (8.89 centimeters) maximum. The average extreme spread of all twenty five-round-groups shall be 2.5 inches (6.35 centimeters) maximum shot with the target at 50 yards (45.7 meters).

4-17 .50 CALIBER AMMUNITION

The .50 caliber cartridge, Figure 4-20, is for use in .50 caliber machine guns. However, the .50 caliber M48/T189E1/M48A1/M48A2 and the T249E2 practice spotter-tracer cartridge, Figure 4-23, are only for use in the M8 .50 Caliber Spotting Rifle. These are special-purpose spotting devices for the 106mm recoilless rifle, M40 Series. The following paragraphs describe .50 caliber ammunition available for service use. Unless there is a different specification described, Table 4-19 contains the components of .50 caliber ammunition. See Table 4-20 for packaging and identification data.

4-17.1 Cartridge, .50 Caliber, Armor Piercing, M2 (A525), (A529), (AA06).

4-17.1.1 Intended Use. This cartridge is procured for use in .50 caliber machine guns against armored vehicles, armored aircraft, concrete shelters and similar bullet-resisting targets. There are no plans to purchase additional quantities once current inventories become depleted.

4-17.1.2 Description. The cartridge is 5.45 inches (13.843 centimeters) long, weighs approximately 1,822 grains (118.065 grams), contains a 19.0-grain (1.231 grams) primer and approximately 235 grains (15.228 grams) of propellant composition.

4-17.1.3 Cartridge Case. The brass cartridge case is 3.91 inches (9.93 centimeters) long and weighs approximately 850 grains (55.08 grams).

4-17.1.4 Bullet. The gilding metal-jacketed bullet has a hardened core of manganese-molybdenum steel and a point filler of lead-antimony. The bullet is 2.31 inches (5.86 centimeters) long, weighs approximately 708 grains (45.88 grams), and has a boattailed base. The bullet tip is black for identification.

4-17.1.5 Accuracy. The average of the mean radii of all targets at the time of acceptance is not greater than 10 inches (25.4 centimeters) at 600 yards (548 meters) range.

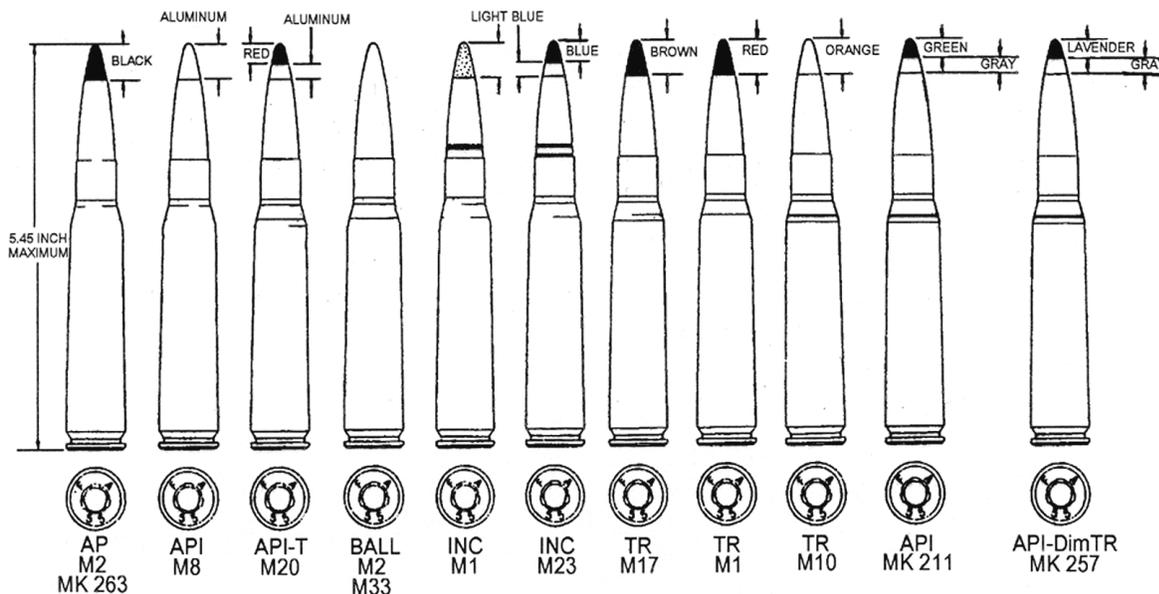


Figure 4-20 .50 Caliber Cartridges

Table 4-19 .50 Caliber Cartridge Components

CARTRIDGE	PROPELLANT	CASE
M2, AP	Double-base, ball, WC 860	Brass
M8, API	Double-base, ball, WC 860	Brass
MK 211 MOD 0, API	Double-base, ball, WC 860 or single-base, tubular, IMR 5010	Brass
M20, API-T	Single-base, tubular, IMR 5010	Brass
M2, Ball	Double-base, ball, WC 860	Brass
M1, Incendiary	Double-base, ball, WC 860	Brass
M23, Incendiary	Double-base, ball, tubular, IMR 4831	Brass
M1, Tracer	Single-base, tubular, IMR 5010	Brass
M10, Tracer	Single-base, tubular, IMR 5010	Brass
M17, Tracer	Single-base, tubular, IMR 5010	Brass
M33, Ball	Double-base, ball, WC 860 or single-base, tubular, IMR 5010	Brass or Steel
T49, API, Grade A.C.	Double-base, ball, WIC 860	Brass
M1, Blank	Double-base, ball, WC 150	Brass
M1A1, Blank	Double-base, HiSkor 700X	Brass
M2, Dummy	Inert	Brass or Steel
M48, Spotter-Tracer	Double-base, tubular, IMR 7383	Brass
M48A1, Spotter-Tracer	Double-base, tubular, IMR 7383	Brass
MK 211 MOD 1, API	Double-base, ball, WC 860 or single-base, tubular, IMR 5010	Brass
MK 257 MOD 0, API-DT	Single-base, tubular, IMR 5010	Brass
M1, Test, High Pressure	Double-base, ball, WC 860	Brass

Table 4-20 .50 Caliber Ammunition

ITEM	DODIC/N ALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, .50 Caliber, Armor Piercing, M2	A525	4-17.1	1305-00-555-7061	5569930	Packed loose, 360 per box
	A525		1305-00-028-6294	5569930/ C69930	10 per carton, (6 cartons per can M10, 2 cans (120 cartridges) per wooden box M12
	A525		1305-00-028-6296	5569930/ C69930	10 per carton, 35 cartons (350 cartridges) per metal-lined wooden box M1917
Cartridge, .50 Caliber, Armor Piercing Incendiary, M8	A531	4-17.2	1305-00-028-6457	7670238	10 per carton, 35 cartons (350 cartridges) per metal-lined wooden box M1917
	A531		1305-00-555-7053	7670238	350 cartridges per box MK 1 MOD 0

Table 4-20 .50 Caliber Ammunition (Continued)

ITEM	DODIC/N ALC	PARA	NSN	REFERENCE NO.	PACKAGING
	A531		1305-00-093-3030	7670238	10 per carton, 6 cartons per metal can, M10, 6 cans (360 cartridges) per box MK 1 MOD 0
Cartridge, .50 Caliber, Armor Piercing Incendiary-Tracer, M20	A541	4-17.3	1305-00-0286598	7672003	10 per carton, 12 cartons per can, 2 cans (240 cartridges) per wooden box
	A541		1305-00-585-5194	7672003	120 per metal box, M2A1, 2 boxes (240 cartridges) per wirebound box
	A541		1305-00-028-6492	7672003	10 per carton, 35 cartons (350 cartridges) per metal-lined wooden box
	A541		1305-00-028-6494	7672003	10 per carton, 6 cartons per can, M10, 6 cans (360 cartridges) per box MK 1 MOD 0
	A541		1305-00-555-7075	7672003	10 per carton as required in box MK 1 MOD 0
Cartridge, .50 Caliber, Ball, M2	A552	4-17.4	1305-00-028-6337	5577960	10 per carton, 6 cartons per can, M10, 2 cans (120 cartridges) per wooden box M12
	A552		1305-00-028-6333	5577960	10 per cartons, 35 cartons (350 cartridges) per metal-lined wooden box M1917
	A552		1305-00-093-3036	5577960	10 per carton, 6 cartons per can M10, 6 cans (360 cartridges) per box MK 1 MOD 0
Cartridge, .50 Caliber, Ball, M2	A553	4-17.4	1305-00-028-6335	5577960	10 per carton, 35 cartons per M1917 metal and wooden box
Cartridge, .50 Caliber, Blank, M1	A558	4-17.6	1305-00-093-3048	7673517	10 per carton, 45 cartons (450 cartridges) per wooden box
Cartridge, .50 Caliber, Dummy, M2	A560	4-17.8	1305-00-028-6383	5556579	10 per carton, 12 cartons per waxed container, 2 containers (240 cartridges) per wooden box
	A560		1305-00-028-6382	5556579	10 per carton, 35 cartons (350 cartridges) per metal-lined wooden box M1917
	A560		1305-00-028-6381	5556579	10 per carton, 35 cartons (350 cartridges) per wooden box M1917 without metal liner
	A560		1305-00-028-6384	5556579	120 per metal box M2A1, 2 boxer per wooden box, 24 wooden boxes per pallet
Cartridge, .50 Caliber, Incendiary, M1	A562	4-17.9	1305-00-301-1643	5579812	10 per carton, 12 cartons per waxed container T2, 2 containers (240 cartridges) per wooden box T2

Table 4-20 .50 Caliber Ammunition (Continued)

ITEM	DODIC/N ALC	PARA	NSN	REFERENCE NO.	PACKAGING
	A562		1305-00-301-1642	5579812	10 per carton, 35 cartons (350 cartridges) per metal-lined wooden box M1917
	A562		1305-00-555-7062	5579812	10 per carton, 6 cartons per metal can M10, 6 cans (360 cartridges) per box MK 1 MOD 0
Cartridge, .50 Caliber, Tracer, M10	A570	4-17.10	1305-00-555-7076	7670296	50 cartridges per box MK 1 MOD 0
	A570		1305-00-028-6437	7670296	10 per carton, 35 cartons (350 cartridges) per metal-lined wooden box M1917
Cartridge, .50 Caliber, Tracer, M17	A570	4-17.11	1305-00-028-6430	7672165	10 per carton, 6 cartons per can M10, 2 cans (120 cartridges) per wood box M12
	A570		1305-00-555-7051	7672165	10 per carton, 6 cartons per can M10, 6 cans (360 cartridges) per box MK 1 MOD 0
	A570		1305-00-028-6427	7672165	10 per carton, 35 cartons (350 cartridges) per metal-lined wooden box M1917
Cartridge, .50 Caliber, Tracer, M1	A571	4-17.12	1305-00-028-6394	5544843	10 per carton, 35 cartons (350 cartridges) per metal-lined wooden box M1917
	A571		1305-00-028-6395	5544843	Grade MG, 10 per carton, 35 cartons (350 cartridges) per metal-lined wooden box M1917
Cartridge, .50 Caliber, Spotter-Tracer, M48/T189E1	A574	4-17.14	1305-00-028-6611	7553689	104 per metal box M2A1 boxes (208 cartridges) per wirebound box
Cartridge, .50 Caliber, Spotter-Tracer, M48A1	A574	4-17.15	1305-00-554-6745	8594735	10 per carton, 11 cartons per metal box M2A1, 2 boxes (220 cartridges) per wirebound box
Cartridge .50 Caliber, Test, High Pressure, M1	A575	4-17.16	1305-00-126-3852	19200-5544097	90 cartridges per M2A1 metal box, 2 boxes (180 cartridges) per wirebound box
Cartridge .50 Caliber, Armor Piercing Incendiary, MK 211 MOD 0	A606	4-17.13	1305-01-250-8162	6086059	120 per M2A1 metal box, 2 M2A1 boxes (240 cartridges) per wirebound box
Cartridge, .50 Caliber, Armor Piercing Incendiary, MK 211 MOD 1	AA41	4-17.17	1305-01-464-2541	53711-7379631	120 cartilages per M2A1 metal box, 2 boxes (240 cartridges) per wirebound box

Table 4-20 .50 Caliber Ammunition (Continued)

ITEM	DODIC/N ALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, .50 Caliber, Armor Piercing Incendiary Dim Tracer, MK 257 MOD 0	AA42	4-17.18	1305-01-464-3218	53711-7350899	120 cartridges per M2A1 metal box, 2 boxes (240 cartridges) per wirebound box
Cartridge, .50 Caliber, Armor Piercing, MK 263 MOD 0	AA58	4-17.19	1305-01-482-1053	53711-7402416	Package 120 cartridges per M2A1 metal box; 2 M2A1 boxes (total 240 cartridges) per wirebound box

4-17.2 Cartridge, .50 Caliber, Armor Piercing Incendiary, M8 (A531), (A540), (A576), (A577).

4-17.2.1 Intended Use. This cartridge is procured for use in .50 caliber machine guns against armored targets. Upon impact with the target, the incendiary mixture bursts into flame and ignites the flammable material.

4-17.2.2 Description. The cartridge is 5.45 inches (13.843 centimeters) long, weighs approximately 1,739 grains (112.687 grams), has a 19.0-grain (1.231 grams) primer and approximately 233 grains (15.098 grams) of propellant composition.

4-17.2.3 Cartridge Case. The brass cartridge case is 3.91 inches (9.93 centimeters) long and weighs approximately 850 grains (55.80 grams).

4-17.2.4 Bullet. The gilding metal jacketed bullet has a hardened core of manganese-molybdenum steel, a point filler of incendiary composition, and a base filler seal of lead antimony. The bullet is 2.31 inches (5.86 centimeters) long, weighs approximately 662 grains (42.90 grams), and the tip is aluminum colored for identification.

4-17.2.5 Accuracy. The cartridge produces an average of the mean radii of all targets at acceptance not greater than 12 inches (30.48 centimeters) at 600 yards (548 meters) range.

4-17.3 Cartridge, .50 Caliber, Armor Piercing Incendiary-Tracer, M20 (A541), (A576), (A577), (AA06).

4-17.3.1 Intended Use. This cartridge is procured for use in .50 caliber machine guns against armored targets. It is similar to the M8 API cartridge with the addition of a tracer element.

4-17.3.2 Description. The cartridge is 5.45 inches (13.843 centimeters) long, weighs approximately 1,698 grains (110.030 grams), has a 19.0-grain (1.231 grams) of propellant composition.

4-17.3.3 Cartridge Case. The brass cartridge case is 3.91 inches (9.93 centimeters) long and weighs approximately 850 grains (55.08 grams).

4-17.3.4 Bullet. The gilding metal jacketed bullet is similar to the M8 API bullet but with a tracer element. The bullet is 2.31 inches (5.86 centimeters) long, and weighs approximately 619 grains (40.11 grams), and has a red tip and a gray stripe for identification.

4-17.3.5 Accuracy. The cartridge produces an average of the mean radii of all targets at acceptance not greater than 12 inches (30.48 centimeters) at 600 yards (548 meters) range.

4-17.3.6 Trace. The cartridge produces a visible trace beginning approximately 100 yards (91.44 meters) from the muzzle. At approximately 250 yards (228 meters), the trace becomes bright and continues to approximately 1,750 yards (1,600 meters) but not less than 1,600 yards (1,463 meters).

4-17.4 Cartridge, .50 Caliber, Ball, M2 (A552), (A553), (A554), (A557).

4-17.4.1 Intended Use. This cartridge is procured for use in all .50 caliber weapons against personnel and unarmored targets. There are no plans to purchase additional quantities once current inventories become depleted.

4-17.4.2 Description. The cartridge is 5.45 inches (13.843 centimeters) long, weighs approximately 1,813 grains (117.482 grams), contains a 19.0-grain (1.231 grams) primer and approximately 235 grains (15.228 grams) of smokeless propellant.

4-17.4.3 Cartridge Case. The brass cartridge case is 3.91 inches (9.93 centimeters) long and weighs approximately 850 grains (55.08 grams).

4-17.4.4 Bullet. The gilding metal jacketed bullet has a soft steel core and a lead antimony alloy point filler. The boat-tailed bullet weighs approximately 709 grains (45.94 grams), is 2.31 inches (5.86 centimeters) long, and has an unpainted tip.

4-17.4.5 Accuracy. The cartridge produces an average of the mean radii of all targets at acceptance not greater than 9 inches (22.86 centimeters) at 600 yards (548 meters) range.

4-17.5 Cartridge, .50 Caliber, Ball, M33 (A555), (A557).

4-17.5.1 Intended Use. This cartridge is procured for use in all .50 caliber weapons against personnel and unarmored targets.

4-17.5.2 Description. The cartridge is 5.45 inches (13.84 centimeters) long, weighs approximately 1,813 grains (117.482 grams), contains a 19.0-grain (1.231 grams) primer and approximately 235 grains (15.228 grams) of smokeless propellant composition.

4-17.5.3 Cartridge Case. The brass or steel cartridge case is 3.91 inches (9.93 centimeters) long and weighs approximately 850 grains (55.08 grams). A crimp secures the primer in the pocket and the joint has a waterproofing material applied.

4-17.5.4 Bullet. The steel core bullet has a copper-alloy jacket. The point filler is either photographic monohydrate sodium carbonate granules or a 1F6B pelletized composition of graphite, parlon, and photographic monohydrate sodium carbonate. The bullet is 2.31 inches (5.86 centimeters) long and weighs approximately 662 grains (42.90 grams).

4-17.6 Cartridge, .50 Caliber, Blank, M1 (A558), (A559).

4-17.6.1 Intended Use. This cartridge is procured for training purposes use in Browning M2HB, AN-M2 aircraft and XM218 .50 caliber machine guns fitted with blank firing attachments.

4-17.6.2 Description. The cartridge, Figure 4-21, is 3.910 inches (9.93 centimeters) long and weighs approximately 917 grains (59.42 grams). The brass cartridge case has a slight annular groove approximately 1/4 inch (0.63 centimeters) from the mouth that serves as a seat for the Kraftboard (or equivalent) disk wad. There is a crimp on the case mouth and lacquer on both sides of the wad. A heavy coat of vermilion lacquer seals the end. The absence of a bullet identifies the cartridge.

4-17.7 Cartridge, .50 Caliber, Blank, M1A1 (A598).

4-17.7.1 Intended Use. This cartridge is procured for use in .50 caliber machine guns (Browning M2HB, AN-M2 Aircraft, and XM218) fitted with blank firing attachments, for training operations.

4-17.7.2 Description. The cartridge, Figure 4-22, is 3.91 inches (9.93 centimeters) long and weighs approximately 915 to 955 grains (59.29 to 61.88 grams). The brass cartridge case has a rosette crimp on the case mouth, compared to the M1 blank which is crimped via an annular groove approximately 1/4 inch (6.4 millimeters) back of the case mouth. The cartridge is loaded with approximately 42 grains (2.72 grams) of HiSkor 700X propellant. The cartridge is identified by the absence of a bullet.

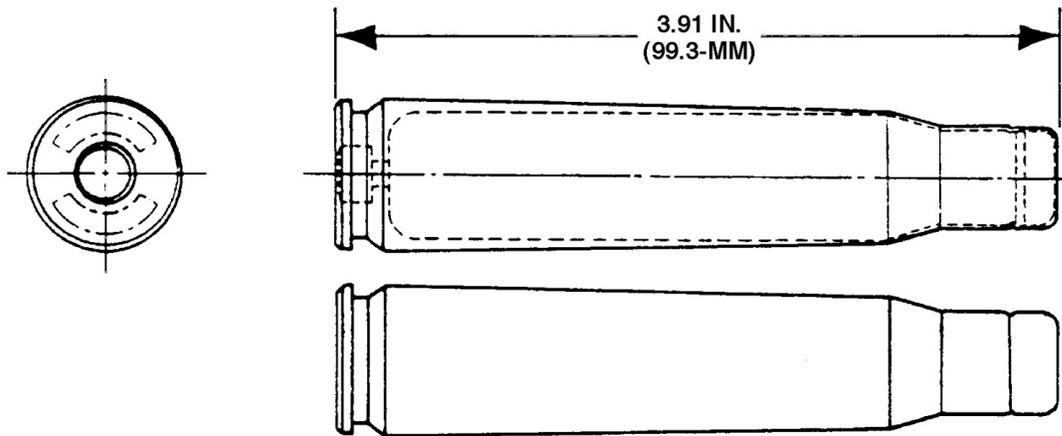


Figure 4-21 .50 Caliber Blank Cartridge M1

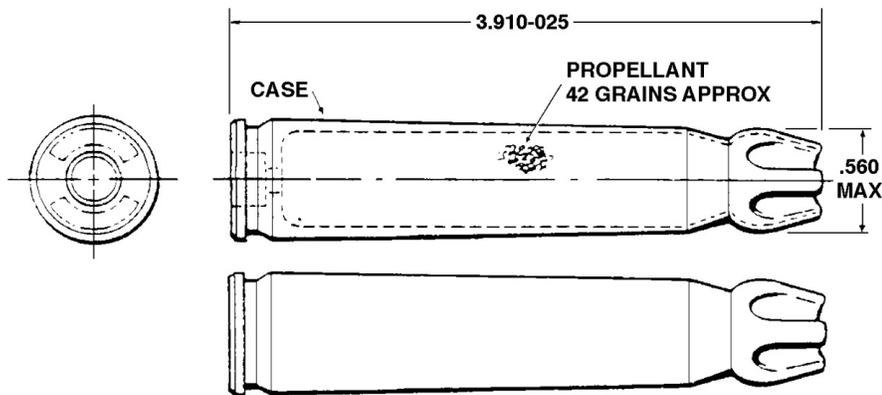


Figure 4-22 .50 Caliber Blank Cartridge M1A1

4-17.8 Cartridge, .50 Caliber, Dummy, M2 (A560).

4-17.8.1 Intended Use. This cartridge is procured for use in all .50 caliber machine guns for personnel training and testing the weapon mechanisms.

4-17.8.2 Description. The cartridge is 5.45 inches (13.84 centimeters) long, weighs approximately 1,214 grains (78.67 grams), and contains neither propellant composition nor primer.

4-17.8.3 Cartridge Case. The brass or steel cartridge case is 3.910 inches (9.93 centimeters) long and weighs approximately 850 grains (55.08 grams). An empty primer pocket and three holes drilled approximately 120 apart around the circumference identify this cartridge.

4-17.8.4 Bullet. The bullet has a gilding metal or gilding metal-clad steel jacket that makes it lighter than types that have a steel core and lead point filler. It is 2.40 inches (6.09 centimeters) long and weighs approximately 364 grains (23.59 grams).

4-17.9 Cartridge, .50 Caliber, Incendiary, M1 (A562), (A551).

4-17.9.1 Intended Use. This cartridge is procured for use in .50 caliber machine guns against combustible targets. It contains an incendiary mixture that ignites upon impact with the target. There are no plans to purchase additional quantities once current inventories become depleted.

4-17.9.2 Description. The cartridge is 5.45 inches (13.84 centimeters) long, weighs approximately 1,703 grains (110.35 grams), contains a 19.0-grain (1.231 grams) primer and approximately 240 grains (15.552 grams) of smokeless propellant.

4-17.9.3 Cartridge Case. The brass cartridge case is 3.91 inches (9.93 centimeters) long and weighs approximately 850 grains (55.08 grams).

4-17.9.4 Bullet. The gilding metal-jacketed bullet is of the size and shape of the AP M2 bullet but has a hollow cylindrical steel body, a lead-antimony base slug, and point filler of incendiary composition. The bullet is 2.35 inches (5.96 centimeters) long, weighs approximately 633 grains (41.02 grams), has two knurled cannelures rolled into the jacket, and the tip is light blue.

4-17.9.5 Accuracy. The cartridge produces an average of the mean radii of all targets at acceptance not greater than 12 inches (30.48 centimeters) at 600 yards (548 meters) range.

4-17.9.6 Velocity. The cartridge produces an average velocity of 2,950 fps (899 meters per second) at 78 feet (23 meters) from the muzzle.

4-17.10 Cartridge, .50 Caliber, Tracer, M10 (A570), (A579).

4-17.10.1 Intended Use. This cartridge is procured for use in all .50 caliber machine guns for firing observation. There are no plans to purchase additional quantities once current inventories become depleted.

4-17.10.2 Description. The cartridge is 5.45 inches (13.84 centimeters) long, weighs approximately 1,752 grains (113.53 grams), contains a

19.0-grain (1.231 grams) primer and approximately 240 grains (15.55 grams) of smokeless propellant.

4-17.10.3 Cartridge Case. The brass cartridge case is 3.91 inches (9.93 centimeters) long and weighs approximately 850 grains (55.08 grams).

4-17.10.4 Bullet. The gilding metal-clad steel jacketed tracer bullet is basically the same as the M1 tracer bullet. It is 2.40 inches (6.09 centimeters) long, weighs approximately 643 grains (41.67 grams), and the tip is orange for identification.

4-17.10.5 Accuracy. At the time of acceptance, the average of the mean radii of all targets is not greater than 20 inches (50.8 centimeters) at 600 yards (548 meters) range.

4-17.10.6 Trace. When fired, the trace is dim or invisible for the first 225 yards (205 meters) of flight, followed by a bright trace to a distance of not less than 1,600 yards (1,463 meters) range from the gun.

4-17.11 Cartridge, .50 Caliber, Tracer, M17 (A570), (A557), (A608).

4-17.11.1 Intended Use. This cartridge is procured for use in .50 caliber machine guns for firing observation. It was originally designed to replace the tracer M1 cartridge (Paragraph 4-17.14). It can substitute for the API-T M20 (Paragraph 4-17.3) except that penetration is not as great. The M17 tracer with deteriorated elements come linked together in 4 M17 tracer to 1-API-T M20 groupings in NALC A523. The M17 tracer rounds serve as ball rounds in that configuration.

4-17.11.2 Description. The cartridge is 5.45 inches (13.84 centimeters) long, weighs approximately 1,742 grains (112.881 grams), contains a 19.0-grain (1.231 grams) primer and approximately 225 grains (14.58 grams) of smokeless propellant.

4-17.11.3 Cartridge Case. The brass cartridge case is 3.91 inches (9.93 centimeters) long and weighs approximately 850 grains (55.08 grams).

4-17.11.4 Bullet. The gilding metal-clad, steel jacketed bullet is similar to the tracer M1 bullet. It is 2.40 inches (6.09 centimeters) long, weighs approximately 643 grains (41.67 grams), and the tip is brown for identification.

4-17.11.5 Accuracy. The cartridge produces an average of the mean radii of all targets at acceptance not greater than 20 inches (50.8 centimeters) at 600 yards (548 meters) range.

4-17.11.6 Trace. The cartridge produces a trace that begins not greater than 100 yards (91 meters) from the muzzle with a bright trace to at least 1,600 yards (1,463 meters) of flight.

4-17.12 Cartridge, .50 Caliber, Tracer, M1 (A540), (A570), (A571), (A549).

4-17.12.1 Intended Use. This cartridge is procured for use in .50 caliber machine guns for firing observation. Its only use is for training in the continental United States. For combat use, the tracer M17 cartridge, Paragraph 4-17.13, replaces the tracer M1. There are no plans to purchase additional quantities once current inventories become depleted.

4-17.12.2 Description. The cartridge is 5.45 inches (13.84 centimeters) long, weighs approximately 1,785 grains (115.668 grams), contains a 19.0-grain (1.231 grams) primer and approximately 240 grains (15.552 grams) of smokeless propellant.

4-17.12.3 Cartridge Case. The brass cartridge case is 3.91 inches (9.93 centimeters) long and weighs approximately 850 grains (55.08 grams).

4-17.12.4 Bullet. The bullet has either a gilding metal or a gilding metal-clad steel jacket, a lead-antimony slug that fires the forward end of the jacket, and a tracer and igniter composition. It is 2.40 inches (6.09 centimeters) long, weighs approximately 677 grains (43.87 grams), and the tip is red for identification. The bullet is cylindrical to the base (not boat-tailed) that is open to let the propelling charge ignite the tracer composition.

4-17.12.5 Accuracy. The cartridge produces an average of the mean radii of all targets at acceptance not greater than 20 inches (50.8 centimeters) at 600 yards (548 meters) range.

4-17.12.6 Trace. The cartridge produces a trace that begins not greater than 250 yards (228 meters) from the muzzle with a trace range of 1,600 to 1,800 yards (1,463 to 1,645 meters).

4-17.13 Cartridge .50 Caliber, Armor Piercing Incendiary, MK 211 MOD 0 (A606), (A607), (A608), (AA06).

4-17.13.1 Intended Use. This cartridge is procured for use in .50 caliber machine guns and other .50 caliber weapons. It is an improved version of the M8-API.

4-17.13.2 Description. The projectile has the same ballistic characteristics as the M8-API projectile but differs in internal construction and components. The MK 211 MOD 0 projectile consists of a copper-alloy jacket housing a steel inner body and a tungsten carbide penetrator core, and a lead sealing disc in the base. Explosive/incendiary components consist of approximately 9.2 grains (.60 gram) of zirconium particles, 13.1 grains (.85 gram) of I-136 incendiary mix, and 15.4 grains (1.00 gram) of Composition A-4. This Pyrotechnically Initiated Explosive (PIE) type projectile provides penetration, fragmentation and fire starting capabilities upon functioning. This cartridge was initially purchased with a green projectile tip as the NM140-A1 (EX 211 MOD 0). The current cartridge drawings require a green projectile tip with aluminum colored annulus.

4-17.14 Cartridge, .50 Caliber, Spotter-Tracer, M48/T189E1 (A574).

4-17.14.1 Intended Use. This cartridge is procured for use in the .50 caliber spotting rifle M8 for spotting before firing the 106mm recoilless rifle M40 series. It will produce a flash and a light puff of smoke upon contact with a target. This cartridge is not for use in other .50 caliber weapons. There are no plans to purchase additional quantities once current inventories become depleted.

4-17.14.2 Description. The cartridge is 4.53 inches (11.50 centimeters) long, weighs approximately 1,651 grains (106.98 grams), contains a 19.0-grain (1.23-grams) primer, and is filled with approximately 120 grains (7.77 grams) of double-base propellant composition. See Figure 4-23.

4-17.14.3 Cartridge Case. The brass cartridge case is 2.99 inches (7.59 centimeters) long and weighs approximately 890 grains (53.33 grams).

4-17.14.4 Bullet. The gilding metal-jacketed bullet contains an incendiary charge within an aluminum alloy container, and a tracer and igniter composition within a steel container. The bullet is 2.72 inches (6.90 centimeters) long, weighs approximately 823 grains (53.33 grams), has a yellow tip and a red annulus to the rear.

4-17.14.5 Accuracy. At the time of acceptance, the average of the mean radii of all targets is not greater than 5 inches (12.7 centimeters) at 600 yards (548 meters) range.

4-17.14.6 Velocity. The average velocity is approximately 1,745 fps (531 meters per second) at 78 feet (23 meters) from the muzzle.

4-17.14.7 Trace. The trace begins at a distance not greater than 100 yards (91 meters) from the muzzle and continues to a distance of approximately 1,500 yards (1,371 meters) range.

4-17.15 Cartridge, .50 Caliber, Spotter-Tracer, M48A1 (A574).

4-17.15.1 Intended Use. This cartridge is procured for use in the .50 caliber spotting rifle (M8) for spotting before firing the 106mm recoilless rifle M40 series. It will produce a flash and a light puff of smoke on contact with a target. It is not for use in other .50 caliber weapons. There are no plans to purchase additional quantities once current inventories become depleted. See Figure 4-23.

4-17.15.2 Description. The cartridge is 4.53 inches (11.50 centimeters) long, weighs approximately 1,651 grains (106.984 grams), contains a 19.0-grain (1.231 grams) primer and approximately 117.5 grains (7.614 grams) of extruded single-base tubular smokeless propellant. It has a

0.984 inch (2.49 centimeter) long flash tube and has an orifice diameter of 0.093 inch (.23 centimeter). The flash tube extends from the primer vent toward the case mouth.

4-17.15.3 Cartridge Case. The brass cartridge case is 2.99 inches (7.59 centimeters) long and weighs approximately 890 grains (57.67 grams).

4-17.15.4 Bullet. The gilding metal-jacketed bullet contains an incendiary charge within an aluminum alloy container and a tracer and igniter composition within a steel container. The bullet is 2.72 inches (6.90 centimeters) long, weighs approximately 823 grains (53.33 grams), has a yellow tip and a red annulus to the rear.

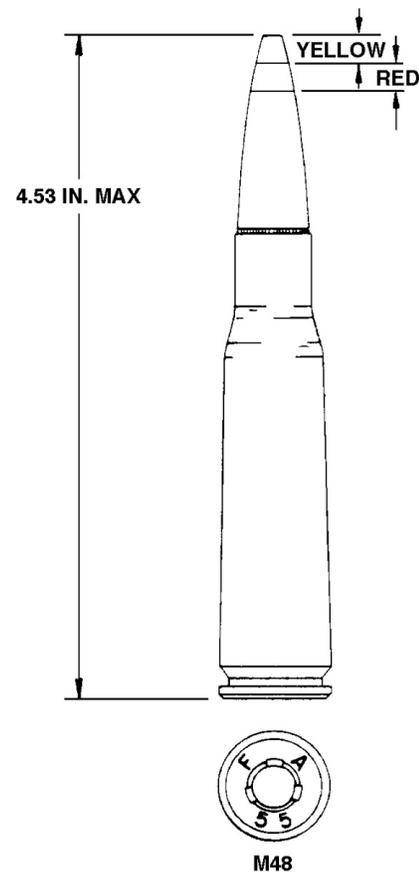


Figure 4-23 .50 Caliber Spotter-Tracer Cartridge

4-17.15.5 Accuracy. At the time of acceptance, the average of the mean radii of all targets is not greater than 5 inches (12.7 centimeters) at 600 yards (548 meters) range.

4-17.15.6 Velocity. The average velocity is approximately 1,745 fps (531 meters per second) at 78 feet (23 meters) from the muzzle.

4-17.15.7 Trace. The trace begins at a distance not greater than 100 yards (91 meters) from the muzzle and continues to a distance of approximately 1,500 yards (1,371 meters) range.

4-17.16 Cartridge .50 Caliber, Test, High Pressure, M1 (A575).

4-17.16.1 Intended Use. This cartridge is procured for use in proof testing caliber .50 weapons (except the 106mm Spotting Rifle) during manufacture, test, or repair.

4-17.16.2 Description. The cartridge is 5.45 inches (13.843 centimeters) long, weighs approximately 2082 grains (134.932 grams), has a 19.0 grain (1.231 grams) primer and approximately 240 grains (15.554 grams) of propellant composition. This is a ball cartridge. The high pressure test cartridge is identified by a stannic stained (silvered) cartridge case.

4-17.16.3 Cartridge Case. The brass cartridge case is 3.91 inches (9.93 centimeters) long and weighs approximately 850 grains (55.08 grams).

4-17.16.4 Bullet. The copper alloy jacket bullet contains two lead-antimony slugs, one in the front and one in the rear. The bullet is 2.42 inches (6.15 centimeters) long, weighs approximately 999 grains (64.74 grams), and has an unpainted tip.

4-17.16.5 Pressure. The .50 caliber High Pressure Test M1 cartridge produces 60,000 to 65,000 Copper Units of Pressure (CUP) chamber pressure.

4-17.17 Cartridge, .50 Caliber, Armor Piercing Incendiary, MK 211 MOD 1 (AA41), (A607), (A608), (AA06) .

4-17.17.1 Intended Use. This cartridge has been procured in the past as the MK 211 MOD 0 Grade B cartridge to be used in .50 caliber machine guns

linked with other .50 caliber cartridges. In order to bulk pack this cartridge the nomenclature has been changed to denote the difference between this cartridge and the MK 211 MOD 0 Grade A cartridge. The MK 211 MOD 1 cartridge has a looser head-space tolerance and looser velocity and accuracy requirements than the MK 211 MOD 0. The MK 211 MOD 1 is to be used in machine guns only. The MK 211 MOD 0 is to be used in sniper rifles and may be used in machine guns when necessary (more costly).

4-17.17.2 Description. (The description is the same as the MK 211 MOD 0).

4-17.18 Cartridge, .50 Caliber, Armor Piercing Incendiary Dim Tracer, MK 257 MOD 0 (AA42) .

4-17.18.1 Intended Use. This cartridge is procured to be used with the Night Vision Devices (NVD) for use in .50 caliber machine guns, with flash suppressors, against armored targets. It is a modification of the M20 API-T cartridge that uses a dim tracer element instead of a standard tracer element used in the M20 API-T. The incendiary mixture is the same used in the M8 API and M20 API-T.

4-17.18.2 Description. The cartridge is 5.45 inches (13.843 centimeters) long, weighs approximately 1718 grains (111.325 grams), has a 19.0 grain (1.231 grams) primer and approximately 230 grains (14.904 grams) of propellant composition.

4-17.18.3 Cartridge Case. The brass cartridge case is 3.91 inches (9.93 centimeters) long and weighs approximately 850 grains (55.08 grams).

4-17.18.4 Bullet. The gilding metal jacket bullet is a modification of the M20 API-T bullet which uses a dim tracer element instead of the standard tracer element the bullet contains approximately 12 grains (0.78 grams) of IM-28 incendiary mix, 2 grains (0.13 grams) of I-136 A igniter composition, and 12 grains (0.78 grams) of R-440 dim tracer composition. The bullet is 2.31 inches (5.86 centimeters) long, weighs approximately 619 grains (40.11 grams), and has a lavender tip with a gray annulus stripe for identification.

4-17.18.5 Accuracy. The cartridge produces an average of the mean radii of all targets at acceptance not greater than 12 inches (30.48 centimeters) at 600 yards (548 meters) range.

4-17.18.6 Trace. The cartridge produces a trace that is visible with the aid of NVD and invisible when viewed with the unaided eye. The trace begins at the muzzle, approximately, and continues to a point of 1600 yards (1463 meters) or greater.

4-17.19 Cartridge, .50 Caliber, Armor Piercing, MK 263 MOD 0 (AA58), (AA06), (AA50).

4-17.19.1 Intended Use. The MK 263 MOD 0 cartridge is used in .50 caliber machine guns against light armored vehicles and similar bullet-resisting targets. This cartridge is a replacement for the M2AP cartridge.

4-17.19.2 Description. The cartridge is 13.84 cm (5.45 inches) long and contains approximately 230 grains (14.9 grams) of propellant composition.

4-17.19.3 Cartridge Case. The brass cartridge case is 9.93 cm (3.91 inches) long and weighs approximately 850 grains (55.1 grams).

4-17.19.4 Bullet. The gilding metal-jacketed bullet has a hardened steel core and inert point filler. The bullet is 6.22 cm (2.45 inches) long, weighs approximately 750 grains (48.6 grams), and has a boat-tailed base. The bullet tip is black for identification.

4-17.19.5 Ballistic Data. The average of the mean radii of all targets at the time of acceptance is not greater than 30.48 cm (12 inches) at a range of 548 meters (600 yards).

4-17.20 Cartridge, .50 Caliber, M858 Ball Plastic Practice, M860 Tracer Plastic Practice, Short Range Training Ammunition (SRTA), Linked 4:1 Configuration (A602).

4-17.20.1 Intended Use. The .50 caliber SRTA cartridges are intended for use in a Browning M2 Heavy Barrel Machine Gun modified with the M3 Recoil Amplifier Barrel. This M2/M3/SRTA system will be used by NAVSPECWAR Special Boat Units for live fire machine gun training in areas with range restrictions. This system will not be used in force-on-force training. The maximum

effective range for the SRTA cartridges is between 150 meters (164.0 yards) and 200 meters (218.7 yards), with a maximum range in terms of safety of 700.0 meters (765.5 yards).

WARNING

WHEN FIRING THE A602 AMMUNITION FROM ENCLOSURES, PERSONNEL ARE LIMITED TO AN EXPOSURE TIME OF 5 MINUTES PER HOUR DUE TO HIGH LEVELS OF CARBON MONOXIDE AND AMMONIA. THERE IS NO RESTRICTION WHEN FIRING IN OPEN TERRAIN.

WARNING

DO NOT LOAD STANDARD .50 CALIBER CARTRIDGES INTO THE M2 MACHINE GUN THAT HAS THE M3RA BARREL INSTALLED. USE ONLY A602 SRTA CARTRIDGES WHEN THE M2 MACHINE GUN HAS THE M3RA BARREL INSTALLED.

4-17.20.2 Description. The .50 caliber SRTA cartridges are M858 .50 caliber ball plastic practice and M860 .50 caliber tracer plastic practice cartridges, linked 4:1 with M9 links. This linked configuration is assigned DODIC A602. The plastic case of the SRTA cartridges is blue to indicate training rounds. The SRTA cartridges are sometimes referred to as "blue bullets". The M860 tracer cartridge has a red tip while the M858 ball cartridge has a blue tip. The SRTA cartridges are functioned in the M2 machine gun which has been modified with the M3 Recoil Amplifier (M3RA) (NSN 1005-01-323-5406). The M3RA has the following major components: modified machine gun barrel; ring support; o-ring; gas cylinder; and right-hand-feed and left-hand-feed discriminators. The discriminators are blue in color and the modified machine gun barrel has a blue band toward the muzzle end of the barrel, to indicate these are for training use.

4-17.20.3 Cartridge Case. The SRTA cartridges have a blue plastic outer case with integral projectile and a blue plastic inner case which contains the smokeless propellant. The outer case is press fitted to the aluminum base with the percussion primer. The length of the SRTA cartridges is 13.21 cm (5.20 inches) maximum, which is shorter than the length of the M33 and M17 cartridges (13.84 cm (5.45 inches) maximum).

4-17.20.4 Bullet. The projectile is integral to the outer blue plastic case. When functioned, sufficient gas pressure is generated in the case to tear the plastic projectile from the case and accelerate it down and out of the barrel. The M858 ball cartridge projectile is solid plastic while the M860 tracer cartridge projectile has a tracer compound in the center of the plastic projectile.

4-17.20.5 Ballistic Data. The M858 ball and M860 tracer SRTA cartridges were designed to be ballistically comparable to the .50 caliber M33 ball and M17 tracer cartridges, respectively, out to 150 meters (164.0 yards).

a. Velocity. At 23.8 meters (78 feet) from the muzzle, the average velocity is 912 meters per second (2992 feet per second).

b. Pressure. The average pressure is 20523 CUP.

c. Accuracy. Average grand mean radius for the A602 cartridges is 27.6mm (1.088 inches) measured at 91.4 meters (100 yards).

4-17.21 Cartridge, .50 Caliber, Linked Configuration.

4-17.21.1 Intended Use. The .50 caliber cartridge for use in machine guns is issued in metallic link belts. The belts are made of unit cartridge links and cartridges, one link for each cartridge. Each link has two loops fitting around one cartridge and a third loop fitting around an adjacent cartridge. See Table 4-21 for packaging and identification data.

4-17.21.2 Closed Loop Links. The .50 caliber, M2 and M9 cartridge links are manufactured with closed loops. When assembled in belts, the links sit on the cartridge shoulder to hold them in proper alignment for feeding into the weapon. Weapons designed for the closed-loop link belts required additional space for retraction in the rear of the receiver.

4-17.21.3 Open Loop Link. The .50 caliber, M15A2 links are manufactured with partially open loops and have a positioning finger on one side that snaps into the cartridge extractor groove. The weapon bolt pushes the cartridge forward and out of the link into the weapon chamber. Those weapons are manufactured with a shorter receiver.

Table 4-21 .50 Caliber Ammunition Linked Configuration

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, .50 Caliber, Armor Piercing Incendiary, M8 Cartridge, .50 Caliber, Tracer, M1	A540	4-17.2 4-17.12	1305-00-028-6471	7670238/ 5544843	Linked 4 API M8, 1 tracer, M1 Grade MG per belt, 1 belt per metal box M2, 2 boxes (120 cartridges) per wirebound box
Cartridge, .50 Caliber, Tracer, M1	A549	4-17.12	1305-00-028-6328	5569930/ 5579812/ 5544843	Linked 2 AP M2, 2 incendiary M1, tracer M1 Grade AC, 265 per belt, 1 belt per metal-lined wooden box M1917
	A549		1305-00-028-6465	5569930/ 5579812/ 55448431	Linked 2 AP M2, 2 incendiary M1, tracer M1 Grade AC, 240 per belt, 1 belt per metal-lined wooden box M1917

Table 4-21 .50 Caliber Ammunition Linked Configuration (Continued)

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
	A549		1305-00-028-6462	7670238/ 5579812/ 7670296	Linked AP M8, 1 incendiary M1, 1 API M8, 1 incendiary M1, 1 tracer M10 Grade AC, 55 per belt, 1 belt per metal can M10, 2 cans (110 cartridges) wooden box M12
	A549		1305-00-0828-6478	7670238/ 5579812	Linked 1 API M8, 1 incendiary M1, 1 API M8, 1 incendiary M1, tracer M10 Grade AC, 60 per belt, 1 belt per wooden container, 4 containers (240 cartridges) per metal-lined wooden box M1917
	A549		1305-00-028-6505	2670296	Linked 2 API M8, 2 incendiary M1, tracer M10, Grade AC, 265 per belt, 1 belt per metal-lined wooden box M1917
	A549		1305-00-028-6482	7670238/ 5579812/ 7670296	Linked 1 API M8, 1 incendiary M1, 1 API M8, 1 incendiary M1, 1 tracer M10, Grade AC, 265 per belt, 1 belt per metal-lined wooden box M1917
Cartridge, .50 Caliber, Incendiary, M1	A551	4-17.9	1305-00-541-0062	7672003	Linked 2 API M8, 2 incendiary M1, API-T M20, Grade AC, 55 per belt as required.
	A551		1305-00-540-7495	7672003	Linked 2 API M8, 2 incendiary M1, API-T M20, Grade AC, 142 per belt, 3 belts (426 cartridges) per box MK 1 MOD 0
	A551		1305-00-028-6484	7672003	Linked 1 API M8, 1 incendiary M1, API M8, 1 incendiary M1, 1 API-T M20, Grade AC, 265 per belt, 1 belt per metal-lined wooden box M1917
	A551		1305-00-301-1647	7670238/ 5579812/ 7672003	Linked 1 API M8, 1 incendiary M1, 1 API M8, 1 incendiary M1, 1 API-T M2, Grade AC, 55 per belt, 1 belt per metal can M10, 6 cans (330 cartridges) per box MK 1 MOD 0
Cartridge, .50 Caliber, Ball, M2	A554	4-17.4	1305-00-028-6355	5577960	Linked ball M2, Grade AC, 105 per belt, 1 belt per metal box M2, 2 boxes (210 cartridges) per wirebound box
Cartridge, .50 Caliber, Ball, M33	A555	4-17.5	1305-0-028-6574	7553097	Linked ball M33, Grade MG, Link M2 or M9, 100 per belt, 1 belt per metal box M2A1, 2 boxes (200 cartridges) per wirebound box
Cartridge, .50 Caliber, Ball, M2 Cartridge, .50 Caliber, Ball, M33	A557	4-17.4 4-17.5	1305-00-817-9661	7670296	Linked 3 ball M2, 1 tracer M10, 142 per belt, 3 belts (426 cartridge) per box MK 1 MOD 0

Table 4-21 .50 Caliber Ammunition Linked Configuration (Continued)

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
	A557		1305-00-028-6347	5577960/ 7672165	Linked 4 ball M2, 1 tracer M17, 105 per belt, 1 belt per metal box M2A1, 2 boxes (210 cartridges) per wirebound box
	A557		1305-00-028-6583	7553097/ 7672165	Linked 4 ball M33, 1 tracer, M17, 100 per belt, 1 belt per metal box M2A1, 2 boxes (200 cartridges) per wirebound box
	A557		1305-00-540-1056	5577960/ 7672165	Linked 4 ball M2, 1 tracer M17, Grade MG, 200 per box
Cartridge, .50 Caliber, Blank, M1	A559	4-17.6	1305-00-028-6378	7673517	Linked blank M1, 37 per belt and 38 per belt, 2 belts per metal can M10, 2 cans (150 cartridges) per wooden M12
	A559		1305-00-028-6379	7673517	Linked blank M1, 75 per belt, 6 belts (450 cartridges) per metal lined wooden box M1917
Cartridge, .50 Caliber, Armor Piercing Incendiary, M8 Cartridge, .50 Caliber, Armor Piercing Incendiary-Tracer, M20	A576), (A577)	4-17.2 4-17.3	1305-00-028-6466	7670238/ 7672003/ 7690845	Linked 4 AP M8, API-T M20 with, deteriorated tracer element, Grade AC, 105 per belt, 1 belt per metal box M2, 2 boxes (210 cartridges) per wirebound box
	A576), (A577)		1305-00-028-6485	7670238/ 7672003	Linked 3 API M8, 1 API-T M20, Grade AC, 55 per belt, 1 belt per metal can M10, 2 cans (110 cartridges) per wooden box M12
Cartridge, .50 Caliber, Armor Piercing Incendiary, M8 Cartridge, .50 Caliber, Armor Piercing Incendiary-Tracer, M20	A576	4-17.2 4-17.3	1305-00-028-6603	7670238/ 7672003	Linked 4 API M8, 1 API-T M20, Grade AC, 100 per belt, 1 belt per metal box M2A1, 2 boxes (200 cartridges) per wirebound box
Cartridge, .50 Caliber, Armor Piercing Incendiary, M8 Cartridge, .50 Caliber, Armor Piercing Incendiary-Tracer, M20	A576), (A577)	4-17.2 4-17.3	1305-00-028-6604	7670238/ 7672003	Linked 4 API M8, 1 API-T M20, Grade MG, 100 per belt, 1 belt per metal box M2A1, 2 boxes (200 cartridges) per wirebound box
	A577		1305-00-540-9645	7670238/ 7672003	Linked 3 API M8, 1 API-T M20, Grade MG, 55 per belt, 1 belt per metal can M10, 20 cans (110 cartridges) per wirebound box
Cartridge, .50 Caliber, Blank, M1A1	A598	4-17.7	1305-01-078-4879	9329735	100 per M2A1 metal box, 2 boxes per wirebound box

Table 4-21 .50 Caliber Ammunition Linked Configuration (Continued)

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, .50 Caliber, Armor Piercing Incendiary-Tracer, M20 Cartridge .50 Caliber, Armor Piercing Incendiary, MK 211 MOD 0	A607	4-17.3 4-17.7	1305-01-249-6888	53711-6086059 19200-7672003 53711-7379631	Linked 4 MK 211 API cartridges, -1 M20 API-T cartridge, packed 100 cartridges per M2A1 metal box, 2 boxes (200 cartridge) per wirebound box
Cartridge .50 Caliber, Armor Piercing Incendiary, MK 211 MOD 0 Cartridge, .50 Caliber, Tracer, M17 Cartridge, .50 Caliber, Armor Piercing Incendiary, MK 211 MOD 1	A608 A608	4-17.13 4-17.11 4-17.17 4-17.13 4-17.11	1305-01-251-2581 1305-01-267-2171	53711-6086059 19200-7672165 53711-73769631 3-271378-001	Linked 4 MK 211 API cartridges, 1 M17 TR cartridge, packed 100 cartridges per M2A1 metal box (200 cartridges) per wirebound box Linked 4 NM140A1, multi-purpose, 1 M17 tracer, 100 belted rounds per M2A1 box, 2 M2A1 boxes per wirebound boxes, 48 wirebound boxes per MK 3 MOD 0 pallet (The MK 211 MOD 0 was initially purchased as the NM140-A1 (EX211 MOD 0) so both nomenclatures may be in inventory)
Link, .50 Caliber, M2	A640 A640 A640 A640	4-17.22	1305-00-096-3177 1305-00-096-3178 1305-00-096-3179 1305-096-3181	6537987 6537987 6537987 6537987	10 per carton, 100 cartons per wooden box Packaged as required 500 per waxed carton, 2 cartons wood box 10 per carton, 100 cartons per waterproof envelope, 1 envelope per wirebound box
Cartridge, .50 Caliber, Armor Piercing, M2 Cartridge, .50 Caliber, Armor Piercing Incendiary-Tracer, M20 Cartridge .50 Caliber, Armor Piercing Incendiary, MK 211 MOD 0 Cartridge, .50 Caliber, Armor Piercing Incendiary, MK 211 MOD 1 Cartridge, .50 Caliber, Armor Piercing, MK 263 MOD 0	AA06	4-17.1 4-17.3 4-17.13 4-17.17 4-17.19	1305-01-400-1398	6650762	Linked, 1 MK 211 API, 1 M2 AP, 1 MK 211 API, 1 M2 AP, 1 M20, API-T; packed 100 cartridges per M2A1 metal box, 2 boxes (200 cartridges) per wirebound box

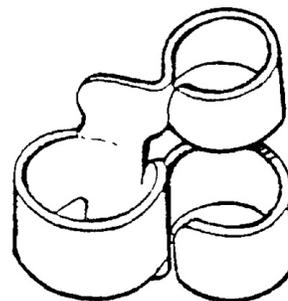
Table 4-21 .50 Caliber Ammunition Linked Configuration (Continued)

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
	AA06		1305-01-473-4774	7350934	Linked, 1 MK 211 API, 1 MK 263 AP, 1 MK 211 API, 1 MK 263 AP, 1 M20 API-T; packed 100 cartridges per M2A1 metal boxes, 2 M2A1 metal boxes (200 cartridges) per wirebound box
Cartridge, .50 Caliber, Armor Piercing, MK 263 MOD 0	AA50	4-17.19	1305-01-473-4766	7350934	Linked 1 MK 211 API, 1 MK 263 AP, 1 MK 211 API, 1 MK 263 AP, 1 MK 257 API-Dim T; packed 100 cartridges per M2A1 metal box, 2 M2A1 metal boxes (200 cartridges) per wirebound box
Cartridge, .50 Caliber, M858 Ball Plastic Practice, M860 Tracer Plastic Practice, Short Range Training Ammunition (SRTA), Linked 4:1 Configuration	A602	4-17.20	1305-01-126-6201	MIL-C-70723	Linked, 4 M858 ball SRTA, 1 M860 tracer, SRTA, with M9 links; packed 100 rounds per M2A1 metal box, 2 M2A1 metal boxes (200 rounds) per wirebound box

4-17.22 Link, .50 Caliber, M2 (A640).

4-17.22.1 Intended Use. These links are intended for use in linking .50 caliber cartridges for use in .50 caliber machine guns (Browning M2HB, AN-M2 aircraft, and XM218). Weapons designed for use with these links require additional space in the rear of the receiver for extraction of the cartridge from the link.

4-17.22.2 Description. M2 links, Figure 4-24, are manufactured with closed loops. When assembled with cartridges in belts, these links fit on the cartridge shoulder. The tapered front loops of these links are positioned firmly on the cartridge shoulder to hold the cartridge in proper alignment for feeding into the weapon. This design requires the cartridge to be extracted from the rear and dropped into position for feeding into the chamber for firing. The M2 link may be distinguished from the M9 link by a tab that protrudes from the top of the single loop where it connects with the neck loop. In addition, the links are marked as to whether they are M2 or M9.



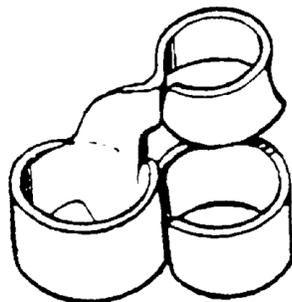
CALIBER .50, M2

Figure 4-24 Caliber .50, M2 Link (Closed Loop)

4-17.23 Link, .50 Caliber, M9 (A641)

4-17.23.1 Intended Use. These links are intended for use in linking .50 caliber cartridges for use in .50 caliber machine guns (Browning M2HB, AN-M2 aircraft, and XM218). Weapons designed for use with these links require additional space in the rear of the receiver for extraction of the cartridge from the link.

4-17.23.2 Description. M9 links, Figure 4-25, are manufactured with closed loops. When assembled with cartridges in belts, these links fit on the cartridge shoulder. The tapered front loops of these links are positioned only on the cartridge shoulder to hold the cartridge in proper alignment for feeding into the weapon. This design requires the cartridge to be extracted from the rear and dropped into position for feeding into the chamber for firing. The M2 link may be distinguished from the M9 link by a tab that protrudes from the top of the single loop where it connects with the neck loop. In addition, the links are marked as to whether they are M2 or M9.



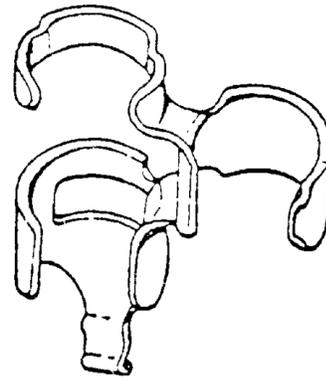
CALIBER .50, M9

Figure 4-25 Caliber .50 M9 Link (Closed Loop)

4-17.24 Link, .50 Caliber, M15A2

4-17.24.1 Intended Use. The M15A2 .50 Caliber Links are open looped and intended for use in linking .50 caliber cartridges for use with the M85 Machine Gun.

4-17.24.2 Description. M15A2 Links, Figure 4-26, are manufactured with partially closed loops and have a positioning finger on one side which snaps into extractor grooves of the cartridge to retain cartridge in proper feed alignment. This link design permits a portion of the bolt to ride through link loop openings and push cartridges forward and out of the link into chamber for firing.



CALIBER .50, M15A2

Figure 4-26 Caliber .50, M15A2 Link (Open Loop)

4-18 .357 CALIBER AMMUNITION

The .357 caliber cartridge fires from the Smith and Wesson Model 686 (S&W 686) revolver. The .357 Caliber cartridges will not be fired from any weapon except the S&W 686 revolver. See Table 4-22 for packaging and identification data.

4-18.1 Cartridge, .357 Caliber, Magnum, Full Metal Jacket, 158 Grain Bullet (AA19).

4-18.1.1 Intended Use. The .357 Caliber Magnum Full Metal Jacket (FMJ) cartridge was procured for use in the S&W 686 revolver. See Figure 4-27 for photographs of the .357 Caliber Magnum FMJ Cartridges, foam packing tray and fiberboard box.

4-18.1.2 Description. The cartridge is 1.590 inches (4.039 centimeters) long and weighs approximately 260.00 grains (16.85 grams). The cartridge consists of a cartridge case, projectile, primer, and propellant. The net explosive weight of the cartridge is 17.28 grains (1.120 grams).

4-18.1.3 Cartridge Case. The brass cartridge case is 1.290 inches (3.277 centimeters) long. The cartridge case rim diameter is 0.440 inch (1.118 centimeters) and mouth diameter is 0.379 inch (0.963 centimeter). The primed case (case with primer inserted) weighs 83.60 grains (5.42 grams). The case headstamp is "WCC98".

4-18.1.4 Projectile. To reduce lead emissions at the shooter's position, the bullet has no exposed lead. The bullets consists of copper alloy metal jacket that fully covers the lead alloy core. The bullet is 0.66 centimeters) long, 0.358 inch (0.910

centimeter) in diam-4 inch (1.687 centimeters, and weighs approximately 158.0 grains (10.239 grams). The bullet is a FMJ configuration.

4-18.1.5 Primer. The cartridge primer is a centerfire, lead styphnate, percussion type, small arms ammunition primer. The primer charge weight (net explosive weight) is 0.38 grains (0.025 grams). The primer is crimped in placed 360° circular.

4-18.1.6 Propellant. The cartridge contains double base Ball Powder® propellant. The net explosive weight of the propellant is 16.9 grains (1.095 grams).

4-18.1.7 Waterproofing. The .357 Magnum FMJ cartridge is waterproofed to two atmospheres for a period of two hours.

4-18.1.8 Ballistic Data. The ballistic data for this cartridge is as follows:

- a. Velocity. The average velocity is 1545 fps (470.92 meters per second) at 15 feet (4.57 meters) from the muzzle of the 10-inch (25.4 centimeter) test barrel.
- b. Pressure. The average chamber pressure shall not exceed 37,000 psi (2643.6 kilograms/centimeters² [259.3 MP_a]).
- c. Kinetic Energy. The minimum kinetic energy is 613.8 ft./lb. at ambient.
- d. Accuracy. At time of acceptance, the extreme spread of an individual 5-shot group was 1.27 inches (3.23 centimeters) maximum and the average extreme spread of all twenty 5-shot groups was 2.00 inches (5.08 centimeters maximum).

Table 4-22 .357 Caliber Ammunition

ITEM	DODIC/N ALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, .357 Caliber, Magnum, Full Metal Jacket, 158 Grain Bullet	AA19	4-18.1	1305-01-443-9588	80236-P03161	50 cartridges per fiberboard boxes (700 cartridges) per metal M2A1 ammunition box, 2 metal M2A1 ammunition boxes (1,400 cartridges) per wirebound wooden box



Figure 4-27 .357 Caliber Magnum FMJ Cartridge

CHAPTER 5

40 MILLIMETER CARTRIDGE

5-1 INTRODUCTION

This chapter contains general and technical information on fixed 40mm grenade cartridges.

5-2 40 MILLIMETER GRENADE CARTRIDGES

5-2.1 General. The 40mm cartridges, Figure 5-1, are issued completely assembled with the cartridge case, Figure 5-12 and Figure 5-13, containing the propellant composition and primer. They are permanently crimped or otherwise attached to a fuzed or unfuzed projectile and ready to fire. All available cartridges, their purposes, characteristics,

and performances are contained in the following paragraphs. See Table 5-2 and Table 5-3 for packaging and identification data.

5-2.1.1 Weapons. The 40mm low-velocity rounds were designed for firing from the M79, M203 (attached to the M16 series of rifles and carbines) and the MK 20 machine gun grenade launchers. The high-velocity rounds were designed for firing from the MK 19 MOD 1 and MK 19 MOD 3 Machine Gun Grenade Launchers. Table 5-1 lists 40mm cartridges and the weapons from which each cartridge is fired.

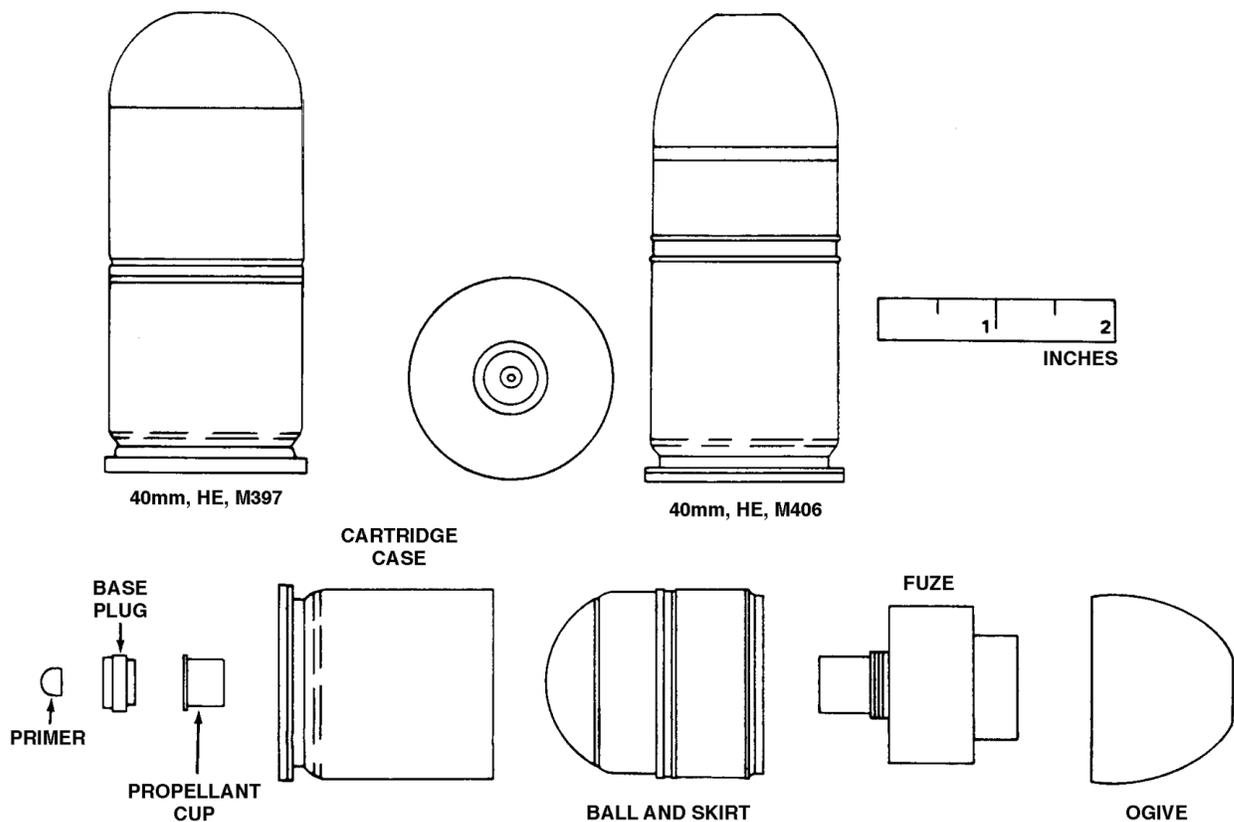


Figure 5-1 Typical 40mm Cartridges

Table 5-1 40mm Cartridges

Cartridge	Type	Velocity	Use with launcher			
			M79	M203	MK 20	MK 19
M383	HE	High				x
M384	HE	High				x
M385	Practice	High				x
M397	HE	Low	x	x	x	
M406	HE	Low	x	x	x	
M407	Practice	Low	x	x	x	
M430	HEDP	High				x
M433	HEDP	Low	x	x	x	
XM576	MP	Low	x	x		
M583 Series	White Star (parachute)	Low	x	x		
M585	White Star (cluster)	Low	x	x		
M651	CS	Low	x	x		
M661	Green Star (parachute)	Low	x	x		
M662	Red Star (parachute)	Low	x	x		
M674	CS	Low	x			
M676	Smoke (yellow)	Low	x	x		
M679	Smoke (green)	Low	x	x		
M680	Smoke (white)	Low	x	x		
M682	Smoke (red)	Low	x	x		
M713	Smoke (red)	Low	x	x		x
M715	Smoke (green)	Low	x	x		x
M716	Smoke (yellow)	Low	x	x		
M781	Practice	Low	x	x		
M918	Training Practice (HV)	High				x
M922	Inert	High				x
MK 249 MOD 0	CS	Low	x	x		
Foam Rubber Baton	Non-lethal	Low		x		
Rubber Ball	Non-lethal	Low		x		
Wooden Baton	Non-lethal	Low		x		
M992	IR Illumination	Low	x	x		
MK 297 MOD 0	Warning (100m)	Low	x			
MK 298 MOD 0	Warning (200m)	Low	x			
MK 299 MOD 0	Warning (300m)	Low	x			

Table 5-2 40mm Grenade Cartridges

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 40 Millimeter, Dummy, inert M406	B473	5-2.2	1310-00-169-5420	8835950-1	For MK 20 Launcher packaged as required
Cartridge, 40 Millimeter, Parachute, Green Star M661	B504	5-2.3	1310-00-541-6148	9317509	1 per fiber tube, 22 tubes per metal box M2A1, 2 boxes (44 cartridges) per wirebound box
Cartridge, 40 Millimeter, Parachute, Red Star M662	B505	5-2.3	1310-00-541-6149	9255145	1 per fiber tube, 22 tubes per metal box M2A1, 2 boxes (44 cartridges) per wirebound box

Table 5-2 40mm Grenade Cartridges (Continued)

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 40mm, Ground Marker, Red Smoke M713	B506	5-2.4	1310-00-541-6150	9323251	1 round per tube, 22 tubes per M2A1 metal box, 2 boxes per wirebound box
Cartridge, 40mm, Ground Marker, Green Smoke M715	B508	5-2.4	1310-00-541-6152	9323261	1 round per tube, 22 tubes per M2A1 metal box, 2 boxes per wirebound box
Cartridge, 40mm, Ground Marker, Yellow Smoke M716	B509	5-2.4	1310-00-541-6153	9323265	1 round per tube, 22 tubes per M2A1 metal box, 2 boxes per wirebound box
Cartridge, 40 Millimeter, Practice, M781 and XM781	B519	5-2.5	1310-01-050-7967	9322240	75 rounds per commercial wooden box
	B519		1310-01-148-8881	9358069	100 per ammo box
	B519		1310-01-211-8073	9395853	Packaged 100 rounds per wirebound box
Cartridge, 40 Millimeter, Multiple Projectile, XM576	B534	5-2.6	1310-00-963-4061	10542398	3 per plastic container, 2 containers per bandoleer, 12 bandoleers (72 cartridges) per wirebound box
Cartridge, 40 Millimeter, Parachute, White Star, M583	B535	5-2.3	1310-00-922-9780	9207986	1 per fiber tube, 22 tubes per metal box M2A1, 2 boxes (44 cartridges) per wirebound box
Cartridge, 40 Millimeter, Parachute, White Star, M583A1	B535	5-2.3	1310-00-159-3198	9243881	1 per fiber tube, 22 tubes per metal box M2A1, 2 boxes (44 cartridges) per wirebound box
Cartridge, 40 Millimeter, Cluster, White Star, M585	B536	5-2.7	1310-00-922-9784	9207987	1 per fiber tuber, 22 tubes per metal box M2A1, 2 boxes (44 cartridges) per wirebound box
Cartridge, 40 Millimeter, CS, Riot Control, M674 and XM674	B537	5-2.8	1310-00-935-9229	122-3-101/ 196-131-845	4 round per bandoleer, 1 bandoleer per box, 10 boxes (40 cartridges) per wooden box
Cartridge, 40 Millimeter, High Explosive Dual Purpose, M433	B546	5-2.9	1310-00-992-0451	8886371	6 per bandoleer, 12 bandoleers per fiberboard box, 1 fiberboard box (72 cartridges) per wooden box
Cartridge, 40mm, Tactical, CS, M651/ XM651E1	B567	5-2.10	1310-00-849-2083	196-131-835	6 rounds per bandoleer, 4 bandoleers per wooden box
Cartridge, 40 Millimeter, HE, M406	B568	5-2.11	1310-00-724-8081	8835950	6 per bandoleer, 12 bandoleers per carton, 1 carton per barrier bag, 1 bag (72 cartridges) per wooden box
Cartridge, 40 Millimeter, High Explosive, M397	B569	5-2.12	1310-00-979-3563	8883461	6 per bandoleer, 12 bandoleers per carton, 1 carton per barrier bag, 1 bag (72 cartridges) per wooden box

Table 5-2 40mm Grenade Cartridges (Continued)

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 40 Millimeter, Practice, M407A1	B577	5-2.13	1310-00-965-0738	8835952	6 per bandoleer, 4 bandoleers per carton, 3 cartons (72 cartridges) per wooden box
Cartridge, 40mm, IR Illumination, M992	BA03	5-2.20	1310-01-442-1048	12956136	1 cartridges per fiber tube, 22 tubes (22 cartridges) per M2A1 metal box, 2 boxes (44 cartridges) per wirebound box
Cartridge, 40 Millimeter, CS, MK 249 MOD 0	BA05	5-2.18	1310-01-440-5316	S8710-20740	1 cartridge per fiber tubes, 22 tubes (22 cartridges) per M2A1 metal box, 2 boxes (44 cartridges) per wirebound box
Cartridge, 40 Millimeter, Foam Rubber Baton, Non- Lethal	BA07	5-2.19.1	1310-01-453-9168	B-8789	1 cartridge per cardboard tube, 22 tubes (22 cartridges) per M2A1 metal box, 2 metal boxes (44 cartridges) per wirebound box
			1310-01-500-7532	B-8789	1 cartridge per cardboard tube, 22 tubes (22 cartridges) per M2A1 metal box, 2 metal boxes (44 cartridges) per wirebound box
Cartridge, 40 Millimeter, Rubber Ball, Non-Lethal	BA08	5-2.19.2	1310-01-453-9154	B-8790	1 cartridge per cardboard tube, 22 tubes (22 cartridges) per M2A1 metal box, 2 metal boxes (44 cartridges) per wirebound box
			1310-01-500-7529	B-8790	1 cartridge per cardboard tube, 22 tubes (22 cartridges) per M2A1 metal box, 2 metal boxes (44 cartridges) per wirebound box
Cartridge, 40 Millimeter, Wooden Baton, Non-Lethal	BA09	5-2.19.3	1310-01-454-0192	B-8788	1 cartridge per cardboard tube, 22 tubes (22 cartridges) per M2A1 metal box, 2 metal boxes (44 cartridges) per wirebound box
Cartridge, 40mm, 100- Meters Warning Signal, MK 297 MOD 0	BA24	5-2.23	1310-01-534-8941	8215544	22 rounds per metal M2A1 can, 44 rounds per wirebound box
Cartridge, 40mm, 200- Meters Warning Signal, MK 298 MOD 0	BA25	5-2.24	1310-01-534-8943	8215545	22 rounds per metal M2A1 can, 44 rounds per wirebound box
Cartridge, 40mm, 300- Meters Warning Signal, MK 299 MOD 0	BA26	5-2.25	1310-01-534-8945	8215546	22 rounds per metal M2A1 can, 44 rounds per wirebound box

Table 5-3 40mm Grenade Cartridges Linked Configuration

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 40 Millimeter, HE, M384	B470	5-2.14	1310-00-143-8863	8886397 9251995	Linked 50 rounds for launcher M75, XM129, & MK 19 MOD 1, 50 cartridges per fiber box, 1 box per barrier bag, 1 bag per wooden box
Cartridge, 40 Millimeter, Dummy, M922/M922A1 or Inert M385/	B472	5-2.2	1310-01-154-6525	9362531 9275763/ 8886326-1	Linked with M16A2 links, 10 rounds per belt, 1 belt per M2A1 metal box, 2 metal boxes per wirebound box
			1310-01-369-4705	12937903 9362531	Linked with M16A2 links, 10 rounds per belt, 1 belt per M2A1 metal box, 2 metal boxes per wirebound box
Cartridge, 40 Millimeter, Practice, M385	B480	5-2.15	1310-00-180-9359	8886326 9251995	Linked 50 rounds with M16A1 link, 50 rounds per fiber box, 1 box per barrier bag, 1 bag per wooden box
Cartridge, 40 Millimeter, HEDP, M430/M430A1	B542	5-2.16	1310-01-159-8043	9287851 9362543	Linked with M16A2 links, 48 rounds per metal box M548
			1310-01-354-8745	12926811 12928042	Linked 32 rounds per belt with M16A2 Link, 32 rounds per PA- 120 container
Cartridge, 40 Millimeter, HE, M406	B570	5-2.11	1310-00-471-3615	8835950	Linked 24 rounds with MK 8 MOD 0 24 per tray, 3 trays (72 cartridges) per ammunition box M548
Cartridge, 40 Millimeter, HE, M383	B571	5-2.17	1310-00-976-0907	9241371 9251995	Linked with M16A2 links, 50 rounds per fiberboard box, 1 fiberboard box (50 cartridges) per wirebound box
	B571		1310-01-196-2654	9362543 9241371	Linked 48 rounds per belt with M16A2 Link, 48 rounds per M548 container
Cartridge, 40 Millimeter, HE, M384	B572	5-2.14	1310-00-976-0908	8886397 9251996	Linked with MK 16 link, 50 per fiber box, 1 fiber box per barrier bag, 1 bag (50 cartridges) per wooden box
Cartridge, 40 Millimeter, Practice, M385A1	B576	5-2.15	1310-00-994-7441	8886326 9251995	Linked 50 rounds with M16 link for launcher M75 and MK 19, 50 rounds per fiber box, 1 box per barrier bag, 1 bag per wooden box
	B576		1310-01-159-3184	8886326/ 9370125 9362543	Linked 48 rounds per belt with M16A2 link, 48 rounds per container M548
	B576		1310-01-316-9973	8886326 12928042	Linked 32 rounds per belt with M16A2 link, 32 rounds per PA-120 container

Table 5-3 40mm Grenade Cartridges Linked Configuration (Continued)

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 40 Millimeter, Practice, M918	B584	5-2.21	1310-01-317-5948	9399372 12928042	Linked 32 rounds per belt with M16A2 link, 32 rounds per PA-120 container
Cartridge, 40 Millimeter, Practice, MK 281 MOD 0	BA12	5-2.22	1310-01-472-9871	12992287 12928042	Linked 32 rounds per belt with M16A2 link, 32 rounds per PA-120 container

WARNING

ONLY FIRE LOW-VELOCITY 40MM ROUNDS FROM THE M79, M203, AND MK 20 LAUNCHERS. ONLY FIRE HIGH-VELOCITY 40MM ROUNDS FROM THE MK 19 MOD 1 AND MK 19 MOD 3 LAUNCHERS.

5-2.1.2 Firing. When fired, the firing pin strikes the primer which is fixed in the base plug. This ignites the propellant charge located in the high-pressure chamber (propellant cup) of the case. The burning propellant charge generates enough pressure to burst the metal propellant cup. This releases the propellant gases through vents into the adjacent pressure chamber. This released gas propels the projectile forward. The projectile rotating bands engage the launcher tube lands to impart the necessary spin to the projectile.

NOTE

For detailed effectiveness data on special warfare ammunition, refer to the appropriate Joint Munitions Effectiveness Manual (JMEM).

5-2.1.3 Ground-Burst Impact. Upon impact, the detonator in the applicable fuze detonates a booster, and the high-explosive main charge fragments the body.

5-2.1.4 Air-Burst Impact. Upon impact, the applicable fuze initiates the separation charge assembly ejecting a ball (containing a high explosive) into the air. At a height of approximately 5 feet (1.5 meters), the ball explodes into fragments.

5-2.2 Cartridge, 40 Millimeter, Dummy, M922/M922A1 or Inert M385/M406 (B472), (B473).

5-2.2.1 Intended Use. This dummy cartridge is used as a drill round to train users in handling ammunition and loading the MK 19 series Grenade Machine Gun and the M129 Grenade Launcher. The Dummy M406 is used as a drill round to train users in handling ammunition and loading the M79 and M203 grenade launchers.

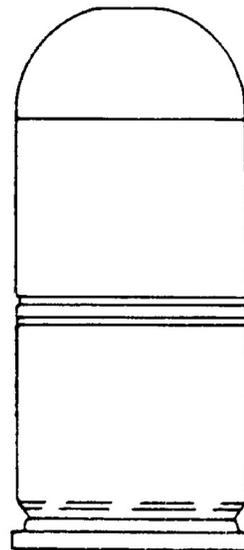


Figure 5-2 Cartridge 40mm, Dummy M922

5-2.2.2 Description. The cartridge, Figure 5-2, is a typical illustration of a completely inert Dummy cartridge. The Dummy cartridges are intended to duplicate a live round of 40mm ammunition. The cartridge case is crimped around the projectile body, except M922A1 which is a one-piece Dummy cartridge. 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 appropriate weapon.

5-2.2.3 Function. This cartridge is completely inert and nonfunctional.

5-2.3 Cartridge, 40 Millimeter, Parachute, (B535) White Star, M583 and M583A1, (B504) Green Star, M661, (B505) Red Star, M662.

5-2.3.1 Intended Use. These cartridges, Figure 5-3, are designed and used for illumination and signaling. They have less weight, less bulk, and greater accuracy than comparable hand-held signals. They are low-velocity rounds designed for firing from M79 and M203 (attached to the M16 series rifles and carbines) launchers.

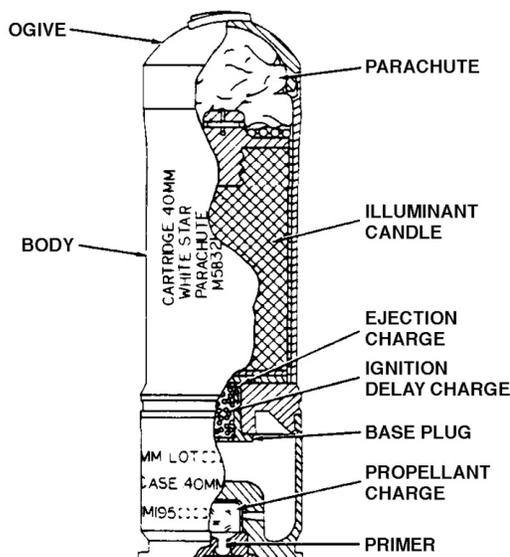


Figure 5-3 40mm Parachute Cartridges, White Star, M583 and M583A1, Green Star, M661, and Red Star, M662

5-2.3.2 Description. The cartridges are 5.268 inches (13.38 centimeters) long and weigh approximately 3,286.59 grains (213 grams). They are fixed rounds of ammunition consisting of an M9 (330 mg) propellant charge, an M42 percussion primer, and a payload. The payload comprises a parachute and 1,003.08 grains (65 grams) (M583)

or 1,434.99 grains (93 grams) (M583A1) of white illuminate candle, or 1,311.55 grains (85 grams) of green (M661) or red (M662) illuminate candle. Loaded into the projectile base plug is a 5-second delay ignition element, and pressed into a cavity above the delay element is a 3.63 ounces (1.03 grams) ejection charge pellet. The cartridge bodies are white with black markings.

5-2.3.3 Function. When fired, the propellant charge ignites, propelling the projectile from the muzzle. The 5-second delay element ignites and in turn ignites the powder ejection charge. The ejection charge ignites the white candle and the candle and parachute eject through the carrier nose. Upon ejection, the parachute deploys and descends at about 7 fps (2.13 mps) while the candle burns for approximately 40 seconds.

5-2.3.4 Ballistic Data. The ballistic data for the cartridge are as follows:

a. Velocity. The average muzzle velocity is 250 fps (76 meters per second).

b. Burst Height. A burst height of approximately 550 feet (167 meters) is achieved at a quadrant elevation of 85°.

c. Candle Burn Time. The candle burn time is approximately 40 seconds.

d. Candlepower. The candle is visible to an air observer at a slant range of at least 3 miles (4.8 kilometers) from 3,000 feet (914 meters) altitude. The candle power is as follows:

- (1) White star M583 – 45,000
- (2) White star M583A1 – 90,000
- (3) Green star M661 – 8,000
- (4) Red star M662 – 20,000.

5-2.4 Cartridge, 40mm, Ground Marker, (B506) Red Smoke, M713, (B508) Green Smoke, M715 and (B509) Yellow Smoke, M716.

5-2.4.1 Intended 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 M16 series rifles and carbines).

5-2.4.2 Description. The cartridges, Figure 5-4, consist of a cartridge case, a projectile with pyrotechnic smoke payload, and a pyrotechnic impact fuze. The color of the smoke is identified by a color band on the tip of the projectile as well as marking on the side of the projectile. The standard M118 cartridge case is a dual chambered aluminum container housing a brass propellant cup, which holds 5.09 grains (330 milligrams) of M9 propellant. 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 projectile utilizes a one-piece, aluminum body-ogive and a steel base. The payload consists of 1,157.25 grains (75 grams) 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 M733 pyrotechnic impact fuze is designed to arm at a minimum of 49 feet (15 meters) from the muzzle of the weapon.

5-2.4.3 Function. Upon firing, the primer ignites the propelling charge. In turn, the projectile is accelerated down the launcher barrel, where a spin of 3,750 revolutions per minute is imparted by the barrel rifling. A muzzle velocity of approximately 250 feet per second (76 m/s) 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 49 feet (15 meters) of projectile flight. When the projectile is between 49 and 147 feet (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, 49 feet (15 meters), results in a dud. Between 49 and 147 feet (15 and 45 meters) from the 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.

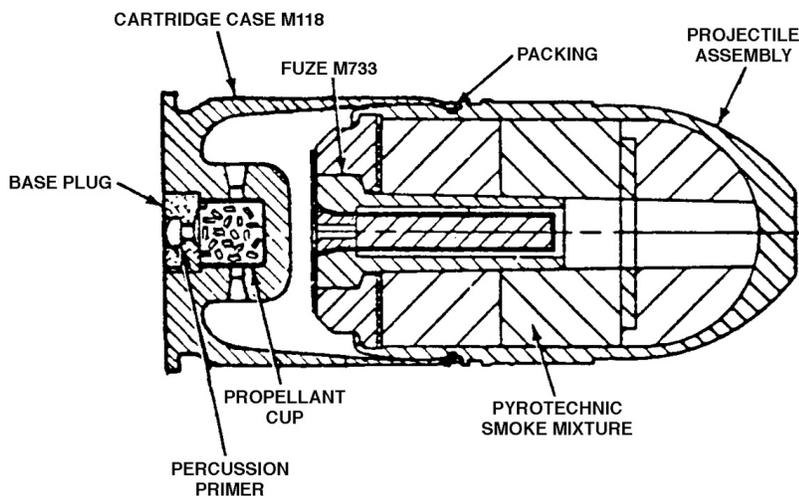


Figure 5-4 40mm Ground Marker Cartridge, Red Smoke M713, Green Smoke M715, and Yellow Smoke M716

5-2.5 Cartridge, 40 Millimeter, Practice, M781 and XM781 (B519).

5-2.5.1 Intended Use. These practice-type ammunition cartridges are low-velocity, fixed-rounds designed for firing from M79 and M203 (attached to the M16 series rifles and carbines) launchers.

5-2.5.2 Description. The cartridges are 4.05 inches (10.29 centimeters) long and weigh approximately 3,163.15 grains (205 grams). They contain a plastic body projectile with no fuze, have approximately 5.25 grains (340 milligrams) of M9 propellant, and a commercial No. 1-1/2 primer or a .38 caliber blank cartridge press-fitted in the base. The filler is an orange dye material. The projectiles are blue with white markings.

5-2.5.3 Function. After firing the weapon, the rotating band causes the projectile to spin at 3,600 rpm as it leaves the muzzle. Upon impact with the target, the breakable ogive (nose) ruptures and releases the dye, causing a puff of yellow-orange smoke that simulates explosive impact and marks the fall of the shot.

5-2.5.4 Ballistic Data. The ballistic data for the cartridges are as follows:

a. Velocity. The average muzzle velocity is 250 fps (76 meters per second).

b. Range. The average maximum range is 437 yards (400 meters).

5-2.6 Cartridge, 40 Millimeter, Multiple Projectile, XM576 (B534).

5-2.6.1 Intended Use. This Multiple Projectile (MP) round, Figure 5-5, is designed and intended for close-range enemy engagements, conventional operations in jungle environments and in counter-insurgency operations. It is a low-velocity round designed for firing from M79 and M203 (attached to the M16/M16A1/M16A2 rifles, Colt 727, M4 Carbines) launchers.

5-2.6.2 Description. The cartridge is 2.5 inches (6.35 centimeters) long and weighs approximately 1,882.46 grains (122 grams). It is a fixed

round of ammunition consisting of an MP assembly and a cartridge case assembly. The projectile contains a polyethylene sabot carrier with a center cavity that contains a plastic pellet cup filled with twenty 20-grain (1.30-gram) lead pellets and covered by a snap-on cap. The cartridge case contains a 2.87 grain (186 milligram), M2 propellant charge and a .45 caliber percussion primer. It is green with white stenciled identification markings.

5-2.6.3 Function. When the firing pin strikes the primer and ignites the propelling charge, the expanding gases propel the projectile forward. Setback force causes the pellet cup to move rearward, disengaging the pellet cup cap. Upon reaching the weapon muzzle, the pellet cup separates from the lead pellets, allowing for free flight of the pellets to the target.

5-2.6.4 Ballistic Data. The ballistic data for the cartridge are as follows:

a. Velocity. The average muzzle velocity is 885 fps (269 meters per second).

b. Range. The maximum effective range is approximately 33 yards (30 meters).

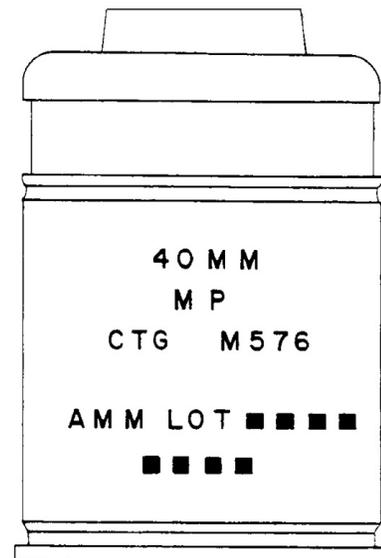


Figure 5-5 40mm MP Cartridge, XM576

5-2.7 Cartridge, 40 Millimeter, Cluster, White Star, M585 (B536).

5-2.7.1 Intended Use. This cartridge, Figure 5-6, is designed for illumination and signaling purposes. It has less weight, less bulk, and greater accuracy than comparable hand-held signals. It is a low-velocity round designed for firing from M79 and M203 (attached to the M16 series rifles and carbines) launchers.

5-2.7.2 Description. The cartridge is 5.268 inches (13.38 centimeters) long, weighs approximately 3,147.72 grains (204 grams), and is a fixed round of ammunition. It consists of a 5.09 grains (330 milligrams) M9 propellant charge, a M42 percussion primer, a payload of five white star charges, and a 5 second delay ignition element loaded into the projectile base plug with a 15.89-grain (1.03-gram), black powder ejection charge pellet pressed into a cavity above the delay element. The five white star charges are in phenolic coated Kraft paper mounted over the ejection charge. The cartridge body is white and the ogive is white to indicate the color of the signal cluster. The markings are stenciled in black.

5-2.7.3 Function. When fired, the propellant charge ignites, propelling the projectile from the muzzle. The 5 second delay element ignites and in turn ignites the black powder ejection charge. The ejection charge ignites the white stars as they are ejected through the carrier nose to commence a free fall.

5-2.7.4 Ballistic Data. The ballistic data for the cartridge are as follows:

- a. Velocity. The average muzzle velocity is 250 fps (76 meters per second).
- b. Burst Height. A burst height of approximately 550 feet (167 meters) is achieved at a quadrant elevation of 85°.
- c. Candle Burn Time. The candle burn time for the individual stars is 7 seconds.
- d. Candlepower. The stars burn with an intensity of 55,000 candlepower during the free fall.

5-2.8 Cartridge, 40 Millimeter, CS, Riot Control, M674 and XM674 (B537).

5-2.8.1 Intended Use. These cartridges are used in riot control to harass personnel by emitting irritant fumes. They are low-velocity rounds designed to be fired from launcher M79.

5-2.8.2 Description. The cartridges are 8.81 inches (22.37 centimeters) long and weigh 0.75 pound (0.34 kilogram). They contain an M2 propellant charge and a percussion primer. Also contained in the projectile is a packet of CS pyrotechnic mix with a small charge of starter mix. The cartridges use a point-initiating delay time fuse. The projectiles are gray with red bands and red markings.



Figure 5-6 40mm White Star Cluster Cartridge, M585

5-2.8.3 Function. The launcher adapter positions the cartridge inserted into the M79 Grenade Launcher. Remove the adapter for insertion in the AN-M8 pyrotechnic pistol. For hand firing, remove the adapter and place the firing cap over the base of the cartridge barrel. Striking the firing cap sharply with the palm of the hand drives the firing pin to initiate the percussion primer. The primer ignites the propelling charge which propels the projectile and simultaneously ignites the delay pellets. After 3 to 6 seconds, the CS agent ignites, generating gas which ruptures the thin walls of the emission holes. This causes CS vapors in the form of smoke for approximately 36 seconds.

5-2.8.4 Ballistic Data. The ballistic data for this cartridge are as follows:

- a. Velocity. The average muzzle velocity is 250 fps (76 meters per second).
- b. Range. The average maximum range is 437 yards (400 meters).

5-2.9 Cartridge, 40 Millimeter, High Explosive Dual Purpose, M433 (B546).

5-2.9.1 Intended Use. This High Explosive Dual Purpose (HEDP) cartridge, Figure 5-7, is designed to penetrate at least 2 inches (5.08 centimeters) of steel armor and inflict casualties on personnel within the target area. It is a low-velocity round intended for use with M79, M203 (attached to the M16 series rifles and carbines) and MK 20 launchers.

5-2.9.2 Description. The cartridge is a fixed round 4.42 inches (11.22 centimeters) long and weighs 0.76 pound (0.34 kilogram). It contains an aluminum projectile body, an M2 propellant charge, an RDX explosive charge, a percussion primer, and an M550 Point Initiated-Base Detonated (PIBD) fuze. It is green with yellow markings and the ogive is gold.

5-2.9.3 Function. When fired, the propellant charge ignites, propelling the projectile from the muzzle. A fuze escapement mechanism delays arming until the projectile has traveled at least 45 feet (13.72 meters) from the muzzle. Impact with the target drives the firing pin into the detonator,

triggering a shaped-charge. This produces a jet blast that detonates the HE bursting charge. The bursting charge forms an armor-piercing jet of molten metal and fragments the projectile body.

5-2.9.4 Ballistic Data. The ballistic data for the cartridge are as follows:

- a. Velocity. The average muzzle velocity is 250 fps (76 meters per second).
- b. Range. The average maximum range is 437 yards (400 meters).
- c. Arming Distance. The average arming distance is at least 45 to 90 feet (14 to 27 meters).

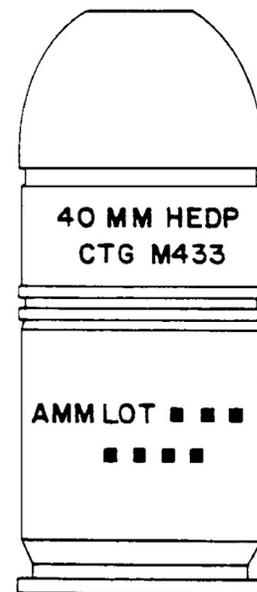


Figure 5-7 40mm HEDP Cartridge, M433

5-2.10 Cartridge, 40mm, Tactical, CS, M651/XM651E1 (B567).

5-2.10.1 Intended Use. This cartridge is used in riot control to harass personnel by emitting irritant fumes. This is a low-velocity cartridge designed to be fired from the M79 and M203 grenade launchers.

5-2.10.2 Description. The cartridge is 11.4 cm (4.5 inches) long and weighs approximately 1.38 kg (0.63 lb.). The cartridge contains an M9 propellant charge, a percussion primer, and a projectile

containing a packet of CS pyrotechnic mix and a point-initiating delay time fuze. The cartridge has a red identification band.

5-2.10.3 Function. When fired, the setback causes the fuze setback pin to free the rotor for movement. Centrifugal force releases the centrifugal lock and arms the fuze after the projectile has traveled 10 to 30 meters (30 to 100 feet) from the muzzle. The force of target impact (at any angle between 0 and 85 degrees) causes the firing pin to be driven into the detonator which causes the ignition of the pyrotechnic CS mixture. The pressure build up caused by the burning CS forces the plastic plug from the vent hole in the base of the projectile and vents the CS. The CS pyrotechnic mixture burns for approximately 25 seconds. The burning is accompanied by a hissing sound and a dense white cloud of CS.

5-2.10.4 Ballistic Data. The ballistic data for this cartridge is as follows:

- a. Velocity. The average muzzle velocity is 250 fps (75 m/s).
- b. Range. The maximum accurate range of this cartridge is 200 meters (220 yards). The average maximum range of this cartridge is 400 meters (435 yards).
- c. Arming Distance. The average arming distance is at least 10 to 30 meters (30 to 100 feet).

5-2.11 Cartridge, 40 Millimeter, HE, M406 (B568), (B570).

5-2.11.1 Intended Use. This cartridge, Figure 5-8, is an HE, APERS, ground-burst, low-velocity round. It is designed to be fired from M79, M203 (attached to the M16/M16A1/M16A2 rifles, Colt 727, M4 Carbines), or MK 20 launchers.

5-2.11.2 Description. The cartridge is 3.894 inches (9.89 centimeters) long, 1.719 inches (4.36 centimeters) in diameter at the rimmed end, and weighs approximately 3,857.5 grains (250 grams). It is a fixed round of ammunition with an aluminum projectile body, a rotating band, and a bi-chambered aluminum cylinder case. A hollow aluminum ogive is fitted to the projectile front end. In the projectile head is a steel ball assembly contain-

ing a booster. A PD fuze assembly threads into a front opening on the ball. It has a 5.09 grains (330 milligrams), M9 propelling charge; a Composition B (Comp B) high-explosive filling; an M42, FED 100 primer, and a PD, M551 fuze. The case is green with yellow markings and the ogive (nose) is gold.

5-2.11.3 Function. Upon impact, the pin is driven into the detonator, triggering the booster charge, detonating the HE bursting charge, and producing a blast and fragmentation of the projectile body that is wire wrapped to produce uniform fragmentation.

5-2.11.4 Ballistic Data. The ballistic data for the cartridge are as follows:

- a. Velocity. The average muzzle velocity is 247 fps (75 meters per second).
- b. Range. The maximum effective range is approximately 437 yards (400 meters).
- c. Arming Distance. The arming delay distance is approximately 16 to 31 yards (14 to 28 meters).



Figure 5-8 40mm HE Cartridge, M406

5-2.12 Cartridge, 40 Millimeter, High Explosive, M397 (B569).

5-2.12.1 Intended Use. This cartridge, Figure 5-9, is a High Explosive (HE) Antipersonnel (APERS), ground-impact, and air-brush round. It is a low-velocity round, designed for firing in M79, M203 (attached to the M16/M16A1/M16A2 rifles, Colt 727, M4 Carbines) or MK 20 launchers.

5-2.12.2 Description. The cartridge is a fixed round 4.05 inches (10.28 centimeters) long and weighing approximately 3,549 grains (230 grams). The aluminum projectile body with a rotating band is press-fitted into a cartridge case containing an M9 propelling charge, an M42 primer, and an M536 Point Detonating (PD) fuze. The case is green with yellow markings and the ogive (nose) is gold. The round comes completely assembled and ready to fire.

5-2.12.3 Function. After the projectile leaves the launcher, centrifugal force from rotation withdraws the firing pin from the rotor and releases a lock from the fuze gear train. As the rotor turns, the rotor detonator lines up with the separation charge after the projectile has traveled at least 45 feet (14 meters) from the weapon. Upon impact, the firing pin is driven into the detonator, exploding the separation charge that ejects the HE assembly upward from the rear of the projectile and simultaneously ignites the delay charge. HE ball detonation and fragmentation occur at approximately 5 feet (1.5 meters) above the ground impact point.

5-2.12.4 Ballistic Data. The ballistic data for the cartridge are as follows:

- a. Velocity. The average muzzle velocity is 247 feet per second (fps) (75 meters per second).
- b. Range. The maximum range is approximately 437 yards (400 meters).
- c. Arming Distance. The arming delay distance is approximately 16 to 31 yards (14 to 28 meters).
- d. Burst Height. The burst height is 5 feet (1.524 meters).

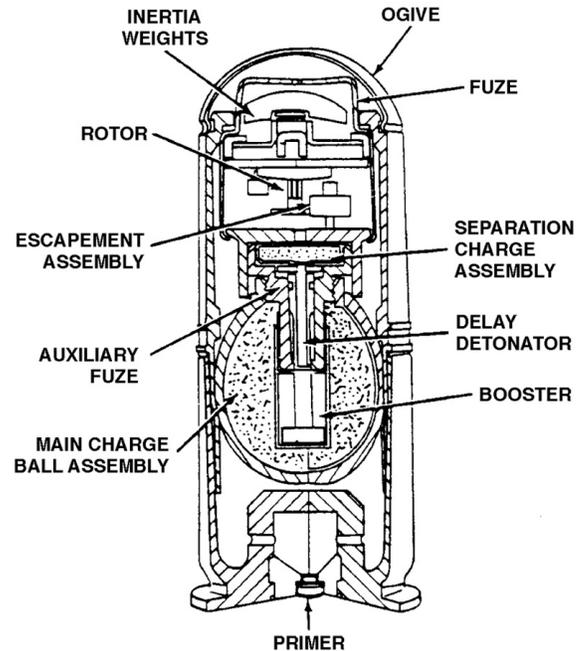


Figure 5-9 40mm HE Cartridge, M397

5-2.13 Cartridge, 40 Millimeter, Practice, M407A1 (B577).

5-2.13.1 Intended Use. This cartridge is procured for training and practice. It is a low-velocity round designed to be fired from M79, M203 (attached to the M16/M16A1/M16A2 rifles, Colt 727, M4 Carbines), or MK 20 launchers.

5-2.13.2 Description. The cartridge is similar to the 40mm, HE, M406 cartridge, Paragraph 5-2.11, except for the projectile filler. The filler consists of an inert material (to simulate the weight of the HE cartridge) pyrotechnic smoke pellet fuze booster charge provides a spotting charge for observing the fall of shot.

5-2.13.3 Function. The cartridge has the same ballistics as the 40mm, HE, M406. On impact, the yellow pyrotechnic smoke pellet fuze booster charge provides a spotting charge for observing the fall of shot.

5-2.14 Cartridge, 40 Millimeter, HE, M384 (B470), (B572).

5-2.14.1 Intended Use. This cartridge, Figure 5-10, is an HE, APERS, fragmentation round designed to inflict casualties on personnel by

ground-burst effect in the target area. It is a high-velocity round for Firing from the M75, MK 19 MOD 1, MK 19 MOD 3 and XM129 launchers.

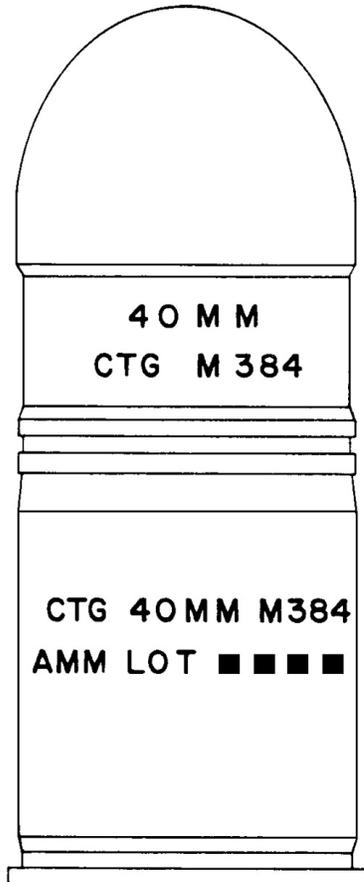


Figure 5-10 40mm HE Cartridge, M384

5-2.14.2 Description. The cartridge is issued in fully assembled rounds. It is 4.4 inches (11.17 centimeters) long and weighs 0.76 pound (0.34 kilogram). It consists of a one-piece, internally embossed steel projectile with a metal rotating band and a case assembly containing 71.60 grains (4.64 grams) of M2 propellant; an FED215 percussion primer; an M533 PD fuze; and 840.94 grains (54.5 grams) of Composition A-5 (Comp A-5) high explosive. The case is green with yellow markings and the ogive (nose) is yellow.

NOTE

During operation and maintenance of the weapon, observe all warnings in the weapon manual and the following cautions and warnings.

CAUTION

THE MK 19 MACHINE GUN REQUIRES A TWO-MAN LIFT. A TWO-MAN LIFT IS REQUIRED FOR EACH FULLY LOADED M548 AMMUNITION CONTAINER.

WARNING

FIRING SHALL NOT BE CONDUCTED FROM ENCLOSURES AND FIRING OVER OPEN HATCHES IS PROHIBITED.

WARNING

SINGLE HEARING PROTECTION SHALL BE WORN BY ALL PERSONNEL WITHIN 20 METERS OF THE FIRING AREA.

WARNING

HELMETS, BODY ARMOR, SINGLE HEARING PROTECTION AND EYE PROTECTION SHALL BE WORN BY THE GUNNER AND ALL PERSONNEL IN CLOSE PROXIMITY TO THE WEAPON WHEN FIRING. ADDITIONALLY, SLEEVES SHALL BE ROLLED DOWN AND GLOVES SHALL BE WORN.

WARNING

WHEN FIRING, IF ANY UNUSUAL NOISE, SMOKE OR CARTRIDGE CASE DAMAGE IS NOTED, THE BORE OF THE WEAPON MUST BE CHECKED FOR OBSTRUCTION BEFORE FIRING IS CONTINUED.

WARNING

BASED UPON TOXIC FUMES AND NOISE DATA, NO CREW MEMBER SHOULD BE EXPOSED TO MORE THAN 1000 ROUNDS IN A 24-HOUR PERIOD.

WARNING

ALL PERSONNEL WITHIN 310 METERS OF POTENTIAL IMPACT OF A M383 HE, M384 HE, AND THE M430 SERIES HEDP, MUST WEAR A HELMET AND BODY ARMOR .

WARNING

DO NOT APPROACH OR HANDLE A "DUD" (A FIRED PROJECTILE WHICH FAILS TO EXPLODE ON IMPACT). THE DUD COULD EXPLODE ANY TIME AFTER FIRING, CAUSING SEVERE INJURY OR DEATH.

5-2.14.3 Function. When the launcher firing pin strikes the primer, the propelling charge ignites and propels the launcher. The rotating band engages the tube rifling, imparting a 12,000 revolution per minute (rpm) spin to the projectile. After the projectile leaves the launcher, the setback and

centrifugal force arm the round. Upon impact, inertial force causes bracket weights to pivot inward, forcing the firing pin into the detonator and initiating the explosive charge bursting charge, producing blast and projectile body fragmentation.

5-2.14.4 Ballistic Data. The ballistic data for the cartridge are as follows:

- a. Velocity. The average muzzle velocity is 790 fps (240 meters per second).
- b. Range. The maximum effective range is approximately 2,400 yards (2,195 meters).
- c. Arming Distance. The fuze arming distance is approximately 60 to 120 feet (18 to 36 meters).

5-2.15 Cartridge, 40 Millimeter, Practice, (B480-M385), (B576-M385A1).

5-2.15.1 Intended Use. This cartridge is designed and procured for training, practice, and proof-testing to ensure correct functioning of the launcher. It is a high velocity round designed to be fired from MK 19 MODs 1 and 3 launchers

WARNING

THE 40MM, PRACTICE, M385 CARTRIDGE IS NOT A DUMMY ROUND. IT SHOULD BE USED TO FUNCTION FIRE THE LAUNCHER IN AN AUTHORIZED AREA ONLY.

WARNING

DO NOT FIRE HIGH-EXPLOSIVE AMMUNITION AT TARGETS LESS THAN 310 METERS AWAY DURING TRAINING OR 75 METERS AWAY DURING COMBAT. FRAGMENTATION CAN REACH THE GUNNER POSITION AT DISTANCES LESS THAN 310 METERS.

WARNING

HELMET, BODY ARMOR, SINGLE HEARING PROTECTION AND PROPER EYE PROTECTION SHALL BE WORN BY THE GUNNER AND ALL PERSONNEL IN CLOSE PROXIMITY (I.E. WITHIN 20 METERS) TO THE WEAPON WHEN FIRING. APPROVED HEARING PROTECTION DEVICES, INCLUDING SINGLE-FLANGE AND VINYL FOAM EARPLUGS, AND CORRESPONDING NATIONAL STOCK NUMBERS (NSN) ARE LISTED IN DODI 6055-12 OF 5 MAR 04. EYE PROTECTION DEVICES SHALL BE IN COMPLIANCE WITH AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) Z87.1-1989 STANDARD AS ADOPTED BY OCCUPATION SAFETY AND HEALTH AGENCY (OSHA) STANDARD NO. 1910-133. COMPLIANCE TO ANSI Z87.1 VERSION 2003 IS RECOMMENDED. COMPLIANCE IS NORMALLY INDICATED ON PRODUCT PACKAGING AND/OR PRODUCT.

5-2.15.2 Description. The cartridge is similar to the 40mm, HE, M384, Paragraph 5-2.14, except the projectile is a solid aluminum slug. It has no fuze, does not detonate, and has a metal rotating band. It is press fitted into an aluminum bi-chambered case assembly. The case contains an FED215 percussion primer and a 37.80 grain (2.45 gram), M2 propelling charge contained in a high-pressure chamber ball with vent holes at the top. An aluminum base plug crimped to the case base at the bottom seals the round. The projectile is blue with white markings and has a green cartridge base. The M385A1 differs from the M385 cartridge in that the ogive matches the shape of the M430 pro-

jectile ogive. The M385A1 is only linked with the M16A2 link, whereas the M385 is linked with either M16A1 or M16A2 links.

5-2.15.3 Function. When the launcher firing pin strikes the primer, the propelling charge ignites and propels the launcher. The rotating band engages the tube rifling, imparting a 12,000 - rpm spin to the projectile. The projectile does not function upon impact with the target.

5-2.15.4 Ballistic Data. The ballistic data for the cartridge are as follows:

- a. Velocity. The average muzzle velocity is 795 fps (242 meters per second).
- b. Range. The maximum effective range is approximately 2,400 yards (2,195 meters).

5-2.16 Cartridge, 40 Millimeter, HEDP, M430/M430A1 (B542).

5-2.16.1 Intended Use. This cartridge is used against lightly armored vehicles and for inflicting casualties on personnel within a target area. It is a high-velocity round designed for use in the MK 19 MODs 1 and 3 launchers.

WARNING

DO NOT FIRE HIGH-EXPLOSIVE AMMUNITION AT TARGETS LESS THAN 310 METERS AWAY DURING TRAINING OR 75 METERS AWAY DURING COMBAT. FRAGMENTATION CAN REACH THE GUNNER POSITION AT DISTANCES LESS THAN 310 METERS.

WARNING

HELMET, BODY ARMOR, SINGLE HEARING PROTECTION AND PROPER EYE PROTECTION SHALL BE WORN BY THE GUNNER AND ALL PERSONNEL IN CLOSE PROXIMITY (I.E. WITHIN 20 METERS) TO THE WEAPON WHEN FIRING. APPROVED

HEARING PROTECTION DEVICES, INCLUDING SINGLE-FLANGE AND VINYL FOAM EARPLUGS, AND CORRESPONDING NATIONAL STOCK NUMBERS (NSN) ARE LISTED IN DODI 6055-12 OF 5 MAR 04. EYE PROTECTION DEVICES SHALL BE IN COMPLIANCE WITH AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) Z87.1-1989 STANDARD AS ADOPTED BY OCCUPATION SAFETY AND HEALTH AGENCY (OSHA) STANDARD NO. 1910-133. COMPLIANCE TO ANSI Z87.1 VERSION 2003 IS RECOMMENDED. COMPLIANCE IS NORMALLY INDICATED ON PRODUCT PACKAGING AND/OR PRODUCT.

5-2.16.2 Description. The cartridge is a fixed round of ammunition 4.42 inches (11.22 centimeters) long. It weighs 0.76 pound (0.34 kilogram) and contains an M2 propellant charge, a Comp A-5 explosive charge, a percussion primer, and a PIBD fuze. It is olive drab with white markings and a yellow ogive.

NOTE

During operation and maintenance of the weapon, observe all warnings in the weapon manual and the cautions and warnings prior to paragraph 5-2.14.3

5-2.16.3 Function. When fired, the rotating band causes the projectile to spin at 12,000 rpm as it leaves the muzzle. Upon impact with the target, the firing pin is driven into the detonator, initiating the main charge and causing blast and fragmentation of the steel body.

5-2.16.4 Ballistic Data. The ballistic data for the cartridge are as follows:

- a. Velocity. The average muzzle velocity is 795 fps (242 meters per second).
- b. Range. The average maximum range is 2,400 yards (2,195 meters).
- c. Arming Distance. The arming distance is at least 45 to 90 feet (13 to 27 meters).

5-2.17 Cartridge, 40 Millimeter, HE, M383 (B571).

5-2.17.1 Intended Use. This cartridge is designed to inflict casualties in the target area using the ground burst effect. It comes completely assembled in linked belts of 50 rounds. It is a high-velocity round designed for firing from the M75, M129, and MK 19 MODs 1 and 3 launchers.

WARNING

DO NOT FIRE HIGH-EXPLOSIVE AMMUNITION AT TARGETS LESS THAN 310 METERS AWAY DURING TRAINING OR 75 METERS AWAY DURING COMBAT. FRAGMENTATION CAN REACH THE GUNNER POSITION AT DISTANCES LESS THAN 310 METERS.

WARNING

HELMET, BODY ARMOR, SINGLE HEARING PROTECTION AND PROPER EYE PROTECTION SHALL BE WORN BY THE GUNNER AND ALL PERSONNEL IN CLOSE PROXIMITY (I.E. WITHIN 20 METERS) TO THE WEAPON WHEN FIRING. APPROVED HEARING PROTECTION DEVICES, INCLUDING SINGLE-FLANGE AND VINYL FOAM EARPLUGS, AND CORRESPONDING NATIONAL STOCK NUMBERS (NSN) ARE LISTED IN DODI 6055-12 OF 5 MAR 04. EYE PROTECTION DEVICES SHALL BE IN COMPLIANCE WITH AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) Z87.1-1989 STANDARD AS ADOPTED BY OCCUPATION SAFETY AND HEALTH AGENCY (OSHA) STANDARD NO. 1910-133. COMPLIANCE TO ANSI Z87.1 VERSION 2003 IS RECOMMENDED. COMPLIANCE IS NORMALLY INDICATED ON PRODUCT PACKAGING AND/OR PRODUCT.

5-2.17.2 Description. The cartridge is a fixed round with a steel body projectile and a cartridge case containing an M169 propelling charge and an FED215 percussion primer. Threaded into the front end of the projectile is a PD fuze enclosed in an aluminum ogive. The projectile cavity is filled with a Comp A-5 bursting charge. The cartridge is olive drab with white markings and the ogive is yellow.

NOTE

During operation and maintenance of the weapon, observe all warnings in the weapon manual and the cautions and warnings prior to paragraph 5-2.14.3

5-2.17.3 Function. When fired, the rotating band causes the projectile to spin at 12,000 rpm as it leaves the muzzle. An escapement mechanism delays arming the fuze for approximately 0.07 to 0.16 second. The fuze arms between 59 to 118 feet (18 to 36 meters) from the muzzle. Upon impact with the target, the firing pin pierces the detonator, initiating the explosive charge and causing a blast and projectile fragmentation.

5-2.17.4 Ballistic Data. The ballistic data for the cartridge are as follows:

- a. Velocity. The average muzzle velocity is 795 fps (242 meters per second).
- b. Range. The average maximum range is 2,400 yards (2,195 meters).
- c. Arming Distance. The arming distance is 59 to 118 feet (18 to 36 meters).

5-2.18 Cartridge, 40 Millimeter, CS, MK 249 MOD 0 (BA05).

5-2.18.1 Intended Use. The 40mm CS cartridges are used in riot control to harass personnel by emitting irritant fumes. These cartridges are low-velocity rounds designed to be fired from the M79 and M203 (both 9 inch and 12 inch versions) grenade launchers.

5-2.18.2 Description. The cartridge is approximately 4.02 inches (10.20 centimeters) long and weighs approximately 1.38 pounds (0.63 kilograms). The cartridge contains a propellant charge of Alliant Tech Systems Bullseye smokeless pro-

pellant, a percussion primer, and a projectile containing a black powder delay element and a pyrotechnic CS pellet. The cartridge case is composed of aluminum alloy and is not painted or anodized. The projectile is gray with a red band and lettering.

5-2.18.3 Function. The primer is initiated by the firing pin of the weapon and the propellant is ignited. The burning of the propellant causes a buildup of gas pressure in the high pressure chamber of the cartridge case. This gas pressure buildup causes the vent cap to blow. The propellant gases are released into the low pressure chamber of the cartridge case. The gas pressure reaches a point where the frictional forces holding the projectile in place are overcome and the projectile is propelled through the bore of the weapon. The burning propellant also causes the delay element in the projectile to be initiated. The delay element burns for a minimum of 2.0 seconds, enough time for the projectile to travel approximately 136.7 yards (125 meters), and a maximum of 3.5 seconds. Once the delay element burns through, the CS pellet is ignited and the projectile begins to emit CS under pressure. CS is emitted for between 10 and 50 seconds. The burning is accompanied by a hissing sound and a dense white cloud of CS.

WARNING

LABORATORY TESTING HAS SHOWN THAT THE CS PELLET MAY CRACK UPON IMPACT WITH A HARD SURFACE, POTENTIALLY CAUSING THE CS PELLET TO EXPERIENCE DEFLAGRATION (RAPID BURNING). THIS EVENT IS CHARACTERIZED BY SHORTER EMISSION TIME FOLLOWED BY THE PROJECTILE DECOMPOSING WITH LOW VELOCITY FRAGMENTS.

5-2.18.4 Ballistic Data. The ballistic data for this cartridge is as follows:

- a. Velocity. The average muzzle velocity of this cartridge is 242 fps (73.8 m/s).

b. Range. The average maximum range of this cartridge is 437.4 yards (400 meters).

c. Delay. The emission delay for this cartridge is 2.0 seconds minimum and 3.5 seconds maximum.

d. Emission. Time. The emission time for this cartridge is between 10 and 50 seconds.

5-2.19 Non-Lethal 40 Millimeter Cartridges.

5-2.19.1 Cartridge, 40 Millimeter, Foam Rubber Baton, Non-Lethal (BA07).

5-2.19.1.1 Intended Use. The Non-Lethal 40mm Foam Rubber Baton cartridge is intended for use in scenarios where the use of lethal incapacitating force is not warranted because of various operational considerations. This cartridge is intended for use in the M203 Grenade Launcher.

5-2.19.1.2 Description. The Non-Lethal 40mm Foam Rubber Baton cartridge consists of the following components: cartridge case, sealant, end wad, felt washer (spacers), foam rubber batons, plastic gas check, over powder, wad, smokeless propellant, an model 209 shotshell primer. The cartridge weighs approximately 0.443 pounds (3101 grains, 200.94 grams) and is approximately 4.789 inches (12.16 centimeters long).

a. Cartridge Case. The cartridge case is composed of aluminum. The case diameter is 1.59 inches (4.04 centimeters) and rim diameter is 1.72 inches (4.37 centimeters).

b. Propellant. The cartridge contains approximately 13.0 grains (0.84 grams) of double base smoke-less propellant.

c. Foam Rubber Batons. There are three foam rubber batons in each cartridge. Each baton weighs 250 grains (16.20 grams) minimum to 280 grains (18.15 grams) maximum. The hardness of each baton is 25+10 in durometer "A" scale. The three batons are separated from the propellant by a chipboard over powder wad and a plastic gas check. The three batons are enclosed in the cartridge case by a felt washer and chipboard end wad. The cartridge is sealed with polyurethane. The end wad is marked with the letter "F" for low light identification.

d. Primer. The primer is a model 209 shot-shell primer. It contains approximately 0.87 grains (57 grams) of lead styphnate.

5-2.19.1.3 Function. The primer is initiated by the firing pin of the weapon and the propellant is ignited. The burning of the propellant causes a buildup of gas pressure. The gas pressure reaches a point where the frictional forces holding the foam rubber batons in place are overcome and the foam rubber batons are propelled through the cartridge case, the bore of the weapon and the air to the target.

5-2.19.2 Cartridge, 40 Millimeter, Rubber Ball, Non-Lethal (BA08).

5-2.19.2.1 Intended Use. The Non-Lethal 40mm Rubber Ball cartridge is intended for use in scenarios where the use of lethal incapacitating force is not warranted because of various operational considerations. This cartridge is intended for use in the M203 Grenade Launcher.

5-2.19.2.2 Description. The Non-Lethal 40mm Rubber Ball cartridge consists of the following components: cartridge case, sealant, end wad, felt washer (spacers), rubber balls, plastic gas check, over powder wad, smokeless propellant, and model 209 shotshell primer. The cartridge weighs approximately 0.443 pounds (3101 grains, 200.94 grams) and is approximately 4.789 inches (12.16 centimeters) long.

a. Cartridge Case. The cartridge case is composed of aluminum. The case diameter is 1.59 inches (4.04 centimeters) and the rim diameter is 1.72 inches (4.37 centimeters).

b. Propellant. The cartridge contains approximately 7.30 grains (0.48 grams) of double base smokeless propellant.

c. Rubber Ball. A minimum of twenty-two (22) each .60 caliber rubber balls are contained in each cartridge. Each rubber ball weighs 34+5 grains (2.20+0.33 grams) and has a hardness of 60+10 on the durometer "A" scale. The rubber balls are separated from the propellant by a chipboard over powder wad and a plastic gas check. The rubber balls are enclosed in the cartridge case

by a felt washer and chipboard end wad. The cartridge is sealed with polyurethane. The end wad is marked with the letter "B" for low light identification.

d. Primer. The primer is a model 209 shot-shell primer. It contains approximately 0.87 grains (57 grams) of lead styphnate.

e. Function. The primer is initiated by the firing pin of the weapon and the propellant is ignited. The burning of the propellant causes a buildup of gas pressure. The gas pressure reaches a point where the frictional forces holding the rubber balls in place are overcome and the rubber balls are propelled through the cartridge case, the bore of the weapon and the air to the target.

5-2.19.3 Cartridge, 40 Millimeter, Wooden Baton, Non-Lethal (BA09).

5-2.19.3.1 Intended Use. The Non-Lethal 40mm Wooden Baton cartridge is intended for use in scenarios where the use of lethal incapacitating force is not warranted because of various operational considerations. This cartridge is intended for use in the M203 Grenade Launcher.

5-2.19.3.2 Description. The Non-Lethal 40mm Wood-en Baton cartridge consists of the following components: cartridge case, sealant, end wad, wooden batons, over powder wad, smokeless propellant, and model 209 shotshell primer. The cartridge weighs approximately 0.489 pounds (3423 grains, 221.81 grams) and is approximately 4.789 inches (12.16 centimeters) long.

a. Cartridge Case. The cartridge case is composed of aluminum. The case diameter is 1.59 inches (4.04 centimeters) and the rim diameter is 1.72 inches (4.37 centimeters).

b. Propellant. The cartridge contains approximately 36.3 grains (2.36 grams) of double base smokeless propellant.

c. Wooden Batons. Each cartridge contains three wooden batons. Each wooden baton weighs 335 grains (21.71 grams) minimum. Wooden batons are made of hardwood which is classified as Group IV in MIL-STD-731A. The density of the wood is 40 pounds a cubic foot minimum and 50 pounds a cubic foot maximum at 12 percent mois-

ture content. The three wooden batons are separated from the propellant by a chipboard over powder wad. The three wooden batons are enclosed in the cartridge case by a chipboard end wad and sealed with polyurethane. The end wad is marked with the letter "W" for low light identification.

d. Primer. The primer is a model 209 shot-shell primer. It contains approximately 0.87 grains (57 grams) of lead styphnate.

5-2.19.3.3 Function. The primer is initiated by the firing pin of the weapon and propellant is ignited. The burning of the propellant causes a buildup of gas pressure. The gas pressure reaches a point where the frictional forces holding the wood batons in place are overcome and the wooden batons are propelled through the cartridge case, the bore of the weapon and the air to the target.

5-2.20 Cartridge, 40mm, IR Illumination, M992 (BA03).

5-2.20.1 Intended Use. These cartridges are designed for illumination and signaling and are used with NVEO equipment. They are low velocity rounds designed for firing from M79 and M203 launchers attached to M16 series rifles and carbines.

5-2.20.2 Description. The cartridge is 5.272 inches (13.39 centimeters) long. The cartridge is a fixed round consisting of an M195 cartridge case assembly (M42 percussion primer and M9 Propellant) and a payload. The payload includes a parachute and an IR illumination candle. Loaded in the projectile is a 5-second delay ignition element and an ejection charge. The ogive of the projectile is marked with a raised letter "I".

5-2.20.3 Function. When fired, the propellant charge ignites, propelling the projectile from the muzzle. The 5-second delay element ignites and in turn ignites the powder ejection charge. The ejection charge ignites the IR candle and the candle and parachute eject through the carrier nose. Upon ejection, the parachute deploys. The candle burns for approximately 40 seconds.

5-2.20.4 Ballistic Data. The ballistic data for the cartridge are as follows:

- a. Velocity. The nominal muzzle velocity is 250 fps (76 meters per second).
- b. Burst Height. The burst height is a minimum of 500 feet (152 meters).
- c. Candle Burn Time. The candle burn time is approximately 40 seconds.

5-2.21 Cartridge, 40 Millimeter, Practice, M918 (B584).

5-2.21.1 Intended Use. This cartridge, Figure 5-11, is a target practice round designed to simulate the M430 Cartridge in appearance and ballistics. It is fired from the 40mm Grenade Machine Gun MK 19 MOD 3. It is also used in the cartridge, subcaliber ammunition, training (CSAT): M970 to simulate the loading and firing of large caliber ammunition.

WARNING

DO NOT FIRE HIGH-EXPLOSIVE AMMUNITION AT TARGETS LESS THAN 310 METERS AWAY DURING TRAINING OR 75 METERS AWAY DURING COMBAT. FRAGMENTATION CAN REACH THE GUNNER POSITION AT DISTANCES LESS THAN 310 METERS.

WARNING

HELMET, BODY ARMOR, SINGLE HEARING PROTECTION AND PROPER EYE PROTECTION SHALL BE WORN BY THE GUNNER AND ALL PERSONNEL IN CLOSE PROXIMITY (I.E. WITHIN 20 METERS) TO THE WEAPON WHEN FIRING. APPROVED HEARING PROTECTION DEVICES, INCLUDING SINGLE-FLANGE AND VINYL FOAM EARPLUGS, AND CORRESPOND-

ING NATIONAL STOCK NUMBERS (NSN) ARE LISTED IN DODI 6055-12 OF 5 MAR 04. EYE PROTECTION DEVICES SHALL BE IN COMPLIANCE WITH AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) Z87.1-1989 STANDARD AS ADOPTED BY OCCUPATION SAFETY AND HEALTH AGENCY (OSHA) STANDARD NO. 1910-133. COMPLIANCE TO ANSI Z87.1 VERSION 2003 IS RECOMMENDED. COMPLIANCE IS NORMALLY INDICATED ON PRODUCT PACKAGING AND/OR PRODUCT.

5-2.21.2 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 anticreep 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 bi-chambered 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.

5-2.21.3 Function. 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 set-back 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.

5-2.21.4 Ballistic Data. The ballistic data for the cartridge are as follows:

- a. Velocity. The average muzzle velocity is 795 fps (242 meters per second).
- b. Range. The maximum effective range is approximately 2400 yards (2,195 meters).

5-2.22 Cartridge, 40 Millimeter, Practice, (BA12) MK 281 MOD 0.

5-2.22.1 Intended Use. This cartridge is a target practice round designed to simulate the M430A1 Cartridge in appearance and ballistics. It is fired from the 40mm Grenade Machine Gun MK 19 MOD 3.

5-2.22.2 Description. The cartridges are 4.415 inches (11.21 centimeters) long and weigh approximately 0.8125 pounds (368 grams). The cartridges contain an aluminum projectile body with a plastic ogive and no fuze. Each cartridge contains approximately 62 grains (4000 milligrams) of M2 propellant, and a Federal No. 215 primer. The filler is an orange dye material. The projectiles are blue with white markings.

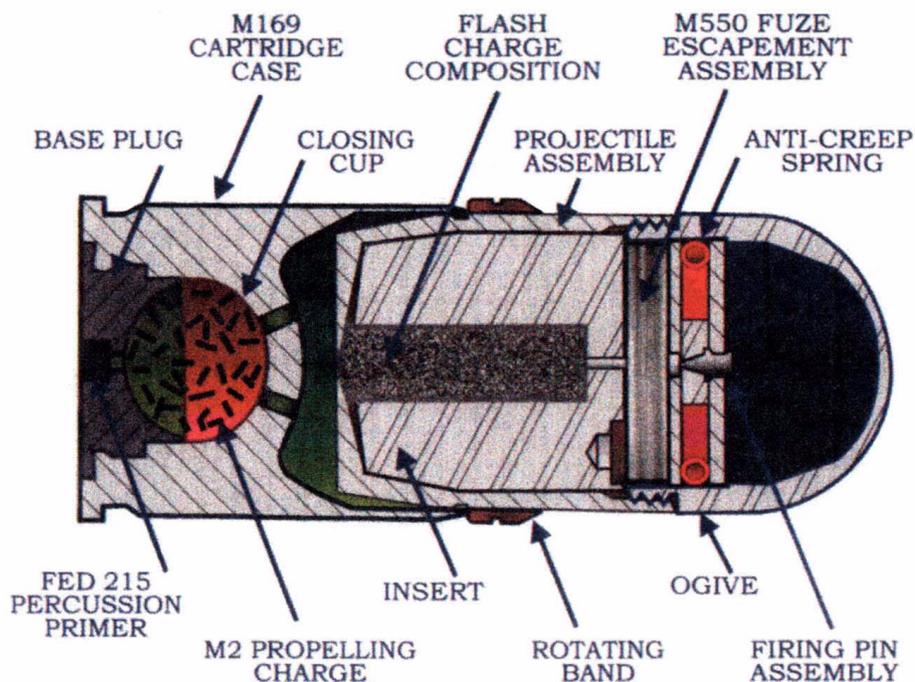


Figure 5-11 40mm M918 Target Practice Cartridge

5-2.22.3 Function. After firing the weapon, the rotating band causes the projectile to spin at 3,600 rpm as it leaves the muzzle. Upon impact with the target, the breakable ogive (nose) ruptures and releases the dye, causing a puff of yellow-orange smoke that simulates explosive impact and marks the fall of the shot.

5-2.22.4 Ballistic Data. The ballistic data for the cartridge are as follows:

- a. Velocity. The average muzzle velocity is 790 fps (241 meters per second).
- b. Range. The maximum effective range is approximately 2400 yards (2,195 meters).

5-2.23 Cartridge, 40mm, 100-Meters Warning Signal, MK 297 MOD 0 (BA24).

5-2.23.1 Intended Use. This cartridge is used for guard and security purposes. The cartridges provide the capability to project clear, unambiguous warning signals out to 100 meters.

WARNING

DO NOT FIRE HIGH-EXPLOSIVE AMMUNITION AT TARGETS LESS THAN 310 METERS AWAY DURING TRAINING OR 75 METERS AWAY DURING COMBAT. FRAGMENTATION CAN REACH THE GUNNER POSITION AT DISTANCES LESS THAN 310 METERS.

WARNING

HELMET, BODY ARMOR, SINGLE HEARING PROTECTION AND PROPER EYE PROTECTION SHALL BE WORN BY THE GUNNER AND ALL PERSONNEL IN CLOSE PROXIMITY (I.E. WITHIN 20 METERS) TO THE WEAPON WHEN FIRING.

APPROVED HEARING PROTECTION DEVICES, INCLUDING SINGLE-FLANGE AND VINYL FOAM EARPLUGS, AND CORRESPONDING NATIONAL STOCK NUMBERS (NSN) ARE LISTED IN DODI 6055-12 OF 5 MAR 04. EYE PROTECTION DEVICES SHALL BE IN COMPLIANCE WITH AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) Z87.1-1989 STANDARD AS ADOPTED BY OCCUPATION SAFETY AND HEALTH AGENCY (OSHA) STANDARD NO. 1910-133. COMPLIANCE TO ANSI Z87.1 VERSION 2003 IS RECOMMENDED. COMPLIANCE IS NORMALLY INDICATED ON PRODUCT PACKAGING AND/OR PRODUCT.

5-2.23.2 Description. The cartridge has an all-weather plastic projectile and aluminum case. The 40mm cartridge is 4.13 inches long and is 1.624 inches diameter at the rotating band. The primer is a percussion primer, and the propellant is smokeless powder. The projectile has a black powder delay and approximately 4 grams of flash charge. The projectile windshield is green, and has one raised ring for tactile indication of projectile range.

5-2.23.3 Operation. Cartridges are shoulder-fired with military 40mm launchers, M79 and M203. The operator elevates the launcher muzzle approximately 4 degrees above horizontal, and aims at an area that is a minimum of 20-meters from the target. When the cartridge is fired, the burning propellant ignites the delay and launches the projectile. The delay burns for approximately 1.1 seconds, and then ignites the flash charge. The projectile airbursts at 100-meters nominal to produce a light flash, loud report (bang), and smoke.

5-2.23.4 Packaging. Packaging drawing 53711-7624909. NSN 1310-01-534-8941. 22 rounds per metal M2A1 can, 44 rounds per wirebound box.

5-2.24 Cartridge, 40mm, 200-Meters Warning Signal, MK 298 MOD 0 (BA25).

5-2.24.1 Intended Use. This cartridge is used for guard and security purposes. The cartridges provide the capability to project clear, unambiguous warning signals out to 300 meters.

WARNING

DO NOT FIRE HIGH-EXPLOSIVE AMMUNITION AT TARGETS LESS THAN 310 METERS AWAY DURING TRAINING OR 75 METERS AWAY DURING COMBAT. FRAGMENTATION CAN REACH THE GUNNER POSITION AT DISTANCES LESS THAN 310 METERS.

WARNING

HELMET, BODY ARMOR, SINGLE HEARING PROTECTION AND PROPER EYE PROTECTION SHALL BE WORN BY THE GUNNER AND ALL PERSONNEL IN CLOSE PROXIMITY (I.E. WITHIN 20 METERS) TO THE WEAPON WHEN FIRING. APPROVED HEARING PROTECTION DEVICES, INCLUDING SINGLE-FLANGE AND VINYL FOAM EARPLUGS, AND CORRESPONDING NATIONAL STOCK NUMBERS (NSN) ARE LISTED IN DODI 6055-12 OF 5 MAR 04. EYE PROTECTION DEVICES SHALL BE IN COMPLIANCE WITH AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) Z87.1-1989 STANDARD AS ADOPTED BY OCCUPATION SAFETY AND HEALTH AGENCY (OSHA) STANDARD NO. 1910-133. COMPLIANCE TO ANSI Z87.1 VERSION 2003 IS RECOMMENDED. COMPLIANCE IS NORMALLY

INDICATED ON PRODUCT PACKAGING AND/OR PRODUCT.

5-2.24.2 Description. The cartridge has an all-weather plastic projectile and aluminum case. The 40mm cartridge is 4.13 inches long and is 1.624 inches diameter at the rotating band. The primer is a percussion primer, and the propellant is smokeless powder. The projectile has a black powder delay and approximately 4 grams of flash charge. The projectile windshield is green, and has two raised rings for tactile indication of projectile range.

5-2.24.3 Operation. Cartridges are shouldered-fired with military 40mm launchers, M79 and M203. The operator elevates the launcher muzzle approximately 8 degrees above horizontal, and aims at an area that is a minimum of 20-meters from the target. When the cartridge is fired, the burning propellant ignites the delay and launches the projectile. The delay burns for approximately 2.3 seconds, and then ignites the flash charge. The projectile airbursts at 200-meters nominal to produce a light flash, loud report (bang), and smoke.

5-2.24.4 Packaging. Packaging drawing 53711-7624909. NSN 1310-01-534-8943. 22 rounds metal M2A1 can, 44 rounds per wirebound box.

5-2.25 Cartridge, 40mm, 300-Meters Warning Signal, MK 299 MOD 0 (BA26).

5-2.25.1 Intended Use. This cartridge is used for guard and security purposes. The cartridges provide the capability to project clear, unambiguous warning signals out to 300 meters.

WARNING

DO NOT FIRE HIGH-EXPLOSIVE AMMUNITION AT TARGETS LESS THAN 310 METERS AWAY DURING TRAINING OR 75 METERS AWAY DURING COMBAT. FRAGMENTATION CAN REACH THE GUNNER POSITION AT DISTANCES LESS THAN 310 METERS.

WARNING

HELMET, BODY ARMOR, SINGLE HEARING PROTECTION AND PROPER EYE PROTECTION SHALL BE WORN BY THE GUNNER AND ALL PERSONNEL IN CLOSE PROXIMITY (I.E. WITHIN 20 METERS) TO THE WEAPON WHEN FIRING. APPROVED HEARING PROTECTION DEVICES, INCLUDING SINGLE-FLANGE AND VINYL FOAM EARPLUGS, AND CORRESPONDING NATIONAL STOCK NUMBERS (NSN) ARE LISTED IN DODI 6055-12 OF 5 MAR 04. EYE PROTECTION DEVICES SHALL BE IN COMPLIANCE WITH AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) Z87.1-1989 STANDARD AS ADOPTED BY OCCUPATION SAFETY AND HEALTH AGENCY (OSHA) STANDARD NO. 1910-133. COMPLIANCE TO ANSI Z87.1 VERSION 2003 IS RECOMMENDED. COMPLIANCE IS NORMALLY INDICATED ON PRODUCT PACKAGING AND/OR PRODUCT.

5-2.25.2 Description. The cartridge has an all-weather plastic projectile and aluminum case. The 40mm cartridge is 4.13 inches long maximum, and is 1.624 inches diameter maximum at the rotating band. The primer is a percussion primer, and the propellant is smokeless powder. The projectile has a black powder delay and approximately 4 grams of flash charge. The projectile windshield is green, and has three raised rings for tactile indication of projectile range.

5-2.25.3 Operation. Cartridges are shoulder-fired with military 40mm launchers, M79 and M203. The operator elevates the launcher muzzle approximately 12 degrees above horizontal, and aims at an area that is a minimum of 20-meters from the target. When the cartridge is fired, the burning propellant ignites the delay and launches the projectile. The delay burns for approximately 3.8 seconds, and then ignites the flash charge. The projectile airbursts at 300-meters nominal to produce a light flash, loud report (bang), and smoke.

5-2.25.4 Packaging. Packaging drawing 53711-7624909. NSN 1310-01-534-8945. 22 rounds per metal M2A1 can, 44 rounds per wirebound box.

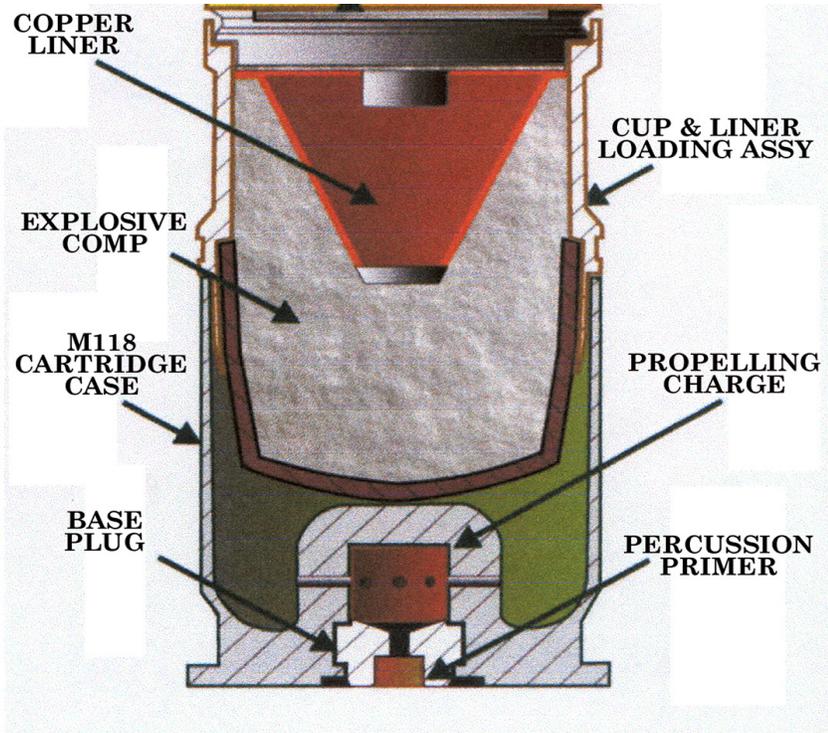


Figure 5-12 Typical Low Velocity Cartridge

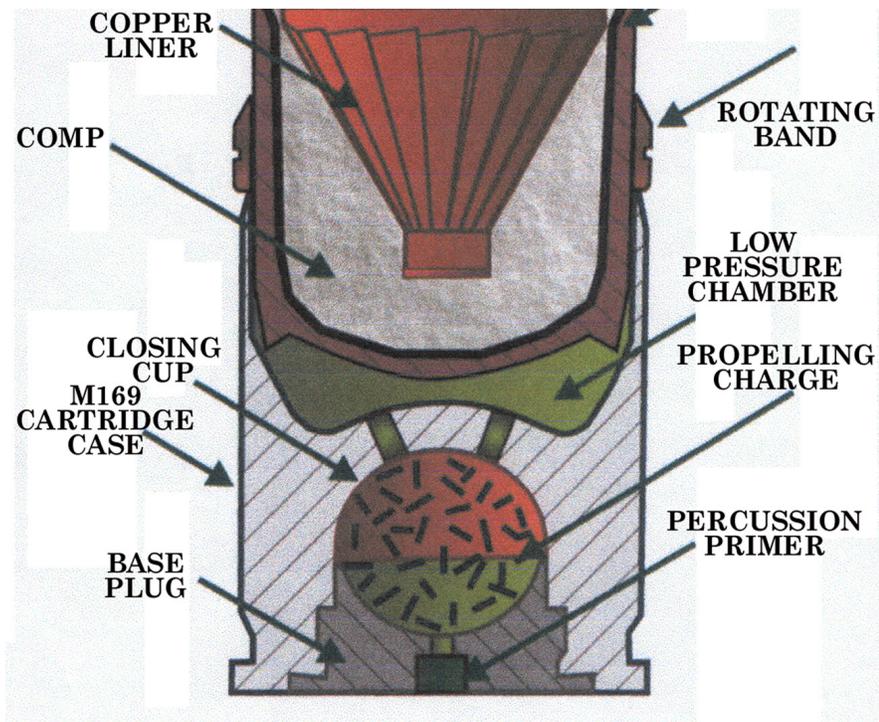


Figure 5-13 Typical High Velocity Cartridge

CHAPTER 6

MORTAR AMMUNITION

6-1 INTRODUCTION

The chapter contains general and technical information on semifixed 60mm and 81mm mortar cartridges.

6-2 60 MILLIMETER CARTRIDGES

CAUTION

60MM AND 81MM MORTARS ASSEMBLED WITH THE RIGID HORSESHOE SHAPED PROPELLANT INCREMENTS HAVE BEEN FOUND WITH PUNCTURES, DISCOLORATION AND/OR PLASTIC FOAM STUCK TO THE EXTERIOR OF THE PROPELLANT INCREMENTS.

WARNING

UPON REMOVAL FROM PACKAGING, AND PRIOR TO FIRING, ALL HORSESHOE SHAPED PROPELLANT CHARGES SHALL BE INSPECTED FOR DAMAGE, DISCOLORATION AND/OR PRESENCE OF FOAM.

WARNING

CARTRIDGES FOUND WITH PUNCTURED PROPELLANT INCREMENTS MAY LEAK PROPELLANT RESULTING IN CRITICALLY SHORT ROUNDS AND SHOULD NOT BE FIRED. LEAKING PROPELLANT CHARGES SHALL BE REMOVED AND DISPOSED OF IN ACCORDANCE WITH LOCAL PROCEDURES. DURING TRAINING, IF MISSION ALLOWS, CARTRIDGES MAY BE FIRED AT A LOWER CHARGE.

WARNING

DISCOLORED INCREMENTS ARE CONSIDERED SERVICEABLE UNLESS OTHER VISUAL CONDITIONS SUCH AS FIN CORROSION PROVIDE INDICATIONS THAT DETERIORATION RESULTED FROM EXPOSURE. MAJOR CORROSION ON FUZE OR FIN IS A RESULT OF MOISTURE CONTAMINATION WITHIN SENSITIVE COMPONENTS WHICH COULD RESULT IN MALFUNCTIONS SUCH AS DUDS AND MISFIRES.

WARNING

PLASTIC FOAM MATERIAL CAUSES BUILD-UP OR RESIDUE IN WEAPON, WHICH COULD RESULT IN HANG FIRES OR MISFIRES. ALL PLASTIC FOAM RESIDUE SHALL BE BRUSHED AWAY FROM PROPELLANT INCREMENTS BY HAND.

6-2.1 General. These cartridges are considered semifixed mortar ammunition because the propelling charge is adjustable. The cartridges are issued as a complete round containing all components required to fire a weapon once. The increment charges (bags) of granular propellant are attached to the fins or boom, and one or more bags may be removed for fire adjustment. The 60mm cartridge components are listed in Table 6-1. See Table 6-11 for packaging and identification data.

Table 6-1 60mm Cartridge Components

COMPONENT	COMPONENT						
	HE, M49	WP, M302	ILLUM, M83	TP, M50	HE, M720/M888	ILLUM, M721	WP, M722
Projectile	Cast PMI or forged steel	Forged Steel	Steel tubing	Cast PMI or forged steel	Alloy Steel	Steel Tubing	Alloy Steel
Filler	Comp B or TNT (M49A2)	WP Burster, M119	Illuminant	Inert with spotting charge of black powder	Comp B	Illuminant	WP
Ignition Cartridge	M5A1/M5A2	M5A1/M5A2	M5A2	M5A1 with	M702	M702	M702
Propellant	M3A1/M181	M181	M3A1/M181	M181	M204	M204	M204
Primer	M32	M32	M32	M32	M35	M35	M35
Fin Assembly	M2	M2	M2	M2	M27	M27	M27
Fuze	PD M525 PD M717 PD M52* PD M53* PD M83* M77**	PD M527B1 PD M82*	Time-M645A	PD M525	Multi-option M734 M734 (M720) PD, M935 (M888)	MTSQ M776	PD M745

Notes: * Combat emergency Only ** Time super quick

6-2.1.1 Weapon. The cartridges are designed for firing from the MK 4 Navy Mortar, the M19 Field Mortar, the M224 Lightweight Company Mortar, the T18E6, and the M2 Mortar. These mortars are smooth-bore, muzzle-loading, air-cooled, portable, high-angle fire weapons. The MK 4, M19, and M224 mortars have firing mechanisms for selective firing by either the drop-fire or trigger-fire method.

6-2.1.2 Identification. The identifying characteristics of the cartridges are the unique shape, the grooved bourrelet, (gas-check band), and the use of the fin assembly to hold a propelling charge and provide stability in flight.

6-2.1.3 Type of Projectile. Ammunition for these mortars is classified as HE, Illuminating (ILLUM), WP, TP, or training, according to filler type and projectile use.

6-2.1.4 Propelling Charge. The full propelling charge for the 60mm Mortar ammunition consists of ignition cartridge M5A1 or M5A2 and four

propellant increment charges M3A1 or M181, or M702 ignition cartridge and four M204 propellant increment charges. Any or all propellant increments are removable for fire adjustment per the appropriate tables for the respective round.

6-2.1.5 Ignition Cartridge. The M5A1, M5A2, and M702 ignition cartridges are considered as Charge 0. The ignition cartridge serves to ignite the propellant charges when firing Charges 1 through 4.

6-2.1.6 Propellant Increment Charges. Four M3A1 propellant increment charges are provided for fire adjustment (charge firing) for 60mm, HE, M49A2/M49A3, and ILLUM, M83A1/M83A2. Four M181 charges are provided for WPM302A1/M302E1; HE, M49A2E2/M49A4; and TP, M50A2E1/M50A3. Four M204 propellant increment charges are provided for the M720/M888 HE, M721 ILLUM, and M722 WP. To prepare the ammunition for fire adjustment, remove the propellant increment that is not required to attain the range.

6-2.1.7 Primer. Percussion primer M32 is a threaded screwing type used to ignite cartridge M5A1 or M5A2. Percussion primer M35 is used to ignite the M702 ignition cartridge.

6-2.1.8 Fin Assembly. The M2 or M27 fin assembly is used with all 60mm mortar ammunition.

6-2.1.9 Function. All 60mm mortar ammunition function in a similar manner up to the point of fuze functioning at impact. The cartridge loads through the muzzle by hand. When released and slides down the mortar tube, the primer in the ignition cartridge strikes the firing pin in the base cap. The flash from the primer ignites the ignition charge and the propelling charge. The gases from the propelling charge expel the projectile from the mortar tube. It is fin stabilized in flight as it is propelled to the target.

6-2.2 Cartridge, 60 Millimeter, Illuminating, M83A3/M83A2/M83A1 (B627).

6-2.2.1 Intended Use. This cartridge, Figure 6-1, is designed and procured for use in night missions requiring illumination for observation.

WARNING

MAXIMUM ALLOWABLE RATE OF FIRE IS 30 ROUNDS PER MINUTE FOR PERIODS NOT EXCEEDING 1 MINUTE, 18 ROUNDS PER MINUTE FOR PERIODS NOT EXCEEDING 4 MINUTES, OR 8 ROUNDS PER MINUTE INDEFINITELY.

CAUTION

REFER TO THE ILLUMINATING, M83A3/M83A2/M83A1 FIRING TABLE (TABLE 6-2) BEFORE FIRING THIS CARTRIDGE. ALL OTHER 60MM CARTRIDGE BALLISTICS DIFFER. FIRING THIS CARTRIDGE BELOW CHARGE 2 WILL RESULT IN DUDS.

6-2.2.2 Description. The complete cartridge consists of a relatively thin-walled steel body tube assembly with cylindrical side walls and a conical base. It has an M2 tail fin assembly, an M5A2 ignition cartridge, an M32 percussion primer, and an M65A1 time fuze. There are four propelling charges; charge M181 for M83A3 and charge M3A1 for M83A2 and M83A1. The filler is 0.49 pound (0.22 kilogram) of illuminate and the projectile contains a parachute. Brazed to the front end is an internally threaded steel adapter to seat the fuze. The tail assembly is a lightweight metal cone. Brazed to a coupling that forms a collar and a bourrelet is the forward end of the tail cone. Four equally spaced shear pins hold the collar into the body tube. Fitted to the base of the cone is a fin adapter brazed in place to hold the fin assembly. The illuminate assembly consists of a first-fire disk assembly, first-fire composition and a main charge of illuminant composition held in a boxboard casing. The parachute attaches to the casing by a 16-inch (40.64 centimeters) suspension cable. The cartridge weighs 4.15 pounds (1.88 kilograms), is 14.28 inches (36.27 centimeters) long, and is white with black markings.

6-2.2.3 Function. Approximately 15 seconds after firing, the fuze expelling charge functions, ejecting the parachute and illuminate charge assembly from the projectile base and igniting the illuminate charge. The illuminant composition burns for at least 32 seconds with a minimum candlepower for 250,000 candles. Its descent is 10 fps (3 meters per second). See Table 6-2 for ballistic data.

6-2.3 Cartridge, 60 Millimeter, Smoke, WP, M302A1/M302E1/M302A2 (B630).

6-2.3.1 Intended Use. This cartridge, Figure 6-2, is designed and procured for use in screening and spotting.

WARNING

WHEN FIRED IN TEMPERATURES BELOW 0°F (17°C), EXCESSIVE SHORT ROUNDS MAY OCCUR. MAXIMUM ALLOWABLE RATE OF FIRE IS

30 ROUNDS PER MINUTE FOR PERIODS NOT EXCEEDING 1 MINUTE, 18 ROUNDS PER MINUTE FOR PERIODS NOT EXCEEDING 4 MINUTES, OR 8 ROUNDS PER MINUTE INDEFINITELY.

CAUTION

TRANSPORT AND STORE WP ROUNDS AT TEMPERATURES BELOW 111.4°F (44.1°C), THE MELTING POINT OF WP. WHEN PRACTICAL, STORE ROUNDS ON THEIR BASES SO IF THE WP MELTS, IT WILL RESOLIDIFY WITH THE NORMAL VOID SPACE LEFT IN THE PROJECTILE NOSE. IF VOIDS (BUBBLES) EXIST IN THE WP FILLER, ERRATIC PERFORMANCE MAY OCCUR WHEN FIRED. REFER TO THE WP, M302A1/M302E1 FIRING TABLE (TABLE 6-3) BEFORE FIRING THIS CARTRIDGE. ALL OTHER 60MM CARTRIDGE BALLISTICS DIFFER.

6-2.3.2 Description. The complete cartridge consists of a relatively thin-walled, steel casing projectile (M302) with cylindrical side walls and a conical base. The M302A/M02E1 has a M527B1 PD fuze and a M2 fin assembly with a 2 inch (5.08 centimeters) fin extension. The M302A2 has the M936 PD Fuze. There are four M181 increment charges, a M5A1/M5A2 ignition cartridge coupled with a M32 percussion primer. Completing the round is a M19 projectile burster. The projectile is filled with 347 grams (12.23 ounces) of WP. Fitted into the nose is a threaded steel adapter to receive the fuze and hold the M19 burster casing. One type of M19 burster casing is a steel tube 0.57 inch (1.44 centimeters) in diameter and 4.1 inches (10.41 centimeters) long fitted with a steel sleeve. Another type is a one-piece construction manufactured from a deep-drawn stamping of steel. The cartridge is 13.07 inches (33.19 centimeters) long, weighs 4.10 pounds (1.86 kilograms), and is light green with a yellow band and light red markings.

6-2.3.3 Function. The PD fuze functions on impact, detonating the fuze booster that initiates the burster charge. The burster charge ruptures the projectile and disperses the WP filler. The WP ignites on contact with air, producing a dense white smoke cloud. See Table 6-3 for ballistic data.

Table 6-2 M83A3/M83A2/M83A1 Illuminating Ballistics

Propellant Charge M181/M3A1	Muzzle Velocity (fps)	Horizontal Range		Height of Burst		Elevation	
		Yard	Meter	Yard	Meter	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	1,100	1,006	175	160	45	15
Illuminate Charge	Candlepower	Burn Time					
M83A3	250,000	32 seconds					
M83A2	250,000	32 seconds					
M83A1	145,000	25 seconds					

Note: * Ignition cartridge and number of increment charges.

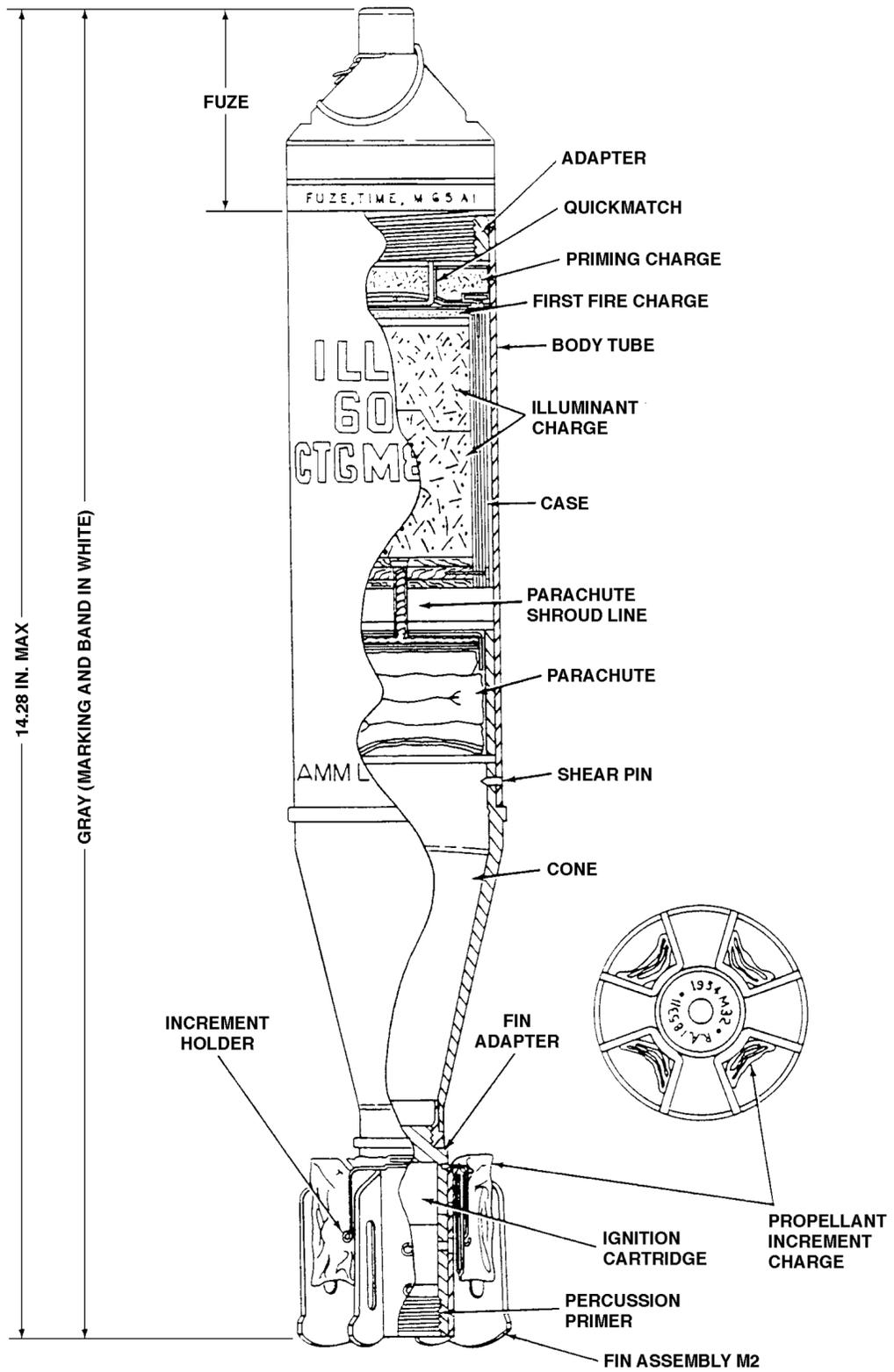


Figure 6-1 Illuminating 60mm Cartridge, M83A3

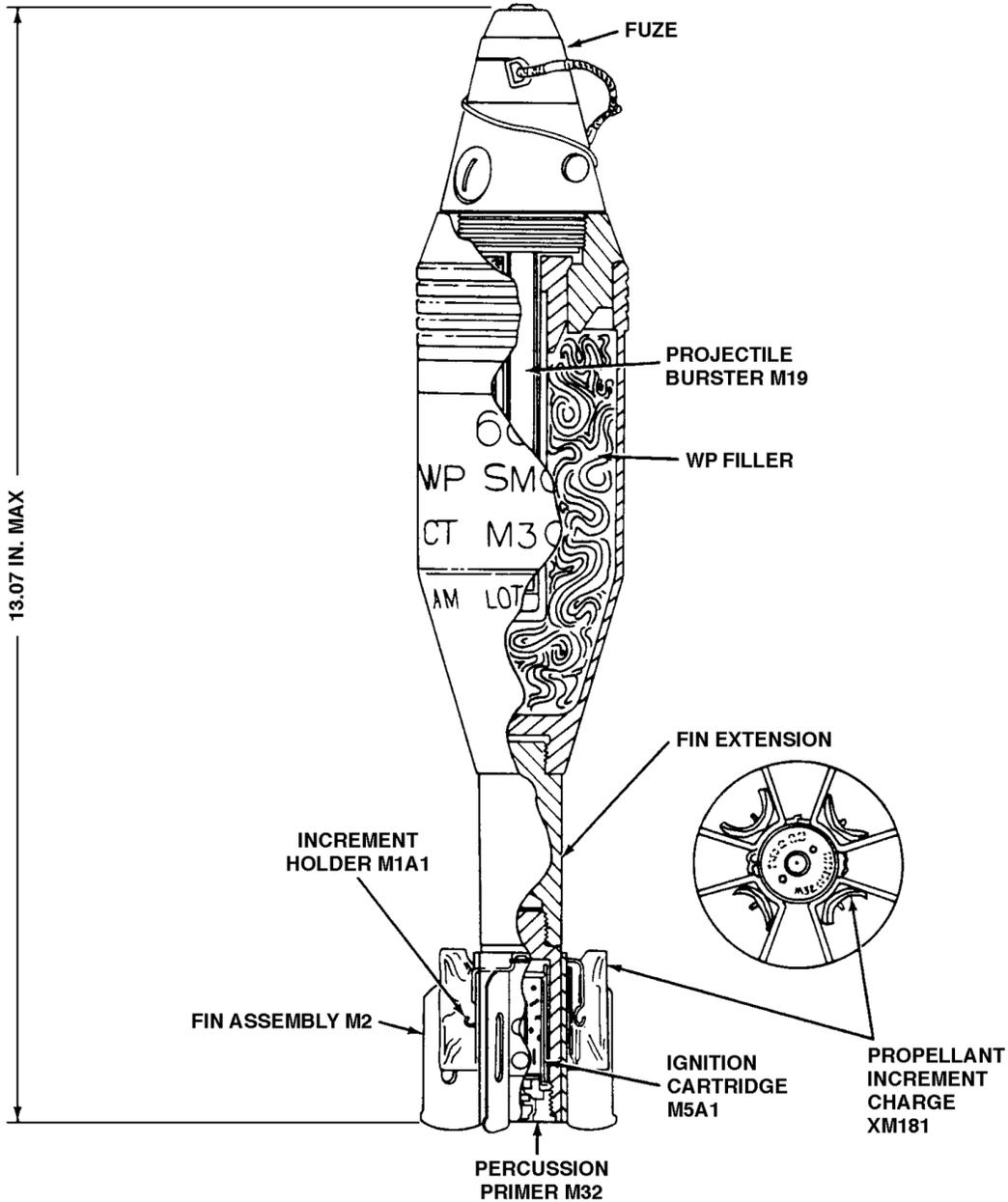


Figure 6-2 WP, Smoke 60mm Cartridge, M302A1/M302E1

Table 6-3 M302A1/M302E1 WP Ballistics

Propellant Charge, M181	Muzzle Velocity (fps)	MAXIMUM RANGE	
		Yard	Meter
0 (Ignition cartridge only)	156	213	195
1 (Ignition cartridge and 1 increment charge)	244	535	488
2 (Ignition cartridge and 2 increment charges)	316	916	839
3 (Ignition cartridge and 3 increment charges)	380	1,272	1,164
4 (Ignition cartridge and 4 increment charges)	439	1,582	1,448

6-2.4 Cartridge, 60 Millimeter, HE, M49A4/M49A2E2 (B632).

6-2.4.1 Intended Use. This cartridge, Figure 6-3, is designed and procured for use against light material and personnel. It produces a fragmentation and a blast effect.

WARNING

THE CARTRIDGE IS LAUNCH SAFE AT TEMPERATURES FROM -45°F TO 145°F. EXCESSIVE SHORT ROUNDS MAY OCCUR WHEN FIRED AT TEMPERATURES BELOW 0°F. MAXIMUM ALLOWABLE RATE OF FIRE IS 30 ROUNDS PER MINUTE FOR PERIODS NOT EXCEEDING 1 MINUTE, 18 ROUNDS PER MINUTE FOR PERIODS NOT EXCEEDING 4 MINUTES, OR 8 ROUNDS PER MINUTE INDEFINITELY.

IF YOU HEAR A BUZZING SOUND AFTER REMOVING THE PULL WIRE AND SAFETY WIRE FUZE, DO NOT FIRE THE CARTRIDGE. THE ROUND IS SAFE TO HANDLE AND TRANSPORT AFTER REINSERTING THE SAFETY WIRE IF THE BORE-RIDING PIN IS IN POSITION.

WARNING

DO NOT FIRE THIS CARTRIDGE IN M2 OR M19 MORTARS.

CAUTION

REFER TO THE HE, M49A4/M49A2E2 FIRING TABLE (TABLE 6-4) BEFORE FIRING THIS CARTRIDGE. ALL OTHER 60MM CARTRIDGE BALLISTICS DIFFER.

6-2.4.2 Description. The complete cartridge consists of a forged steel or Pearlitic Malleable Iron (PMI) projectile body, a 0.42 pound (0.19 kilogram) Comp B bursting charge, a M525 or M935 PD fuze, a M2 fin assembly with a 2 inch (5.08 centimeters) extension, four M181 propellant increment charges, a M5A2 ignition cartridge, and a M32 percussion primer. It is 11.59 inches (29.43 centimeters) long, weighs 3.25 pounds (1.47 kilograms), and is olive drab with yellow markings.

6-2.4.3 Function. The PD fuze functions on impact, detonating the fuze booster charge that initiates the Comp B HE bursting charge. The bursting charge shatters the projectile body, producing near optimum fragmentation and blast effects at the target. See Table 6-4 for ballistic data.

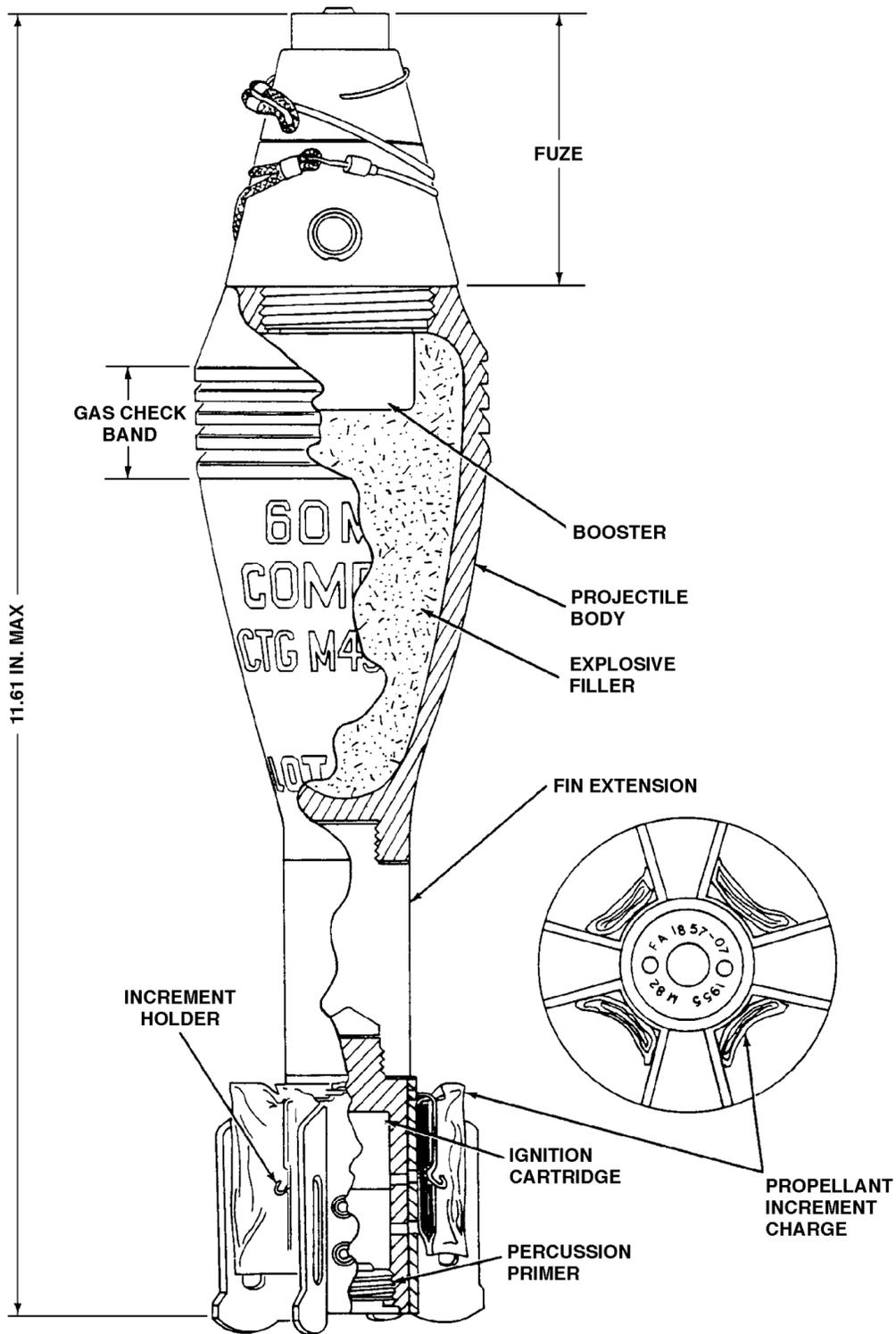


Figure 6-3 HE 60mm Cartridge, M49A4/M49A2E2

Table 6-4 M49A4/M49A2E2 HE Ballistics

Propellant Charge, M181	Muzzle Velocity (fps)	MAXIMUM RANGE	
		Yard	Meter
0 (Ignition cartridge only)	169	280	256
1 (Ignition cartridge and 1 increment charge)	247	700	639
2 (Ignition cartridge and 2 increment charges)	373	1,163	1,069
3 (Ignition cartridge and 3 increment charges)	450	1,587	1,452
4 (Ignition cartridge and 4 increment charges)	520	11,985	111,814

6-2.5 Cartridge, 60 Millimeter, HE, M49A2 (B632).

6-2.5.1 Intended Use. This cartridge, Figure 6-4, is designed and procured for use against light material and personnel. It produces a fragmentation and blast effect.

FUZE, DO NOT FIRE THE CARTRIDGE. THE ROUND IS SAFE TO HANDLE AND TRANSPORT AFTER REINSERTING THE SAFETY WIRE IF THE BORE-RIDING PIN IS IN POSITION.

WARNING

THE CARTRIDGE IS LAUNCH SAFE FOR FIRING AT TEMPERATURES FROM 0°F TO 145°F (-17°C TO 62°C) AT CHARGE 4 AND -65°F TO 145°F (-53°C TO 62°C) AT CHARGE 3 OR LESS. EXCESSIVE PRESSURE MAY DEVELOP AT CHARGE 4 BELOW 0°F (17°C). MAXIMUM ALLOWABLE RATE OF FIRE IS 30 ROUNDS PER MINUTE FOR PERIODS NOT EXCEEDING 1 MINUTE, 18 ROUNDS PER MINUTE FOR PERIODS NOT EXCEEDING 4 MINUTES, OR 8 ROUNDS PER MINUTE INDEFINITELY.

IF YOU HEAR A BUZZING SOUND AFTER REMOVING THE PULL WIRE AND SAFETY WIRE

CAUTION

REFER TO THE HE, M49A2/M49A3 FIRING TABLE (TABLE 6-5) BEFORE FIRING THIS CARTRIDGE. ALL OTHER 60MM CARTRIDGE BALLISTICS DIFFER.

6-2.5.2 Description. The complete cartridge consists of a projectile body (forged steel), a bursting charge, a M2 fin assembly, four M3A1 propellant charge increments, a M5A1 ignition cartridge, a M32 percussion primer, and a M525 PD fuze. It is 9.61 inches (24.40 centimeters) long, weighs 3.07 pounds (1.39 kilograms) and is olive drab with yellow markings.

6-2.5.3 Function. The PD fuze functions on impact, detonating the fuze booster charge that initiates the HE bursting charge. The bursting charge shatters the projectile body, producing near optimum fragmentation and blast effects at the target. See Table 6-5 for ballistic data.

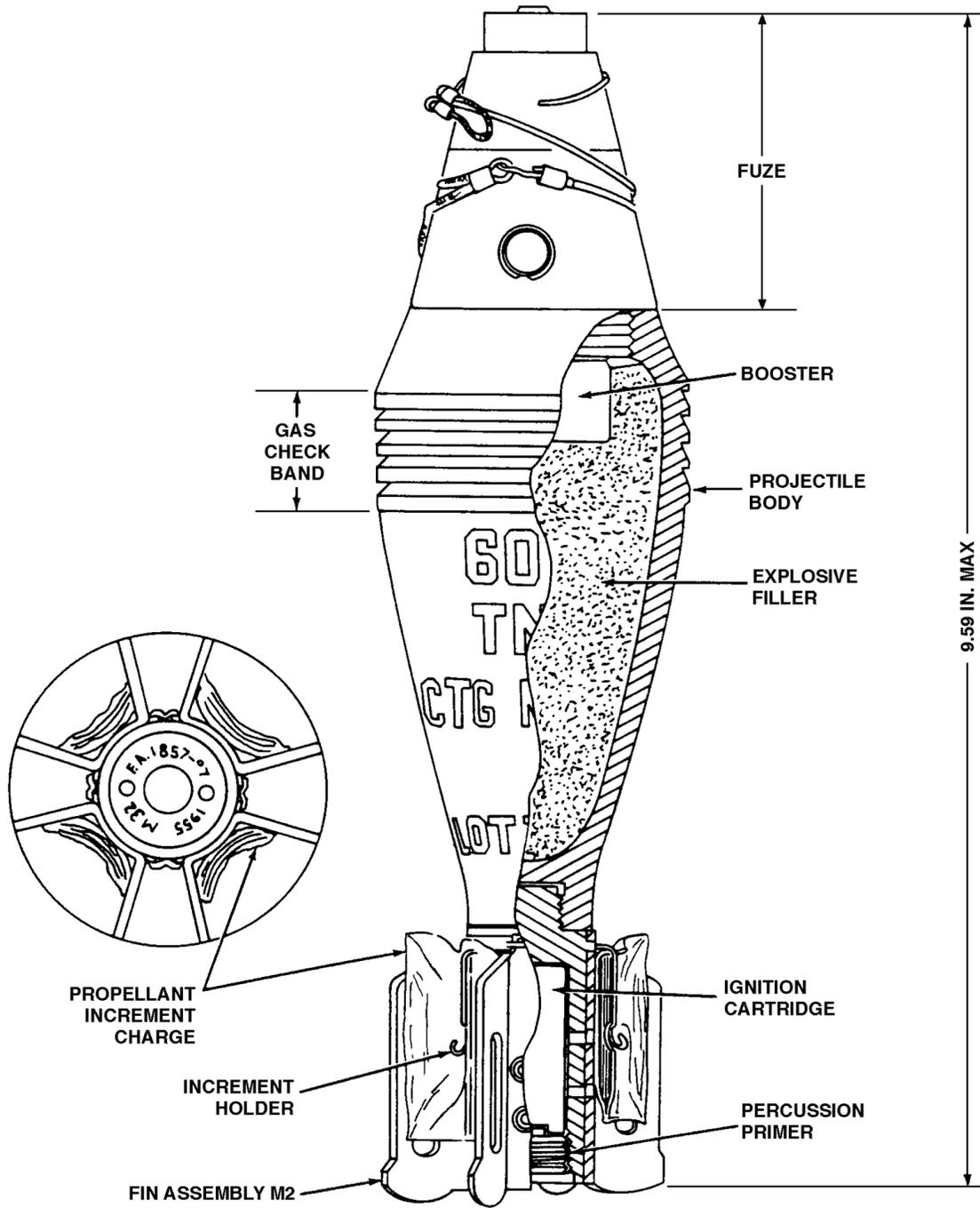


Figure 6-4 HE 60mm Cartridge, M49A2/M49A3

Table 6-5 M49A2/M49A3 HE Ballistics

Propellant Charge, M181	Muzzle Velocity (fps)	MAXIMUM RANGE	
		Yard	Meter
0 (Ignition cartridge only)	189	332	303
1 (Ignition cartridge and 1 increment charge)	292	784	716
2 (Ignition cartridge and 2 increment charges)	377	1,204	1,101
3 (Ignition cartridge and 3 increment charges)	449	1,594	1,458
4 (Ignition cartridge and 4 increment charges)	518	1,978	1,809

6-2.6 Cartridge, 60 Millimeter, TP, M50A2E1/M50A3 (B634).

6-2.6.1 Intended Use. This cartridge, Figure 6-5, is designed and procured for use in training and practice.

WARNING

FIRING THESE ROUNDS AT TEMPERATURES BELOW 0°F (-17°C) MAY CAUSE THE OCCURRENCE OF EXCESSIVE SHORT ROUNDS. MAXIMUM ALLOWABLE RATE OF FIRE IS 30 ROUNDS PER MINUTE FOR PERIODS NOT EXCEEDING 1 MINUTE, 18 ROUNDS PER MINUTE FOR PERIODS NOT EXCEEDING 4 MINUTES, OR 8 ROUNDS PER MINUTE INDEFINITELY.

IF YOU HEAR A BUZZING SOUND AFTER REMOVING THE PULL WIRE AND SAFETY WIRE FROM THE FUZE, DO NOT FIRE THE CARTRIDGE. THE ROUND IS SAFE TO HANDLE AND TRANSPORT AFTER REINSERTING THE SAFETY WIRE IF THE BORE-RIDING PIN IS IN POSITION.

CAUTION

REFER TO THE TP, M50A2E1/M50A3 FIRING TABLE (TABLE 6-6) BEFORE FIRING THIS CARTRIDGE. ALL OTHER 60MM CARTRIDGE BALLISTICS DIFFER.

6-2.6.2 Description. The complete round consists of a forged steel or cast PMI projectile body, a M525 or M935 PD fuze, a M2 fin assembly with a 2 inch (5.08 centimeters) extension, four increments of M181 propellant charge, a M5A1 ignition cartridge, and a M32 percussion primer. The nose is internally threaded to accept the fuze and the base is internally threaded to accept the fin extension. Loaded into the body is an inert material (plaster of paris and stearic acid) to simulate the weight and ballistic characteristics of an HE cartridge. Loaded in a cavity below the booster casing of the fuze is a 0.055 pound (0.024 kilogram) black powder pellet for a spotting charge. The cartridge weighs 3.15 pounds (1.42 kilograms), is 11.61 inches (29.48 centimeters) long, and is blue with a brown band and white markings.

6-2.6.3 Function. The PD fuze functions on impact, detonating the fuze booster charge and the black powder pellet to provide a spotting charge for observation of the fall of the shot. See Table 6-6 for ballistic data.

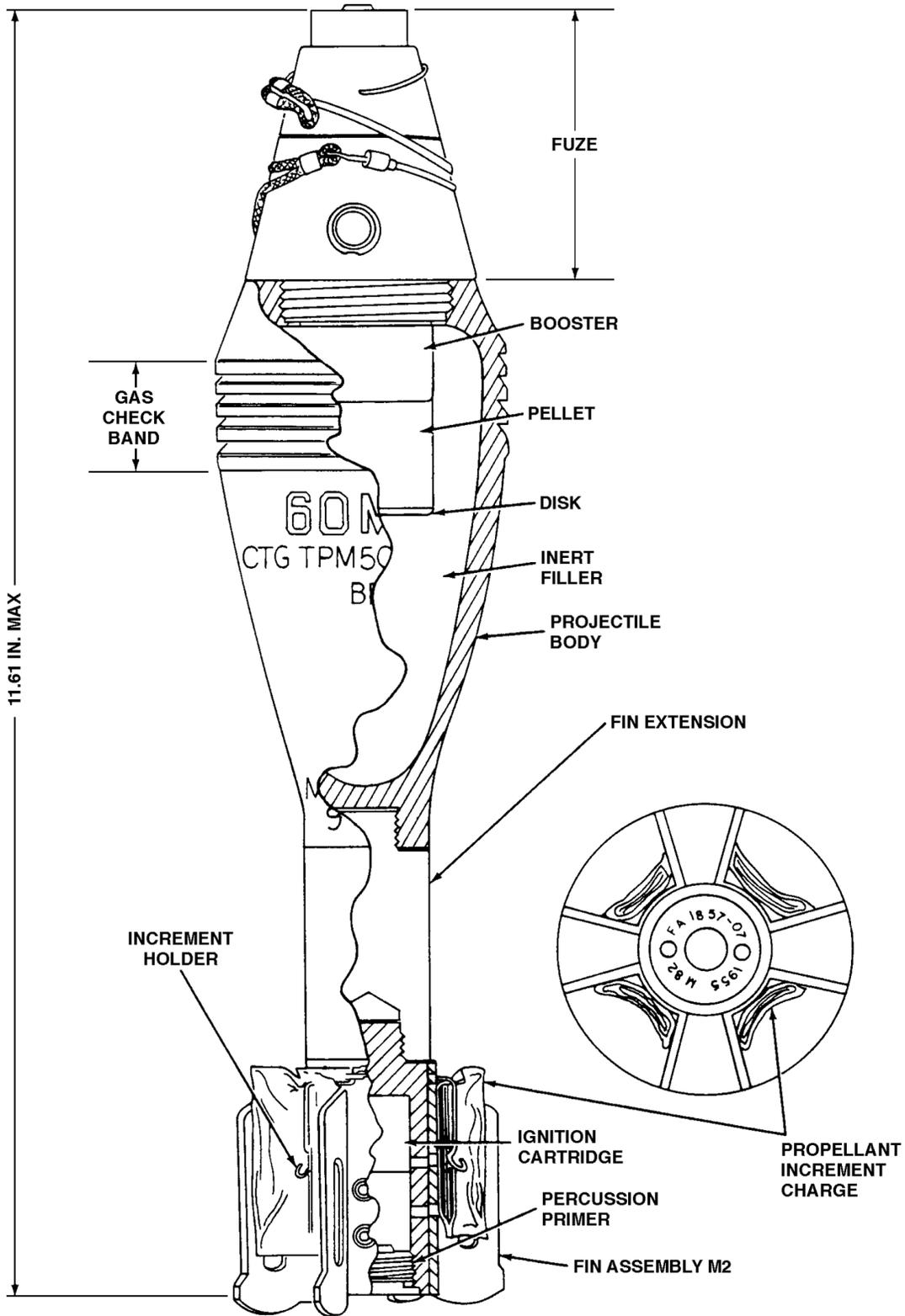


Figure 6-5 TP 60mm Cartridge, M50A2E1/M50A3

Table 6-6 M50A2E1/M50A3 TP Ballistics

Propellant Charge, M181	Muzzle Velocity (fps)	MAXIMUM RANGE	
		Yard	Meter
0 (Ignition cartridge only)	169	280	256
1 (Ignition cartridge and 1 increment charge)	247	700	639
2 (Ignition cartridge and 2 increment charges)	373	1,163	1,069
3 (Ignition cartridge and 3 increment charges)	450	1,587	1,452
4 (Ignition cartridge and 4 increment charges)	520	1,963	1,814

6-2.7 Cartridge, 60 Millimeter, HE, M720 With Fuze Multi-Option M734 (B642).

6-2.7.1 Intended Use. This cartridge, Figure 6-6, is designed and procured for use against light vehicles and light bunkers. It is also used against troops (either in the open or in foxholes), and other similar targets. It is fired in the M224 mortar or the M19 mortar.

WARNING

DO NOT FIRE THE M720 CARTRIDGE IN THE M19 MORTAR ABOVE PROPELLANT CHARGE 2. DO NOT FIRE THE M720 CARTRIDGE WITH A CHARGE GREATER THAN 1 IN THE HAND-HELD MODE. SERIOUS INJURY OR LOSS OF LIFE COULD RESULT. IT IS LAUNCH-SAFE IN TEMPERATURES RANGING BETWEEN -50°F TO 145°F (-45°C TO 62°C).

CAUTION

REFER TO THE HE, M720 FIRING TABLE (TABLE 6-7) BEFORE FIRING THIS CARTRIDGE. ALL OTHER 60MM CARTRIDGE BALLISTICS DIFFER.

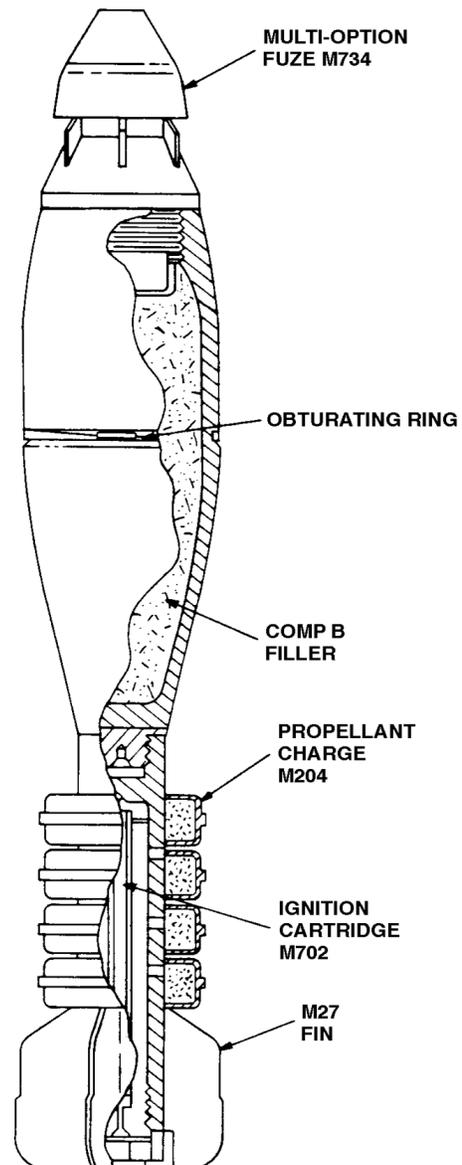


Figure 6-6 HE 60mm Cartridge, M720

Table 6-7 M720 HE Ballistics

Propellant Charge, M181	Muzzle Velocity (fps)	MAXIMUM RANGE		MINIMUM RANGE	
		Yard	Meter	Yard	Meter
0 (Ignition cartridge only)	210	440	400	77	70
1 (Ignition cartridge and 1 increment charge)	415	1,474	1,340	275	250
2 (Ignition cartridge and 2 increment charges)	560	2,365	2,150	385	350
3 (Ignition cartridge and 3 increment charges)	680	3,179	2,890	550	500
4 (Ignition cartridge and 4 increment charges)	810	3,839	3,490	715	650

6-2.7.2 Description. The complete cartridge consists of an alloy steel projectile body, a multi-option M734 fuze, a M27 fin assembly, four M204 propellant charge increments, a M702 ignition cartridge, a M35 percussion primer, and the body is filled with high-explosive Comp B. It weighs 3.75 pounds (1.70 kilograms), is 14.85 inches (37.71 centimeters) long, and is olive drab with yellow markings.

6-2.7.3 Function. The multi-option M734 fuze functions as a proximity initiating device or an impact delay to initiate the bursting charge, causing fragmentation and blast effects at the target. See Table 6-7 for ballistic data.

WARNING

DO NOT FIRE THE M720 CARTRIDGE IN THE M19 MORTAR ABOVE PROPELLANT CHARGE 2. SERIOUS INJURY OR LOSS OF LIFE COULD RESULT. DO NOT FIRE THE M720 CARTRIDGE WITH A CHARGE GREATER THAN 1 IN THE HAND-HELD MODE. SERIOUS INJURY OR LOSS OF LIFE COULD RESULT. IT IS LAUNCH SAFE IN TEMPERATURES RANGING BETWEEN 50°F TO 145°F.

6-2.8 Cartridge, 60 Millimeter, HE, M888 With PD Fuze M935 (B643).

6-2.8.1 Intended Use. This cartridge, Figure 6-7, is designed and procured for use against personnel, light bunkers, material, and similar targets. It is for firing in the M224 mortar.

WARNING

MAXIMUM ALLOWABLE RATE OF FIRE IS 30 ROUNDS PER MINUTE FOR FOUR MINUTES, THEN 20 ROUNDS PER MINUTE INDEFINITELY.

DO NOT FIRE THE HE, M888 CARTRIDGE IN THE 60MM, M2 OR M19 MORTARS. DAMAGE TO EQUIPMENT AND/OR LOSS OF LIFE COULD RESULT.

CAUTION

REFER TO THE HE, M888 FIRING TABLE (TABLE 6-8) BEFORE FIRING THIS CARTRIDGE.

6-2.8.2 Description. The complete cartridge consists of an alloy steel projectile body with a M935 fuze. It has a M27 fin assembly and four M204 propellant charge increments. There is a M702 ignition cartridge, a M35 percussion primer and a body filler of HE Comp B. It weighs 3.75 pounds (1.70 kilograms), is 14.738 inches (37.43 centimeters) long, and is olive drab with yellow markings.

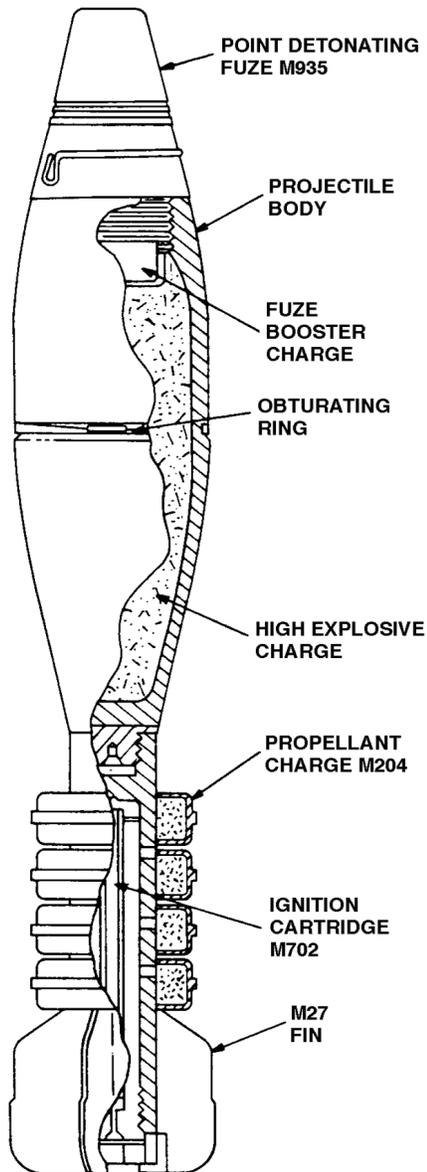


Figure 6-7 HE 60mm Cartridge, M888

6-2.8.3 Function. The PD, M935 fuze functions to detonate the booster charge and the HE burster to shatter the projectile body, producing fragmentation and blast effects at the target area. See Table 6-8 for ballistic data.

WARNING

DO NOT FIRE THE HE, M888 CARTRIDGE IN THE 60MM, M2 OR M19 MORTARS. SERIOUS INJURY OR LOSS OF LIFE COULD RESULT.

6-2.9 Cartridge, 60 Millimeter, Illumination, M721 With MTSQ Fuze M776 (B647).

6-2.9.1 Intended Use. This cartridge, Figure 6-8, is procured to be used with the M224 mortar and is used for illuminating a desired point or area.

WARNING

REFER TO THE ILLUMINATING, M721 FIRING TABLE (TABLE 6-9), BEFORE FIRING THIS CARTRIDGE. ALL OTHER 60MM CARTRIDGE BALLISTICS DIFFER. FIRING THIS CARTRIDGE BELOW CHARGE 2 WILL RESULT IN DUDS.

MAXIMUM ALLOWABLE RATE OF FIRE IS 30 ROUNDS PER MINUTE FOR FOUR MINUTES, THEN 20 ROUNDS PER MINUTE INDEFINITELY.

6-2.9.2 Description. The complete cartridge consists of a relatively thin walled steel body tube assembly with cylindrical side walls and a conical base, a M776 MTSQ (DM93) fuze, M27 fin assembly, four (4) M204 propelling charge increments, and a M702 ignition cartridge. The body is filled with a 0.49 pound (.2 kg) illuminate and a parachute. It is approximately 16.58 inches (42.11 cms) long (max), weighs approximately 3.76 pounds (1.7 kgs), and is white with black markings.

6-2.9.3 Functioning. Loaded fin-end first into the mortar barrel, the cartridge slides down the barrel and strikes the filing 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 tailcone. The parachute opens, slowing the descent of the burning candle which illuminates the target. The illumination composition burns at least 40 seconds and provides 400,000 average candlepower. See Table 6-9 for ballistic data.

Table 6-8 HE M888 Ballistics

Propellant Charge, M204	Muzzle Velocity (fps)	MAXIMUM RANGE	
		Yard	Meter
0 (Ignition cartridge only)	210	440	400
1 (Ignition cartridge and 1 increment charge)	415	1,474	1,340
2 (Ignition cartridge and 2 increment charges)	560	2,365	2,150
3 (Ignition cartridge and 3 increment charges)	680	3,179	2,890
4 (Ignition cartridge and 4 increment charges)	810	3,839	3,490

Table 6-9 M721 Illumination Ballistics

Propellant Charge M204	Muzzle Velocity (fps)	RANGE				Height of Burst		Elevation	Fuze Setting
		Horizontal		Impact		Yards	Meters	Mils	Sec
		Yards	Meters	Yards	Meters				
2	558	1,970	1,800	2,207	2,018	344	315	915	21.5
3	689	2,843	2,600	3,099	2,834	344	315	826	24.4
4	800	3,500	3,200	3,376	3,416	344	315	862	27.8

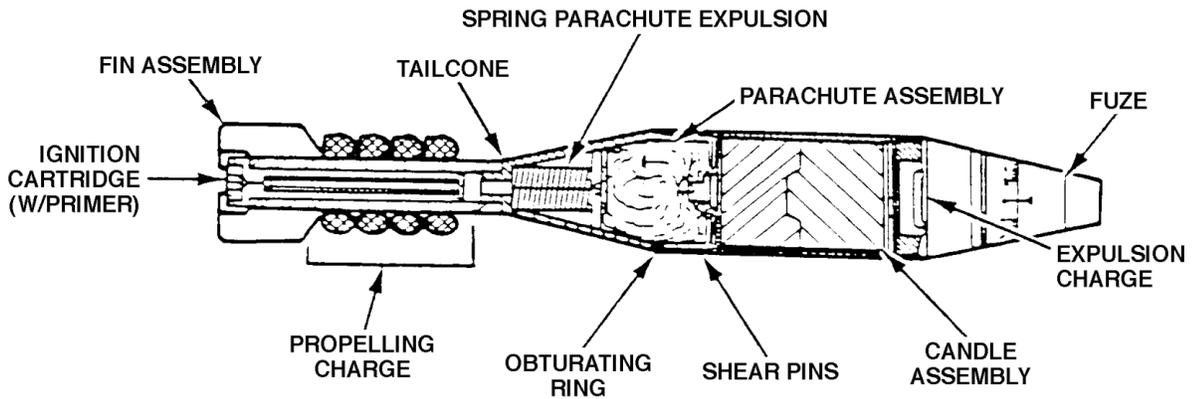


Figure 6-8 Illuminating 60mm Cartridge, M721

6-2.10 Cartridge, 60 Millimeter, Smoke, White Phosphorous, M722 (B646).

6-2.10.1 Intended Use. This cartridge, Figure 6-9 is procured to be used with the M224 mortar and is used for spotting purposes.

WARNING

THE M722 CARTRIDGE CANNOT BE FIRED ABOVE CHARGE TWO (2) IN THE M19 MORTAR.

MAXIMUM ALLOWABLE RATE OF FIRE IS 30 ROUNDS PER MINUTE FOR FOUR MINUTES, THEN 20 ROUNDS PER MINUTE INDEFINITELY.

CAUTION

TRANSPORT AND STORE WP ROUNDS AT TEMPERATURES BELOW 111.4°F (44.1°C), THE MELTING POINT OF WP. WHEN PRACTICAL STORE ROUNDS ON THEIR BASES SO IF THE WP MELTS, IT WILL RESOLIDIFY WITH THE NORMAL VOID SPACE LEFT IN THE PROJECTILE NOSE. IF VOIDS

(BUBBLES) EXIST IN THE WP FILLER, ERRATIC PERFORMANCE MAY OCCUR WHEN FIRED.

CAUTION

REFER TO THE WP, M722 FIRING TABLE, (TABLE 6-10), BEFORE FIRING THIS CARTRIDGE.

6-2.10.2 Description. The complete cartridge consists of a thin walled steel body, a M745 point detonating fuze, a burster charge, white phosphorus (WP) filler, M27 fin assembly, four (4) M204 propelling charge increments, and a M702 ignition cartridge.

6-2.10.3 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 ignites the burster charge. The burster charge ruptures the shell and disperses the WP filler. The WP produces smoke upon exposure to the air. See Table 6-10 for ballistic data.

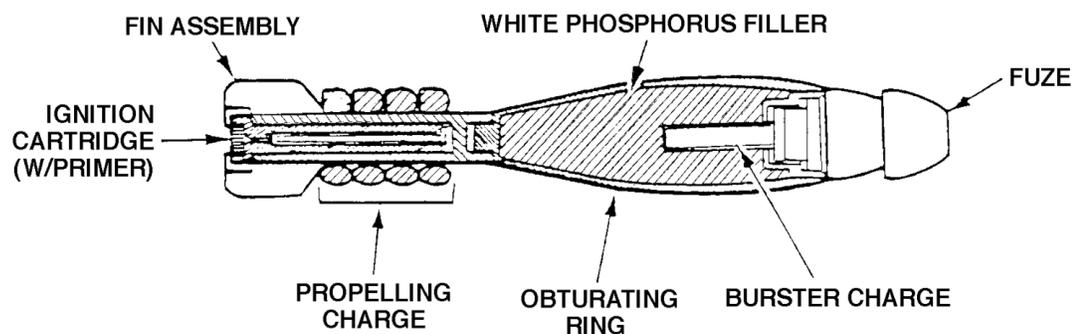


Figure 6-9 Smoke, White Phosphorous, 60mm, M722

Table 6-10 M722 WP Ballistics

Propellant Charge, M204	Muzzle Velocity (fps)	MAXIMUM RANGE		MINIMUM RANGE	
		Yards	Meters	Yards	Meters
0 (Ignition cartridge only)	213	445	407	77	70
1 (Ignition cartridge and 1 increment charge)	413	1,468	1,342	242	221
2 (Ignition cartridge and 2 increment charges)	558	2,355	2,153	398	364
3 (Ignition cartridge and 3 increment charges)	682	3,161	2,890	525	480
4 (Ignition cartridge and 4 increment charges)	790	3,816	3,489	687	628

Table 6-11 60 Millimeter Mortar Ammunition

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 60 Millimeter, Illuminating, M83A3/M83A2/M83A1	B627	6-2.2	1310-00-782-5518	9207516	1 per metal container, M265, 9 containers per wooden box
			1310-00-143-7056	9207516	1 per fiberboard container, PA44, 9 containers per wooden box
Cartridge, 60 Millimeter, Smoke, WP, M302A1/M302E1/M302A2	B630	6-2.3	1310-00-926-3951	9215575/ 8796473	1 per fiberboard container, 9 containers per wire crate
			1310-00-926-3976	9215575	1 per fiberboard container, 12 containers per wooden box
			1310-00-935-9129	9215575	1 per fiberboard container, 9 containers per wooden box
			1310-01-240-9253	12903088	1 per PA63 fiberboard container, 8 containers per PA62 metal box, 2 boxes (16 rounds) per wirebound box
			1310-01-240-9252	9215577	1 per M567 fiberboard container, wax dipped, 9 containers per wooden box
Cartridge, 60 Millimeter, HE, M49A4/M49A2E2	B632	6-2.4	1310-00-935-9130	9220179	1 per fiberboard container, 12 containers per wooden box
			1310-01-240-9254	9297859	1 per M567 fiberboard container, wax dipped, 12 rounds per wooden box
			1310-00-926-9308	9220179/ 76-1-753	1 per fiberboard container, 10 containers per wooden box
Cartridge, 60 Millimeter, HE, M49A2	B632	6-2.5	1310-00-926-3919	75-1-82	1 per fiberboard container M50A3, 11 containers per wooden box

Table 6-11 60 Millimeter Mortar Ammunition (Continued)

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 60 Millimeter, TP, M50A2E1/M50A3	B634	6-2.6	1310-00-935-1995 1310-01-276-4075	9220383/ 76-1-753 12630673	1 per fiberboard container, 10 containers per wooden box 1 per fiberboard container, without barrier bag, 12 containers per wooden box
Cartridge, 60 Millimeter, HE, M720 With Fuze Multi-Option M734	B642	6-2.7	1310-01-022-7680	9275526/ 65602-00204- 042	1 per fiberboard container, 8 containers per metal box, metal boxes (16 rounds) per wirebound box
Cartridge, 60 Millimeter, HE, M888 With PD Fuze M935	B643	6-2.8	1310-01-149-3185	9354430/ 9354440	1 per fiberboard container, 8 containers per metal box, 2 boxes (16 rounds) per wirebound box
Cartridge, 60 Millimeter, Illumination, M721 With MTSQ Fuze M776	B647	6-2.9	1310-01-258-8689	9390712	1 per fiberboard container, 8 containers per metal box, 2 boxes per wirebound wooden box
Cartridge, 60 Millimeter, Smoke, White Phosphorous, M722	B646	6-2.10	1310-01-236-1354	15-12-345	1 per fiberboard container PA78, 8 containers per PA 70 metal box, 2 boxes per wirebound wooden box

6-3 81 MILLIMETER CARTRIDGES

CAUTION

60MM AND 81MM MORTARS ASSEMBLED WITH THE RIGID HORSESHOE SHAPED PROPELLANT INCREMENTS HAVE BEEN FOUND WITH PUNCTURES, DISCOLORATION AND/OR PLASTIC FOAM STUCK TO THE EXTERIOR OF THE PROPELLANT INCREMENTS.

WARNING

UPON REMOVAL FROM PACKAGING, AND PRIOR TO FIRING, ALL HORSESHOE SHAPED PROPELLANT CHARGES SHALL BE INSPECTED FOR DAMAGE, DISCOLORATION AND/OR PRESENCE OF FOAM.

WARNING

CARTRIDGES FOUND WITH PUNCTURED PROPELLANT INCREMENTS MAY LEAK PROPELLANT RESULTING IN CRITICALLY SHORT ROUNDS AND SHOULD NOT BE FIRED. LEAKING PROPELLANT CHARGES SHALL BE REMOVED AND DISPOSED OF IN ACCORDANCE WITH LOCAL PROCEDURES. DURING TRAINING, IF MISSION ALLOWS, CARTRIDGES MAY BE FIRED AT A LOWER CHARGE.

WARNING

DISCOLORED INCREMENTS ARE CONSIDERED SERVICEABLE UNLESS OTHER VISUAL CONDITIONS SUCH AS FIN CORROSION PROVIDE INDICATIONS

THAT DETERIORATION RESULTED FROM EXPOSURE. MAJOR CORROSION ON FUZE OR FIN IS A RESULT OF MOISTURE CONTAMINATION WITHIN SENSITIVE COMPONENTS WHICH COULD RESULT IN MALFUNCTIONS SUCH AS DUDS AND MISFIRES.

WARNING

PLASTIC FOAM MATERIAL CAUSES BUILD-UP OR RESIDUE IN WEAPON, WHICH COULD RESULT IN HANG FIRES OR MISFIRES. ALL PLASTIC FOAM RESIDUE SHALL BE BRUSHED AWAY FROM PROPELLANT INCREMENTS BY HAND.

6-3.1 General. This cartridge is considered semi-fixed ammunition because propelling charges are adjustable. The propelling charges are small bags (increments) of granular propellant attached to the fins or boom. Table 6-12 lists the 81mm components. See Table 6-26 for packaging and identification data.

6-3.1.1 Weapons. The 81mm cartridge is for firing from the MK 2 MOD 0 Shipboard Mortar and the 81mm, M1 and M29 and the M252 Field Mortars. These mortars are air-cooled, smooth-bore, muzzle-loading high-angle-fire weapons. The MK 2 mortar has direct fire capabilities when in the trigger fire mode.

6-3.1.2 Identification. The unique use of the fin and tail boom assembly, to hold the propelling charge and provide stability in flight, and the characteristic shape and size are identifying features of 81mm ammunition.

6-3.1.3 Projectile. Depending on the type of projectile filler, the 81mm ammunition is classified as HE, ILLUM, WP, TP, training, leaflet, chaff, or APERS.

Table 6-12 81mm Cartridge Components

	Fin Assy	Propelling Charge	Primer	Ignition Cartridge
M43A1A, (HE)	M3	M1A1	M34	M6/M8
M362/M362A1, (HE)	M141	M5	M71/M71E1	M66
M374, (HE) and M374A2	M149/M170	M90/M90A1	M71A2	M66A1/M286
M374A3 (HE)	M24	M205	M35	M299
M57	M4	M2A1	M34	M6
M57A1	M4A1	M2A1	M34	M6
M375	M149	M90	M71 Series	M66
M375A1/M375A2	M149/M170	M90A1	M71A1/M71A2	M66A1/M285
M301	M4A1/M158	M2A1/M185	M34/M71A2	M6/M66E1
M43A1, (TP)	M3	M1A1	M34	M8
MK 120 (AP)	M4A1	M2A1	M34	M6
MK 112 (Leaflet)	M4A1	M2A1	M34	M6
MK 115, 133, 134, and 135 MOD 0 (Chaff)	M4A1	M2A1	M34	M6

6-3.1.4 Fuze. Three types of fuzes, Table 6-13, are used with 81mm mortar ammunition: impact, time, and proximity. Arming the impact fuze is facilitated by the combination of setback and centrifugal forces when the projectile is fired. The time fuze is preset in increments of seconds or parts of a second to determine the burning speed of the variable time powder train. The setback force in firing the projectile initiates the ignition of the primer to start the burning of the fuze train. Setback of a prescribed minimum force and duration initiates the proximity fuze. The setback force activates a reserve battery and releases the arming delay clock. As the projectile fuze approaches the target (or ground), a reflected wave interacts with a transmitted signal to cause a triggering circuit to initiate the detonator.

6-3.1.5 Propelling Charge.

a. The full propelling charge. The 81mm cartridges, except for training cartridges, consists of an ignition cartridge and the propelling charge (increments of propellant). It is permissible to

remove any or all of the propellants for adjustment of fire per the appropriate firing tables. The propelling charge for training cartridges consists of either ignition cartridge M3 or ignition cartridge M6 with percussion primer M34.

CAUTION

ONLY FIRE M90 AND M90A1 PROPELLING CHARGES WITH SPECIFIC CHARGES AS THEY ARE NOT INTER-CHANGEABLE.

b. Charge Firing. Applicable 81mm cartridges with fin assemblies use Propelling charge M1A1, M2A1, M5, M90 series, M205, or M185. The cartridges come with six M1A1 charges, four M2A1 charges, eight M5 or M185 charges, or nine M90 charges for adjustment of fire (charge firing). To adjust for charge firing, remove the propelling charge increments not required to attain the respective range.

Table 6-13 81mm Mortar Cartridge-Fuze Combinations

81mm Cartridges	FUZES								
	Point Detonating						Proximity		Time
	M524E6 Navy MOD 0*	M524A1 M524A2 M524A3 M524A4	M524A5	M525 Series**	M526 Series**	MK 363 MOD 0	M517	M532	M84 Series
HE or TP M43 Series				E					
HE or TP M362 Series	X	N	X		E	X	N	X	
HE M374 Series		N	X		E	X		X	
ILLUM M301 Series**									X
Smoke FS or WP M57 Series				E					
Smoke WP M375		N	X		E		X		
MK 112 MOD 0 Leaflet									X
MK 115 MOD 0 Chaff									X
MK 133 MOD 0 Chaff									X
MK 134 MOD 0 Chaff									X
MK 135 MOD 0 Chaff									X
APERS MK 120 MOD 0***									

Legend:

- X-Authorized for Navy Use.
- N-For Navy use only if authorized fuzes are not available
- E-Emergency combat use only.

Notes:

- * Fuze, PD, 524E6 Navy MOD 0 has a short arming time for Coast Guard use. Use only with Charge 8.
- ** Do not fire in trigger fire mode.
- *** Antipersonnel Cartridge MK 120 MOD 0 is a fuzeless cartridge consisting of a body which contains a payload of flechettes assembled to an M4A1 fin assembly. This cartridge is for use in the 81mm Mortar MK 2 MOD 0 only.

6-3.1.6 Ignition Cartridge. Applicable 81mm cartridges use ignition cartridge M3, M6, M8, M66 series, M2909, or M285 as Charge 0. The ignition cartridge also serves to ignite the propelling increments when firing with more than Charge 0.

6-3.1.7 Primer. M6 and M8 ignition cartridges use the M34 percussion primer, a threaded screw-in type for ignition. M66 series and M285 ignition

cartridges use the M71 series percussion primer, a threaded screw-in type for ignition. Firing the M68 training cartridge with the M3 ignition cartridge requires no separate primer.

6-3.1.8 Fin Assembly. The fin assemblies used with 81mm cartridges are the: M3, M4 series, M6, M141, M149, M158, and M170.

CAUTION

SOME M362 CARTRIDGES OF EARLIER MANUFACTURE CONTAIN AN ERRONEOUS LABEL STARTING NOT MORE THAN SIX INCREMENTS. DISREGARD THAT LABEL AND STRICTLY ADHERE TO THE FIVE-INCREMENT RESTRICTION WHEN FIRING THE M1 MORTAR.

6-3.1.9 Special Safety Precautions. The following special safety precautions must be observed:

- a. Do not fire rounds that are obviously wet.
- b. Protect the propelling charges from weather.
- c. Prevent water accumulation in the mortar tube.
- d. Prior to firing, check to ensure that there is no oil or water in the mortar tube.
- e. Prior to firing, check for proper number of propelling charge increments.
- f. Prior to firing, check for loose fins.
- g. When extracting the cartridge from the fiber container, do not grasp the cartridge around the propelling charge. Grasp the cartridge by the fin and the free-fold of the plastic bag.
- h. Prior to chambering the round, ensure that all packing materials, protective covering, plastic bags, and packing supports are removed from the round.
- i. When firing with M1 mortar, do not fire the following rounds with more than 5 increments: HE Cartridge M374 series and M362 series; Smoke Cartridge M370 and M375 series; and ILLUM Cartridge M301A3. These rounds are authorized for full charge firing in the M29 mortar only.

6-3.1.10 Function. All 81mm mortar ammunition functions up to the point of impact (or fuze function) as follows. The cartridge is dropped into the muzzle end of the mortar, fin end first. The primer in the hub of the fin assembly functions when struck by the firing pin in the base cap of the

mortar. The burning primer flashes through the central flash hole in the ignition cartridge housing, igniting the ignition cartridge. The ignition cartridge flashes through the flash holes in the wall of the housing to ignite the propelling charge. The pressure, created by the ignition cartridge and propelling charge deflagration, forces the cartridge out of the mortar tube. The projectile is fin stabilized in flight.

6-3.2 Cartridge, 81 Millimeter, HE, M362 and M362A1 (C222).

6-3.2.1 Intended Use. This cartridge, Figure 6-10, is designed and procured as a high-explosive round against light material and personnel. Upon functioning, it produces blast and fragmentation effects. It is fired from the M1, M29, or M29A1 mortar.

WARNING

IF YOU HEAR A BUZZING SOUND AFTER REMOVING THE PULL WIRE AND SAFETY WIRE FROM THE FUZE, DO NOT FIRE THE CARTRIDGE. THE ROUND IS SAFE TO HANDLE AND TRANSPORT AFTER REINSERTING THE SAFETY WIRE IF THE BORE-RIDING PIN IS IN POSITION.

CARTRIDGES OF EARLIER MANUFACTURE MAY BEAR WARNING LABELS INDICATING THE USE OF NOT MORE THAN SIX INCREMENTS WHEN FIRING IN M1 MORTAR. DISREGARD THE LIMITATION OF SIX INCREMENTS. DO NOT USE MORE THAN FIVE INCREMENTS WHEN USING M1 MORTAR.

6-3.2.2 Description. The M362 and M362A1 cartridges are the same except the projectile body in the M362 is a steel forging and in the M362A1 is a PMI casting. The cartridge consists of a Comp B bursting charge and a PD or proximity fuze. It has a fin assembly, M141 with propelling charge made

up of 8 increments, primer, and ignition cartridge. The projectile contains a bursting charge of 2.10 pounds (0.95 kilogram) pounds of Comp B. Fin assembly M141 consists of the cartridge housing, fin, and increment holders. The steel wire increment holders have kidney-shaped projections for holding the propellant increments. One increment holder fits between the cartridge housing and the projectile, and the other holder fits between the cartridge housing and the fin. Ignition cartridge M66 used with this cartridge consists of approximately 115 grains (7.45 grams) of ignition powder M9. The ignition cartridge goes in the cartridge housing with the red end toward the primer. Propelling charge M5 consists of 8 increments, each containing approximately 160 grains (10.37 grams) of M9 propellant. The increments are contained in cotton cloth bags with a buttonhole on each end. The bags are attached to the projectile by engaging the buttonholes over the kidney-shaped projections of the increment holders. The complete round with fuze and Comp B filler weighs 9.42 pounds (4.27 kilograms), is 20.80 inches (52.83 centimeters) long, and is olive drab with yellow markings.

6-3.2.3 Function. Compatible fuzes for use with the M362 or M362A1, HE cartridge, are the PD M524 series, M526 series, M716, or Proximity (PROX) M532. Depending on the type of fuze used (PD or PROX), the projectile bursts either over or on the target, producing a blast and fragmentation effect. The PD M716 is a super-quick, delay arming impact fuze armed by a combination of setback force, ejection of the bore-riding pin and the metered relief of vacuum pressure when fired. It detonates on impact. The PD M524 is a dual-purpose fuze designed to function on impact or graze with a preselected super-quick action or with a 0.05 second delay. The PD 526 is a super-quick, delayed arming impact type of fuze. The PROX M517 fuze contains a radio transmitter and receiver in the plastic head, and a power source in the steel body. Setback firing source initiates both the electrical and mechanical arming. HE Cartridge M362 is used for surface targets. If the proximity mode does not function, the PD mode

detonates the projectile on impact. The PROX M532 is a dual-purpose-type fuze. Setback of a prescribed force and duration activates a battery and releases the arming delay clock. Initiation occurs between 3 to 30 feet (0.9 to 9.1 meters) above the ground (target), depending on the angle of fall, nature of terrain, and approach velocity. Using the fuze nose and an attached ring changes the mode of operation from PROX to PD when desirable.

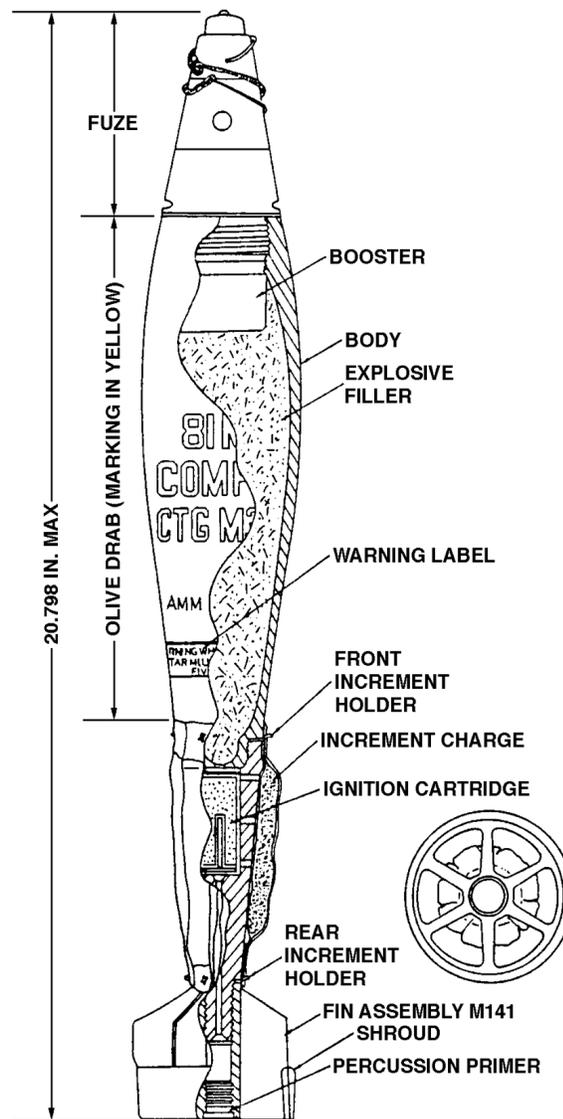


Figure 6-10 Cartridge, 81mm, HE M362/M362A1

Table 6-14 Cartridge, 81mm, M362 and M362A1 Firing Adjustment Ballistics

Charge	Muzzle Velocity (fps)	RANGE	
		Meters	Yards
0 (Ignition cartridge only)	181	297	324
1 (Ignition cartridge and 1 increment)	298	777	849
2 (Ignition cartridge and 2 increments)	397	1,301	1,430
3 (Ignition cartridge and 3 increments)	780	1,791	1,951
4 (Ignition cartridge and 4 increments)	554	2,246	2,450
*5 (Ignition cartridge and 5 increments)	620	2,657	2,910

Note: * Maximum increment charges authorized for use when firing in the M1 mortar.

WARNING

CARTRIDGES OF EARLIER MANUFACTURE MAY BEAR WARNING LABELS INDICATING THE USE OF NOT MORE THAN SIX INCREMENTS WHEN FIRING IN THE M1 MORTAR. DISREGARD THE LIMITATION OF SIX INCREMENTS. DO NOT USE MORE THAN FIVE INCREMENTS WHEN USING THE M1 MORTAR.

6-3.2.4 Ballistics. The firing adjustment ballistics are listed in Table 6-14.

6-3.3 Cartridge, 81 Millimeter, HE, M362/T28, Without Fuze (C223).

6-3.3.1 Intended Use. This cartridge, Figure 6-11, is procured with a plastic plug in place of a fuze for delivery to respective organizational arsenals/depots. Prior to shipboard delivery, depot personnel remove the plastic plug and attach the required fuze.

6-3.3.2 Description. This cartridge is similar in appearance and assembly to the M362 tactical round, Figure 6-10, except for length, weight, and fuze. It may be fired in M1 or M29 mortar. The compatible fuzes that may be affixed at arsenals/depots are PD M524 series, M526 series, M716, or PROX M532. The forged steel projectile body is

internally threaded at the nose to accept the nose plug or a fuze, depending on the tactical requirements. It is externally threaded at the base to accept the fin assembly. The body is green with yellow markings and contains a warning label that reads: Firing: When firing in 81mm Mortar M1, use not more than five increments.

6-3.3.3 Characteristics. The specifics of the components assembled with the forged steel projectile body without a fuze are as follows:

- a. Length, 18.29 inches (46.45 centimeters)
- b. Weight, 8.62 pounds (3.91 kilograms)
- c. Filler, 2.10 pounds (0.95 kilogram) of Comp B
- d. Ignition cartridge M66
- e. Propellant charge (8) M5
- f. Percussion primer M71
- g. Fin assembly M141
- h. Nose plug Drawing No. 7549009

6-3.4 Cartridge, 81 Millimeter, HE, M43A1 (C225).

6-3.4.1 Intended Use. This cartridge, Figure 6-12, is designed and procured as an HE light-weight round for use against light material and personnel. It functions to produce blast and fragmentation effects. It is fired from M1, M29, or M29A1 mortars.

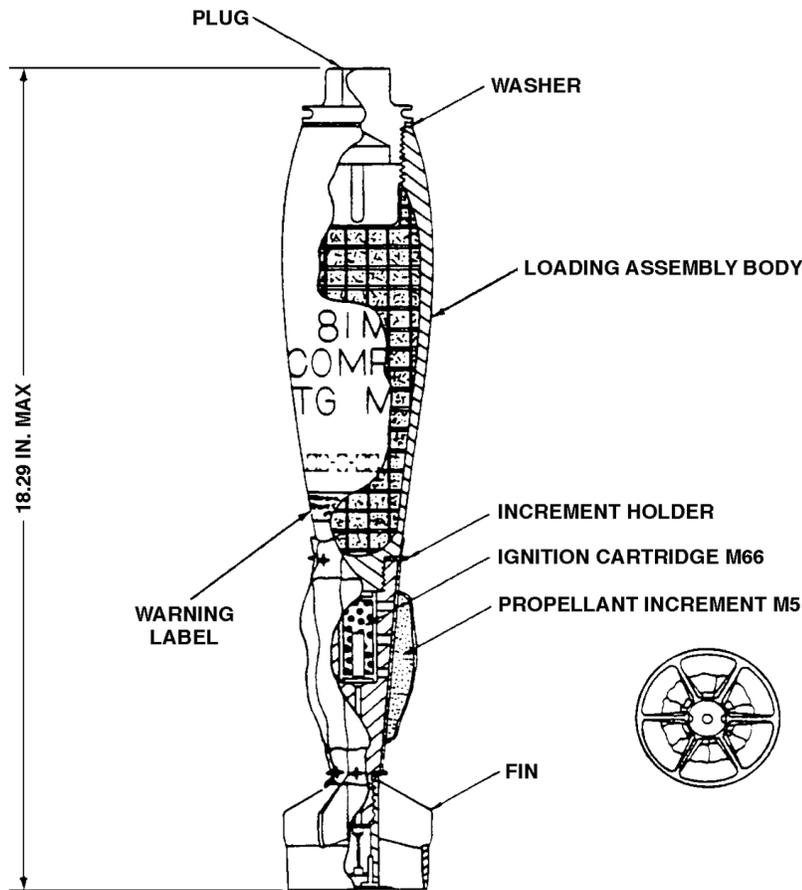


Figure 6-11 Cartridge, 81mm, HE, M362/T28, Without Fuze

WARNING

IF YOU HEAR A BUZZING SOUND AFTER REMOVING THE PULL WIRE AND SAFETY WIRE FROM THE FUZE, DO NOT FIRE THE CARTRIDGE. THE ROUND IS SAFE TO HANDLE AND TRANSPORT AFTER REINSERTING THE SAFETY WIRE IF THE BORE RIDING PIN IS IN POSITION.

6-3.4.2 Description. The complete cartridge consists of a steel projectile with a TNT bursting charge. It has an M525 PD fuze and a M3 fin assembly with propelling charge M1A1. There is also an ignition cartridge M6 or M8, and percussion primer M34. Inserted between the blade of each fin is a cellophane-wrapped propellant increment charge, held in position by a spring-clip increment holder. Any or all of the propellant increment charges may be removed for fire adjustment (charge firing) by pulling them from under the increment holder clips. The complete round with fuze and Comp B or TNT filler weighs 7.15 pounds (3.24 kilograms), is 13.32 inches (33.83 centimeters) long, and is olive drab with yellow markings.

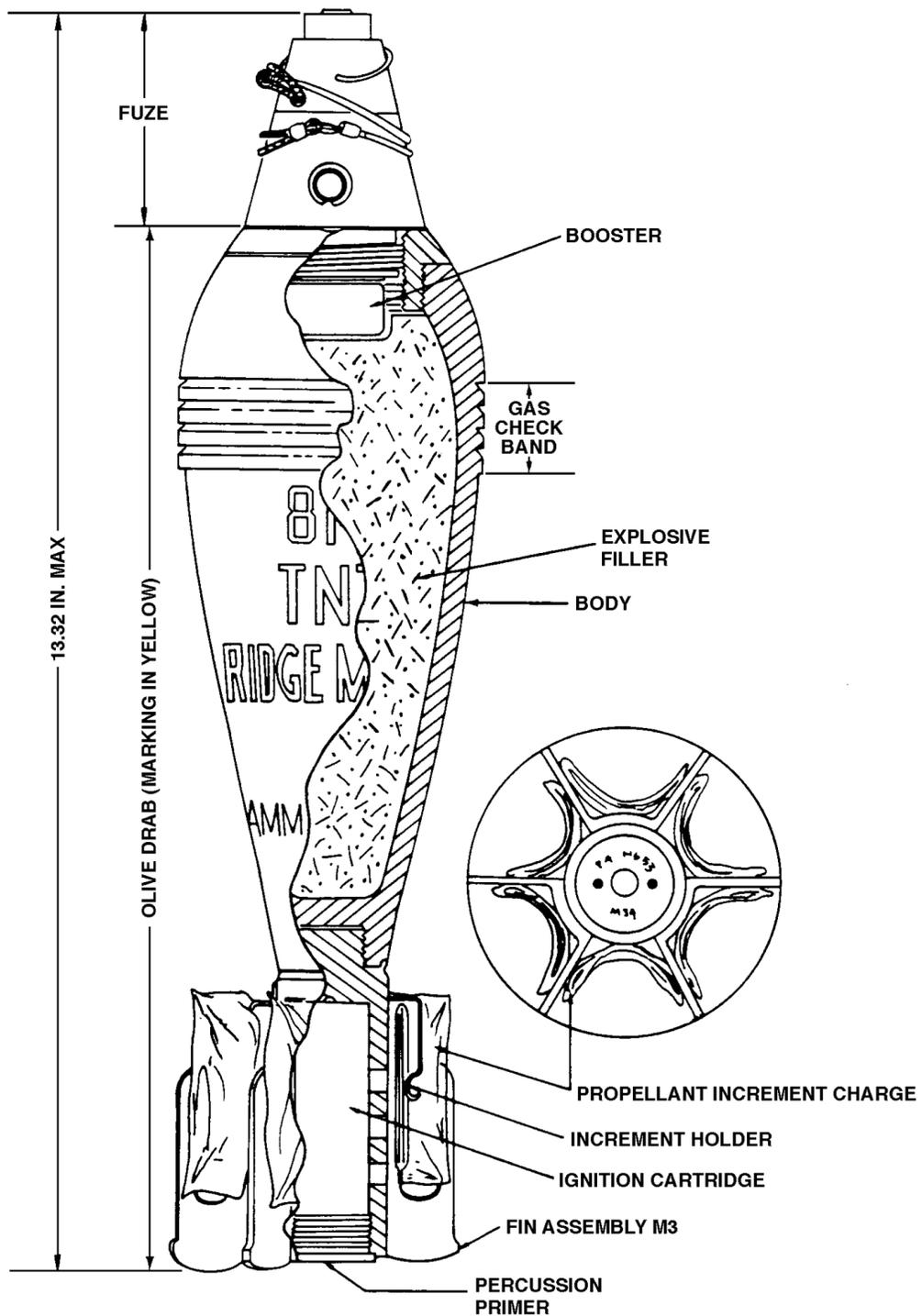


Figure 6-12 Cartridge, 81mm, HE, M43A1

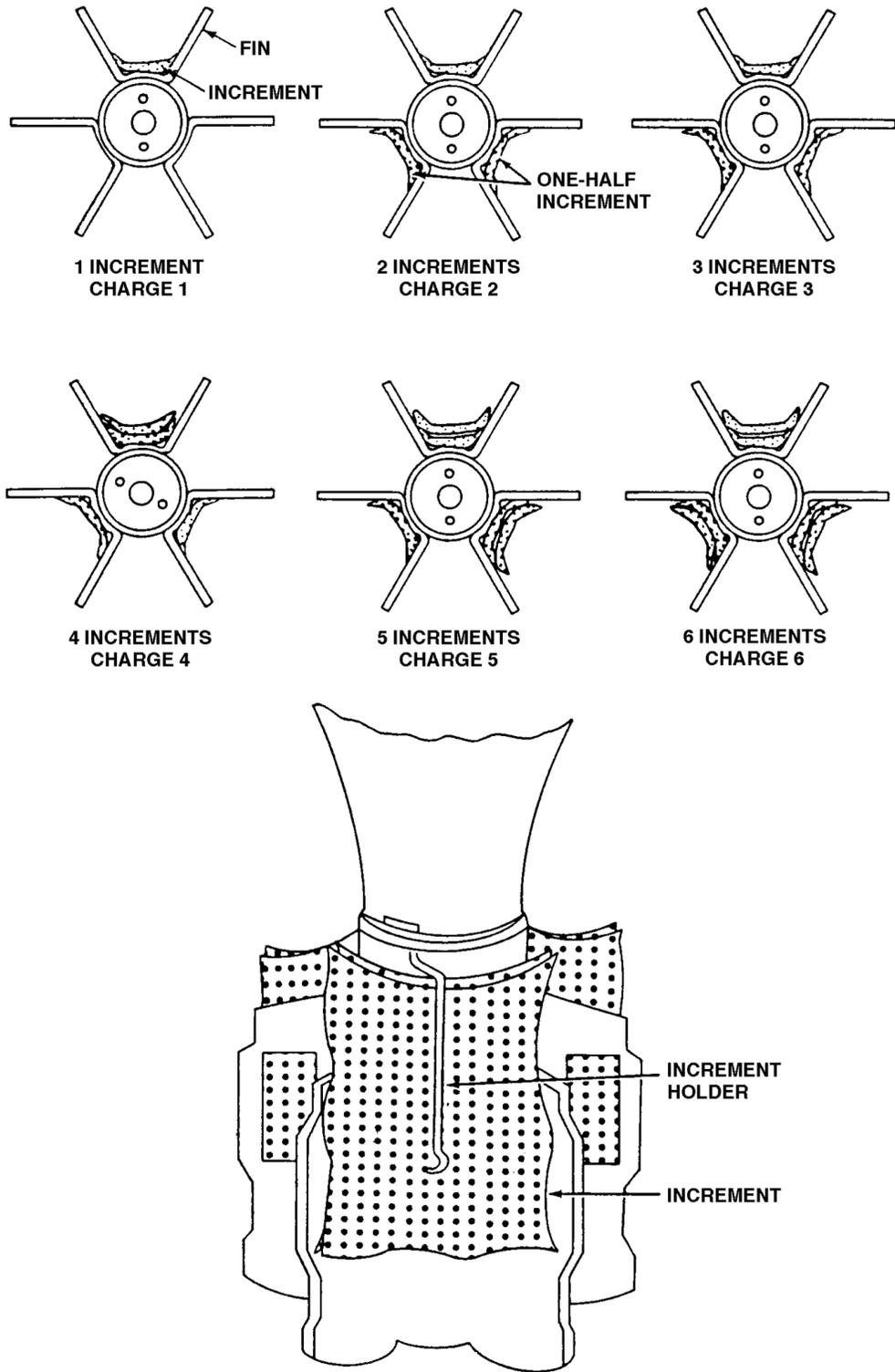


Figure 6-13 Placement of Propellant Increment Charges

Table 6-15 Cartridge, 81mm, HE, M43A1 Firing Adjustment Ballistics

Charge	Muzzle Velocity (fps)	RANGE	
		Meters	Yards
0 (Ignition cartridge only)	238	517	565
1 (Ignition cartridge and 1 increment)	351	1,029	1,111
2 (Ignition cartridge and 2 increments)	443	1,511	1,649
3 (Ignition cartridge and 3 increments)	519	1,947	2,120
4 (Ignition cartridge and 4 increments)	590	2,349	2,560
5 (Ignition cartridge and 5 increments)	656	2,700	2,950
6 (Ignition cartridge and 6 increments)	719	3,016	3,290

6-3.4.3 Fire Adjust Procedure. When adjusting the propelling charge on HE cartridge M43 series, Figure 6-13, use following procedure to prevent loss of fins and resulting short rounds:

NOTE

Place the increments well within a fin blade.

- a. Charge 1. Remove five increments. Leave one within a fin blade.
- b. Charge 2. Proceed as in Charge 1, leaving one increment within a fin blade. Tear one increment in half and add in half an increment in each of the remaining fin blades.
- c. Charge 3. Remove three increments. Leave a single increment in each of the fin blades.
- d. Charge 4. Proceed as in Charge 3. Add one increment, piggyback fashion, in one fin blade.
- e. Charge 5. Proceed as in Charge 3. Add one increment, piggyback fashion, in two fin blades.
- f. Charge 6. Proceed as in Charge 3. Add one increment, piggyback fashion, in each of the fin blades.

6-3.4.4 Function. The PD fuze functions on impact, detonating the TNT bursting charge that shatters the projectile body and results in both blast and fragmentation on the target.

6-3.4.5 Ballistics. The firing adjustment ballistics are listed in Table 6-15.

6-3.5 Cartridge, 81 Millimeter, Illuminating, M301A1/M301A2 and M301A3 (C226).

6-3.5.1 Intended Use. This cartridge, Figure 6-14, is designed and procured as an illumination round. It is intended to be used for illuminating a desired point or area.

WARNING

WHEN PREPARING THE CARTRIDGE M301 SERIES FOR FIRING, IF A METAL CONTAINER IS USED TO PROTECT THE PROPELLANT, DO NOT ALLOW THE CARTRIDGE BASE TO STRIKE THE BOTTOM OF THE CONTAINER. WHEN REPACKING UNFIRED AMMUNITION, DO NOT INSERT THE ROUNDS FIN-END-FIRST IN THE CONTAINER.

WARNING

FIRING THE M301A1/M301A2 CARTRIDGE WITH LESS THAN TWO PROPELLANT CHARGES (CHARGE 2) IS NOT AUTHORIZED.

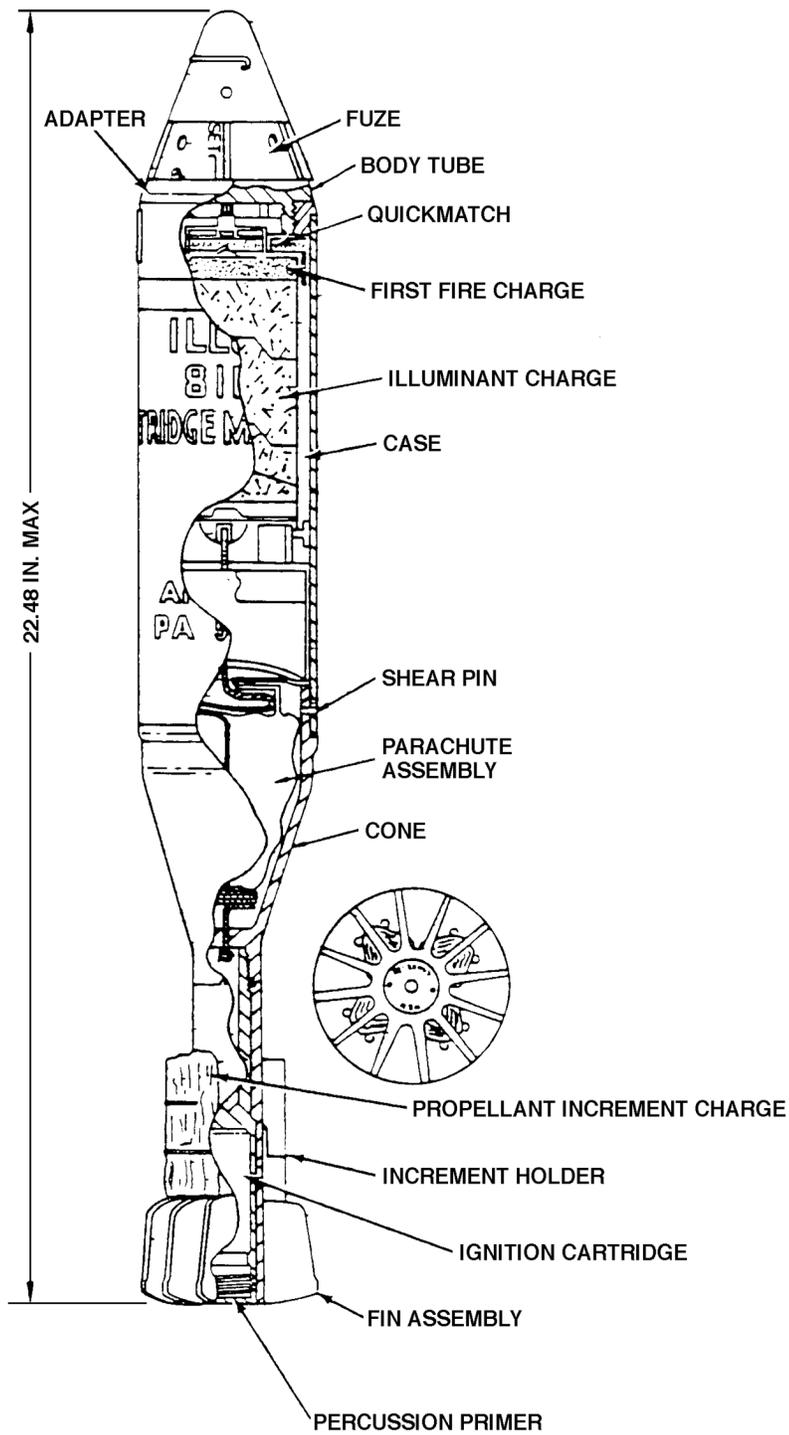


Figure 6-14 Cartridge, 81mm, Illuminating, M301 Series

WARNING

FIRING THE M301A3 CARTRIDGE WITH LESS THAN THREE PROPELLANT CHARGES (CHARGE 3) IS NOT AUTHORIZED. EXPOSING PROPELLING CHARGES TO MOISTURE CAN PRODUCE SHORT ROUNDS.

6-3.5.2 Description. The M301A1/M301A2 and M301A3 cartridges are similar, except the M301A1 has gas check bourrelet grooves and some minor dimensional differences in metal parts, and the M301A3 fin assembly attaches with or without an adapter, depending on the tail cone design. The complete round consists of a body tube and tail cone assembly. It contains an illuminant candle and parachute assembly and a time fuze with a built-in expelling charge. There is a fin assembly with a cartridge housing and propellant charges. Lastly, there is an ignition cartridge with a percussion primer. Fitted to the internally-threaded nose of the thin-walled steel tube body is a steel adapter for accepting the fuze. The tail cone may be internally or externally threaded depending on the model. Models that are internally threaded require an adapter for attaching the fin assembly. The tail cone attaches to the body with four equally spaced shear pins. The illuminant assembly, consisting of a first-fire charge, is in a boxboard case and attached to the parachute with a 30-inch (76.2 centimeters) suspension line. The older M301A1/M301A2 cartridge is gray with a white band and white markings. The new M301A3 cartridge is white with black markings. Additional component data differences are as follows:

- a. M301A1/M301 A2 complete round:
 - (1) Weight– 10.7 pounds (4.85 kilograms)
 - (2) Length– 22.48 inches (57.09 centimeters)
 - (3) Ignition cartridge M6
 - (4) Propellant charge M2A1
 - (5) Percussion primer M34
 - (6) Fin assembly M4A1
 - (7) Fuze, time M84 or M84A1
- b. M301A3 complete round:
 - (1) Weight– 10.1 pounds (4.58 kilograms)

- (2) Length– 24.735 inches (62.83 centimeters)
- (3) Ignition cartridge M66E1
- (4) Propellant charge M185
- (5) Percussion primer M71A2
- (6) Fin assembly M158
- (7) Fuze, time M84A1

6-3.5.3 Function. The function of both types of rounds is similar. 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 55 seconds with a minimum of 500,000 candlepower.

6-3.5.4 Ballistics. The firing adjustment ballistics are listed in Table 6-16.

6-3.6 Cartridge, 81 Millimeter, TP, M43A1 or M43A1B1 (C227).

6-3.6.1 Intended Use. This cartridge, Figure 6-15, is designed and procured as a target practice round intended for use in training. It contains a spotting charge for observation of the fall of the shot.

6-3.6.2 Description. The TP cartridge is similar to the M43A1, HE cartridge, Paragraph 6-3.4, except for the projectile filler. The TP projectile has a load of inert material (plaster of paris and stearic acid) to simulate the weight of an HE projectile. It has a 0.05 pound (0.02 kilogram) black powder pellet for spotting, with either a black powder or a tetryl booster charge. The complete round is 13.32 inches (33.83 centimeters) long and weighs 7.29 pounds (3.30 kilograms). The M43A1 consists of a forged steel projectile body with a PD M52A2 fuze and M3 fin assembly. It has a M1A1 propellant charge with a M8 ignition cartridge and a M34 percussion primer. The M43A1B1 utilizes the same components with the exception of that it has M525 or M717 Series PD Fuze. Internal threads at the nose and base of the projectile body accept the fuze and fin assembly. The old TP cartridge is blue or black with white markings and the new one is blue with white markings.

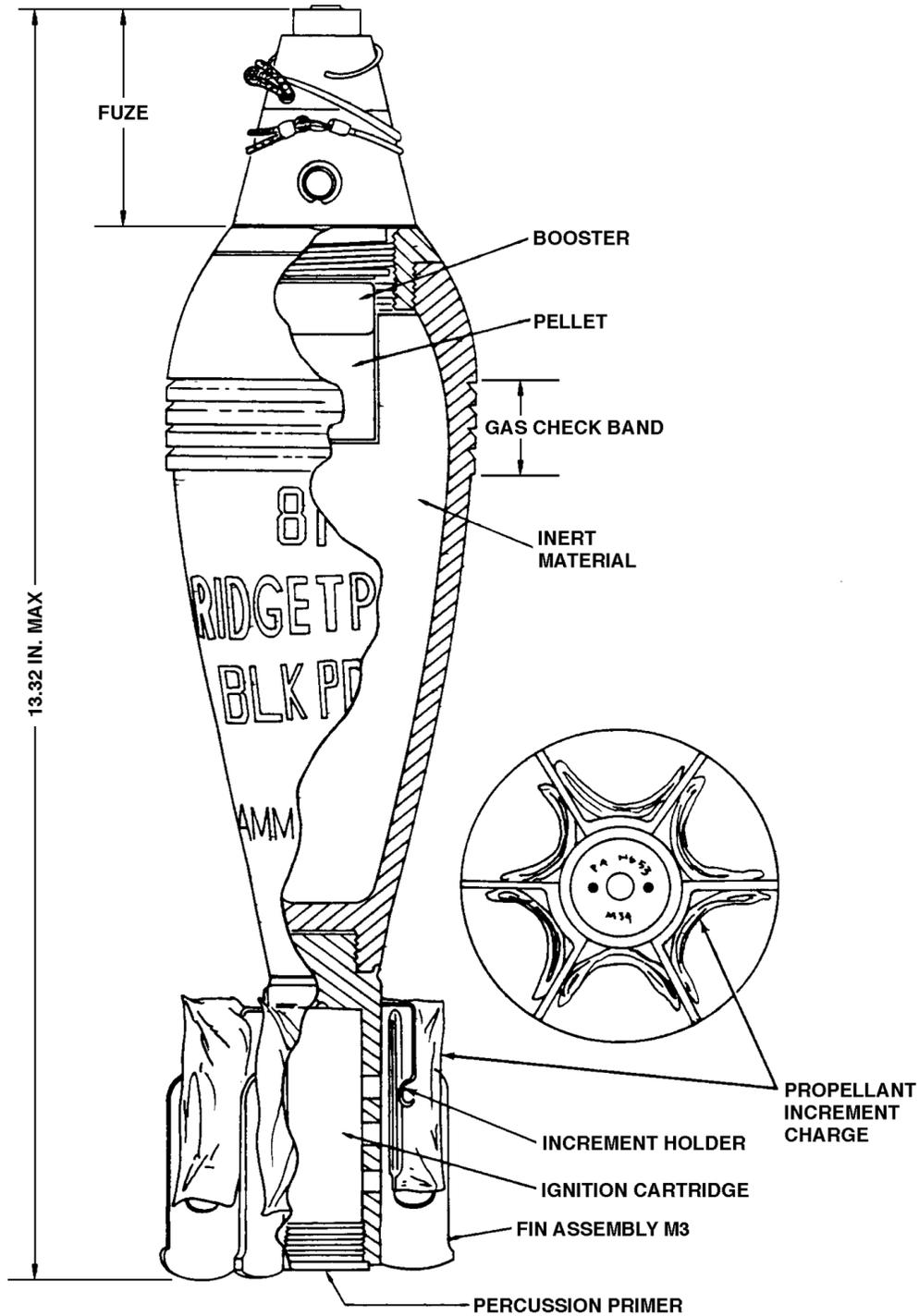


Figure 6-15 Cartridge, 81mm, TP, M43A1 or M43A1B1

**Table 6-16 Cartridge, 81mm, Illuminating, M301A1, M301A2, and M301A3
Firing Adjustment Ballistics**

	Charge	Fuze Setting (Sec)	Horizontal Range (Yd)	Burst Height (Yd)	ELEVATION	
					Deg	Min
M301A1/M301A2 Cartridge	*2 (Ignition cartridge and 2 increments)	4.0	109	491	79	15
	*2 (Ignition cartridge and 2 increments)	5.0	137	586	79	15
	*2 (Ignition cartridge and 2 increments)	16.3	1,104	695	62	30
	3 (Ignition cartridge and 3 increments)	17.8	1,857	741	52	45
	4 (Ignition cartridge and 4 increments)	20.6	2,557	909	51	15
M301A3 Cartridge	*3 (Ignition cartridge and 3 increments)	20.6	275	660	52	11
	**3 (Ignition cartridge and 3 increments)	15.91	1,555	660	36	17
	4 (Ignition cartridge and 4 increments)	19.8	1,705	660	34	55
	5 (Ignition cartridge and 5 increments)	22.1	2,255	660	32	37
	6 (Ignition cartridge and 6 increments)	26.1	2,695	660	33	24
	7 (Ignition cartridge and 7 increments)	27.6	3,245	660	31	12
	8 (Ignition cartridge and 8 increments)	29.8	3,465	660	30	35

Notes: *Firing the M301A1 cartridge with less than two propellant increments (Charge 2) is not authorized.
** Firing the M301A3 cartridge with less than three propellant increments (Charge 3) is not authorized.

Table 6-17 Cartridge, 81mm, TP, M43A1 or M43A1B1 Firing Adjustment Ballistics

Charge	Muzzle Velocity (fps)	RANGE	
		Meters	Yards
0 (Ignition cartridge only)	238	517	565
1 (Ignition cartridge and 1 increment)	351	1,024	1,111
2 (Ignition cartridge and 2 increments)	443	1,511	1,649
3 (Ignition cartridge and 3 increments)	519	1,947	2,120
4 (Ignition cartridge and 4 increments)	590	2,349	2,560
5 (Ignition cartridge and 5 increments)	656	2,700	2,950
6 (Ignition cartridge and 6 increments)	719	3,016	3,290
7 (Ignition cartridge and 7 increments)	779	3,292	3,590

6-3.6.3 Function. On impact, the fuze functions to detonate the fuze booster-charge and spotting charge to provide an observation point for the fall of the shot.

6-3.6.4 Ballistics. The firing adjustment ballistics are listed in Table 6-17.

6-3.7 Cartridge, 81 Millimeter, Training, M68 (C228).

6-3.7.1 Intended Use. This cartridge, Figure 6-16, is procured for training in the loading and firing of the 81mm mortar.

6-3.7.2 Description. The cartridge is assembled of separate components to facilitate the replacement of worn components. The complete round consists of an inert projectile, a fin assembly, and an ignition cartridge. The pear-shaped, cast iron or bronze projectile has no provision for a fuze, and is internally threaded at the base to accept the M6 Fin Assembly. The fin assembly accepts either the M3 Ignition Cartridge or the M6 Ignition Cartridge with the M34 Percussion Primer. The projectile is cast iron that may be painted black or left unpainted, or may have a bronze body. It has an inert filler to match the weight of the standard round. The weight of the assembled round is 10.79 pounds (4.9 kilograms) and it has an assembled length of 11.08 inches (28.14 centimeters).

CAUTION

THIS CARTRIDGE IS INTENDED TO BE FIRED AT CHARGE 0 ONLY.

6-3.7.3 Function. 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 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 in fin stabilized in flight. Since the projectile is inert, there is no detonation upon impact, and the cartridge may be recovered for reuse. The muzzle velocity of the projectile is approximately 175 feet per second (53.34 meters per second) and the maximum range is approximately 285 meters (310 yards).

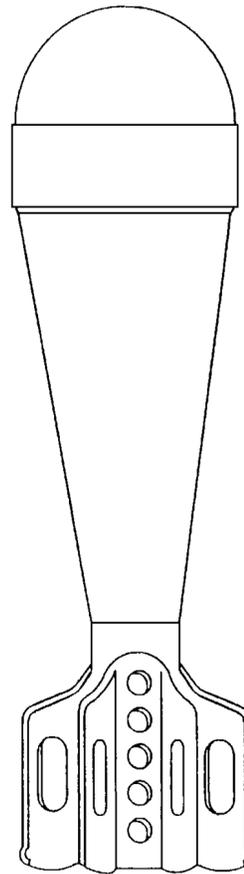


Figure 6-16 Cartridge, 81mm, Training, M68

6-3.8 Cartridge, 81 Millimeter, Smoke, WP, M57A1 (C231).

6-3.8.1 Intended Use. This cartridge, Figure 6-17, is designed and procured for use against material and personnel as an incendiary device and to produce a screening smoke. It is fired from M1, M29, and M29A1 mortars.

WARNING

IF YOU HEAR A BUZZING SOUND AFTER REMOVING THE PULL WIRE AND SAFETY WIRE FROM THE FUZE, DO NOT FIRE THE CARTRIDGE. THE ROUND IS SAFE TO HANDLE AND TRANSPORT AFTER REINSERTING THE SAFETY WIRE IF THE BORE-RIDING PIN IS IN POSITION.

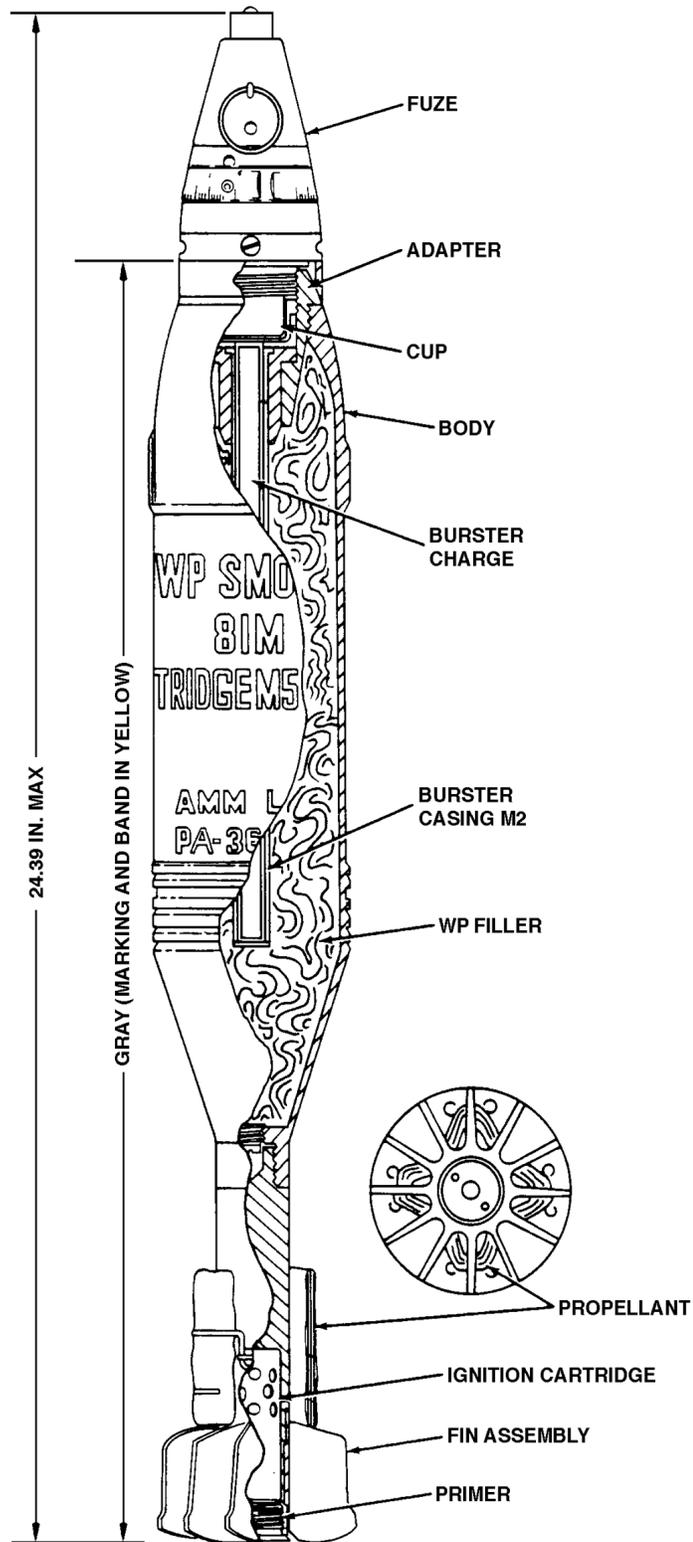


Figure 6-17 Cartridge, 81mm WP, Smoke, M57A1

CAUTION

TRANSPORT AND STORE WP ROUNDS AT TEMPERATURES BELOW 111.4°F (44.1°C), THE MELTING POINT OF WP. WHEN PRACTICAL, STORE ROUNDS ON THEIR BASES SO IF THE WP MELTS, IT WILL RESOLIDIFY WITH THE NORMAL VOID SPACE LEFT IN THE PROJECTILE NOSE. IF VOIDS (BUBBLES) EXIST IN THE WP FILLER, ERRATIC PERFORMANCE MAY OCCUR WHEN FIRED.

6-3.8.2 Description. This cartridge consists of a steel projectile body containing 4.06 pounds (1.84 kilograms) WP filler, TSQ M77 Time Fuze, M4A1 fin assembly, M2A1 propelling charge, M6 ignition cartridge, and M34 percussion primer. The nose of the projectile is provided with a steel adapter that serves as a seal for the chemical filler and a seat for the M1 burster assembly. The burster assembly consists of a burster charge and Burster Casing M2. The burster charge is a thin-walled steel tube filled with 0.63 ounce (17.86 grams) of tetryl. The burster charge is held in the Burster Casing M2 that is press fit into the steel nose adapter of the projectile and extends axially through the chemical filler approximately three-fourths of the length of the projectile cavity. The complete round with fuze and filler weighs 11.38 pounds (5.16 kilograms), is 24.39 inches (61.95 centimeters) long, and is gray with yellow markings.

6-3.8.3 Function. Upon impact and fuze functions, the fuze booster initiates the burster charge. The burster charge ruptures the projectile body and disperses the chemical filler. WP smoke acts spon-

taneously on contact with the air. It ignites, creating a dense white smoke with some incendiary effect.

6-3.8.4 Ballistics. The firing adjustment ballistics are listed in Table 6-18.

6-3.9 Cartridge, 81 Millimeter, Leaflet, MK 112 MOD 0 (C232).

6-3.9.1 Intended Use. This cartridge is designed and procured for use in psychological warfare operations.

WARNING

THE USE OF THE MK 112 MOD 0 LEAFLET CARTRIDGE WITH LESS THAN TWO PROPELLANT INCREMENTS (CHARGE 2) IS NOT AUTHORIZED.

6-3.9.2 Description. The complete cartridge with fuze weighs 10.10 pounds (4.58 kilograms). It is 22.48 inches (57.09 centimeters) long and is similar in appearance to the M301 series illumination cartridge, Figure 6-14. The MK 112 MOD 0 cartridge consists of a thin-walled steel body tube assembly with a M84 time fuze. It has a steel tail cone M4A1 fin assembly with propellant charge M2A1. The ignition cartridge is a M6 with percussion primer M34. The body load consists of paper leaflets containing psychological propaganda. This propaganda literature depends upon the environment in which the round deploys. The projectile body is aluminum colored, has a brown 1/2 inch (1.27 centimeters) band located 1-1/2 inches (3.81 centimeters) below the fuze, and black body markings.

Table 6-18 Cartridge, 81mm, Smoke, WP, M57A1 Firing Adjustment Ballistics

Charge	RANGE	
	Meters	Yards
1 (Ignition cartridge and 1 increment)	630	700
2 (Ignition cartridge and 2 increments)	1,199	1,300
3 (Ignition cartridge and 3 increments)	1,646	1,800
4 (Ignition cartridge and 4 increments)	2,169	2,372

Table 6-19 Cartridge, 81mm, Leaflet, MK 112 MOD 0 Firing Adjustment Ballistics

Charge	Fuze Setting (Sec)	Horizontal Range (Yd)	Burst Height (Yd)	ELEVATION	
				Deg	Min
* 2 (Ignition cartridge and 2 increments)	4.0	109	491	79	15
* 2 (Ignition cartridge and 2 increments)	5.0	137	586	79	15
* 2 (Ignition cartridge and 2 increments)	16.3	1,104	695	62	30
3 (Ignition cartridge and 3 increments)	17.8	1,857	741	52	45
4 (Ignition cartridge and 4 increments)	20.6	2,557	909	51	15

Note: * Firing the MK 112 MOD 0 Leaflet Cartridge with less than two propellant increments (Charge 2) is not authorized.

6-3.9.3 Function. When the time fuze functions, the expelling charge ejects the leaflet load. The rate of descent will vary depending on atmospheric conditions.

6-3.9.4 Ballistics. The firing adjustment ballistics are listed in Table 6-19.

6-3.10 Cartridge, 81 Millimeter, HE, M374, Without Fuze (C236).

6-3.10.1 Intended Use. This cartridge, Figure 6-18, procured with a plastic plug in place of a fuze for delivery to respective organizational arsenals/depots. Prior to shipboard delivery, depot personnel remove the plastic plug and install the required fuze.

6-3.10.2 Description. This cartridge is similar in appearance and assembly to the M374 Tactical Round, Figure 6-19, except for length, weight, and fuze. It is for firing in the M1, M29 or M252 mortar. The compatible fuzes that may be affixed at arsenals/depots are PD M524 series, M526 series, M567, M716, or PROX M532. The projectile body has an internally threaded nose to accept the nose plug or a fuze, depending on the tactical requirements. It is externally threaded at the base to accept the fin assembly. The body is olive drab with yellow markings and contains a warning label that reads: Firing: When firing in 81mm Mortar M1, use not more than five increments.

6-3.10.3 Characteristics. The specifics of the components assembled with a forged steel or PMI projectile body without a fuze are as follows:

- Length, 13.318 inches (33.82 centimeters)
- Weight, 8.54 pounds (3.87 kilograms)
- Filler, 2.10 pounds (0.95 kilogram) of Comp B
- Ignition cartridge M66A1
- Propellant charge A (1) M90
- Propellant charge B (8) M90
- Percussion primer M71A2
- Fin assembly M149
- Nose plug Drawing No. 7549076 or 7549009.

6-3.11 Charge, Propelling, 81 Millimeter, M2A1, (C239).

6-3.11.1 Intended Use. The M2A1 81mm Propellant Increment Charge is intended to be used with M56, M57, or M301 81mm Cartridges. Four propellant increment charges are issued with the 81mm cartridge for adjustment of fire (charge firing).

6-3.11.2 Description. The propellant increment charge consists of 20 sheets of M8 Sheet Propellant contained in 3.12 x 2.25 inch cellophane bag.

6-3.11.3 Function. Any or all four of the propellant increment charges may be removed for fire adjustment (charge firing) by pulling them from under the increment holder clips. The number of propellant increment charges used will increase the muzzle velocity and the range of the 81mm cartridge.

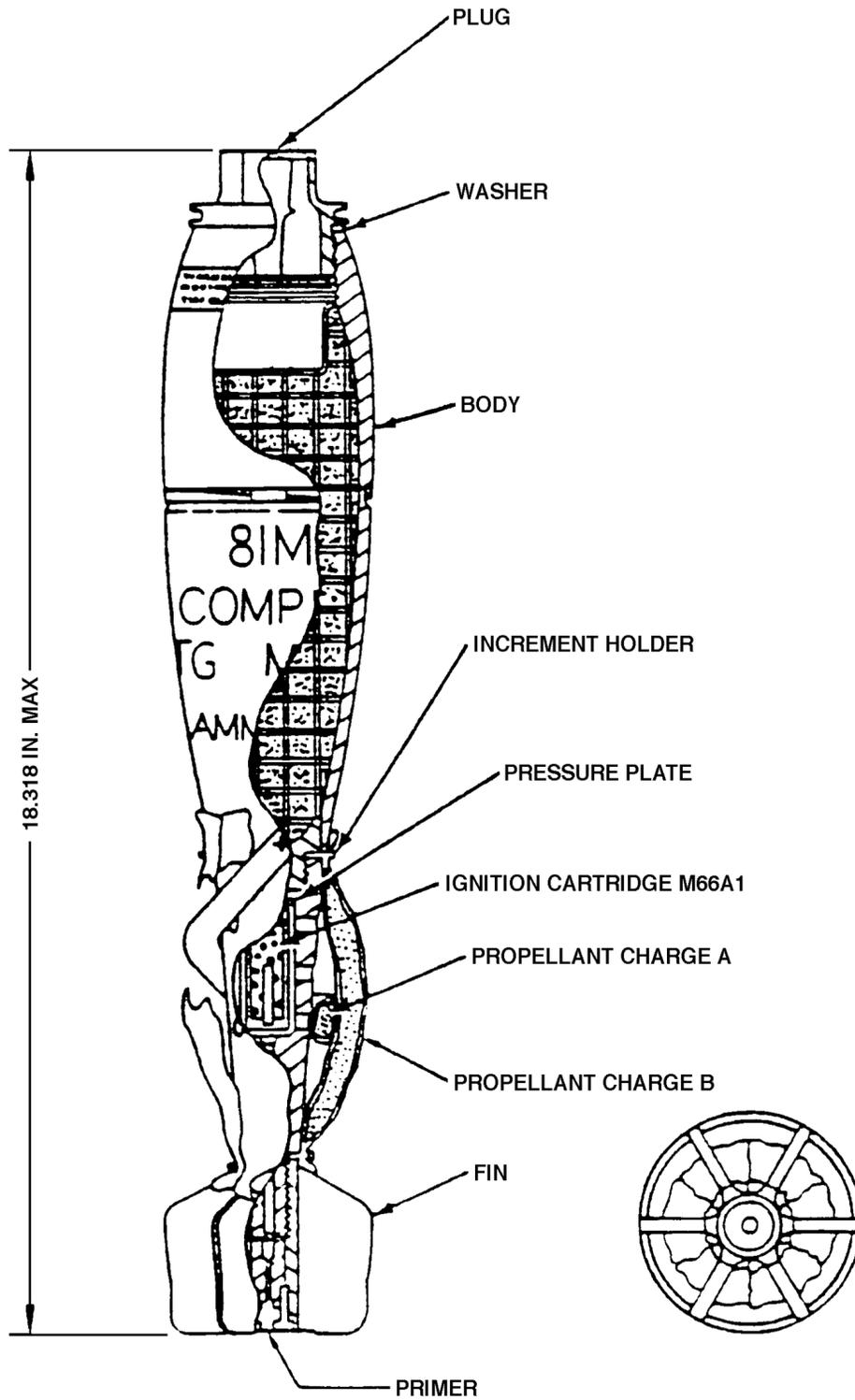


Figure 6-18 Cartridge, 81mm, HE, M374, Without Fuze

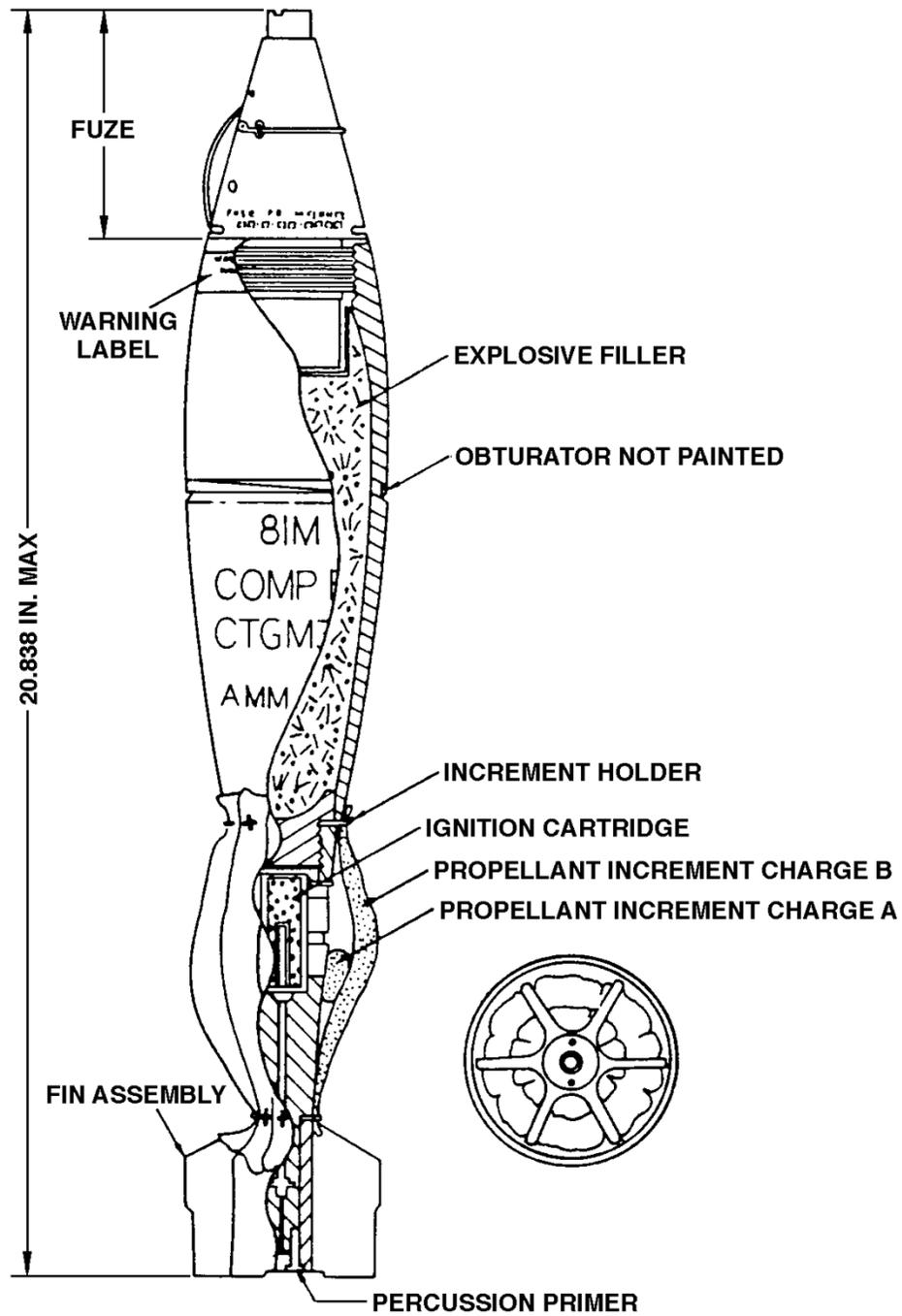


Figure 6-19 Cartridge, 81mm, HE, M374

6-3.12 Cartridge, 81 Millimeter, Chaff, MK 115 (C250), MK 133 (C850), MK 134 (C851), and MK 135 MOD 0 (C852).

6-3.12.1 Intended Use. This cartridge series is designed and procured as a chaff dispenser intended for countermeasure/decoy use against radar/computer guided missiles.

WARNING

IF USING A METAL CONTAINER TO PROTECT PROPELLANT WHEN PREPARING CHAFF CARTRIDGES FOR FIRING, DO NOT ALLOW THE CARTRIDGE BASE TO STRIKE THE BOTTOM OF THE CONTAINER. WHEN REPACKING UNFIRED AMMUNITION DO NOT INSERT ROUNDS FIN-END-FIRST INTO THE CONTAINER.

CAUTION

THE USE OF THIS CHAFF DISPENSER CARTRIDGE WITH LESS THAN TWO PROPELLANT INCREMENTS (CHARGE 2) IS NOT AUTHORIZED.

6-3.12.2 Description. The complete cartridge with fuze weighs 10.10 pounds (4.58 kilograms). It is 22.48 inches (57.09 centimeters) long and is similar in appearance to the M301 series illumination cartridge, Figure 6-14. The cartridges consist of a time fuze, M84 thin-walled steel body-tube assembly, steel tail cone, in assembly M4A1 with propellant charge M2A1, ignition cartridge M6, and percussion primer M34. The body load consists of aluminum foil cut to various dipole or band lengths, Table 6-20.

6-3.12.3 Function. On time fuze functioning, the expelling charge ejects the chaff foil payload to form a chaff cloud. The rate of descent of the chaff cloud will vary depending on atmospheric conditions.

6-3.12.4 Ballistics. The firing adjustment ballistics are listed in Table 6-21.

6-3.13 Cartridge, 81 Millimeter, HE, M374 (C256).

6-3.13.1 Intended Use. This cartridge, Figure 6-19, is designed and procured as a high-explosive round for use against light material and personnel, functioning with fragmentation and blast effects. This cartridge provides increased range accuracy and terminal effectiveness over the M362 series high-explosive cartridges. It is fired from the M1, M29, and M29A1 mortars.

WARNING

IF YOU HEAR A BUZZING SOUND AFTER REMOVING THE PULL WIRE AND SAFETY WIRE ARE REMOVED FROM THE FUZE, DO NOT FIRE THE CARTRIDGE. THE ROUND IS SAFE TO HANDLE AND TRANSPORT AFTER REINSERTING THE SAFETY WIRE IF THE BORE-RIDING PIN IS IN POSITION.

WHEN FIRING HE CARTRIDGE M374 AT LOW CHARGES (3 AND BELOW), OCCASIONAL SHORT ROUNDS IMPACTING DOWN TO APPROXIMATELY 70 PERCENT OF THE EXPECTED RANGE. THE LOW CHARGES RESULT IN A WIDER DISPERSION PATTERN THAN INDICATED IN APPLICABLE FIRING TABLES.

DO NOT FIRE CARTRIDGES ASSEMBLED WITH PD FUZE M519 OVER THE HEADS OF TROOPS.

WHEN FIRING AS MANY AS 10 OF THESE CARTRIDGES WITH MAXIMUM CHARGE IN THE 81MM M29 MORTAR, THE RATE OF FIRE SHALL NOT EXCEED 12 ROUNDS PER MINUTE.

CAUTION

THE DUD RATE WILL BE HIGHER THAN WITH OTHER AUTHORIZED FUZES WHEN FIRING HE CARTRIDGES M374 WITH PD FUZE M526 AT CHARGE 0.

6-3.13.2 Description. The complete cartridge consists of a PMI projectile loaded with 2.10 pounds (0.95 kilogram) of Comp B. It has a M149 aluminum fin assembly consisting of a M66A1 Ignition Cartridge Housing. Another configuration has the M170 fin assembly with a M285 ignition cartridge. There are six extruded fins assembled to the rear of the projectile. Steel increment holders with kidney-shaped projections hold the propellant increments in place around the exterior of the ignition cartridge housing. The fins, attached to the rear of the housing, consist of six extruded blades canted counterclockwise 5° at the rear to introduce spin in flight. Located in the hub of the fin assem-

bly is a percussion primer M71A2. It contains a central flash hole for transmission of the flash from the primer to the ignition cartridge. Propelling charge M90 (A and B) used with this cartridge consists of nine increments of M9 flake propellant. Increment A contains 184 grains (11.92 grams), while the eight other increments B contain 168 grains (10.89 grams) each. Each increment is in a water-repellent cotton cloth bag having a button-hole at each end. Engaging the buttonholes over the kidney-shaped projections of the increment holder attaches the bags to the projectile. Increment A assembles spirally underneath the eight increments B's. The cartridge uses fuzes PD M524 series, M526 series, M567, M716, and PROX M532. The complete cartridge with fuze and explosive filler weighs 9.34 pounds (4.24 kilograms), is 20.838 inches (52.92 centimeters) long, and is olive drab with yellow markings.

Table 6-20 81mm Chaff Cartridge Identification

DODIC/NALC	CARTRIDGE	NSN	REFERENCE NO.	BAND
C250	MK 115	1315-00-999-6308	2615070	C,S,X
C850	MK 133	1315-00-075-1141	2663148	X
C851	MK 134	1315-00-075-1143	2663149	S
C852	MK 135	1315-00-075-1144	2663150	C,X

Table 6-21 Cartridge, 81mm, Chaff, MK 115, MK 133, MK 134, and MK 135 Firing Adjustment Ballistics

Charge	Fuze Setting (Sec)	Horizontal Range (Yd)	Burst Height (Yd)	ELEVATION	
				Deg	Min
* 2 (Ignition and 2 increments)	4.0	109	491	79	15
* 2 (Ignition and 2 increments)	5.0	137	500	79	15
* 2 (Ignition and 2 increments)	16.3	1,104	695	62	30
3 (Ignition and 3 increments)	17.8	1,857	741	52	45
4 (Ignition and 4 increments)	20.6	2,557	909	51	15

Note: * Firing this series of chaff cartridges with less than two propellant increments (Charge 2) is not authorized.

Table 6-22 Cartridge, 81mm, HE, M374 Firing Adjustment Ballistics

Charge	Muzzle Velocity (fps)	RANGE	
		Meters	Yards
0 (Ignition cartridge only)	210	403	442
1 (Ignition cartridge and 1 increment)	341	1,001	1,095
2 (Ignition cartridge and 2 increments)	433	1,529	1,674
3 (Ignition cartridge and 3 increments)	505	1,988	2,175
4 (Ignition cartridge and 4 increments)	577	2,475	2,710
* 5 (Ignition cartridge and 5 increments)	656	2,955	3,237

Note: * Charge 5 is the maximum authorized for firing in the M1 mortar.

6-3.13.3 Difference in Models. The projectile body may be of forged steel or 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 a moisture proof ignition system, moisture-resistant propelling charges M90A1, and improved protective packaging.

6-3.13.4 Function. The M374 cartridge functions similarly to the M362A1 cartridge, Paragraph 6-3.2.3, except the M374 cartridge provides a greater range and increased lethality. The M374 cartridge uses the PD, M524 series fuze, or PD M567 Fuze.

6-3.13.5 Ballistics. The firing adjustment ballistics are listed in Table 6-22.

6-3.14 Cartridge, 81 Millimeter, HE, M374A3 (C256).

6-3.14.1 Intended Use. This cartridge, Figure 6-20, is designed and procured as an HE round to be used against light material and personnel with extensive fragmentation and blast effects. It provides increased range, accuracy, and terminal effects. It is fired from the M1, M29, and M29A1 mortars.

FROM THE FUZE, DO NOT FIRE THE CARTRIDGE. THE ROUND IS SAFE TO HANDLE AND TRANSPORT AFTER REINSERTING THE SAFETY WIRE IF THE BORE-RIDING PIN IS IN POSITION.

6-3.14.2 Description. The complete round consists of a steel alloy projectile body, a point-detonating fuze, a fin assembly, four propellant charge increments, an ignition cartridge, and a percussion primer. The steel body has internal threads at the nose to accept the fuze and external threads at the base to accept the fin assembly. The projectile filler is 2.10 pounds (0.95 kilogram) of Comp B. The paper and brass ignition cartridge assembly contains a Percussion Primer M35, a black powder pellet, and approximately 115 grains (7.45 grams) of Propellant M9. Surrounding the fin assembly are four horse shoe shaped Propelling Charge M205 increments. Each Propelling Charge M205 increment consists of a nitrocellulose container holding approximately 400 grains (25.92 grams) of Propelling Charge M10. A protective plastic propelling charge suppose surrounds the four propelling charge increments. The complete round weighs 9.05 pounds (4.11 kilograms), is 20.813 inches (52.86 centimeters) long (20.833 inches [52.91 centimeters] long with fuze PD M524A6), and is olive drab with yellow markings.

WARNING

IF YOU HEAR A BUZZING SOUND AFTER REMOVING THE PULL WIRE AND SAFETY WIRE

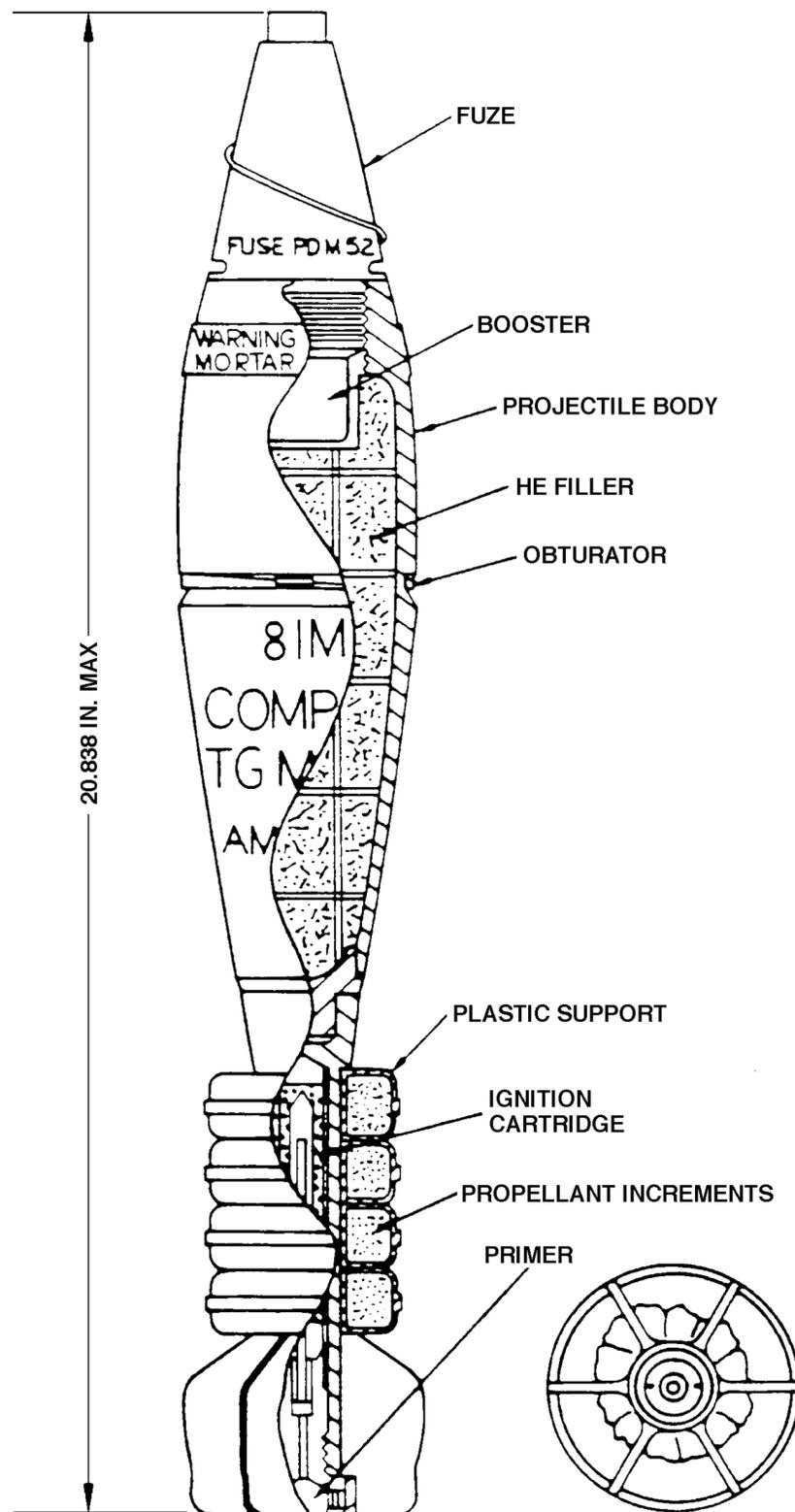


Figure 6-20 Cartridge, 81mm, HE, M374A3

Table 6-23 Cartridge, 81mm, HE, M374A3 Firing Adjustment Ballistics

Charge	Muzzle Velocity (fps)	RANGE	
		Meters	Yards
0 (Ignition cartridge only)	215	454	504
1 (Ignition cartridge and 1 increment)	438	1,633	1,814
* 2 (Ignition cartridge and 2 increments)	608	2,866	3,184
3 (Ignition cartridge and 3 increments)	750	4,013	4,459
4 (Ignition cartridge and 4 increments)	879	4,2800	5,333

Note: * Firing with more than two propellant increments (Charge 2) is not authorized in M1 mortar.

WARNING

DO NOT USE MORE THAN TWO CHARGE INCREMENTS WHEN FIRING THE M374A3 CARTRIDGE IN M1 MORTAR.

6-3.14.3 Function. This cartridge is fired with either a M567 or M524A6 PD fuze. Upon impact the functioning of the fuze detonates the fuze booster which detonates the HE charge. The projectile bursts on the target, producing extensive fragmentation and blast effects.

6-3.14.4 Ballistics. Table 6-23 lists the firing adjustment ballistics.

6-3.15 Cartridge, 81 Millimeter, Smoke, WP, M375 (C276).

6-3.15.1 Intended Use. This cartridge, Figure 6-21, is designed and procured as a lightweight round for incendiary use against material and personnel. It is for producing a smoke screen, and for marking or adjustment of fire.

WARNING

IF YOU HEAR A BUZZING SOUND AFTER REMOVING THE PULL WIRE AND SAFETY WIRE FROM THE FUZE, DO NOT FIRE THE CARTRIDGE. THE ROUND

IS SAFE TO HANDLE AND TRANSPORT AFTER REINSERTING THE SAFETY WIRE IF THE BORE-RIDING PIN IS IN POSITION.

WHEN FIRING AS MANY AS 10 OF THESE CARTRIDGES WITH MAXIMUM CHARGE IN 81MM M29 MORTAR, THE RATE OF FIRE SHALL NOT EXCEED 12 ROUNDS PER MINUTE.

DO NOT FIRE CARTRIDGES ASSEMBLED WITH PD FUZE M519 OVER THE HEADS OF TROOPS.

WARNING

WHEN FIRING THE CARTRIDGE M375 AT LOW CHARGES (3 AND BELOW), EXPECT OCCASIONAL SHORT ROUNDS IMPACTING DOWN TO APPROXIMATELY 70 PERCENT OF THE EXPECTED RANGE. THE LOW CHARGES RESULT IN A WIDER DISPERSION PATTERN THAN INDICATED IN APPLICABLE FIRING TABLES.

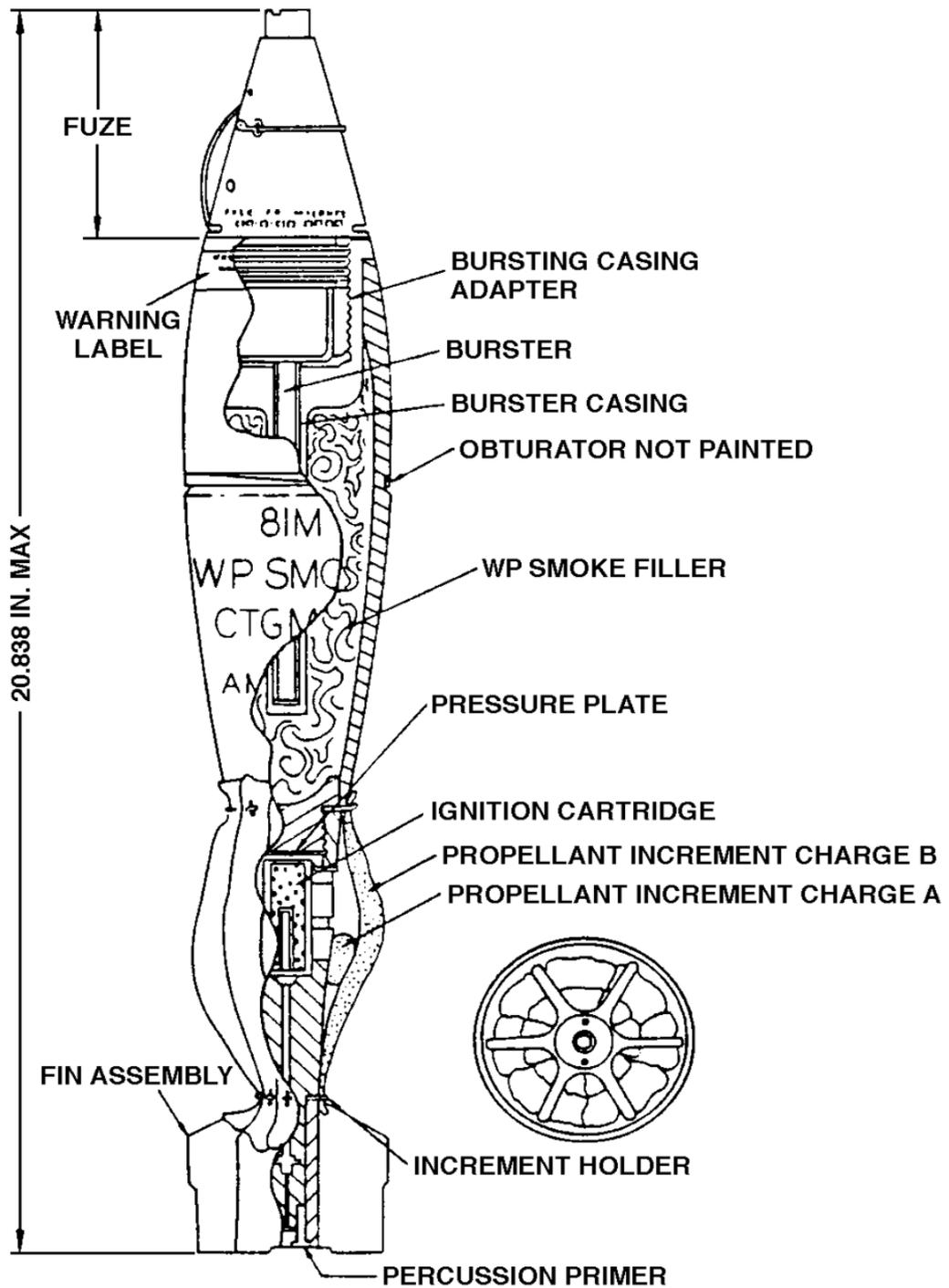


Figure 6-21 Cartridge, 81mm, WP, Smoke, M375

CAUTION

WHEN WP CARTRIDGE M375 IS FIRED WITH PD FUZE M526 AT CHARGE 0, THE DUD RATE WILL BE HIGHER THAN WITH OTHER AUTHORIZED FUZES.

FIVE INCREMENT CHARGES PLUS THE IGNITION CARTRIDGE ARE THE MAXIMUM NUMBER OF CHARGES AUTHORIZED FOR USE WHEN FIRING IN THE M1 MORTAR.

NOTE

Increment Charge 1A is used as Charge 1 and will be one of the increments assembled when firing above Charge 1.

6-3.15.2 Description. This cartridge is similar to the M374 HE Cartridge, Paragraph 6-3.1.6, except the projectile is loaded with 1.60 pounds

(0.72 kilogram) of WP and contains a one-piece aluminum burster casing M158 which is press fitted to the forward end of the body. The burster casing houses a central burster tube containing approximately 180 grains (11.66 grams) of RDX. The complete round with fuze and filler weighs 9.34 pounds (4.24 kilograms), is 20.838 inches (52.92 centimeters) long, and is light green with a yellow band and light red markings.

6-3.15.3 Function. Depending on the type of fuze used (PD M524 series, M526 series, M567, M716, or PROX M532), the projectile will burst either over or on the target. Functioning of the fuze detonates the burster charge, rupturing the projectile, and dispersing the WP. The WP ignites on contact with air, producing a cloud of dense white smoke with some incendiary effect.

6-3.15.4 Ballistics. The firing adjustment ballistics are listed in Table 6-24.

Table 6-24 Cartridge, 81mm, Smoke, WP, M375 Firing Adjustment Ballistics

Charge	Muzzle Velocity (fps)	RANGE	
		Meters	Yards
0 (Ignition cartridge only)	210	403	442
* 1 (Ignition cartridge and 1 increment)	341	1,001	1,095
2 (Ignition cartridge and 2 increments)	433	1,529	1,674
3 (Ignition cartridge and 3 increments)	505	1,988	2,175
4 (Ignition cartridge and 4 increments)	577	2,475	2,710
** 5 (Ignition cartridge and 5 increments)	656	2,955	3,237
6 (Ignition cartridge and 6 increments)	709	3,416	3,740
7 (Ignition cartridge and 7 increments)	764	3,831	4,190
8 (Ignition cartridge and 8 increments)	814	4,197	4,598
9 (Ignition cartridge and 9 increments)	856	4,500	4,932

Notes: * Increment A is used as Charge 1 and is one of the increments when firing above Charge 1.

** The maximum number of charges authorized when firing in the M1 mortar.

6-3.16 Cartridge, 81 Millimeter, Smoke, WP, M375A2 (C276).

6-3.16.1 Intended Use. This cartridge is designed and procured for use as an incendiary round against material and personnel. It is for producing a smoke screen, and for marking or adjustment of fire.

WARNING

IF YOU HEAR A BUZZING SOUND AFTER REMOVING THE PULL WIRE AND SAFETY WIRE FROM THE FUZE, DO NOT FIRE THE CARTRIDGE. THE ROUND IS SAFEST TO HANDLE AND TRANSPORT AFTER REINSERTING THE SAFETY WIRE IF THE BORE-RIDING PIN IS IN POSITION.

WHEN FIRING AS MANY AS 10 OF THESE CARTRIDGES WITH MAXIMUM CHARGE IN THE 81MM M29 MORTAR, THE RATE OF THE FIRE SHALL NOT EXCEED 12 ROUNDS PER MINUTE.

WHEN FIRING THE CARTRIDGE M375A2 AT LOW CHARGES (3 AND BELOW), EXPECT OCCASIONAL SHORT ROUNDS IMPACTING DOWN TO APPROXIMATELY 70 PERCENT OF THE EXPECTED RANGE. THE LOW CHARGES RESULT IN A WIDER DISPERSION PATTERN THAN INDICATED IN APPLICABLE FIRING TABLES.

CAUTION

THE DUD RATE WILL BE HIGHER THAN WITH OTHER AUTHORIZED FUZES WHEN FIRING WP CARTRIDGE M375A2 WITH PD FUZE M526 AT CHARGE 0.

CAUTION

FIVE INCREMENT CHARGES PLUS THE IGNITION CARTRIDGE ARE THE MAXIMUM NUMBER OF CHARGES AUTHORIZED FOR USE WHEN FIRING IN THE M1 MORTAR.

NOTE

Increment Charge 1A is used as and will be one of the increments assembled when firing above Charge 1.

6-3.16.2 Description. The complete round weighing 9.34 pounds (4.24 kilograms) is 20.838 inches (52.92 centimeters) long and consists of a forged steel or PMI projectile body containing 1.60 pounds (0.72 kilogram) of WP filler with a M47 burster assembly. The cartridge has either a PD M524 series, M526 series, M567, M716, or PROX M532 fuze. There is an M170 fin assembly that with a M285 cartridge housing. There are two types of M90A1 propellant (A and B) and a M71A1 or M71A2 percussion primer. The base of the projectile is externally threaded to accept the fin assembly. Fitted into the projectile nose is 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 WP filler. The fins are canted at 5° at the rear to spin-stabilize the projectile in flight. The projectile is light green with a yellow band and light red markings.

6-3.16.3 Function. Depending on the type of fuze used, the projectile will burst either over or on the target. Functioning of the fuze detonates the burster charge, ruptures the projectile, and disperses the WP. The WP ignites on contact with air, producing a cloud of dense white smoke with some incendiary effect.

6-3.16.4 Ballistics. The firing adjustment ballistics are listed in Table 6-25.

Table 6-25 Cartridge, 81mm, Smoke, WP, M375A2 Firing Adjustment Ballistics

Charge	Muzzle Velocity (fps)	RANGE	
		Meters	Yards
0 (Ignition cartridge only)	210	403	442
* 1 (Ignition cartridge and 1 increment)	341	1,001	1,095
2 (Ignition cartridge and 2 increments)	433	1,529	1,674
3 (Ignition cartridge and 3 increments)	505	1,988	2,175
4 (Ignition cartridge and 4 increments)	577	2,475	2,710
** 5 (Ignition cartridge and 5 increments)	656	2,955	3,237
6 (Ignition cartridge and 6 increments)	709	3,416	3,740
7 (Ignition cartridge and 7 increments)	764	3,831	4,190
8 (Ignition cartridge and 8 increments)	814	4,197	4,598
9 (Ignition cartridge and 9 increments)	856	4,508	4,932

Notes: * Increment A is used as Charge 1 and is one of the increments when firing above Charge 1.
 ** The maximum number of charges authorized when firing the M1 mortar.

6-3.17 Cartridge, 81 Millimeter, Antipersonnel, MK 120 MOD 0 (C855).

6-3.17.1 Intended Use. This cartridge, Figure 6-22, is designed and procured for use only with the MK 2 MOD 0 Shipboard Mortar. It is an APERS round that functions with the disbursement of flechettes (steel darts).

WARNING

DO NOT DROP FIRE THE MK 120 MOD 0 CARTRIDGE. THE CARTRIDGE IS OPERATIONAL WITHIN 10 FEET (3.04 METERS) FROM THE BARREL.

DO NOT FIRE THIS CARTRIDGE OVER THE HEADS OF FRIENDLY TROOPS.

DO NOT EXCEED SEVEN INCREMENT CHARGES WHEN FIRING THE MK 120 MOD 0 CARTRIDGE.

THIS CARTRIDGE IS TO BE FIRED ONLY FROM THE MK 2 MOD 0 SHIPBOARD MORTAR.

6-3.17.2 Description. The complete cartridge is a fuzeless round consisting of a body that contains the flechettes and is assembled to a M4A1 fin assembly. The body of this cartridge does not contain explosives. The cartridge body consists of a payload of approximately 1,300 13-grain (.84-gram) flechettes packed head to tail in 2 layers. The bottom layer of flechettes rests on a steel piston plate and is separated from the upper layer by a support segment. The fin assembly contains an M34 percussion primer, an M6 ignition cartridge, and seven M2A1 propellant increments. The cartridge is olive drab with a 1/2 inch (1.27 centimeters) brown band marked with white diamonds. The identification markings are white stencils.

6-3.17.3 Function. Upon firing, the percussion primer actuates the ignition cartridge to ignite the propellant increments. The heat generated by the burning increments burns out a fusible foil disk covering an orifice to a cavity in the rear of the cartridge body. Pressurized gas enters this cavity and acts on the piston plate. The resulting piston action and high internal gas pressure force the flechettes and the front cover assembly forward and out, expelling the flechettes from the body of the cartridge after it leaves the barrel. For maximum effectiveness, use seven propellant increments.

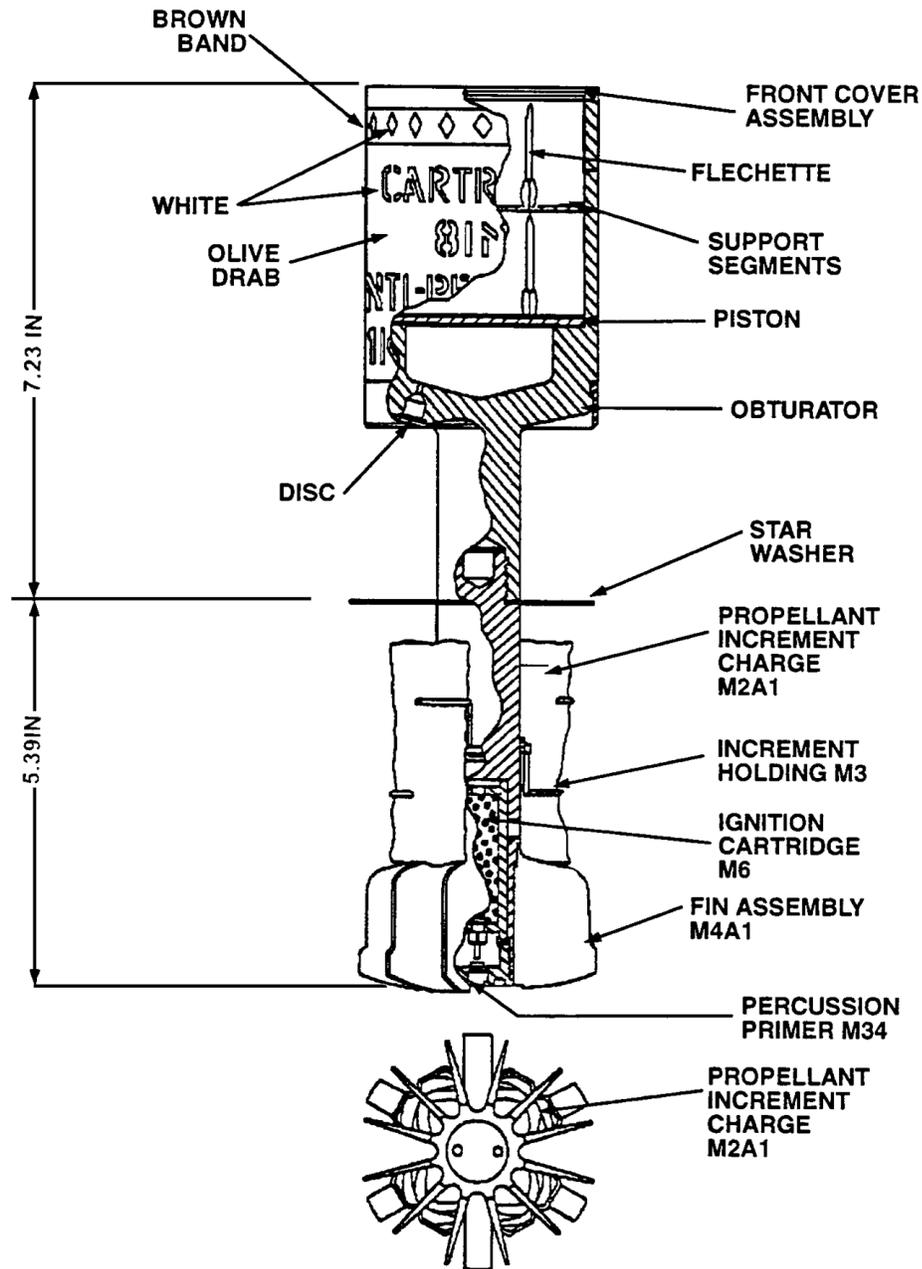


Figure 6-22 Cartridge, 81mm, Antipersonnel, MK 120 MOD 0

Table 6-26 81mm Mortar Ammunition

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 81 Millimeter, HE, M362 w/fuze PD M526	C222	6-3.2	1315-00-602-5177	7549034	1 per fiber container M252, 3 (M362) containers per wooden box
Cartridge, 81 Millimeter, HE, M362A1 w/fuze PD, M524A4/M524E6	C222	6-3.2	1315-00-702-0724	8838144	1 per fiber container M252A2, 3 containers per wooden box
Cartridge, 81 Millimeter, HE, M362/T28, Without Fuze	C223	6-3.3	1315-00-542-0179	7549013	1 per fiber carton M252, 3 cartons per wooden box
Cartridge, 81 Millimeter, HE, M43A1 w/fuze PD, M525	C225	6-3.4	1315-00-555-4778	9218433	1 per fiber carton M36A4, 4 containers per wooden box
Cartridge, 81 Millimeter, Illuminating, M301A1/ M301A2, w/fuze, time, M84	C226	6-3.5	1315-00-028-4964	8865058	1 per fiber container M209A1 or metal container M266, 3 containers per wooden box
Cartridge, 81 Millimeter, Illuminating, M301A3 w/ fuze, time, M84A1	C226	6-3.5	1315-00-143-7048	9220705	1 per fiber container PA43, 3 containers per wooden box
Cartridge, 81 Millimeter, Illuminating, M301A1 w/ fuze, Time, M84A1	C226	6-3.5	1315-01-277-5554	5354251	1 per fiber container, 3 containers per wooden box
Cartridge, 81 Millimeter, TP, M43A1 or M43A1B1 w/fuze PD, M52A2	C227	6-3.6	1315-00-028-5000	75-1-89/ WR55/31	1 per fiber container M36, 4 containers per wooden box
Cartridge, 81 Millimeter, Training, M68, Projectile w/o Fin Assembly	C228	6-3.7	1315-00-028-4972	8796522	12 per wooden box
	C228		1315-00-028-4975	7691562	8 per M12 waterproof paper and wooden box
	C228		1315-00-028-4991	8796522	Packaged as required.
Cartridge, 81 Millimeter, Smoke, WP, M57A1 w/ fuze TSQ, M77	C231	6-3.8	1315-00-028-4989	75-1-199	1 per fiber container M149, 2 containers per wooden box
Cartridge, 81 Millimeter, Leaflet, MK 112 MOD 0 w/fuze, time M84	C232	6-3.9	1315-00-884-1731	2516121	1 per container, 3 containers per wooden box
Cartridge, 81 Millimeter, HE, M374, Without Fuze	C236	6-3.10	1315-00-965-0597	9225283/ MIL-C-46995	1 per plastic container M513, 4 containers per wirebound crate
	C236		1315-00-935-6007	9226248	1 per plastic container M513 in barrier bag, 3 bags per wirebound crate

Table 6-26 81mm Mortar Ammunition (Continued)

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
	C236		1315-00-935-6013	9225283	1 per fiber container M252A2 in barrier bag, 3 bags per wooden box
Charge, Propelling, 81 Millimeter, M2A1, F/CTG M56, M57, M301	C239	6-3.11	1315-00-028-4983	8865214	4 increments per charge, packaged as required.
	C239		1315-00-826-5404	8865214	4 increments per charge, packaged as required.
Cartridge, 81 Millimeter, Training, M68, Fin Assembly, M6, F/CTG M68	C241	6-3.7	1315-00-028-4952	75-23-96	Packaged as required.
Cartridge, 81 Millimeter, Training, M68, Cartridge, Ignition, M6 F/CTG M43A1, M301A2, M301A3, M57 and M57A1	C242	6-3.7	1315-00-096-3081	8865062	Packaged as required.
Cartridge, 81 Millimeter, Training, M68, Cartridge, Ignition, M3, F/CTG M68	C243	6-3.7	1315-00-028-4954	75-19-76	25 per carton, 10 cartons per waterproof carton, 2 cartons per wooden box (500 cartridges)
	C243		1315-00-555-4274	75-19-76	25 per carton, 20 cartons per wooden box (500 cartridges)
Cartridge, 81 Millimeter, Chaff, MK 115 MOD 0 w/ fuze time M184	C250	6-3.12	1315-00-999-6308	2615070	1 per fiber container M209A1, 3 containers per wooden box
Cartridge, 81 Millimeter Chaff MK 133, MOD 0 w/ fuze time M184	C850	6-3.12	1315-00-075-1141	2663148	1 per fiber container M209A1, 3 containers per wooden box
Cartridge, 81 Millimeter, Chaff, MK 115 MK 134, MOD 0 w/fuze time M184	C851	6-3.12	1315-00-075-1143	2663149	1 per fiber container M209A1, 3 containers per wooden box
Cartridge, 81 Millimeter, Chaff, MK 135, MOD 0 w/ fuze time M184	C852	6-3.12	1315-00-075-1144	2663150	1 per fiber container M209A1, 3 containers per wooden box
Cartridge, 81 Millimeter, HE, M374 w/fuze PD, M524A5	C256	6-3.13	1315-00-782-5547	8881026	1 per plastic container M513 series, 4 containers per wirebound crate
Cartridge, 81 Millimeter, HE, M374 Series w/fuze PD, M524A5	C256	6-3.13	1315-00-935-6002	8881026	1 per plastic container M513 series in barrier bag, 3 bags (3 rounds) per wooden box

Table 6-26 81mm Mortar Ammunition (Continued)

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 81 Millimeter, HE, M374 w/fuze PD, M524A5	C256	6-3.13	1315-00-935-6010	8881026	1 per fiber container M252A3 in barrier bag, 3 bags (3 rounds) per wooden box
Cartridge, 81 Millimeter, HE, M374 w/fuze PD, M524A5	C256	6-3.13	1315-00-935-6032	8881026	1 per plastic-dipped fiber container M252A2, 3 containers per wooden box
Cartridge, 81 Millimeter, HE, M374 w/fuze PD, M567	C256	6-3.13	1315-01-147-6307	8881026	1 per fiber container M252 series, wax dipped, 3 containers per wooden box
Cartridge, 81 Millimeter, HE, M374A3 w/fuze PD, M567	C256	6-3.14	1315-00-563-7067	9241291	1 per fiber container M252A5, 3 containers per wirebound wooden box
Cartridge, 81 Millimeter, Smoke, WP, M375 w/ fuze PD, M524A5	C276	6-3.15	1315-00-935-6076	8885264	1 per plastic dipped fiber container M252, 3 containers per wooden box
Cartridge, 81 Millimeter, Smoke, WP, M375 w/ fuze PD, M524A5	C276	6-3.15	1315-00-782-5838	8885264	1 per plastic container, 4 containers per wooden box
	C276		1315-00-935-6003	8885264	1 per container M513 in a barrier bag 3 containers per wooden box
Cartridge, 81 Millimeter, Smoke, WP, M375 w/ fuze PD, M567	C276	6-3.15	1315-00-574-7680	9294735	1 per fiber container M252A3, 3 per wooden box
Cartridge, 81 Millimeter, Smoke, WP, M375 w/ fuze PD, M524A6	C276	6-3.15	1315-00-935-6068	8885264	1 per fiber container M252 series in a barrier bag, 3 containers per wooden box
Cartridge, 81 Millimeter, Smoke, WP, M375A2 w/ fuze PD, M524A6	C276	6-3.16	1315-00-498-6406	9240953	1 per fiber container M252, 3 containers per wooden box
Cartridge, 81 Millimeter, Smoke, WP, M375A2 w/ fuze PD, M567	C276	6-3.16	1315-00-241-9275	9240953	1 per fiber container M252A5 wax dipped, 3 per wooden box
Cartridge, 81 Millimeter, Antipersonnel, MK 120 MOD 0	C855	6-3.17	1315-00-127-6605	2842386	Packed in accordance with DL 2846716 for Mortar, MK 2 MOD 0 only

CHAPTER 7

SHOULDER LAUNCHED WEAPONS SYSTEMS

7-1 INTRODUCTION

This chapter provides general and technical information on several shoulder launched anti-armor weapon systems. It covers general characteristics, specific data, and logistical information. See Table 7-2 and Table 7-3 for packaging and identification data.

7-2 LIGHT ANTI-ARMOR WEAPON (LAW) SYSTEM

This section provides general and technical information on the variants of the M72 LAW rocket. See Table 7-1 for a comparison of the technical characteristics for each variant.

7-2.1 Rocket, High Explosive, 66mm, M72 (H555) and M72A2 (H557). The M72 series, Figure 7-1 through Figure 7-4, anti-armor weapons are lightweight, recoilless, preloaded, disposable systems that are designed for use against light armored vehicles. Each M72 LAW is comprised of a launcher and a free flight rocket.

7-2.1.1 Launcher. The launcher is a lightweight, expendable, telescoping device consisting of an aluminum inner tube, fiberglass outer tube, tube detenting device, mechanical sight system, firing mechanism, safety interlocks, integral rear cover and shoulder rest, and a carry sling with front cover. When prepared for firing, the launcher serves as a platform to ignite and initially guide the rocket on its free flight trajectory toward the intended target.

7-2.1.2 Rocket. The rocket assembly consists of a high explosive shaped charge warhead, nose fairing (ogive), nose cap, fuze, and propulsion unit. The propulsion unit is made up of a rocket motor case and fin group, M7 double base propellant, and igniter. The nose cap houses a piezoelectric crystal which supplies electrical power to initiate the warhead assembly on target impact.

7-2.1.3 Functioning. Transitioning the launcher from the carry to the ready-to-fire mode releases one mechanical firing interlock, cocks the weapon, and displays the spring-loaded sights. Depressing the trigger ignites the rocket propellant and discharges the rocket. Rocket motor burning is completed before the rocket exits the launcher. When the rocket emerges from the launcher, the fins spring out to stabilize the rocket in flight. Crushing of the nose cap upon target impact causes the piezoelectric crystal to generate electricity to fire the detonator. The booster is then initiated which detonates the warhead explosive charge. A graze function is present on the M72A2 LAW (H557), M72A3 LAW (H557), and the M72A7 LAW (HA29). This graze function was designed as a range clearing feature intended to detonate the warhead in the event of a target miss or other situations where the nose cap piezoelectric element failed to fire the warhead.

Table 7-1 M72 Weapon Systems Characteristic Comparisons

CHARACTERISTICS	M72A3	M72A4	M72A5	M72A6	M72A7	M72A9
Carry Weight	2.5 kg	3.45 kg	3.45 kg	3.45 kg	3.45 kg	4.28 kg
Carry Length	665mm	775mm	775mm	775mm	775mm	775mm
Firing Length	899mm	980mm	980mm	980mm	980mm	980mm
Caliber	66mm	66mm	66mm	66mm	66mm	66mm
Muzzle Velocity	150 m/s	200 m/s	200 m/s	200 m/s	200 m/s	126 m/s
Effective Range	170 m	220 m	220 m	220 m	220 m	150 m
Operational Range	250 m	350 m	350 m	350 m	350 m	150 m
Dispersion @ 250 m	2.30 mils	1.33 mils	1.50 mils	1.50 mils	1.50 mils	TBD
Flight Time to 250 m	1.9 sec.	1.4 sec.	1.4 sec.	1.4 sec.	1.4 sec.	TBD

Table 7-1 M72 Weapon Systems Characteristic Comparisons (Continued)

CHARACTERISTICS	M72A3	M72A4	M72A5	M72A6	M72A7	M72A9
Armor Penetration	300mm	355mm	300mm	150mm	125mm	N/A
Behind Armor Effects	Moderate	Limited	Moderate	Extensive	Extensive	N/A

Table 7-2 Shoulder Launched Weapons System

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Rocket, High Explosive, 66mm, M72	H555	7-2.1	1340-00-926-4086	10048500	5 per carton in barrier bag, 3 bags, (15 rockets) per wooden box
	H555		1340-00-982-1561	10048503	5 per fiberboard carton, 3 cartons, (15 rockets) per wooden box
Rocket, High Explosive, 66mm, M72A2	H557	7-2.1	1340-00-021-4478	9270983-1 9227926	15 per wooden box
Rocket, High Explosive, 66mm, M72A3 LAW	H557	7-2.2	1340-25-116-2520	7549072	15 per wooden box
Rocket, High Explosive, 66mm,	H557	7-2.3	1340-01-199-8683	13230362	15 per wooden box
Rocket, High Explosive, 66mm, M72A5 LAW	H557	7-2.4	1340-01-384-9479	51110-3	15 per wooden box
	H557	7-2.4	1340-01-429-4632	51110-7	1 per MK 14 container
Rocket, High Explosive, 66mm, M72A6 LAW, with Octol	H557	7-2.5	1340-01-384-9481	51360-1	15 per wooden box
Rocket, High Explosive, 66mm, M72A7 LAW	H557	7-2.6	1340-01-472-5349	52390-1 52400	1 per MK 14 container
Rocket, High Explosive, 66mm, M72A7 LAW w/ Graze	HA29	7-2.7	1340-01-497-7630	52390-5 52400-5	1 per MK 14 container
M72AS 21mm Trainer Rocket	HA21	7-2.8	1340-01-482-5049	51671 51730	Packed 72 per wooden box
Rocket, High Explosive, 66mm, M72A9 (green launcher)	HA48	7-2.9	1340-01-538-4308	52500-5 52490-5	1 per MK 14 container
Rocket, High Explosive, 66mm, M72A9 (black launcher with reflex sight rail	HA48	7-2.9	1340-01-545-5033	51780-9 52440-1	1 per MK 14 container
M136 (AT4) Light Anti- Armor Weapon	C995	7-3.1	1315-01-245-4950	13230240	5 rockets per plywood box, 4 boxes (20 rockets) per pallet
AT4, 84mm Confined Space (CS), Reduced Sensitivity (RS)	CA30	7-3.2	1315-01-508-8521	3074162 4113415	2 per wooden box, 8 boxes per pallet

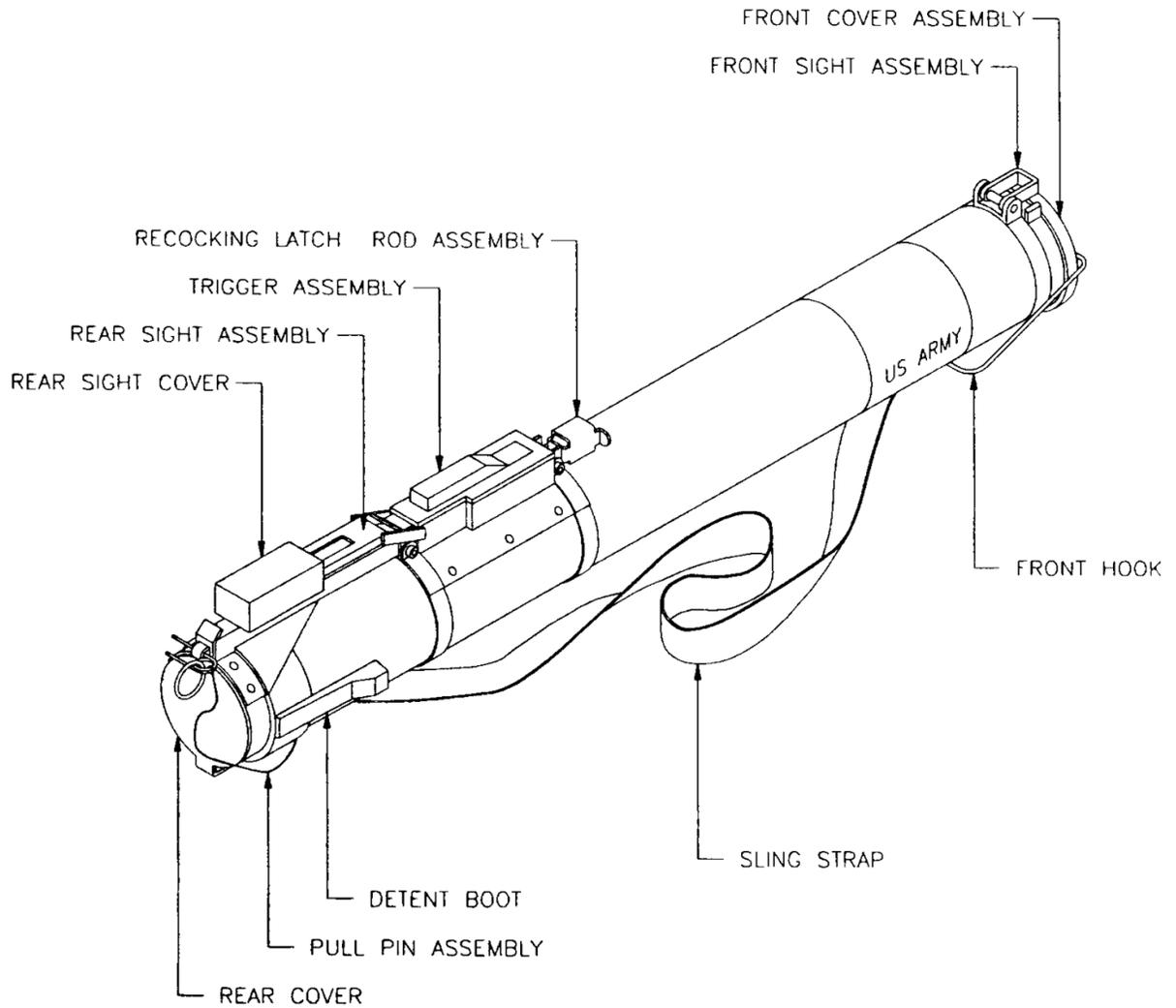


Figure 7-1 M72 Basic 66mm Light Anti-Armor Weapon (LAW) System

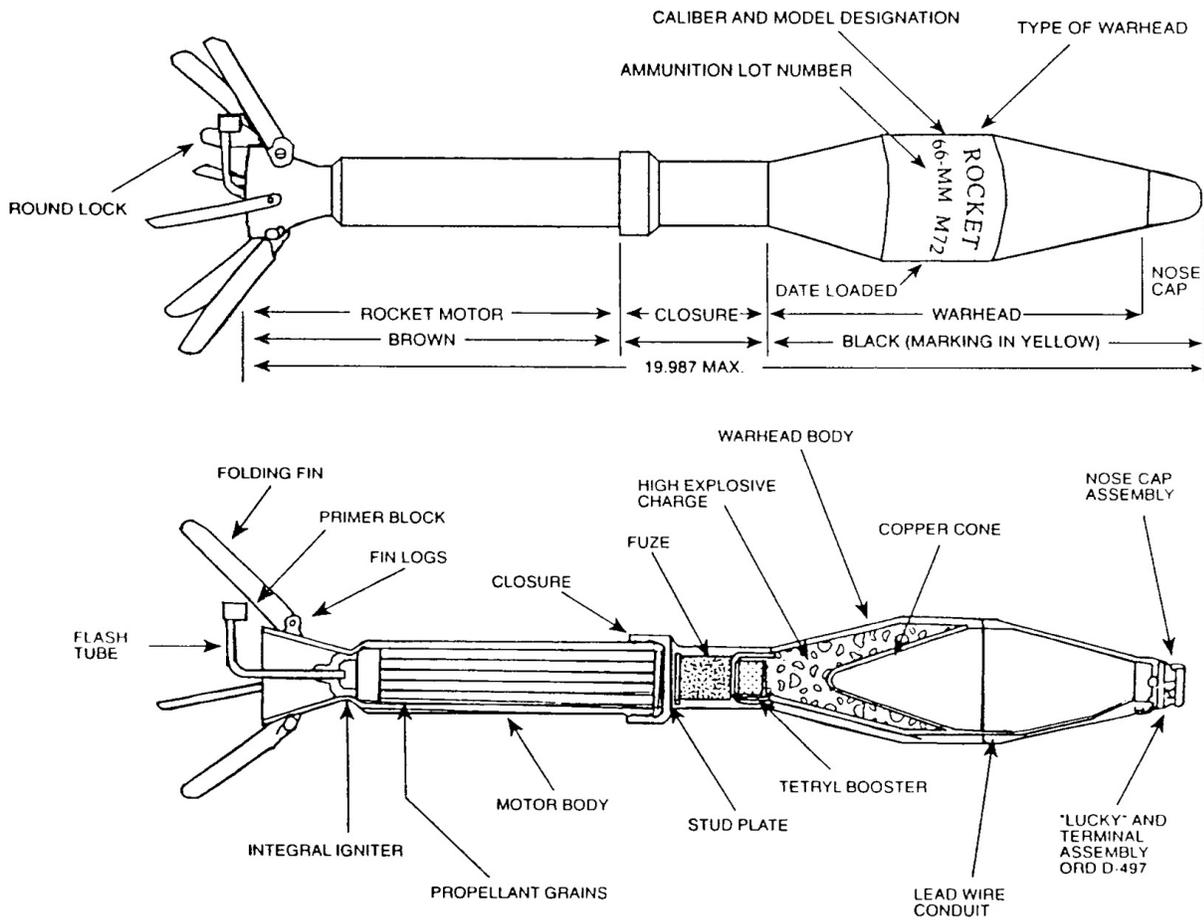


Figure 7-2 M72A3 66mm Light Anti-Armor Weapon (LAW) System

7-2.2 M72A3 LAW (H557).

7-2.2.1 **Intended Use.** The M72A3, Figure 7-3, is in current use by U.S. Forces and most NATO armies. In addition, it is widely used in many countries around the world. No future procurements of this weapon are planned. However, U.S. Forces will continue drawing on the current stocks until depleted.

7-2.2.2 **Description.** The M72A3 has a carry weight of 2.5 kilograms (5.5 pounds) and a carry length of 665 millimeters (26.2 inches). The firing length is 899 millimeters (35.4 inches). Muzzle velocity is 150 meters per second (492 feet per second). The effective range is 170 meters (186 yards) and the operational range is 250 meters (273 yards). Armor penetration is 300 millimeters (11.8 inches). Moderate Behind Armor effects are provided. The high explosive shaped charge is filled with Octol.

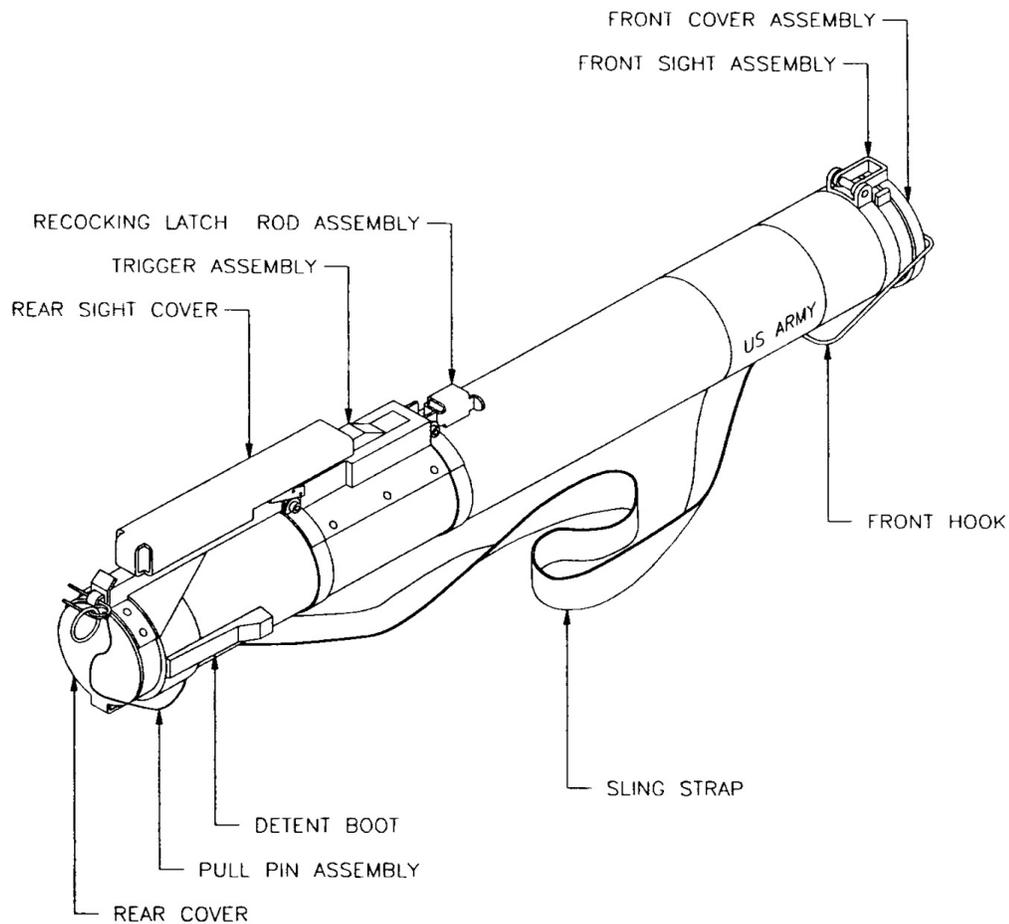


Figure 7-3 M72A3 66mm Light Anti-Armor Weapon (LAW) System

7-2.3 (M72A4 LAW (H557).

7-2.3.1 Intended Use. The M72A4 contains a high explosive warhead that is designed for use against light armored vehicles. It was designed to provide deeper armor penetration but limited behind armor effects.

7-2.3.2 Description. The M72A4, Figure 7-4, has a carry weight of 3.45 kilograms (7.6 pounds) and a carry length of 775 millimeters (30.5 inches). The firing length is 980 millimeters (38.6 inches). Muzzle velocity is 200 meters per second (656 feet per second). The effective range is 220 meters (240 yards) and the operational range is 350 meters (383 yards). Armor penetration is 355 millimeters (14 inches). The warhead has a 60 degree conical shaped charge liner and utilizes octol as the primary explosive charge.

7-2.4 M72A5 LAW (H557).

7-2.4.1 Intended Use. The M72A5 contains a high explosive warhead that is designed for use against light armored vehicles. It utilizes an M72A3 type warhead to provide moderate behind armor effects.

7-2.4.2 Description. The M72A5, Figure 7-4, has a carry weight of 3.45 kilograms (7.6 pounds) and a carry length of 775 millimeters (30.5 inches). The firing length is 980 millimeters (38.6 inches). Muzzle velocity is 200 meters per second (656 feet per second). The effective range is 220 meters (240 yards) and the operational range is 350 meters (383 yards). Armor penetration is 300 millimeters (11.8 inches). The warhead has a 60 degree conical shaped charge liner and utilizes octol as the primary explosive charge.

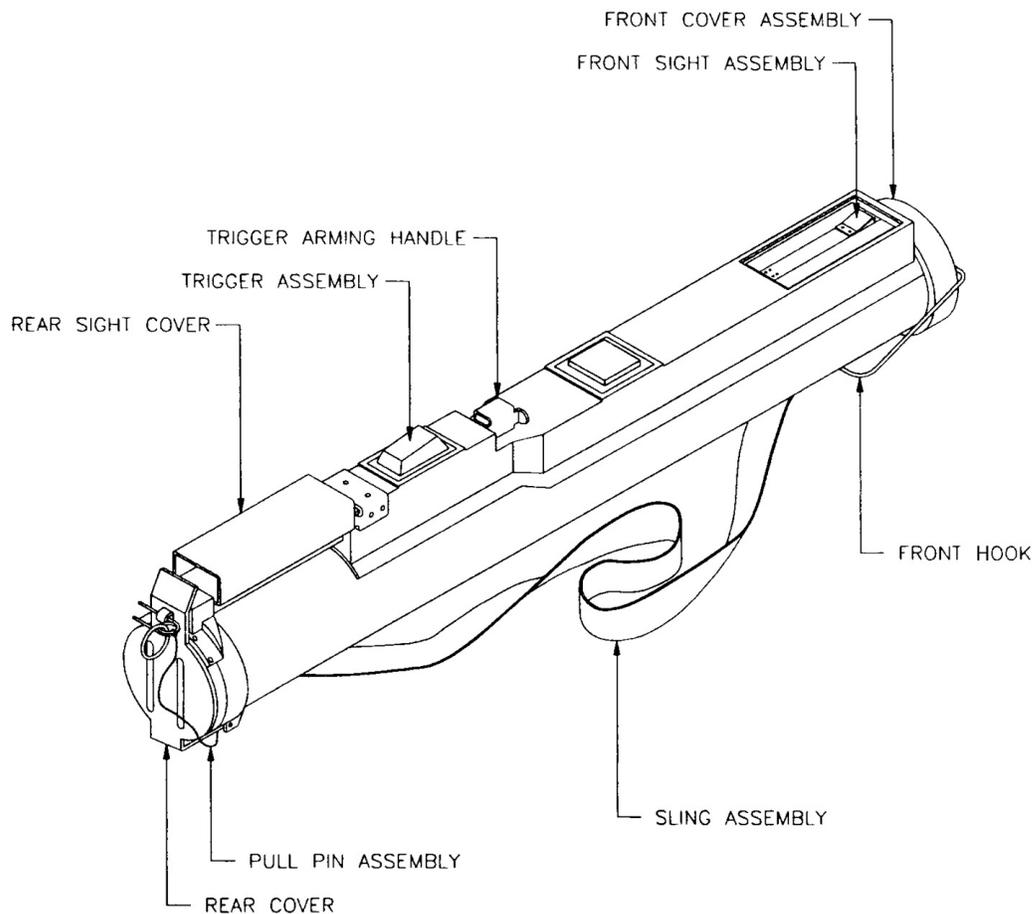


Figure 7-4 M72A4/A5/A6/A7/A9 66mm Light Anti-Armor Weapon (LAW) System

7-2.5 M72A6 LAW (H557).

7-2.5.1 Intended Use. The M72A6 contains a high explosive warhead that is designed for use against light armored vehicles. The warhead has been designed to provide greater behind armor effects than previous versions of the LAW rocket.

7-2.5.2 Description. The M72A6, Figure 7-4, has a carry weight of 3.45 kilograms (7.6 pounds) and a carry length of 775 millimeters (30.5 inches). The firing length is 980 millimeters (38.6 inches). Muzzle velocity is 200 meters per second (656 feet per second). The effective range is 220 meters (240 yards) and the operational range is 350 meters (383 yards). Armor penetration is 150 millimeters (5.9 inches). The shaped charge liner is an explosive formed penetrator (EFP) and octol is used as the primary explosive charge.

7-2.6 M72A7 LAW (H557).

7-2.6.1 Intended Use. The M72A7 contains a high explosive warhead that is designed for use against light armored vehicles. The warhead was designed to provide greater behind armor effects than previous versions of the LAW rocket.

7-2.6.2 Description. The M72A7, Figure 7-4, has a carry weight of 3.45 kilograms (7.6 pounds) and a carry length of 775 millimeters (30.5 inches). The firing length is 980 millimeters (38.6 inches). Muzzle velocity is 200 meters per second (656 feet per second). The effective range is 220 meters (240 yards) and the operational range is 350 meters (383 yards). Armor penetration is 150 millimeters (5.9 inches). The shaped charge liner is an explosive formed penetrator (EFP) and utilizes PBXN-9 as the primary explosive charge.

7-2.7 M72A7 LAW w/Graze (HA29).

7-2.7.1 Intended Use. The M72A7 with Graze is a man-portable, standoff weapon for use against light armored vehicles. The M72A7 LAW with Graze is restricted to combat use only. The graze feature in the fuze ensures the warhead will initiate in situations where the rocket only “grazes” the target.

7-2.7.2 Description. The M72A7 LAW with Graze (HA29) is identical to the M72A7 LAW (H557) with the exception of a graze feature in the fuze. The rocket has an M412A1 fuze, which is a single safe design that relies on acceleration to arm and contains a graze feature that provides a redundant means of initiating the warhead.

7-2.8 M72AS 21mm Trainer Rocket (HA21).

7-2.8.1 Intended Use. The M72AS 21mm rocket is used as a training round. Its flight characteristics match those of the M72A4 through M72A7 LAW rockets. The 21mm rocket is fired from a modified tactical launcher which is reusable. The round was Type Classified by the U.S. Army in 1994 and was approved for use by Naval Special Warfare in CY 2002.

7-2.8.2 Description. The trainer rocket weighs 160 grams (0.35 lbs.) and is approximately 280 mm (11 in) in length. The trainer launcher is a modified tactical launcher. A sub-caliber barrel, protective sleeve, trigger housing reinforcement, and a rotating primer cover are used to modify the tactical launcher for trainer use.

7-2.8.3 Function. After inserting the 21mm trainer rocket into the sub-caliber barrel of the trainer launcher, the procedures to fire the rocket are the same as those for the tactical round: The launcher is transitioned from the carry to the ready-to-fire mode which cocks the weapon and releases the spring-loaded sights. Moving the safety forward arms the weapon. Depressing the trigger ignites the rocket propellant, discharging the 21mm rocket. A red tracer provides a visible means of tracking the rocket.

7-2.9 M72A9 Lightweight Assault Weapon Anti-Structure Munition (HA48).

7-2.9.1 Intended Use. The M72A9 utilizes an enhanced blast warhead. The warhead is designed to penetrate urban walls and subsequently detonate a high performance enhanced blast explosive within the interior of the structure.

7-2.9.2 Description. The M72A9, Figure 7-4, has a carry weight of 4.28 kgs (9.5 pounds) and a carry length of 775 millimeters (30.5 inches). The firing length is 980 millimeters (38.6 inches). Muzzle velocity is 126 meters per second (415 feet per second). The effective and operational ranges are 150 meters (492 feet) The weapon uses the M72A7 propulsion system and launcher. PBXIH-18 is the primary explosive charge. The warhead penetrates the target prior to initiation to allow for enhanced blast effects. (There are two versions of the M72A9 and both have the same form, fit, and function. The differences are that NSN 1340-01-538-4308 has a green launcher and NSN 1340-01-545-5033 has a black launcher and includes a reflex sight rail.)

7-3 AT4 WEAPON SYSTEM

7-3.1 M136 (AT4) Light Anti-Armor Weapon (C995).

7-3.1.1 Intended Use. The M136 (AT4) HEAT Light Anti-Armor Weapon, Figure 7-5, is a lightweight, recoilless, preloaded, disposable weapon designed for use against modern light armored vehicles. However, landing craft, hovercraft, small vessels, aircraft, and helicopters coming into land may also be engaged. The AT4 weapon system utilizes an 84 millimeter (3.3 inches) diameter warhead. A 9 millimeter subcaliber trainer is available for marksmanship training.

7-3.1.2 Description. The AT4 HEAT system weighs approximately 6.7 kilograms (14.8 pounds) and is 1020 mm (40 inches) in length. Muzzle velocity is 290 meters per second (950 feet per second) and penetration is 420mm (16.5 inches). Minimum arming range is 10 meters (33 feet). Behind armor effects include blinding light, intense heat, over pressure, and massive internal damage. The explosive shaped charge is filled with Octol.

7-3.2 AT4 Confined Space (CS) Reduced Sensitivity (RS) (CA30).

7-3.2.1 Intended Use. The 84mm AT4 CS RS, Figure 7-6, is a preloaded, disposal weapon designed for close combat scenarios against modern light armored vehicles. The lightweight, recoilless, anti-armor weapon can be fired from within a confined space (i.e. bunkers or small buildings) through the use of a counter-mass container, which attenuates sound levels and absorbs much of the propellant gases ejected out of the rear of the launcher. The launcher houses a fin stabilized HEAT shell with cartridge case assembly and counter-mass container.

7-3.2.2 Description. The AT4 CS RS weighs 7.9 kg (17.5 pounds) and is 1043 mm (41.7 inches) in length. The high explosive warhead (PBXN-110) functions on impact. Penetration exceeds 500 mm RHA. Initial projectile acceleration and pressure from propellant gases are the physical fuze arming conditions. The minimum arming distance is 10 meters, and the time of flight to 300 meters is approximately 1.5 seconds. Muzzle velocity is 225 m/s.

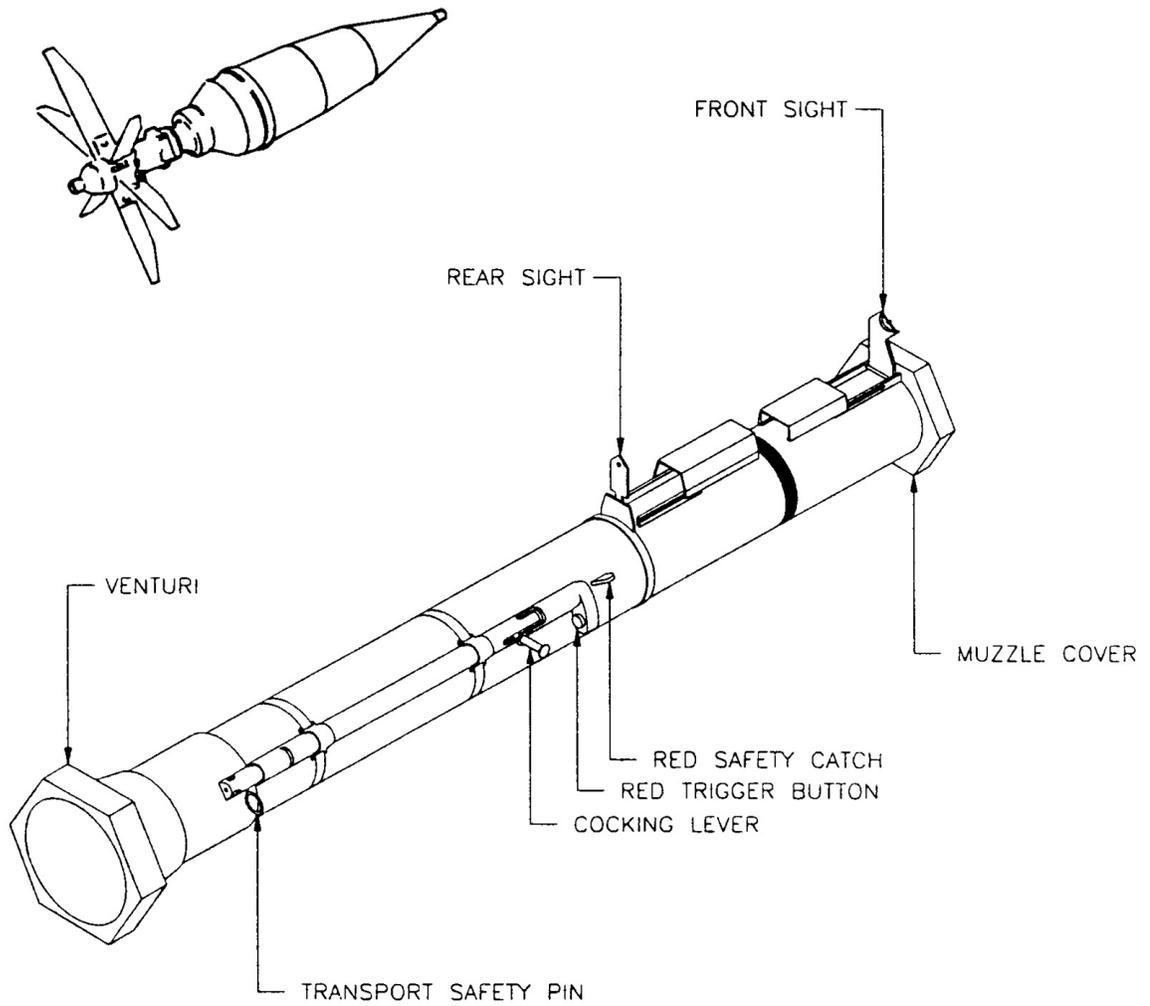


Figure 7-5 M136 (AT4) Light Anti-Armor Weapon

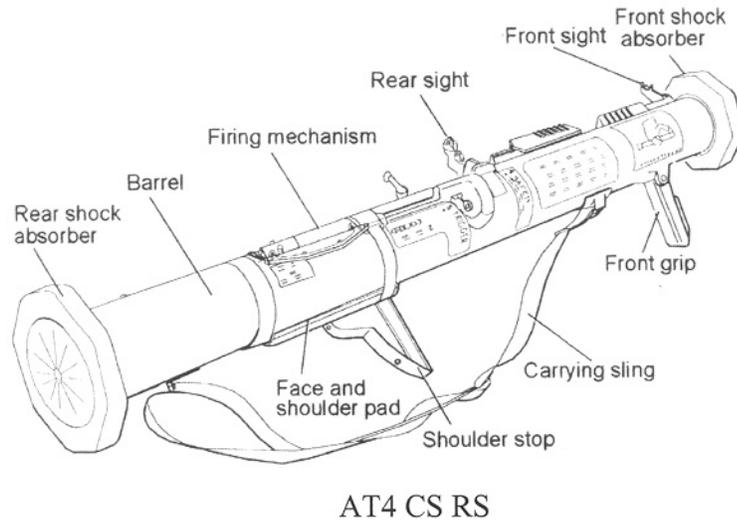


Figure 7-6 AT4 CS RS

The minimum size of the confined space for the AT4 CS RS shall be a room with dimensions of 3 x 3 x 2.5 m (LxWxH). The room shall have an open window (1 x 1 m), and an open door (1 x 2 m) in the wall opposite the window as a minimum. The extended bore axis line must face anywhere along the rear wall, but cannot face side walls of the room. The maximum permissible vertical angle must not exceed 30° above or below the horizontal plane (Figure 7-7).

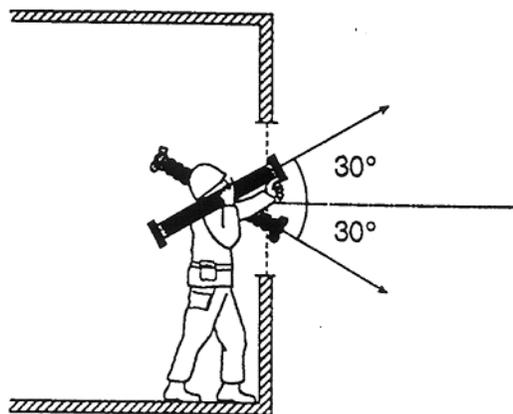


Figure 7-7 Maximum Permissible Vertical Angle for AT4 CS RS

7-4 CARL-GUSTAF WEAPON SYSTEM

7-4.1 84 Millimeters Carl-Gustaf Recoilless Rifle, M3.

7-4.1.1 Intended Use. The M3 is a multipurpose, medium range weapon system and was specifically designed to engage lightly armored targets at ranges of 700 meters (2,300 feet) and soft targets at ranges up to 1,000 meters (3,300 feet).

7-4.1.2 Function. The gun is breech-loaded and laterally percussion-fired type. The gun is recoilless and can be fired from the standing, kneeling, sitting, or prone positions. It can fire 84mm HE, HEAT, HEDP, smoke, illumination, practice, and training ammunition.

7-4.1.3 Description. The weight of the gun, mount, and sight is approximately 10 kilograms (22 pounds). The length of the gun is 1,065mm (41.9 inches). See Figure 7-8.

7-5 M3 CARL GUSTAF 84MM AMMUNITION

This section provides general and technical information on the types of ammunition fired with the M3 Carl Gustaf 84mm Weapon, see Figure 7-9. See Table 7-3 for packaging and identification data.

7-5.1 84 Millimeter HEAT Round 551 (C383).

7-5.1.1 Intended Use. This 84mm HEAT round is intended for use against all types of armored fighting vehicles and may also be employed against concrete bunkers, landing craft, and other similar hard targets. In addition to its great penetrating power, the fragments of the shell body have a high lethal effect on personnel in close proximity to the target.

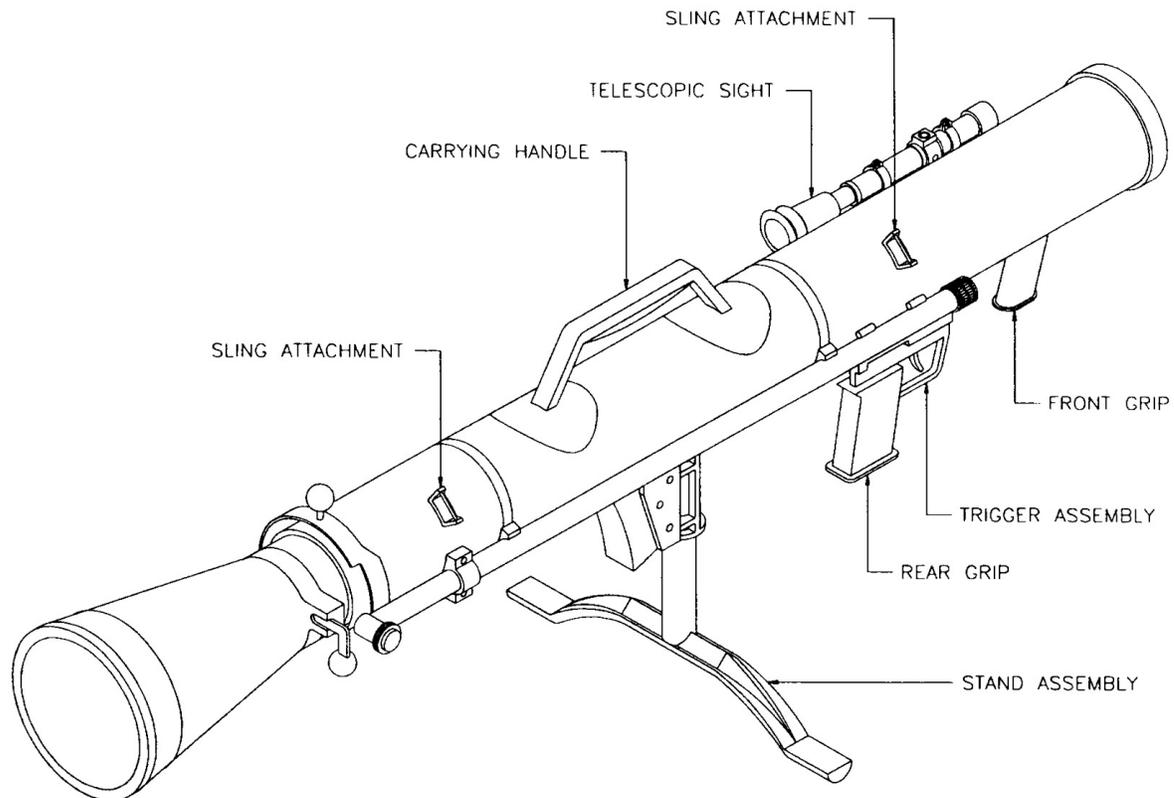


Figure 7-8 M3 Carl-Gustaf 84mm System

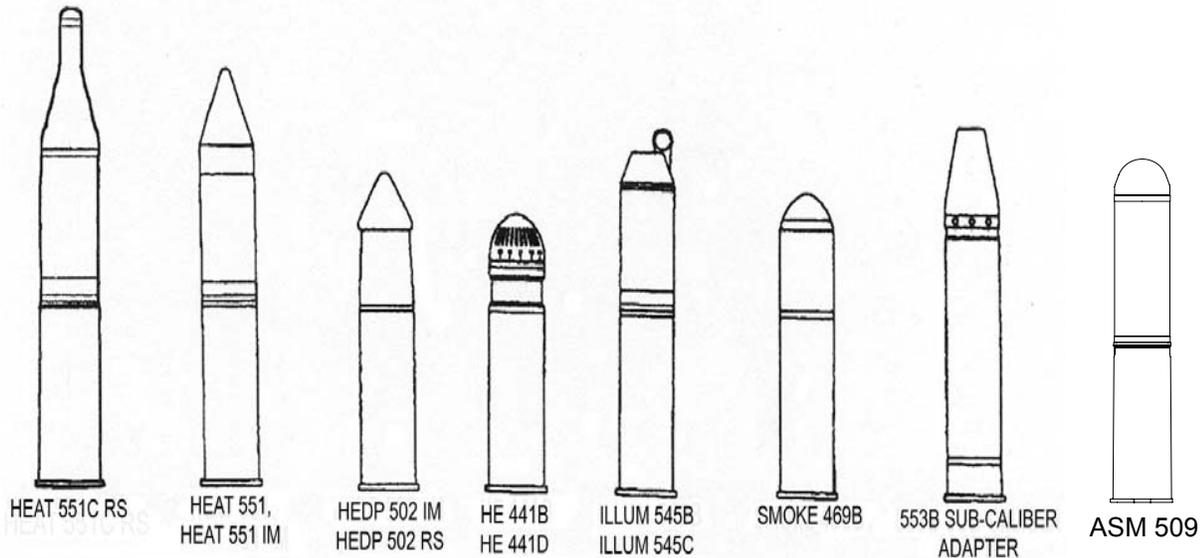


Figure 7-9 84mm Ammunition (M3 Carl-Gustaf System)

7-5.1.2 Description. The HEAT shell weighs 3.2 kilograms (7.1 pounds) and is 600 millimeters (23.6 inches) long. Muzzle velocity is 255 meters per second (837 feet per second) and the maximum velocity at 500 meters (547 yards) is 330 meters per second (1083 feet per second). The maximum effective range is 700 meters (765 yards). The arming range is 5-15 meters (15-50 feet). This round will penetrate approximately 400 millimeters (16 inches) of armor. The explosive fill is Octol.

7-5.1.3 Function. In order to obtain a flat trajectory and a short time of flight, the shell has a rocket motor which is ignited when the shell has left the gun barrel. The shell is fin-stabilized and rotates slowly in flight. A piezoelectric fuze system is utilized, making it possible to fire the shell through brush and shrub without fuze initiation.

7-5.2 84 Millimeter HEAT Round 551 IM (HA16).

7-5.2.1 Intended Use. This 84mm HEAT round is intended for use against all types of armored fighting vehicles and may also be employed against concrete bunkers, landing craft, and other similar hard targets. In addition to its

great penetrating power, the fragments of the shell body have a high lethal effect on personnel in close proximity to the target. The U.S. Navy conducted a foreign comparative test program in which the primary explosive fill of the 551 was replaced with PBXN-110. The round has been qualified by the U.S. Navy and is designated the 551 IM.

7-5.2.2 Description. The HEAT shell weighs 3.2 kilograms (7.1 pounds) and is 600mm (23.6 inches) long. The muzzle velocity is 255 meters per second (837 feet per second) and the maximum velocity at 500 meters (547 yards) is 330 meters per second (1083 feet per second). The maximum effective range is 700 meters (765 yards). The arming range is 5-8 meters (16-26 feet). This round will penetrate approximately 200mm (7.9 inches) of armor. The explosive fill is PBXN-110.

7-5.2.3 Function. In order to obtain a flat trajectory and a short time of flight, the shell has a rocket motor which is ignited when the shell has left the gun barrel. The shell is fin-stabilized and rotates slowly in flight. A piezoelectric fuze system is utilized, making it possible to fire the shell through brush and shrub without fuze initiation.

7-5.3 84 Millimeter HEAT Round 551C RS(CA20).

7-5.3.1 Intended Use. This 84mm HEAT round is intended for use against all types of armored fighting vehicles and may also be employed against concrete bunkers, landing craft, and other similar hard targets. In addition to its great penetrating power, the fragments of the shell body have a high lethal effect on personnel in close proximity to the target. This round is a variant of the 551 IM (HA16). The round has been released for use by Special Operations Forces.

7-5.3.2 Description. The HEAT shell weighs 3.5 kilograms (7.7 pounds) and is 652mm (25.7 inches) long. The muzzle velocity is 245 meters per second (804 feet per second) and the maximum velocity at 500 meters (549 yards) is 330 meters per second (1083 feet per second). The maximum effective range is 700 meters (766 yards). The arming range is 5-8 meters (17-26 feet). The minimum armor penetration recorded in testing was 279 mm (11 inches). The explosive fill is PBXN-110.

7-5.3.3 Function. In order to obtain a flat trajectory and a short time of flight, the shell has a rocket motor which is ignited when the shell has left the gun barrel. The shell is fin-stabilized and rotates slowly in flight. A piezoelectric fuze system is utilized, making it possible to fire the shell through brush and shrub without fuze initiation.

7-5.4 84 Millimeter Sub-Caliber Adapter 553B (A254), (L498), (L612).

7-5.4.1 Intended Use. The 84mm Sub-Caliber Adapter 553B is intended for use with the 7.62mm Tracer Training Cartridge 553, Backblast Simulator Charge 553B and the Percussion Cap W/Holder FFV 553B (See Paragraph 4-13.16). This training aid, when used with the 7.62mm Training Cartridge, Percussion Cap and Backblast Simulator Charge, is intended to simulate the trajectory and backblast of 84mm HEAT Round 551. The tracer cartridge and the backblast charge can be used together or separately.

7-5.4.2 Description. The subcaliber adapter weighs 3.7 kilograms (8.16 pounds) and is 600 millimeters (23.6 inches) long. The adapter is exter-

nally similar to the 84mm HEAT round but contains a 7.62mm baffle which is boresighted with the rifle.

7-5.4.3 Function. Upon firing, the firing pin initiates the Percussion Cap 553B. The resultant pressure wave fires the 7.62mm Tracer Training Cartridge 553 and the Backblast Simulator Charge 553B. The loading, arming, and firing operations are the same as the 84mm HEAT Round 551.

7-5.5 84 Millimeter Smoke Round 469B (C385).

7-5.5.1 Intended Use. The 84 millimeter Smoke Round 469B is intended for tactical use on the battlefield to blind direct fire weapons. On impact, a smoke screen with a width of 15 meters (49 feet) is obtained. As the smoke does not give a thermal effect, the smoke screen remains on the ground. In addition, the smoke is nontoxic, does not cause fires, and leaves no harmful residues on the ground. The round has been released for use by Special Operations Forces.

7-5.5.2 Description. This round weighs 3.1 kilograms (6.8 pounds), is 4.42mm (17.4 inches) long, and has a maximum effective range of 1300 meters (1422 yards). The muzzle velocity is 240 meters per second (790 feet per second). The arming range is 70 meters (230 feet).

7-5.5.3 Function. The smoke shell contains a special smoke composition, based on titanium tetrachloride, which is able to withstand the stresses on firing. The longitudinal projections in the shell body make the smoke composition follow the spin of the shell, giving the shell stability in flight. The fuze functions both on direct impact with the nose and at small angles of impact.

7-5.6 84 Millimeter Illuminating Round 545B (C384).

7-5.6.1 Intended Use. The 84mm Illuminating Round 545B is designed for very quick illumination of target areas. The illuminating round is also intended to facilitate other units supplying continuous illumination to a target and/or battle area. The descent of the illuminating round is controlled by a parachute attached to the canister. The round has been released for use by Special Operations Forces.

7-5.6.2 Description. The Illuminating Round weighs 3.1 kilograms (6.8 pounds) and is 476 millimeters (18.73 inches) long. This round consists of a cartridge case, illuminating shell, and time fuze. The illuminating shell contains a pyrotechnic time fuze, a canister with illuminating composition and canopy parachute. The pyrotechnic time fuze is fitted with a graduated setting ring and is provided with a protective rubber hood. The fuze can be set for times corresponding to 500, 800, 1100, 1400, and 1700 meter distances (subdivided in 50 meter settings) through manual turning of the fuze head. The muzzle velocity is 260 meters per second (850 feet per second).

7-5.6.3 Function. On firing, the time fuze is ignited and a pyrotechnic train burns for the pre-selected time and ignites the expelling charge. The expelling charge, in turn, ignites the illuminating composition in the shell. Overpressure in the shell body ejects the canister with attached parachute. The practical of burst is 300 to 2,100 meters (330 to 2,300 yards). The height of the burst is approximately 200 meters (660 feet), the illuminated area is approximately 400-500 square meters (1300-1640 square feet). A 650,000 candle power of illumination is provided with an average burning time of 30 seconds. The rate of descent is approximately 5 meters per second (16.4 feet per second).

7-5.7 84 Millimeter HEDP Round 502 (C387).

7-5.7.1 Intended Use. The 84mm HEDP Round 502 is a dual purpose HE and HEAT round optimized for combat in urban areas. This round is fin-stabilized and is effective against light armored vehicles, concrete and brick walls, field fortifications and ground forces. The round has been released for use by Special Operations Forces.

7-5.7.2 Description. The HEDP round weighs 3.3 kilograms (7.27 pounds) and is 437 millimeters (17.2 inches) long. This round consists of a cartridge case, nose cap, shell body, fin assembly and fuze system. The fuze system has two modes, impact or delayed action, selected when loading according to the type of target. The muzzle velocity is 225 meters per second (738 feet per second). The arming range is 15-40 meters (49-131 feet).

7-5.7.3 Function. On firing, an overpressure builds up in the cartridge case. This overpressure is one of the conditions for starting the arming function and accomplishing fin unfolding when the shell has left the muzzle. After muzzle exits, the dual mode fuze system safety devices are armed approximately 15 meters (49 feet) from the muzzle. On detonation (initiated either by the delay fuze mode or direct target impact), the delay detonator initiates and initiates an electric detonator which, in turn, initiates the booster. The booster then initiates the burster charge creating the detonation wave.

7-5.8 84 Millimeter High Explosive Dual Purpose (HEDP) Round 502 IM or 502RS (CA21).

7-5.8.1 Intended Use. The 84mm HEDP 502 IM or RS Round is a dual purpose HE and HEAT round optimized for combat in urban areas. This round is fin-stabilized and is effective against light armored vehicles, concrete and brick walls, field fortifications and ground forces. This round is a variant of the HEDP 502 and utilizes Navy approved explosives. The round has been released for use by Special Operations Forces. There are no differences in the designs of the 502 IM and 502 RS; only a change in the nomenclature designation (IM or RS).

7-5.8.2 Description. This round weighs 3.2 kilograms (7.1 pounds) and is 439 millimeters (17.3 inches) long. This round consists of a cartridge case, nose cap, shell body, fin assembly and fuze system. The fuze system has two modes, impact or delay action, selected when loading according to the type of target. The muzzle velocity is 225 meters per second (738 feet per second). The arming range is 15 - 40 meters (49-131 feet).

7-5.8.3 Function. On firing, an overpressure builds up in the cartridge case. This overpressure is one of the conditions for starting the arming function and accomplishing fin unfolding when the shell has left the muzzle. After exiting from the muzzle, the dual mode fuze system safety device is armed approximately 15 meters (49 feet) from the muzzle. On detonation (initiated either by the delay fuze mode or direct target impact), the delay

detonator initiates the booster. The booster then initiates the burster charge creating the detonation wave.

7-5.9 84 Millimeter HE Round 441B (C382).

7-5.9.1 Intended Use. The 84mm HE Round 441B is intended for use against troops in the open, machine gun posts, soft-skinned transport vehicles and similar type targets. This round is fin-stabilized and can be set for either impact detonation or air burst. The round has been released for use by Special Operations Forces.

7-5.9.2 Description. This HE round weighs 3.1 kilograms (6.8 pounds) and is 375 millimeters (15.2 inches) long. This round consists of a cartridge case, shell body, fin assembly and a 447 Fuze. The 447 Fuze is a combined mechanical time and impact fuze. The shell body contains two rubber inserts with about 800 steel balls surrounding the explosive charge. The muzzle velocity is 240 meters per second (787 feet per second). The arming range is 20-70 meters (66-230 feet).

7-5.9.3 Function. On firing, an overpressure builds up in the cartridge case. This overpressure is one of the conditions for starting the arming function and accomplishing fin unfolding when the shell has left the muzzle. On detonation (initiated either by time mechanism or direct impact), the 800 steel balls are evenly ejected to form a highly lethal cloud.

7-5.10 84 Millimeter Target Practice (TP) Round 552 (C386).

7-5.10.1 Intended Use. The 84 millimeter Target Practice (TP) 552 round is intended for use as a training aid with flight characteristics which correspond with the HEAT 551 (IM) round. The TP 552 has the same weight, center of gravity, and ballistic characteristics as the tactical round. The difference is the TP 552 does not have a fuze or a main explosive charge. The round has been released for use by Special Operations Forces.

7-5.10.2 Description. This round weighs 3.2 kilograms (7.1 pounds) and is 60 millimeters (23.6 inches) long. The muzzle velocity is 255 meters per second (840 feet per second) and the maximum velocity at 500 meters (550 yards) is 330 meters per second (1080 feet per second). The maximum effective range is 700 meters (765 yards).

7-5.10.3 Function. To duplicate the flight characteristics of the 551 (IM) round, the shell has a rocket motor which is ignited when the shell has left the gun barrel resulting in a flat trajectory and a short time of flight.

7-5.11 84 Millimeter High Explosive (HE) Round 441D (CA27).

7-5.11.1 Intended Use. The 84mm HE 441D Round is intended for use against troops in the open, machine gun posts, soft-skinned transport vehicles and similar type targets. This round is fin-stabilized and can be set for either impact at detonation or air burst. This round is a variant of the 441B and utilizes Navy approved explosives. The round has been released for use by Special Operations Forces.

7-5.11.2 Description. This round weighs 3.2 kilograms (7.05 pounds) and is 376 millimeters (14.8 inches) long. It consists of a cartridge case, shell body, fin assembly and fuze system. The fuze is combined mechanical time and impact fuze. The shell body contains two rubber inserts with about 800 steel balls surrounding the explosive charge. The muzzle velocity is 240 meters per second (787 feet per second). The arming range objective is 40-70 meters (131-230 feet).

7-5.11.3 Function. On firing, an overpressure builds in the cartridge case. This overpressure is one of the conditions for starting the arming function and accomplishing fin unfolding when the shell has left the muzzle. On detonation (indicated either by the timing mechanism or direct impact), the 800 steel balls are ejected to form a highly lethal cloud.

7-5.12 84 Millimeter Illuminating Round 545C (CA36).

7-5.12.1 Intended Use. The 84mm Illuminating Round 545C is designed for illumination of target areas. The descent of the illuminating round is controlled by a parachute attached to the canister. This round is being qualified for use by Special Operations Forces.

7-5.12.2 Description. The Illuminating Round weighs 3.1 kilograms (6.83 pounds) and is 466 millimeters (18.35 inches) long. This round consists of a cartridge case, illuminating shell, and time fuze. The illuminating shell contains a pyrotechnic time fuze, a canister with illuminating composition and canopy parachute. The pyrotechnic time fuze is fitted with a graduated setting ring and is provided with a protective rubber hood. The F555 fuze can be set for times corresponding to 300, 600, 900, 1200, 1500, 1800 and 2100 meter distances (subdivided in 50 meter settings) through manual turning of the fuze head. The muzzle velocity is 260 meters per second (853 feet per second). The height of the burst is approximately 200 meters (660 feet), the illuminated area is approximately 400-500 square meters (1300-1640 square feet).

7-5.12.3 Function. On firing, the percussion cap initiates the ignition composition that will initiate the propellant. The propellant burns for the pre-selected time and ignites the expelling charge. The expelling charge, in turn, ignites the ignition pellet. After ejection of the illumination assembly from the shell, the illuminating composition is ignited. Overpressure in the shell body ejects the canister with attached parachute. A 650,000 can-

dlepower of illumination is provided with an average burn time of 30 seconds. The rate of descent is approximately 5 meters per second (16.4 feet per second).

7-5.13 84 Millimeter Anti-Structure Munition 509 (CA41).

7-5.13.1 Intended Use. This 84mm ASM round is intended for use against a threat force inside a building or a bunker. This round is being qualified for use by Special Operations Forces.

7-5.13.2 Description. The 509 ASM Round weighs 4.2 kilograms (9.282 pounds) and is 537 millimeters (21.48 inches) long. This round consists of a cartridge case, shell body, and fuze system. The fuze system has two modes, impact and delayed action, that are selected when loading. The muzzle velocity is approximately 170 meters per second (558 feet per second) and the maximum effective range is 300 meters (980 feet). The arming range is 14 to 25 meters (45.9 to 82 feet). The time of flight to 300 meters (980 feet) is 1.9 seconds. The explosive fill is YJ05.

7-5.13.3 Function. On firing, an overpressure builds up in the cartridge case. The overpressure begins to accelerate the projectile when the joint between the projectile and cartridge case has been broken. The fins unfold when the shell has left the muzzle. After exiting from the muzzle, the dual mode fuze system safety device is armed approximately 14 to 25 meters from the muzzle. The fuze is initiated at impact or 30 ± 15 ms thereafter, depending on which mode (impact or delay) was selected when loading.

Table 7-3 M3 Carl-Gustaf Ammunition

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
84 Millimeter HEAT Round 551 Carl-Gustaf	C383	7-5.1	1315-21-885-5293	166880 166990	2 rounds per twin pack, 3 twin packs per wooden box
84 Millimeter HEAT Round 551 IM Carl-Gustaf	HA16	7-5.2	1340-01-448-0560	5215425 4110086	2 rounds per twin pack, 3 twin packs per wooden box
84 Millimeter HEAT Round 551C RS Carl-Gustaf	CA20	7-5.3	1315-01-468-8838	5227266 4113357	2 rounds per twin pack, 3 twin packs per wooden box
Cartridge, 7.62mm, Tracer/Training, 84 Millimeter Sub-Caliber Adapter 553B Carl-Gustaf	A254	7-5.4 4-13.16	1305-01-379-1539	104500 1107110	20 rounds per cardboard container, 8 cardboard containers per sub-pack, 8 sub-packs per wooden box
Percussion Primer Cap Holder for 84 Millimeter Sub-Caliber Adapter 553B Carl-Gustaf	L498	7-5.4 4-13.16	1340-01-379-1540	290080 110730	20 rounds per cardboard container, 12 cardboard containers per sub-pack, 8 sub-packs per wooden box
Backblast Simulator 84 Millimeter Sub-Caliber Adapter 553B Carl-Gustaf	L612	7-5.4 4-13.16	1370-01-379-3617	100660 110750	20 rounds per styrofoam container, 6 containers per wooden box
84 Millimeter Smoke Round 469B Carl-Gustaf	C385	7-5.5	1315-25-114-5323	5212094 4111232	2 rounds per twin pack, 3 twin packs per wooden box
84 Millimeter Illuminating Round 545B Carl-Gustaf	C384	7-5.6	1315-12-172-7195	5211996 4111529	2 rounds per twin pack, 3 twin packs per wooden box
84 Millimeter HEDP Round 502 Carl-Gustaf	C387	7-5.7	1315-01-343-1944	143824	2 rounds per twin pack, 3 twin packs per wooden box
84 Millimeter HEDP Round 502 IM or RS Carl-Gustaf	CA21	7-5.8	1315-01-468-8840	5227014 4113234	2 rounds per twin pack, 3 twin packs per wooden box
84 Millimeter HE Round 441B Carl-Gustaf	C382	7-5.9	1315-25-114-5324	167020	2 rounds per twin pack, 3 twin packs per wooden box
84 Millimeter Target Practice (TP) Round 552 Carl-Gustaf	C386	7-5.10	1315-21-885-5294	5210352 4111325	2 rounds per twin pack, 3 twin packs per wooden box
84 Millimeter High Explosive (HE) Round 441D Carl-Gustaf	CA27	7-5.11	1315-01-492-9747	5227050 4113253	2 rounds per twin pack, 3 twin packs per wooden box
84 Millimeter Illumination 545C Carl Gustaf	CA36	7-5.12	1315-01-519-3136	5229871 4113912	2 rounds per twin pack, 3 twin packs per wooden box
84 Millimeter Anti-Structure Munition 509 Carl Gustaf	CA41	7-5.13	1340-01-528-1013	5229960 4113911	2 rounds per twin pack, 3 twin packs per wooden box

CHAPTER 8

LAND MINES

8-1 INTRODUCTION

This chapter contains general and technical information on land mines available for fleet use. The types of land mines discussed are Antipersonnel (APERS), Antitank (AT), and training. See Table 8-2 for packaging and identification data.

8-1.1 General. Land mines are explosive items placed in the enemy path to hinder movement or deny access to certain territory. The mines are usually concealed and rigged to initiate by enemy presence or contact. In some situations, personnel remotely initiate the mines. Mines may produce casualties by direct explosive force, fragmentation, or shaped-charge effect.

WARNING

HANDLE MINES WITH CARE AT ALL TIMES. THE EXPLOSIVE ELEMENTS IN FUZES, PRIMERS, DETONATORS, AND BOOSTERS ARE PARTICULARLY SENSITIVE TO MECHANICAL SHOCK, FRICTION, STATIC ELECTRICITY, AND HIGH TEMPERATURES.

WARNING

DO NOT DROP, DRAG, TUMBLE, WALK ON THE CORNERS, OR STRIKE, AS IN LINING UP A STACK BOXES OR CRATES CONTAINING MINES. ELECTRICALLY GROUND THE BOXES WHENEVER PRACTICABLE AND PROTECT THEM FROM HIGH TEMPERATURES.

CAUTION

IF THE TEMPERATURE FLUCTUATES AROUND FREEZING, TAKE STEPS TO PREVENT MOISTURE OR WATER FROM ACCUMULATING AROUND THE MINE AND SUBSEQUENTLY FREEZING. THE MINE MAY BECOME NEUTRALIZED BY THE FORMATION OF ICE.

8-1.1.1 Description. Land mines come in a variety of types, sizes, and shapes. They also may differ in material, quantity, type of explosive charge, or fuze type. Some mines use booby traps to prevent neutralization. Others have built-in mortars that project them into the air for wider fragment distribution. Directional fragmentation mines use a sighting mechanism for aiming, and some mines use remote-controlled firing devices for aiming. Most mines have fuzes which detonate the mine near the target. The primary components of land mines are the explosive charge, the fuze, and the mine body.

8-1.1.2 Explosive Charge. The major mine component is the explosive charge that provides the energy necessary for the mine to accomplish its mission. The energy may come in direct contact with the target or it may propel a fragmented projectile or a single, solid metal slug by means of an explosive charge. Antitank mines usually depend on direct contact, but a shaped charge aimed at the sides or belly of a tank or wheel of a vehicle is sometimes used. The basis of highest detonation consistent with ease of loading, compatibility, and logistics determines the type of explosive used for the main charge. Choices include, but are not limited to, tetryl, TNT, Comp B, and Comp C-4.

8-1.1.3 Fuze. The mechanical or electro-mechanical land mine fuze is usually activated by direct pressure from the target, such as being run over or stepped on, or by pressure exerted on a trip wire or tilt rod. Most mines come with fuzes already in them. This is safe because fuzes contain safety elements to inhibit accidental firing.

8-1.1.4 Mine Body. The bodies, some of which have actuator or secondary fuze wells, usually serve as a fuzeholder and explosive charge container. Materials used for body construction of mines include cast or sheet metal or plastics, depending on the degree of non-detectability or fragmentation desired.

8-1.2 Mine Explosive Train. The mine explosive train is a sequence of explosive elements. It begins with a small amount of highly sensitive explosive. Following that are other elements of progressively larger amounts and lesser sensitivity. This leads finally to the large main charge. Safety requires maintaining a ratio of sensitivity to quantity. Also required is a specific sequence of events from the triggering of the fuze to the detonation of the main charge. To make a complete explosive train requires a primer and detonator having at least a booster and a main charge. Sometimes the mine explosive train becomes more complicated, requiring other elements to produce the desired effects. A good example is the APERS bounding-type mine described in Paragraph 8-2.4.1

8-1.3 Handling And Storing Land Mines. Land mines come packed in wooden boxes or metal crates that may also contain the fuzes, activators, and accessories required for use. A box or crate may contain one mine or several mines of the same type. The packaging of mines enable them to withstand conditions ordinarily encountered in the field. Items that are not waterproofed come packaged in moisture-resistant containers.

8-1.4 Precautions. In addition to other warnings and cautions contained in this chapter, when handling and storing land mines, observe the following precautions:

a. Take care to keep containers and packing boxes from being broken or damaged. Immediately repair broken containers and transfer markings to the new parts. Do not open these containers until ready to use the mines or prepare for use. Repack items unpacked but not used and seal the containers. Use such items first in subsequent operations in order to keep opened containers and packing boxes to a minimum. When the ammunition packing box contains a metal liner, seal the

liner and air-test it at 3 to 5 pounds per square inch (1.36 to 2.27 kilograms/centimeter² [1.33 to 2.22 MP_a]), if equipment is available.

b. When storing mines in the open, raise them on dunnage at least 6 inches (15.24 centimeters) from the deck. Cover them with a double thickness of tarpaulin, leaving enough space for air circulation. When storing mines in the field, dig drainage ditches around the stacks to prevent water from running under the pile.

c. Protect mines and components in their packings from moisture.

d. Do not fuze a mine closer than 100 feet (30.48 meters) to a magazine or other such stores of explosives. If available, use safety tools in unpacking and repacking operations. Safety tools are those made of copper, wood, or other material incapable of producing sparks when struck.

e. Do not disassemble mines or components except as directed by the NAVSEASYSKOM.

f. The design of safety pins, safety forks (clips) and other safety devices is for preventing accidental initiation of the mine while being handled. Leave them in place until the last possible moment before arming a mine. Arm the mine per the procedures prescribed in arming procedures for the particular item. Disarm the mines by replacing safety devices before removing (picking up).

g. Clear the firing device wells, cap wells, activator wells, and fuze cavities of foreign obstruction matter before attempting to install the fuze or detonator. Inspect secondary fuze wells for signs of corrosion. Corrosion in a secondary fuze well can lead to explosive exudation. Do not attempt to clear corrosion from the fuze well. Do not attempt to fit an activator into corroded secondary fuze well.

h. Mines will usually function satisfactorily at temperatures of -40°F to 160°F (-40°C to 71°C). Most mines are not appreciably affected by temperature changes.

i. It is permissible to take up and re-lay mines numerous times by observing proper procedures and the components show no evidence of damage or deterioration.

8-2 ANTIPERSONNEL MINES

8-2.1 General. The primary purpose of APERS mines, Figure 8-1, is presenting a hazard that restricts or delays movement of enemy foot troops by denying them access to certain areas. For this reason, the number of casualties caused by these mines is of secondary importance. APERS mines usually initiate because of enemy intrusive action, Figure 8-2. However, some have the option of having friendly observers/ rig the mines so they may initiate them when enemy troops move within range. APERS mines are not effective against armored vehicles. However, light thin-skinned vehicles such as trucks and jeeps, may suffer damage or their occupants may be injured by a nearby detonation. Take special care when camouflaging APERS mines. Foot troops move slowly and this increases the possibility of spotting poorly concealed installations. The two basic types of APERS mines are blast and fragmentation.

8-2.2 Blast. This type mine depends on the effect of direct force developed by the explosion. The mine functions without delay while still in contact with the enemy who has initiated it.

8-2.3 Fragmentation. This type mine covers a fairly wide area with high-velocity fragments. The effective range of fragmentation mines is much greater than that of the blast type. There are three basic fragmentation-type mines: Bounding, Fixed Non directional, and Fixed Directional.

8-2.3.1 Bounding. Placement of this type mine is beneath the surface of the ground. When the mine explodes, it expels a fragmentation projectile from the mine body. The projectile explodes at a height of approximately 2 meters (6.56 feet) above the ground and propels fragments laterally in all directions.

8-2.3.2 Fixed Non-Directional. Placement of this type mine is on or just beneath the surface of the ground. When the mine explodes, it propels fragments upward and outward in all directions.

8-2.3.3 Fixed Directional. Placement of this type mine is on the ground or attached to a tree or a pole and aimed at the expected enemy path. When the mine explodes, it propels fragments outward in a fanshaped pattern (60° arc) above the ground. This mine has the capability of being initiated either by approaching enemy or a remote control device.

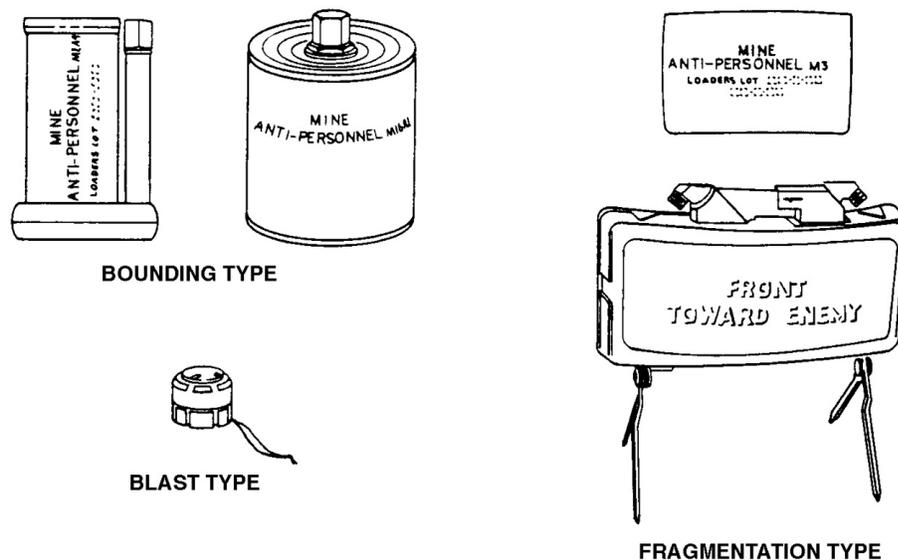
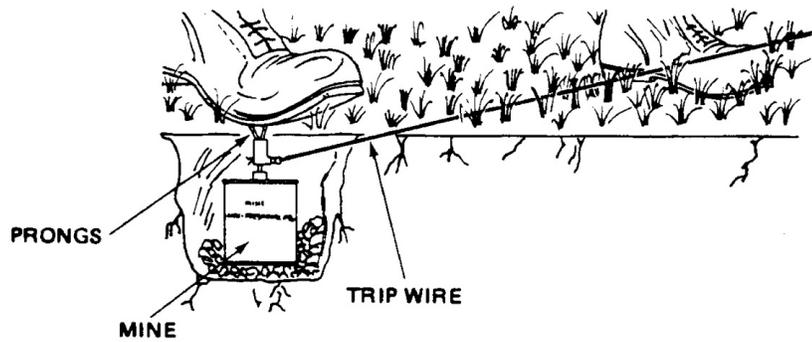


Figure 8-1 Antipersonnel Mines



**BOUNDING TYPE ANTIPERSONNEL MINE
ABOUT TO BE INITIATED BY:**

- (A) PRESSURE PRONGS OR
- (B) PULL ON TRIP WIRE ATTACHED
TO RELEASE RING

Figure 8-2 Initiating and Antipersonnel Mine

CAUTION

DETONATING FUZES AND IGNITION FUZES ARE FUNCTIONALLY DIFFERENT AND ARE NOT INTERCHANGEABLE.

8-2.4 Antipersonnel Mine Fuze (Obsolete).

The initiating action for an APERS mine fuze is either pressure applied directly on the fuze or a pull on a trip wire attached to the fuze. A detonating fuze is the term applied to a fuze that provides an explosive force. An ignition fuze is the term applied to a fuze that provides burning action. Various type of fuzes initiate the functioning of APERS mines. The fuze serves to transform mechanical action into an explosive force that detonates the high explosive charge. It can also convert mechanical action into a burning action that ignites the propelling charge of a bounding type APERS mine. The mechanical action originates from pressure on the fuze or pull on the trip cord.

8-2.4.1 Antipersonnel Explosive Train. Figure 8-3 shows the explosive trains in the bounding-type APERS mines. This type mine has two explosive trains, a propelling charge explosive train and a high explosive train. Operation of the propelling

charge explosive train causes ejection of the fragmentation shell or body from the outer case. When the shell or body reaches a predetermined height from the surface of the ground, the high explosive train detonates. This causes a dispersal of the shell or body fragments in a circular pattern.

8-2.4.2 Propelling Charge Explosive Train. The propelling charge explosive train functions as follows:

- a. Percussion Primer. The fuze firing pin strikes the percussion primer and initiates the priming composition. The percussion primer emits a small, intense flame downward.
- b. Delay Charge. The flame from the percussion primer ignites the delay charge which burns for a predetermined period.
- c. Relay Charge. The delay charge ignites the relay charge.
- d. Igniter Charge. The relay charge ignites the igniter charge that burns with sufficient intensity to set off the propelling charge.
- e. Propelling Charge. The propelling charge throws the high explosive filled shell or body into the air and also initiates the delay charge of the high explosive train.

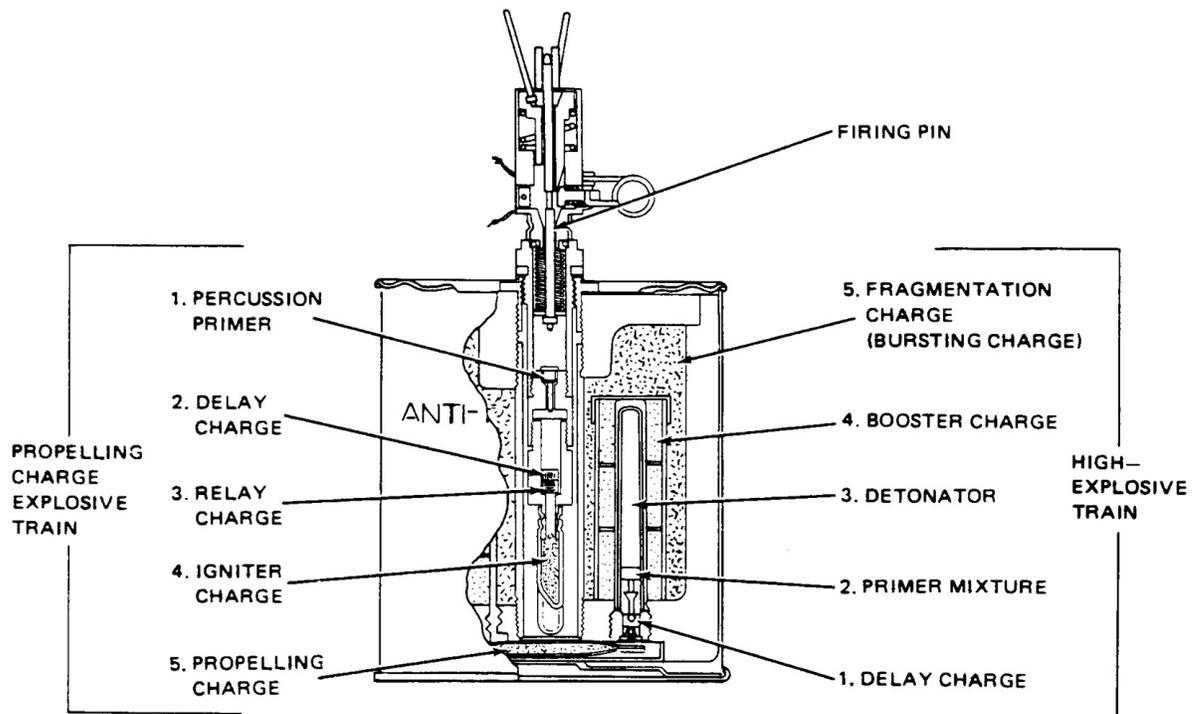


Figure 8-3 Explosive Trains in Bounding-Type Antipersonnel Mine

8-2.4.3 High Explosive Train. The components of the high explosive train function as follows:

a. **Delay Charge.** The propelling charge ignites the delay charge as it propels the high explosive projectile from the mine case. The delay charge burns, delaying detonation of the high explosive until the projectile attains sufficient height for producing an effective fragmentation pattern upon detonation.

b. **Primer Mixture.** After the time lag has elapsed, the delay charge sets off the primer mixture.

c. **Detonator Charge.** The flash from the primer mixture sets off the detonator charge.

d. **Booster Charge.** The detonation wave, from the detonator charge, sets off the booster charge. The booster charge reinforces and strengthens the detonation wave, assuring detonation of the fragmentation charge.

e. **Fragmentation (Bursting) Charge.** The detonation wave from the booster charge sets off the fragmentation charge. This ruptures the projectile case and projects the fragments in all directions at a high velocity.

8-2.5 Mine, Antipersonnel, M14, Non-Metallic (K121) (Obsolete).

8-2.5.1 Intended Use. This is a nonmetallic, blast-type, high-explosive, APERS mine. It is small, capable of being used in large numbers, and may be readily concealed. Since it explodes in direct contact with the enemy, the mine inflicts serious casualty. It is practically all plastic construction and is non detectable by magnetic mine detectors.

8-2.5.2 Description. The mine is cylindrical in shape. Six ribs on the outside of the body provide strength and serve as a means for identifying the mine in darkness. Packed separately for safety within the same shipping container as the mine is the plug-type plastic detonator holder with detonator. Install the detonator holder in the base of the mine. A shipping plug closes the hole in the base

of the mine during shipment. The plug is similar in external shape to the detonator holder. The difference is the shipping plug has a circular head and the detonator holder has a hexagonal head. The pressure plate has a yellow indicating arrow and is indented to accommodate the mine and fuze wrench. The letters A and S on top of the fuze body signify armed and safe, respectively. The slots in the pressure plate are for insertion of the steel, U-shaped safety clip. The pull cord is for use in removing the safety clip from the mine when testing and arming. Beneath the safety clip slots is a circular groove for a rubber gasket that makes a watertight joint between the pressure plate and the fuze body. Fastened to the center of the underside of the pressure plate is a lock key which holds the lockring firmly when the arrow points to "S". The lockring prevents the mine from firing prematurely. The spider spaces the parts within the fuze and supports the pressure plate when it is in the S position. The three projections inside of the center hole of the spider prevent the lockring, belleville spring and firing pin assembly from rotating when the pressure plate turns. The belleville spring with the attached lockring and firing pin assembly seat against the spider and a ridge on the rim of the partition holds it in place. The partition holds the main charge in place and prevents any explosive from getting into the firing mechanism of the fuze. The mine, loaded and fuzed, weighs approximately 3-1/3 ounces (94 grams), contains 1 ounce (28 grams) of tetryl, is 1-9/16 inches (3.96 centimeters) high, is 2-3/16 inch (5.55 centimeters) in diameter, and is olive drab.

8-2.5.3 Function The mine functions satisfactorily in temperatures ranging from -40°F to 125°F (-40°C to 51.66°C). To depress the pressure plate that depresses the lock key requires a force of 20 to 35 pounds (9.0 to 15.8 kilograms). The lock key forces the lockring to slide through notches in the inner ring of the spider and depresses the belleville spring. The belleville spring snaps into reverse and drives the firing pin into the detonator, exploding the main charge and resulting in an extensive blast.

WARNING

USE EXTREME CARE WHEN HANDLING THE DETONATORS FOR THIS MINE. A SEVERE SHOCK, SUCH AS DROPPING THE DETONATOR ON A SOLID SURFACE, MAY CAUSE IT TO FUNCTION. NEVER CARRY DETONATORS ON THE PERSON. AFTER ARMING THE MINE, HANDLE IT WITH CARE. DO NOT DROP OR THROW IT. PLACE IT IN POSITION CAREFULLY. IF THERE IS EVIDENCE OF DAMAGE, BOOBY TRAPPING, OR MALFUNCTION WHEN PROCEEDING TO DISARM OR REMOVE AN INSTALLED MINE, DO NOT ATTEMPT TO DISARM OR REMOVE IT. MARK IT FOR DESTRUCTION IN PLACE.

IF THIS MINE IS BURIED WITH THE TOP OF THE PRESSURE PLATE FLUSH WITH THE GROUND, IT WILL CAUSE A NONLETHAL CASUALTY TO ANY PERSON WHO STEPS ON IT.

CAUTION

THIS MINE IS NOT EFFECTIVE AGAINST ARMORED VEHICLES.

8-2.5.4 Installation and Arming. There are no provisions for booby trapping this mine. There are no secondary fuze wells. The installation and arming procedures are as follows:

- a. Dig a hole in the ground with a firm foundation at the bottom sufficiently stable to support the mine when the pressure plate has pressure applied to it. A block of wood or other non-metallic object provides a firm surface in the bottom of the hole. Ensure the hole is deep enough so the pressure plate extends just above ground level.

b. Unscrew the shipping plug from the bottom of the mine body using mine-and-fuze wrench M22. Inspect the detonator well and remove any foreign material.

c. Using the arming tool section of wrench M22, turn the pressure plate in a clockwise direction until the indicating arrow points to A. The pressure plate is now in the armed position.

d. Test the mine for malfunction. Withdraw the safety clip; if there is no malfunction, replace the safety clip and proceed.

e. Screw the detonator holder with the attached detonator gasket into the detonator well. Use wrench M22 and screw the detonator holder down tightly against the detonator gasket to obtain a watertight joint.

f. Place the mine in the hole so the pressure plate extends just above ground level, otherwise a shoe or boot may bridge the mine.

g. Remove the safety clip by pulling the safety clip pull cord. Retain the safety clip for possible future use to remove the mine.

NOTE

When camouflaging the mine, use a mixture of material such as dirt, clay, grass, gravel, and fine twigs. Arrange the material so that heavy rain is not likely to wash it away.

h. Camouflage the mine and remove any excess soil from the immediate installation vicinity.

8-2.5.5 Disarming and Removal. The disarming and removal (neutralizing) procedures are as follows:

a. Remove camouflage material and carefully uncover the concealed mine. Do not exert pressure on the pressure plate.

b. Enlarge the hole carefully and examine the ground around and underneath the mine for evidence of damage, malfunction, or improvised boobytrapping.

c. Before moving the mine, insert the safety clip in the slots in the pressure plate. If it is not relatively easy to insert the safety clip, it is an indica-

tion that the mine has malfunctioned or suffered damaged. In such cases, mark the spot and discontinue further attempts to disarm the mine.

d. Using the mine-and-fuze wrench, turn the pressure plate in a Counterclockwise (CCW) direction from A to S.

e. Remove the mine from the ground.

f. Unscrew the detonator holder from the bottom of the mine body, using the mine-and-fuze wrench.

g. Replace the shipping plug and gasket.

h. Restore the mine to its original condition and packing.

8-2.6 Mine, Antipersonnel, M16, M16A1 and M16A2 with Fuze, Mine, Combination M605 (K092) (Obsolete).

8-2.6.1 Intended Use. This APERS mine, Figure 8-4, is primarily employed in mixed mine fields to protect antitank mines against enemy breaching parties. However, another method is to use it by itself in the preparation of ambushes or in the nuisance mining of areas subject to likely occupation by enemy troops. This mine is the bounding type and functions similar to the M2 series mine (Paragraph 11-5.1). This mine has an explosive charge three times larger than the M2 series and therefore has a more effective fragmentation pattern and a larger effective radius.

8-2.6.2 Description. This APERS mine consists of a propelling charge, a projectile, and a combination mine fuze M605, all contained in a sheet steel case. The fuze screws into the top of the case and extends through the center of the projectile to the bottom of the case. The bottom of the case contains the propelling charge. The projectile occupies the remaining space inside the case. The propelling charge consists of approximately 75 grains (4.86 grams) of black powder, and the bursting charge in the projectile is approximately 1 pound (.454 kilogram) of TNT. The mine is 4-1/16 inches (10.31 centimeters) in diameter, weighs approximately 7-7/8 pounds (3.57 kilograms) when loaded and fuzed, and is olive drab. The principal differences between the M16, M16A1, and M16A2 are the construction of the detonators and boosters.

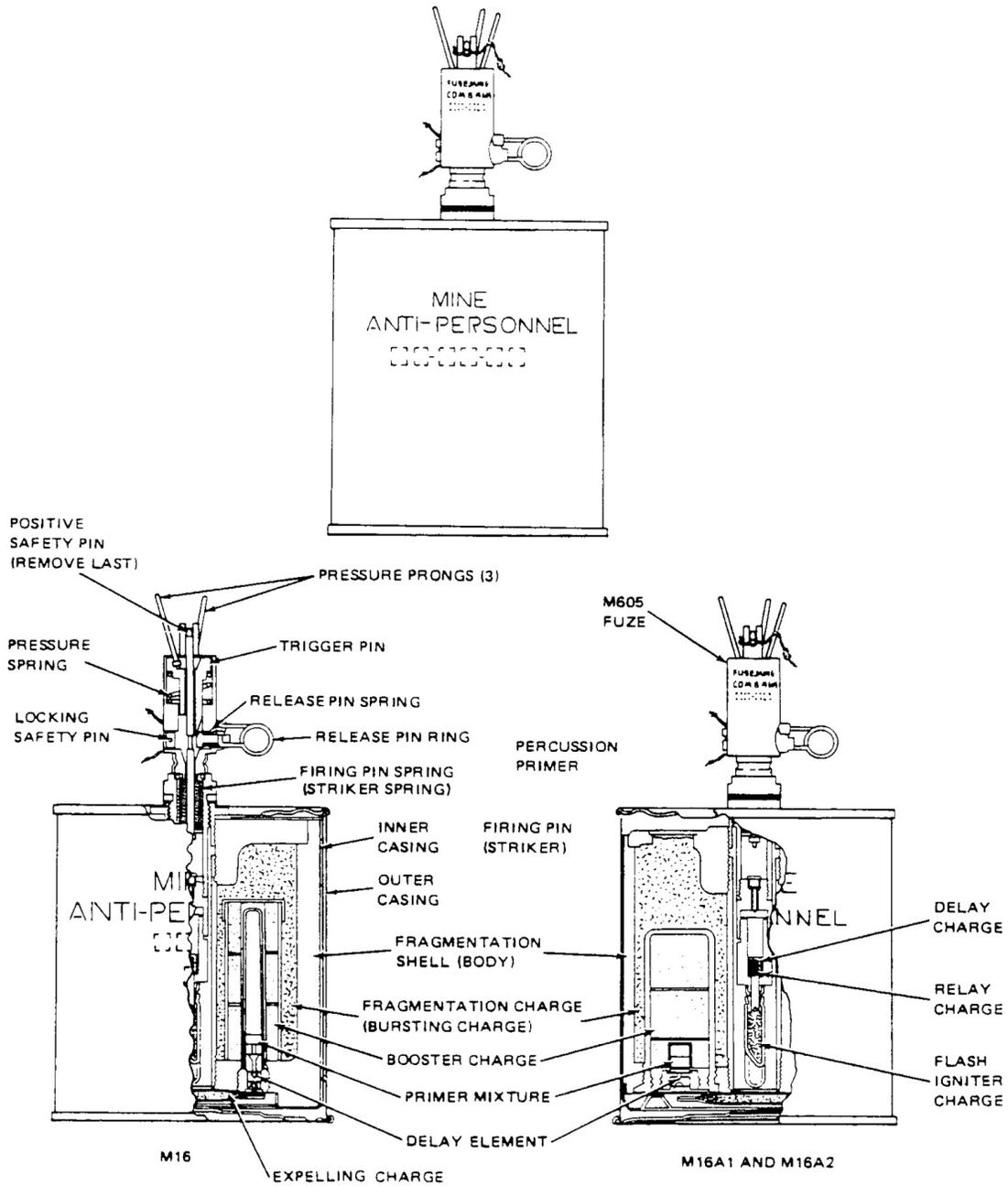


Figure 8-4 Antipersonnel Mine M16, M16A1, and M16A2 with Combination Mine Fuze M605

8-2.6.3 Function. The fuze is triggered when a pressure of 8 to 20 pounds (3.62 to 9.07 kilograms) acting on one or more of the three prongs of the fuze or when a pull of 3 to 10 pounds (1.36 to 4.53 kilograms) on the trip wire releases the firing pin. The firing pin strikes the primer, igniting the fuze delay charge. The fuze delay charge then ignites the fuze relay charge, igniting the fuze igniter charge that ignites the mine propelling charge. The mine propelling charge projects the cast-iron shell upward from the mine body, simultaneously igniting the two detonator delay charges. When the shell is approximately 1 meter (3.28 feet) above the ground, the detonator delay charges initiate the detonators. The detonators explode the boosters that explode the bursting charge, shattering the shell and projecting metal fragments in all directions. The mine has a casualty radius of approximately 30 meters (98 feet) and a danger radius of 200 meters (656 feet).

WARNING

IF THE POSITIVE SAFETY PIN IS HARD TO REMOVE, REPLACE THE FUZE WITH A NEW ONE. DURING INSTALLATION AND ARMING, DO NOT INSTALL THE TRIP WIRES SO TAUT THAT THEY EXERT PULL ON THE RELEASE PIN RING. THE MINE MAY DETONATE ACCIDENTALLY UPON REMOVAL OF THE SAFETY PINS.

WHEN BURIED WITH THE TOPS OF THE PRESSURE PRONGS EVEN WITH THE SURFACE OF THE GROUND, SYMPATHETIC DETONATION OCCURS WHEN M16 MINES LAID APPROXIMATELY 1.5 TO 2 METERS (4.92 TO 6.56 FEET) APART.

8-2.6.4 Installation and Arming. The installation and arming procedures are as follows:

a. Dig a hole approximately 6 inches (15.24 centimeters) deep and approximately 5 inches (12.7 centimeters) in diameter.

b. Unscrew the hexagonal shipping plug from the fuze well of the mine, using the closed end of fuzing wrench M25 issued with the mine.

c. Examine the fuze well and flash tube for evidence of obstruction or foreign matter. To remove obstructions or foreign matter, turn the mine upside down and gently tap its bottom. If any mines appear to be damaged or in an unsatisfactory condition, they should be carried to a safe place and destroyed with explosives by authorized personnel.

d. Carefully examine the fuze assembly for evidence of damage, including the crimping at the top of the fuze where it touches the top of the trigger. Check the safety pins to see that they move freely in the safety pin holes. Ensure the rubber gasket is around the fuze case.

e. Screw the fuze assembly into the fuze well of the mine and tighten it securely against the rubber gasket using the open end of the combination wrench M25.

f. Place the mine in the hole. It can be installed so that it will detonate by pressure alone or with trip wires.

(1) Pressure Actuation. Cover the mine with soil (dirt) from the hole, pressing it firmly into place around the sides of the mine, leaving the release-pin ring and pressure prongs exposed. Arrange the pull cords on the safety pins for easy withdrawal. Camouflage the installation. Remove the locking safety pin. Removal of the locking safety pin permits removal of the interlocking pin from the positive safety pin, located between the prongs. Remove the positive safety pin, arming the fuze.

(2) Trip Wire Actuation. Cover the mine with soil (dirt), pressing it firmly in place around the sides of the mine. Leave the release pin ring and pressure prongs exposed. Drive two anchor stakes approximately 10 meters (32 feet) from the mine. Locate the stakes so the wires form a wide V when attached, preventing lateral enemy movement. If desired, install a third trip wire and anchor. Fasten a wire to each anchor stake and fasten the free ends to the release pin ring of the fuze. Follow the steps outlined in step 7 for removing the safety pins.

g. The M16 is best employed where at least 3 inches (7.62 centimeters) of natural cover exists because of the exposure of the pressure prongs and trip wires after installation. When installed for trip wire actuation, a single mine provides a maximum of front coverage. Normally, each mine uses two trip wires. The spool of trip wire packed with each mine contains four separate 12-meter (39 feet) lengths. Two are green and two are sand colored. Always select the color that blends with the terrain or vegetation. If installing the mine in bare or sparsely covered ground, the use of trip wires is not the optimum choice. A soldier walking erect is less likely to detect the pressure prongs than the trip wires.

WARNING

DO NOT ATTEMPT TO NEUTRALIZE A DAMAGED MINE. DESTROY IT IN PLACE WITH A PREPARED CHARGE. ANOTHER METHOD IS TO ATTACH A 50 METER (164.04 FT. LENGTH OF WIRE OR ROPE TO THE HEAD OF THE FUZE. FROM A PROTECTED POSITION, PULL THE MINE FROM THE HOLE. BE SURE TO EXAMINE THE PROTECTED POSITION FOR MINES BEFORE OCCUPYING IT.

DURING DISARMING OR REMOVAL, INSTALL POSITIVE SAFETY PIN FIRST. IF THE FUZE MALFUNCTIONS, THE POSITIVE SAFETY PIN STOPS ANY ACTION THAT STARTS.

DURING DISARMING OR REMOVAL, BEFORE CUTTING A TAUT WIRE, ALWAYS EXAMINE THE OTHER END TO SEE THAT IT IS NOT ANCHORED TO ANOTHER MINE.

8-2.6.5 Disarming and Removal. The disarming and removal procedures are as follows:

- a. After locating the mine and checking for booby traps, carefully uncover the top and examine it for evidence of malfunction or damage from blast.
- b. If there is no apparent damage to the mine, insert the original safety pin through the locking safety pin hole. The location of this hole is in the head of the fuze, opposite the release pin ring. Substitutes for the original safety pin can be a cotter pin, a length of steel wire, or a nail.
- c. Cut all slack trip wires attached to the release pin ring.
- d. Carefully dig around the sides and bottom of the mine and check for booby trapping devices.
- e. Lift the mine from the ground.
- f. Unscrew and remove the fuze assembly from the mine.
- g. Replace the shipping plug.
- h. Restore the mine to original condition and packing.

8-2.6.6 Special Precautions. Observe the following special precautions:

- a. If not specifically trained, do not attempt to disassemble the mine. Also, do not attempt to unscrew the shipping plug in preparation for fuzing or to unscrew and remove the fuze in neutralizing operation.
- b. Do not use mines with broken or jammed outer casings, or fuzes from jammed or dented metallic containers until inspected by authorized personnel. The inspection must show that neither the propelling charge of the mine nor the fuze has been damaged.

8-2.7 Mine, Antipersonnel, M18A1, With Accessories (K143) (J007).

8-2.7.1 Intended Use. This APERS mine, Figure 8-5, is a directional, fixed fragmentation mine used primarily for defense of bivouac areas, outposts and against infiltration tactics. This mine is effective against thin-skinned vehicles such as jeeps, automobiles, or trucks, and readily perfo-

rates the outer body, injuring or killing the occupants. The fragments will puncture tires, gas tanks, crankcases, radiators, and engine accessories. When detonated, it projects a fanshaped sheaf (pattern) in a 60° horizontal arc. It covers a casualty area of 50 meters (164.04 feet) to a height of 2 meters (6.56 feet).

8-2.7.2 Description. This APERS mine, Figure 8-6 or Figure 8-10, comes in a bandoleer containing one mine with accessories and instructions for use. The following subparagraphs describe the mine and accessories.

a. Mine. The M18A1 mine is a curved, rectangular, olive drab, molded case of fiberglass filled polystyrene (plastic). It is 8.50 inches (21.59 centimeters) long, 1.38 inches (3.50 centimeters) wide, 3.25 inches (8.25 centimeters) high, and weighs 3.5 pounds (1.58 kilograms). In the front portion of the case is a fragmentation face containing 700 steel spheres (10.5 grains each [.68 gram each]) embedded in a plastic matrix. The back portion of the case (behind the matrix) contains a 1.5 pound (0.68 kilogram) layer of Comp C-4 explosive. The fragmentation face is convex horizontally to direct the fragments in a 60° arc and concave vertically to control the vertical dispersion of the fragments. Additional components of this mine are two detonator wells with a shipping plug, priming adapters, a molded slit-type peepsight, and two pairs of scissor-type folding legs. The following subparagraphs describe these components.

(1) Detonator Wells. The two detonator wells in the top of the mine enable firing of the mine from two locations or by nonelectric single or dual priming. The plug ends of the shipping plug priming adapters seal the wells to prevent entry of foreign materials into the detonator wells. The slotted end of the shipping plug priming adapter holds an electric or nonelectric blasting cap in place when arming the mine. Reverse the shipping plug priming adapter prior to arming the mine.

(2) Peepsight and Arrows. A molded slit-type peepsight and arrows on top of the mine provide the means to aim the mine.

(3) Legs. The two pairs of scissor-type folding legs on the bottom of the mine enable placement of the mine on all types of surfaces. Another method of emplacement is to tie the mine to posts or trees.

b. Accessories for Electric Firing (K143). Provided with the mine is the M57 Firing Device, a M40 Test Set, a M4 Electric Blasting Cap, and a M7 Bandoleer as described below.

(1) Firing Device M57. The M57 firing device is a hand-held pulse generator that produces a double (one positive, one negative) electrical pulse by a single actuation of the handle. This device is approximately 4 inches (10.16 centimeters) long, 1.35 inches (3.42 centimeters) wide, 3.25 inches (8.25 centimeters) high, and weighs 0.75 pound (0.34 kilogram). At one end of the firing device is a rubber connector with a dust cover.

(2) Test Set M40. The M40 test set is an instrument used for checking the continuity of the initiating circuit of this mine. This test set is 3.50 inches (8.89 centimeters) long, 1.50 inches (3.81 centimeters) wide, 1.38 inches (3.5 centimeters) high and weighs 0.50 pound (0.22 kilogram). Rubber connectors protrude from each end, one with a combination shorting plug and dust cover and the other with a dust cover only. There is a small window provided for observing the flashes of an indicating lamp.

(3) Electric Blasting Cap M4. The M4 electric blasting cap consists of an M6 electric blasting cap attached to 100 feet (30.48 meters) of firing wire. Attached to the firing wire connector is a combination shorting plug and dust cover. The shorting plug prevents accidental functioning of the blasting cap by static electricity and the dust cover prevents dirt and moisture from entering the connector. The blasting cap assembly is wrapped around a flat paper and then rolled to form a package 6 inches (15.24 centimeters) long, 4 inches (10.16 centimeters) wide, and 2 inches (5.08 centimeters) high. Uncoil this assembly without tangling or kinking. A piece of insulating tape is used to hold the package together.

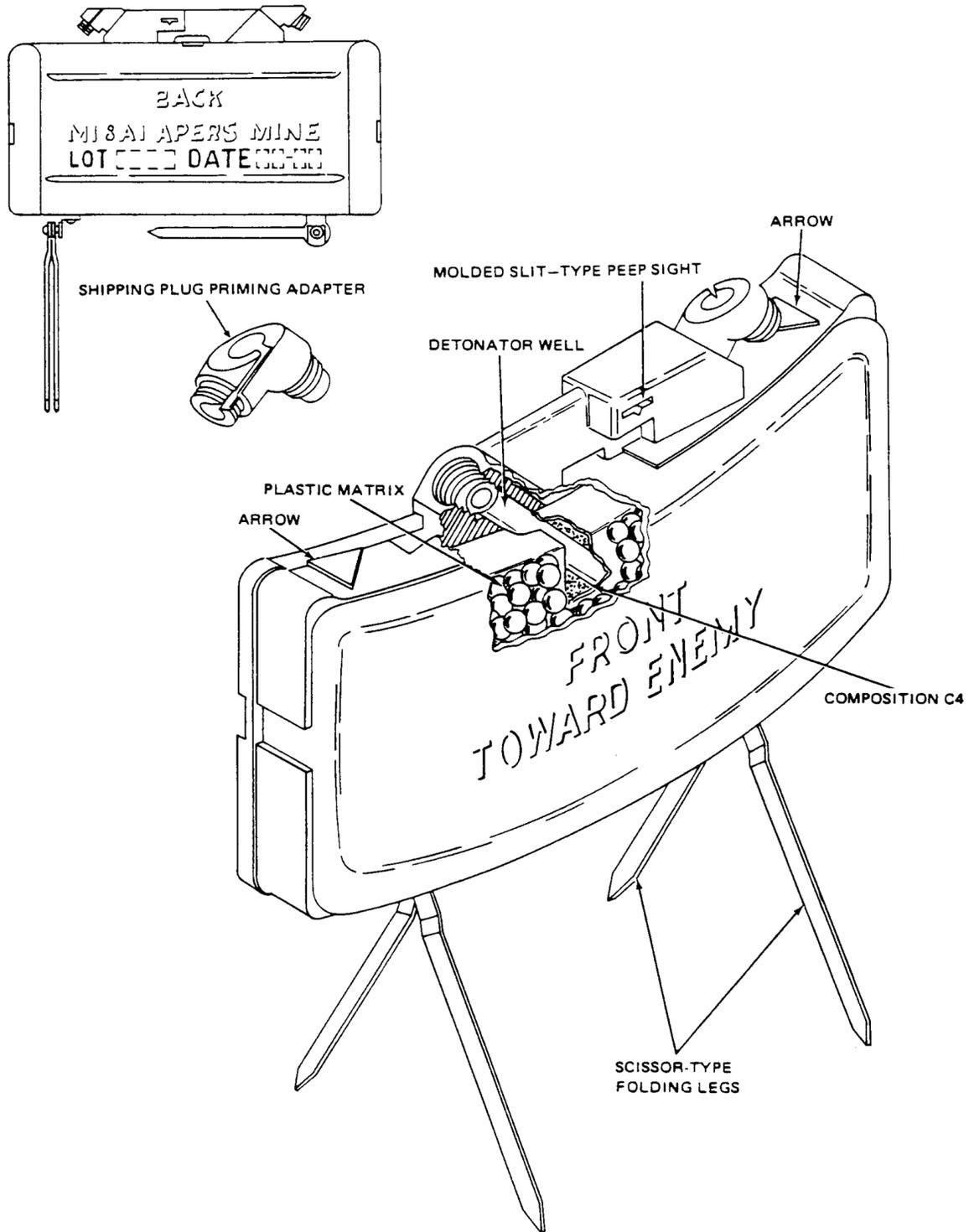


Figure 8-5 Antipersonnel Mine M18A1

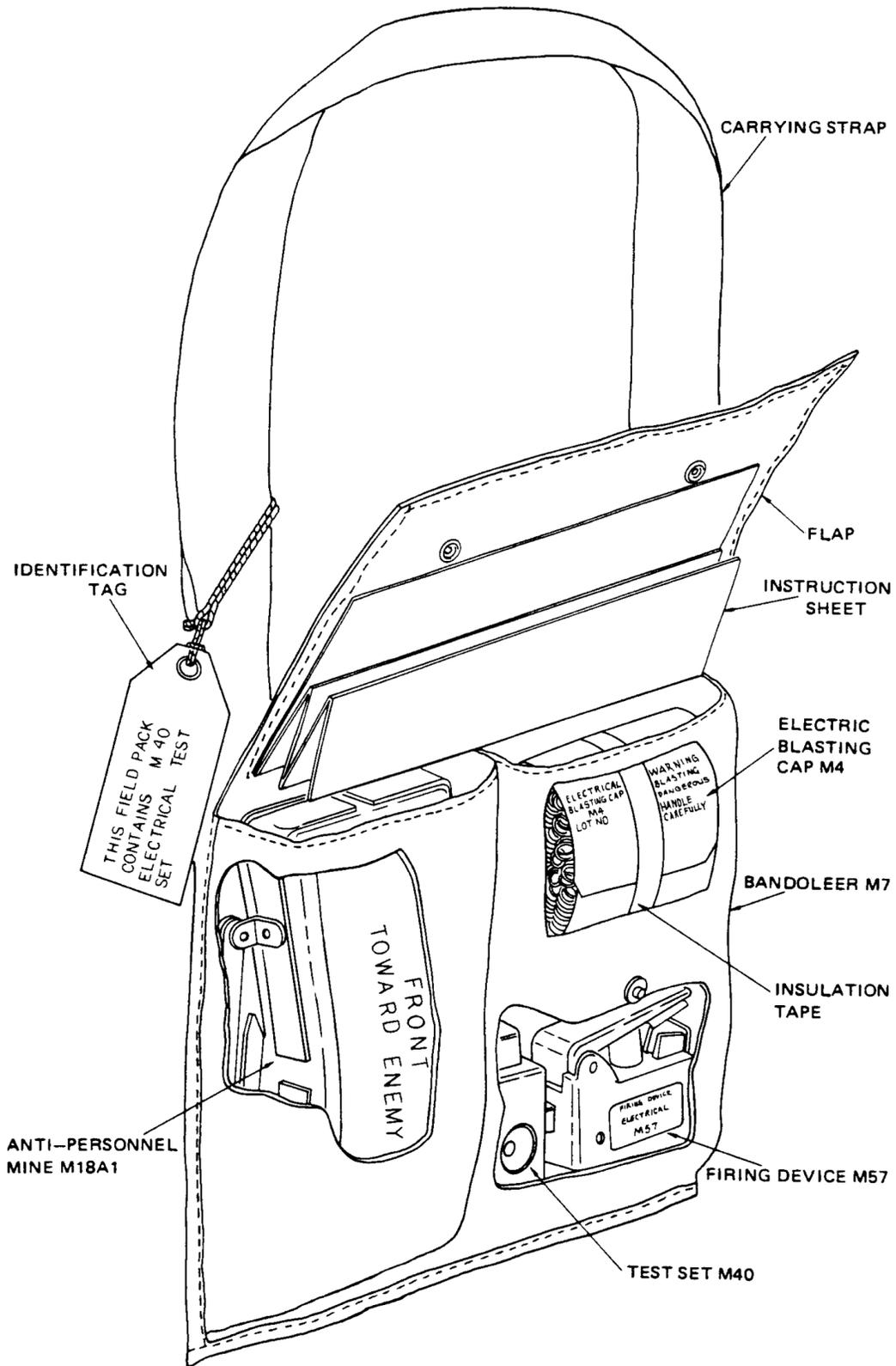


Figure 8-6 Antipersonnel Mine M18A1 and Accessories in Bandoleer M7 (Electric)

(4) Bandoleer M7. The M7 bandoleer is constructed of olive drab, water-resistant canvas with snap fasteners to secure the flaps. The bandoleer has two pockets: one contains the mine, and the other contains a firing device, a test set, and an electric blasting cap assembly. The packed bandoleer measures 9.25 inches (23.49 centimeters) long, 11.50 inches (29.21 centimeters) wide, and 2 inches (5.08 centimeters) high. A 2 inch (5.08 centimeters) wide web strap used as a shoulder carrying strap is sewn to the bag. An olive green, water-repellent instruction sheet is sewn to the inside flap. Only one of the six bandoleers in each packing box contains a test set. An identifying tag on the carrying strap identifies the bandoleer containing the test set.

c. Accessories for Non-Electric Firing (J007).

(1) MiniDet. The MiniDet is made up of: a M81 Firing Device, 100 feet of 2mm shock tube, and a non-delay non-electric blasting cap, equivalent to a commercial size 12 blasting cap. These items are crimped together into one assembly and coiled on a spool.

(2) Bandoleer M7. The M7 bandoleer is constructed of olive drab, water-resistant canvas with snap fasteners to secure the flaps. The bandoleer has two pockets: one contains the mine, and the other contains a MiniDet assembly. The packed bandoleer measures 9.25 inches (23.49 centimeters) long, 11.50 inches (29.21 centimeters) wide, and 2 inches (5.08 centimeters) high. A 2 inch (5.08 centimeters) wide web strap used as a shoulder carrying strap is sewn to the bag. An olive green, water-repellent instruction sheet is sewn to the inside flap.

8-2.7.3 Function.

8-2.7.3.1. Electric Function. After arming the mine, actuation of the firing device handle (safety bail in armed position) provides sufficient electrical energy to detonate M6 Blasting Cap. The detonation of the blasting cap detonates the high-explosive charge (Comp C-4). Detonation of the high-explosive charge causes fragmentation of the plastic matrix and projection of the spherical fragments outward in a fan-shaped pattern. The mine functions effectively in temperatures ranging from -40°F to 125°F (-40°C to 51°C). This mine func-

tions satisfactorily after having been submerged in saltwater or freshwater for 2 hours because of sufficient waterproofing.

8-2.7.3.2. Non-Electric Function. After arming the mine, actuation of the M81 firing device initiates a primer in the M81 firing device and ignites the contents of the shock tube which in turn detonates the blasting cap. The detonation of the blasting cap detonates the high-explosive charge (Comp C-4). Detonation of the high-explosive charge causes fragmentation of the plastic matrix and projection of the spherical fragments outward in a fan-shaped pattern. The mine functions effectively in temperatures ranging from -40°F to 125°F (-40°C to 51°C). This mine functions satisfactorily after having been submerged in saltwater or freshwater for 2 hours because of sufficient waterproofing.

8-2.7.4 Casualty Effect and Danger Area. The mine delivers 700 highly effective steel fragments in a fan-shaped pattern approximately 2 meters (6.5 feet) high and 60 (195 feet) wide at a range of 50 meters (164 feet), Figure 8-7. The effectiveness of these fragments is to a range of 100 meters (328.08 feet) and they can travel up to 250 meters (820.20 feet) forward of the mine. A casualty and danger area exists all around the mine as follows:

(1) Backblast. Within an area of 16 meters (52 feet) to the rear and sides of the mine, backblast can cause injury by concussion and secondary missiles. All friendly personnel must be under cover for protection from secondary missiles up to 100 meters (328 feet) to the rear and sides of the mine.

a. Radius of 0 to 16 meters (0 to 52.49 feet) from the mine. Do not allow friendly troops in this area.

b. Radius of 16 to 100 meters (52 to 328 feet) from the mine. The minimum safe operating distance from the mine is 16 meters (52 feet). At this distance, the operator should be in a foxhole or dugout or lie prone, preferably in a depression. All friendly troops, including the operator, within 100 meters (328.08 feet) of the mine should take cover to prevent being injured by from flying secondary missiles, sticks, stones or pebbles.

8-2.7.5 Installation and Arming. Remove the mine and accessories from the bandoleer. Refer to Figure 8-8 for a typical emplacement of the mine. Read the instruction sheet attached to the flap of the bandoleer prior to proceeding as follows:

WARNING

POSITION THE MINE SO FRIENDLY TROOPS FORWARD AND TO THE SIDES OF THE MINE, (FIGURE 8-7 AND FIGURE 8-8), ARE NOT ENDANGERED. THE FIRING POSITION SHOULD BE AT LEAST 16 METERS (52.5 FEET) TO THE REAR OR TO THE SIDES OF THE MINE.

OPERATOR WILL RETAIN CONTROL OF THE FIRING DEVICE IN HIS POSSESSION AT ALL TIMES DURING SETTING UP THE MINE AND UNSPOOLING THE SHOCK TUBE. THIS PREVENTS ACCIDENTAL FIRING BY A SECOND INDIVIDUAL.

a. Turn the legs downward and spread about 45°. Twist the legs so that one leg protrudes ahead and one behind the mine. Position the mine with the surface marked **FRONT TOWARD ENEMY** and the arrows on top of the case pointing toward the enemy or the desired area of fire. On snow or extremely soft ground (mud), spread the bandoleer beneath the mine as support. To prevent tipping in windy areas or when legs cannot be pressed into the ground, carefully spread legs to the maximum possible (approximately 180°) so the legs will be fore and aft.

b. Select an aiming object (tree or bush) or use an aiming stake that is approximately 50 meters (164 feet) from the mine and projects approximately 1 meter (3.28 feet) above the ground.

c. Keep the eye approximately 6 inches (15.24 centimeters) away from the mine and aim the mine by sighting through the slit-type peep-sight. The groove of the sight should be in line with the aiming point. The aiming object should be in the center of the desired coverage area, and the bottom edge of the peepsight should be parallel to the area to be covered with fragment spray.

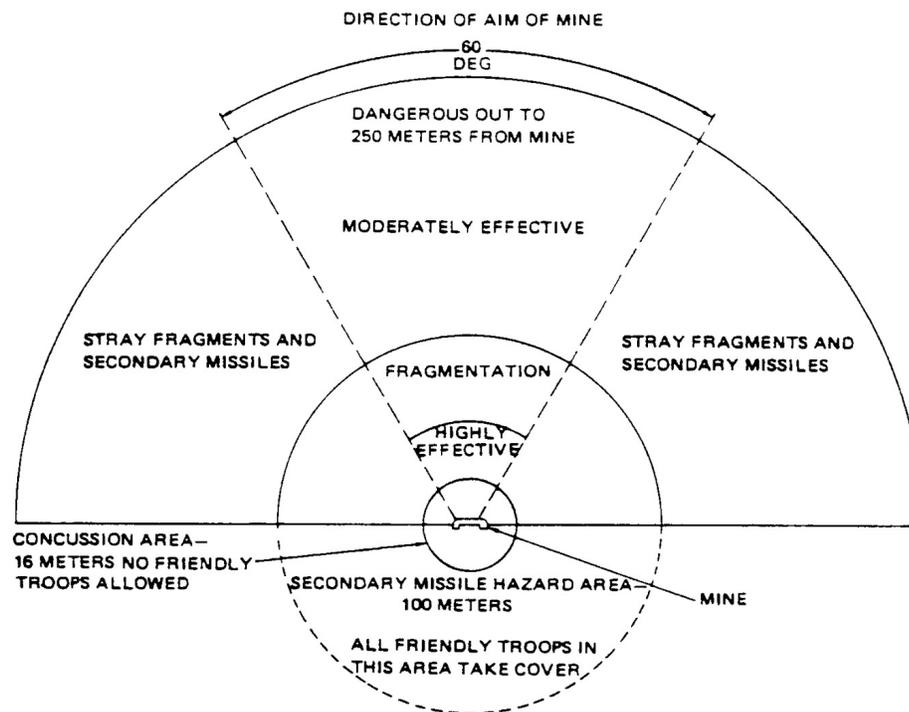


Figure 8-7 Casualty and Danger Areas of Antipersonnel Mine M18A1

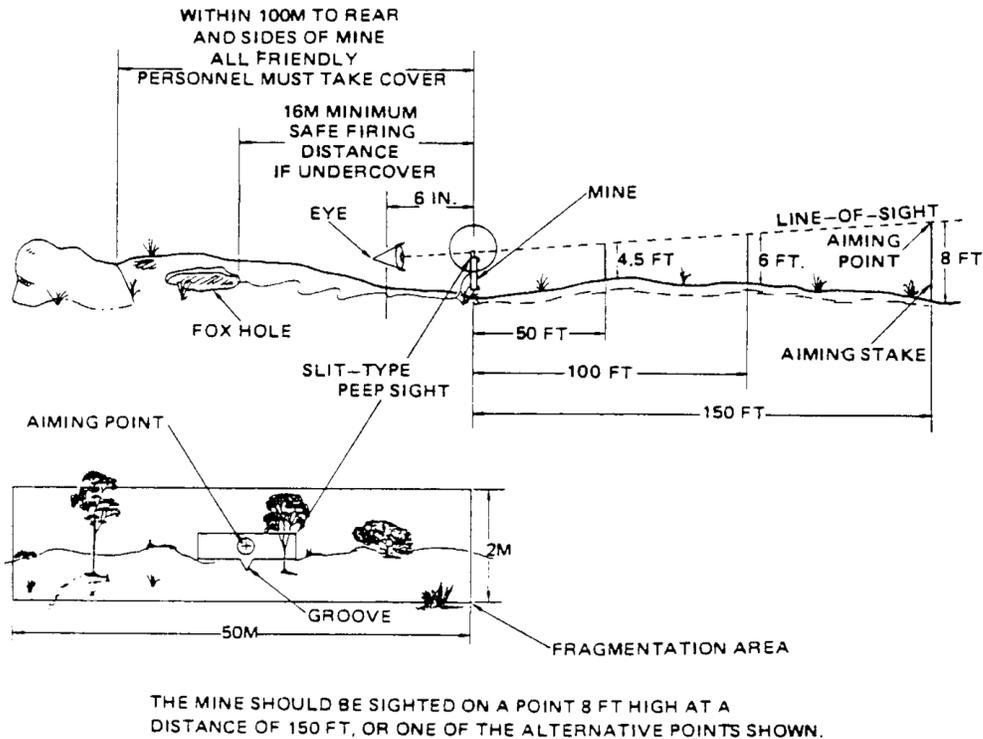


Figure 8-8 Typical Emplacement of Antipersonnel Mine M18A1

8-2.7.6 Arming and Firing.

8-2.7.6.1. Arming and Electrical Firing. The arming and electrical firing procedures are as follows, Figure 8-9:

- a. Unscrew the shipping plug priming adapter and retain for future use.
- b. Remove the insulation tape and unroll the paper form from the electric blasting cap assembly. Retain paper form and tape for possible future use. Hold the blasting cap while unwinding approximately 3 meters (9.8 feet) of the firing wire.

- c. Wind the firing wire around the rear leg two or three times on the same side of the mine as the detonator well selected for use.

- d. Slide the slotted end of the shipping plug priming adapter on the firing wires of the blasting cap between the crimped connections and the blasting cap. Pull the excess wire through the slotted end of the shipping plug priming adapter until the top of the blasting cap is firmly seated in the bottom portion of the shipping plug priming adapter. Screw the shipping plug priming adapter and the blasting cap into the detonator well.

WARNING

ASSEMBLE THE SHORTING PLUG AND DUST COVER COMBINATION TO THE CONNECTOR OF THE BLASTING CAP ASSEMBLY. PERFORM THIS BEFORE PLACING THE BLASTING CAP IN THE DETONATOR WELL.

WARNING

ENSURE THE FACE OF THE MINE MARKED FRONT IS TOWARD THE ENEMY AND THE ARROWS ON TOP OF THE MINE POINT IN THE DIRECTION OF THE ENEMY.

- e. Unwind the remaining firing wire to the firing position. If possible, bury the firing wire to protect it from artillery fire and to prevent easy detection.

WARNING

THE MINE FIRING POSITION SHOULD BE IN A FOXHOLE OR IN A SHIELDED OR PROTECTED POSITION AT LEAST 16 METERS (52.5 FEET) BEHIND OR TO THE SIDE OF THE MINE.

f. If possible, perform the testing described in Paragraph 8-2.7.7 If the area was subjected to recent mortar or artillery bombardment, retest the blasting cap.

g. Remove the dust cover from the connector on the firing device. Remove the shorting plug and dust cover combination from the end of the firing wire. Assemble (plug in) the two connectors.

WARNING

BEFORE CONNECTING THE BLASTING CAP ASSEMBLY TO THE FIRING DEVICE, THE SAFETY BAIL MUST BE IN THE SAFE POSITION. ENSURE ALL PERSONNEL MUST TAKE COVER AT LEAST 250 METERS (820.20 FEET) AWAY FROM THE FRONT AND SIDES OF THE MINE. ALSO ENSURE ALL PERSONNEL TAKE COVER AT LEAST 100 METERS (328 FEET) TO THE REAR OF THE MINE.

h. After performing the testing, the mine is ready for firing. Position the firing device bail in the armed position. When enemy troops approach within 20 to 30 meters (65 to 98 feet) of the front of the mine, fire the mine.

i. Fire the mine by actuating the firing device handle with a firm, quick squeeze and release.

WARNING

BEFORE AND AFTER COMPLETION OF FIRING DEVICE AND BLASTING CAP CONTINUITY

TESTS, ASCERTAIN THAT THE FIRING DEVICE BAIL IS IN THE SAFE POSITION.

8-2.7.6.2. Arming and Non-Electrical Firing with the MiniDet. The arming and non-electrical firing procedures using the MiniDet are as follows, Figure 8-11.

a. Remove the MiniDet assembly from the bandoleer pocket.

b. Set spool down approximately 15 inches behind and to one side of the mine.

c. Insert blasting cap in either detonator well and lock with shipping plug/priming adapter.

d. Recheck aim of mine after arming.

WARNING

ENSURE THE FACE OF THE MINE MARKED FRONT IS TOWARD THE ENEMY AND THE ARROWS ON TOP OF THE MINE POINT IN THE DIRECTION OF THE ENEMY.

e. Secure shock tube approximately 18 inches from the blasting cap of the mine with a stone, gravel, or sand bag. Use care not to pinch the shock tube.

f. Unravel the shock tube until it reaches the operator firing position.

WARNING

ALL PERSONNEL MUST TAKE COVER AT LEAST 250 METERS (820.20 FEET) AWAY FROM THE FRONT AND SIDES OF THE MINE. ALSO ENSURE ALL PERSONNEL TAKE COVER AT LEAST 100 METERS (328 FEET) TO THE REAR OF THE MINE.

g. When enemy troops approach within 20 to 30 meters (65 to 98 feet) of the front of the mine, fire the mine.

h. Fire the mine by holding the M81 Igniter around its body with one hand. Remove the safety pin from the igniter. Sharply pull the ring on the igniter.

i. If the mine does not function, re-cock the igniter and attempt to fire again (the igniter may be re-cocked twice).

WARNING

WAIT 30 MINUTES BEFORE APPROACHING A MINE THAT FAILED TO FUNCTION.

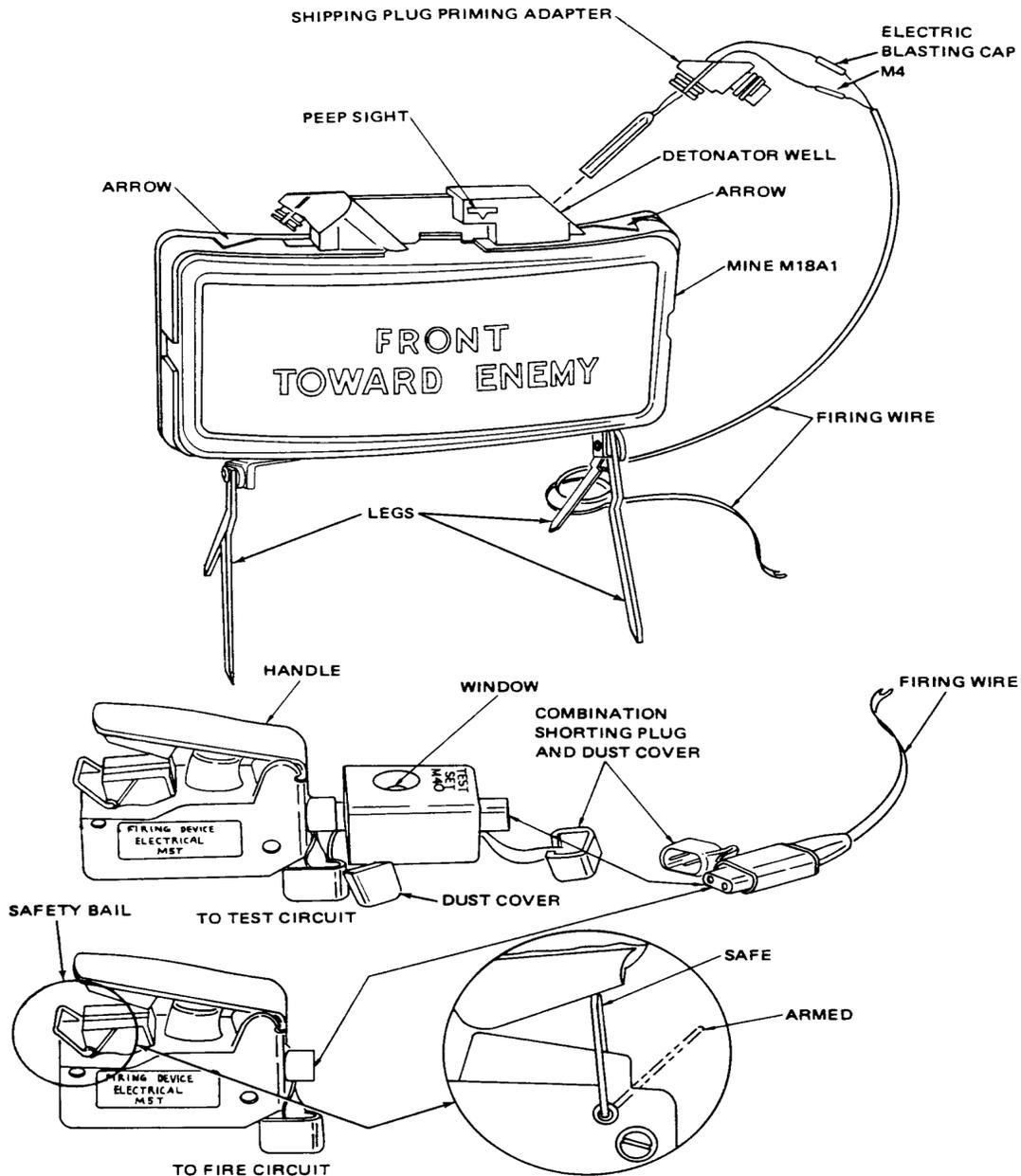


Figure 8-9 Arming and Testing Antipersonnel Mine M18A1

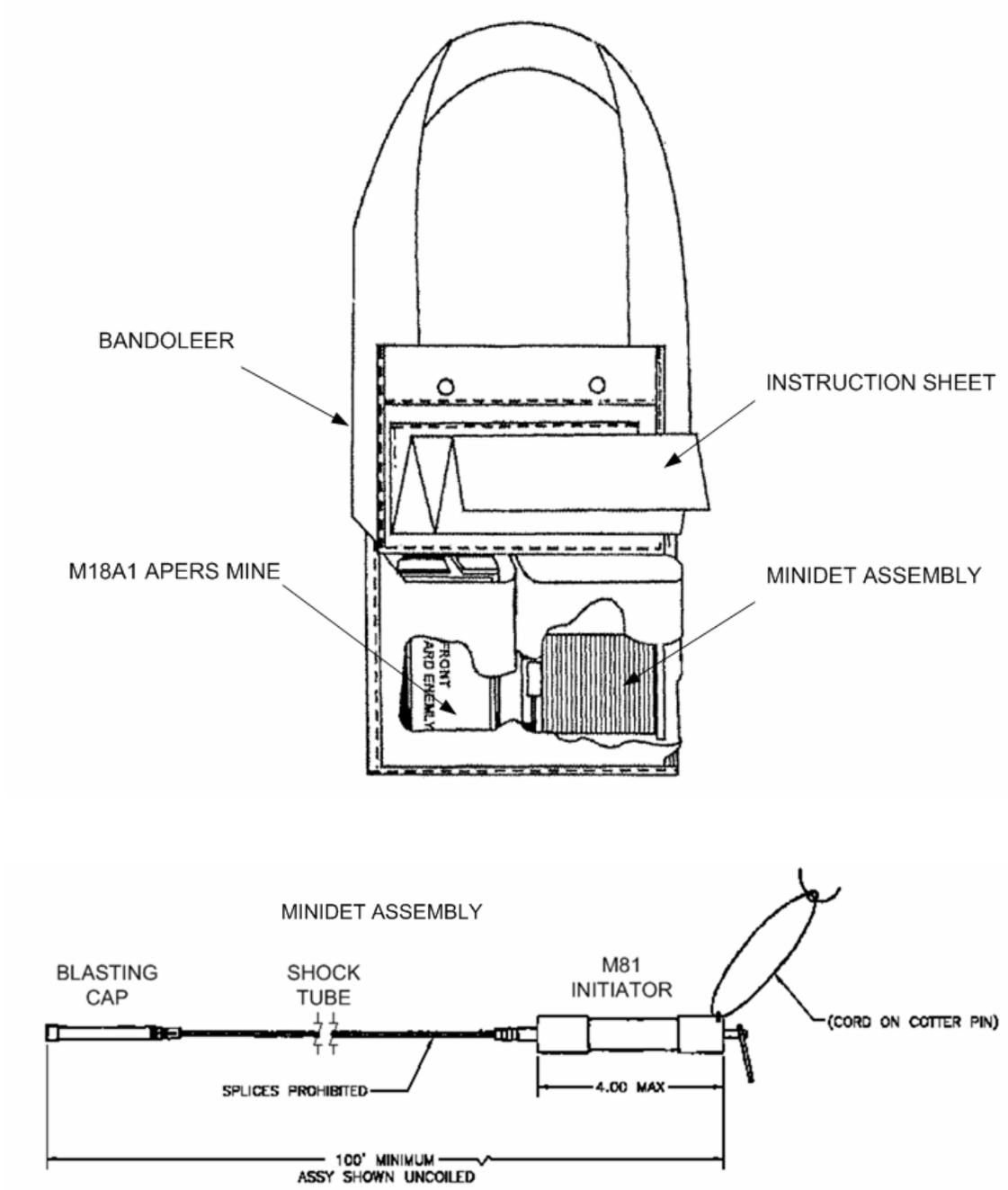


Figure 8-10 Antipersonnel Mine M18A1 and Accessories in Bandoleer M7 (Non-Electric)

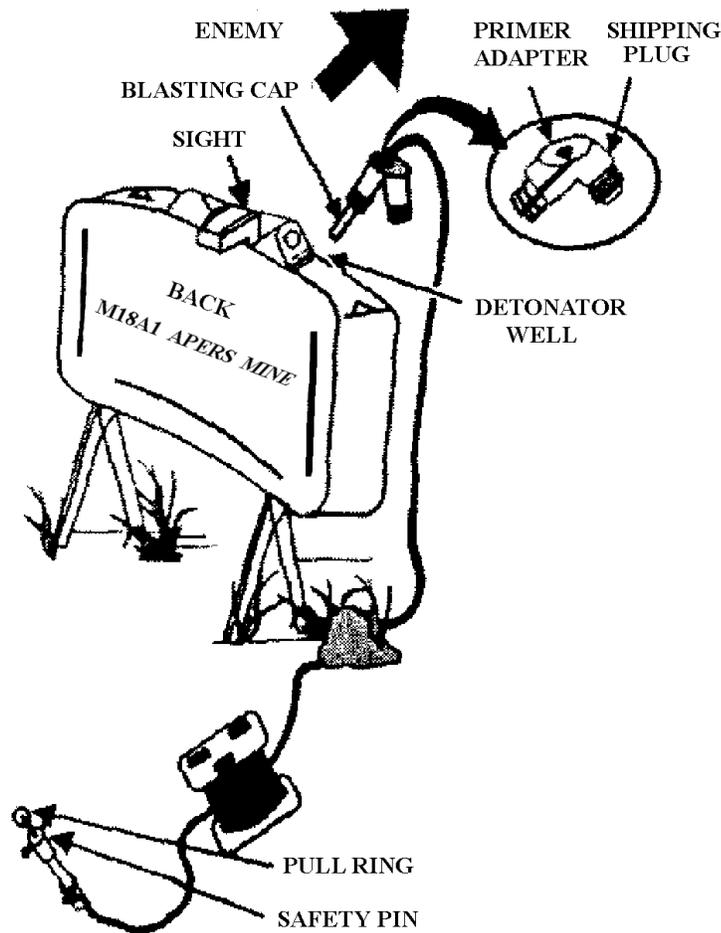


Figure 8-11 Arming and Firing Non-Electric

8-2.7.7 Testing. Time and conditions permitting after the installation of the mine, perform the following tests.

a. Remove the dust cover from the connector of the firing device and from the female connector of the test set.

b. Plug the test set into the firing device. Leave the combination shorting plug and dust cover assembled on the other end of the test set.

c. Hold the window of the test set against the eye when checking the firing device and the blasting cap assembly. This minimizes the risk of enemy observation in the dark. During the day this improves the ability of the operator to see the lamp flashing in bright sunlight.

d. Position the firing device bail to the fire position and actuate the handle of the firing device with a firm, quick squeeze. Observe the flashing of the lamp through the test set window.

e. Flashing of the lamp indicates a properly functioning firing device. If the lamp does not flash on and off, discard the firing device. After completion of the firing device test, place firing device bail in the safe position.

f. If the test set indicates several faulty firing devices, it may indicate a defective test set. Retest with another test set prior to discarding.

WARNING

BEFORE CONNECTING THE BLASTING CAP TO THE TEST SET AND FIRING DEVICE, FIGURE 8-12, THE SAFETY BAIL MUST BE IN THE SAFE POSITION. ALL PERSONNEL MUST BE UNDER COVER AT LEAST 250 METERS (820 FEET) FROM THE FRONT AND SIDES OF THE MINE AND AT LEAST 100 METERS (328 FEET) TO THE REAR OF THE MINE.

g. Remove the shorting plug and dust cover from the connector of the blasting cap and the end of the test set. Plug the connector of the blasting cap into the test set. Position the firing device bail to the armed position. Actuate the handle of the firing device.

h. Flashing of the lamp in the window of the test set indicates that the blasting cap circuitry is satisfactory. If defective, replace blasting cap and test for serviceability as indicated above.

WARNING

TO ARM THE MINE BY THE METHODS BELOW REQUIRES A THOROUGH KNOWLEDGE OF THE USE OF EXPLOSIVES AND DEMOLITION MATERIALS. ALSO REQUIRED IS KNOWLEDGE OF THE USE OF DEMOLITION MATERIALS AND THE USE AND INSTALLATION OF LAND MINES AND BOOBY TRAPS. SEE SW060-AA-MMA-010.

8-2.7.8 Nonelectric Firing. The following paragraphs provide instructions for installing, aiming, and arming the mine. Methods discussed use two M7 Nonelectric Blasting Caps, and approximately 25 feet (7.6 meters) of detonating cord. Initiation is with a pull wire and a pull-type or pull-friction-type firing device such as the M1 or the

M2. Also discussed are methods for installing, aiming and arming the mine using a dual firing or a dual priming system.

a. Pull Wire Initiation. Installation and aiming the mine are performed in the same manner as for electric firing (Paragraph 8-2.7.5). Then proceed as follows:

WARNING

SECURE THE FIRING DEVICE SO THE MINE WILL NOT BE DISLODGED BY A PULL OF THE DETONATING CORD OR TRIP WIRE DURING EMPLACEMENT. IF THE MINE BECOMES DISLODGED, IT WILL BE AIMED IN A DIRECTION OTHER THAN INTENDED.

(1) Crimp a M7 blasting cap to a pull-type or pull-friction-type firing device (M60 fuze igniter) using cap crimping pliers (with fuze cutter) M2 for this operation.

(2) Fasten with tape, one end of the detonating cord to the blasting cap that attached to the firing device. Figure 8-12, View A.

(3) Fasten the firing device securely to a firmly emplaced stake by tape, wire, twine, or anchor cord.

(4) Slip the slotted end of the shipping plug priming adapter over the other end of the detonating plug.

(5) Insert the detonating cord end firmly into the second blasting cap. Crimp the cap to the detonating cord using the cap crimping pliers M2 for this operation.

(6) Seat the cap (with the detonating cord) into the shipping plug priming adapter and carefully insert the cap into the well.

(7) Secure the cap in the well by carefully screwing the shipping plug priming adapter into the detonator well.

(8) Attach a pull wire securely to the pull ring of the firing device. The pull wire should be of sufficient length to allow actuation of the firing device from a protected position. The minimum

safe distance for a protected position is 16 meters (52.5 feet) minimum to the rear of an emplaced mine.

b. Trip Wire Initiation. Installing and aiming the mine are performed in the same manner as for electric firing (Paragraph 8-2.7.5). Then proceed as follows:

WARNING

SECURE THE FIRING DEVICE SO AS TO PREVENT THE MINE BEING DISLODGED BY A PULL OF THE DETONATING CORD OR TRIP WIRE DURING EMPLACEMENT. DISLODGING THE MINE CAN CAUSE ITS POINT OF AIM TO BE IN A DIRECTION OTHER THAN INTENDED.

(1) The preliminary steps used to arm the mine are the same as the procedure used in Paragraph 8-2.7.8(1) for pull wire initiation.

(2) The trip wire stretched across a trail or other avenue of approach and the firing device must be securely attached to two firmly emplaced stakes. The placement is at a distance of approximately 20 meters (65.61 feet) forward of the mine, Figure 8-12, View B.

c. Dual Firing or Dual Primings Systems of Nonelectric Methods. Refer to SW060-AA-MMA-010 for details for using dual firing or dual primary systems, and proceed as described in the following paragraphs.

(1) Dual Fire. For the dual firing system, obtain two 10-meter lengths of detonating cord, four nonelectric blasting caps M7, and two pull-type firing devices. Proceed as follows:

(2) Remove both shipping plug priming adapters from the mine. Push one end of each piece of detonating cord through the holes in the adapters. Push the cord through holes far enough to allow crimping of the blasting caps to the cord ends.

(a) Crimp the end of each piece of detonating cord to a blasting cap M7, using cap crimper M2. Pull the excess detonating cord through holes in the adapters so the blasting caps seat against the bottom of the adapters.

(b) Screw the shipping plug priming adapters into the detonator wells. Unwind the detonating cord while moving back to a safe firing distance (Paragraph 8-2.7.5).

(c) Install the mine and detonating cord as described in Paragraph 8-2.7.8(1) and illustrated in Figure 8-8 and Figure 8-12.

(d) Attach a pull-type firing device (refer to SW060-AA-MMA-010) to the free end of each piece of detonating cord. Attach a pull wire or trip wire to the firing device.

(3) Dual Priming. For the dual priming system, obtain two 10 meter (32 feet) lengths of detonating cord, four nonelectric M7 blasting caps, and two pull-type devices. Proceed as follows:

(a) Remove both shipping plug priming adapters from the mine. Push one end of each piece of detonating cord through the holes in the adapters. Push the cord through the holes far enough to allow crimping of the blasting caps to the cord ends.

(b) Crimp the end of each piece of detonating cord to a blasting cap M7 using cap crimper M2. Pull the excess detonating cord through the holes in the adapters, so the blasting caps seat against the bottom of the adapters.

(c) Screw the shipping plug primary adapters into the detonator wells. Unwind the detonating cord while moving to a safe firing distance (Paragraph 8-2.7.5).

(d) Install the mine and detonating cord as described in Paragraph 8-2.7.8(1) and illustrated in Figure 8-8 and Figure 8-12.

(e) Attach a pull-type firing device (refer to SW060-AA-MMA-010) to the free end of each piece of detonating cord. Attach a pull wire or trip wire to the firing device.

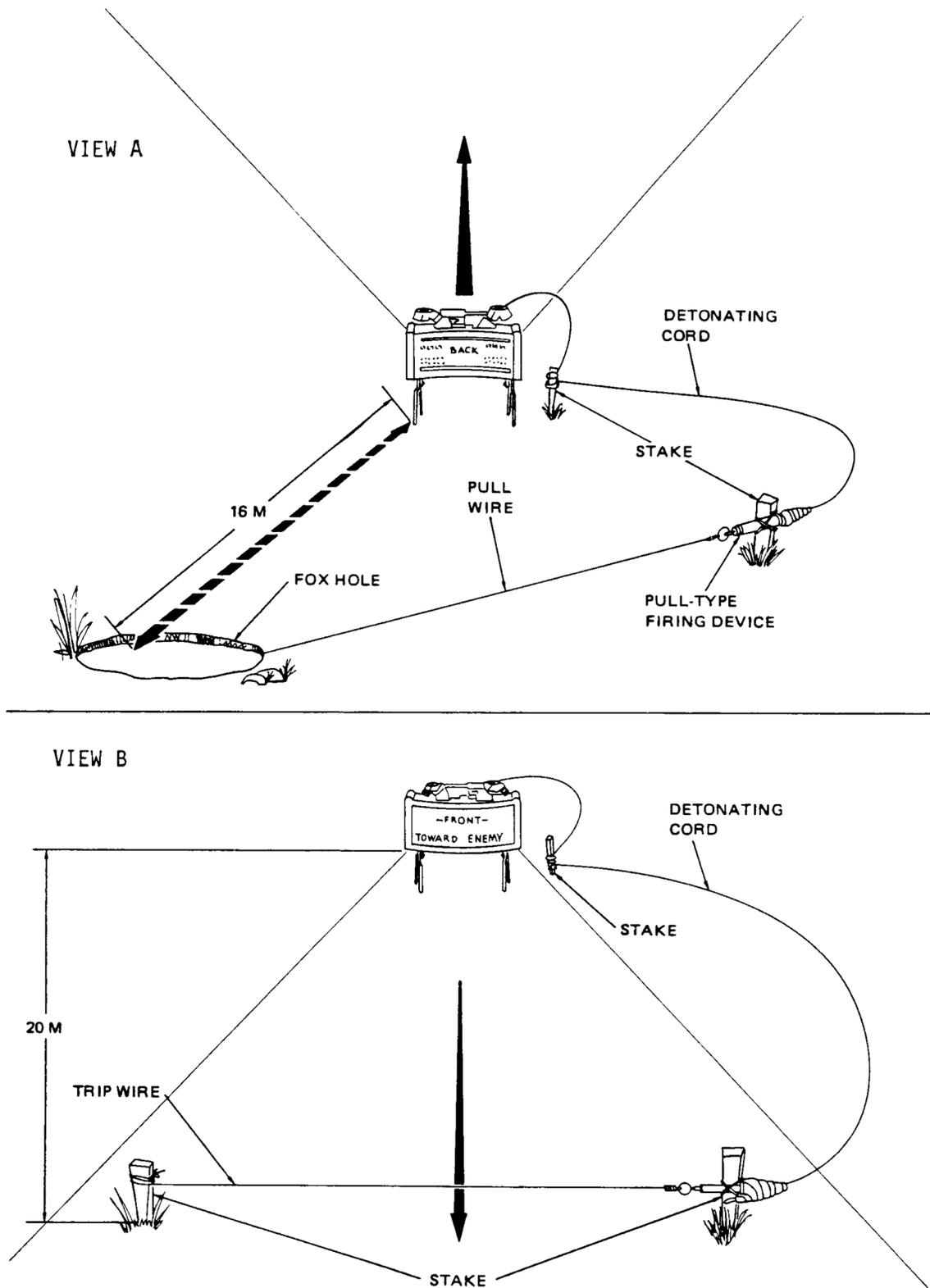


Figure 8-12 Antipersonnel Mine M18A1 Installed for Pull Wire/Trip Wire Initiation

(f) Make a ring of the mines according to the instructions contained in Army Field Manual FM 5-250.

WARNING

DO NOT FIRE A DISLODGED OR OVERTURNED MINE. IT IS A POTENTIAL HAZARD TO FRIENDLY PERSONNEL.

(g) To prevent tipping in windy areas or when the legs cannot be pressed into the ground, carefully spread the legs to the maximum position (approximately 180°) so the legs will project fore and aft.

(h) The firing position must allow for visibility of the mine and the danger area around the mine. This permits the sighting of any friendly personnel in the vicinity and warning to take cover.

(i) Emplacing mines one behind the other requires firing the foremost mine (nearest the enemy) first to prevent destroying the others. Mines emplaced side-by-side in a line allow for simultaneous firing.

WARNING

DO NOT HANDLE OR JAR ANY MINE CONSIDERED A DUD OR IN A UNSAFE CONDITION. REFER IT TO EXPLOSIVE ORDNANCE DISPOSAL (EOD) FOR DESTRUCTION.

8-2.7.9 Disarming a Mine With Electrical Components. When disarming a mine with electrical components, the following procedures apply:

WARNING

RENDER THE FIRING DEVICE SAFE BY RETURNING THE SAFETY BAIL TO THE SAFE POSITION PRIOR TO PERFORMING THE STEPS BELOW.

WARNING

CONSIDER DUDS OR MINES THAT APPEAR TO HAVE BEEN RUN OVER BY A VEHICLE OR OTHERWISE DAMAGED AFTER EMPLACEMENT AS UNSAFE. REFER SUCH MINES TO EOD FOR DESTRUCTION.

a. Disconnect the firing wire from the firing device. Replace the combination shorting plug and dust cover on the blasting cap assembly connector, and the dust cover on the firing device connector.

b. Unscrew and remove the shipping plug priming adapter (Figure 8-5) containing the blasting cap from the mine. Remove the blasting cap and the firing wire from the shipping plug priming adapter.

c. Reverse the shipping plug priming adapter and screw the plug end of the shipping plug priming adapter into the mine.

d. Remove the firing wire from the stake beneath the mine or around the mine leg. Reroll the blasting cap and firing wire on the paper form and secure this assembly with a piece of insulation tape.

e. Remove the mine from its emplacement. Verify the removal of all accessories from the mine before repacking.

f. Repack the mine and its accessories in their respective pockets in the bandoleer.

8-2.7.10 Disarming a Mine With Nonelectric Components. When disarming a mine with nonelectric components, the following procedures apply:

WARNING

ENSURE THE FIRING DEVICE HAS NOT FIRED OR THE MINE RUN OVER. IF THE FIRING DEVICE HAS FIRED OR THE MINE RUN APPEARS DAMAGED, REFER THE MINE TO EOD.

RENDER THE FIRING DEVICE SAFE BY REPLACING ALL SAFETY PINS PRIOR TO PERFORMING THE STEPS BELOW.

WARNING

SEPARATE NONELECTRIC BLASTING CAPS AND DETONATING CORD THAT ARE CRIMPED TOGETHER ONLY BY CUTTING THE BLASTING CAP FREE OF THE DETONATING CORD. USE A NON-SPARKING KNIFE OR AN M2 CRIMPING DEVICE FOR THIS PROCEDURE.

IF FACILITIES ARE NOT AVAILABLE FOR CUTTING THE BLASTING CAP FREE OF THE DETONATING CORD, DESTROY

THE CRIMPED EXPLOSIVE COMPONENTS. THE ONLY EXCEPTION IS IF THESE COMPONENTS ARE FOR IMMEDIATE REUSE.

- a. Disconnect the pull wire or trip wire from the firing device.
- b. Unscrew and remove shipping plug priming adapters containing the blasting caps from the mine. Cut the blasting cap free of the detonating cord using a nonsparking knife.
- c. Return the blasting cap to the storage container and pull the detonating cord end free of the shipping plug priming adapters.
- d. Reverse the shipping plug priming adapter and screw it into the detonator well plug end down.
- e. Remove the mine from its emplaced position and repack. Store accessory items in original or appropriate containers.

8-3 ANTITANK MINES

8-3.1 General. The purpose for antitank mines is to immobilize or destroy enemy tanks or other vehicles. These mines are generally employed in mine fields, laid on or slightly below the surface of the ground. They consist of a charge of high explosive, usually 3 to 22 pounds (1.3 to 9.9 kilograms) in current standard mines, in a metallic or nonmetallic casing fitted with a primary fuze and provisions for attachment of one or two secondary fuzes. Ordinarily, antitank mines require a pressure of 300 to 400 pounds (136.08 to 181.44 kilograms) for actuation, but running troops can actuate them. One type of antitank mine derives its effectiveness to immobilize or destroy enemy tanks from the ability to project a mass of steel upward at a high velocity. The two general classes of antitank mines are heavy and light.

8-3.2 Antitank Mine Explosive Train. The antitank mine explosive train is a sequence of explosive elements beginning with a small amount of highly sensitive explosive (primer) followed by progressively larger amounts before reaching the main charge. Figure 8-13 illustrates a typical antitank mine explosive train. All antitank mines have a main or primary explosive train initiated by action of the weight of the vehicle on the fuze, Figure 8-14. Delay elements may be added to give the

tank time to move well over the mine before the explosion takes place. The mine may have one or more secondary explosive trains that are substantially the same as the primary explosive train but differing in the mechanical arrangement of the assembled fuzes. The secondary explosive trains are usually part of the booby trapping installation.

8-3.3 Antitank Mine Types. Figure 8-15, shows representative types of antitank mines, both light and heavy antitank mines. Light antitank mines are now obsolete; however, inert, empty and practice models of light antitank mines are still available. Most antitank mines are of the blast type and depend on the explosive force for their effect.

8-3.4 Antitank Mine Fuzes. Antitank mines use various type of fuzes for activation. The fuze serves to transform the mechanical initiating action (pressure) on the fuze to an explosive force that initiates the high explosive train of the mine. Antitank mines require a booster that amplifies the explosive force of the detonator in the fuze and assures initiation of the main charge in the mine. Antitank mines have secondary fuze wells for booby trapping the mine. A secondary fuze usually consists of a standard firing device screwed into an activator that serves as an adapter detonator for the firing device.

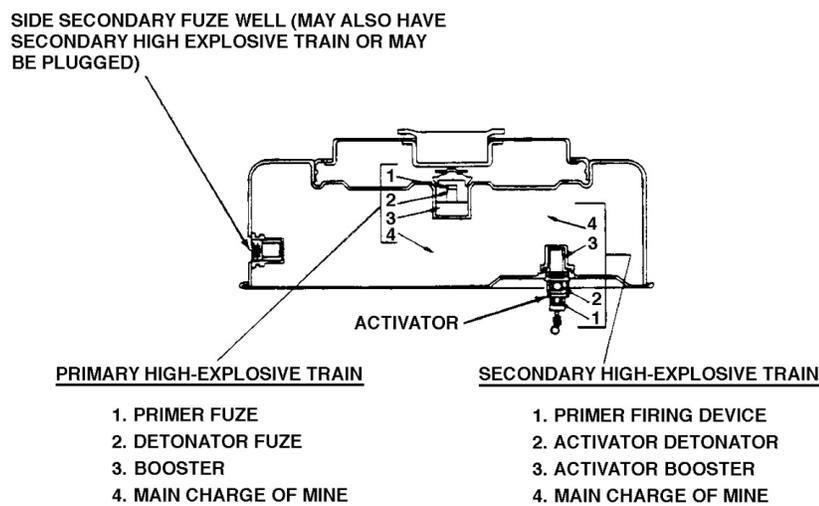


Figure 8-13 Explosive Trains in Antitank Mine

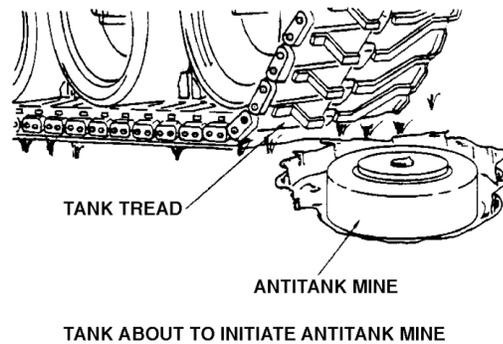


Figure 8-14 Initiating Action on Antitank Mine

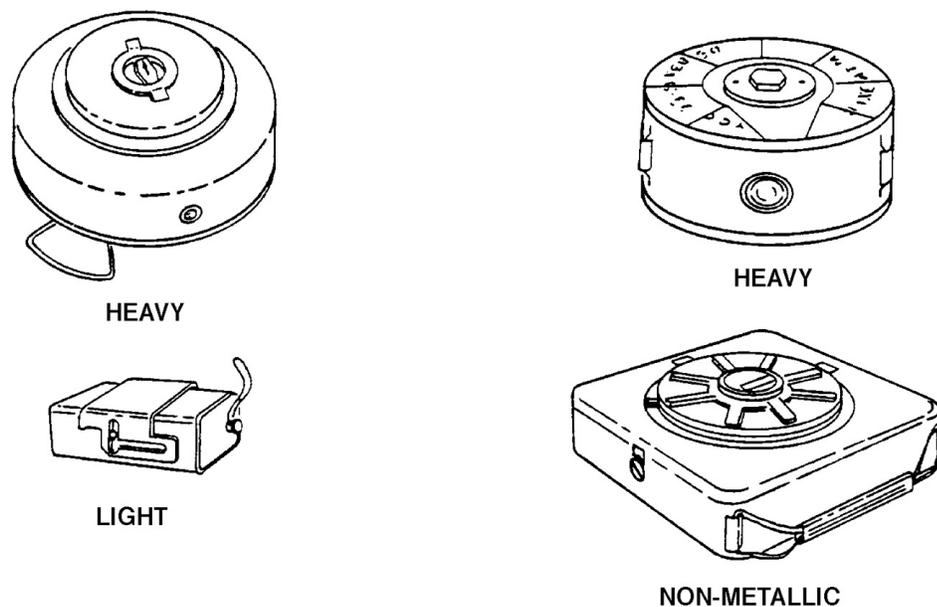


Figure 8-15 Antitank Mine Types

8-3.5 Mine, Antitank, High Explosive (HE), Heavy, M15 With Fuze, Mine, Antitank, M603 And Activator, M1 (K180).

8-3.5.1 Intended Use. This mine, Figure 8-16, is designed and procured as a high-capacity mine for use against heavy tanks. A minimum 300 pounds (136.08 kilograms) of force on the fuze is required to initiate the mine. It will not ordinarily be initiated by walking troops, but detonation by a running soldier is possible.

WARNING

FRIENDLY TROOPS SHOULD AVOID AREAS MINED WITH THE M15 ANTITANK MINE.

8-3.5.2 Description. This antitank mine is provided with the M603 Fuze and the M1 Activator. The mine consists of a steel case 13.25 inches (33.65 centimeters) in diameter and 4.875 inches (12.38 centimeters) high containing an explosive charge of approximately 22 pounds (9.9 kilograms) of Comp B. The main or primary fuze well is in

the center of the mine with an M120 Booster in the bottom of the well. Arming plug M4 or M4B1 is in place over the main fuze well of the mine as shipped. This plus has a steel shutter that moves from a side position as the setting knob moves from SAFE through DANGER to the ARMED position. There are two secondary (booby trapping) fuze wells located on the mine. One well is in the side and the other in the bottom; both are covered with tape, as shipped. The mine is olive drab and weighs 31.33 pounds (14.21 kilograms) unfuzed.

8-3.5.3 Function. When the shutter of the arming plug is in the ARMED position, a force of 300 to 400 pounds (136 to 181 kilograms) on the pressure plate of the mine depresses the belleville spring of the mine, causing the shutter to depress the pressure plate of the fuze. The fuze pressure plate depresses the fuze belleville spring that snaps into reverse, driving the firing pin into the detonator and exploding it. The explosion of the detonator explodes the M120 booster that explodes the main charge.

WARNING

PUT NO PRESSURE ON THE PRESSURE PLATE OF THE FUZE WHEN INSERTING IT INTO THE FUZE WELL. TO ASSURE PROPER CLEARANCE BETWEEN THE FUZE PRESSURE PLATE BUTTON AND THE ARMING PLUG SHUTTER, THE FUZE MUST BE FULLY SEATED ON THE INTERNAL SHOULDER OF THE MINE FUZE WELL. IF THE FUZE IS NOT FULLY SEATED, THE BUTTON ON THE FUZE PRESSURE PLATE INTERFERES WITH THE SHUTTER MOVEMENT IN ARMING THE FUZE. IF THE FUZE DOES NOT SEAT FULLY, REMOVE IT AND INVESTIGATE.

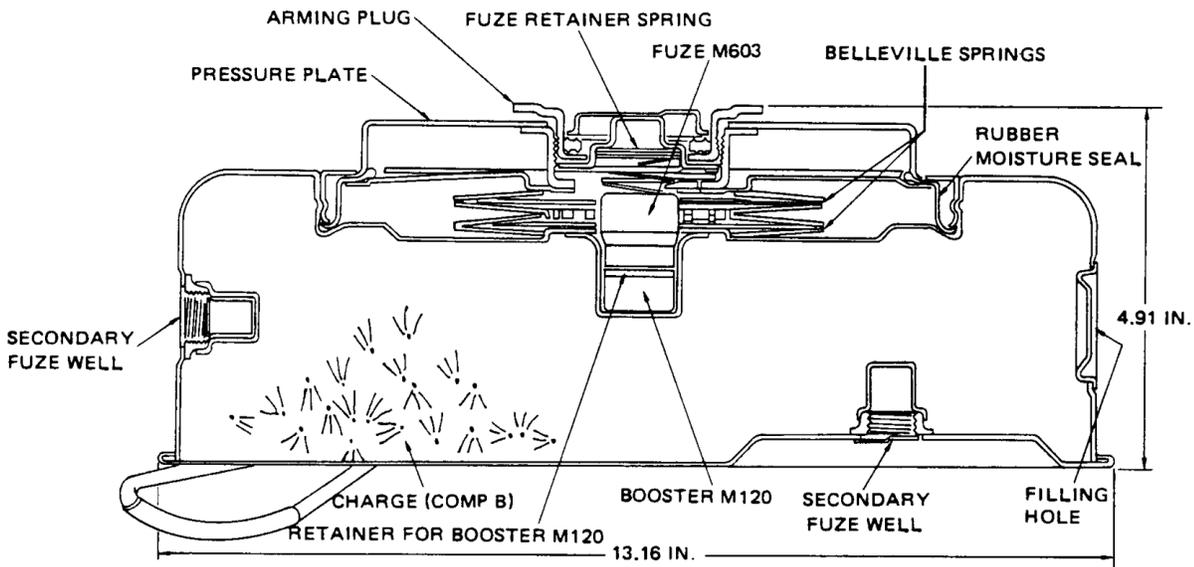


Figure 8-16 HE Antitank Mine (Heavy) M15 with Fuze M603

WARNING

ICE IN THE FUZE WELL DURING FUZING OPERATIONS CAN CAUSE A SERIOUS ACCIDENT. DURING FREEZING WEATHER, ENSURE NONE IS PRESENT.

WARNING

NEVER LEAVE THE SETTING KNOB POINTING TO DANGER.

8-3.5.4 Installation and Arming. The installation and arming of the mine determines the results and depends upon the effectiveness described. When buried 3 inches (7.62 centimeters) deep, the mine has the capability to disable a medium tank such as the M48 (90-millimeter gun) by breaking the track. Laid flush with the ground it has the capacity to disable a medium tank, such as the M48. In this case, it breaks the track and bogies (road wheels or other parts of the suspension system). The installation and arming procedures for this mine for optimum results follow.

- a. At the selected location, dig a hole or use an existing depression that has a firm foundation to accommodate the mine. The hole shall be deep enough so the pressure plate is no more than 1-1/2 inches (3.81 centimeters) beneath ground level.
- b. Using the Arming Plug Wrench M20, Figure 8-17, unscrew the arming plug from the mine, Figure 8-18.
- c. Inspect the fuze well and arming plug threads to see that no foreign material is present. Remove foreign material when found. Inspect secondary fuze wells for signs of corrosion. Corrosion in a secondary fuze well can lead to explosive exudation. Do not attempt to clear corrosion from the fuze well. Do not attempt to fit an activator into corroded secondary fuze well.
- d. Check to ensure the booster retainer seats in the fuze well. If the booster retainer is not present, replace the mine.

- e. After removing it from its metal shipping container, inspect fuze M603 for serviceability. The green end of the detonator must show in the bottom of the fuze.

- f. Just before insertion of the fuze into the mine, remove the safety fork from the cover assembly of the fuze. To accomplish this by hand, use the hook end of the arming wrench. Save the safety fork (clip) for use in disarming the fuze.

- g. Insert the fuze into the fuze well of the mine, pushing it down gently until it seats.

- h. Always insert the main (primary) fuze before installing secondary fuzes.

WARNING

BECAUSE OF TOLERANCES PERMITTED IN MANUFACTURE, THE POSSIBILITY EXISTS THAT THE PRESSURE PLATE OF THE M603 FUZE EXTENDS TOO HIGH. THIS MAKES IT DIFFICULT IF NOT IMPOSSIBLE TO TURN THE KNOB ON THE ARMING PLUG TO THE ARMED POSITION. DO NOT ATTEMPT TO FORCE THE KNOB BUT, IF NECESSARY, UNSCREW THE ARMING PLUG JUST ENOUGH TO ALLOW THE KNOB TO BE TURNED FREELY. NEVER LEAVE THE SETTING KNOB POINTED TO DANGER.

- i. Ensure that the setting knob and shutter are in the SAFE position. Screw the arming plug with helical spring fuze retainer into the mine securely using the arming wrench to ensure a watertight joint.

- j. Lay the mine on a firm foundation with the top surface of the pressure plate not more than 1-1/2 inches (3.81 centimeters) beneath the ground level.

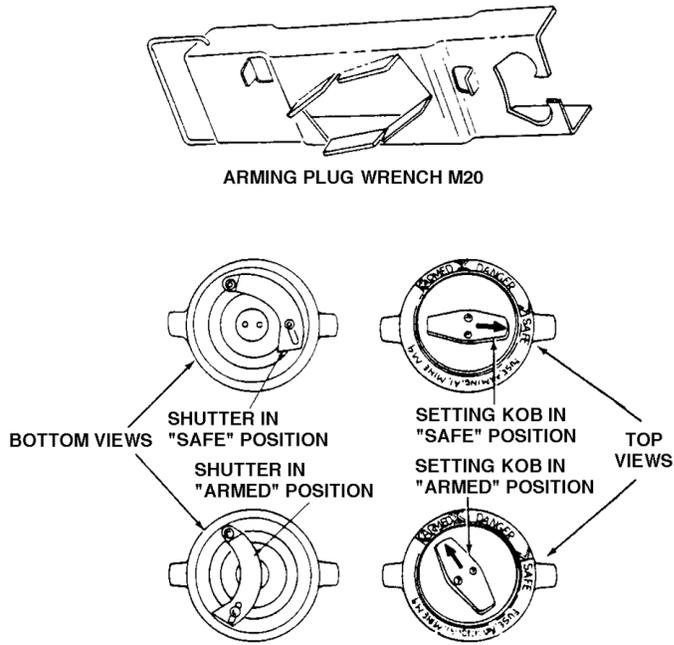


Figure 8-17 Arming Plug Wrench M20 and Arming Plug M4 and M4B1

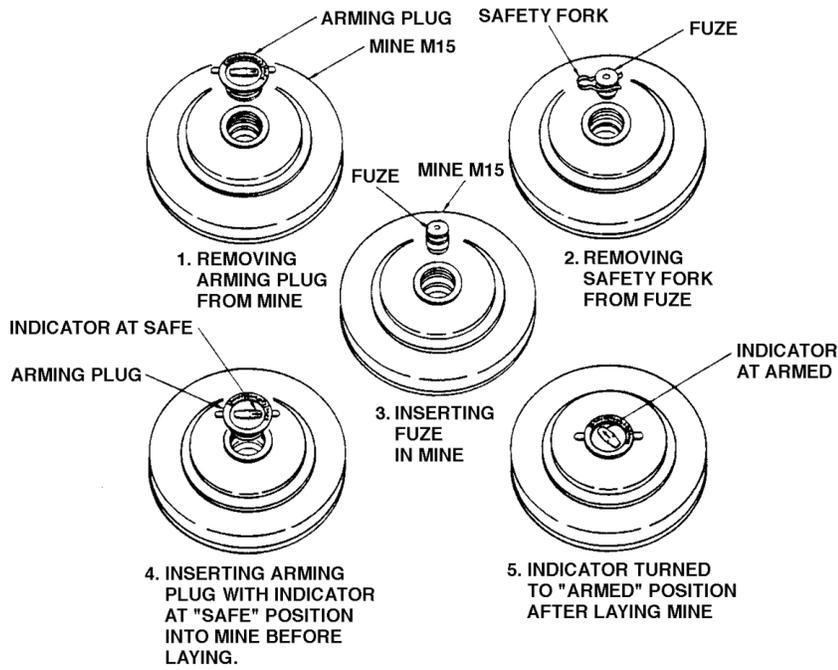


Figure 8-18 Fuzing and Arming Antitank Mine M15

k. Just before covering the mine, arm it by turning the setting knob with red pointer from SAFE through DANGER to ARMED. The arming wrench will work for this purpose. The fuze will not function if the pointer on the arming plug points to SAFE.

l. Camouflage the mine per the instructions in FM 20-32 Army Field Manual.

8-3.5.5 Booby Trapping. Booby trapping the M15 mine requires the M1 activator, a pull or pull-release-type firing device, and wire or trip wire. The booby trapping procedures follow:

a. Remove mine M15 from packing and inspect for and remove foreign material.

b. Remove tape and shipping sleeve from secondary fuze well (side well, bottom well, or both).

c. Inspect secondary fuze well carefully to make certain it is free of foreign material. Inspect secondary fuze wells for signs of corrosion. Corrosion in a secondary fuze well can lead to explosive exudation. Do not attempt to clear corrosion from the fuze well. Do not attempt to fit an activator into corroded secondary fuze well.

d. Remove plug and its gasket from head of activator (activator M1), and screw the activator hand-tight into the secondary fuze well of the mine. Retain plug and gasket for future use.

e. Check to ensure that the small rubber gasket is in place inside the activator. Screw firing device hand-tight into activator (the firing device does not have a blasting cap).

f. Install trip wires as required, fastening them to anchor posts first and to the mine firing device last. Ensure there is no tension on the wires, except on the pull-release-type device. Only specially trained troops install this device.

8-3.5.6 Disarming and Removal. Personnel may install and removed this mine any number of times, provided neither fuze nor mine shows evidence of damage or deterioration. The disarming and removal (neutralizing) procedures follow:

WARNING

IF TAUT WIRES ARE ENCOUNTERED WHEN ATTEMPTING TO NEUTRALIZE THE MINE, DO NOT CUT THE WIRES. TO NEUTRALIZE THE MINE, ATTACHE A LONG ROPE OR WIRE TO THE MINE WITHOUT DISTURBING THE TAUT TRIP WIRE AND PULL THE MINE FROM THE GROUND WHILE IN AN UNMINED PROTECTED POSITION. IF THIS METHOD IS NOT PRACTICABLE, REFER THE MATTER TO THE SPECIALLY TRAINED PERSONNEL (EOD).

WARNING

WHEN REMOVING THE MINE WITH A LONG ROPE OR WIRE, USE EXTREME CAUTION. THE MINE MAY DETONATE.

WARNING

DO NOT ATTEMPT TO REMOVE ANY FUZE APPARENTLY FROZEN IN PLACE OR DIFFICULT TO REMOVE.

a. Carefully uncover the concealed mine and examine the side and bottom secondary fuze wells for booby trapping devices (secondary fuzes).

b. Do not cut taut trip wires, but cut all slack trip wires.

c. Replace all safety pins in the firing devices. Replace the positive safety pin first and remove the trip wire.

d. Unscrew the activator. Replace the plug and gasket in head of activator.

e. Turn the setting knob of the arming plug to the SAFE position.

- f. Unscrew firing device from the activator.
- g. Remove the arming plug by unscrewing it in counterclockwise direction.
- h. Remove the fuze by grasping the fuze pressure plate with the fingers and insert the safety fork (clip) under the pressure plate. The fuze should come out easily.
- i. Unscrew the actuator from the secondary fuze well(s). Replace the plug and gasket in the head of the actuator.
- j. Screw arming plug with retainer spring into place hand-tight, with pointer on setting knob pointing to SAFE.
- k. Replace tape over secondary fuze well.

l. Pack the mine and fuze in its original position in its packing container.

8-3.6 Mine, Antitank, HE, Nonmetallic (NM) M19 With Fuze, Mine, M606 And Activator M2 (K250).

8-3.6.1 Intended Use. This mine, Figure 8-19, is designed and procured for use against heavy tanks and other types of heavy tracked and wheeled vehicles. The mine is nearly all plastic construction and non detectable by magnetic mine detectors. The mine uses an M606 Fuze (a mechanical-pressure type) constructed of plastic material and functions effectively at temperatures between -40°F to 125°F (-40°C to 51.66°C).

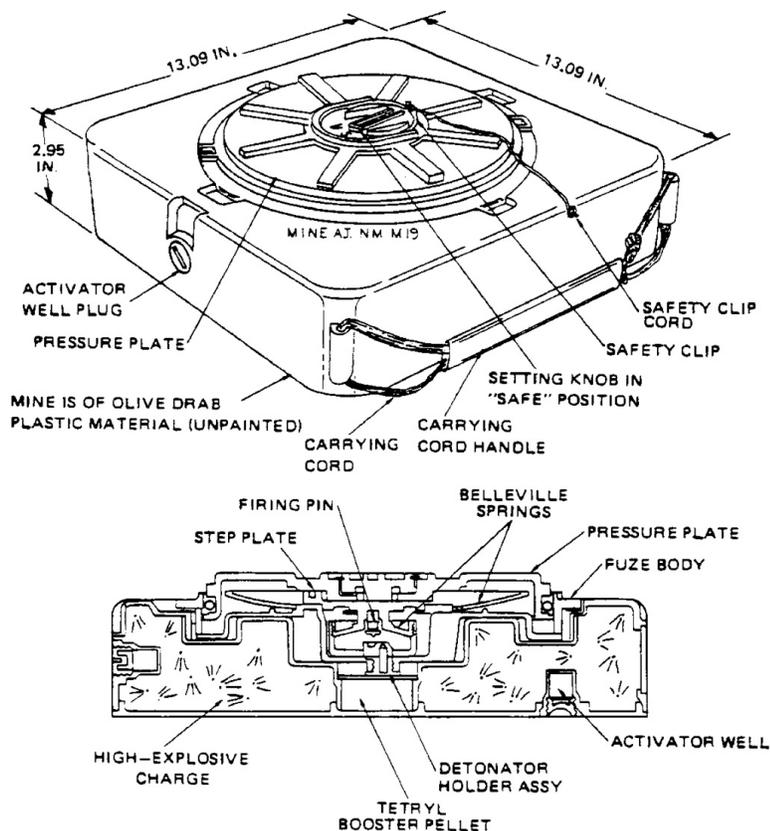


Figure 8-19 Antitank Mine (Nonmetallic) M19 with Fuze M606

8-3.6.2 Description. This antitank mine is provided with the M606 Fuze and the M2 Activator. The mine is box shaped, 13.09 by 13.09 by 2.95 inches (33.24 by 33.24 by 7.49 centimeters), and contains approximately 21 pounds (9.5 kilograms) of Comp B. The mine case is an olive drab plastic material with embossed and yellow markings. The mine body holds the high explosive charge, the tetryl booster pellet, and the fuze. It has two activator wells, one in the side and one in the bottom, threaded to receive activators for booby-trapping the mine. The fuze body contains the pressure plate, belleville spring, setting knob, step plate, firing pin assembly, and detonator. The belleville spring supplies the power to snap the firing pin assembly into the detonator when the pressure plate is forced downward. The setting knob is keyed with the step plate so it rotates when the setting knob is turned. The safety clip prevents the setting knob from moving.

8-3.6.3 Function. When the setting knob on top of the setting plate is in the SAFE position, the mine cannot function by action of the main fuze. This is because the detonator is out of line with the firing pin, and the position of the step plate prevents depression of the pressure plate. Turning the setting knob to the ARMED position aligns the detonator with the firing pin and rotates the step plate to a position enabling the pressure plate to depress. This permits functioning of the main fuze. Packed and shipped with the mine is a safety clip in place to prevent accidental movement of the setting knob. After removal of the safety clip and the setting knob turned to the ARMED position, a minimum force of 300 to 500 pounds (136.1 to 226.8 kilograms) on the pressure plate depresses the belleville spring of the fuze. The belleville spring snaps into reverse, driving the firing pin into the detonator and exploding it. Explosion of the detonator initiates the booster pellet that explodes the main charge of the mine.

NOTE

The M19 mine may function at a force lower than the production specification of 300 pounds. On average, mines can

be expected to function between 260 and 500 pounds. The lowest functional force recorded during testing was 198.5 pounds.

8-3.6.4 Installation and Arming. The installation and arming of the mine determines the results. If the mine is buried 1-1/2 inches (3.81 centimeters) deep, it will immobilize light and heavy trucks. The installation and arming procedures follow:

WARNING

ENSURE THE FUZE FIRING PIN HAS NOT BEEN FIRED AND IS IN THE SAFE POSITION BEFORE ASSEMBLING THE DETONATOR.

- a. At the selected location, dig a hole or use an existing depression that has a firm foundation with a 45° side slope.
- b. Remove the fuzed mine assembly from the packing.
- c. Using the M22 arming wrench contained in the packing box, remove the fuze from the mine.
- d. Remove the shipping plug from the bottom of the fuze using the arming wrench M22, and inspect the opening for foreign matter.
- e. Insert the detonator and detonator holder assembly in place of the shipping plug. Tighten the assembly with the arming wrench or by hand (Figure 8-20).
- f. Insert the fuze into the mine and lay it on a firm foundation in the hole with a 45° side slope and with sufficient depth to cover the mine with 1-1/2 inches (3.81 centimeters) of dirt.
- g. Remove the safety clip and turn setting knob to ARMED position using an arming wrench.
- h. Cover with dirt and camouflage per FM 30-21 Army Field Manual.
- i. For amphibious use and emplacement, see Army Technical Manual TM-9-1345-200.

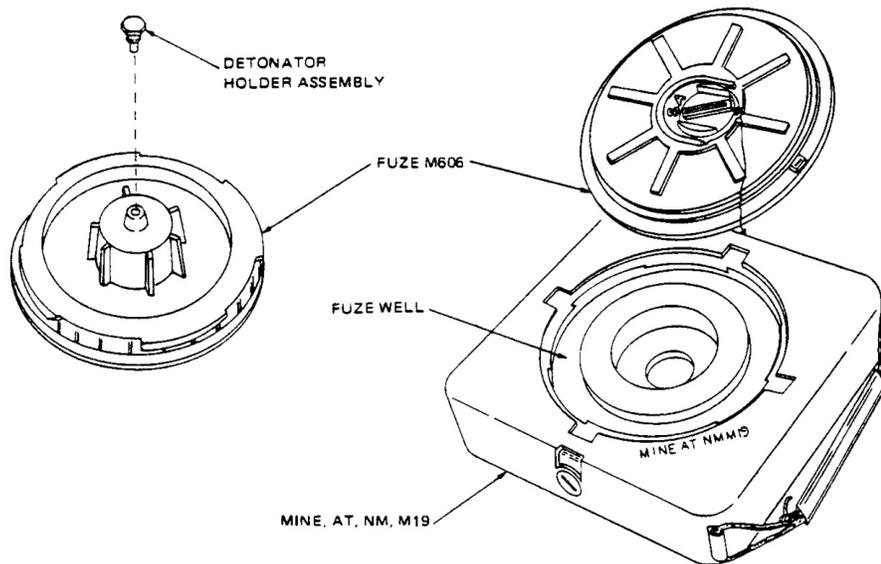


Figure 8-20 Placement of Detonator Holder and Fuze M606 into Mine M19

8-3.6.5 Sympathetic Detonation. The mine explosion transmits a shockwave with the ability to trigger an adjacent mine. For this reason, observe the following distances:

a. When buried 1-1/2 inches (3.81 centimeters) deep, expect sympathetic detonation when mines are 12 feet (3.6 meters) or less apart;

b. When buried 2 inches (5.08 centimeters) deep, expect sympathetic detonation when mines are 15 feet (4.5 meters) or less apart;

c. When laid on top of the ground, expect sympathetic detonation when mines are 25 feet (7.62 meters) or less apart;

d. To obtain satisfactory reliability of actuation and elimination of sympathetic detonation, bury the mines under 1-1/2 inches (3.81 centimeters) of dirt cover with a 45° side slope of holes and 6 yards (5.49 meters) center-to-center distance between mines.

8-3.6.6 Amphibious Emplacement. The M19 mine is two to three times more effective in water than it is on land. Tracked or wheeled vehicles that strike the mines implanted in water not only have their tracks or wheels destroyed, but their support members also. Smaller vehicles will be flipped over and almost completely destroyed. Because

the water amplifies and transmits the shock waves more than land, the mines equipped with pressure-actuated fuzes are subject to sympathetic detonation. To avoid sympathetic detonation, M19 mines with M606 fuzes planted in water must be at least 14 feet (4.26 meters) apart in water 2 feet (0.60 meter) deep, and at least 24 feet (7.31 meters) apart in water 5 feet (1.52 meters) deep.

8-3.6.7 Booby Trapping. Booby trapping the M19 Mine requires the M2 Antitank Mine Activator, a pull or pull-release-type firing device, and a trip wire(s). The following procedures describe how to booby trap the mine:

a. Remove closure from one or both activator well(s).

b. Ensure there is no foreign matter in either activator well.

c. Remove activator plug and its gasket from the head of activator M2 and screw the activator hand-tight into the activator well of the mine.

d. Ensure that the small rubber gasket is in place inside the activator and screw the firing device hand-tight into activator.

e. Install trip wires, as required, fastening them to anchor posts first and to the firing device last.

f. Arm the firing device by removing safety pins, removing the positive safety pin last.

g. Save and conceal all safety pins, the activator plug and its gasket, and the activator well closure for future use in disarming and removal.

8-3.6.8 Disarming and Removal. The mine may be installed and removed any number of times, provided neither the fuze nor the mine shows evidence of damage or deterioration. The disarming and removal (neutralizing) procedures follow:

WARNING

WHEN ATTEMPTING TO NEUTRALIZE THE MINE, DO NOT CUT ANY ENCOUNTERED TAUT WIRES. TO NEUTRALIZE THE MINE, ATTACH A LONG ROPE OR WIRE TO THE MINE WITHOUT DISTURBING THE TAUT TRIP WIRE. PULL THE MINE FROM THE GROUND WHILE IN AN UNMINED PROTECTED POSITION. IF THIS METHOD IS NOT PRACTICABLE REFER THE MATTER TO SPECIALLY TRAINED PERSONNEL (EOD).

WHEN REMOVING THE MINE WITH A LONG ROPE OR WIRE, USE EXTREME CAUTION. THE MINE MAY DETONATE.

a. Carefully uncover the concealed mine and examine the side and bottom wells for booby trapping devices (secondary fuzes). There may be trip wires installed to initiate a secondary fuze by either pull or release.

b. Never cut taut wires, but cut all slack trip wires.

c. Replace all safety pins in the firing devices, replacing the positive safety pin first. Refer to SW060-AA-MMA-010 for instructions pertaining to the particular firing device involved.

d. Unscrew firing device from activator.

e. Unscrew Activator. Replace plug and rubber gasket in head of activator. Replace the closure for the activator well.

f. Turn the setting knob to the SAFE position.

g. Remove the mine fuze, grasping the fuze pressure plate with the fingers. The fuze should come out easily.

h. Remove the trip wire and retape the secondary well.

i. Restore the mine and fuze to original position and packing. Install and remove the mine as many times as desired, provided neither the fuze nor the mine shows evidence of damage or deterioration.

8-4 PRACTICE AND TRAINING MINES

8-4.1 General. Practice mines are of the same size, weight, and shape as service mines. However, they contain a small smoke puff and noise charge consisting of black powder or pyrotechnic composition instead of a high explosive. Inert mines are available for training in handling. Inert mines are usually the metal or plastic parts of service mines empty or filled with inert materials such as sand.

8-4.2 Mine, Antipersonnel, Practice, M16A1, Inert, With Fuze, Mine, Combination M605 Inert.

8-4.2.1 Intended Use. This APERS mine is designed and procured to simulate the M16A1 Service Mine (Paragraph 8-2.6). It is used to train personnel in the recognition, care, handling, and use of APERS mines.

8-4.2.2 Description. This practice mine and fuze consists of the same metal components as those used for their service counterparts. The mine and fuze contain inert material and, except for the firing mechanism of one fuze, will not function.

8-4.2.3 Precautions. Observe the following safety precautions for use and handling of practice and training mines:

a. Do not mix service, practice, and inert mines and fuzes. Practice and inert mines should be painted the proper color and have the appropriate identifying terms stenciled upon the bodies.

b. Inert APERS mines are safer to handle because they contain no explosive. They are the item for training purposes. Train all personnel to handle all ammunition and ammunition components as potentially dangerous, regardless of the inert or empty designation.

c. The rules, regulations, and precautions in this publication that pertain to service mines and their components pertain also to practice APERS mines.

8-4.3 Mine, Antipersonnel, Practice, M8 (K280).

8-4.3.1 Intended Use. This APERS mine is designed and procured to simulate the M16 series mines. It is used to train personnel in the recognition, care, handling, and use of the M16 series mines.

8-4.3.2 Description. This practice mine consists of practice mine components as listed in Table 8-1. The projectile in the M8 is made of cardboard and contains a spotting charge assembly of black powder. The spotting charge resembles a blank-loaded shotgun shell with a delay fuze element instead of a primer.

8-4.4 Mine, Antitank, Practice, Empty, Heavy, M12 And M12A1 (K230).

8-4.4.1 Intended Use. This mine, Figure 8-21, is designed and procured for training in identification, care, handling, and use of antitank service mines. The practice mine simulates the heavy service antitank mine M15 Antitank Mine described in Paragraph 8-3.5

8-4.4.2 Description. This practice mine consists of the same components as those in the service mine, but contains no explosive materials. Shipped empty, the procedures call for filling the mine with 11.12 pounds (5.04 kilograms) of sand in the field. The M1 Activator (K002) and the M604 Fuze (K051) are optional components for use with this mine.

Table 8-1 M8 Practice APERS Mine Components

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Spool, Antipersonnel Wire, Trip, F/Mine AP M2, M3 and M8	K013	8-4.3	1345-00-011-3260	8796355	Packaged as required.
Primer-Igniter, Mine Fuze, F/Fuze Combination M10 or M10A1, F/Mine APERS Practice M8	K030	8-4.3	1345-00-028-5128	76-8-65	Packaged as required
Charge, Spotting, mine, F/ Mine APERS Practice M8	K040	8-4.3	1345-00-028-5127	82-15-26G	Packaged as required
Fuze, Mine, Combination, M10A1, w/o Primer Igniter	K055	8-4.3	1345-00-028-5121	73-9-25A	10 per fiberboard carton, 1 carton per barrier bag, 18 bags per wooden box
Simulator, Anti-personnel Mine, Proj, F/Mine APERS Practice M8	K270	8-4.3	1345-00-028-5123	82-15-26A	This item consists of a reusable boxboard tube and is inert, packaged as required.
Cap, Antipersonnel Mine, For Mine, APERS Practice M8	K271	8-4.3	1345-00-028-5126	82-15-20G	Packaged as required
Body, Antipersonnel Mine, For Mine, APERS Practice M8	K280	8-4.3	1345-00-028-3955	82-15-20A	Packaged as required.

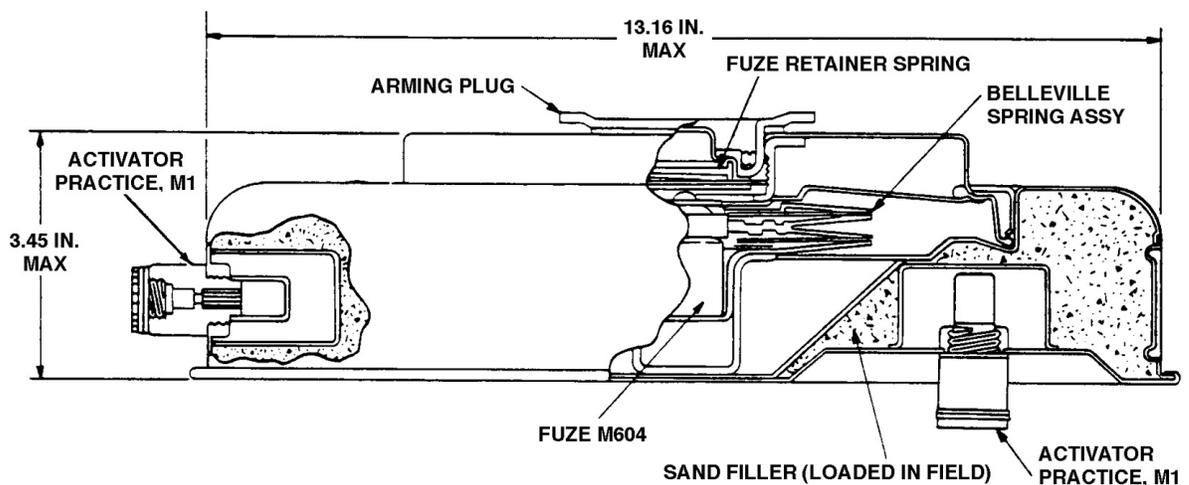


Figure 8-21 Practice Antitank Mine (Heavy) M12

8-4.4.3 Precautions. Observe the following safety precautions concerning the use of practice and training mines.

a. Ensure that all mines are properly color coded and marked. Keep service, practice and inert mines segregated from each other.

b. Although inert mines do not require special safety precautions, observe the safety regulations governing the use of service mines when using inert mines. This establishes and maintains habits necessary to the safe handling of explosives.

c. When using practice antitank mines, observe all regulations found in this manual that apply to service or practice mines.

8-4.5 Mine, Antitank, Practice, Empty, Heavy M20 (K231).

8-4.5.1 Intended Use. This mine, Figure 8-22, is designed and procured for training in proper methods and precautions to be observed in the care, handling, installing and arming, booby trapping, and disarming the high-explosive heavy antitank mine M15 as described in Paragraph 8-3.5

8-4.5.2 Description. This practice mine consists of a flat cylindrical steel casing similar to the service mine M15. The practice mine has a wire

carrying handle that folds under the mine when not in use. It uses the M4 arming plug and differs from the M15 mine in having three filler holes in the side and perforations in the top and around the side secondary fuze well. The empty mine contains no explosive materials. The M1 Activator (K002) and the M604 Fuze (K051) are optional components for use with this mine. The mine is blue with white markings.

8-4.5.3 Precautions. The safety precautions as described in Paragraph 8-4.4.3 shall also apply to the practice mine.

a. Ensure that all mines are properly color coded and marked. Keep service, practice and inert mines segregated from each other.

b. Although inert mines do not require special safety precautions, observe the safety regulations governing the use of service mines when using inert mines. This establishes and maintains habits necessary to the safe handling of explosives.

c. When using practice antitank mines, observe all regulations found in this manual that apply to service or practice mines.

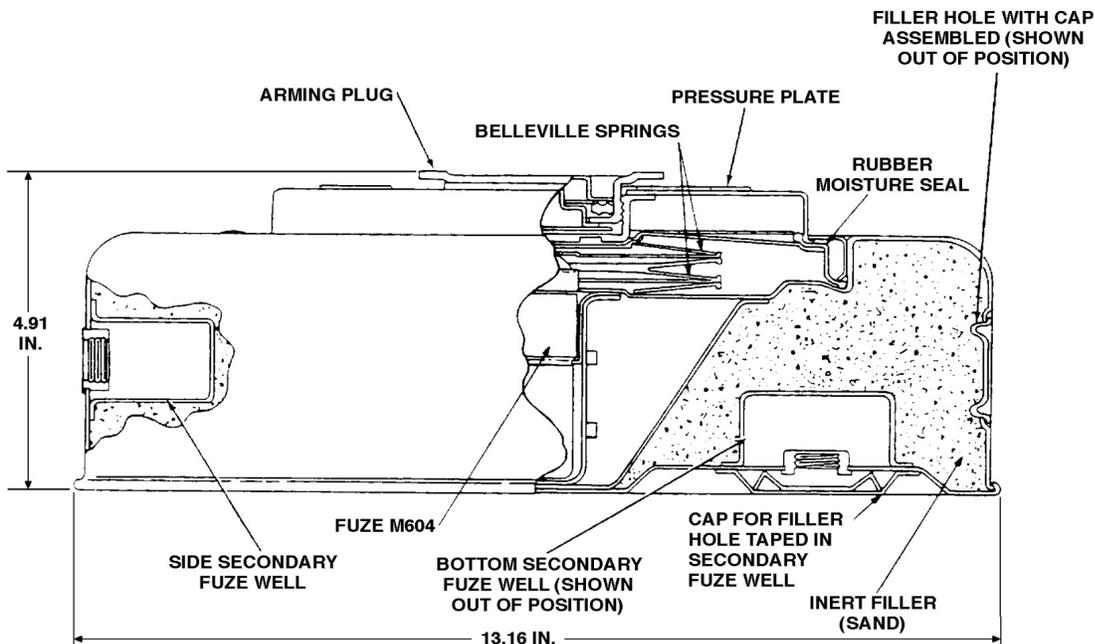


Figure 8-22 Practice Antitank Mine (Heavy) M20

8-5 MINE FUZES

This section describes the various antitank mine fuzes.

8-5.1 Fuze, Mine, Antitank, HE M603 (K050).

8-5.1.1 Intended Use. The Antitank Mine Fuze M603 is an instantaneous mechanical-pressure type fuze. This fuze is used and packed with M15 Antitank Mine. The Fuze M603 is also available as a separately issued item.

8-5.1.2 Description. This fuze, Figure 8-23, consists of an aluminum body containing a firing pin assembly, a cover assembly, a safety fork (clip), and a detonator. The firing pin assembly consists of a firing pin and two steel belleville springs held together by a retainer which is crimped to the firing pin. The cover assembly consists of a metal cover for the top of the fuze body and a pressure plate which is attached to the cover in such a manner that the safety fork may be inserted between the fuze body and the pressure plate. The detonator well contains a detonator crimped to the body of the fuze.

8-5.1.3 Function. A load of 140 to 240 pounds (65.56 to 108.96 kilograms) is required to depress the belleville spring and cause it to snap into reverse, driving the firing pin into the detonator. When assembled to the M15 Mine, a total force of 350 to 750 pounds (160 to 340 kilograms) is

needed on the pressure plate to overcome the combined resistance of the belleville springs in the mine and the fuze and activate the fuze.

8-5.2 Fuze, Mine, Antitank, Practice, M604 (K051).

8-5.2.1 Intended Use. The M604 Practice Antitank Fuze Mine is used with the M12 Series and M20 Practice Antitank Mine in conduction with M1 Activator (K002).

8-5.2.2 Description. The fuze, Figure 8-24, is an instantaneous mechanical-pressure actuated type with no explosive train interruption. The fuze consists of an aluminum body containing a belleville spring, and fitted with a firing pin, an igniter charge, and a smoke composite charge weighing 17 grains (1.1 grams).

8-5.2.3 Function. A minimum force of 140 to 240 pounds (63.56 to 108.96 kgs) depresses the pressure plate which causes the belleville spring to snap into reverse, driving the firing pin into the primer. When assembled to the M12A1 Mine, a total force of 350 to 750 pounds (160 to 340 kgs) is needed on the pressure plate to overcome the combined resistance of the belleville springs in the mine and the fuze and activate the fuze. The primer ignites the smoke composition, which flashes, emitting a cloud of smoke and an audible report.

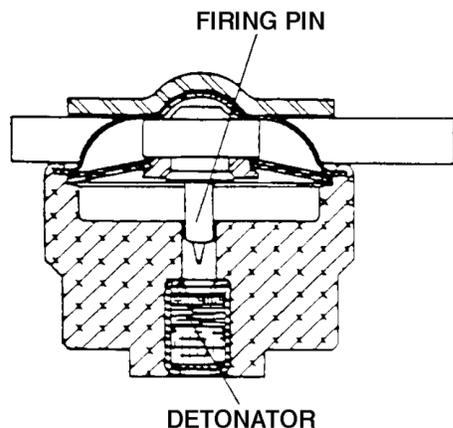


Figure 8-23 HE Antitank Mine Fuze M603

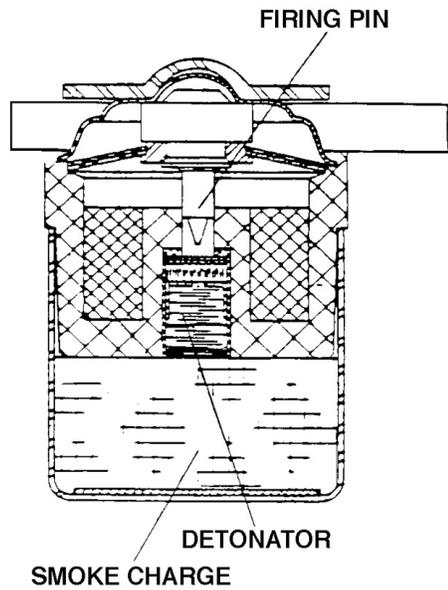


Figure 8-24 Practice Antitank Mine Fuze M604

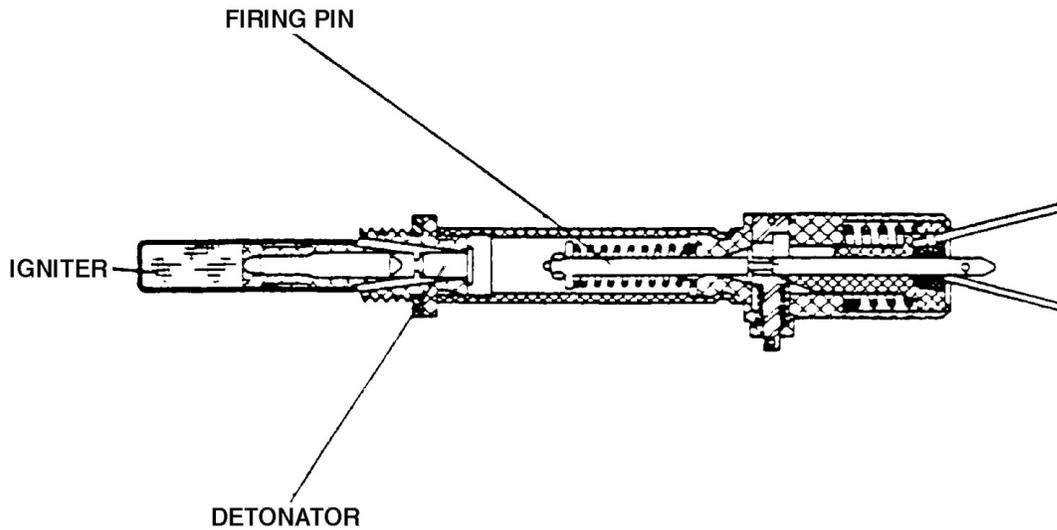


Figure 8-25 Combination Mine Fuze M10A1

8-5.3 Fuze, Mine, Combination, M10A1 w/o Primer Igniter (K055).

8-5.3.1 Intended Use. This Fuze is a combination fuze of the side-pressure type, used to ignite the spotting charge in Antipersonnel Practice Mine.

8-5.3.2 Description. M10 series Combination Fuzes, Figure 8-25, have a three-pronged pressure firing device at the top and a pull wire release pin ring at the side. The body houses a spring-loaded firing pin and a cocking mechanism. The base contains a primer and length of safety fuse. The firing mechanism consists of cylindrical metal case containing a trigger pin, a release pin, and a firing

pin, each fitted with a coil spring. Two safety pins render the fuze safe during shipment and handling. A cotter pin passes through the end of the release pin and bears against the body of the fuze. A second pin, called the safety firing pin, passes through the end of the firing pin that protrude above the top of the fuze. The fuze igniter assemblies are replaceable. The fuzes may be used many times by replacing the fired igniter assembly and recocking the firing mechanism.

8-5.3.3 Function. The firing mechanism is activated by a force on any of the prongs or a pull on the release pin. Either action causes the firing pin to strike the primer which initiates the delay fuze and after 4 or 5 seconds, the igniter charge.

8-5.4 Fuze, Mine, Combination, M605, F/ Mine APERS M16 (K058).

8-5.4.1 Intended Use. The M605 Mine Combination Fuze is used to ignite the M16 Series Anti-personnel Mine.

8-5.4.2 Description. This fuze, Figure 8-26, consists of two main assemblies, the head assembly and the loading assembly.

a. **Head Assembly.** The head assembly contains the firing mechanism and safety devices. It includes the three pressure prongs projecting from the top of the fuze case. Attached to the other end of the release pin is the release pin ring to which trip wires may be attached. Threads for assembling the fuze in the fuze well of the mine are located about midway on the head assembly.

b. **Loading Assembly.** The loading assembly, which is screwed to the head assembly to complete the fuze assembly, consists of the primer assembly and the delay and relay charge assembly to which the igniter is crimped.

8-5.4.3 Function. A force of 8 to 20 pounds (3.6 to 9.1 kgs) on any of the pressure prongs or a pull of 2 to 10 pounds (.9 to 4.6 kgs) on the trip-wire, activates the fuze. The trip wire pulls the release pin outward, releasing the firing pin. Pressure on the prongs compresses the pressure spring, forcing the trigger pin downward, pushing the release pin out and thereby releasing the firing pin. The firing pin is forced into the primer by a spring, which in turn ignites a fuze delay charge, a relay charge, and an igniter charge, initiating the mine expelling charge.

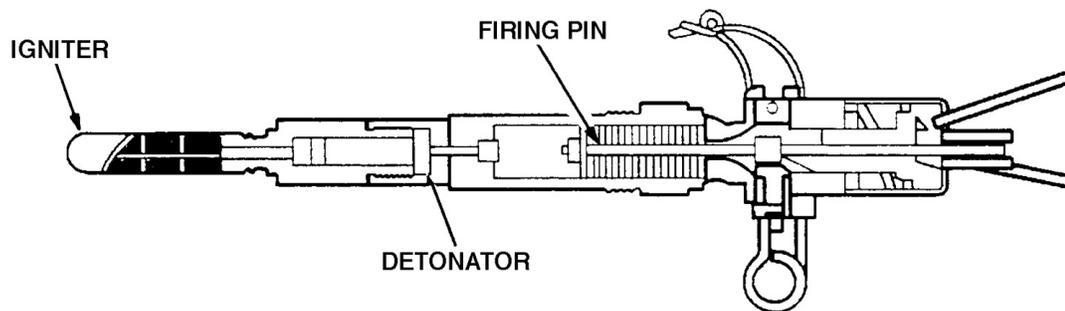


Figure 8-26 Combination Mine Fuze M605

Table 8-2 Antipersonnel and Antitank Land Mines

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Mine, Antitank, Practice, Empty, Heavy, M12 And M12A1 Mine, Antitank, Practice, Empty, Heavy M20	K002	8-4.4 8-4.5	1345-00-028-5105	76-7-721	1 per metal container, 180 containers per wooden box
Fuze, Mine, Antitank, HE M603	K050 K050	8-5.1	1345-00-028-5078 1345-00-028-5122	76-1-1329 76-1-1328	1 per metal container, 144 containers per wooden box 1 per metal container, 180 containers per wooden box
Fuze, Mine, Antitank, Practice, M604	K051	8-4.4 8-4.5 8-5.2	1345-00-028-5130	76-1-1625	1 per metal container, 180 containers per wooden box
Fuze, Mine, Combination, M605, F/Mine APERS M16	K058	8-5.4	1345-00-717-5770	76-1-1329	4 per metal box, 6 boxes per wooden box
Mine, Antipersonnel, M16, M16A1 and M16A2 with Fuze, Mine, Combination M605 (Obsolete)	K092	8-2.6	1345-00-028-5131	82-0-194	4 mines with 4 fuzes per metal container, and 4 spools of trip wire and 1 M25 wrench per wooden box
Mine, Antipersonnel, M16, M16A1 and M16A2 with Fuze, Mine, Combination M605	K092	8-2.6	1345-00-529-7303	8796365	4 mines with 4 fuzes per metal container, and 4 spools of trip wire and 1 M25 wrench per wooden box
Mine, Antipersonnel, M16A2, w/M605 Fuze (Obsolete)	K092	8-2.6	1345-00-965-0742	8796365/ MIL-M-45174	4 mines with 4 fuzes per metal box, 2 spools of trip wire and 1 wrench in barrier bag per wirebound box
Mine, Antipersonnel, M14, Non-Metallic (Obsolete)	K121	8-2.5	1345-00-028-5108	82-0-79	90 mines per carton with 90 M46 detonators in setup box, and 6 M22 wrenches per wooden box
Mine, Antipersonnel, M14, Non-Metallic (Obsolete)	K121	8-2.5	1345-00-096-3093	8885271/ 75-14-652	90 mines per carton with 90 M46 detonators in setup box, and 9 M22 wrenches per wooden box
Mine, Antipersonnel, Practice, M16A1, Inert, With Fuze, Mine, Combination M605 Inert	---	8-4.2	1345-00-799-7391	8796345	4 mines with 4 fuzes per waterproof wrapper, with 4 spools trip wire and 1 M25 wrench per wooden box
Mine, Antipersonnel, M18A1, With Accessories	K143	8-2.7	1345-00-710-6946	8835166	1 mine per M7 bandoleer, 6 bandoleers, 1 M40 test set, 1 identification tag (6 mines) per wooden box
Mine, Antipersonnel, M18A1, With Accessories	J007	8-2.7	1345-01-526-6440	8836102	1 mine per M7 bandoleer, 6 bandoleers, 1 MiniDet and 1 identification tag (6 mines) per wooden box

Table 8-2 Antipersonnel and Antitank Land Mines (Continued)

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Mine, Antitank, High Explosive (HE), Heavy, M15 With Fuze, Mine, Antitank, M603 And Activator, M1	K180	8-3.5	1345-00-028-5118	82-0-189	1 mine with fuze and activator per can M182, 1 can per wooden box
	K180		1345-00-042-3441	82-0-189	1 per M182 metal can, with 1 arming wrench M20, in barrier bag, 1 can and barrier bag per wooden box
Mine, Antitank, Practice, Empty, Heavy, M12 And M12A1	K230	8-4.4	1345-00-028-5117	82-1-44-4	2 mines per wooden box
Mine, Antitank, Practice, Empty, Heavy M20	K231	8-4.5	1345-00-344-2368	7548128	3 mines with 1 arming wrench per wooden box
Mine, Antitank, HE, Nonmetallic (NM) M19 With Fuze, Mine, M606 And Activator M2	K250	8-3.6	1345-00-348-8646	82-15-71	2 mines with 2 fuzes, 2 detonator assemblies, and 1 wrench M22 in cardboard container, with 1 container and 2 activators (in individual metal containers) in wooden box
	K250		1345-00-849-9768	9209328	Packaged 2 per support bag, 2 bags, 4 mines and 1 arming wrench M22 per wooden box

CHAPTER 9

HAND AND RIFLE GRENADES

9-1 INTRODUCTION

This chapter provides general and technical information on hand and rifle grenades.

9-2 HAND GRENADES

WARNING

IF PRESSURE ON THE SAFETY LEVER IS RELAXED AFTER THE SAFETY CLIP AND SAFETY PIN HAVE BEEN REMOVED, IT IS POSSIBLE THAT THE STRIKER CAN ROTATE AND STRIKE THE PRIMER WHILE THE THROWER IS STILL HOLDING THE GRENADE. THIS IS CALLED "MILKING" THE GRENADE. THROWERS MUST BE INSTRUCTED TO MAINTAIN ENOUGH PRESSURE ON THE SAFETY LEVER SO THE STRIKER CANNOT ROTATE.

WARNING

WAIT AT LEAST 30 MINUTES BEFORE APPROACHING A SUSPECTED DUD FIRED GRENADE. DAMPNES OR DETERIORATION MAY HAVE PROLONGED BURNING OF THE PYROTECHNIC DELAY.

9-2.1 General. Hand grenades, Figure 9-1, are used to supplement small arms for effect against an enemy in close combat. The hand grenades are a convenient size and shape for throwing by hand. They are used against a variety of combat targets: riot control, incendiary, diversionary, and training. The various types of hand grenades include fragmentation, illumination, chemical, offensive, diversionary and practice.

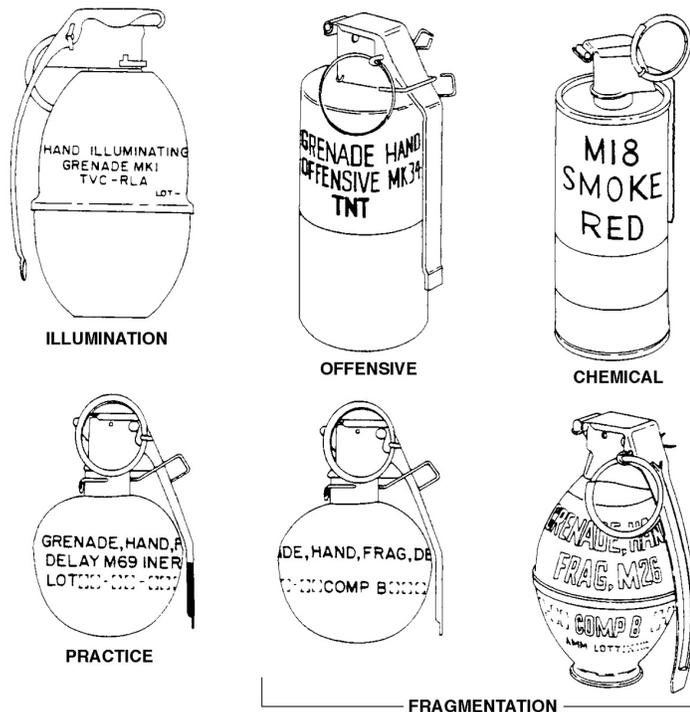


Figure 9-1 Typical Hand Grenades

9-3 FRAGMENTATION HAND GRENADES

The fragmentation hand grenades produce casualties by high-velocity fragment projection. However, the blast effect is also useful for effecting casualties in small enclosed places. The fragmentation is more effective against a scattered deployment of personnel because the effective range of the high-speed fragments is much greater than the effective radius of the blast effect. The casualty radius of fragmentation hand grenades is comparably greater than the blast effect of offensive hand grenades. See Table 9-1 for packaging and identification data.

9-3.1 Grenade, Hand, Fragmentation, MK 2 and MK 2A1 (G890).

9-3.1.1 Intended Use. This hand grenade, Figure 9-2, is designed and procured for use to produce casualties by high-velocity fragment projection.

9-3.1.2 Description. This hand grenade consists of a cast iron body with deep serrations, containing high explosives [2 ounces (56 grams) of flaked Trinitrotoluene (TNT)]. The MK 2 and MK 2A1 grenades use hand grenade fuzes M204A1, M204A2 and M6A4C. The grenade is olive drab and weighs 21 ounces (595 grams) with the fuze.

9-3.1.3 Function. Removal of the safety pin permits release of the safety lever. When the safety lever is released, it is forced away from the grenade body by a striker acting under the force of a striker spring. The striker rotates on its axis and strikes the percussion primer. The primer emits a small, intense flame, igniting the delay element. The delay element burns for 4 to 5 seconds, then sets off the detonator. The detonator explodes, initiating the explosive charge. The explosive charge explodes, rupturing the body and projecting fragments.

Table 9-1 Fragmentation Hand Grenades

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Grenade, Hand, Fragmentation, MK 2 and MK 2A1, w/fuze M6A4C	G890	9-3.1	1330-00-028-5832	82-0-41	1 per fiber container M41A1, 25 containers per wooden box
Grenade, Hand, Fragmentation, MK 2 and MK 2A1, w/fuze M204A1/M204A2	G890	9-3.1	1330-00-028-5837	82-0-143	1 per fiber container M41A1, 25 containers per wooden box
Grenade, Hand, Fragmentation, M26 and M26A1, w/fuze M204 or M204A1	G890	9-3.2	1330-00-028-5839	82-0-190	1 per fiber container M47 or M289A1, 25 containers per wooden box
Grenade, Hand, Fragmentation, M26 and M26A1, w/fuze M204A2	G890	9-3.2	1330-00-926-1857	9212181	1 per fiber container M289A1, 30 containers per wooden box
Grenade, Hand, Fragmentation, M67, w/fuze M213	G881	9-3.3	1330-00-133-8244	9235492	1 per fiber container M415A1, 30 containers per wooden box
Grenade, Hand, Fragmentation, M61 with Fuze M204A2	G880	9-3.4	1330-00-935-6064	9231594	1 per fiber container, 30 containers per wooden box

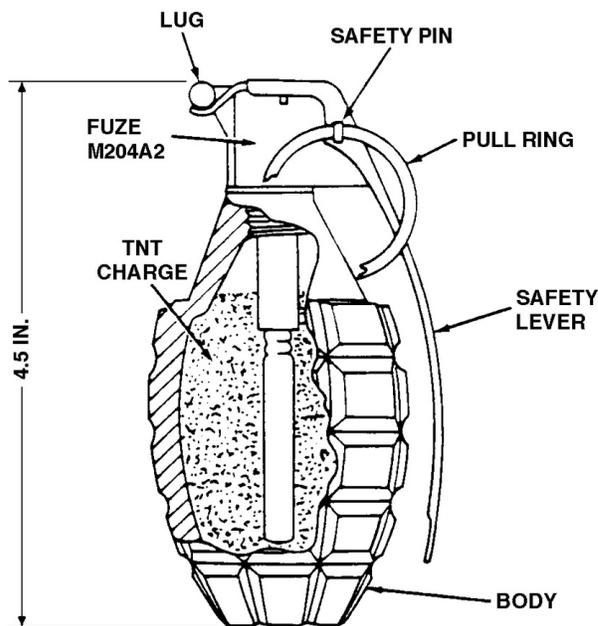


Figure 9-2 Fragmentation Hand Grenade MK 2

9-3.2 Grenade, Hand, Fragmentation, M26 and M26A1 (G890).

9-3.2.1 Intended Use. This hand grenade, Figure 9-3, is designed and procured for use to produce casualties by high-velocity projection of fragments.

9-3.2.2 Description. This hand grenade consists of a two-piece, thin-wall sheet steel body with a notched fragmentation coil liner. The explosive charge in the M26 grenade consists of 5.8 ounces (164 grams) of Composition B (Comp B), and the M26A1 has 5.5 ounces (155 grams) of Comp B and 0.3 ounce (8.5 grams) of tetryl pellets. Assembled with each grenade is a fuze that initiates the explosive charge. The M26 grenade uses the M204A1 fuze and the M26A1 grenade uses the M204A2 fuze. This grenade is olive drab with yellow markings.

9-3.2.3 Function. Removal of the safety pin permits release of the safety lever. When the safety lever is released, it is forced away from the grenade body by a striker acting under force of a striker spring. The striker rotates on its axis and strikes the percussion primer. The primer emits a small, intense flame, igniting the delay element. The delay element burns for 4 to 5 seconds, then sets

off the detonator. The detonator explodes, initiating the explosive charge. The explosive charge explodes, rupturing the body and projecting fragments.

9-3.3 Grenade, Hand, Fragmentation, M67 (G881).

9-3.3.1 Intended Use. This hand grenade, Figure 9-4, is designed and procured for use to produce casualties by high-velocity projection of fragments.

9-3.3.2 Description. This hand grenade consists of a spherical-shaped steel body 2.5 inches (6.35 centimeters) in diameter containing 6.5 ounces (184.28 grams) of Comp B. This grenade is assembled with the M213 fuze and is provided with a steel wire safety clip. The grenade is olive drab with yellow markings.

9-3.3.3 Function. Release of the safety clip and removal of the safety pin permit release of the safety lever. When the safety lever is released, it is forced away from the grenade body by a striker acting under the force of a striker spring. The striker rotates on its axis and strikes the percussion primer. The primer emits a small, intense flame, igniting the delay element. The delay element burns for 4 to 5 seconds, then sets off the detonator. The detonator explodes, initiating the explosive charge. The explosive charge explodes, rupturing the body and projecting fragments.

9-3.4 Grenade, Hand, Fragmentation, M61 with Fuze M204A2 (G880).

9-3.4.1 Intended Use. This hand grenade is designed and procured for use to produce casualties by high-velocity projection of fragments.

9-3.4.2 Description. In appearance and operation, this hand grenade replaces the M26 Hand Grenade, Figure 9-3. It consists of a two-piece, thin-wall sheet steel body with a notched fragmentation coil liner. The explosive charge is 5.5 ounces (155 grams) of Comp B and 0.3 ounce (8.5 grams) of tetryl pellets. The M204A2 fuze is a pyrotechnic delay-detonating type. It has an M42 percussion primer; a lead azide, lead styphnate, and RDX detonator; and a 4- to 5-second delay time. The hand grenade with filler and fuze weighs

approximately 16 ounces (453 grams), is 3.9 inches (9.9 centimeters) long, has a diameter of 2.25 inches (5.7 centimeters), and is olive drab with yellow markings.

9-3.4.3 Function. Removal of the safety pin permits release of the safety lever. When the safety lever is released, it is forced away from the grenade body by a striker acting under the force of a striker spring. The striker rotates on its axis and strikes

the percussion primer. The primer emits a small, intense flame, igniting the delay element. The delay element burns for 4 to 5 seconds, then sets off the detonator. The detonator explodes, initiating the explosive charge. The explosive charge explodes, rupturing the body and projecting fragments.

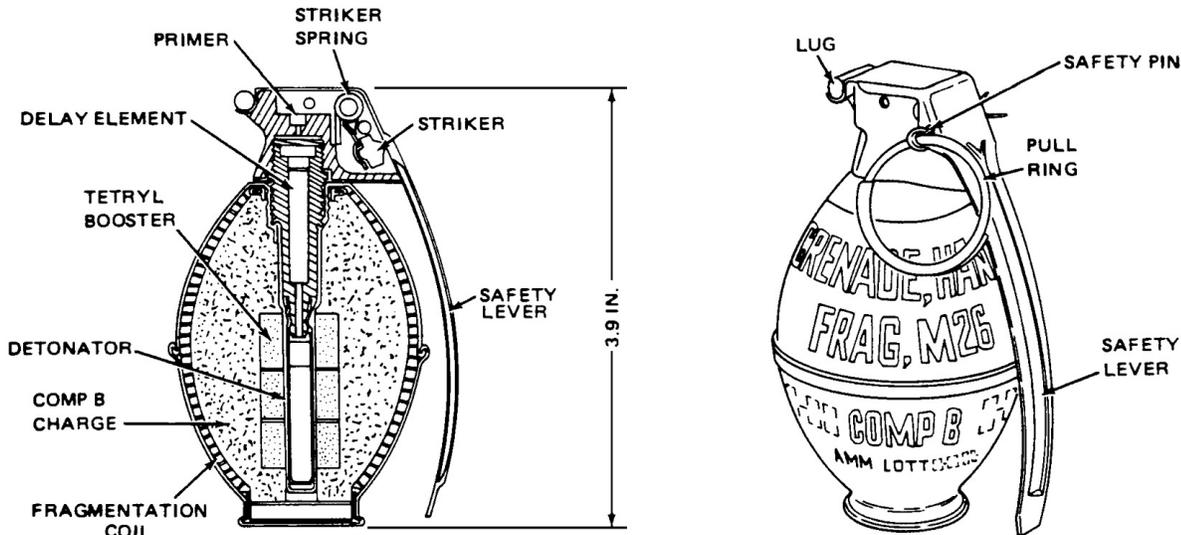


Figure 9-3 Fragmentation Hand Grenade M26

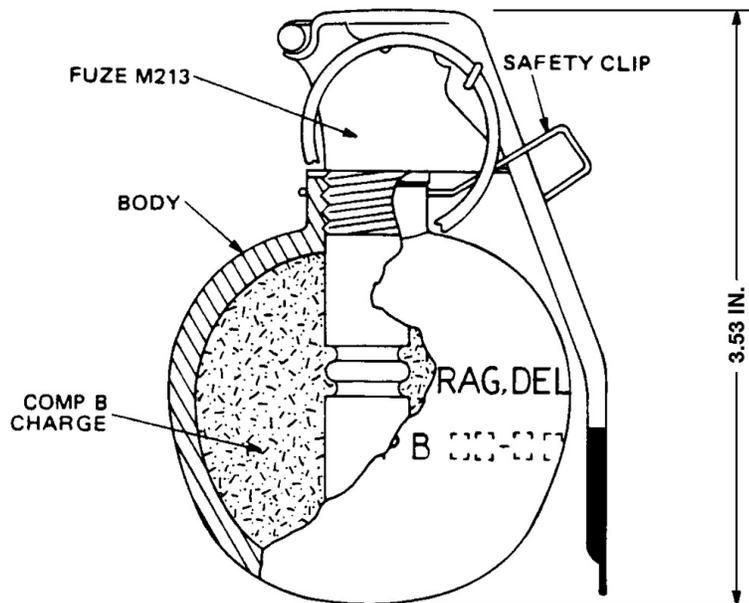


Figure 9-4 Fragmentation Hand Grenade M67

9-4 ILLUMINATING HAND GRENADES

The primary use of illuminating hand grenades is to illuminate a certain area or targets. The high temperature generated by the pyrotechnic composition filler allows the grenade to function as an incendiary device against flammable targets. See Table 9-2 for packaging and identification data.

9-4.1 Grenade, Hand, Illuminating, MK 1 MODs with Fuze MK 372 MOD 0 (G895).

9-4.1.1 Intended Use. This hand grenade, Figure 9-5, is designed and procured for use in illuminating certain areas in night operations. This hand grenade may be launched by hand or by a rifle equipped with Grenade Projection Adapter M1.

WARNING

THIS DEVICE BURNS FOR A CONSIDERABLE TIME AND DEVELOPS INTENSE HEAT. HANDLE THIS DEVICE CAREFULLY TO AVOID ACCIDENTAL INITIATION.

DO NOT REMOVE THE SAFETY COTTER PIN EXCEPT IN ACTUAL PREPARATION FOR LAUNCHING. HOLD THE RELEASE LEVER FIRMLY AGAINST THE GRENADE BODY UNTIL THE DEVICE IS THROWN.

9-4.1.2 Description. This hand grenade consists of two steel cups force fitted and sealed together. It contains 3.5 ounces (99 grams) of illuminating composition. The MK 372 MOD 0 fuze has a release lever held in place by a safety cotter pin. The fuze is an integral part of the hand grenade. The body contains a percussion primer and

quick-match bushing. Assembled to the fuze body are a striker, striker spring, safety lever, and safety pin with pull ring. The hand grenade with filler and fuze weighs approximately 10 ounces (283 grams), is 4.35 inches (11 centimeters) long, has a diameter of 2.19 inches (5.5 centimeters), and is white or unpainted with a white band and black markings.

WARNING

DO NOT POINT THE RIFLE TOWARD FRIENDLY PERSONNEL, EQUIPMENT, OR MATERIAL WHEN LOADING, UNLOADING, OR PREPARING TO FIRE.

9-4.1.3 Rifle Application and Launching Procedures. This hand grenade may be launched with rifles equipped with Grenade Projection Adapter M1 and attachments as follows

CAUTION

DO NOT USE THIS GRENADE WITH M16 SERIES RIFLES OR CARBINES. DAMAGE TO EQUIPMENT COULD RESULT.

- a. Rifle, 7.62mm, MK 2 – Launcher M7 series – 7.62mm, M64 grenade cartridge.
- b. Rifle, 7.62mm, M14 – Launcher M76 – 7.62mm, M64 grenade cartridge.
- c. Rifle, .30 Caliber M1 – Launcher M7 series – .30 caliber M3 cartridge.
- d. Carbine, .30 Caliber M1, M1A1, and M2 – Launcher M8 – .30 caliber M6 grenade cartridge.

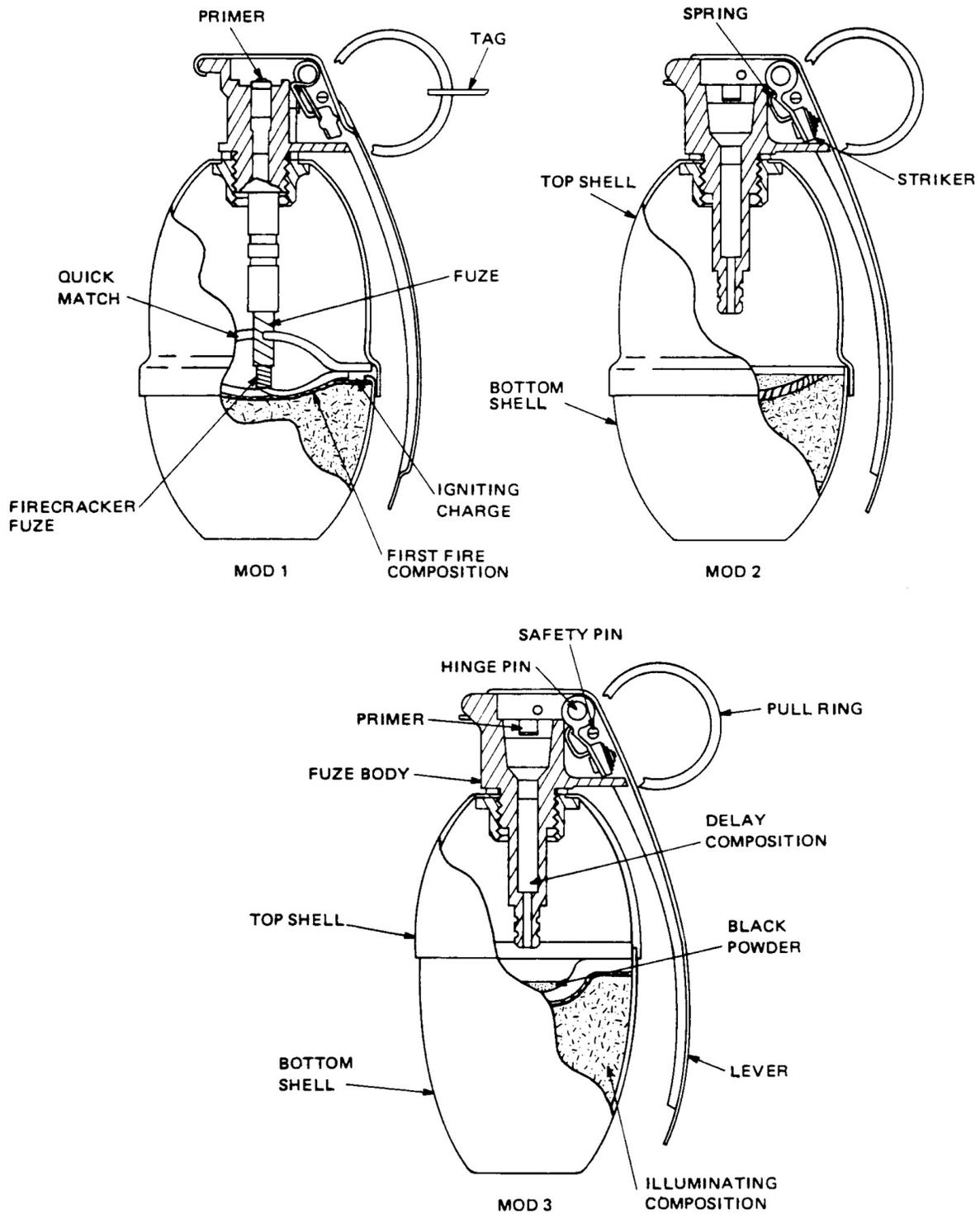


Figure 9-5 Illuminating Hand Grenade MK 1 MODs 1, 2, and 3

Table 9-2 Illuminating Hand Grenades

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Grenade, Hand, Illuminating, MK 1 MODs with Fuze MK 372 MOD 0, (MOD 0)	G895	9-4.1	1330-00-309-5013	344573/ WS3015	1 per plastic bag, 25 bags per wooden box
Grenade, Hand, Illuminating, MK 1 MODs with Fuze MK 372 MOD 0, (MOD 1)	G895	9-4.1	1330-00-969-6824	121289/ WS3015	1 per screw-top can, 24 cans per wooden box
Grenade, Hand, Illuminating, MK 1 MODs with Fuze MK 372 MOD 0, (MOD 2)	G895	9-4.1	1330-00-107-1686	2113315/ WS3015	1 per tear-strip can, 28 cans per plastic box
Grenade, Hand, Illuminating, MK 1 MODs with Fuze MK 372 MOD 0, (MOD 2)	G895	9-4.1	1330-00-935-6092	2113315/ WS3015	1 per screw-top can, 24 cans per wooden box
Grenade, Hand, Illuminating, MK 1 MODs with Fuze MK 372 MOD 0, (MOD 3)	G895	9-4.1	---	2128065/ WS3015	1 per tear-strip can, 28 cans per plastic box

9-4.1.4 Launching Procedures. This hand grenade is launched as follows:

- a. Activate rifle safety lock device.
- b. Place grenade in the M1 Series Grenade Projection Adapter by inserting the release lever into the arming cup and forcing the joint bead of the grenade between the claws of the adapter.
- c. Place adapter, with grenade, on the launcher and position it in accordance with desired range.
- d. Rotate adapter on the launcher so that the release lever does not interfere with sighting the rifle.
- e. Remove the safety cotter pin from the grenade.
- f. Insert specified cartridge in magazine of the rifle being used.
- g. Close the bolt and elevate barrel to an angle of 45°.
- h. Release rifle safety lock.

- i. Place rifle butt on the ground. Do not fire from against the shoulder since there is considerable recoil.

9-4.1.5 Function. After removal of the safety cotter pin and release of the lever, the spring-loaded striker rotates about its hinge pin and strikes the primer. The primer ignites a 4- to 6-second delay composition that ignites the black-powder coating over the first-fire composition. The first-fire composition then ignites the illuminating composition. Pressure resulting from combustion bursts the outer case. Average burning time is 30 to 40 seconds.

NOTE

Drawings of the MOD 1 have been declared obsolete. There may be some MOD 1 grenades still available in the supply system as use is not restricted.

The body of the MOD 1 resembles the MOD 2, but the MOD 3 uses two plastic cups sealed together with epoxy. Except for slight differences in lever and fuze configuration and the elimination of the warning tag in MODs 2 and 3, the three MODs look the same. In the MOD 1, the primer

ignites a quick match that activates a 7-second delay fuze. Near the end of its burning, the delay fuze ignites a second quick match that sets off an igniting charge. This charge is in direct contact with first-fire composition that is pressed across the top of the illuminating composition. As a redundancy feature, the MOD 1 fuze contains a short section of firecracker fuze to transfer ignition from the delay fuze to the igniting charge if the normal quick match firing train fails. The MK 372 MOD 0 Hand Grenade Fuze in the MODs 2 and 3 eliminates these several ignition transfers. In all MODs, pressure resulting from combustion bursts the outer case. Average burning time for the MOD 1 is 25 seconds.

9-4.1.6 Safety Precautions. In addition to applicable safety rules, warnings, and cautions, observe the following special precautions.

a. Since this grenade bursts with considerable force, aim it to function at least 30 feet (9.14 meters) away from the nearest friendly personnel, material, or equipment.

b. After installing this device in the adapter of a rifle grenade launcher, do not remove it without first reinserting the safety cotter pin.

c. In hand launching, throw the grenade immediately after pulling the pin.

d. If this grenade is accidentally dropped after pulling the safety pin and releasing the lever, move away as far and as fast as possible. Do not pick up the grenade and throw it. Judgment as to action should be based on the 4-second minimum delay built into the fuze.

9-5 OFFENSIVE HAND GRENADES

The purpose of offensive hand grenades is to produce blast effects. Since they may project fragments over 185 meters (607 feet) from the point of explosion, these hand grenades are not used in training without the availability of adequate safety cover. See Table 9-3 for packaging and identification data.

9-5.1 Grenade, Hand Offensive, MK 3A1 and MK 3A2 without Fuze, (G910).

WARNING

USING THIS GRENADE WITH A M206A1 FUZE WITHOUT SAFETY CLIP IS NOT AUTHORIZED.

9-5.1.1 Intended Use. These hand grenades, Figure 9-6, are designed and procured to be used for blast effect or demolition and produce casualties during close combat with minimum danger to friendly personnel.

9-5.1.2 Description. This offensive hand grenade consists of a cylindrical body of pressed fiber containing 7.36 ounces (208 grams) of TNT. The grenade shall only be assembled with the M206A2 fuze or M206A1 fuze modified with safety clip. The grenade weighs 15.6 ounces (442 grams), is 5.275 inches (13.39 centimeters) long, and is black with yellow markings.

9-5.1.3 Function. After assembly with M206A2 fuze, release of the safety clip and removal of the safety pin permit release of the safety lever. When the safety lever is released, it is forced away from the grenade body by a striker acting under the force of a striker spring. The striker rotates on its axis and strikes the percussion primer. The primer emits a small, intense flame, igniting the delay element. The delay element burns for 4 to 5 seconds and sets off the detonator. The detonator explodes, initiating the explosive charge. When the filler detonates, the force of the explosion is dissipated mainly in the form of shock waves rather than high-velocity fragments.

Table 9-3 Offensive Hand Grenade MK 3A2

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Grenade, Hand Offensive, MK 3A1 and MK 3A2 without Fuze, (MK 3A1)	G910 G910	9-5.1	1330-00-028-5844 1330-00-028-5845	75-14-346 75-14-346	24 per wooden box 50 per wooden box
Grenade, Hand Offensive, MK 3A1 and MK 3A2 without Fuze, (MK 3A2)	G910 G910	9-5.1 9-5.1	1330-00-028-5846 1330-00-203-4233	9215458 9215458	50 per wooden box 1 per fiber container M340, 20 containers per wooden box
Grenade, Hand, Offensive, MK 3A2 with Fuze M206 Series, (M206A2, w/Safety Clip)	G911	9-5.2	1330-00-194-2768	9215458	1 per fiber container, 20 containers per wooden box
Grenade, Hand, Offensive, MK 3A2 with Fuze M206 Series	G911	9-5.2	1330-00-143-6807	9215458	1 per fiber container, 20 containers per wooden box

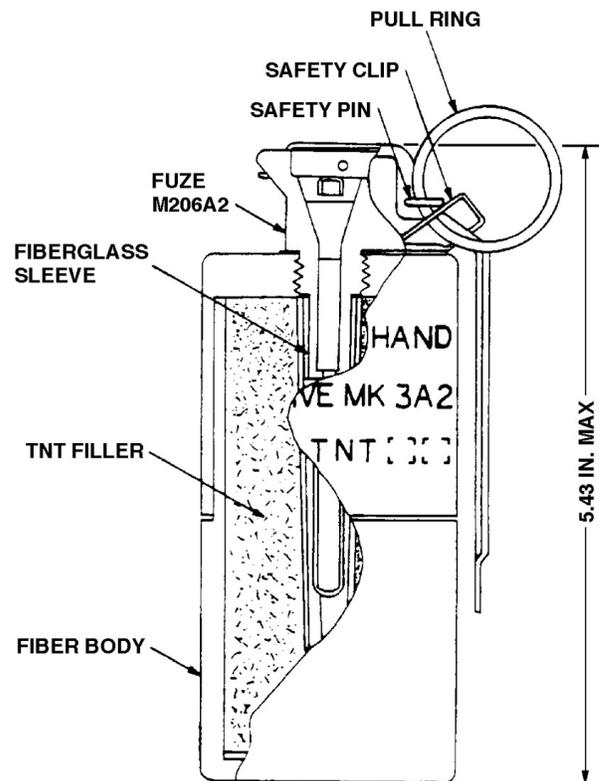


Figure 9-6 Offensive Hand Grenade MK 3A2

9-5.2 Grenade, Hand, Offensive, MK 3A2 with Fuze M206 Series (G911).

WARNING

USING THIS GRENADE WITH A M206A1 FUZE WITHOUT SAFETY CLIP IS NOT AUTHORIZED.

9-5.2.1 Intended Use. This hand grenade is designed and procured to be used for blast effects or demolition and produce casualties during close combat with minimum danger to friendly personnel.

9-5.2.2 Description. This hand grenade resembles the MK 3A2 Hand Grenade, Figure 9-6, in appearance, size and construction. The grenade body is a pressed fiber cylinder containing 8 ounces (226 grams) of high explosive TNT. The M206 series fuze is a pyrotechnic delay-detonating device containing a primer and a pyrotechnic delay column. Assembled to the fuze body are a striker,

striker spring, safety lever, safety pin with pull in and the detonator assembly. Attached at the top to keep the safety lever in place is a safety clip. The safety clip is a loop of spring steel wire fitted around the threaded section of the fuze and a clamp that fits over the safety lever. The grenade weighs 15.6 ounces (442 grams), is 5.275 inches (13.39 centimeters) long, has a diameter of 2.13 inches (5.41 centimeters), and is black with yellow markings.

9-5.2.3 Function. Release of the safety clip and removal of the safety pin permit release of the safety lever. When the safety lever is released, it is forced away from the grenade body by a striker acting under the force of a striker spring. The striker rotates on its axis and strikes the percussion primer. The primer emits a small, intense flame, igniting the delay element. The delay element burns for 4 to 5 seconds and sets off the detonator. The detonator explodes, initiating the explosive charge. When the filler detonates, the force of the explosion dissipates mainly in the form of shock waves rather than high-velocity fragments.

9-6 DIVERSIONARY HAND GRENADES

See Table 9-4 for packaging and identification data.

9-6.1 Charge, Diversionary, MK 141 MOD 0 (DWBS).

9-6.1.1 Intended Use. The MK 141 MOD 0 Diversionary Charge is a pyrotechnic device used for diversionary purposes. The Diversionary Charge is a low hazard, non-shrapnel producing explosive device which produces an intense flash and sound report with a minimal amount of smoke.

9-6.1.2 Description. The Diversionary Charge, Figure 9-7, is approximately 5.00 inches (12.7 centimeters) high and 1.75 inches (4.44 centimeters) in diameter. The Diversionary Charge consists of two major assemblies, the Fuze System and the Pyrotechnic Charge System.

a. Fuze System. The fuze body is made of 10% glass filled polyethylene and is provided with a striker, metal safety release lever, safety pin assembly, M42 Primer, first fire mixture, a delay column (T₁), and a separation charge. The Fuze System is threaded into the main body of the Pyrotechnic Charge System and sealed with an O-ring.

b. Pyrotechnic Charge System. The Pyrotechnic Charge System consists of a main body containing the secondary delay column (T₂), ignition charge, and the pyrotechnic output charge. The cylindrical main body is made of machined rigid polyurethane foam and is encased with adhesive aluminum foil.

9-6.1.3 Operational Instructions. Prepare the MK 141 Diversionary Charge for operation as follows: See Figure 9-8.

WARNING

DO NOT REMOVE THE ADHESIVE ALUMINUM FOIL FROM THE MAIN BODY OF THE MK 141 DIVERSIONARY CHARGE. THE FOIL SERVES AS AN ELECTROSTATIC SHIELD.

WARNING

WHEN UNPACKING THE DIVERSIONARY CHARGE FROM THE SHIPPING AND STORAGE CONTAINER FOR DEPLOYMENT TO THE TARGET AREA, DO NOT REMOVE THE CHARGE FROM THE HEAT SEALED BARRIER BAG OR FROM THE PROTECTIVE PLASTIC SLEEVE. THE CHARGE SHALL ONLY BE REMOVED FROM THE BARRIER BAG AND PLASTIC SLEEVE AT THE TARGET AREA JUST PRIOR TO USE. RETAIN THE PROTECTIVE PLASTIC SLEEVE FOR REPLACEMENT OF ALL UNUSED CHARGES.

WARNING

THE CHARGE BODY IS MADE OF FOAM. AVOID EXCESSIVE ROUGH HANDLING.

WARNING

USE OF THE MK 141 DIVERSIONARY CHARGE CAN CAUSE HEARING DAMAGE. EAR PROTECTION MUST BE WORN, WHICH WILL PROVIDE THE USER EAR PROTECTION FOR 185 DB IMPACT NOISE.

a. Unpackage the charge from the shipping and storage container and remove charge with protective plastic sleeve from the barrier bag. Remove the charge from the protective plastic sleeve. Retain the protective sleeve for replacement of unused charges.

Table 9-4 Diversionary Hand Grenades

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Charge, Diversionary, MK 141 MOD 0	DWBS	9-6.1	1375-01-387-5748	6570654	One per barrier bag, 3 bags/ M19A1 Ammo Box
Grenade, Hand, Diversionary, BTV-1 EL, MK 13 MOD 0	GG20	9-6.2	1330-01-537-9812	-	Ten per M2A1 Ammo Box

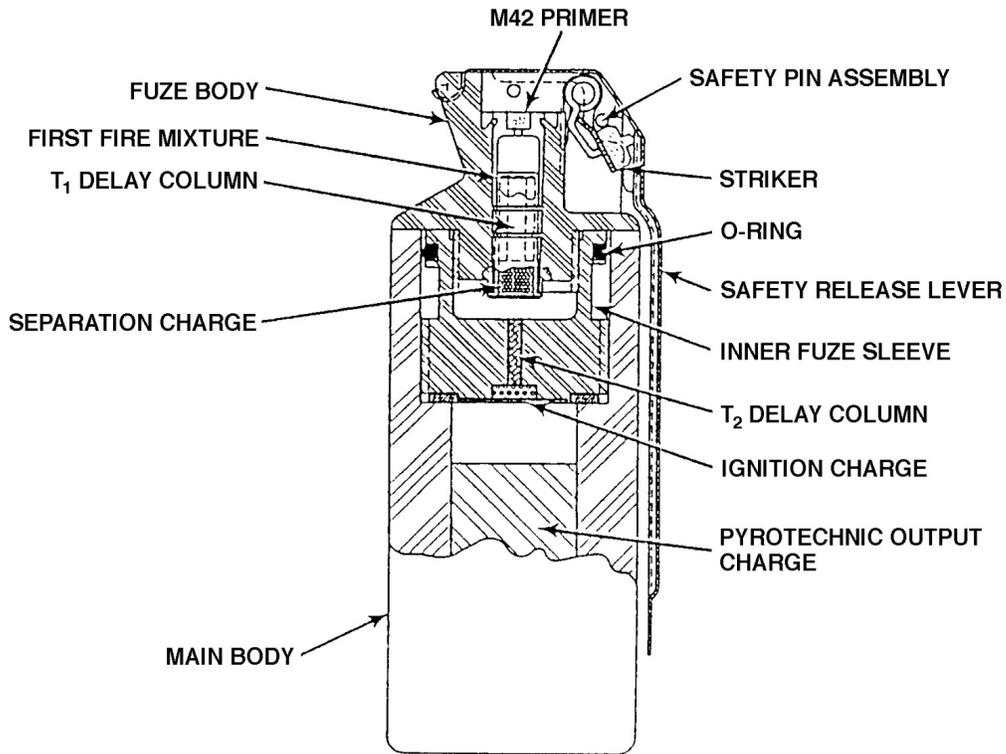


Figure 9-7 Diversionary Charge MK 141 MOD 0

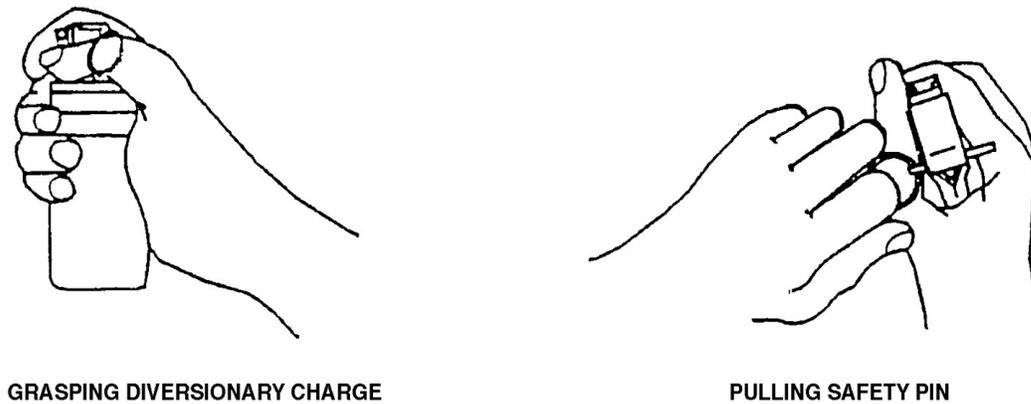


Figure 9-8 Diversionary Charge MK 141 MOD 0, Operation

b. Immediately inspect the charge for damage. Holding the main body, apply a slight torque to the fuze body. Any charge with movement of the fuze relative to the main body SHALL NOT BE USED.

NOTE

Any damaged charge or charge with movement of the fuze relative to the main body shall be disposed of in accordance with local regulations.

WARNING

ANY ALTERATION OF THE SAFETY PIN ANGLE (BENDING, FLEXING, REMOVAL AND REINSERTION, CHANGING OF ANGLE, ETC.) FROM THE POSITION OF THE STRAIGHT LEG AND ONE LEG AT 90 DEGREES RELATIVE TO THE OTHER CAN RESULT IN AN INCREASE IN THE PULL FORCE. THIS HIGHER FORCE MAY FRACTURE INTERNAL STRUCTURE THEREBY CAUSING PREMATURE FUNCTION IN HAND.

c. Remove the red protective sleeve on the straight leg of the safety pin and discard.

d. Prior to pulling safety pin take action to ensure that one of the safety pin legs is straight and the other leg is bent approximately 90 degrees relative to the other.

e. Grasp the Diversionary Charge firmly, holding the safety release lever against the main body and in palm of throwing hand. Hold the fuze body tightly against the main body by curling the index finger and thumb, of the throwing hand, around the plastic fuze body flange. See Figure 9-8.

WARNING

DO NOT REMOVE THE SAFETY PIN UNTIL READY TO USE. ONCE SAFETY PIN HAS BEEN REMOVED, DIVERSIONARY CHARGE MUST BE THROWN. DO NOT ATTEMPT TO REINSTALL THE SAFETY PIN.

f. Using the other hand, pull on the pull ring to remove the safety pin. See Figure 9-8.

g. Do not release the spring loaded safety release lever until thrown.

h. It is recommended that the Diversionary Charge be thrown a minimum distance of ten feet then turn away.

WARNING

DO NOT LOOK DIRECTLY AT THE DISPLAY OF THE MK 141 DIVERSIONARY CHARGE.

WARNING

DO NOT ATTEMPT TO RETRIEVE AN ARMED MK 141 DIVERSIONARY CHARGE.

i. The Diversionary Charge will function between 1.2 seconds and 1.8 seconds after release of spring loaded safety release lever.

9-6.1.4 Functional Description. The MK 141 Diversionary Charge is functioned by removing the safety pin assembly and releasing the safety release lever which allows the spring loaded striker to hit the M42 Timer which ignites the primer. After release of the safety release lever, the Diversionary Charge will produce a delay (T_1) of 1.2 to 1.5 seconds before initiation of the separation charge. The separation charge ejects the Fuze System from the Pyrotechnic Charge System and ignites the second delay (T_2) of approximately 100 milliseconds (0.1

second). The second delay ignites the pyrotechnic output charge which disintegrates the main body and produces the flash and sound report.

9-6.1.5 Handling and Storage. The Diversionary Charge shall be handled and stored in accordance with specifications as set forth in SW050-AB-MMA-010. Additionally, the following requirements apply:

WARNING

WHEN UNPACKING THE DIVERSIONARY CHARGE FROM THE SHIPPING AND STORAGE CONTAINER FOR DEPLOYMENT TO THE TARGET AREA, DO NOT REMOVE THE CHARGE FROM THE HEAT SEALED BARRIER BAG OR FROM THE PROTECTIVE PLASTIC SLEEVE. THE CHARGE SHALL ONLY BE REMOVED FROM THE BARRIER BAG AND PLASTIC SLEEVE AT THE TARGET AREA JUST PRIOR TO USE. RETAIN THE PROTECTIVE PLASTIC SLEEVE FOR REPLACEMENT OF ALL UNUSED CHARGES.

a. The main body of the MK 141 Diversionary Charge is made of foam. Avoid excessive rough handling

b. The MK 141 Diversionary Charge is water resistant but is not waterproof. Submersion of the MK 141 Charge in water can cause malfunction of the charge. The MK 141 Charge should remain in the heat sealed barrier bag and inside the protective sleeve until just prior to use.

c. Prior to removal of the safety pin assembly, the MK 141 Diversionary Charge should be inspected by application of slight torque to the fuze. Do not use MK 141 Charge if any movement of fuze relative to body occurs.

9-6.1.6 Safety Precautions. The general safety rules contained in SW050-AB-MMA-010 apply to this item. To prevent safety pin assembly from being inadvertently pulled, comply with the following precautions:

a. Retain Diversionary Charges in their original shipping containers until ready to be used.

b. Always store and transport the Diversionary Charges in their original shipping containers.

c. Prior to removing the Diversionary Charge from the shipping container for use, observe the safety pin. If the safety pin is missing, do not remove the Diversionary Charge from the shipping container.

NOTE

Safety pin may be installed with both legs straight, or one leg straight and the other leg bent to an angle other than 90 degrees.

d. Prior to use, inspect safety pin and take action to ensure that one leg is straight and the other is bent approximately 90 degrees relative to the straight leg.

9-6.1.7 Explosive/Pyrotechnic Weights. The explosive/pyrotechnic weights for the Diversionary Charge are listed as follows:

a. Fuze System. The Fuze System of the MK 141 Diversionary Charge consists of an M42 primer, first fire mix, a delay column, and a separation charge. The following table outlines each component and material of the fuze system.

COMPONENT	ENERGETIC MATERIAL	QUANTITY
M42 Primer	Lead Styphnate	20.9 mg
	Tetracene	1.1 mg
First Fire Mix	Silicone	11.5 mg
	Red Lead	19.5 mg
	Binder	1.0 mg
Delay Column (T ₁)	Boron	11.0 mg
	Barium Chromate	164.0 mg
Separation Charge	Zirconium	6.75 mg
	Potassium	15.75 mg
	Perchlorate	

b. Pyrotechnic Charge System. The Pyrotechnic Charge System of the MK 141 Diversionary Charge consists of a secondary delay column (T₂), ignition charge, and a pyrotechnic output charge. The following table outlines each component and material of the Pyrotechnic Charge System.

COMPONENT	ENERGETIC MATERIAL	QUANTITY
Secondary Delay Column (T ₂)	Molybdenum	248.0 mg
	Potassium	31.1 mg
	Perchlorate	
	Barium Chromate	31.1 mg
Ignition Charge	Zirconium	67.5 mg
	Potassium	157.5 mg
	Perchlorate	
Pyrotechnic Output Charge	Aluminum	4.81 g
	Carbon	0.09 g
	Potassium	12.60 g
	Perchlorate	

9-6.2 Grenade, Hand, Diversionary, BTV-1 EL, MK 13 MOD 0 (GG20) .

9-6.2.1 Intended Use. The MK 13 Diversionary Charge is a pyrotechnic device used to confuse and disorient an enemy by producing bright light and loud sound. It is sometimes referred to as the BTV EL, “Bottom-Top Vent Extra Length”. It is a low hazard device, which produces an intense flash and sound report, with a minimal amount of smoke. Sometimes referred to as a “flash bang”, it is intended to provide a non-lethal means of temporarily dazzling, dazing, or disorienting targeted individuals or groups before they can injure themselves or others.

9-6.2.2 Description. The MK 13 Diversionary Charge is approximately 5.50 inches high and 1.75 inches in diameter. The body of the device is made of aluminum and consists of two major subassem-

blies, the fuze system and the pyrotechnic charge. The device is used and operated like a hand grenade without its lethal effects. See Figure 9-9.

9-6.2.3 Operational Instructions. Follow steps one through seven below for safe operation of the MK 13 MOD 0 Diversionary Hand Grenade.

WARNING

OPERATORS SHALL WEAR THE APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT INCLUDING CLOSE QUARTER BATTLE EYE GOGGLES AND HEARING PROTECTION WHEN USING OR TRAINING WITH THIS DEVICE.

WARNING

USE OF THE GRENADE CAN CAUSE HEARING DAMAGE. EAR PROTECTION MUST BE WORN. WHICH WILL PROVIDE THE USER EAR PROTECTION FOR 185 dB IMPACT NOISE.

1. During the entire operation, clutch the Grenade body with the throwing hand in such a way that the safety lever is in the palm of the hand between thumb and forefinger. Unpackage the Grenade from the shipping and storage container.

WARNING

INCORRECT HANDLING OR USE MAY CAUSE INJURY OR DEATH.

2. User must thoroughly inspect top of fuze for cracks and missing/improperly installed safety pin, which are critical defects. Defective grenades must be turned over to EOD for disposal in accordance with local regulations.

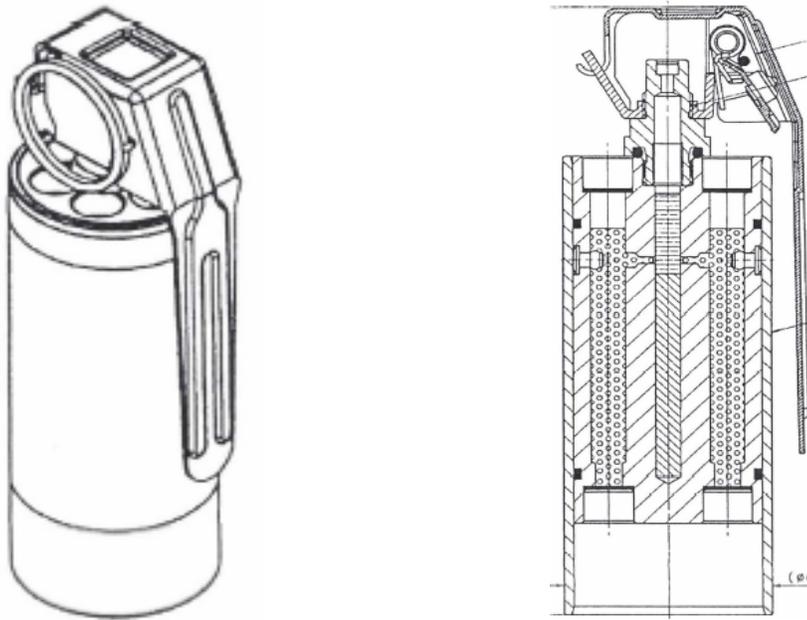


Figure 9-9 MK 13 MOD 0 BTV-1 EL Diversionary Hand Grenade

WARNING

ANY ALTERATION OF THE SAFETY PIN ANGLE (BENDING, FLEXING, REMOVAL AND REINSERTION, CHANGING OF ANGLE, ETC.) FROM THE POSITION OF THE STRAIGHT LEG AND ONE LEG AT 90 DEGREES RELATIVE TO THE OTHER CAN RESULT IN AN INCREASE IN THE PULL FORCE. THIS HIGHER FORCE MAY FRACTURE INTERNAL STRUCTURE THEREBY CAUSING PREMATURE FUNCTION IN HAND.

3. Remove the safety pin shield on the straight leg of the safety pin and discard.

WARNING

AFTER ARMING THE SAFETY LEVER, DO NOT LOOSEN GRIP. ALSO, DO NOT CHANGE THE THROWING HAND, AS THE SAFETY LEVER FUZE WILL FUNCTION IMMEDIATELY.

4. Grasp the Grenade firmly, holding the safety lever against the main body and in palm of the throwing hand, making sure the hand does not cover the six discharge vents at the top or bottom of grenades. Hold the fuze body tightly against the main body by curling the index finger and thumb, of the throwing hand, around the fuze body flange. See Figure 9-10.

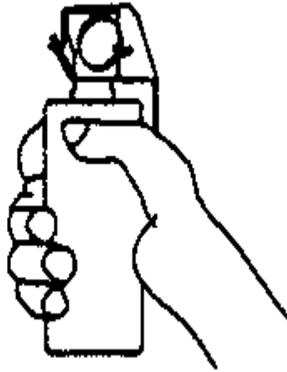


Figure 9-10 Grasping Grenade

WARNING

DO NOT REMOVE THE SAFETY PIN UNTIL READY TO USE. ONCE SAFETY PIN HAS BEEN REMOVED, GRENADE MUST BE THROWN. DO NOT ATTEMPT TO REINSTALL THE SAFETY PIN.

5. Using the other hand, pull on the pull ring to remove the safety pin making sure the discharge vents on the top and bottom of grenade are not pointed at the body. See Figure 9-11.



Figure 9-11 Pulling Safety Pin

WARNING

DO NOT RELEASE THE SPRING LOADED SAFETY LEVER UNTIL THROWN.

WARNING

DO NOT THROW AT PERSONS AND IN AREAS WITH EASILY FLAMMABLE MATERIALS.

6. It is recommended that the Grenade be thrown a minimum distance of ten feet then turn away. At seven feet or less, plastic particles are dangerous immediately after function.

WARNING

DO NOT LOOK DIRECTLY AT THE DISPLAY OF THE GRENADE.

WARNING

DO NOT ATTEMPT TO RETRIEVE AN ARMED GRENADE.

7. The Grenade will function between 1.2 and 1.5 seconds after release of spring loaded safety lever.

9-6.2.4 Packaging and Identification. See Table 9-4 for identification data. The MK 13 MOD 0 Hand Grenade is packaged 10 per M2A1 container. A foam insert molded to accept 10 MK 13's is inserted into the M2A1 container. The grenades are then placed in the foam insert. The top foam insert molded in the shape of the fuze head is installed. The top and bottom molded foam inserts provides a cushion and prevents movement of the grenades. A foam spacer is lastly installed to ensure a tight fit.

9-6.2.5 Handling and Storage. The Diversionary Charge shall be handled and stored in accordance with specifications as set forth in SW050-AB-MMA-010.

9-6.2.6 Safety Precautions. The general safety rules contained in SW050-AB-MMA-010 apply to this item. To prevent safety pin assembly from being inadvertently pulled, comply with the following precautions:

- a. Retain Diversionary Charges in their original shipping containers until ready to be used.
- b. Always store and transport the Diversionary Charges in their original shipping containers.
- c. Prior to removing the Diversionary Charge from the shipping container for use, observe the safety pin. If the safety pin is missing, do not remove the Diversionary Charge from the shipping container.

9-7 CHEMICAL HAND GRENADES

Various uses for chemical hand grenades are riot control, smoke screening and signaling, practice, incapacitating and incendiary purposes. For screening and/or signaling purposes, the grenades use white and various colored smokes. Antipersonnel (APERS) grenade agents include irritating agents and White Phosphorous (WP) burning compositions. Incendiary grenades provide a high-temperature burning agent against flammable or light-armored targets. Chemical grenades do not require safety clips. SW073-AC-MMA-010 contains additional information concerning chemical hand grenades. See Table 9-5 for packaging and identification data.

WARNING

EVEN IF EQUIPPED WITH A PROTECTIVE MASK, DO NOT STAY DIRECTLY DOWNWIND FROM THE BURNING CHEMICAL GRENADES.

WARNING

WAIT AT LEAST 30 MINUTES BEFORE APPROACHING A SUSPECTED DUD FIRED GRENADE. DAMPNES OR DETERIORATION MAY HAVE PROLONGED BURNING OF THE PYROTECHNIC DELAY.

9-7.1 Grenade, Hand, Riot Control, CS, M7A2 And M7A3 (G963).

9-7.1.1 Intended Use. This grenade, Figure 9-12, is designed and procured to be used for control of riots, mobs, and other disturbances and may be used to simulate casualty agents during training. CS has a powerful tearing effect and is irritating to the upper respiratory passages, causing coughing, difficulty in breathing, and chest tightness. Heavy concentrations will cause nausea and vomiting, as well. The onset of incapacitation is 15 to 30 seconds and duration is less than 30 minutes after personnel are removed to fresh air. CS is more persistent and has a more severe reaction than CN.

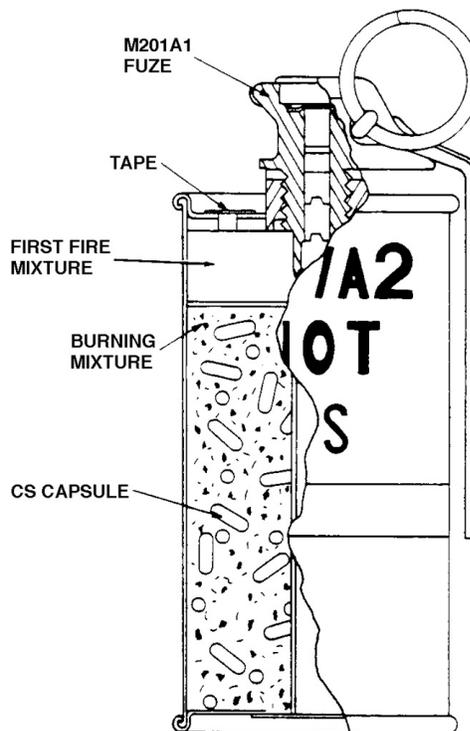


Figure 9-12 M7A2 and M7A3 CS Riot Control Hand Grenade

Table 9-5 Chemical Hand Grenade

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Grenade, Hand, Riot Control, CS, M7A2 And M7A3, (M7A2)	G963	9-7.1	1330-00799-8816	13-22-29	1 per fiber container, 16 containers per wooden box
Grenade, Hand, Riot Control, CS, M7A2 And M7A3, (M7A3)	G963	9-7.1	1330-00-965-0802	13-22-35	1 per fiber container, 16 containers per wooden box
Grenade, Riot Control, CS1, ABC-M25A2, w/ fuze C12	G924	9-7.2	1330-00-645-69211	D13-25-55	1 per fiber container, 50 containers per wooden box
Grenade, Hand, Riot Control, CS, XM 47E3, w/Fuze	G922	9-7.3	1330-00-477-6704	D13-25-70	20 per shipping container, 32 containers per pallet (640 grenades)
Grenade, Hand, Incendiary, TH3, AN-M4	G900	9-7.4	1330-00-219-8557	13-17-3	1 per tear-strip can, 16 cans per wooden box
Grenade, Hand, Smoke, M18, Green, w/fuze M201A1	G940-Green	9-7.5	1330-00-289-6851	D13-19-37/ MIL-G-12326	1 per individual, sealed, fiber or metal container, 16 containers per wooden box
Grenade, Hand, Smoke, M18, Green w/fuze M200, M200A1, M200A2, or M201	G940-Green	9-7.5	1330-00-540-9147	D13-19-37/ MIL-G-12326	1 per container, 16 per wooden box
Grenade, Hand, Smoke, M18, Yellow w/fuze M201A1	G945-Yellow	9-7.5	1330-00-289-6854	D13-19-37/ MIL-G-12326	1 per individual, sealed, fiber or metal container, 16 containers per wooden box
Grenade, Hand, Smoke, M18, Yellow w/fuze M200, M200A1, M200A2, or M201	G945-Yellow	9-7.5	1330-00-540-9145	D13-19-37/ MIL-G-12326	1 per container 16 containers per wooden box
Grenade, Hand, Smoke, M18, Red, w/fuze M201A1	G950-Red	9-7.5	1330-00-289-6852	D13-19-37/ MIL-G-12326	1 per individual, sealed, fiber or metal container, 16 containers per wooden box
Grenade, Hand, Smoke, M18, Violet w/fuze M201A1	G955-Violet	9-7.5	1330-00-289-6853	D13-19-37/ MIL-G-12326	1 per individual, sealed, fiber or metal container, 16 containers per wooden box
Grenade, Hand, Smoke, M18, Violet w/fuze M200, M200A1, or M200A2	G955-Violet	9-7.5	1330-00-540-7185	D13-19-37/ MIL-G-12326	1 per container, 16 containers per wooden box
Grenade, Hand, Smoke, HC, AN-M8, White w/ fuze M201A1	G930	9-7.6	1330-00-219-8511	D13-19-32/ MIL-G-1232	1 per sealed metal container, 16 containers per wooden box
Grenade, Hand, Smoke, HC, AN-M8, White w/ fuze M200, M200A1, M200A2, or M201	G930	9-7.6	1330-00-54-7622	D13-19-32/ MIL-G-1232	1 per container, 16 containers per wooden box
Grenade, Hand Or Rifle, Smoke WP, M34, w/fuze M206A2	G937	9-7.7	1330-00-676-2671	D1-7-4	1 per fiber container, 16 containers per wooden box (w/o cartridge or launch clips)

9-7.1.2 Description. This grenade is a cylindrical metal container 2.5 inches (6.35 centimeters) in diameter, 4.5 inches (11.43 centimeters) high, and weighs 1.06 pounds (.480 kilogram). The body has 18 emission holes (3 rows of 6 holes) covered with adhesive tape to protect the filler from moisture. The top of the filler and the sides of a channel down the center are coated with a starter mixture. The grenade contains a compressed filler of CS and a starter mixture. The M7A2 contains 5.5 ounces (155 grams) of burning mixture with 3.5 ounces (99 grams) of powdered CS in gelatin capsules. The M7A3 contains 7.35 ounces (208.3 grams) of burning mixture with 4.5 ounces (127 grams) of pelletized CS agent. This grenade uses the M201A1 fuze and is gray with one red band and red markings.

9-7.1.3 Function. Removal of the safety pin permits release of the safety lever. When the safety lever is released, it is forced away from the grenade body by a striker acting under the force of a striker spring. The striker rotates on its own axis and strikes the percussion primer. The primer initiates

the first-fire mixture. The fuze delay element, ignition mixture, and grenade starter mixture and filler are initiated in turn by the preceding component. The pressure-sensitive tape is blown off the emission holes and the CS agent is emitted for 15 to 35 seconds.

9-7.2 Grenade, Riot Control, CS1, ABC-M25A2 (G924).

9-7.2.1 Intended Use. This hand grenade, Figure 9-13, is designed and procured to be used for control of riots, mobs, and other disturbances and may be used to simulate casualty agents during training. CS has a powerful tearing effect and is irritating to the upper respiratory passages, causing coughing, difficulty in breathing, and chest tightness. Heavy concentrations will cause nausea and vomiting, as well. The onset of incapacitation is 15 to 30 seconds and duration is from 30 minutes to several hours, depending upon the dosage concentration. CS is more persistent and causes a more severe reaction than CN.

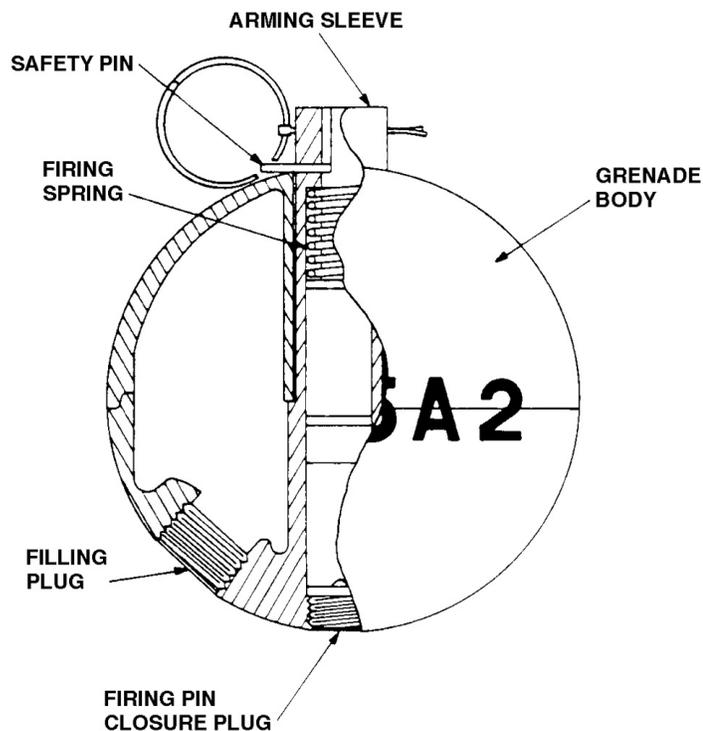


Figure 9-13 ABC-M25A2 CSI Riot Control Hand Grenade

9-7.2.2 Description. This grenade consists of a plastic spherical body 2.93 inches (7.44 centimeters) in diameter and contains 2 ounces (56 grams) of CS1 composition. The grenade body consists of two hemispheres cemented together, forming a burster well and slider housing. The fuze is a pyrotechnic delay-detonating type integrated with the grenade body. The fuzing components consist of an arming sleeve, arming pin, firing spring slider assembly, and firing pin. The slider assembly contains a primer, a pyrotechnic delay column, and a detonator. There is a safety pin and pull ring assembled with the grenade. The grenade color is gray with one red band and red markings.

9-7.2.3 Function. The safety pin locks the arming sleeve to the grenade body through the slider assembly and retains the arming pin in a horizontal position. Removal of the safety pin frees the arming sleeve from the grenade body. This releases the slider assembly and drives it against the firing pin. The firing pin initiates a primer in the end of the slider. The primer initiates the delay column that initiates the detonator. The detonator shatters the grenade body and disperses the CS agent.

WARNING

THE M52A2 HAS A BLAST EFFECT WHEN IGNITED THAT SHATTERS THE GRENADE BODY AND DISBURSES THE CS AGENT. WHEN RIOT CONTROL USE IS REQUIRED WITHIN CONFINED SPACES, THE M52A2 BLAST EFFECT MAY BE UNDESIRABLE AND THE M47 (G922) OR M7A3 (G963) MAY BE PREFERABLE.

9-7.3 Grenade, Hand, Riot Control, CS, XM 47E3, w/Fuze (G922).

9-7.3.1 Intended Use. The M47 Grenade is a special-purpose, burning type munition used for control of riots and counter-insurgencies. This grenade is a nonlethal, incapacitating-type munition that contains non persistent CS agent.

9-7.3.2 Description. The M47 Grenade, Figure 9-14, consists of a rubber body assembly, an M227 fuze, and a filling of CS pyrotechnic mixture. The grenade weighs 6,826.3 grains (410 grams) and is 3.5 inches (8.9 centimeters) in diameter. The gray grenade body is made of two rubber hemispheres vulcanized together. The top half of the grenade contains the fuze, and the bottom half contains the filling hole and the exhaust port. The grenade is filled with approximately 2,854.55 grains (185 grams) of CS-pyrotechnic granulated mix.

9-7.3.3 Function. First, the tape over the emission port will be removed. The safety pin will be pulled and then the safety latch is slid into the armed position. The arming handle is then free to separate from the grenade body. The firing pin initiates a starting mixture which then initiates the delay charge, lighting the ignition mix. The built-up pressure forces the CS mixtures through the emission port, dispersing the agent.

9-7.4 Grenade, Hand, Incendiary, TH3, AN-M4 (G900).

9-7.4.1 Intended Use. This hand grenade, Figure 9-15, is designed and procured for use as an incendiary device. It gives off intense heat for starting fires or destroying light equipment. The grenade can initiate the M3 Document Destroyer, fuse electronics equipment or start fires to destroy classified materials. With imaginative use, the grenade can be an effective and versatile demolition tool. It can melt thin steel and common nonferrous metals, jam mechanisms by warping the components and weld properly prepared iron and steel. Other examples of its versatility are its ability to destroy oil drums and shipping containers, engine water jackets or manifolds, and metal ammunition boxes. It can jam weapon breechblocks, melt electric motor cage and rotor windings and set buildings or papers afire. Due to its burning characteristics and limited capacity, the grenade will not adequately destroy the contents of a file cabinet drawer or safe.

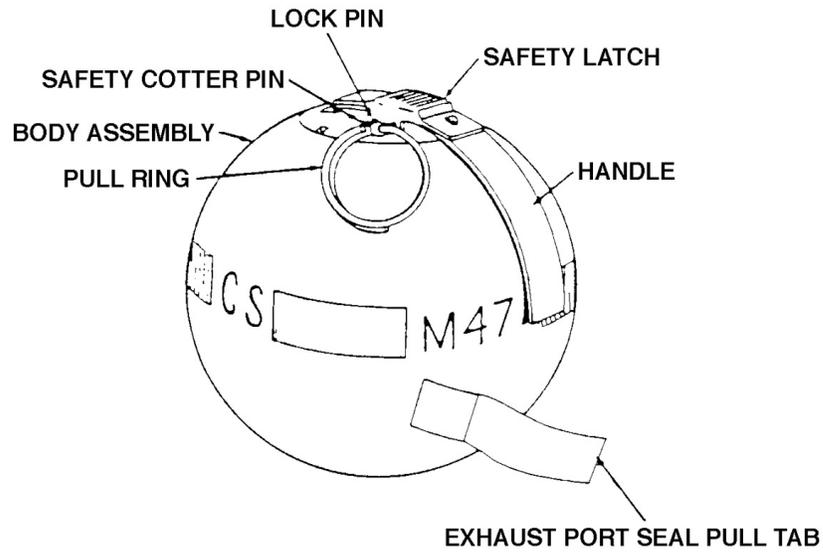


Figure 9-14 Riot Control Hand Grenade CS, XM 47E3, with Fuze

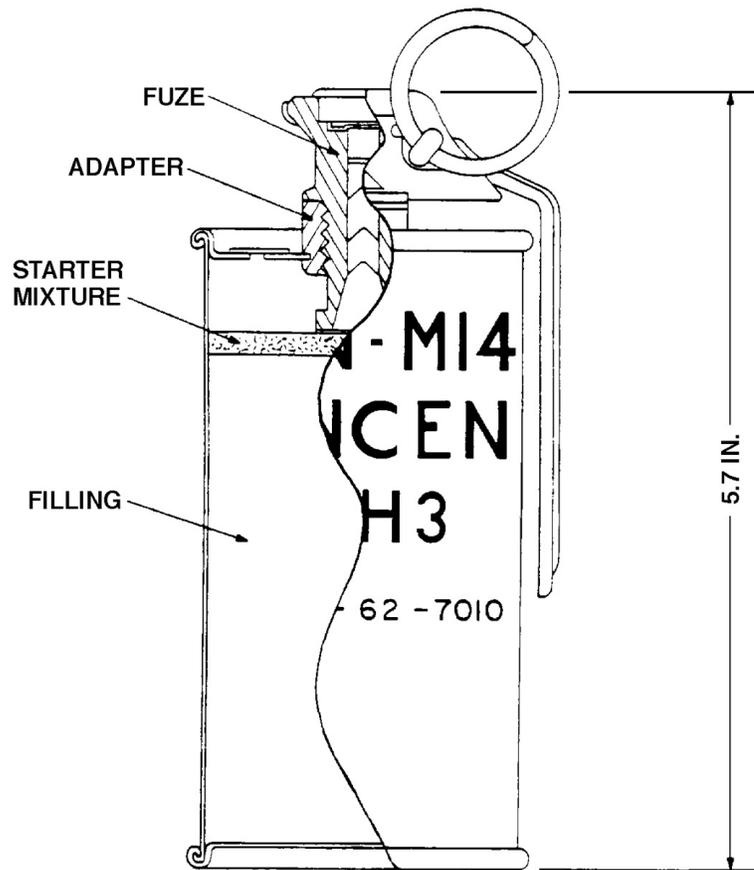


Figure 9-15 Incendiary Hand Grenade AN-M14, TH3

WARNING**MODIFICATION OF THE GRENADE FOR ELECTRICAL IGNITION IS NOT AUTHORIZED FOR UNTRAINED PERSONNEL.**

9-7.4.2 Description and Installation. This grenade is a thermitic device 2.33 inches (5.91 centimeters) in diameter and 5.7 inches (14.47 centimeters) high. The grenade weighs approximately 2 pounds (.907 kilogram), with 1.65 pounds (.748 kilogram) of TH3 as the filler material. The grenade uses the M201A1 Standard Grenade Fuze, which screws into an adapter in the top of the grenade. To use the grenade, place it securely in position. If necessary, fasten the grenade in place with a metal strap or ordnance tape, but do not rely on either fastener to hold the grenade as it burns. To ignite the grenade, hold the grenade with the safety lever pressed firmly against the grenade. Pull out the safety pin, release the safety lever, and then move quickly to a safe distance. For remote firing, fasten the grenade securely in place, tie a lanyard to the ring on the safety pin, and take the free end of the lanyard to a safe firing location. Make sure the lanyard is not taut. Hold down the safety lever with one hand and straighten the end of the safety pin with a pair of pliers. This enables removal of the pin from a safe distance by a firm pull on the lanyard.

9-7.4.3 Safety Precautions. In addition to other warnings and cautions, when handling the AN-M14 Grenade, observe the following safety precautions.

- a. Stay at least 20 feet (6.09 meters) away from a grenade that is being ignited. For more than one grenade or destructor, increase the distance. When using the grenade in an enclosed space, evacuate the space.
- b. Do not ignite the grenade within 5 feet (1.52 meters) of flammable material that is not to be destroyed.
- c. Do not use the ring on the safety pin for lifting and handling the grenade.

- d. Never pull the safety pin out until ready to ignite the grenade.

- e. Do not strike the tip of the fuze or drop the grenade. Such actions may initiate the fuze.

- f. Do not alter fuzes. Any attempt to alter or disassemble the fuze of the grenade is dangerous and is prohibited.

- g. Confine fire-fighting efforts involving Thermite-filled grenades to holding fires ignited by Thermite in check until the molten filling has cooled off. Sand, sodium bicarbonate, or dolomite mixtures (calcium magnesium carbonate of varying proportions) will smother Thermite fires. Water is insufficient unless used in massive amounts.

- h. Treat Thermite burns like those caused by fire. Flood the burn with water and remove any particles from the skin. For areas with broken skin, cover the raw area with first-aid dressing. For more serious burns, give first aid for shock, keep the victim quiet and warm and transfer to the care of medical personnel. Injuries resulting from Thermite burns require no unusual first-aid treatment.

9-7.5 Grenade, Hand, Smoke, M18, (G940-Green), (G945-Yellow), (G950-Red), (G955-Violet).

9-7.5.1 Intended Use. This hand grenade, Figure 9-16, is designed and procured to be used for daytime signaling by air or surface forces. This device is filled with a red, green, yellow, or violet smoke mixture. It may be dropped from helicopters at slow speeds to provide visual information as to the direction and approximate velocity of surface wind to facilitate landings.

9-7.5.2 Description. This hand grenade consists of a cylindrical metal container 4.5 inches (11.43 centimeters) high and 2.5 inches (6.35 centimeters) in diameter. It has either a M200, M200A1, M200A2, M201 or M201A1 fuze fitted into the top. The container filler material is 11.5 ounces (326.02 grams) of either red, green, yellow, or violet smoke mixture. The green grenade has four smoke-emission holes in the top and one in the bottom, each sealed with tape to protect the smoke composition from moisture. All other colors have only the one hole in the bottom, sealed with tape.

A cotter pin with a pull ring attached holds the fuze safety lever. A stencil on the body of the grenade indicates the smoke color.

9-7.5.3 Function. Hold the safety lever firmly against the grenade body while removing the cotter pin and throwing the grenade. Release of the safety lever allows the striker to hit the primer that ignites the 0.7- to 2-second delay element of the fuze. At the end of the delay, the ignition mixture is ignited and ignites the starter mixture which is spread as a thin coating over the top of the smoke composition as well as on the surface of the hole through the center of that composition. The starter mix ignites the smoke composition, and gases are generated that blow off the tape covering the emission holes. Smoke emits for 50 to 90 seconds.

9-7.6 Grenade, Hand, Smoke, HC, AN-M8 (G930).

9-7.6.1 Intended Use. This hand grenade, Figure 9-17, is designed and procured for daytime ground and ground-to-air signaling. It may be used in training or in combat for screening purposes.

9-7.6.2 Description. This hand grenade consists of a thin sheet metal cylinder filled with 16 to 19 ounces (453 to 538 grams) of Type C HC (Hexachloroethane) smoke mixture. Fitted to the grenade is an M201A1 igniting fuze. The body is 2.5 inches (6.35 centimeters) in diameter and 4.5 inches (11.43 centimeters) from top to bottom. There are four tape-covered smoke-emission holes around the fuze at the top. A cotter pin with a pull ring attached holds the safety lever in place.

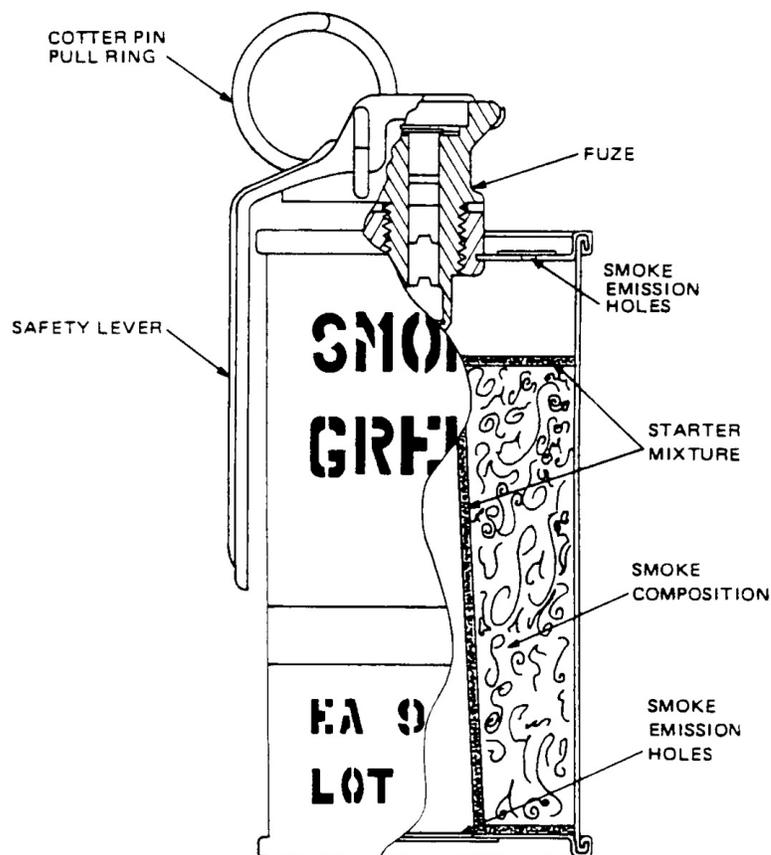


Figure 9-16 Smoke Hand Grenade M18

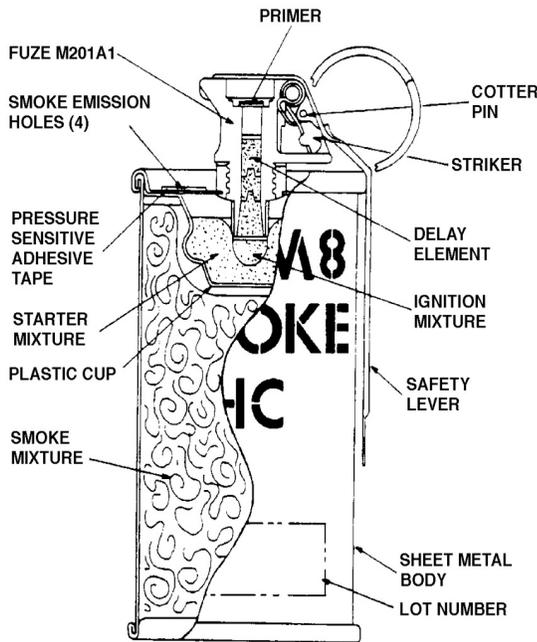


Figure 9-17 HC Smoke Hand Grenade AN-M8

9-7.6.3 Handling and Storage. Type C HC smoke composition decomposes in contact with moisture and generates some heat. Under ordinary stowage conditions, this is not sufficient to cause spontaneous combustion. However, handle this device with care so as not to destroy its watertight integrity. Stow the device topside, in an area convenient for jettisoning, and not near ventilation intakes. Protect this device from water and from the direct rays of the sun. This grenade is a Group D chemical munition. Stacking methods in storage must allow for a good ventilation to all parts of the stack.

9-7.6.4 Function. Hold the safety lever firmly against the grenade body while removing the cotter pin and until throwing the grenade. Releasing the safety lever allows the striker to hit the primer that ignites the 1.2 to 2-second delay element of the M201A1 Fuze. At the end of the delay, the ignition mixture ignites the starter mixture contained within a plastic cup embedded in the top of the HC smoke composition. When this cup melts, the starter mixture ignites the smoke composition. Gases of combustion blow off the tape over the emission holes, and dense white smoke is emitted for 105 to 150 seconds.

9-7.6.5 Safety Precautions. In addition to other warnings and cautions, observe the following safety precautions when handling the HC, AN-M8 grenade:

- a. Do not attempt to recover or tamper with grenade duds.
- b. Do not lift or handle grenade by the pull ring.
- c. If the grenade is accidentally activated, throw it as far away as possible immediately, being careful to avoid friendly personnel and craft.
- d. If personnel drop the grenade after pulling the safety pin, move quickly to a safe distance.
- e. HC smoke becomes toxic in high concentrations. Wear gas masks in the event there is an accidental release of this smoke in confined areas.

9-7.7 Grenade, Hand Or Rifle, Smoke WP, M34 (G937).

WARNING

USING THIS GRENADE WITH A M306A1 FUZE WITHOUT SAFETY CLIP IS NOT AUTHORIZED.

9-7.7.1 Intended Use. This grenade, Figure 9-18, is designed and procured for use to provide APERS smoke-screening, and incendiary effects. It is a bursting-type grenade and can be fired from Grenade Projection Adapter M1A2.

WARNING

THIS DEVICE CONTAINS WP. HANDLE IT WITH EXTREME CARE TO PREVENT DAMAGE THAT MIGHT CAUSE LEAKAGE OF ITS FILLER OR PREMATURE INITIATION.

9-7.7.2 Description. This grenade, consists of a steel cylindrical body serrated into 60 segments to facilitate bursting. Its lower end tapers for fitting into the M1A2 Grenade Projection Adapter. A fuze M206A2 protrudes from its upper end. The

grenade is filled with WP. The fuze is a pyrotechnic delay-detonating type. It has an M42 primer with a lead azide, lead styphnate, and RDX detonating mixture. A safety clip designed of spring steel wire fits around the threaded section of the fuze and keeps the safety lever in place. This grenade is light green with a yellow band and light red markings.

9-7.7.3 Function. A rifle can project his grenade to a distance approaching 200 yards (182.88 meters). It contains a 4- to 5-second delay element. At detonation, the body bursts and scatters fragments of the case. Particles of the WP filler ignite to form the desired smoke cloud. The WP will burn for approximately 60 seconds and will ignite any flammable material contacted. The effective casualty radius is approximately 82 feet (25 meters).

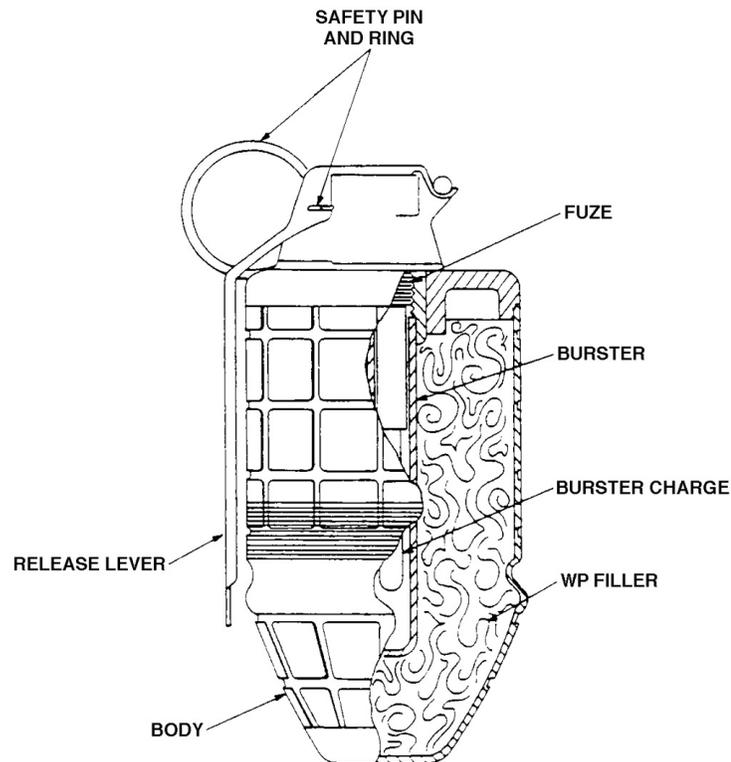


Figure 9-18 WP Smoke Hand or Rifle Grenade M34

9-8 PRACTICE AND TRAINING HAND GRENADES

Practice hand grenades simulate functioning of service hand grenades to provide realism in training. Training hand grenades are completely inert. Practice and training hand grenades are used only for training personnel in the care, handling, and throwing of hand grenades. See Table 9-6 for packaging and identification data. See Table 9-7 and Table 9-8 for practice hand grenade components.

9-8.1 Grenade, Hand, Practice, M21 (G916).

9-8.1.1 Intended Use. This hand grenade is designed and procured to be used for training in care, handling, and throwing of the MK 2 fragmentation hand grenade, Figure 9-2. This grenade simulates the MK 2 fragmentation hand grenade in appearance, weight, and functioning.

9-8.1.2 Description. This practice grenade consists of a body, a black powder charge, and a delay ignition fuze. The cast iron body has openings at both ends. There is a small black powder charge in a cloth bag inserted in the opening in the base of the body. A stopper closes the base opening. Opposite this opening is a smaller threaded opening into which the fuze is installed. The grenade is available completely assembled and ready to use. It is also available as a separately issued body, practice charge, and practice fuze, which are assembled in the field prior to use. After use, the body may be recovered and reused by installing a new fuze, charge, and stopper. Three practice hand grenade fuzes are available: M10A3, M205A1, and M205A2.

WARNING

DO NOT ATTEMPT TO RECOVER FIRED HAND GRENADES IMMEDIATELY. ALLOW THEM TO COOL FOR 30 MINUTES.

NEVER ATTEMPT TO USE A DETONATING FUZE WITH A PRACTICE HAND GRENADE.

WARNING

UNDER NO CIRCUMSTANCES ATTEMPT TO USE A GRENADE BODY THAT HAS ANY SIGNS OF CRACKS OR WEAKNESS. NEVER ATTEMPT TO REINFORCE THE STANDARD PRACTICE CHARGE BY ADDING OR SUBSTITUTING OTHER EXPLOSIVES.

DO NOT INSERT MORE THAN ONE PRACTICE CHARGE INTO THE GRENADE. DO NOT SUBSTITUTE ANY OTHER EXPLOSIVE FOR THE AUTHORIZED PRACTICE CHARGE.

9-8.1.3 Function. The M21 Practice Hand Grenade functions in the same manner as the MK 2 Fragmentation Hand Grenade. However, instead of detonating, the fuze igniter ignites the black powder charge. Upon exploding, the black powder charge forces the stopper from the base of the body and emits a loud report. Along with the detonation there is a puff of white smoke. After use, troops may recover the expanded grenade and reload it with a new fuze, black powder charge, and stopper.

9-8.1.4 Preparation for Use. Prepare and assemble the M21 practice hand grenade components for use as follows:

- a. Inspect for foreign matter in the body cavity or in the openings. Inspect for any signs of metal failure.
- b. Inspect igniting fuze for deformation, cracks, and corrosion.
- c. Holding the fuze in one hand with the igniter up, screw the body into the fuze.
- d. Carefully insert one practice hand grenade charge in the body through opening in bottom.
- e. Insert stopper in hole in base of body.
- f. The M21 practice hand grenade is ready for use.

Table 9-6 Practice and Training Hand Grenades

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Grenade, Hand, Practice, M21, w/fuze M10A3	G916	9-8.1	1330-00-028-5835	82-0-1	1 per fiber container M41A1, 25 containers per wooden box
Grenade, Hand, Practice, M21, w/fuze 205A1, or M205A2	G916	9-8.1	1330-00-028-5838	82-0-144	1 per fiber container M41A1, 25 containers per wooden box
Grenade, Hand, Practice, M21, w/fuze 205A1	G916	9-8.1	1330-00-545-5612	82-0-144	1 per fiber container M41A1, 24 containers per wooden box
Grenade, Hand, Training, MK 1A1	G965	9-8.2	1330-00-028-5847	82-1-7	1 per container, 24 grenades per wooden box
Grenade, Hand, Dummy, M1	-	9-8.4	6910-*00-609-3407	6S44BB	Packaged as required.
Grenade, Hand, Riot Control Type, M7, Inert	-	9-8.3	1330-00-672-0194	D13-21-3	Packaged as required.

9-8.2 Grenade, Hand, Training, MK 1A1 (G965).

9-8.2.1 Intended Use. This hand grenade, Figure 9-19, is designed and procured to be used for training in handling and throwing the MK 2 fragmentation hand grenade, Paragraph 9-3.1 The grenade is a non functioning type (completely inert) and may be used for throwing practice in small confined areas. The grenade is used principally to improve techniques in throwing and accuracy.

9-8.2.2 Description. This training grenade consists of an empty, cast iron body simulating the weight, size, and shape of the MK 2 fragmentation grenade. This grenade has no fuze and is black with no markings.

9-8.3 Grenade, Hand, Riot Control Type, M7, Inert.

9-8.3.1 Intended Use. This hand grenade is designed and procured to be used for training in the care, handling, and throwing of the Riot Control Hand Grenade, M7 Series, Paragraph 9-6.1 It is completely inert and is used to improve throwing accuracy and techniques.

9-8.3.2 Description. This hand grenade is a cylindrical metal container 2.5 inches (6.35 centimeters) in diameter, 4.5 inches (11.43 centimeters) high, and filled with an inert material to simulate the weight of an M7 Series hand grenade.

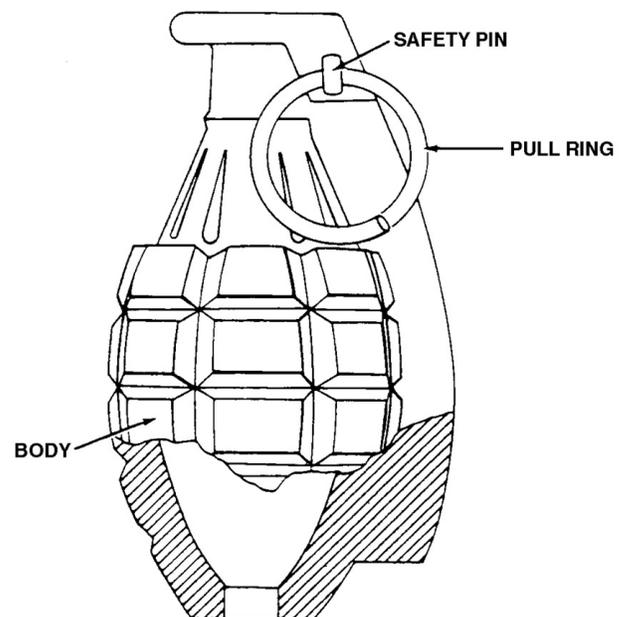


Figure 9-19 Training Hand Grenade MK 1A1

Table 9-7 Practice Hand Grenade Components

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Grenade, Hand, Practice, M30, Stopper, Molded Plastic	GX03	9-8.5	1330-00-097-8368	82-1-110B	Packaged as required
Grenade, Hand, Practice, M21/MK 2	G810	9-8.1	1330-00-028-5859	82-1-92	1 per fiberboard container, 25 containers per wooden box
Grenade, Hand, Practice, M30	G810	9-8.5	1330-00-305-0877	82-1-110	50 per fiberboard box
Grenade, Hand, Practice, Delay, M69, f/M659	G811	9-8.6	1330-00-178-8515	9235207	50 per fiberboard box
Grenade, Hand, Practice, M21, MK 2 Grenade, Hand, Practice, M30	G850	9-8.1 9-8.5	1330-00-028-5854	82-1-48H5	5000 per wooden box
			1330-00-28-5855	82-1-48H5	4000 per wooden box
			1330-00-308-5657	82-1-48H5	25 per metal container, 75 containers per wooden box (1,875 charges)
			1330-00-529-9939	82-0-191B	Packaged as required
			1330-00-585-9362	82-1-48H5	40 per waterproof bag, 150 bags per wooden box (6,000 charges)
Grenade, Hand, Practice, M21 or MK 2, w/Stopper	G851	9-8.1	1330-00-028-5856	82-1-48H5	25 per foil bag, 1 bag w/25 filling hole stoppers per fiberboard container, 30 containers per wooden box (750 charges and 750 stoppers)
			1330-00-028-5857	82-1-48H5	25 per waterproof bag, 1 bag w/25 stoppers per fiberboard container M43A1, 20 containers per metal-lined wooden box (500 charges and 500 stoppers)
Grenade, Inert, MK 12 MOD 0 w/Fuze, Inert	GG15	9-8.7	1330-01-506-0622	7546742	2 per M19A1 Ammo Can

9-8.4 Grenade, Hand, Dummy, M1.

9-8.4.1 Intended Use. This hand grenade is designed and procured to be used for training in handling and throwing hand grenades. It is completely nonfunctional. It is ideal for practicing in confined spaces to improve accuracy and throwing technique.

9-8.5 Grenade, Hand, Practice, M30 (G810).

9-8.5.1 Intended Use. This practice grenade simulates the M26 series fragmentation grenades, Paragraph 9-3.2

9-8.5.2 Description. The M30 grenade consists of a reusable cast iron body that is identical in shape to the M26 fragmentation grenade. The body is colored blue with white markings and is open at both ends. A stopper, issued with the grenade and as a replacement component, closes the

base opening. Opposite this opening is a smaller threaded opening into which the fuze is installed. The grenade is available as a separately issued body, black powder practice charge, and practice fuze, which are assembled in the field prior to use. After use, the body may be recovered and reused by installing a new fuze, charge, and stopper. The grenade utilizes an M205A1 or M205A2 ignition fuze, a charge assembly that provides a puff of white smoke and a loud popping noise after a delay of approximately 4 to 5 seconds. The assembled grenade is approximately 3.9 inches (9.91 centimeters) in length and weighs approximately 16 ounces (453.6 grams).

WARNING

FUZE FRAGMENTS MAY EXIT THE HOLE IN THE BASE OF THE GRENADE BODY, CAUSING INJURY.

DO NOT ATTEMPT TO RECOVER FIRED HAND GRENADE IMMEDIATELY. ALLOW THEM TO COOL FOR 30 MINUTES.

NEVER ATTEMPT TO USE A DETONATING FUZE WITH A PRACTICE HAND GRENADE.

UNDER NO CIRCUMSTANCES ATTEMPT TO USE A GRENADE BODY THAT HAS ANY SIGNS OF CRACKS OR WEAKNESS. NEVER ATTEMPT TO REINFORCE THE STANDARD PRACTICE CHARGE BY ADDING OR SUBSTITUTING OTHER EXPLOSIVES.

DO NOT INSERT MORE THAN ONE PRACTICE CHARGE INTO THE GRENADE. DO NOT SUBSTITUTE ANY OTHER EXPLOSIVE FOR THE AUTHORIZED PRACTICE CHARGE.

9-8.5.3 Function. The practice hand grenade M30 functions in the same manner as the M26 fragmentation grenade, except instead of detonating, the fuze igniter ignites the charge. Removal of the safety pin permits release of the safety lever. When the safety lever is released, it is forced away from the grenade body by a striker acting under the force of a striker spring. The striker rotates on its axis and strikes the percussion primer. The primer emits a small, intense flame, igniting the delay element. The delay element burns for 4 to 5 seconds, then sets off the practice charge. Upon exploding, the black powder charge forces the stopper from the base of the body and emits a loud report, like a firecracker, and a puff of white smoke. After use, the expended grenade may be recovered and reloaded with a new fuze, black powder charge, and stopper.

9-8.5.4 Preparation for Use. Prepare and assemble the M30 practice grenade components for use as follows:

- a. Inspect for foreign matter in the body cavity or in the openings. Inspect for any signs of metal failure.
- b. Inspect the igniting fuze for deformation, cracks, and corrosion.
- c. Holding the fuze in one hand with the igniter up, screw the body onto the fuze.
- d. Carefully insert one practice hand grenade charge in the body through the opening in the bottom.
- e. Insert the stopper in the base of the body.
- f. The M30 practice hand grenade is ready for use.

9-8.6 Grenade, Hand, Practice, Delay, M69 (G811), (G878).

9-8.6.1 Intended Use. This practice grenade simulates the M67 series fragmentation grenades, Paragraph 9-3.2

9-8.6.2 Description. The M69 grenade consists of a steel body that is identical in shape to the M67 fragmentation grenade. The body is colored blue with white markings and is open at one end, where there is a threaded opening into which the

fuze is installed. The grenade is available as a separately issued body, and fuze assembly. After use, the body may be recovered and reused by installing a new fuze assembly. The grenade utilizes the M228 ignition fuze assembly which contains a black powder charge that provides a puff of white smoke and a loud popping noise after a delay of approximately 4 to 5 seconds. The assembled grenade is approximately 3.35 inches (8.51 centimeters) in length and weighs approximately 14 ounces (369.9 grams).

WARNING

FUZE FRAGMENTS MAY EXIT THE HOLE IN THE GRENADE BODY, CAUSING INJURY.

DO NOT ATTEMPT TO RECOVER FIRED HAND GRENADES IMMEDIATELY. ALLOW THEM TO COOL FOR 30 MINUTES.

NEVER ATTEMPT TO USE A DETONATING FUZE WITH A PRACTICE HAND GRENADE.

UNDER NO CIRCUMSTANCES ATTEMPT TO USE A GRENADE BODY THAT HAS ANY SIGNS OF CRACKS OR WEAKNESS. NEVER ATTEMPT TO REINFORCE THE STANDARD REPORT BY ADDING OR SUBSTITUTING OTHER EXPLOSIVES.

9-8.6.3 Function. The practice hand grenade M69 functions in the same manner as the M67 fragmentation grenade, except instead of detonat-

ing, the fuze assembly provides a report and a puff of smoke upon exploding. Removal of the safety pin permits release of the safety lever. When the safety lever is released, it is forced away from the grenade body by a striker acting under the force of a striker spring. The striker rotates on its axis and strikes the percussion primer. The primer emits a small, intense flame, igniting the delay element. The delay element burns for 4 to 5 seconds, then sets off the practice charge that is part of the fuze assembly. After use, the expended grenade may be recovered and reloaded with a new fuze assembly.

9-8.6.4 Preparation for Use. Prepare and assemble the M69 practice grenade components for use as follows:

- a. Inspect for foreign matter in the body cavity or in the opening. Inspect for any signs of metal failure.
- b. Inspect the M228 fuze assembly for deformation, cracks, and corrosion.
- c. Holding the fuze in one hand with the igniter up, screw the body onto the fuze.
- d. The M69 practice hand grenade is ready for use.

9-8.7 Grenade, Inert MK 12 MOD 0 w/Fuze, Inert (GG15)

9-8.7.1 Intended Use. This hand grenade is designed and procured to be used for training in the care, handling and throwing of the Grenade, Hand, Offensive, MK 3A2 with Fuze M206 Series, paragraph 9-5.2. It is completely inert and is used to improve throwing accuracy and techniques.

9-8.7.2 Description. This hand grenade is a cylindrical pressed fiber container 2.13 inches (5.41 centimeters) in diameter, 5.275 inches (13.39 centimeters) long and weighs 15.6 ounces (442 grams).

9-9 HAND GRENADE FUSES

See Table 9-8 for packaging and identification data.

9-9.1 Fuze, Hand Grenade, Practice, M10A3, M205A1 and M205A2 (G870).

9-9.1.1 Intended Use. These pyrotechnic delay fuzes are intended to initiate a small black powder charge in various practice hand grenades. They are used in the M21 and M30 Practice Hand Grenades.

9-9.1.2 Description. These fuzes, Figure 9-20, consist of a body containing a primer and a pyrotechnic delay column. Assembled to the body are a striker, striker spring, safety lever, safety pin with pull ring, and an igniter assembly. The split end of the safety pin has an angular spread or a diamond crimp.

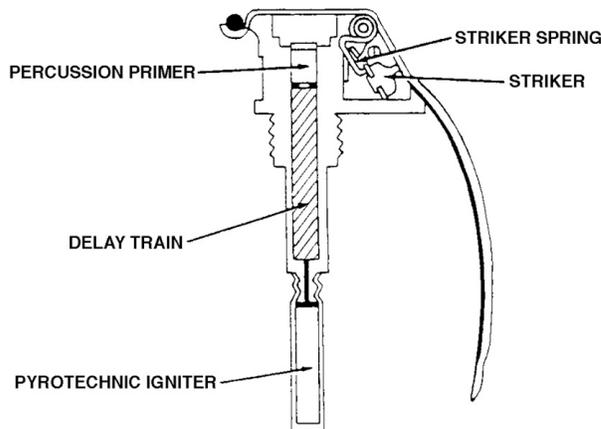


Figure 9-20 Hand Grenade Fuze M10A3, M205A1 or M205A2

9-9.2 Fuze, Hand Grenade, M201A1 (G874).

9-9.2.1 Intended Use. This pyrotechnic delay fuze is intended to initiate the explosive, pyrotechnic or chemical charge in various hand grenades. This fuze is used in the M7A2 and M7A3 CS Riot Control, AN-M14 TH3 Incendiary, M18 Smoke, and AN-M8 HC Smoke Hand Grenades.

9-9.2.2 Description. This fuze, Figure 9-21, consists of a body containing a primer, first-fire mixture, pyrotechnic delay column, and ignition mixture. Assembled to the body are a striker, striker spring, safety lever, and safety pin with pull ring. The split end of the safety pin has an angular spread.

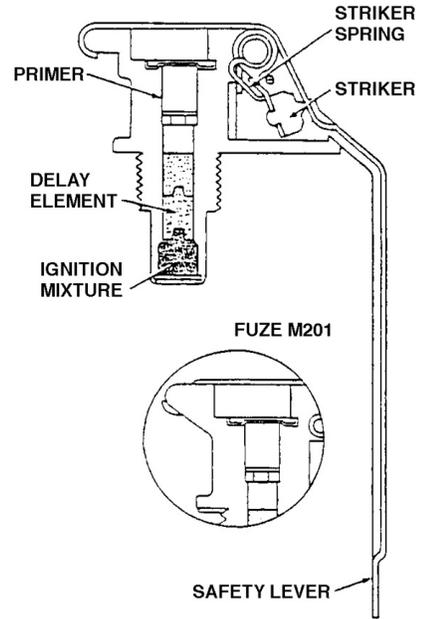


Figure 9-21 Hand Grenade Fuze, M201A1

9-9.3 Fuze, Hand Grenade, M228, f/Practice Grenade M69 (G878).

9-9.3.1 Intended Use. This pyrotechnic delay fuze is intended to be used in the M69 Practice Hand Grenade.

9-9.3.2 Description. This fuze, Figure 9-22, consists of a body containing a primer and pyrotechnic delay column. Assembled to the body are a striker, striker spring, safety lever, safety pin with pull ring, safety clip, and igniter assembly. The split end of the safety pin has an angular spread or a diamond crimp.

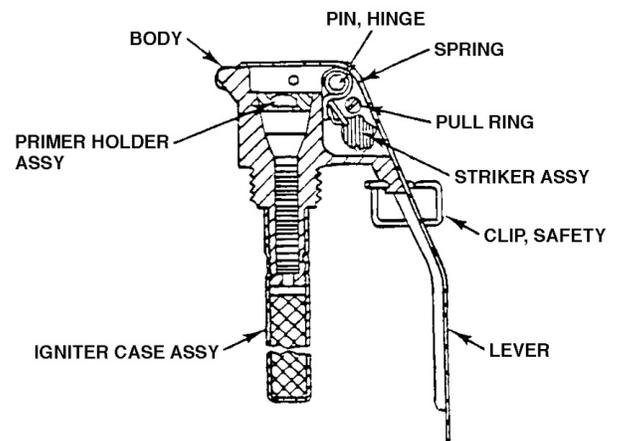


Figure 9-22 Hand Grenade Fuze M228

9-9.4 Fuze, Hand Grenade, Offensive, M6A3, M206A1 and M206A2 (G872).

WARNING

M206A1 AND M6A3 FUZES WITHOUT SAFETY CLIPS ARE NOT AUTHORIZED.

9-9.4.1 **Intended Use.** These pyrotechnic delay fuzes are intended to initiate the explosive, pyrotechnic or chemical charge in various hand grenades. They are used in the MK 3A1 and MK 3A2 Offensive Hand Grenade and the M34 WP Smoke Hand Grenade.

9-9.4.2 **Description.** These fuzes, Figure 9-23, consist of a body containing a primer and pyrotechnic delay column. Assembled to the body are a striker, striker spring, safety lever, safety pin with pull ring, safety clip, (M206A2 fuze only), and detonator assembly. The split end of the safety pin has an angular spread or a diamond crimp.

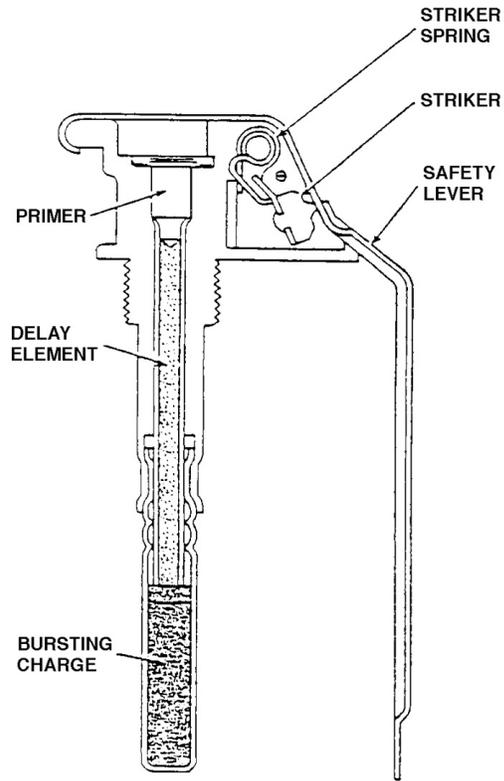


Figure 9-23 Hand Grenade Fuze M6A3, M206A1 or M206A2

Table 9-8 Hand Grenade Fuzes

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Fuze, Hand Grenade, Practice, M10A3, M205A1 and M205A2	G870	9-9.1	1330-00-028-5850	82-1-46	25 per carton, 8 cartons per wooden box
	G870		1330-00-028-5851	8848621	25 per carton, 1 carton per bag, 8 bags per wooden box
Fuze, Hand Grenade, Offensive, M6A3, M206A1 and M206A2	G872	9-9.4	1330-00-028-5848	82-1-31	25 per carton, 8 cartons per wooden box
	G872		1330-00-028-5853	8848622	25 per carton, 8 cartons per wooden box
	G872		1330-00-293-9517	7548570-3	Packaged as required
Fuze, Hand Grenade, M201A1	G874	9-9.2	1330-00-293-9516	D13-10-22	Packaged as required
			1330-01-456-5059	D13-10-22	Packaged as required
Fuze, Hand Grenade, M228, f/Practice Grenade M69	G878	9-8.6 9-9.3	1330-00-168-5502	9251666	45 per fiberboard carton, 8 cartons per wirebound box

9-10 GRENADE PROJECTION ADAPTERS

See Table 9-9 for packaging and identification data.

9-10.1 Adapter, Grenade Projection M1 And M1A2 (G801).

9-10.1.1 Intended Use. The M1 series grenade projection adapters, Figure 9-24, adapt fragmentation, practice, illuminating, and WP smoke grenades for launching from a rifle.

9-10.1.2 Description. Three different models are available: the M1, the M1A1, and the M1A2. Adapter M1 can be used with fragmentation hand grenade MK 2 only.

a. Adapters M1A1 and M1A2 consist of four parts: a fin assembly, a stabilizer tube, a cup and three claws.

b. The adapter is fabricated from sheet steel with three spring-steel claws. These grip and hold the grenade in the adapter. The fin assembly is attached to one end of the stabilizer tube. The cup and claws are attached to the other end of the stabilizer tube. An arming clip is attached to the longest of the three claws.

9-10.1.3 Function. After placing the grenade in the adapter and releasing the safety clip and removing the safety pin, the hand grenade with adapter is placed on the grenade launcher and is fired. It functions as follows:

a. The arming clip moves rearward, striking a small extension of the arming clip retainer.

b. Force of the arming clip's striking the small extension (made of brittle metal) breaks it, allowing the arming clip to fall free, thus releasing the safety lever.

c. The fuze begins to function (see applicable hand grenade for information on subsequent functioning).

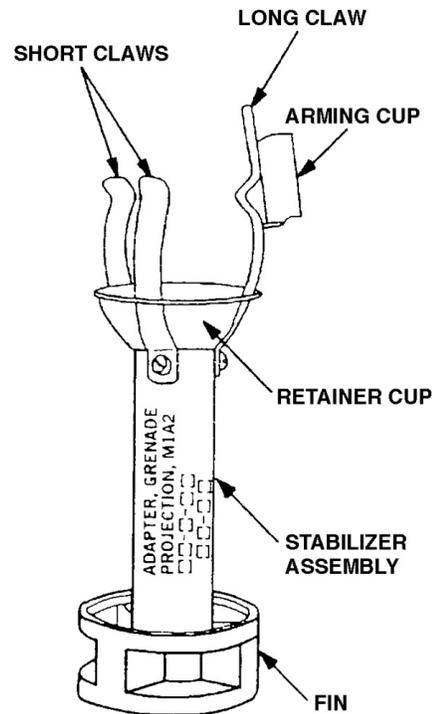


Figure 9-24 Grenade Projection Adapter M1 Series

Table 9-9 Grenade Projection Adapters

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Adapter, Grenade Projection M1 And M1A2	G801	9-10.1	1330-00-028-5822	82-1-81-2	48 adapters, 50 rounds, grenade M3, and 12 clips per wooden box
Adapter, Grenade Projection M2 And M2A1	G805	9-10.2	1330-00-029-5829	82-1-84-1	50 per carton w/5 cartridge assortment, grenade group A and 15 clips per wooden box
	G805		1330-00-028-5830	82-1-84-4	50 per carton w/5 cartridges assortment, grenade group A and 15 clips per wooden box

9-10.2 Adapter, Grenade Projection M2 And M2A1 (G805).

9-10.2.1 Intended Use. The M2 series grenade projection adapters, Figure 9-25, adapt chemical and offensive hand grenades for launching from a rifle.

9-10.2.2 Description. Adapters M2 and M2A1 differ only in the method of attaching the claws and claw base plate to the stabilizer tube. Grenade Projection Adapters M2 Series consists of five parts: a fin assembly, a stabilizer tube, a claw base plate, three claws, and a setback band. The adapter is fabricated from sheet steel. The three spring steel claws grip the lip of the base of the grenade body and hold the grenade in the adapter. The fin assembly is attached to one end of the stabilizer tube. The claw base plate and claws are attached to the other end of the stabilizer.

9-10.2.3 Function. When the hand grenade with adapter placed on the grenade launcher is fired, it functions as follows:

- a. Set back force moves the setback band to the rear, releasing the safety lever.

- b. Fuze begins to function (see paragraph describing particular hand grenade for information on subsequent functioning).

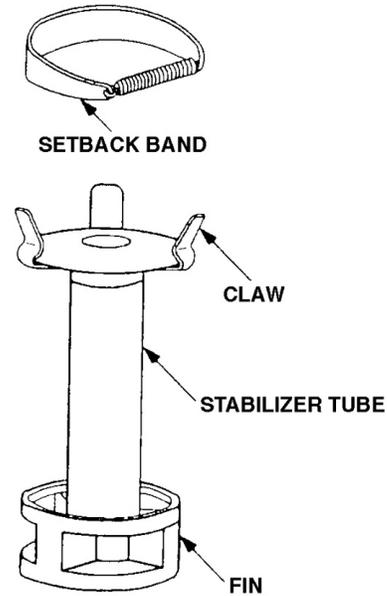


Figure 9-25 Grenade Projection Adapter M2 Series

9-11 RIFLE GRENADES

9-11.1 General. Rifle grenades, Figure 9-26, are fin stabilized and launched from a rifle. Some hand grenades may be adapted for launching from a rifle by means of a projection adapter. The propelling force for the grenade is provided by a special gas-producing grenade cartridge that is loaded into the rifle chamber. Rifle grenades may be used against armored targets or personnel, for screening or signaling, or for incendiary effect against flammable targets. Rifle grenades may be fired at low angles (direct fire) or high angles (indirect fire), depending on the type of grenade being fired and the effect desired. Rifle grenades include Antitank (AT), chemical (smoke, WP), and practice.

WARNING

DO NOT POINT THE RIFLE TOWARD FRIENDLY PERSONNEL, EQUIPMENT OR MATERIAL WHEN LOADING, UNLOADING OR PREPARING TO FIRE.

THE RECOIL FROM FIRING RIFLE GRENADES IS CONSIDERABLE. IF FIRED FROM AGAINST THE SHOULDER, ENSURE THE RIFLE BUTT HAS THE FREEDOM TO MOVE WITH THE RECOIL. IF BRACED AGAINST A HARD SURFACE, THE SHOCK MAY CRACK OR BREAK THE STOCK.

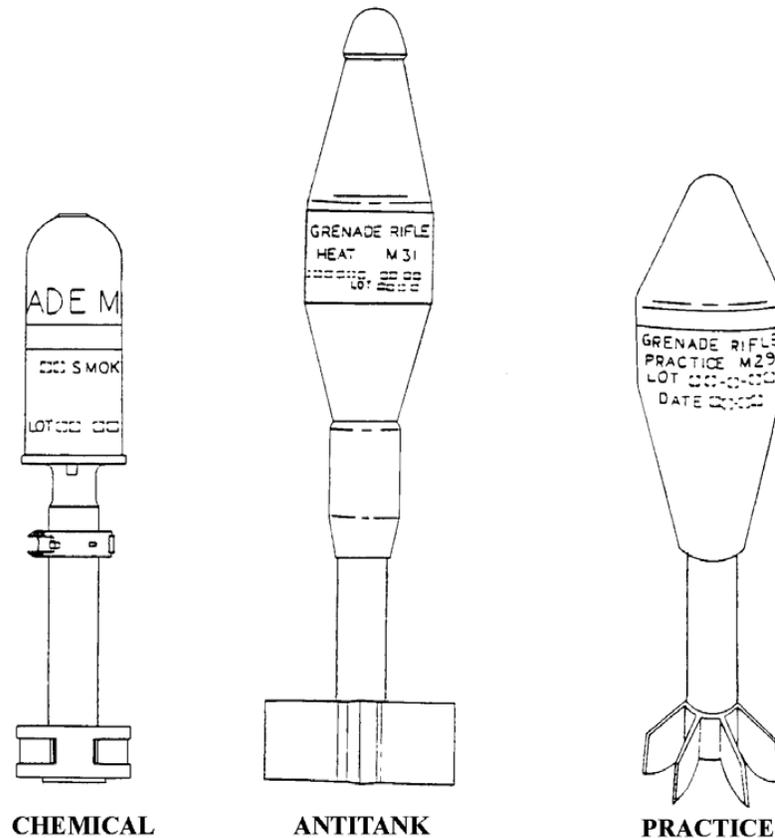


Figure 9-26 Typical Rifle Grenades

9-12 AT RIFLE GRENADES

AT rifle grenades produce a penetrating effect against targets by means of a shaped charge. Detonation of the charge travels from the fuze to the high explosive. The shape of the liner focuses the detonation wave to produce a very high-velocity jet of hot gases and molten metal, which creates a long slug. This jet blasts deep holes into or through steel, concrete and similar materials. In addition, a slug of metal formed from the shaped charge cavity liner acts as a projectile. This slug will be projected into or through the hole. See Table 9-10 for packaging and identification data.

9-12.1 Grenade, Rifle, Heat, M31, with Fuze M211 (G970).

9-12.1.1 Description. This rifle grenade consists of three basic parts: the cylindrical body with conical ogive and conical rear section, the fuze, and the stabilizer. The ogive contains a piezoelectric assembly in the nose. A lead wire (in conduit) connects this assembly to the fuze in the base of the body. The body contains Comp B molded against a copper shaped charge liner. A booster is contained in the fuze at the base of the body. Fuze M211 consists of a base, a spring-driven detonator rotor, and a cover. The detonator rotor contains an electric detonator. The base contains a setback leaf assembly. The cover contains a booster pellet. The aluminum stabilizer consists of a stabilizer tube with an adapter at its forward end (for connection to the body) and a fin assembly at the other end. When assembled, the fuze is held within the adapter. The grenade is olive drab with yellow markings.

9-12.1.2 Function. An inertia-actuated setback leaf assembly prevents alignment of the detonator with the booster in the fuze until the rifle grenade is launched. Prior to arming, the detonating circuit

within the fuze is grounded. Current can not pass through the detonating circuit, and current from an accidentally crushed or stressed crystal is short circuited to the body of the grenade. The detonating switch is contained within a small rotor that is locked into the short-circuit position by a setback leaf assembly. When the grenade is launched, the setback leaf assembly releases the rotor. The rotor turns 90°, opening the shorting switch and closing the firing switch. Upon launching, the grenade functions as follows:

- a. Inertia setback causes the first of the three setback leaves in the setback leaf assembly to overcome the spring tension. This releases the second leaf.
- b. The second leaf rotates, releasing the third leaf.
- c. The third leaf rotates, releasing a rotor assembly containing the firing circuit.
- d. The rotor assembly turns 90° to close the firing circuit, arming the grenade.
- e. Upon impact with the target, the crystal crushes and generates an electrical impulse.
- f. The electrical fuze receives the electrical impulse through a lead wire in the conduit.
- g. The electrical impulse passes through a resistance wire in the detonator, initiating the explosive train.
- h. The detonator detonates the booster, and the booster detonates the shaped charge.
- i. The principal explosive force of the shaped charge is directed forward to penetrate the target

Table 9-10 AT Rifle Grenades

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Grenade, Rifle, Heat, M31, with Fuze M211, w/ Modified Nose Assembly	G970	9-12.1	1330-00-541-9847	82-0-195	1 per metal container M313, 10 containers and 20 cartridges M3 per wooden box
Grenade, Rifle, Heat, M31 with Fuze M211 with Modified Nose Assembly	G970	9-12.2	1330-00-541-9848	82-0-195	1 per fiber container M354, 10 containers and 20 cartridges M3 per wooden box

9-12.1.3 Intended Use. This rifle grenade, Figure 9-27, is designed and procured as a High Explosive Antitank (HEAT) device. It is a Point Initiated, Base Detonated (PIBD) grenade and employs a shaped charge to defeat armor plate or concrete. It functions against targets at all oblique angles up to 65°. The grenade uses a piezoelectric assembly that generates an electric current when crushed on impact with the target. This action initiates the explosive train. The only grenades authorized for use are the M31 Rifle Grenades assembled with modified nose assemblies. The modified nose assembly has a positive ground between the piezoelectric crystal and the metal nose protector cap.

9-12.2 Grenade, Rifle, Heat, M31 with Fuze M211 with Modified Nose Assembly (G970).

9-12.2.1 Intended Use. This rifle grenade is designed and procured as a PIBD, HEAT weapon to be used against armored targets and concrete bunkers.

9-12.2.2 Description. In use and description, this rifle grenade resembles the M31 described in Paragraph 9-12.1. It consists of a cylindrical body and conical rear section, the fuze and the stabilizer section. The body contains approximately 9.92 ounces (281 grams) of Comp B high explosive, is 16.96 inches (43.07 centimeters) long, and is olive drab with yellow markings.

9-12.2.3 Function. Upon launching, the inertia setback causes the first of three leaves in the setback assembly to overcome a spring tension and releases the second leaf. The second leaf rotates and releases the third leaf. The third leaf rotates to release the rotor containing the firing circuit and arms the grenade. Upon impact with the target, an electrical impulse initiates the explosive train. The booster detonates and initiates the shaped charge. The principal explosive force is directed forward to penetrate the target.

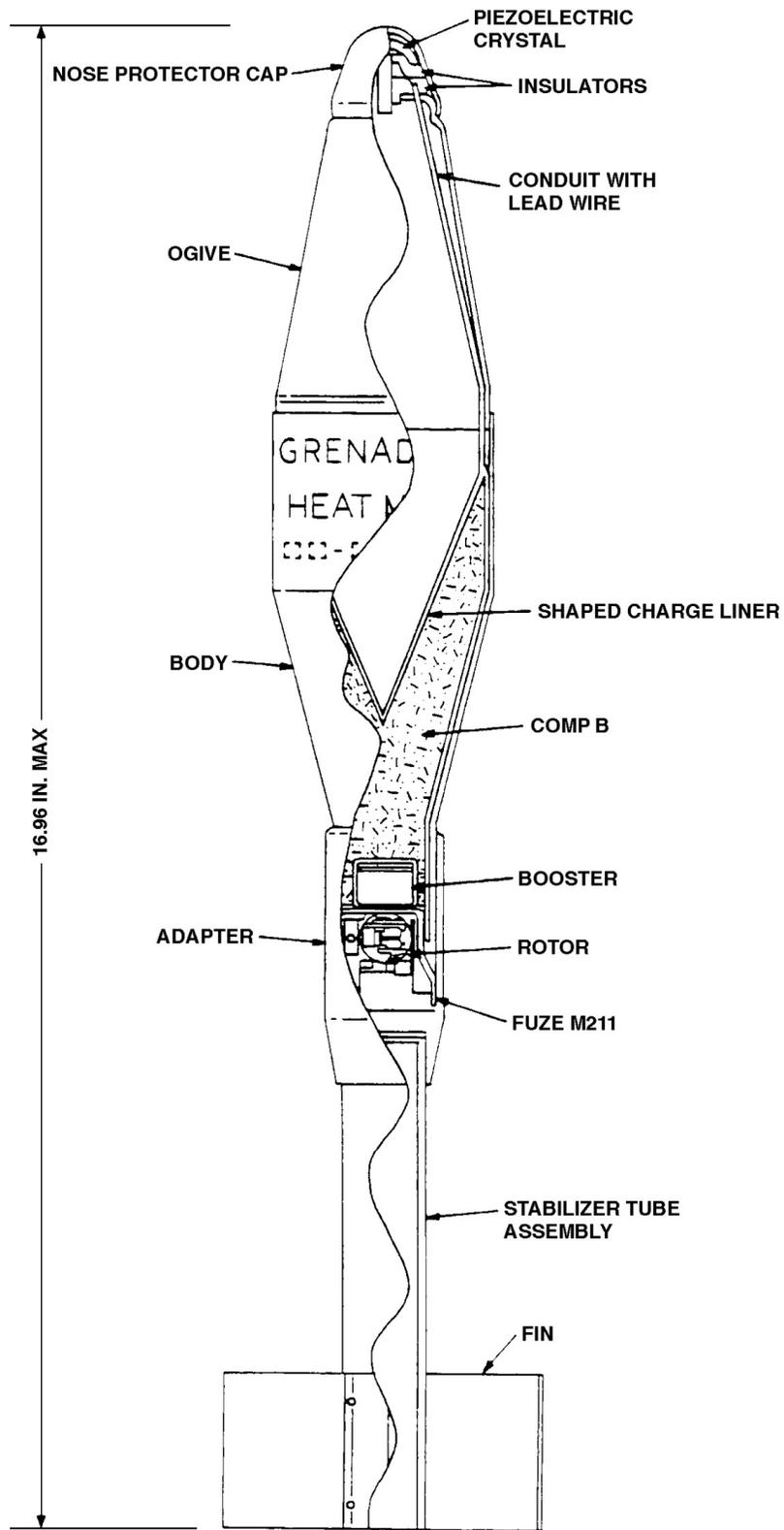


Figure 9-27 HEAT Rifle Grenade M31

9-13 CHEMICAL RIFLE GRENADES

The primary use of all chemical rifle grenades is to produce smoke either for screening or signaling purposes. An exception is the WP rifle grenade. It has incendiary capabilities for use to ignite flammable targets. The four basic types of chemical rifle grenades include the WP smoke, HC and colored smoke, incendiary, and smoke streamer. See Table 9-11 for packaging and identification data.

9-13.1 Grenade, Rifle, Smoke, M22A2 (G995).

9-13.1.1 Intended Use. This rifle grenade, Figure 9-28, is designed and procured for use as an appropriate daytime signaling device by ground forces. It produces a smoke cloud (green, or red) for approximately 8 seconds after impact.

9-13.1.2 Description. The rifle application with appropriate launcher and cartridge, a description of external features, and a functional description of this rifle grenade are contained in NAVSEA SW050-AB-MMA-010.

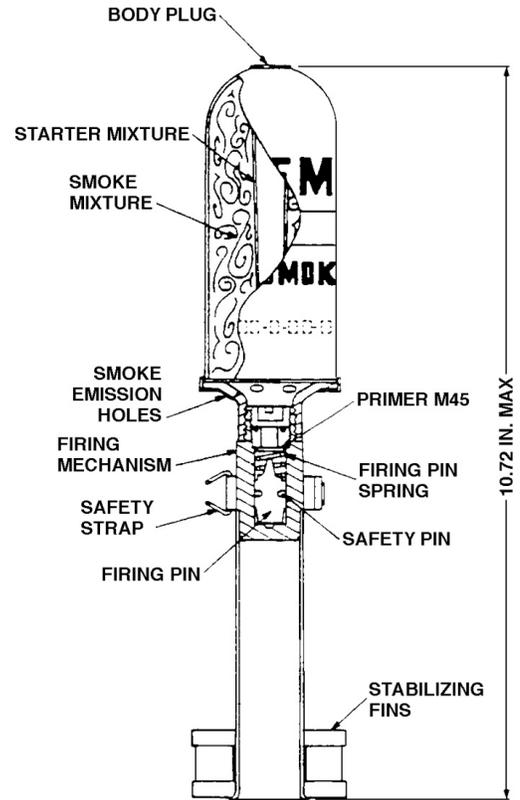


Figure 9-28 Rifle Smoke Grenade M22A2

Table 9-11 Chemical Rifle Grenades

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Grenade, Rifle, Smoke, M22A2	G995	9-13.1	1330-00-028-5909	82-0-117-5	1 per metal container M233, 10 containers, 1 cartridge assortment A, and 3 launcher clips per wooden box
Grenade, Rifle, Smoke, Streamer, M23A1	H000-Green	9-13.2	133000-028-5916	82-0-136-2/ MIL-G-13598	1 per metal container M235A1, 10 containers, 1 cartridge assortment A, and 3 launcher clips per wooden box
Grenade, Rifle, Smoke, Streamer, M23A1	H000-Green	9-13.2	1330-00-028-5889	82-0-139	1 per metal container M235/T28, 10 containers, 1 cartridge assortment C, and 3 launcher clips per wooden box
Grenade, Rifle, Smoke, Streamer, M23A1	H015-Red	9-13.2	1330-00-028-5915	82-0-139-2/ MIL-G-13598	1 per metal container M235A1, 10 containers, 1 cartridge assortment A, and 3 launcher clips per wooden box

9-13.2 Grenade, Rifle, Smoke, Streamer, M23A1 (H000-Green) (H015-Red).

9-13.2.1 Intended Use. This rifle grenade, Figure 9-29, is designed and procured to be launched from rifles for any desired type of daytime signaling purpose. It emits a stream of colored smoke for approximately 12 seconds commencing at a point approximately 50 feet (15 meters) from the rifle muzzle.

WARNING

THE RECOIL FROM FIRING RIFLE GRENADES IS CONSIDERABLE. IF FIRED FROM AGAINST THE SHOULDER, THE RIFLE BUTT MUST BE FREE TO MOVE WITH THE RECOIL. IF THE RIFLE BUTT IS BRACED AGAINST A HARD SURFACE, THE SHOCK MAY CRACK OR BREAK THE STOCK.

CAUTION

DO NOT USE THESE GRENADES WITH M16 SERIES RIFLES OR CARBINES.

9-13.2.2 Rifle Application. Only use this rifle grenade with the following rifles, grenade launchers, and grenade cartridges:

- a. 7.62mm, M2 rifle – M7 series launcher – 7.62mm, M64 grenade cartridge.
- b. 7.62mm, M14 rifle – M76 launcher 7.62mm, M64 grenade cartridge.

9-13.2.3 Description. This rifle grenade consists of a main body containing the pyrotechnic smoke mixture, and a tail section with a circular stabilizing fin welded to it. The nose has a covering of semitransparent tape the approximate color of the smoke produced. In the after end of the main body around the circumference of the curved shoulder, there are five circular smoke emission

holes covered with a square of tape. This shoulder portion of the grenade is painted with a color corresponding to the color of the smoke display. There is appropriate identification stenciling on the exterior of the main body.

9-13.2.4 Function. When the grenade cartridge fires, hot gases rupture the thin scaling disk over the aluminum baffle and travel through the holes and slot of the baffle to ignite the nongaseous powder charge in the igniter assembly. This charge ignites the starter mixture, which coats the tapered inner surface of the smoke composition. The starter mixture ignites the smoke mixture. Gases generated by the burning smoke mixture forces the tape from the nose and the five emission holes. Through these holes smoke emits for approximately 12 seconds.

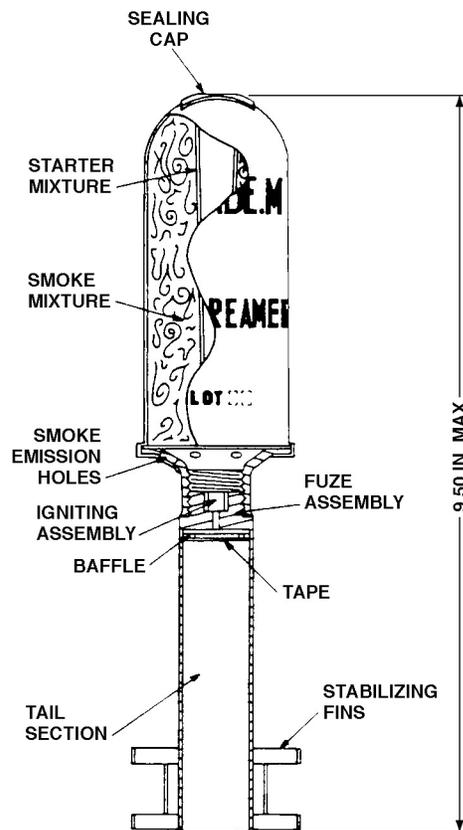


Figure 9-29 Streamer Rifle Smoke Grenade M23A1

9-13.2.5 Safely Precautions. In addition to other applicable warnings and cautions, special safety precautions apply to the handling, storage, care, and firing as follows:

a. Handle these devices with care to prevent damage, particularly to the stabilizing fins. Keep them in their individual, hermetically sealed metal containers until immediately prior to use.

b. Under no circumstances should one of these grenades be placed in a grenade launcher on a rifle or carbine unless it is to be fired immediately.

c. If prepared for launching and not launched, return the grenade to its metal shipping container and seal with tape.

d. Do not use grenades with cracked, bent, or otherwise damaged fins and/or tail assemblies. Segregate them for disposition in accordance with Chapter 10 of this manual.

e. Use these grenades only with the rifles, launchers, and grenade cartridges as specified in Paragraph 9-13.2.2

f. When launching a grenade, do not point the rifle in the direction of, or over the heads of friendly personnel.

g. Because of component sensitivity to undue shock, do not drop or otherwise mishandle these grenades.

h. Strictly adhere applicable rules concerning the firing of grenades from rifles. In most instances, place the rifle butt in soft ground or against a sandbag for firing.

i. All personnel using rifle grenades and other personnel in the immediate vicinity should wear helmets to protect themselves from flying debris in the event of a malfunction.

9-14 PRACTICE RIFLE GRENADES

Practice rifle grenades are used for training personnel in the care, handling and use of rifle grenades prior to training and handling service rifle grenades. Some types of practice rifle grenades are issued ready for use and some are assembled from practice and training grenades. See Table 9-12 for packaging and identification data.

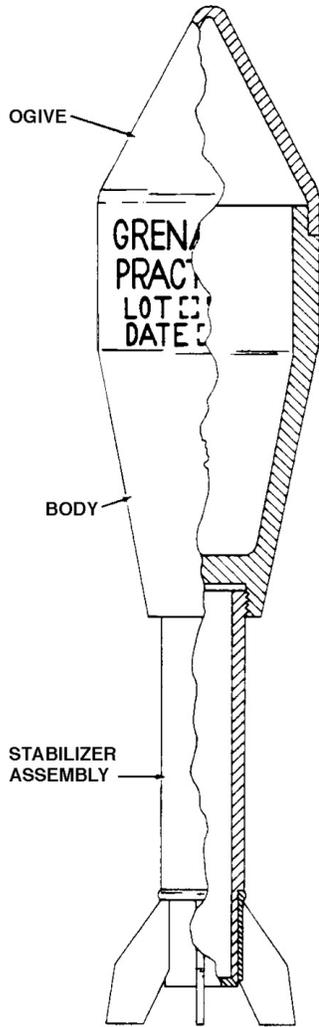


Figure 9-30 Practice AT Rifle Grenade M29/T42

9-14.1 Grenade, Rifle, AT, Practice, M29/T42, Empty (G980).

9-14.1.1 Intended Use. This practice rifle grenade, Figure 9-30, is designed and procured for use to simulate the flight characteristics of a service rifle grenade. It has neither filler nor fuze and may be used repeatedly as a training device if the stabilizer tube fin assembly is replaced when damaged.

9-14.1.2 Description. This practice rifle grenade consists of an empty cast iron body and a steel stabilizer tube fin assembly. It is 14.5 inches (36.83 centimeters) long, weighs 1.5 pounds (0.68 kilogram), and is black or blue with white markings.

9-14.2 Grenade, Rifle, AT, Practice, M11A4 (G980).

9-14.2.1 Intended Use. This practice rifle grenade is designed and procured for use to simulate the flight characteristics of the Rifle Grenade M23A1, Paragraph 9-13.2, and Rifle Grenade M19A1, Paragraph 11-6.9

9-14.2.2 Description. This practice rifle grenade is made of steel and the parts are reusable and interchangeable when not damaged. The weight, size, and shape are similar to Rifle Grenades M19A1 and M23A1.

9-14.3 Grenade, Rifle, Practice, AT, M3 (G981).

9-14.3.1 Intended Use. This rifle grenade is designed and procured for use to simulate the ballistic characteristics of the M31 Rifle Grenade, HEAT, Paragraph 9-12.1

9-14.3.2 Description. This rifle grenade is made of sheet metal and aluminum. It contains neither filler nor fuze, is 16.96 inches (43 centimeters) long, weighs approximately 25 ounces (708 grams), and has a maximum range of 164 yards (150 meters). There are no replacement parts for this grenade.

Table 9-12 Practice Rifle Grenades

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Grenade, Rifle, AT, Practice, M29/T42, Empty	G980	9-14.1	1330-00-028-5920	8864102	1 per container, M37A2 with 2 cartridges M3, 10 containers and 20 cartridges per wooden box
Grenade, Rifle, AT, Practice, M11A4, Empty, w/o fuze, Grenade Cartridge, or Clips	G980	9-14.2	1330-00-028-5884	82-0-73	1 per fiber container, 50 containers per wooden box
Grenade, Rifle, Practice, AT, M3, Inert, w/o fuze or Grenade Cartridge	G981	9-14.3	1330-00-892-4885	82-0-195	1 per fiber container M354A2, 10 containers per wooden box

9-15 NON-LETHAL GRENADES

Non-Lethal Grenades are intended for use in crowd control situations where the use of non-lethal force is desired. These grenades are meant to inflict minimal injuries (e.g., bruises) to the crowd, by-standers, and "friendly forces". The intent is to disperse people in the crowd without causing any permanent injuries or extensive property damage. See Table 9-13 for packaging and identification data.

9-15.1 Grenade, Rubber Ball, Non-lethal (GG04).

9-15.1.1 Intended Use. The Non-Lethal Rubber Ball Grenade is intended for use in crowd control situations where the use of nonlethal force is desired. It can be thrown by hand or launched from the Non-Lethal Rubber Ball Grenade Launching System. The launching system consists of four components: (1) a Mossberg 500 A2 shotgun; (2) a Non-Lethal Rubber Ball Grenade Launch Cup (designation TBD); (3) Non-Lethal Rubber Ball Grenades (GG04), or Non-Lethal Practice Grenades (GG05) with M201A1-1 Fuzes (G874) installed; and (4) 12 Gauge Launching cartridges (AA30).

WARNING

PERSONNEL WILL FOLLOW INSTRUCTIONS FOR ATTACHING LAUNCHING CUP, LOADING GRENADES OR PRACTICE GRENADES, AND CHAMBERING AND FUNCTIONING 12 GAUGE LAUNCHING CARTRIDGES. FAILURE TO FOLLOW INSTRUCTIONS FOR SYSTEM OR MISUSE OF NON-LETHAL HAND GRENADE LAUNCHING SYSTEM OR ITS COMPONENTS MAY RESULT IN DAMAGE TO PROPERTY OR INJURY TO PERSONNEL.

9-15.1.2 Description. The Rubber Ball Non-Lethal Grenade consists of a grenade body, fuze, black powder separation charge, pressed black powder delay, bursting charge, and rubber balls.

The grenade weighs 0.584 pound (0.265 kilogram) and is 5.25 inches (13.34 centimeters) long. It has a diameter of 3.13 inches (7.94 centimeters).

a. **Grenade Body.** The grenade body is a hollow rubber sphere that contains a fuze well and rubber balls. It is black with "Grenade, Non-Lethal" in white lettering. Visually, the only difference between the Non-Lethal Rubber Ball Grenade (GG04) and the Non-Lethal Practice Grenade (GG05) is the exterior color and the lettering.

b. **Fuze.** The grenade fuze is an M201A1-1 pyrotechnic delay igniting fuze. The fuze weighs 1.8 ounces (51.03 grams) and is 3.9 inches (9.91 centimeters) long. The assembled fuze contains a striker, striker spring, safety lever, safety pin with pull ring, and detonator assembly. The safety lever is black.

c. **Explosive Components.** The M201A-1-1 fuze contains 6.94 grains (0.45 grams) of zirconium nickel alloy delay composition/titanium powder/potassium perchlorate. The separation charge is 15 grains (0.97 gram) of black powder, the delay is 15 grains (0.97 gram) of pressed black powder, and the bursting charge is 123 grains (7.97 grams) of flash powder (aluminum, magnesium, potassium perchlorate).

d. **Rubber Balls.** Each rubber ball has a hardness of 70 to 80 on the Durometer "A" scale and a minimum diameter of 0.25 inch (0.64 centimeters). The grenade body contains a minimum of 100 rubber balls.

9-15.1.3 Function. The safety pin is removed, allowing the safety lever to be released either when the grenade is thrown or when it is launched from the launching cup. Release of the safety lever allows the spring-loaded striker to impact the primer in the fuze, initiating the explosive train in the fuze. This causes the fuze to ignite the separation charge, which separates the fuze/fuze well from the grenade and initiates the pressed black powder delay. When the delay burns through, it initiates the bursting charge. The burning of the bursting charge generates gas, which causes the rubber body of the grenade to rupture and disperse the rubber balls. The burning of the bursting charge also generates a flash and report.

9-15.2 Grenade, Practice, Non-Lethal (GG05).

9-15.2.1 Intended Use. The Non-Lethal Practice Grenade is intended for training use only. It allows trainees to prepare for use of the Non-Lethal Rubber Ball Grenade (GG04) in crowd dispersal situations. It can be thrown by hand or launched from the Non-Lethal Rubber Ball Grenade Launching System. The launching system consists of four components: (1) a Mossbert 500 A2 shotgun; (2) a Non-Lethal Rubber Ball Grenade Launch Cup (designation TBD) (3) Non-Lethal Rubber Ball Grenades (GG04), or Non-Lethal Practice Grenades (GG05) with M201A1-1 Fuzes (G874) installed; and (4) 12 Gauge Launching cartridges (AA30).

CAUTION

PERSONNEL WILL FOLLOW INSTRUCTIONS FOR ATTACHING LAUNCHING CUP, LOADING GRENADES OR PRACTICE GRENADES, AND CHAMBERING AND FUNCTIONING 12 GAUGE LAUNCHING CARTRIDGES. FAILURE TO FOLLOW INSTRUCTIONS FOR SYSTEM OR MISUSE OF NON-LETHAL HAND GRENADE LAUNCHING SYSTEM OR ITS COMPONENTS MAY RESULT IN DAMAGE TO PROPERTY OR INJURY TO PERSONNEL.

The Non-Lethal Practice Grenade is inert until the M201A1-1 Fuze (G874) is installed. It can be re-used by removing the expended fuze and installing a new fuze.

9-15.2.2 Description. The Non-Lethal Practice Grenade consists of a grenade body and rubber balls. Prior to using it, a M201A1-1 Fuze (G874) is installed in the Non-Lethal Practice Grenade. The grenade weighs approximately 0.584 pound (0.265 kilogram) with the fuze installed. It is 5.25 inches (13.34 centimeters) long and has a diameter of 3.13 inches (7.94 centimeters).

a. **Grenade Body.** The grenade body is a hollow rubber sphere that contains a fuze well and rubber balls. It is blue with "Grenade, Non-Lethal,

Practice" in white lettering. Visually, the only difference between the Non-Lethal Rubber Ball Grenade (GG04) and the Non-Lethal Practice Grenade (GG05) is the exterior color and the lettering.

b. **Fuze.** The grenade fuze is a M201A1-1 pyrotechnic delay igniting fuze. The fuze weighs 1.8 ounces (51.03 grams) and is 3.9 inches (9.91 centimeters) long. The assembled fuze contains a striker, striker spring, safety lever, safety pin with pull ring, and detonator assembly. The safety lever is black.

c. **Explosive Components.** There are no explosive components in the Non-Lethal Practice Grenade until the M201A1-1 Fuze is installed. The fuze contains 6.94 grains (0.45 grams) of zirconium nickel alloy delay composition/titanium powder/potassium perchlorate.

d. **Rubber Balls.** Each rubber ball has a hardness of 70 to 80 on the Durometer "A" scale and a minimum diameter of 0.50 inch (1.27 centimeters). The grenade body contains approximately 30 rubber balls, which allows the Non-Lethal Practice Grenade with a fuze installed to have approximately the same overall weight as the Non-Lethal Rubber Ball Grenade and to simulate the weight and "feel" of the Non-Lethal Rubber Ball Grenade during training.

9-15.2.3 Function. The safety pin is removed, allowing the safety lever to be released either when the grenade is thrown or when it is launched from the launching cup. Release of the safety lever allows the spring-loaded striker to impact the primer in the fuze, initiating the explosive train in the fuze. This causes the fuze to generate smoke and an audible report. The smoke is vented through holes in the fuze well of the grenade body. The vented smoke and audible report indicate that the grenade has functioned. When the grenade is functioned, the grenade body remains intact and does not expel the rubber balls. When safe to do so, the expended Non-Lethal Practice Grenades can be collected and the expended fuzes removed. The Non-Lethal Practice Grenades can then be re-used for training when new fuzes are installed.

Table 9-13 Non-Lethal Grenades

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Grenade, Rubber Ball, Non-lethal	GG04	9-15.1	1330-01-454-0132	925011 201030	1 grenade per cardboard sleeve, 6 sleeves (6 grenades) per M2A1 metal box, 2 metal boxes (12 grenades) per wirebound box
			1330-01-503-1036	925011 201030	1 grenade per cardboard sleeve, 6 sleeves (6 grenades) per M2A1 metal box, 2 metal boxes (12 grenades) per wirebound box
Grenade, Practice, Non-Lethal	GG05	9-15.2	1330-01-454-0099	925011 201030	Commercial pack (item is inert until fuze (G874) is installed)

CHAPTER 10

DISPOSAL

10-1 INTRODUCTION

The destruction and disposal of ammunition, explosives, and other dangerous articles may be required because of age, deterioration, damage, obsolescence, surplus, lack of identity, or other cause of unserviceability. It is the policy of Naval Sea Systems Command (NAVSEASYSCOM) to dispose of those materials in the most economical method consistent with established safety standards.

Affording safe, effective, expeditious, and economical disposal of ammunition, explosives, and other dangerous articles must be consistent with the best interests of the government. Due consideration must be given to demilitarization of material that can be reclaimed safely and economically or salvaged for reuse or resale. Those materials that cannot be salvaged safely and economically shall be destroyed as prescribed in this manual and the procedures listed in OP 5, Volume 1.

NOTE

Expended hardware and residual products associated with functioned demolition items shall be processed through local Defense Reutilization and Marketing Office (DRMO) for reclamation and/or sale, in accordance with DoD Instruction 4160.21-M-1 (Defense Demilitarization Manual) and OP 5 (Sale, Salvage, and Disposition of inert material).

10-1.1 Authorization For Destruction. In as much as the inherent hazards of ammunition, explosives, and other hazardous materials are often increased by the factors which cause their unserviceability, these items, regardless of type or condition, shall not be destroyed without specific authorization and instructions from NAVSEA, PM NCAS, in each specific instance (except in the case of Marine Corps activities). When the commanding officer of a Naval Activity decides that immediate destruction of dangerously deteriorated or damaged ammunition or explosives is necessary in order to protect life and property, NAVSEA PM NCAS shall be contacted by the quickest available means and technical disposal instructions will be issued promptly. Marine Corps activities under

similar circumstances shall request disposition instructions from the Commandant, Marine Corps if material is under the technical direction of the Marine Corps. When material is under the technical direction of NAVSEA, PM NCAS, disposition instructions shall be requested from NAVSEA, PM NCAS. Policy, responsibility, and procedures for release of hazardous/non-hazardous (large and small quantities) of ammunition, explosives, and other hazardous materials for demilitarization/disposal are contained in NAVSEA INST 4570.1 Series. The procedures outlined in this paragraph are not meant to prohibit routine disposal of small amounts of ammunition, explosives, and other hazardous materials by any activity in accordance with specific procedures set forth in this manual and OP 5, Volume 1.

10-1.1.1 Emergency Ordnance Disposal. The provisions of this chapter and OP 5, Volume 1 may be modified by authorized agencies, Explosive Ordnance Disposal (EOD) units, or qualified graduates of EOD schools who are called upon in an emergency to render safe, destroy, or otherwise dispose of ammunition or explosives in an approved manner.

10-1.1.2 Situations to Guide Commanding Officers. In determining what constitutes an emergency in the disposal of explosive ordnance and determining the type of personnel used for specific disposal operations are included in the following paragraphs. The situations described are not intended to preclude the use of EOD personnel if the circumstance warrants.

a. Acute Emergency. Acute emergencies requiring the services of an EOD unit or qualified graduates of EOD schools include the following:

(1) Disasters similar to those of the USS-SOLAR and at Port Chicago where unexploded, live ammunition remains and constitutes a continuing hazard to lives and property.

(2) Projectiles washed ashore in locations where immediate action, and incapable of being disposed of by detonation or burning on site with-

out endangering the life and property or items, shall be rendered safe prior to removal or dismantling.

(3) Bombs, rockets, and projectiles in hazardous condition as described in the preceding subparagraph as a result of firing or dropping.

(4) Crashed aircraft containing live projectiles in a fuzed condition or exposed to fire in connection with the crash. This type of emergency includes water crashes where personnel deem a continuing hazard to lives or property exists.

(5) Other unforeseeable emergencies involving explosive ordnance not safely remediable through the local or area command and requiring the services of specially trained personnel. In case of doubt, always consider the item to be in the most dangerous condition possible.

b. Situations not in the acute emergency category but requiring the services of qualified graduates of the EOD school include the following:

(1) Clearance of training or dud ammunition test ranges necessary due to land disposal or other reasons.

(2) Investigation and disposal of foreign or unknown types of explosive ordnance items in other than dangerously exposed locations or when known to be deteriorated.

(3) Destruction of explosive ordnance by demolition requiring special techniques.

(4) General explosive ordnance disposal work in areas subjected to combat.

(5) Explosive charges of any type washed ashore in remote areas where they may be safely destroyed by demolition.

10-1.1.3 Routine Ordnance Disposal. The following disposal operations normally are within the capabilities of local ordnance personnel if adequate instructions and safety precautions have been promulgated or can readily be furnished by NAVSEA, PM NCAS on request:

a. Routine dumping of ammunition.

b. Disposal of known types of explosives with specific approval of NAVSEA, PM NCAS within the continental United States.

c. Disposal of ammunition and components by burning or detonation in a suitable, safe area approved by NAVSEA, PM NCAS.

d. Inert ordnance items by scrapping.

10-1.1.4 Use of Approval Procedures. No procedure shall be used in connection with the disposal of ammunition, explosives, or similarly hazardous materials that is not in accordance with the procedures specifically authorized by NAVSEA, PM NCAS. In the absence of specific regulations or information covering any phase of the destruction of explosive material, instructions shall be requested from NAVSEA, PM NCAS. All routine demilitarization or disposal of large quantities of ammunition (even though performed by EOD personnel) shall be covered by standard operating procedures, prepared and submitted to and approved by NAVSEA, PM NCAS.

10-1.1.5 Waivers. Commanding Officers have no authority to alter, waive, or relax regulations included in this publication regarding the disposal of ammunition, explosives, and similarly hazardous materials without approval from NAVSEA, PM NCAS. This includes duly promulgated future directives. In case of doubt about any procedures, obtain clarification or confirmation from NAVSEA, PM NCAS.

10-1.2 Methods Of Disposal. Ammunition and explosives that are dangerously deteriorated or damaged, obsolete, subject to malfunctions, or unserviceable and cannot be economically salvaged or safely sold are normally destroyed. Destruction is by dumping in deep water, burning, detonating, neutralization, or bleeding off as prescribed in OP 5, Volume 1 or other applicable instructions provided by NAVSEA, PM NCAS. Use of methods other than those prescribed by regulations or manuals for standard military items requires the permission from NAVSEA, PM NCAS.

10-1.3 Prohibited Disposals. Prohibited procedures include burying of ammunition or explosives, dumping the materials in wells, marshes, streams, inland waterways, waste places or pits.

10-1.4 Environmental Aspects. The intentional disposal of hazardous substances (ammunition and explosives) in a significant quantity or on a continuing or periodic basis is a major action that may significantly affect the quality of the environment. OPNAV Instruction 6240.2C prescribes the requirements for the preparation and processing of environmental impact statements and delineates Navy policy regarding such actions. Obtain Federal Aviation Administration (FAA) clearance for restricted/controlled firing areas per OPNAV INST 3770.2 (series).

10-2 DEEP WATER DISPOSAL

10-2.1 Regulations. The Environmental Protection Agency (EPA) regulates ocean dumping of all types of materials, including ammunition and explosives. The Code of Federal Regulation (CFR), Title 40, Chapter 1, Subchapter H, Part 227 promulgates regulations, policy, and criteria for ocean dumping. That reference provides general grounds for the issuance of permits as well as information concerning prohibited and strictly regulated acts.

10-2.1.1 Dumping Sites. There are EPA approved interim dumping sites with primary use of ocean dumping of conventional munitions per CFR, Title 40, Part 227. All disposal operations in deep water are to be in areas as directed by the Chief of Naval Operations (CNO) and specified in the following:

- a. Submerge explosive-loaded ammunition and pyrotechnics in water over 500 fathoms (914.4 meters) deep and at least 10 miles (16 kilometers) from shore.
- b. Submerge chemicals, exclusive of pyrotechnics, in water over 1,000 fathoms (1,828.8 meters) deep and at least 10 miles (16 kilometers) from shore.
- c. Dispose of ammunition designated for deep water disposal in areas designated by District Commandants or Sea Frontier Commanders.

10-2.1.2 Buoyancy Criteria. A minimum weight of 100 pounds per cubic foot (1,602 kilograms/m³) shall be used to classify material as having acceptable negative buoyancy. Physical tests

for buoyancy shall be conducted if there is any question of buoyancy classification. In all cases, the minimum described in Paragraphs 10-2.1 and 10-2.1.1 shall apply.

10-2.1.3 Methods of Deep Water Disposal.

Deep water disposal of ammunition, explosives, and other dangerous articles is accomplished by two methods:

- a. Over-the-side dumping from Navy or Military Sealift Command (MSC) vessels.
- b. Barge dumping using commercial or Navy barges.

10-3 DISPOSAL BY BURNING

10-3.1 Authorized Types. The following is a list of the types of ammunition and explosives authorized for destruction by burning.

- a. Black powder.
- b. Certain Group B chemical agents and ammunition.
- c. Limited quantities of dynamite in bulk.
- d. Floating smoke pots (HC-filled) or similar ammunition.
- e. Group C chemical ammunition. Do not load or store explosives with chemical ammunition containing incendiary charges or white phosphorus, either with or without bursting charges.
- f. Bulk high explosives.
- g. Group D chemical munitions.
- h. Nitrocellulose.
- i. Primers.
- j. Pyrotechnics.
- k. Small arms ammunition.
- l. Smokeless powder.
- m. TNT demolition blocks.
- n. Tracer mix and other pyrotechnic mixtures.
- o. Rocket motor propellant grains.
- p. Propellant, explosive and pyrotechnic manufacturing wastes.

10-3.1.1 General Requirements for Burning Operations. The burning site shall conform to the following requirements:

a. Disposal of ammunition by burning shall be accomplished in an area approved by NAVSEA, PM NCAS, except in those instances where destruction takes place at other than a naval facility. The criteria established by the host activity shall be used. The destruction shall not be undertaken until NAVSEA, PM NCAS has approved the operations.

b. The ground within the immediate vicinity of the burning pad shall not exceed a 10% grade. Conduct the burning operation on a dirt surface only.

c. Regardless of the type of ammunition, explosive, or other similarly hazardous material involved in an authorized disposition by burning, detonation may occur. Unless otherwise specified in this chapter, burning grounds shall be a minimum of 1,800 feet (548 meters) away from any magazine, storehouse, inhabited building or other structure, and any main traveled roadway or passenger railroad.

d. Burning grounds shall be reasonably free from undergrowth or shrubbery. Clear an area 300 feet (91.44 meters) square of all long grass and under-growth. Remove all vegetation such as dry grass, leaves, and other combustible materials within a radius of 200 feet (60.96 meters) from the burning pad(s).

e. Do not locate one site within 50 feet (15.24 meters) of another site where material was previously burned and the area not cleared.

10-4 DISPOSAL BY DETONATING

10-4.1 Authorized Types. Ammunition and explosives may be destroyed by initiating the explosion of the item or by the explosive force of materials placed in contact with the item. Destruction by detonating as described in the respective paragraphs of this publication may be authorized for the following types of ammunition and explosives:

a. Detonators (separate electric and percussion)

- b. Dynamite in bulk (large quantities)
- c. Explosive-loaded grenades
- d. Group C chemical ammunition
- e. High explosive bombs
- f. Mortar ammunition
- g. Projectiles
- h. Rocket heads weighing less than 200 pounds (440.53 kilograms).

10-4.1.1 Limitations. Do not load or store explosives with chemical ammunition containing incendiary charges or white phosphorus with or without bursting charges. In the case of white phosphorus-loaded grenades (rifle and hand) and igniters (WP or Na), request disposition instructions from NAVSEA, PM NCAS.

10-4.1.2 General Requirements for Demolition Operations. Only undertake the disposal of ammunition and explosive material by detonation in detonation sites, areas, or locations specifically approved for that purpose by NAVSEA, PM NCAS. Where destruction takes place at other than a naval facility (such as an Army installation), follow the criteria established by the host activity. Do not undertake the destruction until NAVSEA, PM NCAS has approved the operation.

10-5 DISPOSAL BY NEUTRALIZATION

10-5.1 General. Neutralization is one method of disposing of certain ammunition and explosives. Methods of neutralization include dissolving water-soluble material, chemical decomposition and venting (bleeding off).

10-5.1.1 Dissolution in Water. Disposal of explosives by dissolution in water requires that the explosive material be, in part, readily soluble in water and the resulting solution as well as any residue be innocuous or otherwise disposed of as hazardous material. The safest and preferred method of disposing of black powder is by dissolution in water as prescribed in OP 5, Volume 1.

10-5.1.2 Chemical Decomposition. Small quantities of initiating explosives (i.e., lead azide) and others used predominantly in detonators and small arms primers may be decomposed chemi-

cally. Refer to OP 5, Volume 1 for chemical destruction of lead azide. If directions are followed regarding quantities and order of treatment, no explosive material should remain and the solution may be disposed of as chemical waste. Normal caution regarding handling of chemicals should be observed.

10-5.1.3 Venting (Bleeding Off). Certain chemical ammunition may be disposed of by venting (bleeding off) to the atmosphere, provided the

requirements of state and local government agencies are observed. This method of disposal will be limited to small quantities of non persistent agents under controlled conditions. It must be done at selected locations and at a controlled rate so that nuisance threshold levels or toxic concentrations of vapors or aerosols are not emitted at points beyond the control of the installation.

CHAPTER 11

OBSOLETE ITEMS

11-1 INTRODUCTION

This chapter contains information on small arms and special warfare ammunition which have been declared obsolete.

NOTE

If any of the items listed in this chapter are found in the supply system, they **MUST NOT BE USED**. Instead, an ammunition disposition request should be submitted to the inventory manager at Naval Operational Logistics Support Center (NOLSC) Mechanicsburg, Pennsylvania, for disposition instructions.

11-1.1 Arrangement Of Material In This Chapter. The obsolete items are arranged in this chapter as they previously appeared in the manual.

11-2 SMALL ARMS AMMUNITION

See Table 11-1 for packaging and information data.

11-2.1 Cartridge, .22 Caliber Ball, Long Rifle, Match Grade For Rifle (A091).

11-2.1.1 Intended Use. Procured from various manufacturers, this cartridge is for use in weapons chambered for .22 caliber long rifle ammunition. Such weapons include match rifles, match pistols, match revolvers, small bore match rifles, and auto-load match pistols.

11-2.1.2 Description. The cartridge is 1.00 inch (2.54 centimeters) long, loaded with 2.1 grains (0.13 gram) of smokeless powder and weighs approximately 52 grains (3.36 grams).

11-2.1.3 Cartridge Case. The brass cartridge case is 0.613 inch (1.55 centimeters) long and weighs 9.8 grains (0.63 gram).

11-2.1.4 Bullet. The bullet is lead or lead alloy, is 0.46 inch (1.16 centimeters) long, and weighs approximately 40 grains (2.59 grams).

11-2.1.5 Ballistic Data. The ballistic data for this cartridge are as follows:

a. Velocity. The velocity shall vary to meet accuracy requirements.

b. Pressure. The average chamber pressure shall not exceed 24,000 psi (1,688 kilograms/cm² [165.5 MP_a]).

c. Accuracy. The extreme average spread of all targets at the time of acceptance is not greater than 1.25 inches (3.17 centimeters) at 100 yards (91 meters) range.

11-2.2 Cartridge, .22 Caliber Ball, Long Rifle Match Grade For Pistol or Revolver (A093).

11-2.2.1 Intended Use. Procured from various manufacturers for use in match pistols and match revolvers chambered for .22 caliber long rifle ammunition.

11-2.2.2 Description. This cartridge is 1.00 inch (2.54 centimeters) long, loaded with 2.1 grains (0.13 gram) of smokeless powder, and weighs approximately 52 grains (3.36 grams).

11-2.2.3 Cartridge Case. The brass cartridge case is the rimfire type, is 0.613 inch (1.55 centimeters) long, and weighs 9.8 grains (.64 gram).

11-2.2.4 Bullet. The bullet is lead or lead alloy, is 0.46 inch (1.17 centimeters) long, and weighs approximately 40 grains (2.59 grams). The bullet has a coating of moisture proof material and lubrication grooves per individual manufacturer's practices.

11-2.2.5 Ballistic Data. The ballistic data for this cartridge are as follows:

a. Velocity. The basic velocity shall be not less than 1,125 fps (343 meters per second) at 15 feet (4-5 meters) from the muzzle and is varied to meet accuracy requirements.

b. Pressure. The maximum average chamber pressure shall not exceed 24,000 psi (5,683 kilograms/cm² [165.5 MP_a]).

c. Accuracy. At the time of acceptance, the average extreme spread of all targets shall not exceed 2.00 inches (5.08 centimeters) at 50 yards (45 meters) range.

Table 11-1 Obsolete Small Arms Ammunition

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, .22 Caliber Ball, Short, Match	A084	11-2.7	1305-00-049-5400	001-90-10021	50 per commercial box
			1305-00-049-5400	10523992	50 per commercial box
Cartridge, .22 Caliber Ball, Lead, Short, Standard Velocity	A084	11-2.5	1305-00-028-6139	10523992	50 per commercial box
Cartridge, Hornet .22 Caliber Ball Soft Point	A088	11-2.8	1305-00-028-6141	7553664	50 per carton in laminated waterproofed envelopes, 40 envelops (2,000 cartridges) per wooden box
Cartridge, .22 Caliber Ball, Long Rifle, Match Grade For Rifle	A091	11-2.1	1305-00-049-5398	7553931	50 per commercial box, 10 boxes per container, 20 cartons (10,000 cartridges) per commercial box
Cartridge, .22 Caliber Ball, Long Rifle Match Grade For Pistol or Revolver	A093	11-2.2	1305-00-690-5118	7553931	50 per commercial box, 10 boxes per container, 20 cartons (10,000 cartridges) per commercial box
Cartridge, .22 Caliber Ball, Short Match, Pistol Match	A095	11-2.6	1305-01-018-1539	PS7043C7445	50 per commercial box
Cartridge, .22 Caliber Ball, Long Rifle, Standard Match For Small Bore Match	A096	11-2.3	1305-01-018-1542	PS7043C7443-2	50 per commercial box, 10 boxes (500 cartridges) per carton
Cartridge, .22 Caliber Ball, Long Rifle Match, Pistol Match	A098	11-2.4	1305-01-018-1544	PS7043C7444-1	50 per commercial box, 10 boxes (500 cartridges) per carton
Cartridge, 12 Gauge Shotgun, No. 8 Chilled Shot, Paper Case, Tracer Element	A016	11-2.9	1305-00-301-1705	T3AUA	25 per carton, 20 cartons (500 cartridges) per wooden box
Cartridge, 12 Gauge Shotgun, Flechette	A019	11-2.10	1305-00-560-2090	2663006	25 per carton, 7 cartons per metal box M2A1, 2 boxes (350 cartridges) per wirebound box
Cartridge, .410 Bore Shotgun, M35/T135 Aluminum Case	A055	11-2.11	1305-00-096-3168	7553403	25 per carton, 20 cartons (500 cartridges) per wooden box
Cartridge, .38 Caliber, Special, Mid-Range, 148-Grain, Lead Wadcutter Bullet	A404	11-2.12	1305-00-123-0548	10522441	50 per box, 24 boxes per metal box, 2 metal boxes (2,400 cartridges) per wirebound box
Cartridge, .38 Caliber, Special, Mid-Range, 148-Grain, Lead Wadcutter Bullet	A404	11-2.12	1305-00-348-8650	10533805	50 per carton, commercial box
Cartridge, .38 Caliber, Special, Match, Mid- Range, Wadcutter Lead-Alloy Bullet	A407	11-2.13	1305-01-018-1536	PS7043C7446	50 per box, commercial package

Table 11-1 Obsolete Small Arms Ammunition (Continued)

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 7.62 Millimeter, Match, Short Range Load	A169	11-2.16	1305-01-018-1545	PS7043C7566	20 per box commercially packaged
Cartridge, .30/.338 Caliber Match, For Long Range	A190	11-2.17	1305-01-018-1546	PS7043C7670-1	Commercially packaged
Cartridge, .45 Caliber, ACP, Match, Wadcutter	A470	11-2.18	1305-01-018-1537	PS7043C7447	50 per box, 10 boxes (500 cartridges) per carton, commercially packaged
Cartridge, .45 Caliber, ACP, 230-Grain, Match Ball	A471	11-2.19	1305-01-015-1538	PS7043C7448	50 per box, 10 boxes (500 cartridges) per carton, commercially packaged
Cartridge, .50 Caliber, Ammunition, Linked Configuration	A523	-	1305-01-131-7822	7672165/ 7672003	Linked 4 tracer M17 with deteriorated trace element and 1 API-T M20
Cartridge, .50 Caliber, Armor Piercing Incendiary, T49	A535	11-2.20	1305-00-301-1650	7673511	10 per carton, 6 cartons per can M10, 2 cans (120 cartridges) per wooden box M12
Cartridge, .50 Caliber, Incendiary, M23	A562	11-1.21	1305-00-555-7063	7673512	10 per carton as required in box MK 1 MOD 0
Cartridges, .50 Caliber, Ammunition, Linked Configuration	A547	-	1305-00-028-6483	7670238/ 5579812	Linked 1 API M8, 1 Incendiary M1 grade A.C., 55 per belt, 1 belt per can M10, 2 cans (110 cartridges) per wooden box M12
	A600	-	1305-01-085-2460	5577960/ 7672003	Linked 4 ball M20, API-T M20, 100 per belt, 1 belt per metal box M2A1
	A612	-	1305-00-028-6357	5577960/ 7672165	Linked 4 ball M2, 1 tracer M17, grade A.C., 265 per belt, 1 belt per metal-lined wooden box M1917
Cartridges, Signal, MK 130	L334-Red	11-2.14	1370-00-883-9023	2150907	50 per cardboard box, 24 boxes per metal container, 2 metal containers (2,400 cartridges) per wooden box
Cartridges, Signal, MK 130 MK 138	L335-Yellow	11-2.14	1370-00-104-7270	2113286	50 per cardboard box, 24 boxes per metal container, 2 metal containers (2,400 cartridges) per wooden box
Cartridges, Signal, MK 130 MK 139	L336-Green	11-2.14	1370-00-104-7271	2113287	50 per cardboard box, 24 boxes per metal container, 2 metal containers (2,400 cartridges) per wooden box
9 Millimeter Pistol Accessory Kit MK 26 MOD 0	MW55	11-2.15	1370-00-166-6386	2502208	25 kits per wooden box

11-2.3 Cartridge, .22 Caliber Ball, Long Rifle, Standard Match For Small Bore Match (A096).

11-2.3.1 Intended Use. Procured from various manufacturers for use in small bore match rifles chambered for long rifle ammunition.

11-2.3.2 Description. The cartridge is 1.00 inch (2.54 centimeters) long, loaded with smokeless powder, and weighs approximately 52 grains (3.36 grams).

11-2.3.3 Cartridge Case. The brass cartridge case is the rimfire type, is 0.613 inch (1.55 centimeters) long, and weighs 9.8 grains (.64 gram).

11-2.3.4 Bullet. The bullet is lead or lead alloy, 0.46 inch (1.16 centimeters) long, and weighs approximately 40 grains (2.59 grams). Each bullet is coated with a moisture proof material having lubrication properties. The lubrication grooves are located and configured in accordance with individual manufacturer's practices.

11-2.3.5 Ballistic Data. The ballistic data for this cartridge are as follows:

a. Velocity. The basic velocity shall vary to meet accuracy requirements with a standard velocity of 1,095 to 1,175 fps (333 to 358 meters per second).

b. Pressure. The maximum average pressure shall not exceed 24,000 psi (1,687 kilograms/cm² [165.5 MP_a]) with a maximum variation of 6,500 psi (457 kilograms/cm² [44.8 MP_a]).

c. Accuracy. At the time of acceptance, the average extreme spread of all targets is not greater than 0.75 inch (1.9 centimeters) at 55 yards (50 meters) range.

11-2.4 Cartridge, .22 Caliber Ball, Long Rifle Match, Pistol Match (A098).

11-2.4.1 Intended Use. Procured from various manufacturers for use in .22 caliber autoloading match pistols chambered for long rifle ammunition.

11-2.4.2 Description. The cartridge is 1.00 inch (2.54 centimeters) long, loaded with smokeless powder, and weighs approximately 52 grains (3.36 grams).

11-2.4.3 Cartridge Case. The brass cartridge case is 0.613 inch (1.55 centimeters) long, is the rimfire type, and weighs approximately 10 grains (.65 gram).

11-2.4.4 Bullet. This bullet is lead or lead alloy, is 40 grains (2.59 grams) nominal weight, and coated with a moisture proof lubrication material.

11-2.4.5 Ballistic Data. The ballistic data for the .22 caliber autoloading pistol match cartridge are as follows:

a. Velocity. The velocity is a minimum of 1,060 fps (323 meters per second) and a maximum of 1,090 fps (332 meters per second) at the muzzle of the weapon.

b. Pressure. The average chamber pressure is 17,500 psi (1,230 kilograms/cm² [120.6 MP_a]).

c. Accuracy. The average spread of the targets center-to-center shall not exceed 1.25 inches (3.17 centimeters) at 100-yards (91 meters) range.

11-2.5 Cartridge, .22 Caliber Ball, Lead, Short, Standard Velocity (A084).

11-2.5.1 Intended Use. This cartridge is procured from various manufacturers for use in weapons chambered for .22 caliber ball, short cartridge.

11-2.5.2 Description. The cartridge is 0.695 inch (1.76 centimeters) long, loaded with smokeless powder, and weighs 36.6 grains (2.37 grams).

a. Cartridge Case. The cartridge case is made of brass, copper, or gilding metal, is the rimfire type, 0.420 inch (1.07 centimeters) long, and weighs 6.1 grains (.40 gram).

b. Bullet. The bullet is lead and weighs approximately 29 grains (1.88 grams). It is coated with a moisture proof material having lubrication properties in accordance with commercial practice.

11-2.5.3 Ballistic Data. The ballistic data for the .22 caliber short, lead ball, standard velocity cartridge are as follows:

a. Velocity. The mean velocity at 15 feet (4.5 meters) from the weapon muzzle shall be between 995 and 1,075 fps (303 and 327 meters per second).

b. Pressure. The mean pressure shall not exceed 17,000 psi (1,195 kilograms/centimeters² [117.2 MP_a]) with an extreme variation not to exceed 4,100 psi (288 kilograms/centimeters² [28.2 MP_a]).

c. Accuracy. The average extreme spread at 25 yards (22 meters) shall not exceed 2.0 inches (5.08 centimeters).

11-2.6 Cartridge, .22 Caliber Ball, Short Match, Pistol Match (A095).

11-2.6.1 Intended Use. This cartridge is procured for use in target practice, the Navy Competitive Match Programs, and 25-meter (27.3 yards) International Rapid Fire competitions.

11-2.6.2 Description. The cartridge is 0.695 inch (1.76 centimeters) long, loaded with smokeless powder, and weighs 36.6 grains (2.37 grams).

11-2.6.3 Cartridge Case. The brass cartridge case is the rimfire type, 0.420 inch (1.06 centimeters) long, and weighs 6.1 grains (.40 gram).

11-2.6.4 Bullet. The bullet is lead and weighs approximately 29 grains (1.88 grams). It is coated with a moisture proof material having lubrication properties in accordance with commercial practices.

11-2.6.5 Ballistic Data. The ballistic data for the .22 caliber ball, short match cartridge are as follows:

a. Velocity. The velocity shall vary to meet specification requirements.

b. Pressure. The chamber pressure shall be 17,000 psi (1,195 kilograms/cm² [117.2 MP_a]).

c. Accuracy. The average extreme spread of targets at 27.25 yards (25 meters) shall not exceed 0.600 inch (1.52 centimeters).

11-2.7 Cartridge, .22 Caliber Ball, Short, Match (A084).

11-2.7.1 Intended Use. This cartridge is procured for target practice and the Navy Competitive Match Program. Its primary use is for use in weapons chambered for .22 caliber, ball, short. Although weapons chambered for .22 caliber long rifle cartridges will accept this round, the practice is not recommended because of excessive lead buildup in the long rifle chamber.

11-2.7.2 Description. The cartridge is 0.69 inch (1.75 centimeters) long, loaded with 1.5 grains (.10 gram) of smokeless powder, and weighs 36.6 grains (2.37 grams).

11-2.7.3 Cartridge Case. Made of brass, copper, or copper alloy, the cartridge case is the rimfire type. It is 0.420 inch (1.06 centimeters) long and weighs 6.1 grains (.395 gram).

11-2.7.4 Bullet. The bullet is lead, 0.36 inch (.91 centimeters) long, and weighs 29.0 grains (1.88 grams).

11-2.7.5 Ballistic Data. The ballistic data for the .22 caliber ball, short cartridge are as follows:

a. Velocity. The basic velocity shall be between 1,020 fps (310 meters per second) and 1,050 fps (320 meters per second) at 15 feet (4.57 meters) from the muzzle of the weapon. The average velocity shall not vary from the basic velocity by more than 40 fps (12 meters per second).

b. Pressure. The average chamber pressure shall not exceed 17,000 psi (1,195 kilograms/cm² [117.2 MP_a]).

c. Accuracy. At the time of acceptance, the average of the extreme spread of all targets at 100 yards (91 meters) shall not be greater than 2.00 inches (5.08 centimeters).

11-2.8 Cartridge, Hornet .22 Caliber Ball Soft Point (A088).

11-2.8.1 Intended Use. This cartridge procured for use in the M4 and M6 survival weapons. It is a replacement cartridge for the Hornet .22 caliber ball, soft point M39 cartridge. However, the M39 may be issued and used until present stock is depleted.

11-2.8.2 Description. The cartridge is 1.723 inches (4.37 centimeters) long, weighs approximately 103 grains (6.674 grams), and is loaded with 12.6 grains (.816 gram) of smokeless powder. The charge weight may be varied to comply with ballistic requirements.

11-2.8.3 Cartridge Case. The brass cartridge case is 1.403 inches (3.56 centimeters) long and is the centerfire type. Assembled with a commercial primer, the joint between the walls of the primer and pocket have been waterproofed.

11-2.8.4 Bullet. The bullet has a copper-alloy jacket 12.5 grains (.81 gram) over a lead-antimony slug 22.5 grains (1.46 grams). It has a 6-caliber ogive, is 0.511 inch (1.29 centimeters) long, and weighs approximately 35 grains (2.27 grams). When assembled with the case, it has a waterproofing material applied around the neck.

11-2.8.5 Ballistic Data. The ballistic data for the Hornet .22 caliber, ball, soft point cartridge are as follows:

a. Velocity. The mean velocity at 15 feet (4.5 meters) from the weapon muzzle shall be 2,750 fps (838 meters per second).

b. Pressure. The chamber pressure shall be 43,000 psi (3,023 kilograms/cm² [296.5 MP_a]).

c. Accuracy. At the time of acceptance, the average of the extreme spread of all targets at 100 yards (91 meters) is not greater than 2.5 inches (6.3 centimeters).

11-2.9 Cartridge, 12 Gauge Shotgun, No. 8 Chilled Shot, Paper Case, Tracer Element (A016).

11-2.9.1 Intended Use. This cartridge with No. 8 chilled shot and tracer element is procured from commercial sources for special use.

11-2.9.2 Description. The cartridge has a waterproofed paper case and brass head. It is loaded with No. 8 chilled shot with a tracer element and has a propellant charge of smokeless powder.

11-2.10 Cartridge, 12 Gauge Shotgun, Flechette (A019).

11-2.10.1 Intended Use. This cartridge is procured for special combat purposes.

11-2.10.2 Description. The flechette cartridge has a plastic case and brass head. It has a special load of 20 flechettes (small dart-type projectiles) that weigh approximately 8 grains (.518 gram) each with approximately 26 grains (1.684 grams) of smokeless propellant. The cartridge is 2.41 inches (6.12 centimeters) long and weighs approximately 750 grains (48.6 grams).

11-2.11 Cartridge, .410 Bore Shotgun, M35/T135 Aluminum Case (A055).

11-2.11.1 Intended Use. This cartridge was procured from commercial sources for use in the Model 1100 Remington shotgun for training and in the Navy Competitive Match Programs.

11-2.11.2 Description. The .410 bore, M35/T135 cartridge is all aluminum, 2.68 inches (6.80 centimeters) long, and weighs approximately 430 grains (27.86 grams). It is loaded with approximately 170 No. 6 chilled shot and has a propellant charge of approximately 7 grains (.45 gram) of smokeless powder.

11-2.12 Cartridge, .38 Caliber, Special, Mid-Range, 148-Grain, Lead Wadcutter Bullet (A404).

11-2.12.1 Intended Use. This cartridge is procured from commercial sources for target practice and competitive shooting programs requiring a reduced propellant charge for mid-ranges.

11-2.12.2 Description. The cartridge is 1.19 inches (3.02 centimeters) long, weighs approximately 218 grains (14.12 grams). The load is a reduced propellant charge weighing 3.1 grains (.200 gram). The bullet is 0.60 inch (1.52 centimeters) long, weighs approximately 148 grains (9.59 grams), and is lead alloy. It is entirely enclosed in the cartridge case, has three cannelures, a deep cup formation in the base, and a flat front. The bullet end is blunt, has a sharp shoulder, and will cut a clean hole through target paper making a hit easier to spot and score. It is called a clean cutting bullet.

11-2.12.3 Ballistic Data. This cartridge has an average velocity of 800 fps (243 meters per second) at the muzzle and 750 fps (228 meters per second) at 25 feet (7.6 meters) from the muzzle. The average chamber pressure shall not exceed 16,000 psi (1,124 kilograms/cm²[110.3 MP_a]). The average extreme spread of 5-5 shot groups at 50 yards (45 meters) shall not exceed 2.5 inches (6.3 centimeters).

11-2.13 Cartridge, .38 Caliber, Special, Match, Mid-Range, Wadcutter Lead-Alloy Bullet (A407).

11-2.13.1 Intended Use. This cartridge is procured from commercial sources for use in the .38 caliber Smith and Wesson Model 52 automatic match pistol.

11-2.13.2 Description. The purpose of the cartridge is for target practice. It contains a reduced propellant charge for mid-ranges. The bullet is entirely enclosed in the cartridge case. It is inside lubricated, has three cannelures, a deep cup formation in the base, a flat blunt front, a sharp shoulder (or corner), and will cut a clean hole through target paper. It is sometimes called a clean cutting bullet.

11-2.13.3 Ballistic Data. This cartridge has an average muzzle velocity of 770 fps (234 meters per second), an average maximum chamber pressure of 14,000 psi (894 kilograms/cm² [96.5 MP_a]), and at acceptance an average extreme target spread of 1.8 inches (4.5 centimeters) at 50 yards (45 meters) range.

11-2.14 Cartridges, Signal, MK 130 (L334-Red), MK 138 (L335-Yellow), MK 139 (L336-Green)

11-2.14.1 Intended Use. These signal cartridges, Figure 11-1, fire from standard caliber .38 Special revolvers. They are for signaling purposes, particularly ground-to-air from jungle areas.

WARNING

THESE SIGNAL CARTRIDGES CONTAIN LEAD OXIDE. USE ADEQUATE VENTILATION AND AVOID BREATHING THE DUST

OR FUMES. AFTER HANDLING OR EXPOSURE BY CONTACT, THOROUGHLY WASH HANDS BEFORE EATING OR SMOKING. KEEP AWAY FROM FOOD OR FOOD PRODUCTS. SERIOUS ILLNESS OR DEATH COULD RESULT.

11-2.14.2 Description. These signal cartridges consist of a brass cartridge case that contains a propellant charge and a projectile case that contains an ignition charge and the star composition. Fitted into the base of the cartridge is a percussion-type primer (Primer 116M-282A).

11-2.14.2.1 A 3/16-inch (0.47 centimeter) color band (red, green, or yellow) around the circumference of the projectile case identifies the color display of the signal. The noses of the MK 130, 138, and 139 are either white or natural. The colored bands are to distinguish the signaling rounds from the ball rounds. The four cartridges are identical except for the chemical constituents of the pyrotechnic compositions, the display color, the identification color, and the MK number.

11-2.14.2.2 The signaling cartridge is 1.55 inches (3.93 centimeters) long and 0.379 inch (0.96 centimeter) in diameter. The propellant charge is capable of projecting the display to an average height of 1,700 feet (518.16 meters) when there is no obstruction. It penetrates all jungle canopy except tree limbs and obstructions of considerable size.

11-2.14.3 Operation. This signal cartridge loads into the revolver chamber and fires the same way as ball ammunition. Because of the relatively high muzzle velocity, aim it at an angle of 90° from the horizontal.

11-2.14.4 Ballistic Data. The ballistic characteristics of the signal cartridge make it suitable for use as a defensive weapon at ranges not exceeding 50 yards (45 meters). The displays of the MK 130, 138, and 139 appear as streaks that extend from the point of firing throughout the projectile trajectory. Each signal burns for 6 to 7.5 seconds.

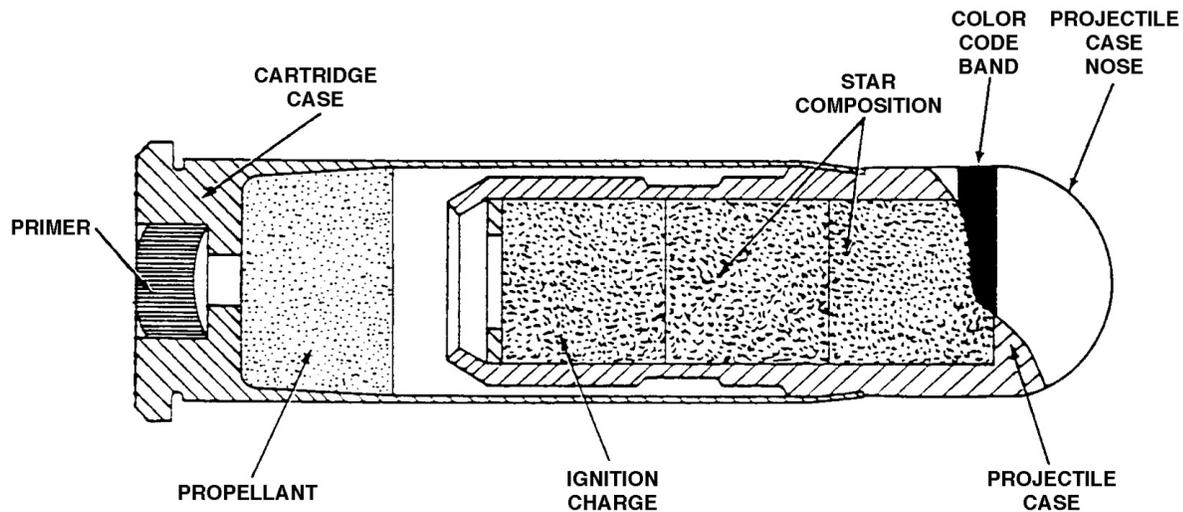


Figure 11-1 Signal Cartridge MK 130, MK 138 and MK 139

11-2.14.5 Safety Precautions. These signal cartridges have percussion-type primers and easily initiate if struck with a hard object. Take care not to drop the cartridges or strike the primers with a hard object.

a. Do not under any circumstances point a loaded sidearm toward friendly personnel. If a signal cartridge ignites and lodges in the barrel, do not throw the gun down. Keep the gun pointed upward and let the cartridge burn out. Pressure buildup in the barrel may dislodge the projectile. (Heat build-up will not be excessive.

b. When the cartridge has burned out, allow the barrel to cool and clean it with a suitable tool. In an emergency situation, use another signal cartridge as clearing round. Exercise caution and self-protection. Firing another cartridge may render the weapon unserviceable.

11-2.15 9 Millimeter Pistol Accessory Kit MK 26 MOD 0 (MW55).

11-2.15.1 Intended Use. The 9mm Pistol Accessory Kit MK 26 MOD 0, Figure 11-2, provides 24 cartridges (9mm, MK 144 MOD 0). Also included are: 1 suppressor insert, 1 O-ring (MS 29513-24); 1 back end cap plug; 6 muzzle plugs; 4 chamber plugs; and 1 barrel cap.

NOTE

The intended use of the ammunition provided in the MK 26 accessory kit is for use in MK 22 (except for suppressed P95 pistols). Do not deplete the supplies in the kit by using the ammunition in other 9mm weapons except for P95 pistols. There are no plans to procure additional MK 26 or MK 144-0 cartridges at the depletion of current inventories. The MK 144 MOD 0 cartridge is available in bulk quantities. See Table 4-10.

a. The 9mm Noise Suppressor MK 3 MOD 0 becomes less effective after firing 24 rounds. The suppressor insert refurbishes the suppressor.

b. An expendable muzzle plug, a back end cap plug, a barrel cap, and a chamber plug seal the noise suppressor and the 9mm MK 22 pistol barrel. Their intended use is for when transporting the pistol and suppressor separately underwater.

c. 9 Millimeter Noise Suppressor MK 3. By attaching this noise suppressor to the 9mm MK 22 Pistol, the expendable muzzle plug seals the noise suppressor muzzle and the chamber plug provides a seal at the chamber end of the barrel. This provides a watertight capability to the noise suppressor and the weapon barrel bore to a water depth of 200 feet (60 meters) underwater.

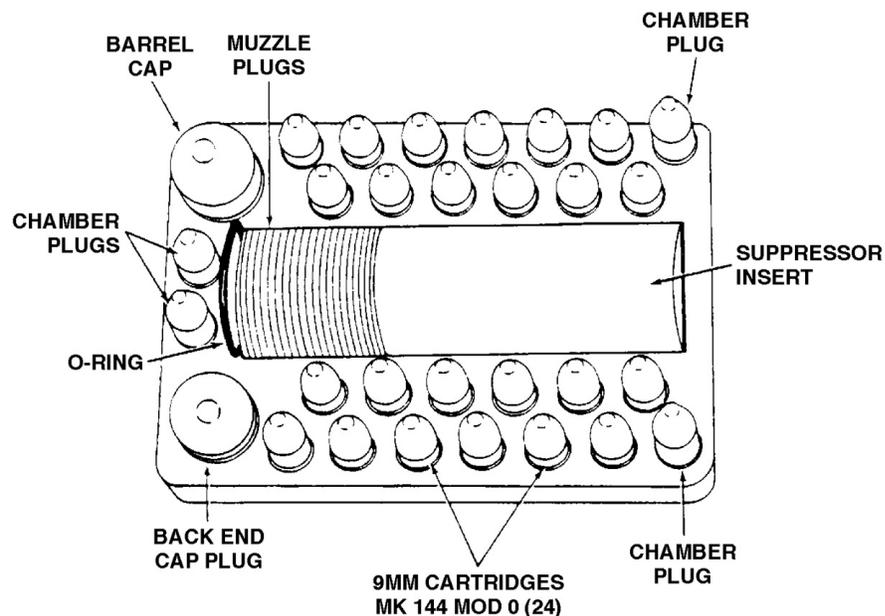


Figure 11-2 9mm Pistol Accessory Kit MK 26 MOD 0

d. The noise suppressor cartridge is a sealed aluminum cylinder containing four soft plastic discs 1/4 inch (0.63 centimeter) thick to attenuate muzzle blast and eliminate muzzle flash. To chamber a live round and fire after surfacing, pull the pistol slide to extract the cartridge-shaped chamber plug and feed a round from the pistol magazine. The expendable muzzle plug may be left in place when the pistol is fired. When the noise suppressor is not attached to the weapon, it is safe to shoot through the barrel cap, but the muzzle blast and flash will not be eliminated.

11-2.16 Cartridge, 7.62 Millimeter, Match, Short Range Load (A169).

11-2.16.1 Intended Use. This cartridge that was procured from commercial sources for use in the 300 Meter International Match Rifle or MK 2 MOD 1 Match Condition Rifle.

11-2.16.2 Description. The cartridge is 2.90 inches (7.366 centimeters) long and produces 2,560 to 2,700 fps (780 to 822 meters per second). It has a ballistic coefficient of 0.470 to 0.560, and has a 168 to 185 grain (10.88 to 11.98 grams) hollow point boat-tailed bullet. It has an accuracy of 1.8 inches (4.572 centimeters) extreme spread at

300 meters (984 feet) range. There are no plans to purchase additional quantities once current inventories become depleted.

11-2.17 Cartridge, .30/.338 Caliber Match, For Long Range (A190).

11-2.17.1 Intended Use. This cartridge is hand-loaded and serialized to each rifle. Its use is for long range match firing. There are no plans to purchase additional quantities once current inventories become depleted.

11-2.17.2 Description. The cartridge produces a maximum chamber pressure of 54,000 psi (3,796 kilograms/cm² [372.4 MP_a]), an approximate velocity of 2,950 to 3,050 fps (899 to 929 meters per second), and a ballistic coefficient of 0.560 to 0.590. The bullet is a hollow point 180- to 200-grain (11.66- to 12.96-grams) boat-tail. It is accurate to within 1 minute of angle at 1,000 yards (914 meters).

11-2.18 Cartridge, .45 Caliber, ACP, Match, Wadcutter (A470).

11-2.18.1 Intended Use. This cartridge is designed and procured for use in the Pistol, .45 Caliber ACP Match Grade C and must function on

the ACP Match Pistol with heavy slide accessories. There are no plans to purchase additional quantities once current inventories become depleted.

11-2.18.2 Description. The cartridge is 1.255 inches (3.18 centimeters) long. The brass cartridge case is 0.898 inch (2.28 centimeters) long and contains a 185-grain (11.99-grams), metal-jacketed, lead slug bullet and a head stamp in accordance with commercial practices. It has an accuracy of 1.9 inches (4.83 centimeters) extreme spread at 50 yards (45 meters) range.

11-2.19 Cartridge, .45 Caliber, ACP, 230-Grain, Match Ball (A471).

11-2.19.1 Intended Use. A cartridge designed and procured for use in the Pistol, .45 Caliber ACP Match Grade A and B. There are no plans to purchase additional quantities once current inventories become depleted.

11-2.19.2 Description. The cartridge is 1.275 inches (3.23 centimeters) long, weighs approximately 319 grains (20.67 grams), and has a brass case. The bullet has either a gilding metal or gilding metal-clad steel jacket, a lead-antimony slug, and weighs approximately 230 grains (14.90 grams). The cartridge has an accuracy of 2.5 inches (6.35 centimeters) extreme spread at 50 yards (45 meters) range.

11-2.20 Cartridge, .50 Caliber, Armor Piercing Incendiary, T49 (A535).

11-2.20.1 Intended Use. A cartridge procured for use in all .50 caliber machine guns against armored targets. Upon impact with the target, the incendiary mixture bursts into flame and ignites the flammable material. There are no plans to purchase additional quantities once current inventories become depleted.

11-2.20.2 Description. The cartridge is 5.45 inches (13.84 centimeters) long, weighs approximately 1,597 grains (103.48 grams), contains a 19.0-grain (1.231 grams) brass primer and approximately 252 grains (16.329 grams) of smokeless propellant.

11-2.20.3 Cartridge Case. The brass cartridge case is 3.910 inches (9.93 centimeters) long and weighs approximately 850 grains (55.08 grams).

11-2.20.4 Bullet. The gilding metal-jacketed bullet has a hardened core of manganese-molybdenum steel weighing approximately 283 grains (18.34 grams). It has a point filler of incendiary mixture, is 1.935 inches (4.91 centimeters) long, weighs approximately 501 grains (32.46 grams), and the tip is blue for identification.

11-2.21 Cartridge, .50 Caliber, Incendiary, M23 (A562).

11-2.21.1 Intended Use. This cartridge was procured for use only in .50 caliber machine guns. The incendiary M23 cartridge has a higher velocity than the incendiary M1 cartridge and is more effective as an incendiary against aviation fuel.

11-2.21.2 Description. The cartridge is 5.45 inches (13.84 centimeters) long, weighs approximately 1,581 grains (102.448 grams), contains a 19.0-grain (1.231 grams) primer and approximately 237 grains (15.357 grams) of smokeless propellant.

11-2.21.3 Cartridge Case. The brass cartridge case is 3.91 inches (9.93 centimeters) and weighs approximately 850 grains (55.08 grams).

11-2.21.4 Bullet. The copper alloy-jacketed bullet has a copper alloy-clad steel container, a lead-antimony base slug and a point fiber weighing 90 grains (5.83 grams). The bullet is 2.29 inches (5.81 centimeters) long, weighs approximately 512 grains (33.177 grams) and the tip is medium blue with a light blue annulus stripe for identification.

11-2.21.5 Accuracy. The cartridge produces an average of the mean radii of all targets at acceptance not greater than 12 inches (30.48 centimeters) at 600 yards (548 meters) range.

11-2.21.6 Velocity. The cartridge produces an average velocity of 3,400 fps (1,036 meters per second) at 78 feet (23 meters) from the muzzle.

CAUTION

WHEN FIRING THE TRACER M1 CARTRIDGE, CARE MUST BE EXERCISED TO PREVENT IGNITING DRY VEGETATION ON THE RANGE.

11-3 40 MILLIMETER CARTRIDGES

See Table 11-2 for packaging and identification data.

11-3.1 Cartridges, 40 Millimeter, Smoke, Canopy, (B475-M676), (B476-M679), (B477-M680), and (B479-M682).

11-3.1.1 Intended Use. Cartridges, Figure 11-3, designed and intended for accurately marking and signaling. They indicate to aerial observers the position of personnel or a unit located beneath moderately thick foliage. They have the advantage of less weight, less bulk, and greater accuracy than other comparable signals. They are low-velocity rounds designed for firing from M79 and M203 (attached to the M16/M16A1/M1A2 rifles, Colt 727, M4 Carbines) launchers.

Table 11-2 Obsolete 40mm Grenade Cartridges

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridges, 40 Millimeter, Smoke, Canopy, (Yellow)	B475-M676	11-3.1	1310-00-133-9413	9229370	1 per fiber tube, 22 per metal box M2A1, 2 boxes (44 cartridges) per wirebound box
Cartridges, 40 Millimeter, Smoke, Canopy, (Green)	B476-M679	11-3.1	1310-00-146-1159	9235364	1 per fiber tube, 22 per metal box M2A1, 2 boxes (44 cartridges) per wirebound box
Cartridges, 40 Millimeter, Smoke, Canopy, (White)	B477-M680	11-3.1	1310-00-179-1163	9235365	1 per fiber tube, 22 per metal box M2A1, 2 boxes (44 cartridges) per wirebound box
Cartridges, 40 Millimeter, Smoke, Canopy, (Red)	B479-M682	11-3.1	1310-00-179-1170	9235963	1 per fiber tube, 22 per metal box M2A1, 2 boxes (44 cartridges) per wirebound box

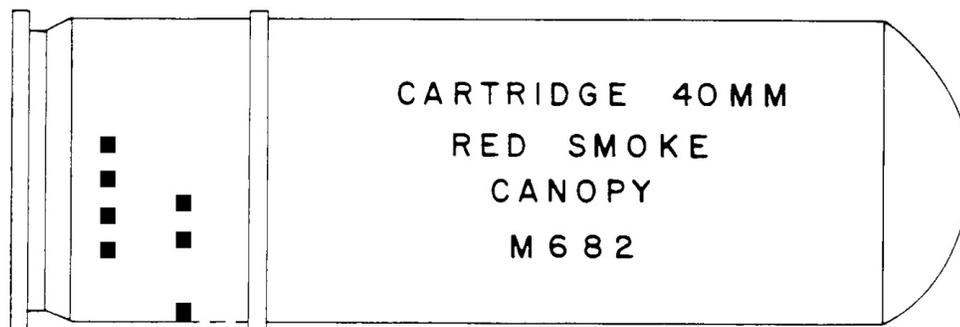


Figure 11-3 40mm Smoke Canopy Cartridges, M676, M679, M680, and M682

WARNING

FIRE CANOPY SMOKE CARTRIDGES SO A FALLING, IGNITED PROJECTILE WILL NOT DESCEND UPON FRIENDLY TROOPS OR EQUIPMENT. DAMAGE TO EQUIPMENT, SERIOUS INJURY, OR DEATH COULD RESULT.

11-3.1.2 Description. The cartridges are fixed rounds consisting of a projectile assembly and a cartridge case assembly. They are 5.232 inches (13.28 centimeters) long, weigh approximately 7.27 ounces (206 grams), contain a M423 percussion primer, a 320mg M9 propellant charge, and the applicable (smoke color) pyrotechnic candles in one-piece, aluminum body projectiles. The pyrotechnic candles are either yellow (M676), green (M679), white (M680), or red (M682) smoke pressed into an aluminum canister with an attached rotating X-type parachute. A 2-second ignition delay element is within a metal delay carrier threaded into the projectile base. Snapped into an O-ring in the front opening of the projectile cavity

is a plastic ogive (nose). The color of the ogive denotes the smoke color. The projectile is pale green with the markings stenciled in black. The cartridge case is chemically finished to an olive drab color.

11-3.1.3 Function. The weapon firing pin strikes the primer igniting the propelling charge, propelling the projectile forward, and igniting a 2-second delay in the base plug. A black powder ejection charge ignites the candle and ejects it through the carrier nose. The special X-type parachute deploys upon ejection, descends with the smoke canister, and becomes entangled in the foliage.

11-3.1.4 Ballistic Data. The ballistic data for the cartridge are as follows:

- a. **Velocity.** The average muzzle velocity is 250 fps (76 meters per second).
- b. **Burst Height.** A burst height of approximately 350 feet (106 meters) is achieved at a quadrant elevation of 85°.
- c. **Smoke Time.** The candle burns for approximately 90 seconds.

11-4 57 MILLIMETER CARTRIDGES

11-4.1 General

See Table 11-3 for packaging and identification data.

11-4.1.1 Intended Use. The 57mm cartridges are complete rounds of ammunition with all the components required to fire a weapon once. Markings on the container, the cartridge, and/or the individual components identify these rounds. These cartridges are for firing from M18 series recoilless rifles. The M18 series recoilless rifle is a lightweight, air-cooled, single-loaded portable weapon. It uses fixed ammunition and is for direct fire from a tripod or the shoulder. It has a manually operated breech mechanism and a percussion firing mechanism. There are no plans for purchasing additional quantities once current inventories become depleted.

11-4.1.2 Description. A perforated steel case, a support shoulder near the cartridge case mouth, and a pre-cut rotating band on the projectile are their distinguishing features.

11-4.1.3 Type. The projection type classifies this ammunition. The classes are High Explosive (HE), High Explosive Anti-tank (HEAT), White Phosphorus (WP) smoke, and Target Practice (TP).

11-4.1.4 Cartridge Case. This ammunition uses perforated steel cartridge cases M30, M30A1, M30A1B1, and M30A1B2. All four cases are similar, except the support shoulder is a gilding metal ring on case M30; a raised, integral circumferential surface on case M30A1, and a series of three or more integral projections on cases M30A1B1 and M30A1B2. Cartridge case M30 employs a brown paper liner lacquered to the interior wall, and cases M30A1, M30A1B1, and M30A1B2 are fitted with a flexible, heat-sealed, plastic liner.

11-4.1.5 Propellant. The propelling charge used in all 57mm rifle ammunition is approximately 6,989.79 grains (453 grams) of type M10 single-perforated granular propellant.

WARNING

INSPECT GUN BORES FOR FRAGMENTS AFTER EACH FIRING BECAUSE THE M60 PRIMERS RUPTURE OCCASIONALLY WHEN FIRED.

11-4.1.6 Primer. The M60A1 percussion primer loaded with approximately 285 grains (18.47 grams) of black powder is currently used in the 57mm cartridge. Cartridges of older manufacture have used primer M60 loaded with approximately 285 grains (18.47 grams) of black powder or primer M46 loaded with 200 grains (12.96 grams) of black powder.

11-4.1.7 Fuze. The fuze designed for the 57mm cartridges, Table 11-4, is either the M89 or M503 series PD or the M90 P.I. The PD fuze is a single-action, super-quick type that functions upon impact or graze. There is a recess at the nose to hold the firing pin head, support caps, and firing pin. Setback from weapon firing and centrifugal force from projectile rotation facilitate fuze arming. Impact on the fuze nose initiates the explosive train. The P.I. fuze is a single-action, super-quick, point-initiating type for use with the HEAT projectile. The die-cast aluminum body has a neck extending forward to house an M56 primer. The fuze base is internally threaded to fit over the projectile nose, and the entire forward end is covered with a thin steel ogive. The setback force from firing and centrifugal force from projectile rotation facilitate fuze arming. Upon impact, crushing the ogive fires the primer and initiates the explosive train.

11-4.1.8 Function. All 57mm cartridges function the same up to the point of impact. Firing the weapon causes the firing pin to strike the percussion primer which ignites the booster. The resulting flash ignites the propellant through holes in the primer tube. The gas buildup resulting from the burning propellant expels the projectile. The pre-cut projectile rotating band engages the rifling in the bore and imparts a stabilizing spin to the projectile as it is propelled toward the target.

11-4.2 Cartridge, 57 Millimeter, HE, M306A1 (B586).

11-4.2.1 Intended Use. This cartridge, Figure 11-4, is designed and procured for blast, fragmentation and mining purposes. It is used with M18 and M18A1 rifles.

11-4.2.2 Description. The cartridge consists of an M30A1 or M30A1B1 perforated case containing a plastic liner and a percussion primer. The propelling charge is loosely loaded into the liner. The projectile is an HE, thin-walled steel body (with a square base) and is crimped to the case. It has a short, internally-threaded ogive, and an integral pre-cut rotating band. The projectile contains a 3,502.61-grain (227-gram) charge of Comp B explosive or Trinitrotoluene (TNT). It has a PD, M503 series fuze that functions on direct contact or a graze. The cartridge weighs approximately 5.46 pounds, (2.47 kilograms) is 17.54 inches (44.55 centimeters) long, and is olive drab with yellow markings.

11-4.2.3 Function. When fired, the burning propellant generates gases to expel the projectile through the barrel. The projectile rotating band engages the barrel rifling and the projectile is spin stabilized in flight. The perforated case design allows controlled escape of some gas pressure through apertures in the breechblock. This eliminates weapon recoil. Upon impact or graze, the fuze functions and initiates the explosive train in the projectile. The subsequent detonation and explosion produces blast and fragmentation.

11-4.2.4 Ballistic Data. The ballistic data for the cartridge are as follows:

- a. Velocity. The average muzzle velocity is 1,200 fps (365 meters per second).
- b. Range. The maximum range is 4,930 yards (4,507 meters).

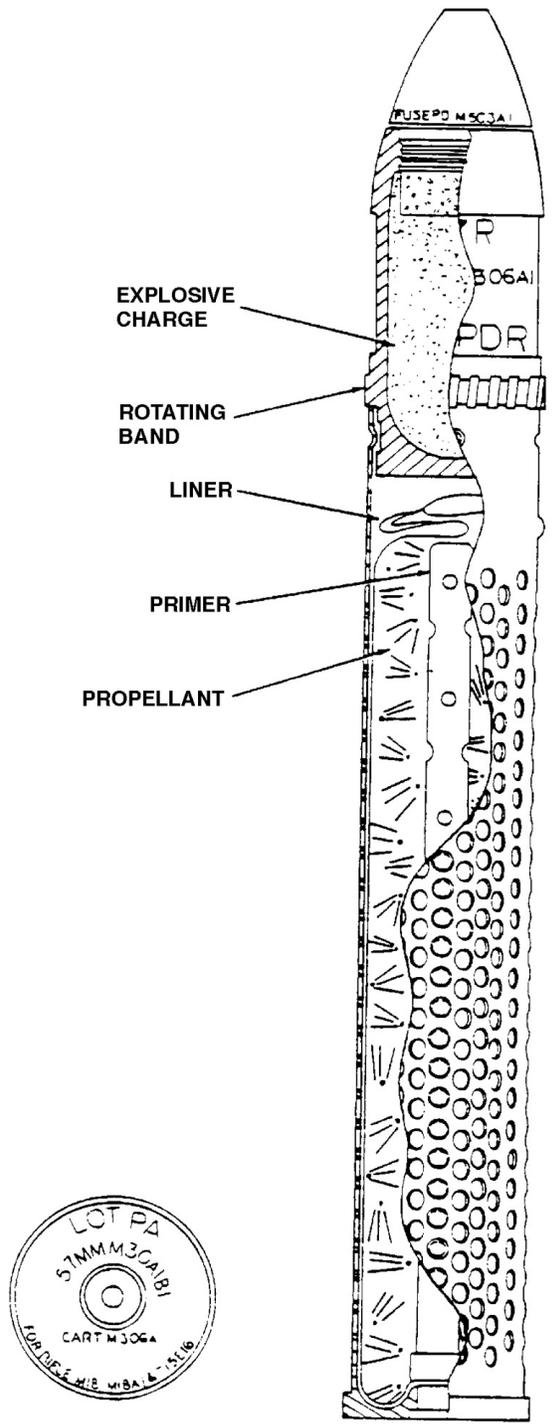


Figure 11-4 HE 57mm Cartridge, M306A1

Table 11-3 Obsolete 57mm Recoilless Cartridges

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 57 Millimeter, HE, M306A1	B586	11-4.2	1310-00-028-4585	9215030	1 per fiberboard container M167A1, 4 containers per wooden box
Cartridge, 57 Millimeter, HEAT, M307A1	B587	11-4.3	1310-00-028-4588	75-1-215-2	1 per fiberboard container M166A1, 4 containers per wooden box
Cartridge, 57 Millimeter, Smoke, WP, M308A1	B590	11-4.4	1310-00-028-4582	9215427	1 per fiberboard container M167A1, 4 containers per wooden box
Cartridge, 57 Millimeter, TP, M306A1	B588	11-4.5	1310-00-029-4589	75-1-252-2	1 per fiberboard container, M167A2, 4 containers per wooden box

Table 11-4 Obsolete 57mm Cartridges, Fuze Combination

Cartridge	FUZE		
	PD		PI
	M89	M503 Series	M90 Series
HE, M306	X		
HE, M306A1		X	
HEAT, M307 Series			X
Smoke, WP, M308	X		
Smoke, WP, M308A1		X	
TP, M306A1		X	

11-4.3 Cartridge, 57 Millimeter, HEAT, M307A1 (B587).

11-4.3.1 Intended Use. This cartridge, Figure 11-5, is designed and procured to be used against armored targets. It is for firing in M18 and M18A1 57mm rifles.

11-4.3.2 Description. The cartridge includes a perforated metal case containing a plastic liner, and a percussion primer crimped to the projectile. The crimp is just behind the pre-engraved rotating band, and consists of four equally-spaced ball-point crimps. The projectile forward end is internally threaded to receive a P.I. fuze. A hemispherical copper liner crimped to the interior forms a shaped charge (6.4 ounces (181 grams) of Comp B or 50-50 pentolite) to the rear, and the space forward provides the standoff necessary for penetration. A steel sleeve provides a passage from the fuze to a tetryl booster pellet in the projectile base explosive charge. The cartridge is 18.78 inches (47.70 centimeters) long, weighs 5.43 pounds (2.46 kilograms), and is olive drab with yellow markings.

11-4.3.3 Function. On impact with the target, the fuze functions and fires through the steel sleeve to the tetryl booster pellet and detonates the explosive charge. The copper liner collapses, creating a high-velocity shock wave and a hot gas and metal particle jet that penetrates the interior of the target.

11-4.3.4 Ballistic Data. The ballistic data for the cartridge are as follows:

- a. Velocity. The average muzzle velocity is 1,200 fps (365 meters per second).
- b. Range. The maximum range is 4,860 yards (4,443 meters).

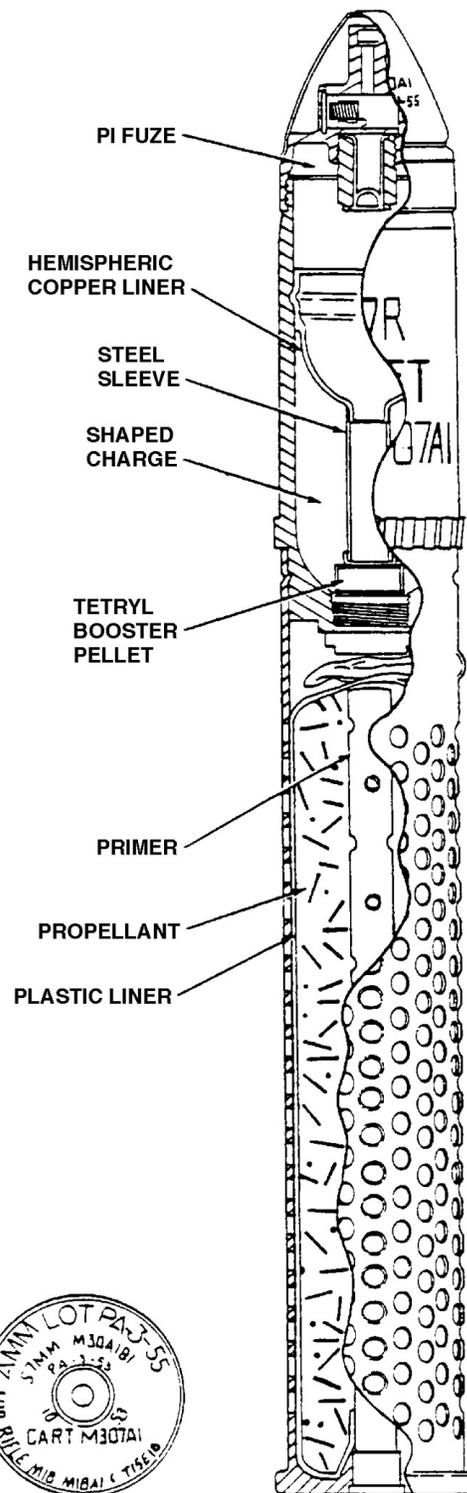


Figure 11-5 HEAT 57mm Cartridge, M307A1

11-4.4 Cartridge, 57 Millimeter, Smoke, WP, M308A1 (B590).

11-4.4.1 Intended Use. This cartridge, Figure 11-6, is designed and procured primarily for screening and spotting. It is fired in M18 and M181A 57mm rifles.

11-4.4.2 Description. The cartridge is similar to the 57mm, M306A1, HE cartridge with a perforated case, a plastic liner loosely fitted with a M10 propelling composition, and a M60A21 percussion primer. It differs from the M306A1 HE because the projectile filler is 0.37 pound (.168 kilogram) of WP; has a steel adapter at the projectile nose to accommodate the M503 PD fuze, and a M21 burster assembly that is used exclusively with a smoke round. The burster assembly is fabricated from aluminum and steel, contains 0.19 ounce (5.38 grams) of tetryl, and is press fitted into the adapter. The fuze is threaded into the adapter. The cartridge is 17.54 inches (44.55 centimeters) long, weighs 5.43 pounds (2.46 kilograms), and is light green with black markings. (The old M308 uses a paper liner, a M46 primer, and is gray with a yellow band and markings.

CAUTION

TRANSPORT AND STORE WP ROUNDS AT TEMPERATURES BELOW 111.4°F (44.1°C), THE MELTING POINT OF WP. WHEN PRACTICAL, STORE ROUNDS ON THEIR BASES SO IF THE WP MELTS, IT WILL RESOLIDIFY WITH THE NORMAL VOID SPACE LEFT IN THE PROJECTILE NOSE. IF VOIDS (BUBBLES) EXIST IN THE WP FILLER, ERRATIC PERFORMANCE MAY OCCUR WHEN FIRED.

11-4.4.3 Function. Upon impact, the fuze functions to detonate the burster tube. The burster ruptures the projectile body and disperses the WP that ignites spontaneously on contact with air, creating a dense white smoke.

11-4.4.4 Ballistic Data. The ballistic data for the cartridge are as follows:

a. Velocity. The average muzzle velocity is 1,200 fps (365 meters per second).

b. Range. The maximum range is 4,530 yards (4,142 meters).

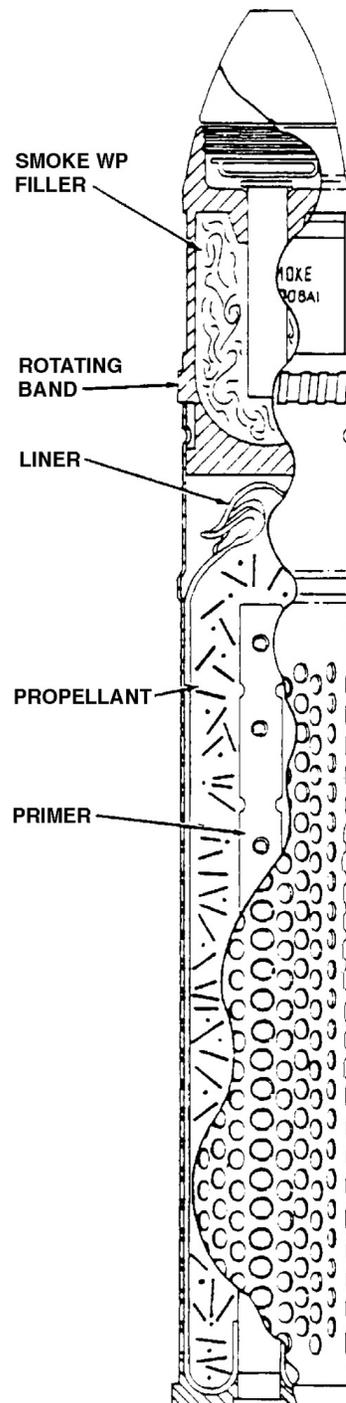


Figure 11-6 Smoke, WP 57mm Cartridge M308A1

11-4.5 Cartridge, 57 Millimeter, TP, M306A1 (B588).

11-4.5.1 Intended Use. This cartridge, Figure 11-7, is designed and procured for training and practice. It is fired in the M18 and M18A1 57mm rifles.

11-4.5.2 Description. The cartridge consists of a perforated metal case, a plastic liner loosely filled with M10 propellant, and M60A1 percussion primer. The primer ignition tube extends through the length of the propelling charge. The projectile resembles the M306A1 HE round except the filler is 7.2 ounces (204 grams) of inert material, a 0.44 ounce (12 grams) black powder pellet serves as a spotting charge, and it has a M503 or M503A1 PD fuze. The cartridge is blue or black with white markings.

11-4.5.3 Function. Upon impact, the fuze detonation ignites the black powder charge to produce flash and smoke to mark the point of impact.

11-4.5.4 Ballistic Data. The ballistic data for the cartridge are as follows:

a. Velocity

. The average muzzle velocity is 1,200 fps (365 meters per second).

b. Range. The maximum range is 4,930

yards (4,508 meters).

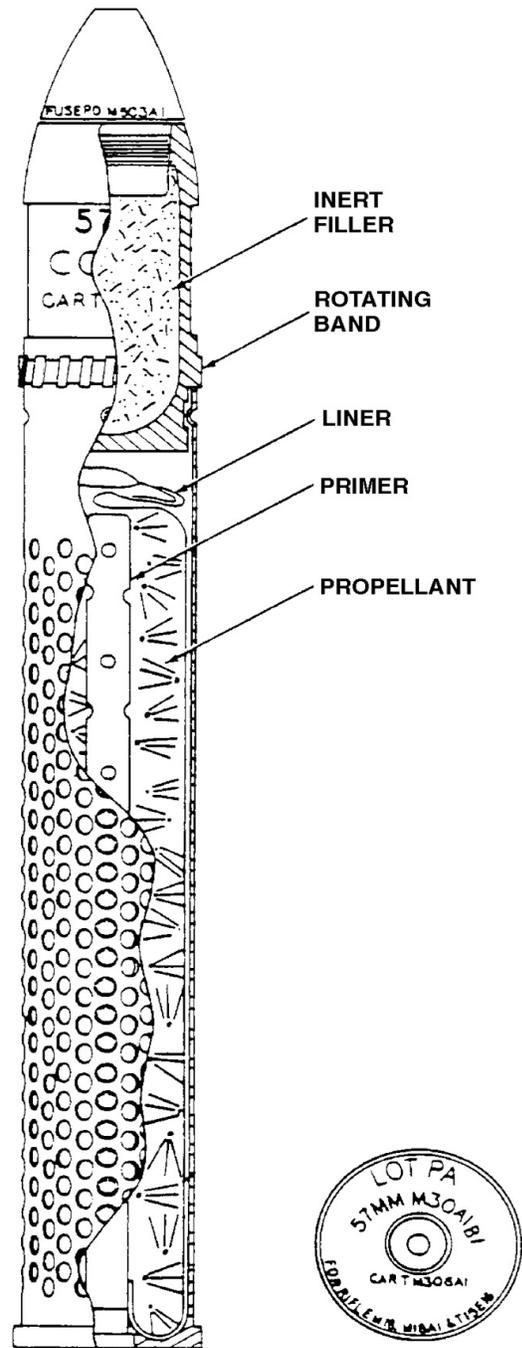


Figure 11-7 TP 57mm Cartridge, M306A1

11-5 ANTIPERSONNEL MINES

See Table 11-5 for packaging and identification data.

11-5.1 Mine, Antipersonnel, M2A1 and M2A4 with Fuze, Mine, Combination M6A1 (K090).

11-5.1.1 Intended Use. This series bounding-type APERS mine, Figure 11-8, is for use against enemy foot troops. Because the main charge projects several feet into the air before it explodes, this mine has an effective fragmentation pattern.

11-5.1.2 Description. This APERS mine consists of a propelling charge and projectile contained in a steel case. The mine has a M6A1 combination fuze. The fuze screws into the tube attached to the base of the mine case. The base also contains approximately 40 grains (2.59 grams) of black powder propelling charge. The projectile is a modified 60mm mortar shell and contains a relay, detonator, booster charge, and an explosive charge of 0.34 pound (0.15 kilogram) of TNT. The mine is 3.75 inches (9.5 centimeters) in diameter and weighs approximately 5 pounds (2.2 kilograms) when loaded and fuzed. The body of the mine is olive drab and the base is yellow. The M2A1 and M2A4 are identical except for minor design improvements in the M2A4.

11-5.1.3 Function. A pressure of 8 to 20 pounds (3.62 to 9.08 kilograms) acting on one or more of the three prongs triggers the fuze. A pull of 3 to 10 pounds (1.36 to 4.54 kilograms) on the trip wire releases the firing pin. The firing pin strikes the

primer and projects a flame to the igniter charge. The igniter transmits flame to the propelling charge, which then transmits flame to the delay charge and propels the projectile from the mine. The delay charge then transmits flame to the igniter charge that causes the detonator, booster, and bursting charge to function, bursting the projectile at a height of approximately 2 to 3 meters (6.5 to 9.8 feet). The mine has a casualty radius of approximately 10 meters (32 feet) and a danger radius of approximately 150 meters (492 feet).

WARNING

DO NOT DISTURB THE TRIP WIRES. ENSURE THERE IS NO TENSION ON THE TRIP WIRES.

11-5.1.4 Installation and Arming. The following lists the installation and arming procedures.

- a. Dig a hole in the ground with a firm foundation at the bottom deep enough, with the mine emplaced, that the fuze prongs extend approximately 1/4 inch to 3/4 inch (0.63 to 1.9 centimeters) above ground level.
- b. After unpacking a mine and a firing mechanism, test the locking safety pin and the positive safety pin for freedom from binding. If either pin binds when twisted in their holes, turn in the mine to the appropriate technical personnel for inspection.

Table 11-5 Obsolete Antipersonnel Mines

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Mine, Antipersonnel, M2A1 and M2A4 with Fuze, Mine, Combination M6A1	K090	11-5.1	1345-00-028-5097	82-0-99-54	1 mine with 1 pool of four (M2A4) 26-foot lengths of steel wire per carton, 6 cartons per wooden box
Mine, Antipersonnel, M18, with Carrying Kit M68	K141	11-5.2	1345-00-575-0851	P86328	1 mine per M68 kit, 6 kits per waterproof container, 1 container (6 mines) per wooden box

c. Unscrew the hexagonal shipping cap from the coupling base in the mine, inspect the fuze well for foreign matter, and screw the firing mechanism to the coupling base hand tight.

d. Place the mine upright in the hole so the prong tips on the fuze protrude 1 inch above ground level. Pack dirt tightly around and over the mine to just below the release pin level. After emplacement, check mine for stability by attempting to move the mine laterally. If the mine moves, pack the dirt more solidly around the mine.

e. Install one or more trip wires by attaching them first to firmly driven stakes and then to the release pin ring. Leave enough slack to allow the top of the fuze to rotate. Rigged as such it will

allow the release pin to receive a direct pull from any one of the trip wires. This is necessary for proper functioning of the fuze.

f. Remove the locking safety pin by pulling on the cord to which it is attached.

g. Finish filling the hole with dirt up to the tips of the prongs. Ensure the dirt around the trip wire(s) and the cord attached to the positive safety pin is loose enough to permit free movement.

h. To increase the effective pressure area, install a board fixed at one end. Install it in such a position that pressure on the board would bring pressure on the fuze prongs. Do not allow the weight of the board to exert any pressure on the fuze.

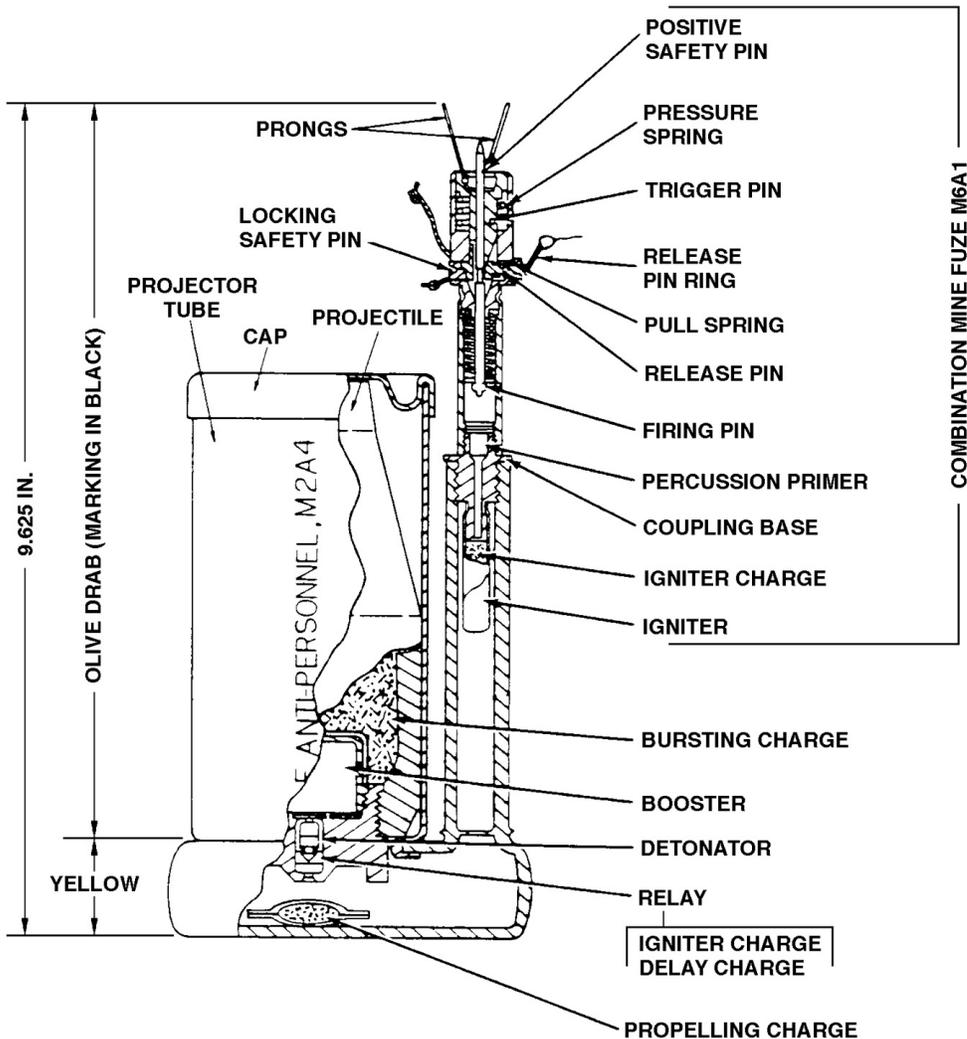


Figure 11-8 Antipersonnel Mine M2A4 with Combination Mine Fuze M6A1

- i. Camouflage the whole installation.
- j. To arm the fuze, remove the positive safety pin by pulling on the end of the cord attached to it.
- k. Save the hexagonal shipping cap and both safety pins for use in disarming the fuze.

WARNING

DO NOT ATTEMPT TO DISARM OR REMOVE ANY MINE FROZEN IN OR TO THE GROUND.

NOTE

In the field, remove the hexagonal shipping and storage cap from the base coupling and replace it with the firing mechanism.

11-5.1.5 Disarming and Removal. The following are the disarming and removal (neutralizing) procedures.

- a. Carefully inspect the installation for booby traps and booby trapping devices before performing steps b through g.
- b. If used, carefully remove the camouflage material and pressure board.
- c. Carefully remove the dirt from around the top of the mine to expose both the positive safety pin hole and the locking safety pin.
- d. Insert the positive safety pin first, and then the locking safety pin.
- e. Disconnect the trip wires.
- f. Remove the remaining dirt from the hole and remove mine.
- g. Unscrew the firing mechanism from the fuze, taking care not to remove the coupling base containing the primer from the mine.
- h. Replace the hexagonal shipping cap and return the mine and firing mechanism to their original condition and packing.
- i. Special Precautions. Observe the following special precautions:

(1) When removing a mine from the emplaced position, make no attempt to disassemble the mine beyond unscrewing the firing mechanism from the base coupling.

(2) Do not use mines with loose projector caps or with a loose primer in the base coupling until inspection by ordnance personnel. This inspection must show that the igniter charge and propelling charge have not been damaged by moisture. It is also necessary that the projector cap and the primer base coupling with igniter charge (primer and igniter assembly) be resealed.

(3) Do not expect the mine to function after prolonged submergence in water in spite of its water resistance.

(4) It is permissible to lay and removed any number of times if it is not damaged or deteriorated. When doing so, follow all of the above instructions. Do not use mines if either the mine projector cap or the coupling base containing the primer are loose, except as provided in (2) above.

11-5.2 Mine, Antipersonnel, M18, with Carrying Kit M68 (K141).

11-5.2.1 Intended Use. This mine, Figure 11-9, is an earlier model of the M18A1 APERS mine. The use and function of this mine are similar to the M18A1 described in Paragraphs 8-2.7 through 8-2.7.1

11-5.2.2 Description. This APERS mine comes in two versions, one with peepsight and one without peepsight. The mine consists of a curved rectangular plastic case containing high explosive and steel fragments. The forward face contains the steel fragments and is designed to produce a fan-shaped spray that can be aimed at a prescribed target area. The arrow on the top of each mine indicates the direction of aiming. The mine has three folding-type legs and cloth tabs on each side. The legs are for above ground emplacement and the cloth tabs are for tying or nailing the mine to trees or posts. Covering the mine is green and brown fleck in a camouflage pattern to reduce detection. The mine has the capacity to cause a severe or fatal wound within 35 meters (114.82 feet) and casualties up to 50 meters (164.04 feet). The mine weighs 2.50 pounds (1.13 kilograms), is 9.25 inches (23.4 centimeters) long, and 3.25

inches (8.25 centimeters) wide. The mine comes with the M68 Carrying Kit. This kit is a bandoleer-type canvas carrier and contains the M18 mine, a battery holder with protective wood block, blasting cap with lead wire in a cardboard tube, and an instruction sheet.

11-5.2.3 Installation and Arming. The installation and arming procedures are as follows:

a. Using the point of a .30 caliber cartridge or a similar shaped object, puncture the tape at either end of the mine and form a hole in the explosive for insertion of the blasting cap.

b. Carefully remove the special electric blasting cap (type II, J2, PETN) from the cardboard tube and insert into the hole provided. Make sure to achieve a firm or positive contact between the explosive charge and the blasting cap.

WARNING

TO PROVIDE MAXIMUM STABILITY WHEN EMLACING IN THE GROUND, PLACE THE CENTER LEG OF THE MINE FORWARD OF THE MINE.

c. For emplacement above ground, carefully unfold the mine legs and press them firmly into the ground.

d. For installation on a tree or post, leave the legs folded and the mine secured by tying or nailing through the holes provided in the cloth tabs. For either method of installation, point the arrow on the top of the mine at the center of the fragmentation pattern. The pattern is 0.83 meters (2.72 feet) high at a distance of 35 meters (114.82 feet).

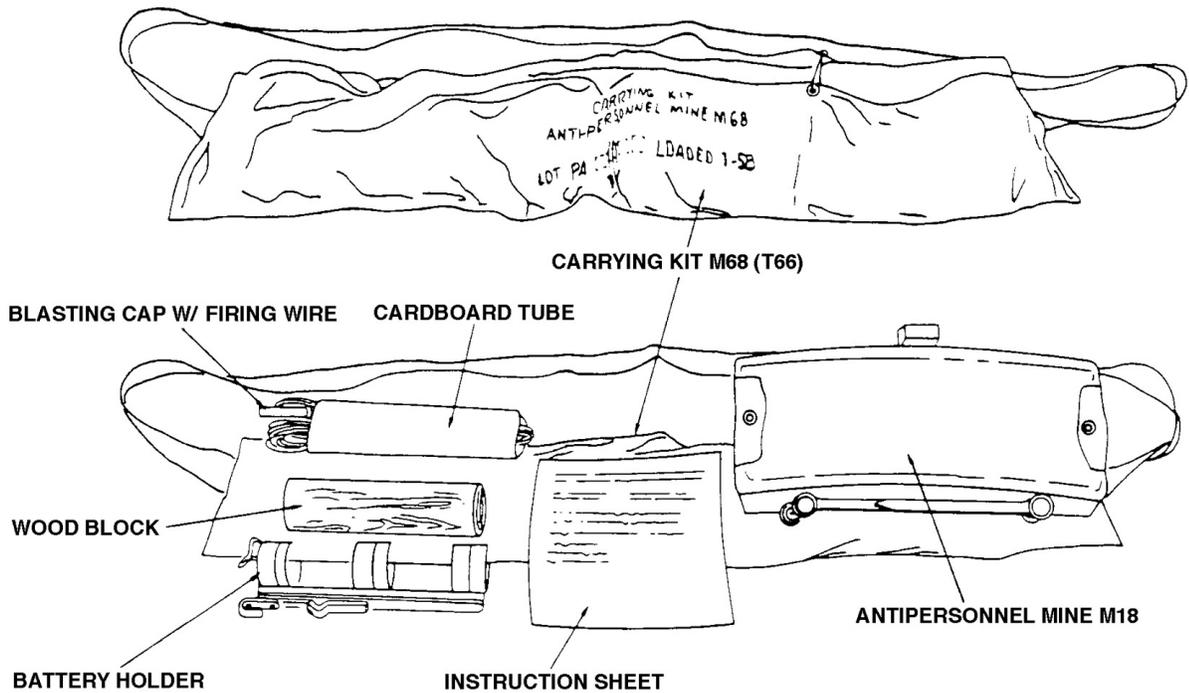


Figure 11-9 Antipersonnel Mine M18 with Carrying Kit M68

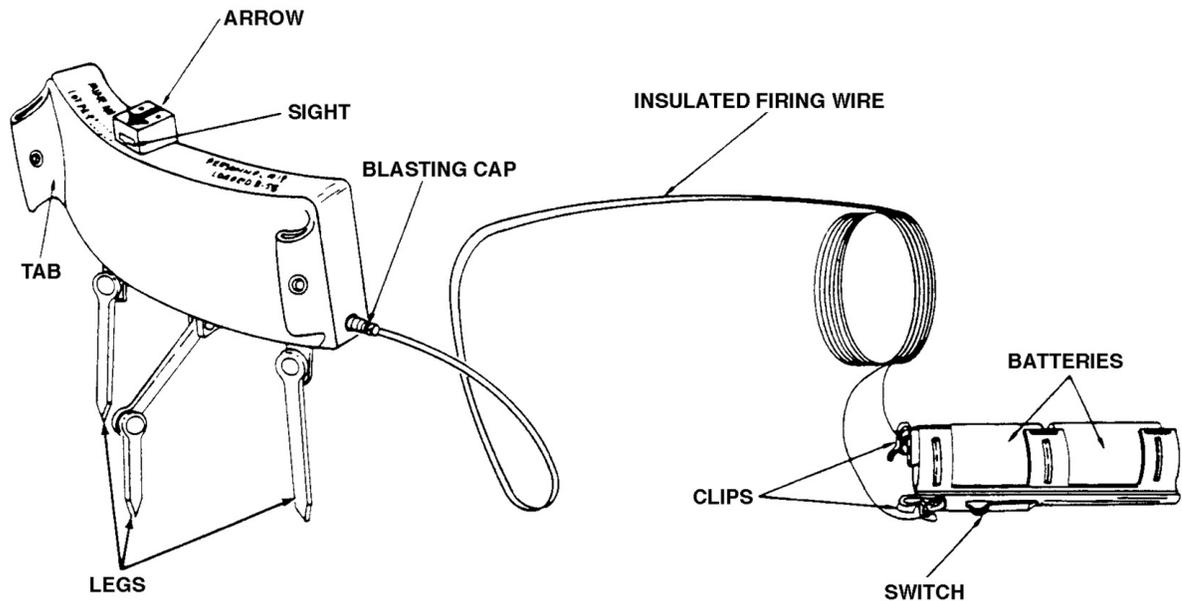


Figure 11-10 Firing Antipersonnel Mine 18

e. After placement of the mine, completely unwind the 52.49 feet (16 meters) of lead wires and run them to the firing position. It is allowable to lay the lead wires on top of the ground. However, if time permits, bury the wires under the soil to reduce the possibility of being dislodged or cut by artillery fragments.

WARNING

THE SWITCH OF THE BATTERY HOLDER MUST BE IN OFF POSITION. STONES OR MINE DEBRIS MAY FLY TO THE REAR OR SIDES AT THE TIME OF FIRING. ENSURE ALL PERSONNEL WITHIN 100 METERS (328.08 FEET) TO THE REAR OR SIDES OF THE MINE ARE UNDER COVER AND ARE NOT EXPOSED. ONLY FIRE THE MINE FROM PROTECTED OR SHIELDED POSITIONS NO CLOSER THAN 16 METERS (52.49 FEET) FROM THE MINE.

f. Prepare the mine for firing, Figure 11-10, by removing the wooden blocks from the battery holder.

g. Insert two 1-1/2-volt flashlight batteries into the battery holder. Ensure that the forward end of each battery is facing the clip of the holder.

h. Carefully attach the lead wires to the clips of the battery holder. The mine is now ready to be fired.

i. For any additional lead wire, add 3 volts (in series) for each 16 meters (52.49 feet), using additional batteries and battery holders. Pull-type firing devices and nonelectric blasting caps with sufficient length of blasting caps is another method of firing this mine. There must be a sufficient length of detonating cord to bridge the distance between the mine and the firing device as described in Paragraph 8-2.7.1

j. Pushing the switch to the ON (full forward) position fires the mine.

11-5.2.4 Disarming. When disarming the M18 APERS mine, observe the following procedures:

CAUTION

IF THE ORIGINAL PACKING MATERIAL IS NOT AVAILABLE, PREVENT WATER FROM ACCUMULATING IN THE HOLE AFTER REMOVAL OF THE BLASTING CAP.

- a. If using dry cell batteries and battery holder(s), ensure that switches are in the OFF (rearmost) position and remove the lead wires from the clips of the holder.
- b. Short the lead wires by twisting the bare ends together.

- c. Carefully remove the blasting cap from the mine.
- d. Rewind the lead wires and return the blasting cap and wire to the original cardboard tube.
- e. Remove the mine from its installed position, fold the legs, and return it to its original packing.

11-5.2.5 Precautions. In addition to precautions described in Paragraphs 8-2.7 through 8-2.7.1, also observe the following precautions:

- a. Keep batteries dry and warm in cold weather so the mine can be successfully detonated.
- b. Use fresh or fully charged batteries at all times.

11-6 HAND AND RIFLE GRENADES

See Table 11-6 for packaging and identification data.

11-6.1 Grenade, Hand, Riot Control, CN-DM, M6 (G905).

11-6.1.1 Intended Use. This hand grenade, Figure 11-11, is designed and procured as a riot control device to aid in quelling civil disturbances, prisoner-of-war riots, or similar disorders that require use of nonlethal agents to restore order.

11-6.1.2 Description. This grenade has a thin sheet steel body 5.7 inches (14.47 centimeters) long with a diameter of approximately 2-1/2 inches (6.35 centimeters). It contains 10.5 ounces (297 grams) of a CN-DM agent combination mixture

with six emission holes at the top and two rows of nine emission holes each along the sides. Assembled with this grenade is an M201A1 pyrotechnic delay-ignition fuze. It is gray with a single red band and red markings.

11-6.1.3 Function. Releasing the safety lever allows the striker to rotate on its axis and strikes the percussion primer. The primer emits an intense flame that ignites the delay element. The time delay element burns 1.2 to 2 seconds and initiates the igniter. The igniter ignites the filler with a violent burning action which expels from the grenade body. The grenade emits a dense cloud of irritant agent for 20 to 60 seconds.

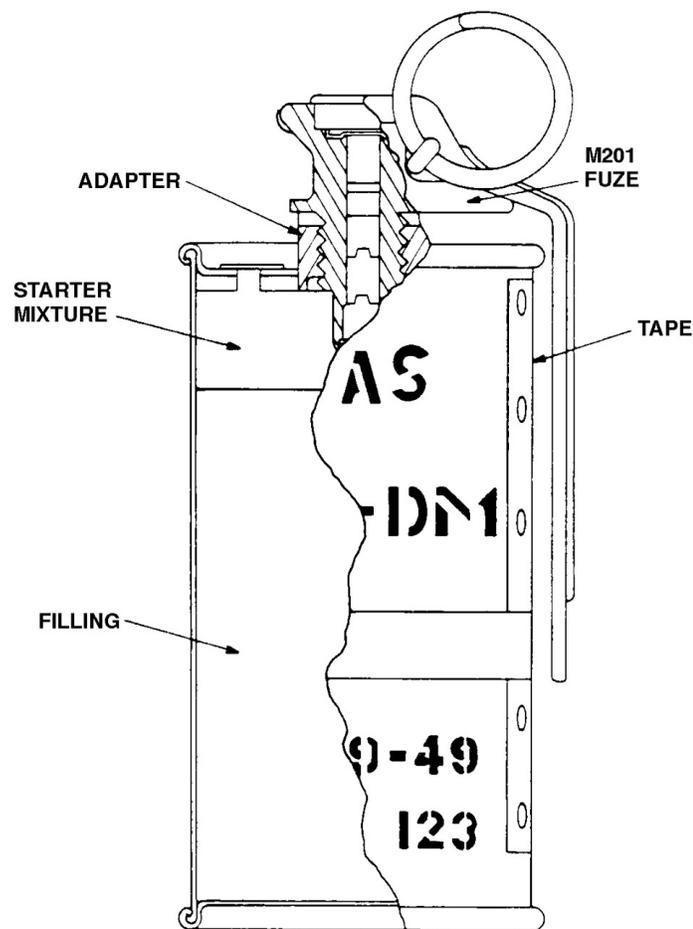


Figure 11-11 M6 CN-DM Riot Control Hand Grenade

Table 11-6 Obsolete Hand and Rifle Grenades

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Grenade, Hand, Fragmentation, MK 2 and MK 2A1, with Fuze M10A1	G892	11-6.6	1330-00-540-7182	82-0-1	1 per fiber container M41A1, 25 containers per wooden box
Grenade, Hand, Riot Control, CN-DM, M6	G905	11-6.1	1330-00-219-8579	13-22-3	1 per container, 16 containers per wooden box
Grenade, Hand, CN-DM, M6, Riot Control, with Fuze M201A1	G905	11-6.2	1330-00-310-2653	C13-22-3	1 per container, 16 containers per wooden box
Grenade, Hand, CN, M7 Riot Control, with Fuze M200A1	G960	11-6.3	1330-00-871-3697	D13-21-3	25 per wooden box
	G960		1330-00-529-8542	D13-21-3	Packed as required
Grenade, Hand, Riot Control, CN, M7 and M7A1 (M7)	G960	11-6.4	1330-00-219-8576	13-21-3	16 per wooden box
Grenade, Hand, Riot Control, CN, M7 and M7A1 (M7A1)	G960	11-6.4	1330-00-219-8577	13-21-7	16 per wooden box
Grenade, Hand, Smoke, WP, M15 with Fuze M206A1 or M206A2	G935	11-6.5	1330-00-219-8510	13-19-17	1 per container, 16 containers wooden box
Grenade, Rifle, AT, Practice, M29	G980	11-6.10	1330-00-028-5920	8864102	1 per container M37A2 with 2 cartridge M3, 10 containers and 20 cartridges per wooden box
Grenade, Rifle, AT, Practice, M11, Empty, without Fuze, Grenade Cartridges, or Clips	G980	11-6.11	1330-00-028-5880	82-0-73	1 per fiber container, 50 containers per wooden box
Grenade, Rifle, AT, Practice, M11A3, Empty, without Fuze, Grenade Cartridge, or Launch Clips	G980	11-6.12	1330-00-028-5886	82-0-73-4	1 pr fiber container, 50 containers per wooden box
Grenade, Rifle, Smoke, Streamer, M23 and M23A1 (M23)	H025-Violet		1330-00-028-5890	82-0-139-1/ MIL-G-13598	1 per metal container M235, 10 containers, 1 cartridge assortment C and 3 launcher clips per wooden box (for training and demonstration)
Grenade, Rifle, Smoke, Streamer, M23 and M23A1 (M23A1)	H040-Yellow		1330-00-028-5917	82-0-139-2/ MIL-G-13598	1 per metal container M235A1, 10 containers, 1 cartridge assortment A, and 3 launcher clips per wooden box
Grenade, Rifle, Smoke, WP, M19 and M19A1without Grenade Cartridge or Clips	H030	11-6.9	1330-00-028-5866	82-0-109	1 per fiber container M141, 10 containers (10 grenades) per wooden box

Table 11-6 Obsolete Hand and Rifle Grenades (Continued)

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Grenade, Rifle, Smoke, M22A2	H035- Yellow	11-6.7	1330-00-028-5910	82-0-117	1 per metal container M234, 10 containers, 1 cartridge assortment A, and 3 launcher clips per wooden box
Grenade, Rifle, Smoke, M22A2	H010-Red	11-6.7	1330-00-028-5908	82-0-117	1 per metal container M234, 10 containers, 1 cartridge assortment A, and 3 launcher clips per wooden box
Grenade, Rifle, Smoke, Streamer, M23 and M23A1	H015-Red		1330-00-028-5887	82-0-139	1 per metal container M235, 10 containers, 1 cartridge assortment C, and 3 launcher clips per wooden box
Grenade, Rifle, Smoke, Streamer, M23 and M23A1	H040- Yellow		1330-00-028-5888	82-0-139	1 per metal container M235, 10 containers, 1 cartridge assortment C, 3 launcher clips and 1 instruction sheet per wooden box
Grenade, Rifle, Smoke, Streamer, M23 and M23A1	H025- Violet		1330-00-301-1984	82-0-139	1 per metal container M235/T28, 10 containers, 1 cartridge assortment C, and 3 launcher clips per wooden box (for training and demonstration)
Grenade, Rifle, Smoke, WP, M19 and M19A1	H030	11-6.9	1330-00-028-5866	82-0-109	1 per fiber container M141, 10 Spec 1906 containers, 1 cartridge assortment A, and 3 launcher clips per wooden box

11-6.2 Grenade, Hand, CN-DM, M6, Riot Control, with Fuze M201A1 (G905).

11-6.2.1 Intended Use. This hand grenade is designed and procured for use to aid in quelling civil disturbances, prisoner-of-war riots, or similar disorders that require the use of nonlethal agents

11-6.2.2 Description. This grenade consists of a thin sheet steel, cylindrical-shaped body approximately 5.7 inches (14.47 centimeters) long. It weighs approximately 17 ounces (481 grams) and contains approximately 10.5 ounces (297 grams) of a CN-DM agent combination mixture. The M201A1 fuze is a pyrotechnic delay-igniting type with a M39A1 primer; an iron oxide, titanium, zirconium ignition mixture; and weighs 1.5 ounces (42 grams). This grenade is gray with a single red

band and red markings. The appearance, emission holes, and configuration resemble the M6 grenade, Figure 11-11.

11-6.2.3 Function. Releasing the safety lever allows the striker to rotate on its axis and strikes the percussion primer. The primer emits an intense flame that ignites the delay element. The time delay element burns 1.2 to 2 seconds and initiates the igniter. The igniter ignites the filler with a violent burning action and causes the filler to be expelled from the grenade body. The grenade emits a dense cloud of irritant agent for 20 to 60 seconds.

11-6.3 Grenade, Hand, CN, M7 Riot Control, with Fuze M200A1 (G960).

11-6.3.1 Intended Use. This grenade, Figure 11-12, is designed and procured to be used for the control of riots, mobs, and other disturbances. It may be used to simulate casualty agents during training. It has a powerful lacrimal effect and is irritating to the upper respiratory passages. In high concentrations it is irritating to the skin, causing a burning and itching sensation. Depending on the concentration, incapacitation may occur within 15 to 30 seconds and last from 5 to 20 minutes.

11-6.3.2 Description. This grenade is a cylindrical metal container 2.5 inches (6.35 centimeters) in diameter, 4.5 inches (11.43 centimeters) high, and weighs 1.06 pounds (.481 kilogram). The body has 18 emission holes (3 rows of 6 holes) covered with adhesive tape to protect the filler from moisture. The top of the filler and the sides of a channel down the center are coated with a starter mixture. The grenade may also be assembled with a M201 or a M201A1 fuze threaded into a fuze adapter in the top. The fuze safety lever is held in an unarmed position by a safety coter pin attached to a pull ring. The body is gray with a single red band and red markings.

11-6.3.3 Function. Hold the fuze safety lever firmly against the grenade body while removing the safety coter pin and until actually throwing the grenade. Throw the grenade at least 30 feet (9.14 meters) away from all friendly personnel. Release of the fuze safety lever allows the striker to hit the primer, igniting the 0.7- to 2.0-second delay element in the fuze. At the end of the delay, the ignition mixture in the fuze ignites and it ignites the starter mixture, igniting the main filler. The gases generated by the burning filler blow off the tape coverings from the emission holes. The CN vapors emit in smoke form for approximately 20 to 60 seconds.

11-6.4 Grenade, Hand, Riot Control, CN, M7 and M7A1 (G960).

11-6.4.1 Intended Use. This hand grenade is designed and procured to be used for control of riots, mobs, and other disturbances, and may be used to simulate casualty agents during training. It has a powerful tearing effect and is irritating to the upper respiratory passages. In high concentrations it is irritating to the skin and causes a burning and itching sensation. Depending on concentration, incapacitation will occur within 15 to 30 seconds and last from 5 to 20 minutes.

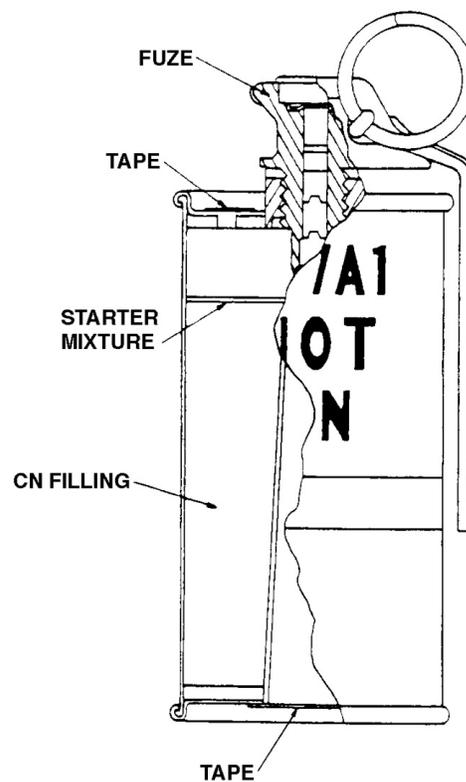


Figure 11-12 M7 and M7A1 CN Riot Control Hand Grenade

11-6.4.2 Description. This grenade resembles the M7 CN Grenade illustrated in Figure 11-12, in appearance, size, and configuration. It consists of a cylindrical sheet metal body containing a compressed filler (10.25 ounces (290 grams) in the M7 and 12.50 ounces (354 grams) in the M7A1) of CN composition. Formed through the body of the filler is a tapered hole. The walls of the hole have a

coating of a starter mixture. This grenade uses the M200A1 fuze and is gray with one red band and red markings.

11-6.4.3 Function. Removal of the safety pin permits release of the safety lever. When the safety lever is released, it is forced away from the grenade body by a striker acting under the force of a striker spring. The striker rotates on its own axis and strikes the percussion primer. The primer initiates the first-fire mixture. The fuze delay element, ignition mixture, and grenade starter mixture and filler are initiated in turn by the preceding component. The pressure-sensitive tape is blown off the emission holes and the CN agent is emitted for 15 to 30 seconds.

11-6.5 Grenade, Hand, Smoke, WP, M15 (G935).

11-6.5.1 Intended Use. This hand grenade, Figure 11-13, is designed and procured for use to provide a screening, incendiary, and casualty effect.

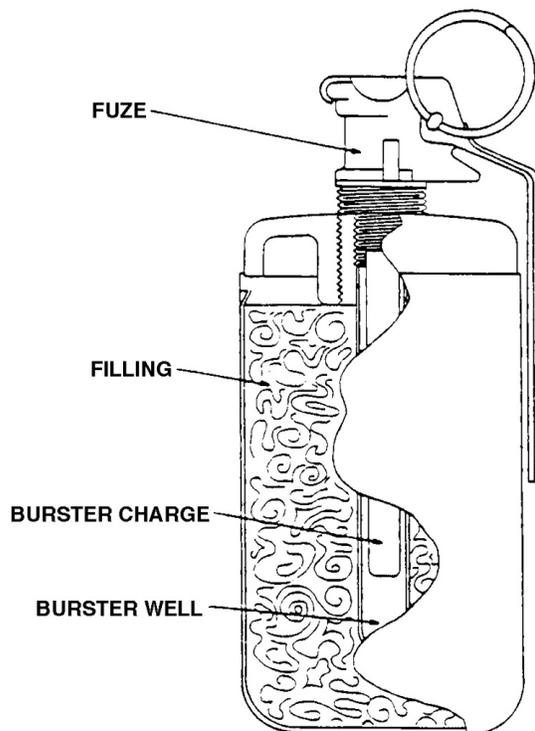


Figure 11-13 WP Smoke Hand Grenade M15

11-6.5.2 Description. This hand grenade consists of a steel cylinder 4.5 inches (11.43 centimeters) long and 2.38 inches (6.04 centimeters) in diameter. A steel cap is brazed to its top. A bursting well, 1/2 inch (1.27 centimeters) in diameter, is screwed into its top and extends to within 3/4 inch (1.90 centimeters) of its bottom. The filler is WP. The fuze screws into the burster well head. The 4- to 5-second delay element extends into the tetryl burster charge.

11-6.5.3 Function. Releasing the safety lever allows the striker to hit the primer, igniting the 4- to 5-second delay element. The delay element ignites the burster charge which bursts the grenade body and scatters WP over a radius of approximately 20 yards (18.2 meters). The WP ignites spontaneously on contact with air to produce a dense white smoke for approximately 60 seconds.

11-6.6 Grenade, Hand, Fragmentation, MK 2 and MK 2A1, with Fuze M10A1 (G892).

11-6.6.1 Intended Use. This hand grenade is designed and procured for use to produce casualties by high-velocity fragment projection.

11-6.6.2 Description. This hand grenade consists of a cast iron body with deep serrations, containing high explosives [2 ounces (56 grams) of flaked Trinitrotoluene (TNT)]. The MK 2 and MK 2A1 grenades use the M10A1 hand grenade fuze. The grenade is olive drab and weighs 21 ounces (595 grams) with the fuze.

11-6.6.3 Function. Removal of the safety pin permits release of the safety lever. When the safety lever is released, it is forced away from the grenade body by a striker acting under the force of a striker spring. The striker rotates on its axis and strikes the percussion primer. The primer emits a small, intense flame, igniting the delay element. The delay element burns for 4 to 5 seconds, then sets off the detonator. The detonator explodes, initiating the explosive charge. The explosive charge explodes, rupturing the body and projecting fragments.

11-6.7 Grenade, Rifle, Smoke, M22A2 (H035-Yellow), (H010-Red).

11-6.7.1 Intended Use. This rifle grenade, Figure 11-14, is designed and procured for use as an appropriate daytime signaling device by ground forces. It produces a smoke cloud (yellow or red) for approximately 8 seconds after impact.

11-6.7.2 Description. The rifle application with appropriate launcher and cartridge, a description of external features, and a functional description of this rifle grenade are contained in NAVSEA SW050-AB-MMA-010.

11-6.8 Grenade, Rifle, Smoke, Streamer, M23 and M23A1 (H040-Yellow), (H025-Violet), (H015-Red).

11-6.8.1 Intended Use. This rifle grenade, Figure 11-15, is designed and procured to be launched from rifles for any desired type of daytime signaling purpose. It emits a stream of colored smoke for approximately 12 seconds commencing at a point approximately 50 feet (15 meters) from the rifle muzzle.

WARNING

THE RECOIL FROM FIRING RIFLE GRENADES IS CONSIDERABLE. IF FIRED FROM AGAINST THE SHOULDER, THE RIFLE BUTT MUST BE FREE TO MOVE WITH THE RECOIL. IF THE RIFLE BUTT IS BRACED AGAINST A HARD SURFACE, THE SHOCK MAY CRACK OR BREAK THE STOCK.

CAUTION

DO NOT USE THESE GRENADES WITH M16 SERIES RIFLES OR CARBINES.

11-6.8.2 Description. This rifle grenade consists of a main body containing the pyrotechnic smoke mixture, and a tail section with a circular

stabilizing fin welded to it. The nose has a covering of semitransparent tape the approximate color of the smoke produced. In the after end of the main body around the circumference of the curved shoulder, there are five circular smoke emission holes covered with a square of tape. This shoulder portion of the grenade is painted with a color corresponding to the color of the smoke display. There is appropriate identification stenciling on the exterior of the main body.

11-6.8.3 Function. When the grenade cartridge fires, hot gases rupture the thin sealing disk over the aluminum baffle and travel through the holes and slot of the baffle to ignite the non gaseous powder charge in the igniter assembly. This charge ignites the starter mixture, which coats the tapered inner surface of the smoke composition. The starter mixture ignites the smoke mixture. Gases generated by the burning smoke mixture forces the tape from the nose and the five emission holes. Through these holes smoke emits for approximately 12 seconds.

11-6.8.4 Safety Precautions. In addition to other applicable warnings and cautions, special safety precautions apply to the handling, storage, care, and firing as follows:

- a. Handle these devices with care to prevent damage, particularly to the stabilizing fins. Keep them in their individual, hermetically sealed metal containers until immediately prior to use.
- b. Under no circumstances should one of these grenades be placed in a grenade launcher on a rifle or carbine unless it is to be fired immediately.
- c. If prepared for launching and not launched, return the grenade to its metal shipping container and seal with tape.
- d. Do not use grenades with cracked, bent, or otherwise damaged fins and/or tail assemblies. Segregate them for disposition in accordance with Chapter 10 of this manual.
- e. Use these grenades only with the rifles, launchers, and grenade cartridges as specified in Paragraph 9-10.2.2

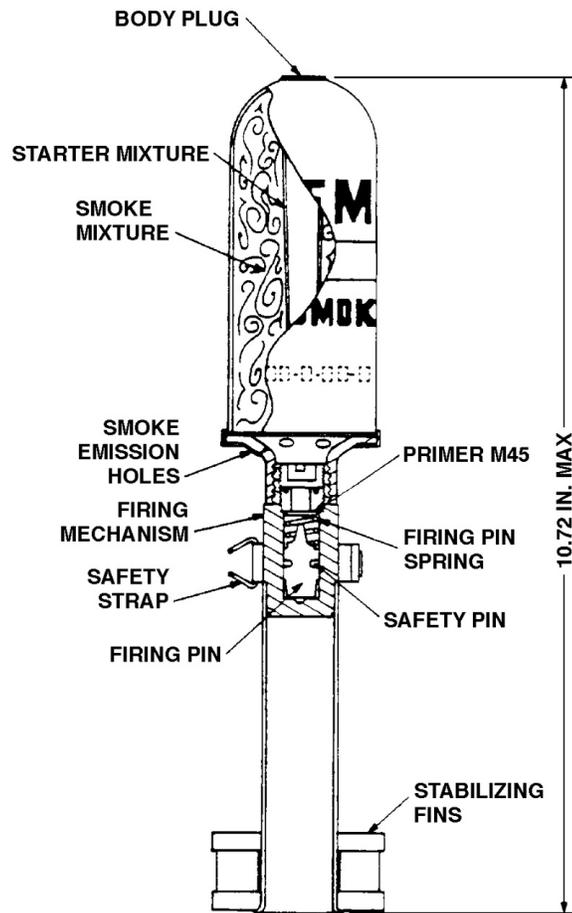


Figure 11-14 Rifle Smoke Grenade M22A2

f. When launching a grenade, do not point the rifle in the direction of, or over the heads of friendly personnel.

g. Because of component sensitivity to undue shock, do not drop or otherwise mishandle these grenades.

h. Strictly adhere to applicable rules concerning the firing of grenades from rifles. In most instances, place the rifle butt in soft ground or against a sandbag for firing.

i. All personnel using rifle grenades and other personnel in the immediate vicinity should wear helmets to protect themselves from flying debris in the event of a malfunction.

11-6.9 Grenade, Rifle, Smoke, WP, M19 and M19A1 (H030).

11-6.9.1 Intended Use. This rifle grenade, Figure 11-16, is designed and procured to be used as a screening, incendiary, and casualty munition. When used as an APERS weapon, it has an effective casualty radius of approximately 11 yards (10 meters).

WARNING

DO NOT REMOVE THE SAFETY PIN UNTIL THIS DEVICE IS FULLY INSTALLED IN THE RIFLE OR CARBINE LAUNCHER AND READY TO FIRE.

WARNING

IN FIRING, THE TRAJECTORY MUST BE SUCH THAT THE POINT OF IMPACT IS AT LEAST 35 YARDS (32.04 METERS) FROM THE FRIENDLY INSTALLATIONS AND PERSONNEL.

IF INSTALLED AND NOT LAUNCHED IMMEDIATELY, REINSTALL THE SAFETY PIN BEFORE REMOVING THE GRENADE FROM THE RIFLE OR CARBINE. ONLY EOD PERSONNEL HAVE AUTHORIZATION TO INVESTIGATE DUDS.

11-6.9.2 Description. This rifle grenade has a sheet steel, straight-walled body with a hemispherical nose; a steel stabilizer tube assembly; and an impact base-detonating fuze with a 13.5 grain (.87 gram) standard blasting cap. Its burster well extends three fourths of the way into the body. The body has a charge of 8.5 ounces (240 grams). The grenade is 11.31 inches (28.73 centimeters) long, weighs 1.5 pounds (0.68 kilogram), and is light green with a yellow band and red markings.

11-6.9.3 Function. This grenade is fired either from a launcher-equipped rifle or from a carbine, using M3 or M3 and M7 cartridges (rifle) and M6 or M6 and M7 cartridges (carbine). The M3 rifle cartridge provides a maximum range of 235 yards (214 meters); the M3 and M7, 310 yards (283 meters). The M6 carbine cartridge provides a maximum range of 155 yards (141 meters); the M6 and M7, 215 yards (196.6 meters). On impact, the firing pin fires the primer which ignites the blasting cap. The blasting cap bursts the grenade body and showers burning WP over a radius of approximately 20 yards (18.2 meters).

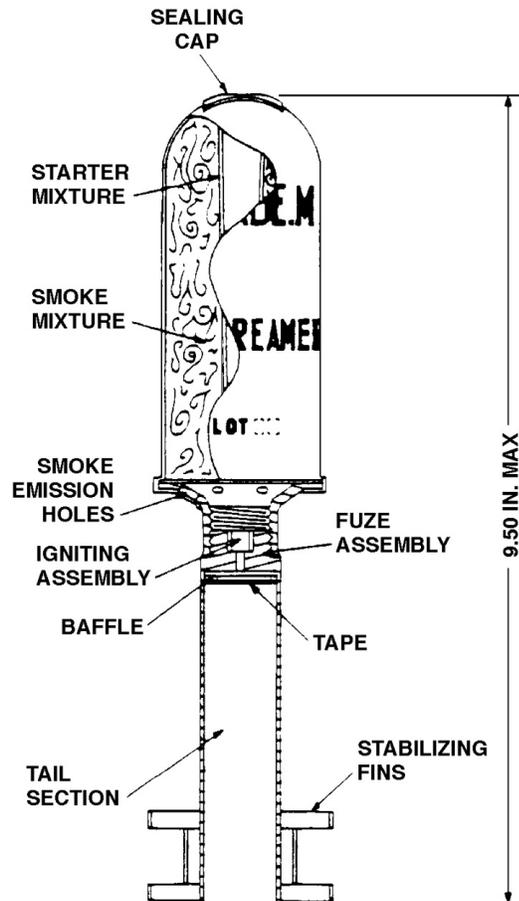


Figure 11-15 Streamer Rifle Smoke Grenade M23A1

11-6.10 Grenade, Rifle, AT, Practice, M29 (G980).

11-6.10.1 Intended Use. This practice rifle grenade, Figure 11-17, is designed and procured for use as a training device. It may be fired at a target without danger to the target except for the force of impact. It may be used repeatedly if the stabilizer tube fin assembly is replaced when it is damaged. It has a maximum range of approximately 164 yards (150 meters).

11-6.10.2 Description. This practice rifle grenade consists of a cast iron body and a steel stabilizer tube fin assembly. Available for replacement purposes, is a separately issued stabilizer tube-fin assembly. It has neither filler nor fuze, is 14.5 inches (36.83 centimeters) long, weighs 1.5 pounds (.68 kilogram) and is black or blue with white markings.

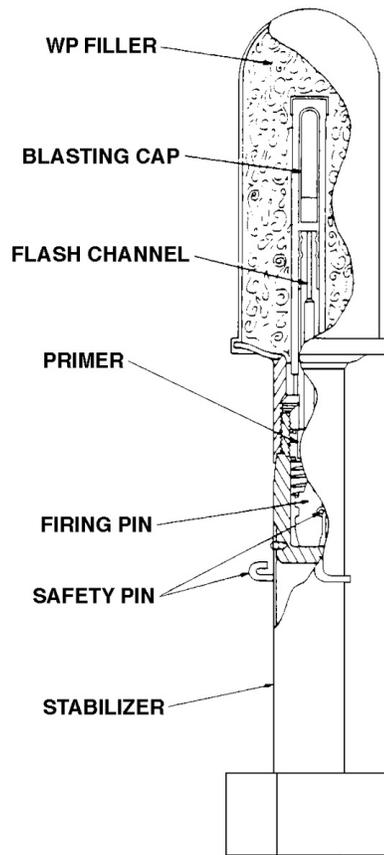


Figure 11-16 WP Smoke Rifle Grenade M19A1

11-6.11 Grenade, Rifle, AT, Practice, M11, Empty (G980).

11-6.11.1 Intended Use. Without fuze, grenade cartridge, or launch clips. This practice rifle grenade is designed and procured for use to simulate the flight characteristics of the M23A1 Rifle Grenade, Paragraph 9-13.2, and M19A1 Rifle Grenade, Paragraph 11-6.9

11-6.11.2 Description. This practice rifle grenade is made of steel with reusable and interchangeable parts if not damaged. The weight, size, and shape resemble the M19A1 and M23A1 Rifle Grenades.

11-6.12 Grenade, Rifle, AT, Practice, M11A3, Empty, without Fuze, Grenade Cartridge, or Launch Clips (G980).

11-6.12.1 Intended Use. This practice rifle grenade is designed and procured for use to simulate the flight characteristics of the Rifle Grenade M23A1, Paragraph 9-13.2, and Rifle Grenade M19A1, Paragraph 11-6.9

11-6.12.2 Description. This practice rifle grenade is made of steel and the parts are reusable and interchangeable when not damaged. The weight, size, and shape resemble the M19A1 and M23A1 Rifle Grenades.

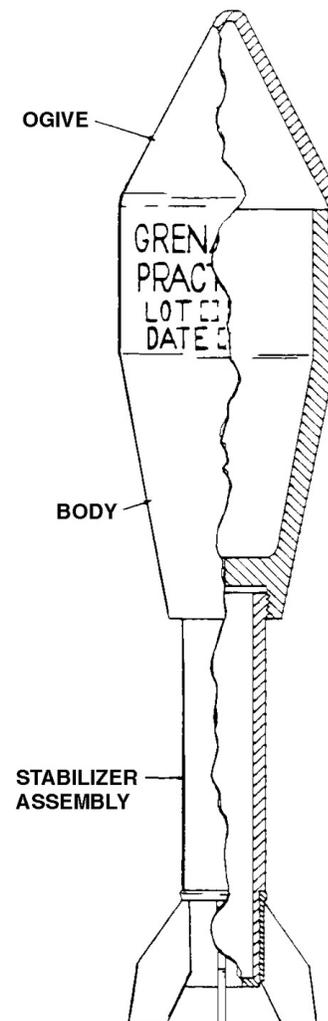


Figure 11-17 Practice AT Rifle Grenade M29

APPENDIX A

CURRENT DEPARTMENT OF DEFENSE IDENTIFICATION CODE/NAVY
AMMUNITION LOGISTIC CODE (DODIC/NALC) INDEX

DODIC/ NALC	ITEM NOMENCLATURE	PARAGRAPH	PAGE
		8-2.7	8-10
A001	- Cartridge, 12 Gauge Shotgun, No. 9 Shot, Plastic Case	4-7.3	4-15
A002	- Cartridge, 12 Gauge Shotgun, No. 7-1/2 Shot, Plastic Case	4-7.4	4-15
A003	- Cartridge, 12 Gauge Shotgun, No. 8 Shot, Plastic Case	4-7.5	4-15
A004	- Cartridge, 12 Gauge Shotgun, No. 8-1/2 Shot, Plastic Case	4-7.6	4-16
A005	- Cartridge, 12 Gauge Shotgun, No. 9 Shot, Plastic Case	4-7.7	4-16
A006	- Cartridge, 12 Gauge Shotgun, No. 8 Shot, Plastic Case	4-7.8	4-16
A007	- Cartridge, 12 Gauge Shotgun, No. 8 Shot, Plastic Case	4-7.9	4-16
A011	- Cartridge, 12 Gauge Shotgun, 00 Buckshot, M19	4-7.10	4-16
A011	- Cartridge, 12 Gauge Shotgun, 00 Buckshot, Paper Case	4-7.11	4-16
A011	- Cartridge, 12 Gauge Shotgun, 00 Buckshot, XM162, Plastic Case	4-7.12	4-16
A015	- Cartridge, 12 Gauge Shotgun, No. 8 Chilled Shot, Paper Case	4-7.13	4-17
A015	- Cartridge, 12 Gauge Shotgun, No. 8 Shot, Plastic Case	4-7.14	4-17
A017	- Cartridge, 12 Gauge Shotgun, No. 9 Chilled Shot, Plastic Case	4-7.15	4-17
A017	- Cartridge, 12 Gauge Shotgun, No. 9 Chilled Shot, Trap And Skeet, Plastic Case	4-7.16	4-17
A019	- Cartridge, 7.62 Millimeter, NATO, Ball, M80	4-13.3	4-51
A020	- Cartridge, 12 Gauge Shotgun, No. 4B Buckshot, M257	4-7.17	4-17
A023	- Cartridge, 12 Gauge, Slug	4-7.18	4-17
A024	- Cartridge, 12 Gauge Shotgun, Door Breaching, MK 246 MOD 0	4-7.19	4-18
A046	- Cartridge, 20 Gauge Shotgun, No. 9 Shot, Skeet Load, Plastic Case	4-7.26	4-22
A052	- Cartridge, .410 Bore Shotgun, Skeet Load, Plastic Case	4-7.28	4-22
A057	- Cartridge, 28 Gauge Shotgun, No. 9 Shot, Skeet Load, Plastic Case	4-7.27	4-22
A059	- Cartridge, 5.56 Millimeter, Ball, M855	4-12.1	4-38
A060	- Cartridge, 5.56 Millimeter, Ball, M19	4-12.4	4-43
A060	- Cartridge, 5.56 Millimeter, Dummy, M199	4-12.3	4-43
A063	- Cartridge, 5.56 Millimeter, Tracer, M856	4-12.2	4-38
A064	- Cartridge, 5.56 Millimeter, Ball, M855	4-12.1	4-38
A064	- Cartridge, 5.56 Millimeter, Tracer, M856	4-12.2	4-38
A065	- Cartridge, 5.56 Millimeter, M862 Short Range Training Ammunition (SRTA)	4-12.9	4-45
A066	- Cartridge, 5.56 Millimeter, Ball, M193	4-12.4	4-43
A068	- Cartridge, 5.56 Millimeter, Tracer, M196	4-12.5	4-44
A070	- Cartridge, 5.56 Millimeter, Test, High-Pressure, M197	4-12.6	4-44
A071	- Cartridge, 5.56 Millimeter, Ball, M193	4-12.4	4-43
A073	- Cartridge, 5.56 Millimeter, Ball, M193	4-12.4	4-43
A073	- Cartridge, 5.56 Millimeter, Tracer, M196	4-12.5	4-44
A080	- Cartridge, 5.56 Millimeter, Blank, M200	4-12.7	4-45
A086	- Cartridge, .22 Caliber Ball, Long Rifle	4-6.2	4-7
A097	- Cartridge, .22 Caliber Ball, Long Rifle Match, Match Grade-Reduced Velocity for Small Bore Match Rifle	4-6.1	4-7
A102	- Cartridge, 7.62 Millimeter, Ball, Intermediate, Designed For AK47 Rifle	4-13.1	4-51

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DODIC/ NALC	ITEM NOMENCLATURE	PARAGRAPH	PAGE
A106 - Cartridge, .22 Caliber Ball, Long Rifle		4-6.2	4-7
A111 - Cartridge, 7.62 Millimeter, NATO, Blank, M82		4-13.2	4-51
A112 - Cartridge, 7.62 Millimeter, NATO, Blank, M82		4-13.2	4-51
A122 - Cartridge, 7.62 Millimeter, NATO, Ball, M59		4-13.4	4-52
A122 - Cartridge, 7.62 Millimeter, NATO, Ball, M80		4-13.3	4-51
A124 - Cartridge, 7.62 Millimeter, NATO, Tracer, M62		4-13.5	4-52
A127 - Cartridge, 7.62 Millimeter, NATO, Ball, M80		4-13.3	4-51
A127 - Cartridge, 7.62 Millimeter, NATO, Tracer, M62		4-13.5	4-52
A129 - Cartridge, 7.62 Millimeter, NATO, Test, High-Pressure, M60		4-13.6	4-53
A130 - Cartridge, 7.62 Millimeter, NATO, Ball, M80		4-13.3	4-51
A131 - Cartridge, 7.62 Millimeter, NATO, Ball, M80		4-13.3	4-51
A131 - Cartridge, 7.62 Millimeter, NATO, Tracer, M62		4-13.5	4-52
A135 - Cartridge, 7.62 Millimeter, NATO, Dummy, M63		4-13.7	4-53
A136 - Cartridge, 7.62 Millimeter, NATO, Match/Special Ball, M118		4-13.8	4-53
A140 - Cartridge, 7.62 Millimeter, NATO, Tracer, M62		4-13.5	4-52
A143 - Cartridge, 7.62 Millimeter, NATO, Ball, M80		4-13.3	4-51
A149 - Cartridge, 7.62 Millimeter, Match, M852		4-13.13	4-55
A149 - Cartridge, 7.62 Millimeter, NATO, Ball, M80		4-13.3	4-51
A159 - Cartridge, 7.62 Millimeter, NATO, Dummy, M172		4-13.11	4-54
A160 - Cartridge, 7.62 Millimeter, NATO, 5 Round Clip		4-13.10	4-54
A162 - Cartridge, 7.62 Millimeter, NATO, Dummy, M172		4-13.11	4-54
A165 - Cartridge, 7.62 Millimeter, NATO, Ball, M80		4-13.3	4-51
A165 - Cartridge, 7.62 Millimeter, NATO, Tracer, M62		4-13.5	4-52
A168 - Cartridge, 7.62 Millimeter, NATO, Ball, M80		4-13.3	4-51
A168 - Cartridge, 7.62 Millimeter, NATO, Tracer, M62		4-13.5	4-52
A170 - Cartridge, 7.62 Millimeter, Match, Long Range Load		4-13.12	4-55
A171 - Cartridge, 7.62 Millimeter, Match, M852		4-13.13	4-55
A191 - Cartridge, .300 Caliber, Winchester Magnum, MK 248 MOD 0		4-15.1	4-64
A222 - Cartridge, .30 Caliber, Blank, M1909		4-14.1	4-62
A224 - Cartridge, .30 Caliber, Blank, M1909		4-14.1	4-62
A254 - Cartridge, 7.62 Millimeter, Tracer, Training 553B		4-13.16	4-56
A255 - Cartridge, 7.62 Millimeter, Dim Tracer, M276		4-13.14	4-55
A255 - Cartridge, 7.62 Millimeter, Flash Suppressed, M80E1		4-13.15	4-56
A257 - Cartridge, 7.62 Millimeter, Dim Tracer, M276		4-13.14	4-55
A257 - Cartridge, 7.62 Millimeter, Flash Suppressed, M80E1		4-13.15	4-56
A258 - Cartridge, 7.62 Millimeter, Dim Tracer, M276		4-13.14	4-55
A258 - Cartridge, 7.62 Millimeter, Flash Suppressed, M80E1		4-13.15	4-56
A260 - Cartridge, 9 Millimeter, Jacketed, Hollow Point, MK 243 MOD 0		4-11.1	4-30
A348 - Cartridge, .32 Caliber, Smith And Wesson Long, Match, Wadcutter		4-8.1	4-23
A358 - Cartridge, 9 Millimeter, Training Practice Tracer, M939		4-11.2	4-30
A359 - Cartridge, 9 Millimeter, Dummy, M917		4-11.3	4-32
A360 - Cartridge, 9 Millimeter, Ball 115-Grain Bullet, Parabellum		4-11.5	4-33
A360 - Cartridge, 9 Millimeter, Ball M1, 116-Grain Bullet, Parabellum		4-11.4	4-32

CURRENT DODIC/NALC INDEX (Continued)

DODIC/ NALC	ITEM NOMENCLATURE	PARAGRAPH	PAGE
A362 - Cartridge, 9 Millimeter MK 144 MOD 0	4-11.6	4-33
A362 - Cartridge, 9 Millimeter, MK 144 MOD 1	4-11.7	4-33
A363 - Cartridge, 9 Millimeter, Ball, NATO, M882	4-11.8	4-34
A400 - Cartridge, .38 Caliber, Special, Ball, M41, 130-Grain Bullet	4-9.1	4-24
A401 - Cartridge, .38 Caliber Special, Ball, Lead, 158-Grain Bullet	4-9.2	4-24
A402 - Cartridge, .38 Caliber, Special, Ball, Steel Jacket, Copper-Plated, 158-Grain Bullet	4-9.3	4-24
A403 - Cartridge, .38 Caliber, Blank	4-9.4	4-26
A406 - Cartridge, .38 Caliber, Special, Ball, Steel Jacket With Tracer	4-9.5	4-26
A413 - Cartridge, .38 Caliber, Special +P, Lead Semi-Wadcutter Hollow Point Bullet	4-9.6	4-27
A415 - Cartridge, .380 Caliber Ball, 95 Grain Bullet	4-10.1	4-29
A470 - Cartridge, .45 Caliber, ACP Match 185 Grain, Metal Case Wadcutter	4-16.8	4-70
A475 - Cartridge, .45 Caliber, Ball, ACP, M1911	4-16.1	4-68
A476 - Cartridge, .45 Caliber, ACP, Blank, M9	4-16.2	4-68
A477 - Cartridge, .45 Caliber (.45-70), Line-Throwing, Blank, M32	4-16.7	4-70
A479 - Cartridge, .45 Caliber, Tracer, ACP, M26	4-16.3	4-68
A482 - Cartridge, .45 Caliber, Ball, ACP, 185-Grain Wadcutter, Match Grade	4-16.4	4-69
A483 - Cartridge, .45 Caliber, Ball, ACP, Match Grade, M1911	4-16.5	4-69
A501 - Cartridge, .45 Caliber, ACP, Dummy, M1921	4-16.6	4-69
A525 - Cartridge, .50 Caliber, Armor Piercing, M2	4-17.1	4-72
A529 - Cartridge, .50 Caliber, Armor Piercing, M2	4-17.1	4-72
A531 - Cartridge, .50 Caliber, Armor Piercing Incendiary, M8	4-17.2	4-76
A540 - Cartridge, .50 Caliber, Armor Piercing Incendiary, M8	4-17.2	4-76
A540 - Cartridge, .50 Caliber, Tracer, M1	4-17.12	4-80
A541 - Cartridge, .50 Caliber, Armor Piercing Incendiary-Tracer, M20	4-17.3	4-76
A549 - Cartridge, .50 Caliber, Tracer, M1	4-17.12	4-80
A551 - Cartridge, .50 Caliber, Incendiary, M1	4-17.9	4-79
A552 - Cartridge, .50 Caliber, Ball, M2	4-17.4	4-77
A553 - Cartridge, .50 Caliber, Ball, M2	4-17.4	4-77
A554 - Cartridge, .50 Caliber, Ball, M2	4-17.4	4-77
A555 - Cartridge, .50 Caliber, Ball, M33	4-17.5	4-77
A557 - Cartridge, .50 Caliber, Ball, M2	4-17.4	4-77
A557 - Cartridge, .50 Caliber, Ball, M33	4-17.5	4-77
A557 - Cartridge, .50 Caliber, Tracer, M17	4-17.11	4-79
A558 - Cartridge, .50 Caliber, Blank, M1	4-17.6	4-77
A559 - Cartridge, .50 Caliber, Blank, M1	4-17.6	4-77
A560 - Cartridge, .50 Caliber, Dummy, M2	4-17.8	4-78
A562 - Cartridge, .50 Caliber, Incendiary, M1	4-17.9	4-79
A570 - Cartridge, .50 Caliber, Tracer, M1	4-17.12	4-80
A570 - Cartridge, .50 Caliber, Tracer, M10	4-17.10	4-79
A570 - Cartridge, .50 Caliber, Tracer, M17	4-17.11	4-79
A571 - Cartridge, .50 Caliber, Tracer, M1	4-17.12	4-80
A574 - Cartridge, .50 Caliber, Spotter-Tracer, M48/T189E1	4-17.14	4-80
A574 - Cartridge, .50 Caliber, Spotter-Tracer, M48A1	4-17.15	4-81

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A576 - Cartridge	.50 Caliber, Armor Piercing Incendiary, M8	4-17.2	4-76
A576 - Cartridge	.50 Caliber, Armor Piercing Incendiary-Tracer, M20	4-17.3	4-76
A577 - Cartridge	.50 Caliber, Armor Piercing Incendiary, M8	4-17.2	4-76
A577 - Cartridge	.50 Caliber, Armor Piercing Incendiary-Tracer, M20	4-17.3	4-76
A579 - Cartridge	.50 Caliber, Tracer, M10	4-17.10	4-79
A598 - Cartridge	.50 Caliber, Blank, M1A1	4-17.7	4-77
A602 - Cartridge	.50 Caliber, M858 Ball Plastic Practice, M860 Tracer Plastic Practice, Short Range Training Ammunition (SRTA)	4-17.20	4-83
A606 - Cartridge	.50 Caliber, Armor Piercing Incendiary, MK 211 MOD 0	4-17.13	4-80
A607 - Cartridge	.50 Caliber, Armor Piercing Incendiary, MK 211 MOD 0	4-17.13	4-80
A607 - Cartridge	.50 Caliber, Armor Piercing Incendiary, MK 211 MOD 1	4-17.17	4-82
A608 - Cartridge	.50 Caliber, Armor Piercing Incendiary, MK 211 MOD 0	4-17.13	4-80
A608 - Cartridge	.50 Caliber, Armor Piercing Incendiary, MK 211 MOD 1	4-17.17	4-82
A608 - Cartridge	.50 Caliber, Tracer, M17	4-17.11	4-79
A640 - Link	.50 Caliber, M2	4-17.22	4-88
A641 - Link	.50 Caliber, M9	4-17.23	4-88
AA01 - Cartridge	5.56 Millimeter, Armor Piercing (AP) , M995	4-12.12	4-46
AA02 - Cartridge	5.56 Millimeter, Armor Piercing (AP) , M995	4-12.12	4-46
AA04 - Cartridge	7.62 Millimeter, Armor Piercing, M993	4-13.18	4-57
AA06 - Cartridge	.50 Caliber, Armor Piercing Incendiary, MK 211 MOD 0	4-17.13	4-80
AA06 - Cartridge	.50 Caliber, Armor Piercing Incendiary, MK 211 MOD 1	4-17.17	4-82
AA06 - Cartridge	.50 Caliber, Armor Piercing Incendiary-Tracer, M20	4-17.3	4-76
AA06 - Cartridge	.50 Caliber, Armor Piercing, M2	4-17.1	4-72
AA06 - Cartridge	.50 Caliber, Armor Piercing, MK 263 MOD 0	4-17.19	4-83
AA11 - Cartridge	7.62 Millimeter, NATO, Special Ball, Long Range, M118	4-13.9	4-54
AA12 - Cartridge	9 Millimeter, Subcaliber, Marking (Red)	4-11.9	4-34
AA16 - Cartridge	9 Millimeter, Frangible, MK 254 MOD 0	4-11.10	4-36
AA18 - Cartridge	.45 Caliber, Auto +P, Full Metal Jacket, Truncated Cone	4-16.9	4-70
AA19 - Cartridge	.357 Caliber, Magnum, Full Metal Jacket, 158 Grain Bullet	4-18.1	4-90
AA21 - Cartridge	9 Millimeter, Subcaliber, Marking (Blue)	4-11.9	4-34
AA29 - Cartridge	12 Gage Bean Bag, Non-Lethal	4-7.25.1	4-20
AA30 - Cartridge	12 Gage, Launching, For Grenade, Non-Lethal	4-7.25.2	4-20
AA31 - Cartridge	12 Gage, Rubber, Fin Stabilized, Non-Lethal	4-7.25.3	4-21
AA34 - Cartridge	7.62 Millimeter, Armor Piercing, M993	4-13.18	4-57
AA35 - Cartridge	7.62 Millimeter, Armor Piercing, M993	4-13.18	4-57
AA36 - Cartridge	7.62 Millimeter, Armor Piercing, M993	4-13.18	4-57
AA37 - Cartridge	7.62 Millimeter, M973 Ball Short Range Training Ammunition (SRTA), M974 Tracer Short Range Training Ammunition-Tracer (SRTA-T)	4-13.19	4-58
AA39 - Cartridge	7.62 Millimeter, M973 Ball Short Range Training Ammunition (SRTA), M974 Tracer Short Range Training Ammunition-Tracer (SRTA-T)	4-13.19	4-58
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AA41 - Cartridge	.50 Caliber, Armor Piercing Incendiary, MK 211 MOD 1	4-17.17	4-82

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AA50 - Cartridge, .50 Caliber, Armor Piercing, MK 263 MOD 0		4-17.19	4-83
AA53 - Cartridge, Caliber 5.56 Millimeter Special Ball, Long Range, MK 262 MOD 0		4-12.11	4-46
AA54 - Cartridge, 12 Gauge, Breaching, M1030		4-7.20	4-18
AA55 - Cartridge, 12 Gauge, Dummy, MK 242 MOD 0		4-7.21	4-18
AA58 - Cartridge, .50 Caliber, Armor Piercing, MK 263 MOD 0		4-17.19	4-83
AA68 - Cartridge, 5.56 Millimeter, M862 Short Range Training Ammunition (SRTA)		4-12.9	4-45
AA69 - Cartridge, 5.56 Millimeter, Armor Piercing (AP), M995		4-12.12	4-46
AY04 - Cartridge, 12 Gauge, Flash-Bang		4-7.22	4-19
B470 - Cartridge, 40 Millimeter, HE, M384		5-2.14	5-13
B472 - Cartridge, 40 Millimeter, Dummy, M922/M922A1 or Inert M385		5-2.2	5-6
B473 - Cartridge, 40 Millimeter, Dummy, M406		5-2.2	5-6
B480 - Cartridge, 40 Millimeter, Practice (M385)		5-2.15	5-15
B504 - Cartridge, 40 Millimeter, Parachute (Green Star, M661)		5-2.3	5-7
B505 - Cartridge, 40 Millimeter, Parachute (Red Star, M662)		5-2.3	5-7
B506 - Cartridge, 40mm, Ground Marker (Red Smoke, M13)		5-2.4	5-7
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REFERENCE PUBLICATIONS

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Navy Publications	
NAVSEA TW010-AA-ORD-010	Index to Navy Ammunition Stock
NAVSEA SW010-AF-ORD-010	Identification of Ammunition
NAVSEA SW020-AC-SAF-010/020/030	Transportation Storage Data for Ammunition, Explosives and Related Hazardous Materials
NAVSEA SW050-AB-MMA-010	Pyrotechnic, Screening, and Marking, and Countermeasure Devices
NAVSEA SW060-AA-MMA-010	Demolition Materials
NAVSEA SW300-BC-SAF-010	Safety Manual for Clearing of Live Ammunition From Guns
NAVSEA SW350-A1-MMO-010	MK 87 MOD 1 Line Throwing Rifle Adapter Kit
NAVSEA OP 1743	81mm Mortar MK 2 MODs 0 and 1
NAVSEA OP 3703	9mm Pistol and Suppressor Kit MK 23 MOD 0 and Accessory Kit MK 26 MOD 0
NAVSEA OP 4	Ammunition Afloat
NAVSEA OP 5	Ammunition & Explosives Ashore Safety Regulations for Handling, Storing, Production, Renovation & Shipping
NAVSUP P-801	Ammunition Unserviceable, Suspended and Limited Use
Army Publications	
FM5-250	Explosives and Demolitions
FM20-32	Mine/Countermining Operations
FM23-30	Grenades and Pyrotechnic Signals
FM23-31	40mm Grenade Launchers M203 and M79
ST9-159	Family of Equipment
TM9-1015-20-12	Mortar, 81mm: M29A1 and M29
TM9-13-00200	Ammunition, General
TM9-1300-203	Artillery Ammunition
TM9-1300-206	Ammunition and Explosives Standards
TM9-1300-214	Military Explosives
TM9-1300-251-20	Artillery Ammunition for Guns, Howitzers, Mortars, Recoilless Rifles; and 40mm Grenade Launchers
TM9-1305-200	Small Arms Ammunition
TM9-1305-205	Ammunition for Mortars

REFERENCE PUBLICATIONS (Continued)

PUBLICATION NUMBER	TITLE
TM9-1310-202-12	Cartridges, 40mm: HE M386, M441, and M397
TM9-1345-203-12 & P	Land Mines
TM43-0001-28	Army Ammunition Data Sheets (Guns, Howitzers, and Mortars)
TM43-0001-29	Army Ammunition Data Sheets (Grenades)
TM43-0001-36	Army Ammunition Data Sheets (Land Mines)
Other Publications	
MIL-STD-1168	Ammunition Lot Numbering and Ammunition Data Card
MIL-STD-709	Ammunition Color Coding

APPENDIX D
ACRONYMS AND ABBREVIATIONS

ACRONYM ABBREVIATION	DEFINITION
ACP	Automatic Colt Pistol
ALN	Ammunition Lot Number
AP	Armor Piercing
APC	Armor Piercing Capped
APDS	Armor Piercing Discarding Sabot
APERS	Antipersonnel
API	Armor Piercing Incendiary
API-T	Armor Piercing Incendiary with Tracer
AT	Antitank
AT/FP	Anti-Terrorism/Force Protection
BD	Base Detonating
BE	Base Ejection
CAL	Caliber
CNO	Chief of Naval Operation
CMC	Commandant U.S. Marine Corps
CON	Contingency
CS	A tactical riot control agent
CUP	Copper Units of Pressure
DoD	Department of Defense
DODIC	Department of Defense Identification Code
DOT	Department of Transportation
DS	Discarding Sabot
EOD	Explosive Ordnance Disposal
FMJ	Full Metal Jacket
fps	Feet per second
FSC	Federal Supply Class
FSN	Federal Stock Number
GB	A nonpersistent toxic (casualty) nerve gas
GL	Grand Lot
H	Mustard Gas
HD	Distilled Mustard Gas
HE	High Explosive
HEAT	High Explosive Antitank
HEAT-TMP	High Explosive Antitank with Tracer, Multipurpose

ACRONYMS AND ABBREVIATIONS (Continued)

ACRONYM ABBREVIATION	DEFINITION
HEDP	High Explosive Dual Purpose
HEI	High Explosive Incendiary
HEP	High Explosive Plastic
HPBT	Hollow-Point Boat-Tail
HERA	High Explosive Rocket Assisted
HV	High Velocity
HVAP	Hypervelocity Armor Piercing
HVTP	Hypervelocity Target Practice
ILLUM	Illuminating
IM	Insensitive Munitions
INC	Incendiary
IR	Infrared
JAG	Judge Advocate General
JHP	Jacketed Hollow-Point
JMEM	Joint Munitions Effectiveness Manual
LAW	Light Anti-Armor Weapon
LCC	Logistics Condition Code (Class)
LP	Limited Procurement
MK	Mark
mm	Millimeter
MOD	Modified
MP	Multipurpose (or multiple projectiles)
MT	Mechanical Time
MTSO	Mechanical Time and Super Quick
MV	Muzzle Velocity
NALC	Naval Ammunition Logistic Code
NATO	North Atlantic Treaty Organization
NCB	National Codification Bureau
NIIN	National Item Identification Number
NSN	National Stock Number
NVEO	Night Vision Electro-Optic
OBS	Obsolete
PD	Point Detonating
PIBD	Point Initiating Base Detonating
PIE	Pyrotechnically Initiated Explosive
PROX	Proximity

ACRONYMS AND ABBREVIATIONS (Continued)

ACRONYM ABBREVIATION	DEFINITION
psi	Pounds per square inch
PWP	Plasticized White Phosphorous
R	Renovated
RAP	Rocket Assisted Projectile
SAAMI	Sporting Arms and Ammunition Manufacturer's Institute
SD	Self Destroying
SEAL	Sea-Air-Land
SLAP	Saboted Light Armor Penetrator
SPCC	Ships Parts Control Center
SPR	Special Purpose Rifle
STHP	Silver Tip Hollow Point
T	Time Fuze, or Training Only
-T	With Tracer
TBD	To Be Determined
TC	Truncated Cone
TNT	Trinitrotoluene
TP	Target Practice
TPT	Target Practice Tracer
TR	Tracer
TSQ	Time Super Quick
VX	Persistent toxic (casualty) nerve gas
WP	White Phosphorous
WSESRB	Weapon System Explosives Safety Review Board

APPENDIX E
METRIC CONVERSION CHART

SYMBOL	WHEN YOU KNOW	MULTIPLY	TO FIND	SYMBOL
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30.5	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
in ²	square inches	6.5	square centimeters	
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	
WEIGHT				
dr	drams	1.772	grams	g
oz	ounces	437.5	grains	gr
oz	ounces	28.0	grams	g
lb	pounds	0.45	kilograms	kg
VOLUME				
tsp	teaspoons	5.0	milliliters	ml
Tbsp	tablespoon	15.0	milliliters	ml
fl oz	fluid ounces	30.0	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

METRIC CONVERSION CHART (Continued)

SYMBOL	WHEN YOU KNOW	MULTIPLY	TO FIND	SYMBOL
yd ³	cubic yards	0.76	cubic meters	m ³
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
WEIGHT				
gr	grains	0.002	ounces	oz
g	grams	0.035	ounces	oz
g	grams	0.5643	drams	dr
kg	kilograms	2.2	pounds	lb
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	35.0	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³

APPENDIX F

NON-LETHAL CARTRIDGES AND GRENADES

ITEM	DODIC/ NALC	PARA	NSN	REFERENCE NO.	PACKAGING
Cartridge, 12 Gauge Bean Bag, Non-Lethal	AA29	4-7.25.1	1305-01-454-0191	925011 201030	5 cartridges per fiberboard box, 32 fiberboard boxes (160 cartridges) per M2A1 metal box, 2 metal boxes (320 cartridges) per wirebound box
Cartridge, 12 Gauge, Launching, For Grenade, Non-Lethal	AA30	4-7.25.2	1305-01-454-0187	925011 201030	5 cartridges per fiberboard box, 32 fiberboard boxes (160 cartridges) per M2A1 metal box, 2 metal boxes (320 cartridges) per wirebound box
	AA30	4-7.25.2	1305-01-464-8389	925011 201030	5 cartridges per fiberboard box, 32 fiberboard boxes (160 cartridges) per M2A1 metal box, 2 metal boxes (320 cartridges) per wirebound box
Cartridge, 12 Gauge, Rubber, Fin Stabilized, Non-Lethal	AA31	4-7.25.3	1305-01-454-0189	925011 201030	5 cartridges per fiberboard box, 32 fiberboard boxes (160 cartridges) per M2A1 metal box, 2 metal boxes (320 cartridges) per wirebound box
Cartridge, 40 Millimeter, Foam Rubber Baton, Non-Lethal	BA07	5-2.19.1	1310-01-453-9168	B-8789	1 cartridge per cardboard tube, 22 tubes (22 cartridges) per M2A1 metal box, 2 metal boxes (44 cartridges) per wirebound box
Cartridge, 40 Millimeter, Rubber Ball, Non-Lethal	BA08	5-2.19.2	1301-01-453-9154	B-8790	1 cartridge per cardboard tube, 22 tubes (22 cartridges) per M2A1 metal box, 2 metal boxes (44 cartridges) per wirebound box
Cartridge, 40 Millimeter, Wooden Baton, Non-Lethal	BA09	5-2.19.3	1301-01-454-0192	B-8788	1 cartridge per cardboard tube, 22 tubes (22 cartridges) per M2A1 metal box, 2 metal boxes (44 cartridges) per wirebound box
Grenade, Rubber Ball, Non-lethal	GG04	9-15.1	1330-01-454-0132	925011 201030	1 grenade per cardboard sleeve, 6 sleeves (6 grenades) per M2A1 metal box, 2 metal boxes (12 grenades) per wirebound box
Grenade, Practice, Non-Lethal	GG05	9-15.2	1330-01-454-0099	925011 201030	Commercial Pack (inert items until loaded with fuze)

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