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TM 9–1900
TO 11A–1–20
*C 3

DEPARTMENT OF THE ARMY TECHNICAL MANUAL
DEPARTMENT OF THE AIR FORCE TECHNICAL ORDER

AMMUNITION, GENERAL

TM 9–1900
TO 11A–1–20
CHANGES No. 3

DEPARTMENTS OF THE ARMY
AND THE AIR FORCE
WASHINGTON 25, D.C., *11 April 1962.*

TM 9-1900/TO 11A-1-20, 1 June 1956, is changed as follows:

Page 2[illegible]:

140 Types.

* * * * * * *

b. Priming and Initiating Components, Accessories, and Tools.

* * * * * * *

(3) (Superseded) Fuse, Blasting, Time, M700 (fig. 197) is in the form of a 0.20-inch diameter cord consisting of a black powder core tightly wrapped with waterproofing materials and a plastic cover. When ignited by a match or a blasting fuse igniter, it transmits a flame to a nonelectric blasting cap that may be installed in a demolition charge. This fuse is for use in demolition both on land or underwater. The burning rate of the fuse is approximately 40 seconds per foot; however, the burning time should be tested by timing the burning of a 1-foot length of fuse, after cutting off a minimum of 3 inches on the end to remove powder that may have absorbed moisture.

***Warning No. 1:* Each roll of fuse must be tested, shortly before use. The rate of burning will vary for the same or different roll under different atmospheric and/or climatic conditions, from a burning time of 30 seconds or less per foot to 45 seconds or more per foot.**

***Warning No. 2:* Particular precautions must be taken when used under water as the rate of burning is increased significantly.**

The dark green cover is smooth with either single painted bands at 1-foot or 18-inch intervals and double painted bands at either 5-foot or 90-inch intervals, depending on old or new manufacture. These markings are used to estimate the ap-

*These changes supersede C 2, 24 January 1961.

proximate lengths of fuse required for tactical situations, Fuse, Blasting, Time (JAN–F–360) (fig. 198), is in the form of a 0.20-inch diameter cord consisting of a black powder core wrapped with several layers of fabric and waterproofing materials. It is used for similar purposes but is not reliably waterproof. The burning time for this fuse also varies, therefore the fuse should be tested shortly before use and attention given to Warning No. 1 and No. 2 above.

* * * * * * *

c. Demolition Equipment, Sets and Kits.

* * * * * * *

(4) (Rescinded by C 2, 24 Jan 61.)

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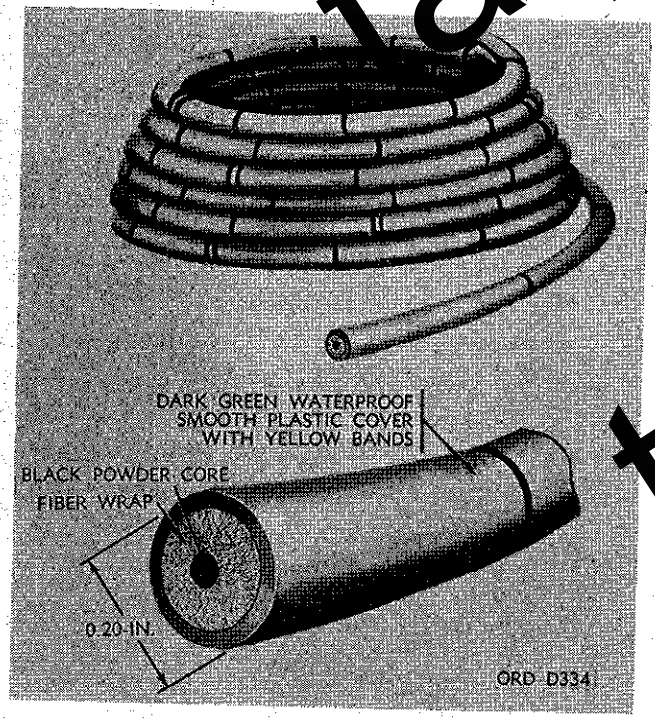

Figure 197. (Superseded) *Fuse, Blasting, Time: M700.*

Page 285, figure 209. Rescinded by C 2, 24 January 1961.

This

BY ORDER OF THE SECRETARIES OF THE ARMY AND THE AIR FORCE:

G. H. DECKER,
General, United States Army,
Chief of Staff.

Official:

J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

CURTIS E. LEMAY
Chief of Staff, United States Air Force.

Official:

R. J. PUGH,
Colonel, United States Air Force,
Director of Administrative Services.

Distribution:

Active Army:

DCSLOG (1)
CNGB (1)
Tech Stf, DA (1) except
CofOrd (2)
CCmlO (4)
CofT (2)
Ord Bd (1)
USCONARC (3)
ARADCOM (2)
ARADCOM Rgn (2)
OS Maj Comd (5)
OS Base Comd (2)
LOGCOMD (2)
MDW (1)
Armies (3)
Corps (2)
Div (2)
Ord Gp (2)
Ord Bn (2)
Instl (2)
Ord Comd
Ord Dist (2)
GENDEP (2)
Ord Sec, GENDEP (1)
Ord Dep (10) except
Savanna (20)
OSA (2)
Ord PG (2)
Ord Arsenals (2) except
Raritan (10)
Picatinny (30)
Springfield Armory (2)
Br Svc Sch (2)
POE (2)
Mil Msn (1)
MAAG (2)
USA Corps (2)
Units organized under following TOE's (2 copies each):

9–26	9–377
9–86	9–510 (AA,
9–367	AB, AC, DA)

NG: State A (3); units same as Active Army except allowance is one copy to each unit.

USAR: None.

For explanation of abbreviations used, see AR 320–50.

U.S. GOVERNMENT PRINTING OFFICE: 1962

Royal G Conley

This manual is correct to 30 August 1955

***TM 9–1900/TO 11A–1–20**

TECHNICAL MANUAL
No. 9–1900
TECHNICAL ORDER
No. 11A–1–20

DEPARTMENTS OF THE ARMY AND THE AIR FORCE

WASHINGTON 25, D. C., *1 June 1956*

AMMUNITION, GENERAL

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US Army Ammo Sub Depot
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*This manual, together with TM 9-1903(when published) supersedes TM 9–1900, 18 June 1945, including C1, 22 October 1952 and C2, 8 April 1953.

CHAPTER 1

GENERAL

Section I. INTRODUCTION

1. Scope

a. This manual contains information pertaining to the classification and identification of ammunition. Personnel concerned with any phase of ammunition should be thoroughly familiar with the provisions of this manual and TM 9–1903.

b. Information pertaining to nuclear and biological munitions has not been included in this manual, since sufficient data are not available at this time.

c. The appendix contains a list of current references, including supply and technical manuals, and other publications applicable to ammunition.

d. Information pertaining to care, handling, preservation, and destruction of ammunition, which appeared in the previous edition of this manual, is contained in TM 9–1903.

2. Forms

The forms prescribed for use throughout the Army establishment are listed in the current DA Pam 310–2. Requisitions for these forms will be submitted in accordance with AR 310–90.

3. Reports

a. Accidents. Responsibilities and procedures for preparation of reports of accidents and recording and reporting requirements for Army accidents are contained in SR 385–10–40.

b. Accidents Involving Ammunition. If an accident or malfunction involving the use of ammunition, including land mines, base charges, dynamite, blasting caps, detonating cord, shaped charges, and demolition charges of all types, occurs during training or combat, the range officer for units in training, if there is one, or the senior officer of the unit in training or combat, or, if there is no officer in charge of the unit, the senior noncommissioned officer or enlisted man of the unit involved, will report immediately the occurrence and all available facts of the accident to the technical service representative under whose supervision the ammunition for the unit involved is maintained or issued. It is the duty of the technical service representative to investigate thoroughly all cases of malfunctioning or accidents observed by him or reported to him and to report serious cases to the head of the appropriate technical service as outlined in SR 700–45–6.

c. Fires. A fire report will be prepared in all cases of fire or fire explosion that result in loss of life or damage (to the extent that the estimated cost of repair or replacement amounts to $50 or more) to Army equipment, materials, structures, plants, systems, timber or grasslands, or other property, except motor vehicles or aircraft damaged incident to their operation, at all Department of the Army installations. For further information, see SR 385–45–20. Reports of fire or explosion followed by fire involving ammunition or other explosives are in addition to reports required as specified in SR 385–10–40.

d. Report of Hazardous Conditions Involving Military Explosives or Ammunition. Commanding officers of Army installations and activities engaged in the development, testing, manufacture, maintenance, salvage, disposal, handling, transportation, or storage of explosives or ammunition will inform the head of the appropriate technical service of concentrations of explosives or ammunition that are or may become undue hazards and of previously unrecognized hazards or conditions for which existing regulations and instructions appear to be inadequate, in order to permit review by the Armed Services Explosives Safety Board. For further information, see SR 385–15–1.

Section II. GENERAL DISCUSSION

4. Definitions

a. Munitions. Munitions consist of everything necessary for the conduct of war and training therefor, except personnel. They include weapons, ammunition, equipment, supplies, food, clothing, forage, and related items.

b. Military Ammunition. Military ammunition is that type of munition that consists of explosive or chemical agents, with their characteristic mechanical devices, designed for use against military objectives.

c. Weapons. A weapon is any instrument of combat. For descriptions of weapons, see pertinent technical manuals pertaining to each weapon.

d. Round. A round of ammunition consists of all the necessary expendable components to fire the system once.

5. Classification

Ammunition is classified according to the characteristics in *a* through *j* below.

a. Type.

(1) *Small arms ammunition.* Small arms ammunition consists of cartridges used in rifles, carbines, revolvers, pistols, submachineguns, and machineguns and shell used in shotguns.

(2) *Grenades.* Grenades are explosive- or chemical-filled projectiles of a size and shape convenient for throwing by hand or projecting from a rifle.

(3) *Artillery ammunition.* Artillery ammunition consists of cartridges;

shot; shell that are filled with high-explosive, chemical, or other active agent; and projectiles that are used in guns, howitzers, mortars, and recoiless rifles.

(4) *Bombs.* Bombs are containers filled with an explosive, chemical, or other active agent, designed for release from aircraft.

(5) *Pyrotechnics.* Pyrotechnics consist of containers filled with low-explosive composition, designed for release from aircraft or for projection from the ground for illumination or signals.

(6) *Rockets.* Rockets are propellant-type motors fitted with rocket heads containing high-explosive or chemical agents.

(7) *JATOS.* JATOS consist of propellant-type motors used to furnish auxiliary thrust in the launching of aircraft rockets, guided missiles, target drones, and mine clearing detonating cables.

(8) *Land mines.* Land mines are containers, metal or plastic, that contain high-explosive or chemical agents designed for laying in or on the ground for initiation by, and effect against, enemy vehicles or personnel.

(9) *Guided missiles.* Guided missiles consist of propellant-type motors fitted with warheads containing high-explosive or other active agent and equipped with electronic guidance devices.

(10) *Demolition materials.* Demolition materials consist of explosives and explosive devices designed for use in demolition and in connection with blasting for military construction.

(11) *Cartridge-actuated devices.* Cartridge-actuated devices are devices designed to facilitate an emergency escape from high-speed aircraft.

b. Standardization. Ammunition is classified as—

(1) Standard.
(2) Substitute standard.
(3) Limited standard.

c. Use. Ammunition is classified according to use as—

(1) Service.
(2) Practice.
(3) Drill (dummy).

d. Form. Ammunition is classified as fixed, semifixed, separated, or separate loading.

e. Kind of Filler. Ammunition is classified as explosive, chemical, leaflet, or inert.

f. Storage. Ammunition is classified for storage purposes into quantity-distance classes, 1 to 12 inclusive (TM 9–1903).

g. Storage Compatibility. Ammunition is grouped for compatibility in storage into 17 groups lettered A to Q, inclusive (TM 9–1903).

h. Interstate Commerce Commission Shipping Regulations. Ammunition is classified by Freight Tariff No. 9, publishing ICC shipping regulations, into class A explosives (which are subdivided into type 1 to type 8, inclusive), class B explosives, and class C explosives. The regulations pertaining to transportation of these classes of explosives are published by the Bureau of Explosives, 30 Vesey Street, New York 7, N. Y.

i. Burning or Explosive Characteristics. Ammunition is classified in groups according to general burning or explosive characteristics. The four groups are identified by "symbols," which are the Arabic numerals 1, 2, 3, and 4. Each group consists of one or more specific quantity-distance classes (see TM 9–1903).

j. Security. Ammunition is classified as to security regulations as unclassified, confidential, secret, or top secret.

6. Identification

a. General. Ammunition is identified by painting and marking (par. 10) on items, containers, and packing boxes. This identification does not include grade except in the case of small arms cartridges. For purposes of record, the standard nomenclature of the item, together with its lot number, completely identifies the ammunition. Once removed from its packing, ammunition may be identified by the painting and marking on the items. Other essential information may also be obtained from the marking on ammunition items, packing containers, and ammunition data cards. The muzzle velocity of projectiles may be obtained from the firing tables and ammunition data cards; in the case of some rounds of artillery ammunition of smaller caliber, the muzzle velocity may appear on the packing box.

(1) Included in both the marking and the standard nomenclature are—

(*a*) Name of type or abbreviation thereof.
(*b*) Caliber, weight, or size.
(*c*) Model designation.

(2) Where required, additional information is included such as the model and type of fuze, the model of the weapon in which the item is fired, and the weight of projectile for which a separate-loading propelling charge is fired.

(3) The lot number is marked on the ammunition or shipping container but is not a part of the nomenclature. However, when referring to specific ammunition in shipping documents and field reports, it is necessary to mention both the lot number and the standard nomenclature.

b. Type Designation. This is an identifying symbol used with nomenclature to distinguish different models and types of items or equipment within categories and to indicate modifications and changes thereto. Only one type identification will be assigned to items of military supply that are physically and functionally interchangeable. For further information, see AR 705–5–5.

c. Mark or Model. To identify a particular design, a model designation is assigned at the time the model is classified as an adopted type. This model designation becomes an essential part of the nomenclature and is

included in the marking of the item. The present system of model designation consists of the letter M followed by an Arabic numeral, for example, M1. Modifications are indicated by adding the letter A and the appropriate Arabic numeral. Thus, M1A1 indicates the first modification of an item for which the original model designation was M1. Wherever a B suffix appears in a model designation it indicates an item of alternative (or substitute) design, material, or manufacture. Certain items standardized for use by both Army and Navy are designated by AN preceding the model designation, for example, AN-M10A1. From World War I to 1 July 1925, it was the practice to assign mark numbers, that is, the word "Mark," abbreviated Mk, followed by a Roman numeral. The first modification was indicated by the addition of AI to the mark number, the second, MII, etc. After 2 August 1926 the mark numbers were indicated by Arabic numerals rather than Roman numerals. Prior to World War I, the letter M followed by the year in which the design was adopted was used as the model designation, for example, M1914. When a particular design has been accepted only for limited procurement and service test, the model designation is indicated by the letter T and an Arabic numeral and modifications by the addition of E and an Arabic numeral. In such cases, if the design subsequently should be standardized, an M designation is assigned; hence there may be encountered some lots still carrying the original T designation (not yet re-marked to show the later standardized M designation). There is no direct relationship between the numerical designation of a T item and that of the item when standardized and assigned an M designation. Items of Navy design are designated Mk, and Navy modifications are designated Mod and appropriate Arabic numeral. On items manufactured in Japan under the offshore procurement program, the prefix J– is added to the model number (see TB ORD 521). Items manufactured in Europe under this program are marked with an E– preceding the model number (see TB ORD 600).

d. Ammunition Lot Number. At the time of manufacture, every item of ammunition is assigned a lot number. Where the size of the item permits, it is marked on the item itself to insure permanency of this means of identification. In addition to this lot number, there is assigned to each complete round of fixed and semifixed ammunition an ammunition lot number, which serves to identify the conditions under which the round was assembled and the components used in the assembly. This ammunition lot number is marked on every complete round of fixed and semifixed ammunition (except where the item is too small) and on all packing containers. It is required for all purposes of record, including reports on condition, functioning, and accidents in which the ammunition is involved. As far as practicable, in the assembly of components during manufacture of items to make up a particular ammunition lot all like components are selected from the same component lot. To obtain the greatest accuracy in any firing, successive rounds should be from the same ammunition lot. On items manufactured in Japan, the prefix J– is added to the manufacturer's symbol in the last number and those manufactured in Europe have the prefix E–.

e. Calibration of Lots. Calibration data for certain lots of ammunition are provided in order to effect improvement in the relative accuracy of predicted artillery fire. The data account for variations among ammunition lots due to differences in muzzle velocity level (interior ballistics) and differences in ballistic coefficient (exterior ballistics). The application of corrections determined from the data is intended to reduce variations in performance due to the employment of individual ammunition-weapon combinations and is expected to be of value in unobserved fire under circumstances when the K correction and the velocity error (VE) type of correction may not be applicable because of transfer limitations, changes in ammunition lots, or weapon tube wear. For tables of data and further information, see TB ORD 420.

f. Ammunition Data Card. An ammunition data card, 5 by 8, which is prepared for each lot of accepted ammunition in accordance with pertinent specifications, will be furnished with the shipping ticket with each shipment of ammunition except small arms ammunition. This card contains printed data concerning the item and its components. Information on the data card includes lot number; date packed; identity of components; expected pressures; expected muzzle velocity; assembling and firing instructions when required; and AIC symbols.

g. Ammunition Identification Code Symbols. The ammunition identification code (AIC) symbol is used to facilitate the supply of ammunition in the field. Code symbols assigned to each item of ammunition in a specific packing are to be used in messages, requisitions, and records. These code symbols are published basically in Department of the Army Supply Manual ORD 3 standard nomenclature lists (SNL) of groups P, R, S, and T. A full explanation of the composition and use of the AIC symbol will be found in TB 9–AMM 5.

7. Nomenclature

Standard nomenclature is established so that every item of ammunition supplied by the Ordnance Corps may be specifically identified by name. It consists of the type, size, and model of each item. Its use for all purposes of record is mandatory, except where the use of the AIC symbol (par. 6*g*) is authorized. Ammunition nomenclature is published in Department of the Army Supply Manual ORD 3 standard nomenclature lists (SNL) of groups P, R, S, and T. The use of exact nomenclature in the requisitioning, shipment, storage, issue, recording, and use of ammunition items will keep errors to a minimum. Ammunition is grouped in the manual as indicated in *a* through *d* below.

a. Group P contains lists of ammunition for heavy field artillery (155-mm gun and above) and antiaircraft weapons.

b. Group R contains lists of ammunition for light and medium field,

tank, antitank, and aircraft artillery weapons (20-mm gun through 155-mm howitzer), mines, and demolition material.

c. Group S contains lists of bombs, grenades, pyrotechnics, rockets, JATOS, catapults, and explosive components of guided missiles.

d. Group T contains lists of ammunition for small arms.

8. Grading

a. Ammunition is manufactured to rigorous specifications and is thoroughly inspected before acceptance. Ammunition in storage is periodically inspected and tested in accordance with specific instructions of the Chief of Ordnance.

b. Each lot of small arms ammunition is graded primarily on the qualities that make that lot especially suitable for use in a particular class of weapons such as aircraft and antiaircraft machineguns, rifles, and ground machineguns. For current grades of small arms ammunition, see TB 9–AMM 4.

c. Ammunition, other than small arms ammunition, is earmarked as a result of surveillance tests into grades, depending on its serviceability and priority of issue (see SR 755–140–1).

9. Priority of Issue

a. Subject to special instructions from the Chief of Ordnance, ammunition of appropriate type and model will be used in the following order: limited standard, substitute standard, standard. Within this rule, ammunition that has had the longest or least favorable storage will be used first. Among lots of equal age, priority of issue will be given to the smallest lot.

b. To prevent the building up of excess stocks in the field, transfers from one station to another should be arranged within the Army command if no stock of appropriate grade for immediate use is on hand.

c. Certain items because of their scarcity, cost, or highly technical or hazardous nature are known as "regulated items." This includes all ammunition items. Close supervision is exercised over these items in order to insure distribution to appropriate units and commands in accordance with Department of the Army priorities (see SB 725–350 and SB 725–950).

d. Priority of issue for lots of small arms ammunition is established by the Chief of Ordnance and published in TB 9–AMM 4 or in special instructions.

e. Further details will be found in Department of the Army Supply Bulletins of the 9–AMM-series, AR 370–5, and SR 755–140–1.

10. Painting and Marking

a. Painting. Ammunition is painted primarily to prevent rust. Secondary purposes are to provide, by the color, a ready means of identification as to type and to camouflage the ammunition by the use of lusterless paint. See figures 1 to 19, inclusive, for the use of color for identification purposes on representative examples of ammunition items.

Table I. Color and Markings for Various Types of Ammunition, Except Bombs, Pyrotechnics, and Small Arms Cartridges

Type of ammunition	Color and markings
Armor-piercing (projectile w/HE).	Olive drab w/marking in yellow.
Armor-piercing (projectile w/o explosive).	Black w/marking in white.
High-explosive	Olive drab w/marking in yellow.
Illuminating	Gray w/one white band and marking in white.
Chemical:	
Persistent casualty gas	Gray w/two green bands and marking in green.
Nonpersistent casualty gas.	Gray w/one green band and marking in green.
Training and riot control gases.	Gray w/one red band and marking in red.
Smoke	Gray w/one yellow band and marking in yellow. (Rifle smoke grenades—one band of the color of smoke produced.)
Incendiary	Gray w/one purple band and marking in purple.
Practice	Blue w/marking in white.
Dummy (inert)	Black w/marking in white (bronze or brass assemblies are unpainted).

(1) For artillery ammunition, grenades, rockets, JATOS, land mines, guided missiles, demolition material, and miscellaneous explosive devices, color and markings are shown in table I.

(2) For bombs, other than chemical, photoflash, target identification, and practice, the painting is olive drab, with 1-inch color bands painted at the nose and tail ends of the body. When bombs are loaded with composition B, COMP B is stenciled twice, 180 degrees apart, on each inner band. When bombs are loaded with tritonal, TRITONAL is stenciled twice, 180 degrees apart, on each inner band. When TNT or COMP B loaded bombs are equipped with inert end pads, they will be stenciled WITH PADS to distinguish from bombs without pads. The purpose of the inert pad is to render the bomb less sensitive to possible blows on the end during handling and shipping. Small fragmentation bombs have no color bands but the nose and tail are painted yellow. For color and marking of various types of bombs, see table II.

(3) Small arms cartridges do not require painting. However, the bullet tips of cartridges are painted a distinctive color to aid in ready identification as to type (fig. 1).

(4) Pyrotechnics are not marked in accordance with the general color scheme but, where color markings are used, they indicate the color of the pyrothenic effect produced. In general, how-

Table II. Color and Marking for Various Types of Bombs

Type of bomb	Color of body	Color of marking	Painted identification bands			
			Color	Number of bands and location		
				Nose	Center	Tail
HIGH-EXPLOSIVE:						
TNT or amatol loaded.	Olive drab.	Black	Yellow	One		One.
COMP B-loaded.	Olive drab.	Black	Yellow	Two		Two.
Tritonal-loaded.	Olive drab.	Black	Yellow	One ½-inch between two 1-inch.		One ½-inch between two 1-inch.
CHEMICAL:						
Smoke	Gray	Yellow	Yellow	One	One	One.
Incendiary	Gray	Purple	Purple	One	One	One.
Persistent gas	Gray	Green	Green	Two	Two	Two.
Nonpersistent gas.	Gray	Green	Green	One	One	One.
TARGET IDENTIFICATION AND PHOTOFLASH.	Gray	Black				
LEAFLET	Olive drab.	Black				
PRACTICE	Blue	White				
DRILL	Olive drab.	Black	Black	One		One.

ever, pyrotechnics are painted gray with marking in black. If the body of the item is aluminum or magnesium, it may not be painted. If the item is intended for incendiary purposes, markings are in purple.

b. Marking.

(1) The marking stenciled or stamped on ammunition includes all information necessary for complete identification. For further information concerning marking on ammunition, see chapter 3 under the specific type of ammunition.

(2) Service components or rounds that have been inerted for drill purposes will be marked as in (*a*) through (*e*) below.

(*a*) Components such as shell, fuzes, boosters, artillery primers, cartridge cases, bombs, and flares in which all explosives, incendiary, or toxic materials have been simulated by substitution of inert material will be identified by impressed INERT markings.

(*b*) Components such as shell, fuzes, boosters, artillery primers, cartridge cases, bombs, and flares in which all explosives, incendiary or toxics, and substitutes have been omitted will be identified by impressed EMPTY markings.

(*c*) In addition to being marked INERT or EMPTY, components, if size permits, such as empty projectiles, bombs, inert loaded and empty cartridge cases, will have four holes not smaller than one-quarter of an inch drilled through them 90° apart. Exceptions are inert projectiles, such as those used in target practice, practice bombs, and other inert items, the designed usage of which would be impaired by the presence of drilled holes. Such items will be considered suitably identified when they are INERT marked.

(*d*) Inert cloth covered components, such as bagged propelling charges, will be marked with durable, waterproof, sunfast ink.

(*e*) Inert mortar propellant increments will have the word INERT cut through each increment.

11. Packing and Marking

Ammunition is packed and packing containers are marked in accordance with pertinent drawings and specifications. Containers are designed to withstand conditions normally encountered in handling, storage, and transportation and to comply with Interstate Commerce Commission regulations. Marking of containers includes all information required for complete identification of their contents and for compliance with Interstate Commerce Commission regulations (see also TM 9–1903).

12. Precautions in Use

a. Explosive ammunition must be handled with appropriate care at all times. Explosive elements, such as in primers and fuzes, are sensitive to undue shock and high temperature.

b. In order to keep ammunition in a serviceable condition and ready for immediate issue and use, due consideration should be given to the general rules in *c* through *g* below.

c. Store ammunition in the original containers in a dry, well-ventilated place protected from the direct rays of the sun and other sources of excessive heat. Keep sensitive initiators such as blasting caps, igniters, primers, and fuzes separate from other explosives.

d. Keep ammunition and its containers clean and dry and protected from possible damage.

e. Disassembly of components of ammunition, such as fuzes and primers, without specific authorization, is strictly prohibited. Any alteration of loaded ammunition, except by direction of the technical source concerned and under the supervision of a commissioned officer of that service, is hazardous and must not be undertaken.

f. Do not open sealed containers or remove protective or safety devices until just before use, except as required for inspection.

g. Return ammunition prepared for firing but not fired to its original packing and mark it appropriately. Use such ammunition first in subsequent firings in order to keep stocks of opened packings at a minimum.

h. The use of live ammunition for training purposes as a substitute for authorized drill ammunition is prohibited. Such substitution must be considered as hazardous and will not be permitted under any circumstances.

13. Firing Data

Firing data for the certain types of ammunition described in this manual are given in firing tables (FT), graphical firing tables (GFT), graphical tables (GT), bombing tables (BT), fluorescent bombing tables (FBT), rocket firing tables (RFT), trajectory charts (TJC), aiming data charts (ADC), and guided missile charts (GMC). For applicable indexes to these publications, see the appendix.

Figure 1. Color identification of bullets, small arm cartridges.

Figure 2. Color identification and typical marking of hand grena

Figure 3. Color identification and typical marking of rifle grenades.

Figure 4. Color identification and typical marking of cartridges for aircraft cannon.

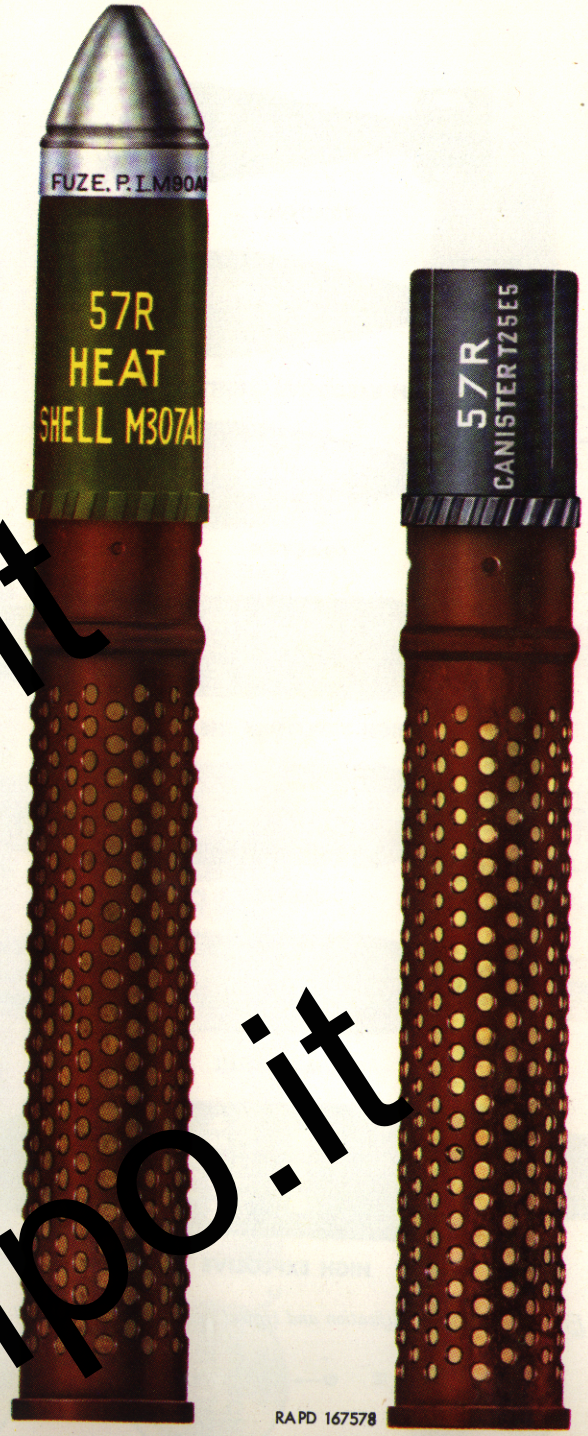


Figure 5. Color identification and typical marking of rifle cartridges.

Figure 6. Color identification and typical marking of mortar shell.

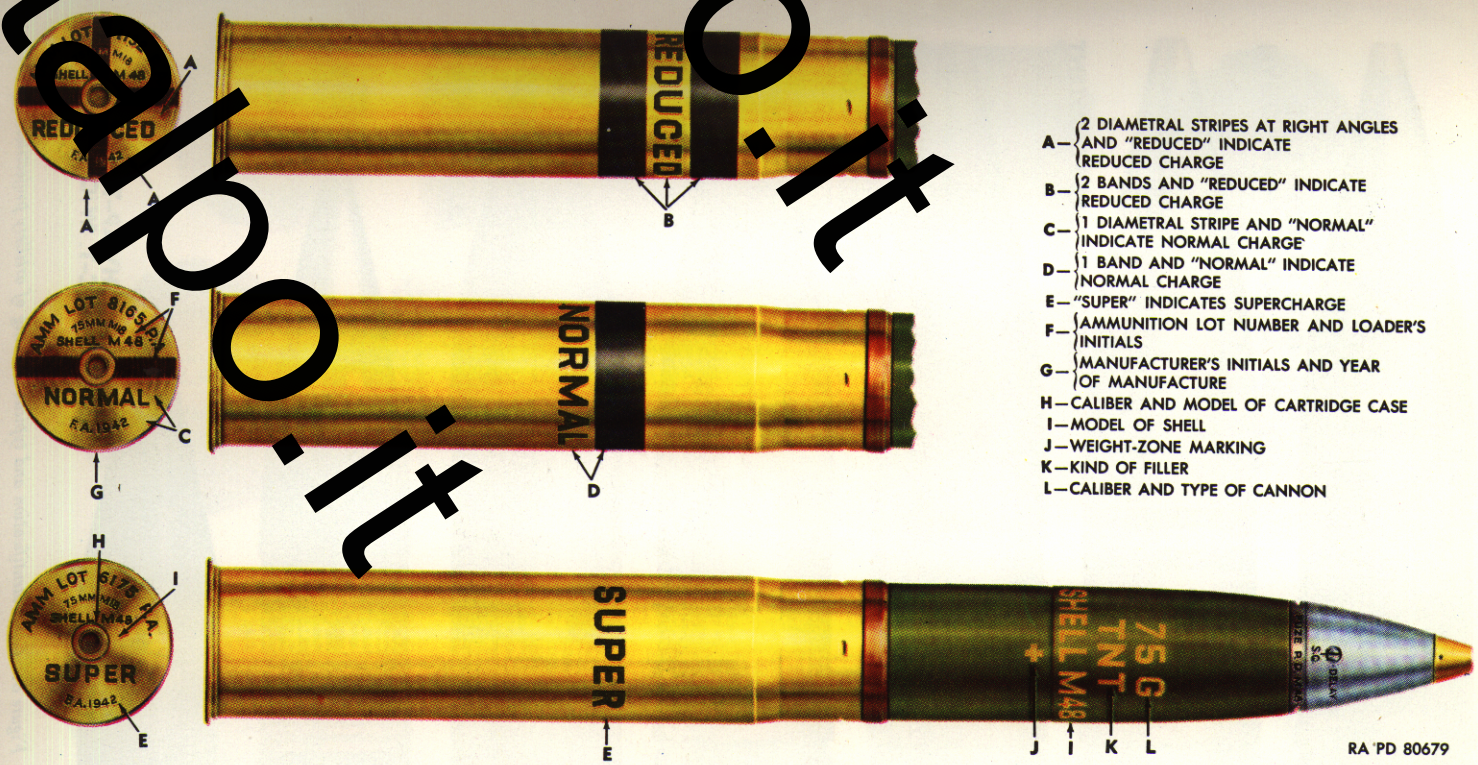


Figure 7 Color identification and typical marking of reduced, normal, and supercharge artillery ammunition.

Figure 8. Color identification and typical marking of artillery projectiles.

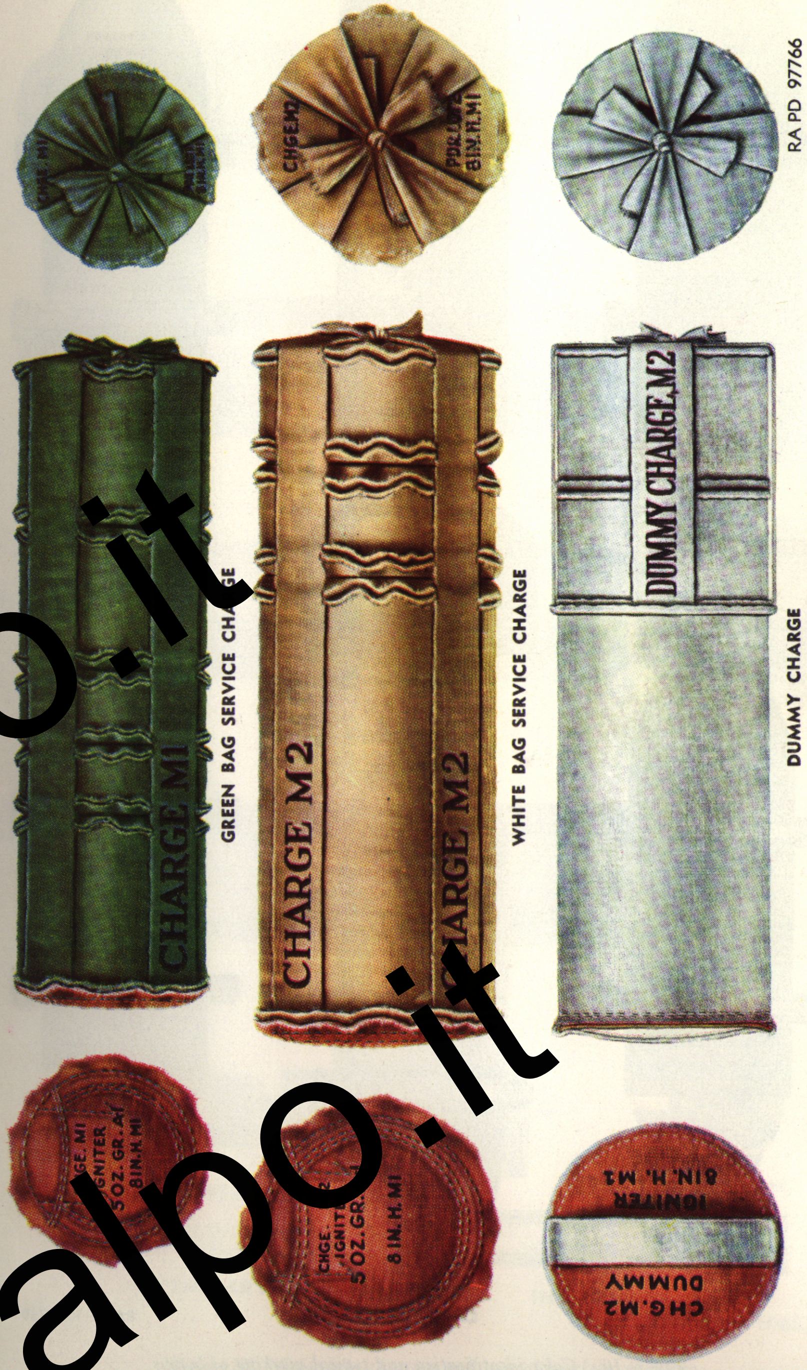


Figure 9. Color identification and typical marking of artillery propelling charges.

Figure 10. Color identification and typical marking of bombs.

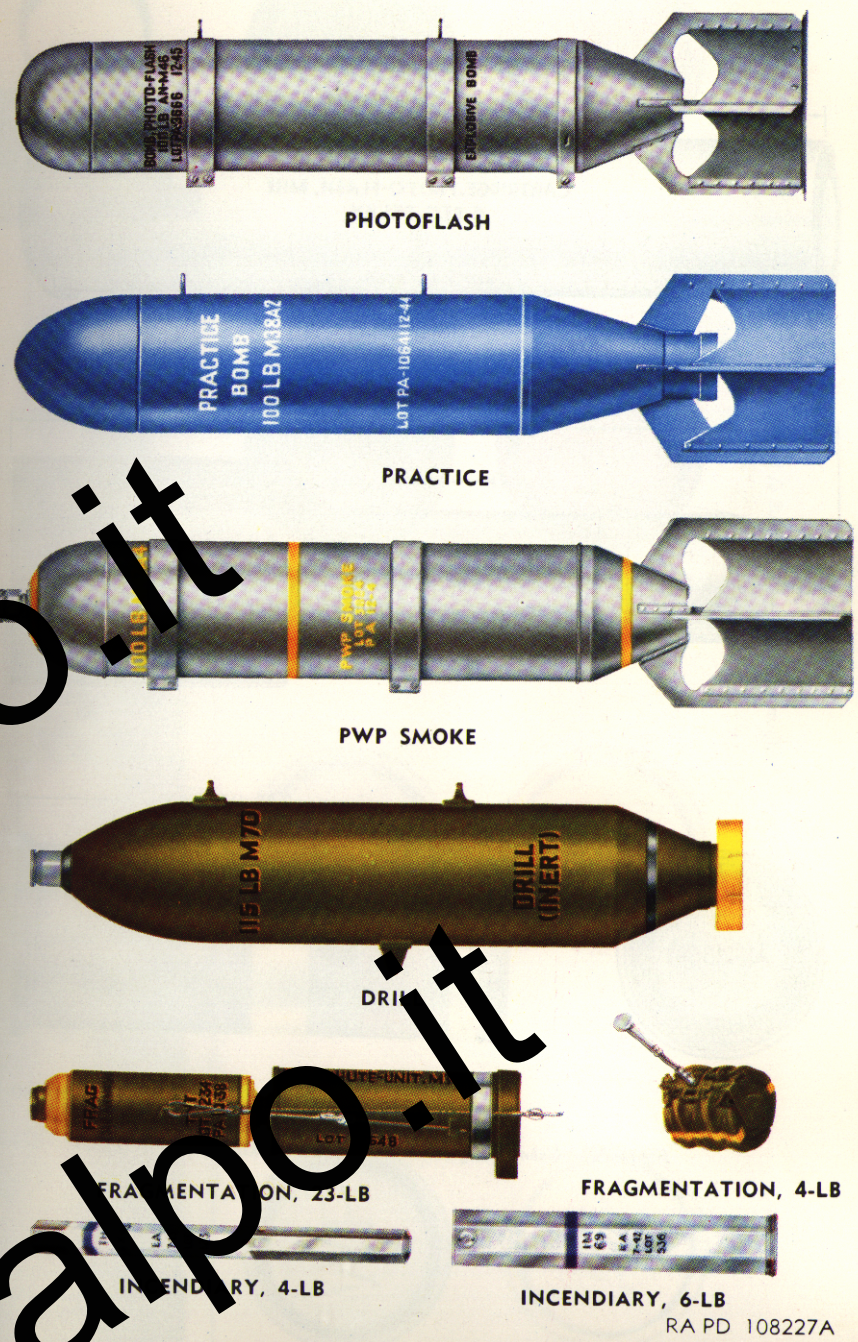
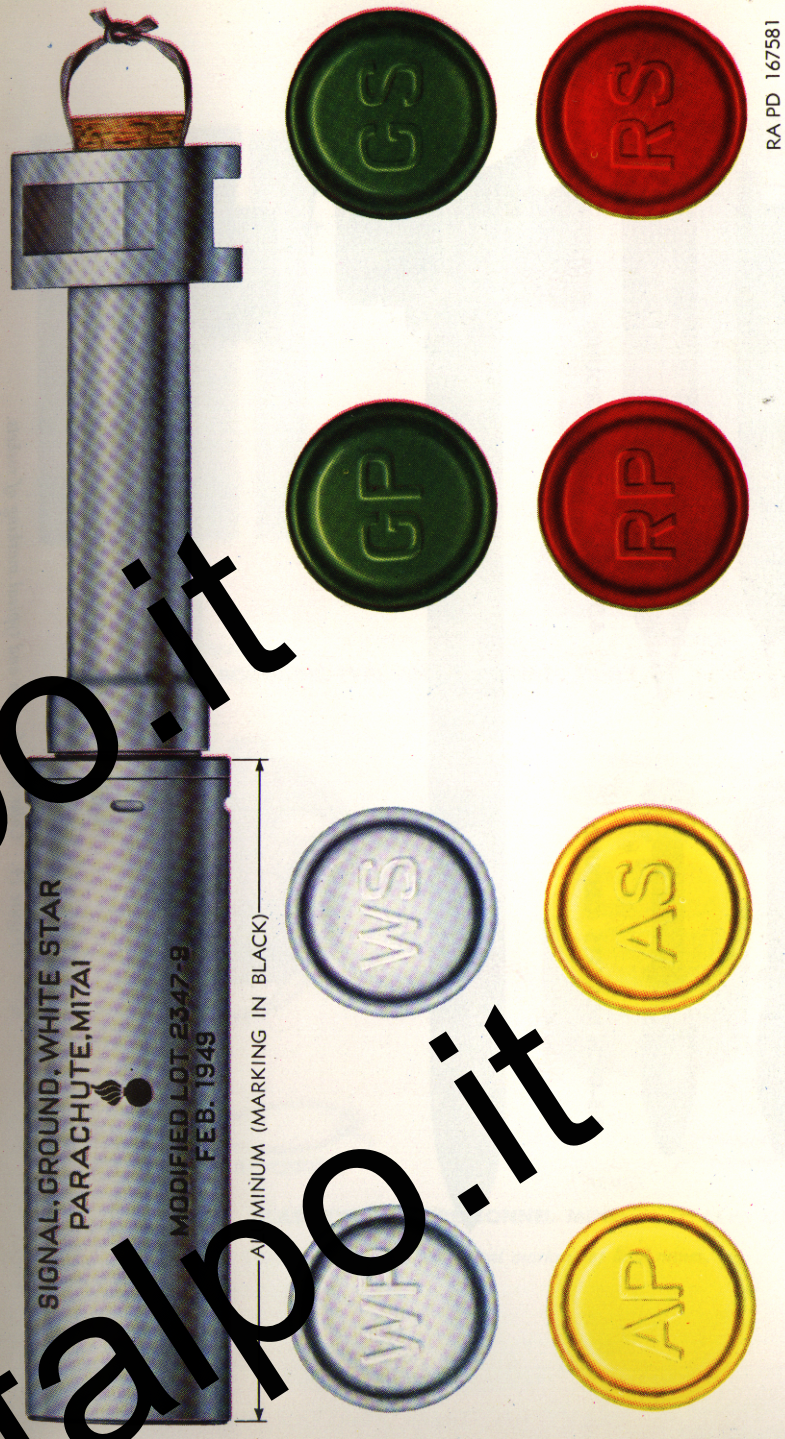


Figure 11. Color identification and typical marking of bombs.

RA PD 167580

Figure 12. Color identification and typical marking of pyrotechnics.



RA PD 167581

Figure 13. Color identification and typical marking of pyrotechnics.

RA PD 73582

Figure 14. Color identification and typical marking of rockets.

RA PD 103504C

Figure [illegible]. Color identification and typical marking of land mines.

Figure 16. Color identification and typical marking of land mines.

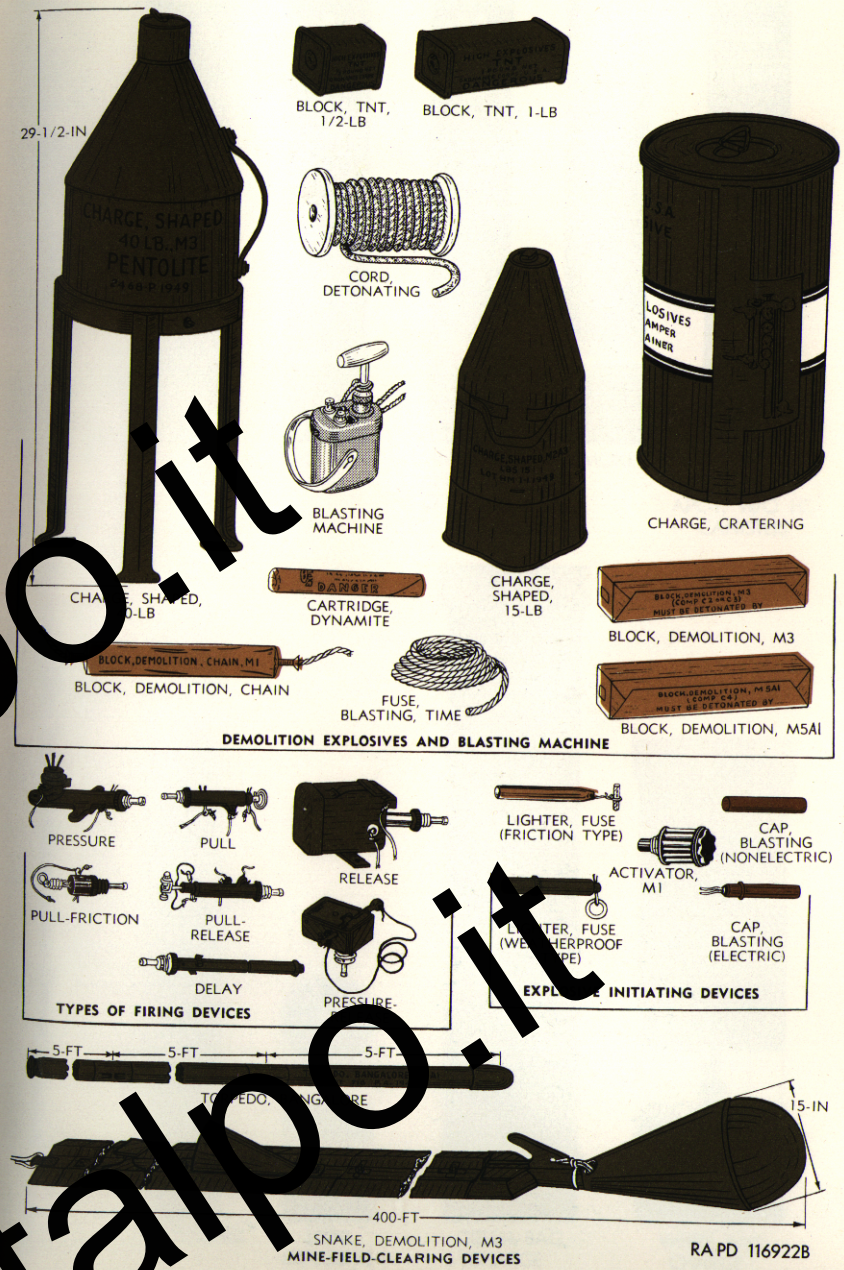


Figure 17. Color identification and typical marking of demolition material.

Figure 18. Color identification and typical marking of fiber and metal containers.

Figure 19. Color identification and typical marking of packing boxes and metal container.

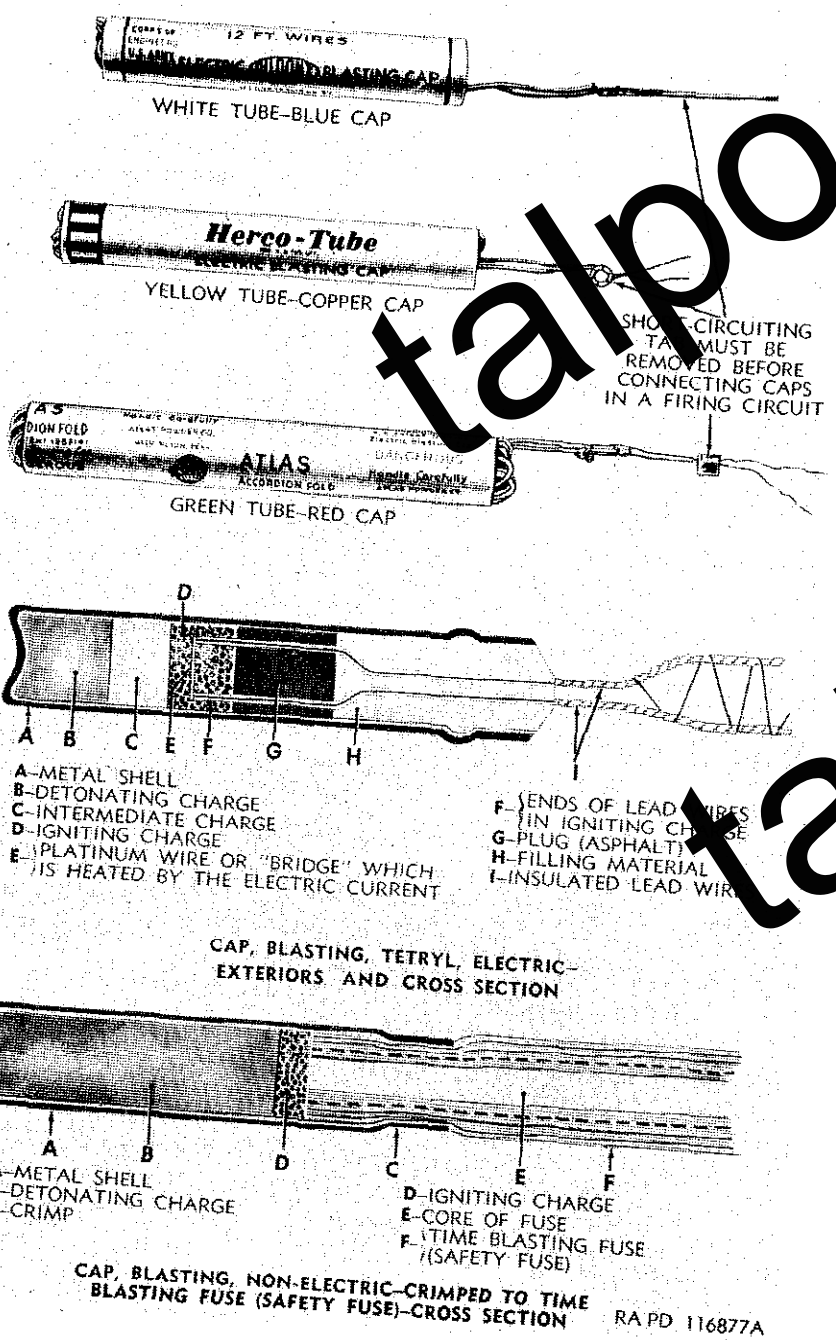


Figure 201. Blasting caps.

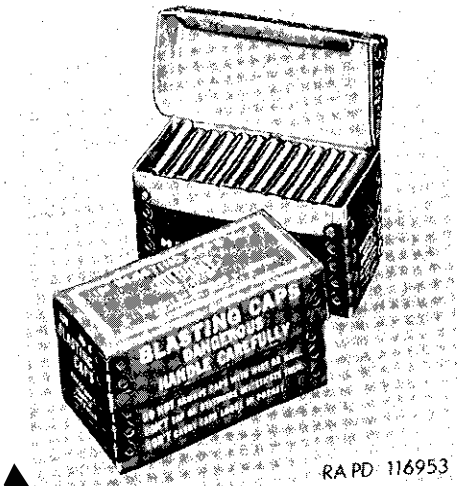


Figure 202. Blasting caps (nonelectric).

a thin tubular metallic shell of noncorrosive metal about 2½ inches long and ¼ inch in diameter filled with a sensitive high explosive. In priming, the caps are inserted into the cap wells of demolition explosives. The electric type has wires for attachment to a blasting machine and the nonelectric type may be crimped to any standard firing device. The nonelectric caps may also be crimped to safety fuse (time blasting fuse) fitted with a fuse lighter or crimped to detonating cord fitted with a delay detonator. Special Army caps, both electric and nonelectric, loaded with pentaerythrite tetranitrate (PETN) are used to detonate the less sensitive military explosives, such as TNT and ammonium nitrate. Commercial caps, principally the No. 6 and No. 8, may be used to detonate the more sensitive explosives, such as dynamite, gelatine dynamite, or nitrostarch. The No. 8 cap is more powerful and more expensive than the No. 6 cap. For description, wiring and electric wiring circuits, see TM 9-1375.

(9) Accessories are issued for use with priming and initiating material.

(*a*) ADAPTER, priming, M1A4 is a small hollow plastic hexagonal head cylinder that is threaded on one end. The adapter simplifies the priming of military explosives having threaded cap wells. The adapter is used with electric blasting cap, with nonelectric blasting cap and safety fuse, and with detonating cord.

(*b*) ADAPTER, priming, M1A3 and earlier models are similar to adapter M1A4 except their external shape is round. The adapter M1A3 is now limited standard and is mandatory for

Figure 203. Demolition equipment set No. 1.

use in training until present supply is exhausted.

(*c*) CLIP, cord, detonating, M1 is a small metal device used to join detonating cord.

(*d*) Waterproof blasting cap sealing compound is used to moistureproof the connection between a nonelectric blasting cap and safety fuse and to moistureproof dynamite primers. The compound does not make a permanent waterproof seal.

(*e*) Single-conductor No. 20 AWG annunciator wire is issued for making connections between electric blasting caps or between cap and firing wire.

(*f*) Firing wire for electric firing of charges consists of two-conductor No. 18 AWG vinyl polymer- or rubber-covered wire or of two-conductor No. 20 AWG vinyl polymer-covered wire. The wire is carried on 500-foot or 1,000-foot firing wire reels.

(10) Instruments and tools are issued for use with priming and initiating material.

(*a*) The blasting galvanometer is used to test electrical firing wire circuits. It contains an electromagnet, a small special silver chloride dry cell, a scale, and indicator needle.

(*b*) Blasting machines are small electric generators that produce current for firing electric blasting caps. There are two types in Army use, the 10-cap twisting-handle type and the 30-, 50-, and 100-cap push-down-handle (rack-bar) type. The

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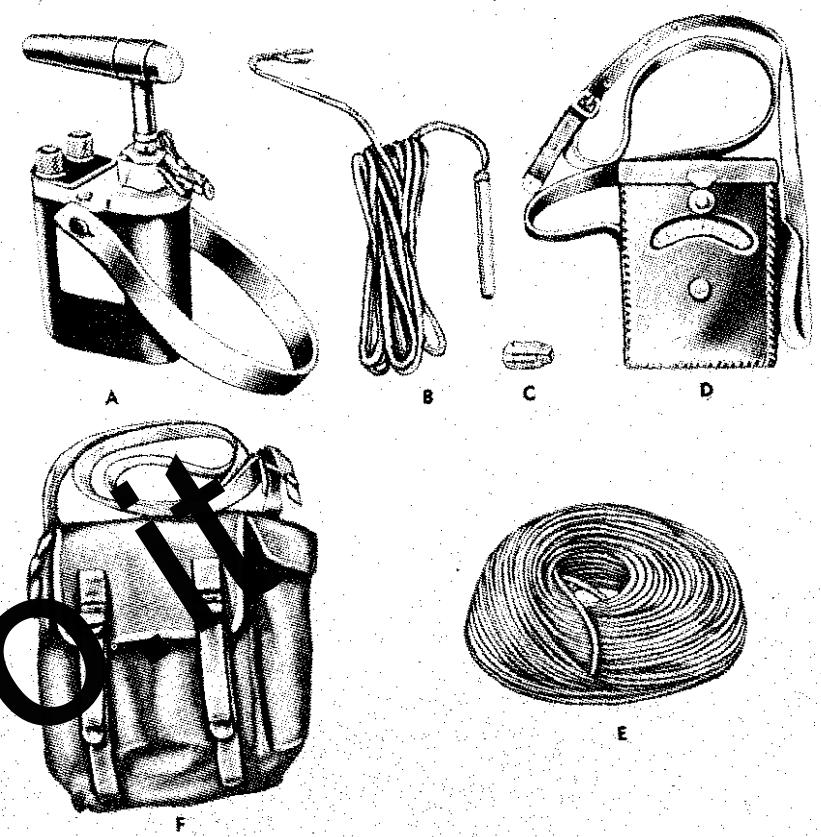
A—3 box, cap, 10-cap capacity, infantry
B—5 firing device, pull-friction type, M2
C—30 clip, cord, detonating, M1
D—5 firing device, pressure type, M1A1
E—10 detonator (five 15-sec delay, M1, and five 8-sec delay, M2)
F—1 chest, demolition squad
G—1 reel, wire, firing, 500 ft, RL–39A, w/2 carrying straps, w/winding device, w/o spool, w/o wire, and 1 spool, DR–8A, empty reel, firing, 500 ft
H—1 block, demolition, chain, M1 (eight 2½-lb blocks ng on cord, detonating)
J—1 wire, firing, 2-conductor, vinyl-polymer co ed, 5 -ft roll, No. 18 awg
K—2 wire, annunciator, single-conductor, cotton vered 00-ft roll, No. 20 awg
L—1 fuse, safety, M700, or fuse, blasting, time (50-f oil)
M—30 adapter, priming, M1A4, or ter, priming, M1A3 or adapter priming, M1A2
N—30 cap, blasting, special, non ctric pe I (J1 PE N))
P—1 knife, pocket, general purp e, 74–K 5 (st d, issued, and reviewed by Quartermaster Corps)
Q—8 block, demolitio M3 om C3) (2 lb block)
R—8 block, molit , M2 (2 lb
S—3 cord, de ating (PETN) 00-ft spool)
T—1 twine, he , N 18, 4-o ball
U—1 ne, b sting capacity, class A
W— tape, ctio gene use, grade A, ¾-in wide, ½-lb roll
X— gal eter last (w/leather case and carrying strap)
Y—30 plosi TNT, 1-lb block
Z—40 ghter use, weatherproof, M2
A—2 blasting, special, electric (type II (J2 PETN))
B— crimper, cap (w/fuse cutter), M2
CC— pliers, lineman's, side-cutting, length 8 in, 2 destructor, high-explosive, universal, M10 (T20)

A—LIGHTER, FUSE, WEATHERPROOF, M2
B—FIRING DEVICE, PRESSURE TYPE, M1A1
C—BLOCK, DEMOLITION, M3
D—CLIP, CORD, DETONATING, M1
E—FIRING DEVICE, PULL FRICTION TYPE, M2
F—ADAPTER, PRIMING, M1A4 OR ADAPTER, PRIMING, EXPLOSIVE, M1A3 OR ADAPTER, PRIMING, EXPLOSIVE, M1A2
G—CRIMPER, CAP, W/FUSE CUTTER, M2
H—CORD, DETONATING (100-FT SPOOL)
J—BAG, CANVAS, CARRYING, DEMOLITION EQUIPMENT
K—FUSE, BLASTING, TIME (25-FT COIL)
L—CAP, BLASTING, SPECIAL, NONELECTRIC, J1 (PETN)
M—DETONATOR, 15-SEC DELAY, M1
N—TAPE, FRICTION, GENERAL USE, BLACK, WIDTH 3/4-IN, 8 OZ ROLL
P—ADHESIVE, PASTE, FOR DEMOLITION CHARGES, 1/2-LB CAN, M1
Q—BOX, CAP, 10-CAP CAPACITY, INFANTRY

RA PD 131021A

Figure 204. Demolition equipment set No. 5.



A—MACHINE, BLASTING, 10-CAP CAPACITY, CLASS A, W/EXTRA HANDLE
B—CAP, BLASTING, SPECIAL, ELECTRIC, J2 (PETN)
C—ADAPTER, PRIMING, M1A4 OR ADAPTER, PRIMING, M1A3 OR ADAPTER, PRIMING, M1A2
D—GALVANOMETER, BLASTING, W/LEATHER CASE AND CARRYING STRAP
E—WIRE, FIRING, 2-CONDUCTOR, VINYL POLYMER COVERED, 500-FT ROLL, NO 20 AWG
F—BAG, CANVAS, CARRYING, DEMOLITION EQUIPMENT

RA PD 131022B

Figure 205. Demolition equipment set No. 7.

capacity of a blasting machine is the number of electric blasting caps properly connected in series that it will fire if operated correctly.

b. Blasting machine testing rheostats of two types are used in the Army in connection with testing blasting machines. The types of rheostats are the six-post and the nine-post.

1. RHEOSTAT, blasting machine, testing, 6-post, consists of a series of coils of electrical resistance wire in a rectangular block-type case. The terminals of the resistance coils are connected to the internal ends of six brass binding posts

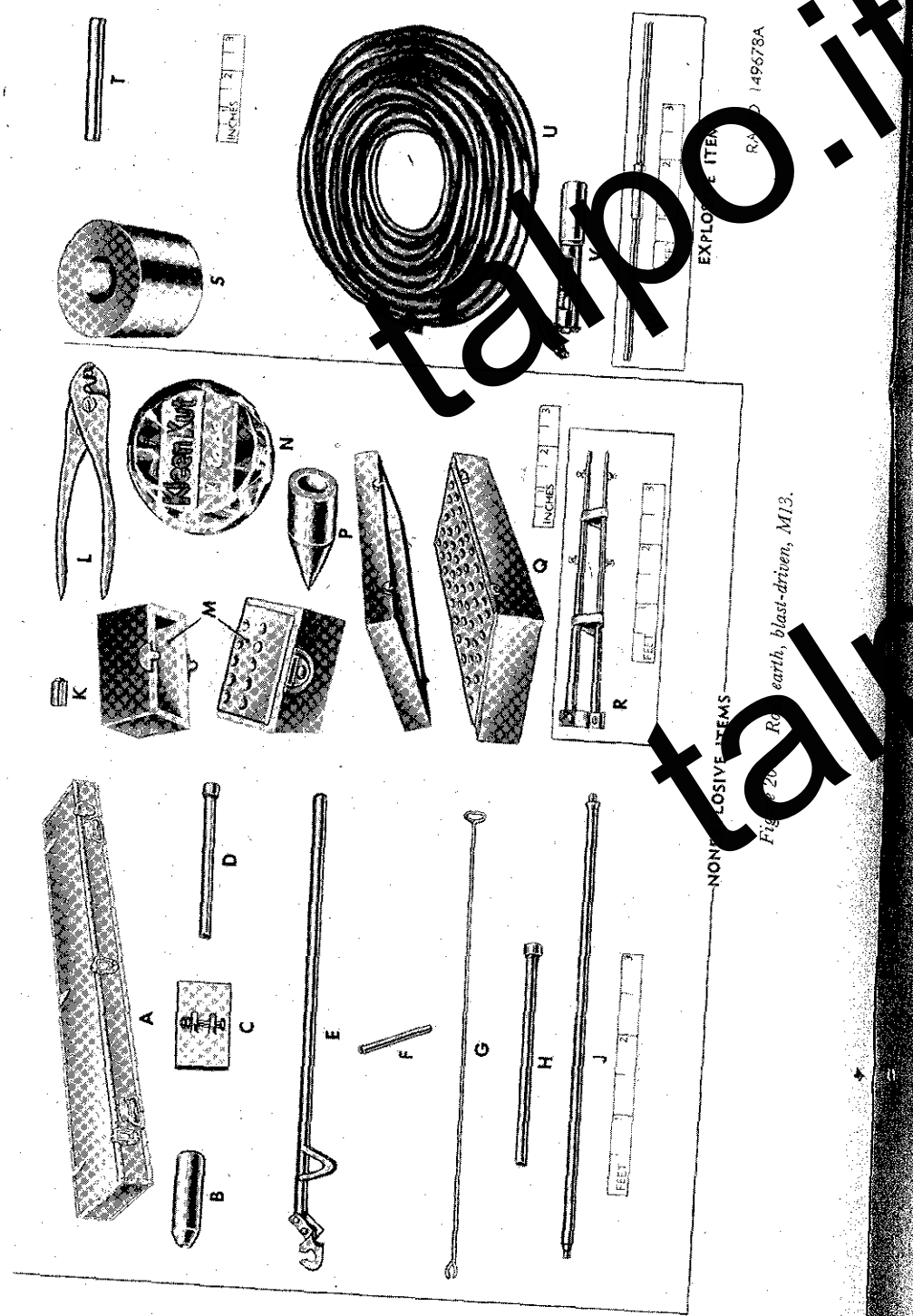


Figure 206. Rock earth, blast-driven, M13.

that extend through the top of the case. Numbers on the side of the case between adjacent pairs of binding posts indicate the number of caps in series having the same resistance as the internal resistance coil connected to that particular pair of posts. The number of caps in series having a resistance equal to that between *any* pair of posts is obtained by adding the figures between the pair selected. This rheostat may be used to test a blasting machine from 5- to 100-cap capacity.

2. RHEOSTAT, blasting machine, testing, 9-post, is similar to the 6-post rheostat except that it is longer and has nine binding posts and correspondingly larger capacity. It may be used to test a blasting machine from 5- to 310-cap capacity.

(*d*) Cap crimpers are designed to squeeze the shell of the nonelectric cap tightly enough around safety fuse or detonating cord to prevent it from being pulled off easily and still not interfere with the burning of the powder train in the fuse. The standard cap crimper is CRIMPER, cap (with fuse cutter), M2, which has a narrow jaw that crimps a water-resistant groove.

Demolition Equipment, Sets and Kits.

(1) Demolition equipment sets (figs. 203–205) contain explosive and nonexplosive items for the performance of particularly designated demolition tasks. Complete lists of the components of specific demolition equipment sets are published in Department of the Army Supply Manual ORD 3 SNL R–7. The sets are designated as follows:

(*a*) DEMOLITION EQUIPMENT set No. 1, engineer squad.
(*b*) DEMOLITION EQUIPMENT set No. 2, engineer platoon.
(*c*) DEMOLITION EQUIPMENT set No. 5, individual.
(*d*) DEMOLITION EQUIPMENT set No. 7, electrical.

(2) The blast-driven earth rod set is used for making holes as deep as 6 feet and several inches in diameter in earth or soft shale. It is not usable in rock or other hard material. The assembled

A—1 chest
B—1 chamber, firing
C—1 plate, base, extractor, assembly
D—1 rod, extension
E—1 extractor, rod
F—1 rod, handle and starting
G—1 rod, inserting
H—1 rod, intermediate
J—2 rods, drill, long
K—10 adapter, firing, explosive, M1A3 or M1A4
L—1 crimper, cap, M2 (w/fuse cutter)
M—1 box, cap, 10-cap capacity, infantry
N—2 tape, friction, general use, black, ¾-in wd, 8-oz roll
P—100 point
Q—2 box, cap, 50-cap capacity, engineer
R—1 tripod
S—100 charge, propelling, M12 (T1) (w/primer, M44)
T—100 cap, blasting, special, nonelectric (type I (J1 PETN))
U—2 fuse, safety, M700, or fuse, blasting time, 50-ft coil
V—200 lighter, fuse, weatherproof, M2
W—100 charge, springing

Figure 206—Continued.

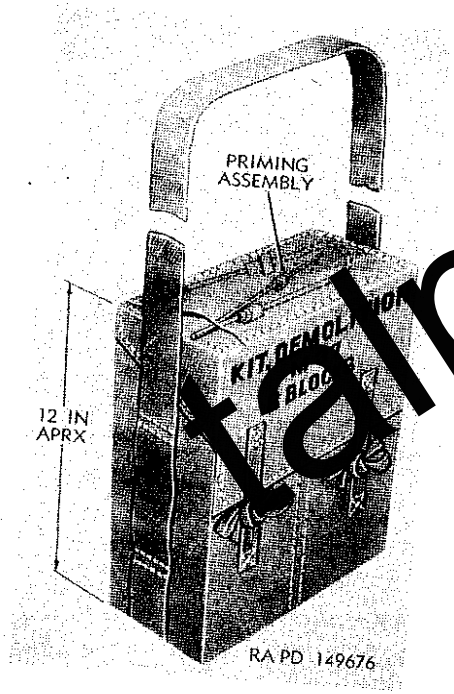


Figure 207. Kit, demolition, M37—in haversack.

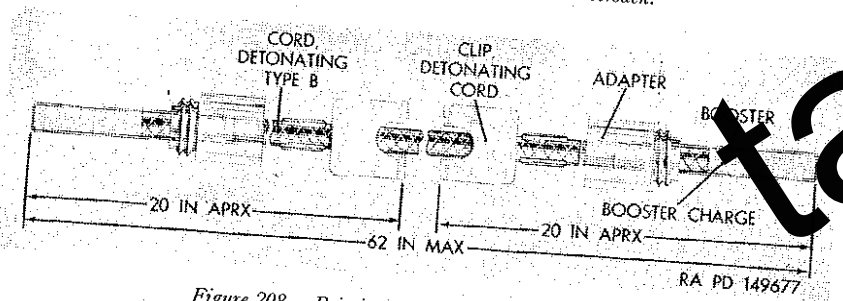
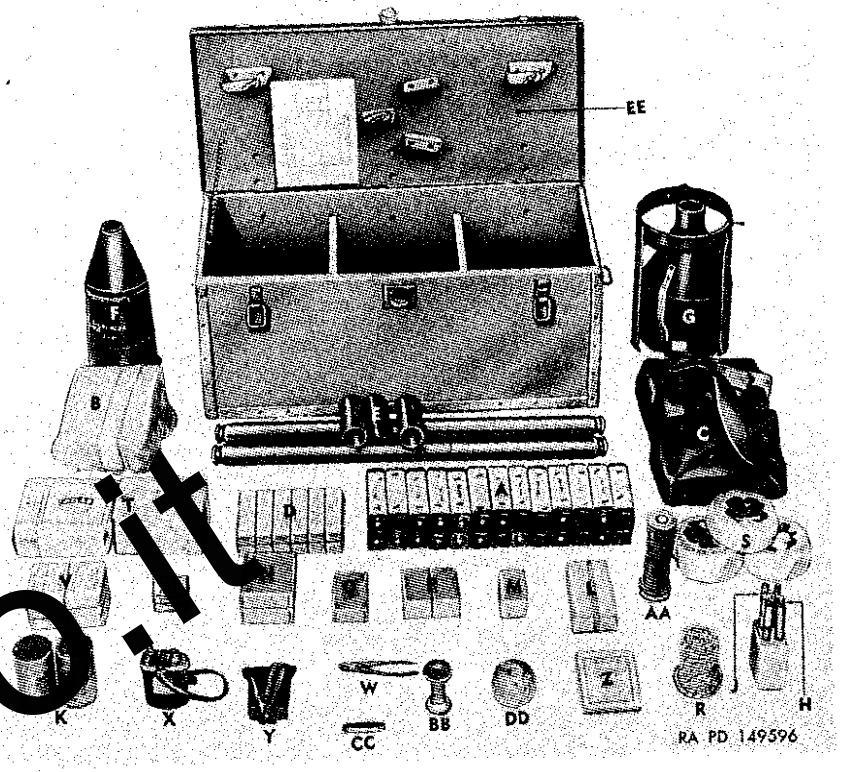


Figure 208. Priming assembly, demolition, M15.

hole-making unit of ROD, earth, blast-driven, M13 (fig. 206) consists of a 6-foot steel rod, a detachable point that fits the lower end of the rod, and a cylindrical firing chamber that screws on the upper end. Propelling charge M12, when placed in the firing chamber and exploded by primer M44, which is attached to a piece of time blasting fuse and a fuse lighter, drives the rod into the earth. A tripod with adjustable legs is used to hold the rod steady for firing. A removable handle, an extractor that grips and lifts the rod, and an extension that can be used to lengthen the rod are used to pull the rod from the earth. A forked inserting rod is furnished for inserting detonating cord charges into the hole made by the rod. The



A—26 explosive, TNT, 1-lb block, inert
B—8 block demolition, chain, M1, inert
C—16 block, demolition, M3, inert
D—12 block, demolition, ½-lb, inert
E—1 torpedo, bangalore, M1A1, inert
F—1 charge, shaped, 15-lb, M2A3, inert
G—1 charge, shaped, 40-lb, M3, inert
H—2 detonator, 15-sec delay, M1, inert
J—2 detonator, 8-sec delay, M2, inert
K—2 detonator, concussion-type, M1, inert
L—50 adapter, priming, explosive, M1A3
M—50 clip, cord, detonating, M
N—10 firing device, pressu type, M1, inert
P—10 firing devic ll-[illegible]ction-ty , inert
Q—5 firi devi pressu rele type, M5, ert
R—4 d, d nati ine (100-ft spool)
S— ft ti bla g, inert (100-ft
T—100 cap, blasting, special, electric (type II (J2 PETN)), inert
U—100 cap, blasting, tetryl, nonelectric, inert
V—30 lighter, fuse, weatherproof, M2, inert
W—2 crimper, cap, M2 (w/fuse cutter)
X— machine, blasting, 10-cap capacity (class A)
Y— alvanometer, blasting, complete
Z—2 pe, friction, general use, black, wd, 8-oz roll
AA—1 wire, firing, 2-conductor, vinyl-polymer covered, 250-ft roll, No 20 awg, training
BB—1 wire, annunciator, single-conductor, cotton covered, 50-ft roll, No 20 awg, training
CC—1 knife, pocket, general purpose
DD—2 twine, hemp, No 18, 4-oz ball
EE—1 chest, demolition squad

Figure 209. Demolition training kit T38.

diameter of the hole may be expanded from top to bottom, as, for example, when making a post hole, by using one or more springing charges or detonating cord, stranded.

(2) Demolition kit M37 (fig. 207) consists of eight demolition blocks

M5A1, eight demolition block hook assemblies, and two demolition priming assemblies M15. Demolition block M5A1 is described in *a*(1)(*c*) above. The priming assembly M15 (fig. 208) consists of a length (approximately 5 ft) of detonating cord, two hexagonal-shaped plastic adapters, each holding a booster and two detonating cord clips. The adapters that are attached to the cord, one at each end, are threaded to fit the cap well of demolition blocks and light antitank mines. Each booster contains a charge of 13.5 grains of RDX. The clips, which are in place on the cord about 20 inches from either end of the assembly, are for making junctions on main lines of detonating cord in a demolition system. The demolition kit M37, together with main lines and their initiators, is used to form a demolition system with one or more demolition blocks M5A1 as the main explosive charge.

(4) Demolition training kits consist of inert items only. KIT, demolition, training, T38 (inert) (fig. 209), and KIT, demolition, training, T39 (inert) are provided for the training of personnel

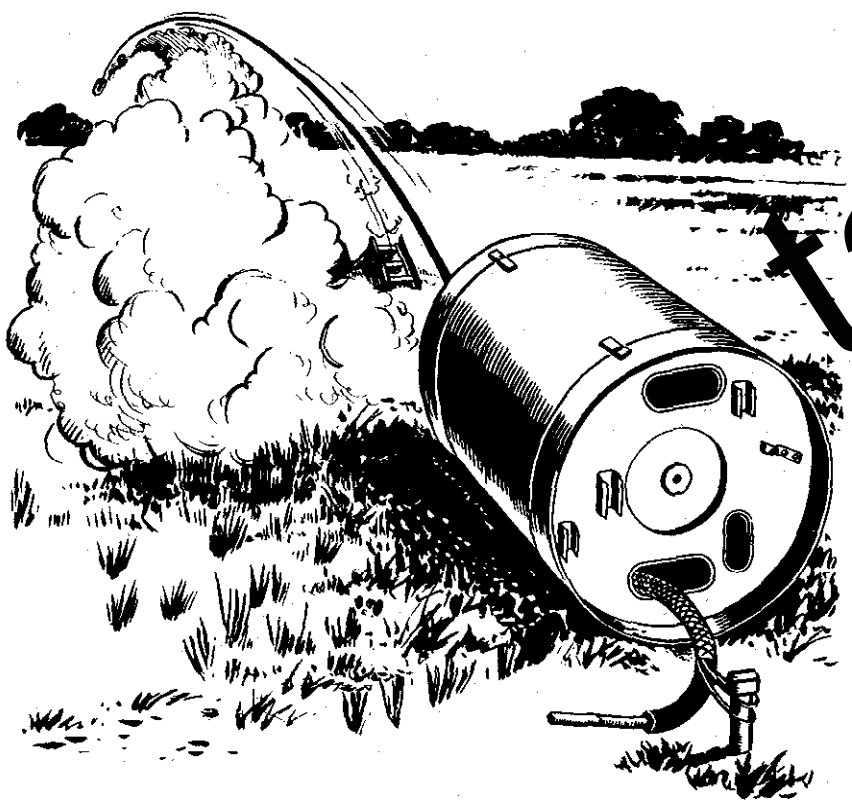


Figure 210. Cable, detonating, mine clearing, antipersonnel, M1—being laid over mine field by jet propulsion unit.

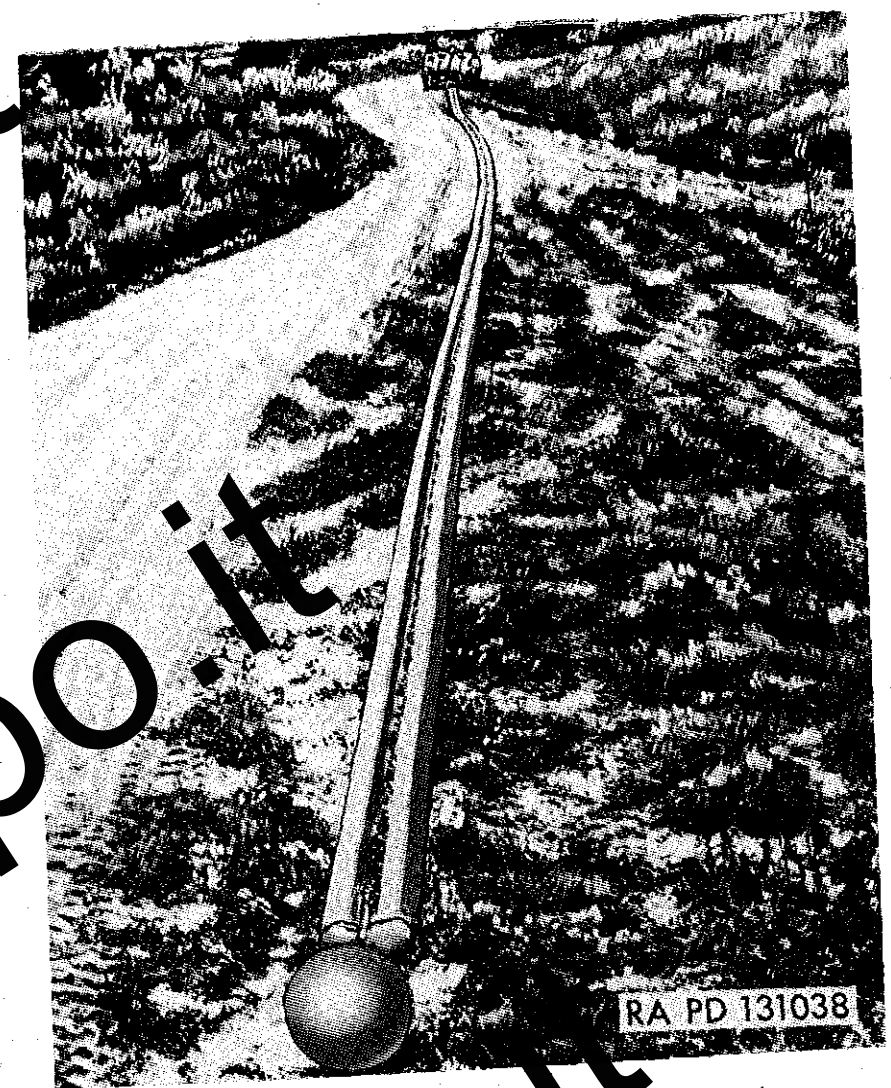


Figure 211. Snake, de... M3—bein... ushed by medium tank.

in the us... em... ition m... erials. Inerted items used for train- ... a... o be ... exactly the same manner and with th... sam... care ... precautions as their explosive counterparts us... in s... See TM 9–1946 for details concerning demo... ition trai... ng kits.

d. Mine-... aring Devices.

(1) The antipersonnel mine clearing detonating *cable* is a flexible linear charge used to clear narrow lanes in antipersonnel mine fields. CABLE, detonating, mine clearing, antipersonnel, M1 (fig. 210) is a nylon-covered cable 170 feet long and about 1

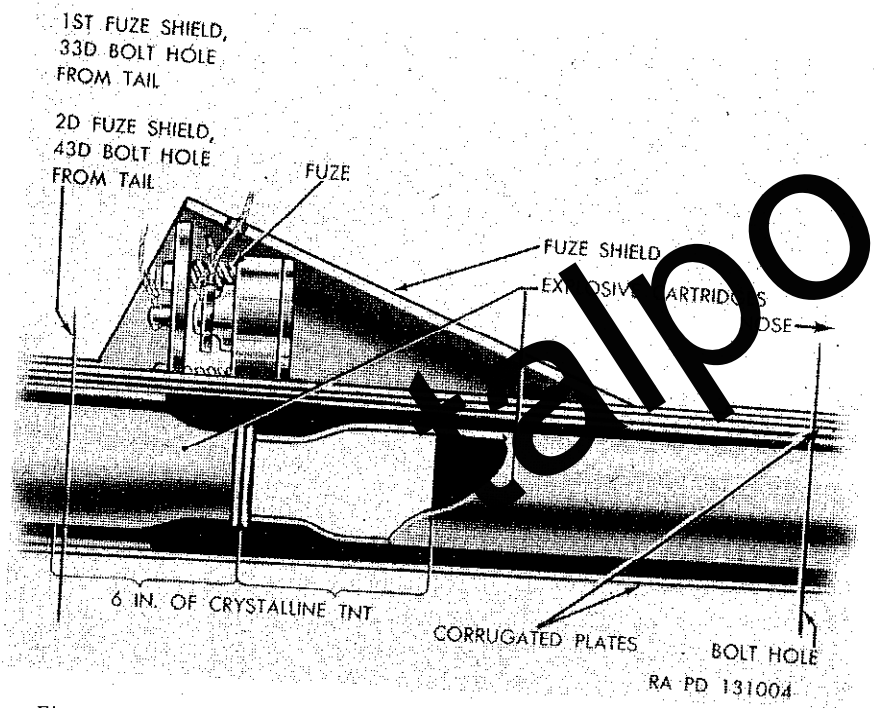


Figure 212. Snake, demolition, M3—longitudinal section at fuze, bullet impact, M1A1.

inch in diameter, which weighs 63 pounds and contains 40 pounds of oil-soaked PETN. This charge consists of 19 strands of *special* detonating cord, each strand containing approximately 100 grains of PETN per foot. Regular detonating cord should not be used as a substitute. One end of the cable has a carrying grip with loops for anchoring the cable to a stake driven in the ground. This end contains a booster charge and a threaded cap well for inserting a 15-second delay detonator for exploding the cable. In the carrying case, the cable is coiled around a cone, which is removed before the unit is fired. The cable is projected across the minefield by a JATO, where it is exploded by the detonator in the anchored end. A launcher, which is a folding stand of aluminum angles, is used to hold the JATO in position for firing. The cable is issued either with or without the JATO. In the latter case, the JATO is requisitioned separately. One LIGHTER, fuse, M2 is provided for igniting the JATO. The entire assembly is contained in a carrying case, which is a cylindrical aluminum can with removable lids, provided with carrying handles on both ends. The loaded case weighs 92 pounds.

(2) Demolition snakes (figs. 211 and 212) are used principally to breach minefields. They may also be used to breach bands of log posts, steel rails, antitank ditches, and some small concrete obstacles. A demolition snake consists of sections made up of two parallel linear explosive charges encased between corrugated metal plates, bolted together to form a rigid assembly that can be towed or pushed by a light or medium tank. The snake is exploded by action of a bullet impact fuze that is actuated by fire from a machine gun on the tank. Complete lists of the components of specific models of demolition snakes are furnished in Department of the Army Supply Manual ORD 3 SNL R–7.

(*a*) SNAKE, demolition, M2, and SNAKE, demolition, M2A1, which are similar except in total explosive load and in minor details, are earlier models. CHARGE, snake, demolition, M2 is used in the snake M2. The charge used in the snake M2A1 is the same as that used in SNAKE, demolition, M3 described in (*b*) below. The corrugated plates used for both snakes M2 and M2A1 are steel. The plates for the demolition snake M3 are of aluminum.

(*b*) SNAKE, demolition, M3 is 14 inches wide, 5 inches high, and 400 feet long when assembled. It weighs approximately 9,000 pounds, including 4,500 pounds of explosives. Corrugated aluminum plates 9 feet long, fastened with steel bolts, washers, and nuts, form the body of the snake. A pear-shaped aluminum nose, attached to the forward end of the snake in such a way that the nose can swivel slightly, aids in guiding the snake over and around obstructions. Other components and accessories adapt the snake for pulling or pushing by a tank. One hundred twenty-eight CHARGE, for snake, demolition, M2A1 and M3 are issued with each SNAKE, demolition, M3. The charge is elliptical in shape, encased in sheet aluminum, is 5 feet long and weighs 40 pounds, including approximately 35 pounds of explosive. The explosive is 20 amatol with a booster charge of crystalline TNT in each end. One end contains a cap well to receive a blasting cap when the explosive cartridges are used individually for general demolition work. The explosive charges are loaded in 320 feet of the 400-foot snake, giving an explosive weight of 14-pounds per loaded foot. Dirt-filled tamping bags are placed adjacent to the charges, extending 20 feet toward the nose of the snake and 20 feet toward the rear, to prevent the charges from shifting. Loading assemblies for bangalore torpedoes may be used as an alternative explosive charge. Two FUZE, bullet impact, M1 are supplied with each demolition snake.

141. Care and Precautions in Handling

a. General. Due consideration should be given to the observance of appropriate safety precautions in handling demolition material.

b. Types of Explosive Charges and Groups. Information concerning the care to be exercised in handling demolition materials will be found in TM 9–1903, TM 9–1946, FM 5–25, and in AR 385–63.

(1) Demolition charges must be handled in accordance with the sensitivity of the explosive comprising the charge. For complete information on characteristics of explosives, see TM 9–1910.

(2) Demolition blocks of plastic explosive must not be exposed to open flame as they ignite easily and burn with intense heat. If burned in large quantities, they may explode. Dynamites must be handled with caution because they may be exploded by flame, sparks, friction, and sharp blows, including impact from bullets or shell fragments. They are more sensitive than other explosives used in demolition or blasting.

(3) Priming components such as safety fuse (time blasting fuse) and detonating cord are sensitive to flame. They should be stored separately from explosive charges or blasting caps.

(4) Initiating components such as detonators, blasting caps, and primers must be protected from shock and high temperature since they contain sensitive explosive elements. Blasting caps will be stored separately from dynamite.

142. Precautions in Firing

a. Detailed information concerning safety precautions to be observed in firing demolition charges will be found in TM 9–1946 and FM 5–25.

b. General safety precautions in firing are in (1) and (2) below.

(1) *General.*

(*a*) Lightning and other sources of extraneous electricity constitute definite hazards when firing charges either electrically or nonelectrically. A strike or a near miss by lightning is almost certain to detonate either type of circuits. For this reason, blasting operations should be suspended and personnel moved to a safe distance upon approach of an electrical storm. Other possible sources of static electricity, such as moving belts, escaping steam, and operating machinery, should be considered and eliminated before connecting up charges, especially when working with electric circuits. Radio transmitters and power lines also produce electrical energy and any electric blasting within 1 mile of a broadcasting or high-power short-wave station or within one-quarter mile of all other radio transmitters must be considered a potential hazard. Nonelectric and detonating cord systems are recommended in such locations.

(*b*) The ammonium nitrate cratering charge, nitrostarch and TNT charges, some demolition blocks, and some dynamites are dangerous to use in inclosed spaces because poisonous fumes result from the explosion.

(*c*) For demolitions in wet surroundings or under water, only those charges and priming and initiating components that are recommended for such use should be employed.

(*d*) Safety-distance requirements for preparation of primers and demolition charges must be observed (see TM 9–1946).

(*e*) Dual-firing systems should be used, whenever practicable, in order to increase the likelihood of a successful operation and to minimize the danger of unexploded charges (see FM 5–25).

(*f*) Primed explosive charges should not be forced into a drill hole (bore hole). Charges should be tamped only with blunt wooden tamping sticks.

(2) *Priming.*

(*a*) *Electric.*

1. All caps used in a circuit will be of the same manufacture.

2. Caps will be tested with an approved galvanometer before priming.

3. Caps will be short-circuited by means of the accompanying shunt or by twisting the bore ends of the wires together until ready to be connected into the circuit.

4. Only after all caps have been connected in the circuit will the final connection be made to the firing wire.

5. The ends of the firing wire at the charge will be kept twisted together until ready to tie into the cap circuit. The blasting machine ends of the wire will be kept twisted together until after the warning signals are given preparatory to connecting the blasting machine.

6. The blasting machine or an essential component thereof will be kept under guard at all times during preparation of the charge until ready to fire.

7. The cap lead wires will not be spliced or tampered with.

8. Only the batteries issued for the galvanometer will be used in the galvanometer.

9. In the event of a misfire in an electric circuit, the leading wires must be disconnected from the source of power before leaving the firing point to investigate. Investigation should be delayed long enough to insure that the misfired charge is not burning.

(*b*) *Nonelectric.*

1. When crimping caps, crimp near open end, pointing it out and away from the body, using only the issued cap crimpers.

2. Caps will be removed from the cap box with the fingertips.

The only materials to be inserted into the end of caps will be time fuse, detonating cord, or standard fuse base. They will not be forced.

3. Charges will be placed on the ground or on the material to be demolished before lighting their fuses.
4. Prime explosives only when planning to detonate them immediately, and *never* store primers after they are assembled.
5. Wait *at least* 30 minutes after the expected time of detonation before investigating any nonelectric misfire.
6. Test time fuse by burning and timing a short length before using. Before using, cut off and discard 2 or 3 inches of the end of the roll to eliminate any absorbed moisture.
7. When using a fuse lighter with less than 1 foot of time fuse, tape the cap-fuse connection to prevent the flash of the fuse lighter from spitting directly into the cap.

143. Packing and Marking

a. Packing.

(1) *Explosive charges.* The chain demolition block is packed one chain per haversack, two haversacks per wooden box. Demolition blocks are packed eight per haversack, two haversacks per wooden box. An exception are the demolition blocks M5 and M5A1, which are packed 24 per plastic bag, 1 bag per wooden box. Nitrostarch and TNT explosives are packed 50 pounds per wooden box. The ammonium nitrate cratering charge is packed one per wooden box. Shaped charges are packed in wooden boxes. From one to eight charges are packed per box, according to the weight of the charge. Dynamite is usually packed 50 pounds per commercial wooden box. High-explosive destructors are packed 1 per fiber container and 50 containers per wooden box.

(2) *Priming and initiating components, accessories, and tools.* Concussion-type detonators are packed in individual metal containers, 50 containers per wooden box. Delay-type detonators are packed 10 per package, 5 packages per inner package, 4 packages (200 detonator) per wooden box. Weatherproof fuse lighters are packed 5 per waterproof carton, 30 cartons per wooden box. Time blasting fuse is packed in 50-foot coils, 2 coils per package, 5 packages per sealed metal can, 8 cans (4,000 feet of fuse) per wooden box. The 2-coil packages are also packed either 30 or 60 per wooden box. Detonating cord is issued in spools of 50, 100, 500, or 1,000 feet. The 50-foot spools are packed 100 per wooden box; 100-foot spools, 50 per wooden box; 500-foot spools, 8 per wooden box. Firing devices are packed 5 or 10 devices per inner box. Trip wires are packed with pull-type firing devices. Inner boxes are packed in wooden boxes that contain from 150 to 250 devices. Primers are packed 5,000 or 10,000 per wooden box. Blasting caps are packed 500 to 10,000 per wooden box or as required. Most accessories and tools are packed as required.

(3) *Demolition equipment, sets and kits.* The explosive items of demolition equipment sets are packed, shipped, and stored separately from the nonexplosive items. No standard packing is prescribed. The blast-driven earth rod set is packed in a plywood box. Demolition kit M37 is packed in a carrying case of the haversack type with priming assemblies attached to the top of the case. Bangalore torpedo M1A1 is packed in a wooden box. Demolition training kits are packed in the standard squad demolition chest.

(4) *Mine-clearing devices.* The antipersonnel mine-clearing detonating cable, including accessories, is contained in a waterproof aluminum carrying case. The carrying case is packed in a wooden box.

b. Marking. In addition to nomenclature and ammunition lot number, packages prepared for shipment are marked with the Interstate Commerce Commission (ICC) shipping name or classification of the article, volume and weight, and the Ordnance Corps escutcheon. The Ammunition Identification Code (AIC) is included in the marking when specified by the packing drawing.

Section X. GUIDED MISSILES

144. General

a. The term "guided missile" refers to an unmanned vehicle moving above the earth's surface or under water, the trajectory or flight path of which is capable of being altered by a mechanism within the vehicle. The missile usually carries a lethal or useful military load.

b. For reasons of safety and ease in handling and shipping, the components of a guided missile are usually stored and shipped separately and must be assembled prior to use. Assembly is performed at predesignated assembly areas. The components of the various guided missiles differ, depending upon the particular type and model. In general, a guided missile is composed of seven basic and distinct major components, described in (1) through (7) below.

(1) *Aerodynamic structure.* This refers to the design and fabrication of the missile body.

(2) *Control system.* The control system is that component that acts as a pilot to keep the missile in a stable flight attitude and make changes in course in response to signals from the guidance system. The control system operates the control surfaces and the propulsion unit.

(3) *Guidance system.* The guidance system is that component that provides continued target intelligence (course data) that will take the missile to its target.

(4) *Propulsion system.* The propulsion system is that component of a guided missile that supplies the power for the missile flight.

(5) *Warhead.* The payload of a guided missile is its warhead. The warhead contains a lethal or useful military load. The mission of a guided missile is to deliver the warhead to a point where maximum effect will be inflicted on a specific target.

(6) *Fuze.* The fuze is that component of a guided missile that causes the warhead to function at the time and under the circumstances desired.

(7) *Electrical power system.* The electrical power system provides electricity for the operation of guidance, control, and fuzing systems of the missile.

145. Classification

a. General. Guided missiles are classified according to the origin of the missile and its destination. They are also designated by service letter, model number and modification letter, prefix letter, popular name, and other appropriate designations.

b. Basic Designations Based on Origin and Destination. Basic designations of guided missiles are:

AAM—Air-to-air missile
ASM—Air-to-surface missile
AUM—Air-to-underwater missile
SAM—Surface-to-air missile
SSM—Surface-to-surface missile
SUM—Surface-to-underwater missile
UAM—Underwater-to-air missile
USM—Underwater-to-surface missile

c. Service Letter, Model Number, and Modification Letter. Each basic designation is followed by a service letter, model number, and modification letter. For example, AAM–N–5b is an air-to-air missile developed by the Navy; it is the fifth model and second modification.

d. Prefix Letters. The status of development is indicated by prefix letters. The letter X indicates experimental; Y indicates service test of the missile; Z indicates obsoletion. For example, XAAM designates an experimental air-to-air missile.

e. Popular Names. Names such as Viking, Nike, Terrier, and Falcon may be assigned to guided missiles.

146. Identification

Guided missiles and their components may be identified by the painting and marking thereon. The markings include such data as name of the component, its model designation, lot number and manufacturer, date of manufacture, type of warhead, and other appropriate identifying markings.

147. Warheads

The useful military load of guided missiles is contained in the warhead. Dependent upon the target and the effect desired, the types of warheads that may be used are indicated in *a* through *e* below.

a. High Explosive. The high-explosive warhead depends upon blast-effect for destruction or demolition of the target.

b. High-Explosive Fragmentation. The effect of this warhead is produced primarily by the fragments of the warhead being projected at high velocity. The blast at the point of functioning will cause additional damage to the target or nearby objects.

c. Chemical. This type may contain toxic chemical agents.

d. Atomic. This type may be designed to produce casualties (by thermal radiation, blast, and nuclear radiation), to cause destruction and damage to structures and equipment, and/or to deny the use of an area due to residual radioactive effects.

e. Practice. Practice warheads simulate service warheads and are provided for such purposes as training in handling, fuzing, and loading.

148. Fuzes

a. General.

(1) A guided missile fuze is a device used with a warhead to cause it to function at the time and under the circumstances desired.

(2) One or more fuzes may be used in conjunction with any of the warheads described in paragraph 147. Depending on the type of target and effect desired at the target, fuzes used with guided missiles may be of the impact, VT (proximity), or ground-controlled types.

b. Impact Fuze. An impact fuze is one that is actuated by striking the target. Functioning time after impact depends upon the design of the fuze and the nature of the target.

c. VT Fuze. VT fuzes function on approach to a target. Each type of VT fuze is actuated by some characteristic of, and at a predetermined distance from, the target. Five basic types of guided missile VT fuzes are—

(1) Radio-proximity.
(2) Pressure-proximity.
(3) Electrostatic-proximity.
(4) Photoelectric-proximity.
(5) Acoustic-proximity.

d. Ground-Controlled Fuzing. In ground-controlled fuzing, the mechanism for determining target proximity is not housed in the fuze, but is on the ground. When the proper proximity relationship is reached between the missile and the target, a signal to detonate is sent to the missile.

149. Electrical Power System

This system supplies electrical power for operation of the guidance and control mechanisms and for the fuzing of the warhead. The types of systems are as described in *a* and *b* below.

a. Battery supply, with or without electronic rectifier and transformer circuit. This type is suitable for small, short-range missiles.

b. An alternating-current generator using a turbine driven by wind, battery, engine, or compressed air. This type is suitable for longer range missiles.

150. Propulsion System

a. General. The propulsion system used in guided missiles employs a jet-type engine, which is the only known type capable of propelling such missiles at the required speeds. A jet engine is one that operates on the reaction principle. It consists essentially of a combustion chamber and a nozzle. When a fuel is burned in the combustion chamber, a thrust is produced as a result of the products of combustion expanding and passing through the nozzle.

b. Types. Jet engines are of two general types, the air-breathing type, and the nonair-breathing type. The air-breathing type, of which the pulse jet, ram jet, and turbo jet engines are examples, uses liquid fuel and atmospheric oxygen as the oxidizer. The nonair-breathing type, of which rocket engines are examples, uses solid propellant (fuel and oxidizer combined) or liquid fuel with an oxidizer.

c. Fuels and Propellants. Fuels and propellants for jet engines are discussed in paragraphs 14 through 21.

d. Phases of Operation. The complete missile propulsion system generally operates in two phases: the launching phase, during which the missile is accelerated to the cruising speed by some means such as a catapult or a high-thrust jet engine sometimes called a "booster unit" or "JATO"; and the cruising phase, during which the missile is maintained at cruising speed by a relatively lower-thrust jet engine sometimes called a "sustainer unit." In other cases, the missile propulsion system does not require a "booster unit" or catapult and operates in only one phase.

151. Control and Guidance Systems

a. General. The control and guidance are parts of an integrated system for automatically directing the flight of the missile.

b. Control System.

(1) *General.* The control system includes all the components necessary for complete automatic control of a missile in flight. The system receives intelligence from a radio signal or other electrical device and makes corrections for changes in yaw, pitch, and roll. The systems usually include gyroscopes, signal amplifiers, servomotors, and control surfaces. The system may also receive internal or external guidance signals in order to adjust the path of a missile.

(2) *Gyroscopes.* The gyroscope is used in a missile to fix a reference direction.

(3) *Electric amplifiers.* The amplifier increases the signal strength to a sufficient level to control the servomotors.

(4) *Servomotors.* The servomotor supplies power to the control surfaces to change the flight path of a missile.

(5) *Control surfaces.* The control surface changes the missile path by application of some force in response to a directing signal. This change in path (steering) is accomplished by one or more of the following devices: air vanes, jet vanes, movable jet motor, or side jets.

c. Guidance System. The main functions performed by the guidance system are tracking, computing, and directing. Tracking is the process of determining the location of a missile and its target with respect to the launcher, and missile and target with respect to each other and some other reference. Computing is the process of calculating the directing signals for the missile by the use of tracking information. Directing is the process of sending the computed signal to the missile. Directing may also be accomplished from within a missile. The directing signals are sent to the control system, thus giving control of missile flight. Some basic guidance systems are described in (1) through (8) below.

(1) *Preset guidance system.* A "preset system" is a guidance system wherein a predetermined path is set into the missile before launching and cannot be adjusted after launching.

(2) *Terrestrial reference guidance system.* A "terrestrial reference system" is a guidance system for a predetermined path, wherein the path of the missile can be adjusted after launching, by devices within the missile that react to some phenomena of the earth.

(3) *Radio navigation guidance system.* A "radio navigation system" is a guidance system for a predetermined path wherein the path of the missile can be adjusted by devices within the missile that are controlled by external radio signals.

(4) *Celestial navigation guidance system.* A "celestial navigation system" is a guidance system for a predetermined path wherein the path of the missile can be adjusted by the use of continuous celestial observation.

(5) *Inertial guidance system.* An "inertial system" is a guidance system for a predetermined path wherein the path of the missile can be adjusted after launching by devices wholly within the missile.

(6) *Command guidance system.* A "command system" is a guidance system wherein the path of the missile can be changed after

launching by directing signals from some agency outside the missile.

(7) *Beam climber guidance system.* A "beam climber system" is a guidance system wherein the direction of the missile can be changed after launching by a device in the missile that keeps the missile in a beam of energy.

(8) *Homing guidance system.* A "homing system" is a guidance system wherein the direction of the missile can be changed after launching by a device in the missile that reacts to some distinguishing characteristic of the target.

152. Launchers

a. General. Launchers are mechanical structures that provide whatever control and acceleration are needed during the initial stages of flight to enable the missile's control and guidance system and the propulsion system to direct and carry it to the target.

b. Types of Launchers. Some basic types of launching devices are trainable platform, vertical tower, vertical ramp, ramp or rail (other than vertical), zero length (a launcher on which there is negligible travel by the missile), gun type, catapult, and aircraft.

c. Firing. Firing of guided missiles from a launcher is usually accomplished electrically by remote control.

d. Blast Protection. Due to the dangerous blast of flame emitted by guided missiles, the launching site must be cleared of all personnel and unnecessary equipment. All unprotected combustible material must also be removed from the launching area.

153. Care, Handling, and Preservation

In general, the same regulations apply to guided missiles as to other types of ammunition. However, certain components of the missile require special handling. The control equipment, which includes such items as gyroscopes, homing devices, electronic equipment, and other precision instruments, must be protected from rough or careless handling. Special precautions must be taken with certain of the fuels and oxidizers due to fire, explosion, contact, and inhalation hazards. Protective clothing and masks must be used when handling certain of the fuels and oxidizers. Careful training in safety measures, procedures for handling, and precautions in use of guided missile explosive or flammable components is essential.

154. Packing and Marking

a. Packing. The components of guided missiles are packed in appropriate types of containers. Fuzes and warheads are packed in wooden or metal containers. Propellants, which includes fuel, oxidizer, reducer, and solid and liquid propellants, are packed in specially designed tanks, metal drums, glass bottles, or fiber containers in wooden boxes. Control and guidance equipment are packed in specially constructed packings since they are precision instruments. Propulsion systems are packed in metal crates or wooden boxes. Special equipment such as compressors, cable sets, storage batteries, firing panels, and similar items are also packed in suitable boxes, crates, and containers.

b. Marking. The packing boxes, crates, drums, and containers in which guided missile components are packed are marked for easy identification. They may or may not be coded for a specific guided missile complete round. Packings of propellants and components of propellants, fuzes, and warheads are also marked to indicate the Interstate Commerce Commission shipping name and any important instructions in handling or storage.

Section XI. CARTRIDGE-ACTUATED DEVICES FOR AIRCRAFT USE

155. General

Cartridge-actuated devices for aircraft use include such items as catapults, rem[illegible]ers, initiators, and thrusters. These devices are actuated by special blank cartridges and are used in emergency-escape mechanisms in high-speed aircraft.

156. Catapults

a. General. A catapult is a cartridge-actuated device designed to facilitate an emergency escape from high-speed combat or bomber aircraft by forcibly ejecting the pilot seat and pilot away from the aircraft. The ejection may be upward or downward from the aircraft depending upon the models of aircraft and catapult. Structurally, an aircraft catapult is composed of three tubes; outer tube, telescoping tube, and inner tube. One end of the catapult is attached to the pilot seat and the other end is attached to the aircraft structure. The catapult is actuated by gas pressure from the burning propellant of a special blank cartridge incorporated in the catapult. This blank cartridge is fired by a firing pin in the catapult that, in turn, is actuated by gas pressure from a remotely

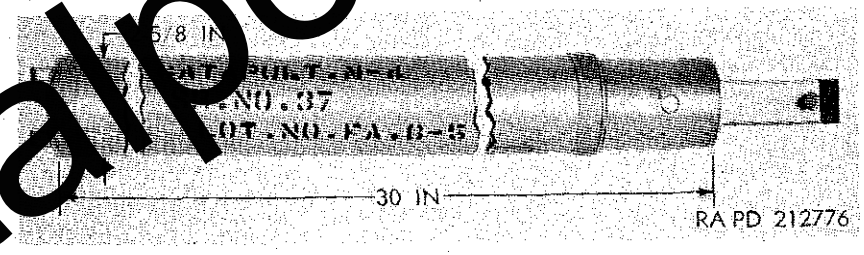


Figure 213. Catapult M4.

located (in the aircraft) initiator. Pressure, generated within the initiator by an integral special blank cartridge, is transmitted to the catapult through a system of connecting hose or tube.

b. Types.

(1) Representative types of service catapults are the M3 for "upward" ejection in high-speed bomber aircraft, the M4 (fig. 21[illegible]) for "downward" ejection, and the M5 for "upward" ejection in fighter planes. Each of these types is operated by a system consisting of the initiator M3 (fig. 217), which provides for remote (in the aircraft) actuation. This initiator contains CARTRIDGE, CAD, M38, which, when fired, furnishes gas pressure through aircraft hose to the catapult. The gas pressure exerts a force on the catapult firing piston forcing firing pin downward, shearing the shear pin, unlocking the catapult, and the remainder of the movement of the firing pin fires the CARTRIDGE, CAD, M36 in the catapult M3; the CARTRIDGE, CAD, M37 in the catapult M4; or the CARTRIDGE, CAD, M28A1 in the catapult M5.

(2) Representative types of training catapults are the M2 that utilizes CARTRIDGE, CAD, M30A1 and the M6 that uses CARTRIDGE, CAD, M57. The catapult M2 is used, in simulating the action of a service catapult, on a fixed tower. It consists of a pair of telescoping tubes, one of which is attached to the pilot training seat and the other to the training tower. Upon firing the cartridge, which simulates the action of the service catapult cartridge, the tubes telescope and the inner tube continues in the training flight attached to the seat. The training

Figure 214. Remover M2A1.

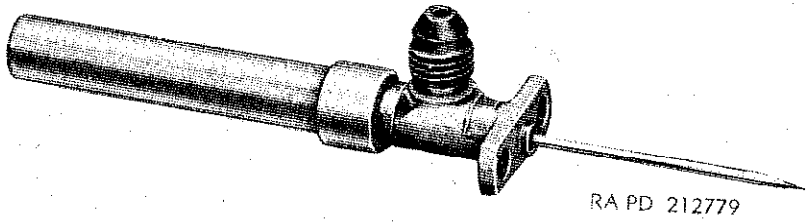


Figure 215. Exactor M1.

catapult M6 is used in conjunction with a mobile seat trainer rather than on a fixed tower as the training catapult M2.

157. Removers

a. General. A remover is a device designed to jettison an aircraft canopy from an aircraft in an emergency, to provide an exit for the pilot when he is ejected by a catapult. The remover is actuated just prior to actuation of the catapult. The remover is a telescoping tube ejector similar to a catapult but smaller and somewhat less powerful. One end of the remover is attached to the canopy, the other to the aircraft structure. Upon firing the remover cartridge, the remover is extended axially and the head and inner tube are ejected with the canopy. The exactor M1 (fig. 215), which is not integral with the remover but attached to it, is connected to an initiator, and functions independently of the catapult. The initiator gas pressure operates the exactor plunger, thus releasing the canopy firing pin that fires the remover cartridge. The initiator generally employed in this capacity is the M3, which is a mechanically (lanyard or cable) operated device.

b. Types. Representative types of removers are the M1A1, M2A1 (fig. 214), and M3. Each model of these series is designed with a particular cartridge for a particular type of aircraft. The remover M1A1 uses

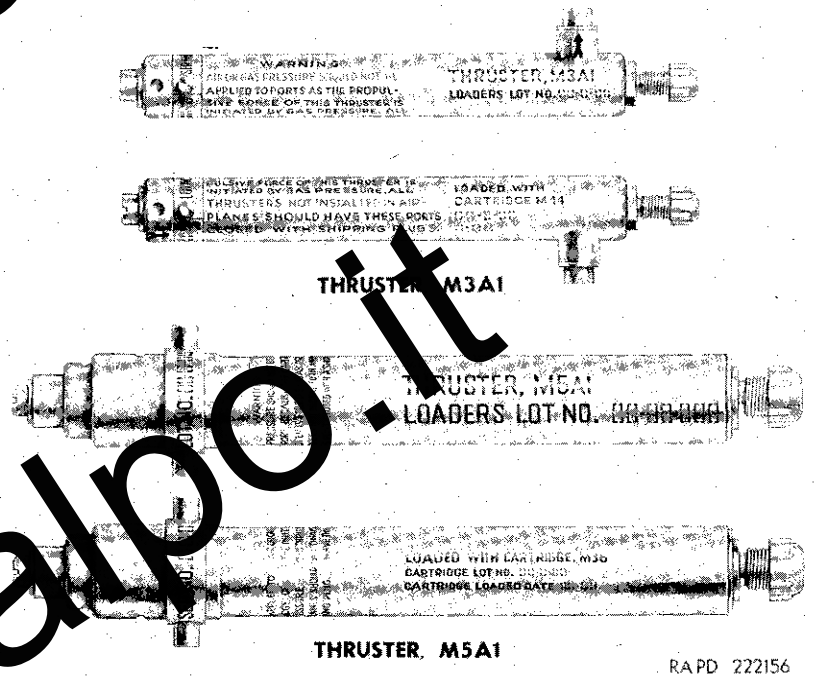


Figure 216. Thrusters M3A1 and M5A1.

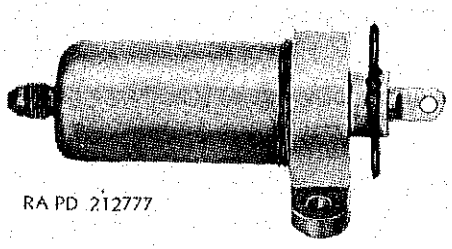


Figure 217. Initiator M3.

CARTRIDGE, CAD, M29A2 and is operated by [illegible] which is actuated by initiator M3. The remover M1A1 uses CARTRIDGE, CAD, M31A1 and is actuated by a seat which is operated by a cable or linkage-type system in the aircraft. The remover M3 uses CARTRIDGE, CAD, M31A1 and is actuated by initiator M3.

158. Thrusters

a. General. Thrusters are cartridge-actuated devices used in aircraft to position various components of the aircraft, as an initial operation to facilitate the subsequent emergency escape of personnel. Thrusters consist essentially of a cylinder, piston, cartridge, and a firing pin, which is actuated by gas pressure furnished from an initiator. When the thruster cartridge is ignited, the piston is forced down the cylinder, exerting a thrust on the related aircraft component. The various models of thrusters differ in design details such as thrust exerted, length of stroke, etc.

b. Types. Representative types of thrusters are the M1 and M1A1, which use CARTRIDGE, CAD, M42; the M2 and M2A1, which use CARTRIDGE, CAD, M43; the M3 and M3A1, which use CARTRIDGE, CAD, M44; and the M5 and M5A1, which use CARTRIDGE, CAD, M38 (fig. 216).

159. Initiators

a. General. Initiators are cartridge-actuated devices that are used in aircraft emergency escape systems to provide a source of gas pressure, which actuates another component of the system, such as a catapult or thruster. Initiators may differ in the method of firing; that is, they may be fired mechanically by the operation of some form of lanyard as is the initiator M3 or by gas pressure furnished by the preceding item in the system as in the case of the initiators M5 and M5A1. Delay initiators incorporate a delay element in the initiator cartridge.

b. Types. Representative types of initiators include the M3 (fig. 217), M5, and M5A1, which use CARTRIDGE, CAD, M38. Representative types of delay initiators are the M4, M6, and M6A1, which use CARTRIDGE, delay, CAD, M46.

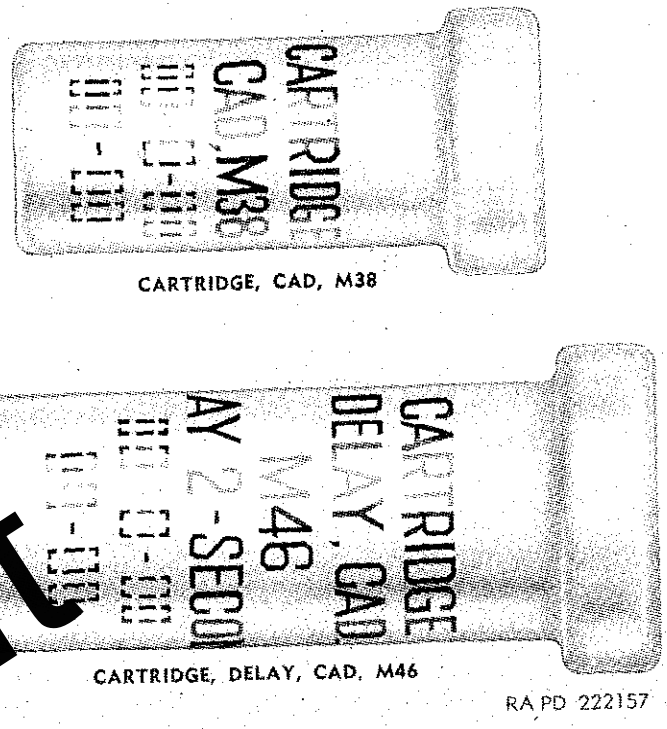


Figure 218. Cartridges.

160. Cartridges

With exception of CARTRIDGE, delay, CAD, M46 (fig. 218), all the CAD cartridges are similar in general design, consisting of an aluminum case, a percussion primer, and a propellant. They differ in size and in the amount of propellant as determined by the military requirements of the item to which they are assembled. The CARTRIDGE, delay, CAD, M46 differs from the other cartridges in that a 2-second delay element M5 is provided between the primer and the propellant. The delay element M5 consists of a cylindrical metal body containing a 2-second fuze with a flash hole on one end of the body and a primer pocket on the other end.

161. Care and Precautionary Handling

a. General. Due consideration should be given to the observance of appropriate safety precautions in handling cartridge-actuated devices. Information concerning the care to be exercised in handling these devices will be found in TM 9–1903 and in pertinent Air Force Technical Orders (see app.).

b. Types.

(1) All types, that is, catapults, removers, thrusters, and initiators, must be handled with care as they contain a cartridge.

(2) Air or gas pressure should not be applied to the inlet ports of those devices that are initiated by gas pressure. When not installed in an airplane, these ports should be kept closed with a shipping plug.

(3) The cotter pin must not be taken out until remover is installed in an airplane and then only if lock pin is in place. Do not remove removers from the airplane unless cotter pin is replaced in the hole.

(4) The safety pin (M3 and M4 type initiator) will always be inserted in the initiator except when the initiator is installed in an aircraft and the aircraft is in flight. Do not remove the initiator from the aircraft or perform any maintenance in the initiator or in the immediate area unless the safety pin is installed.

162. Packing and Marking

a. Packing.

(1) Catapults and training catapults are assembled and shipped as a sealed unit, with the cartridge contained therein. All catapults are packed one per corrugated fiberboard carton, four cartons per wooden box, with the exception of the catapult M3, which is packed two (in fiber container) in a wooden box.

(2) Removers are assembled and shipped as a sealed unit, with the cartridge contained therein. All removers are packed four in a carton in a wooden box, with the exception of the remover M3, which is packed six (in fiber containers) in wooden box in two layers, three per layer.

(3) Initiators are assembled and shipped as a sealed unit, with cartridge contained therein. All initiators are packed 4 per corrugated fiberboard carton, 12 cartons per wooden box.

(4) Thrusters are assembled and shipped as a sealed unit, with the cartridge contained therein. All thrusters are packed in fiber ammunition containers, 12 containers per wooden box, with the exception of thrusters M2 and M2A1, which are packed 9 containers per wooden box.

b. Marking. In addition to nomenclature and ammunition lot number, packages prepared for shipment are marked, in accordance with Interstate Commerce Commission shipping regulations, the same as small-arms ammunition. The ammunition Identification Code Symbol (AIC) is included in the marking when specified by the packing drawing.

APPENDIX

REFERENCES

1. Publication Indexes

DA pamphlets of the 310-series, DA Pam 108–1, and TO 00–101 should be consulted frequently for latest changes or revisions of references given in this appendix and for new publications relating to the matériel covered in this manual.

2. Forms

DA Form 9-5 Ammunition Inspection and Lot Number Report (cut sheet).
DA Form 9-5 Ammunition Inspection and Lot Number Report (continuation sheet) (cut sheet).
DA Form 9-8 Ammunition Stores Slip (pad of 100).
DA Form 347 Registry if Injury Claims (cut sheet).
DA Form 580 Ordnance Ammunition Stock Status Report (cut sheet).
DA Form 580–1 through 12 Ordnance Ammunition Stock Status Report (cut sheets).
DA Form 581 Ammunition (cut sheet).
DA Form 583 Ammunition Visible Index (card).
DA Form 953 Summary of Accident Experience (cut sheet).

3. Types of Ammunition

90-mm HE Shell M71 with PD Fuze; Calibration Data for Certain Lots	TB ORD 420
Ammunition: Identification Code (AIC)	TB 9–AMM 5
Ammunition: Restricted or Suspended	TB 9–AMM 2
Artillery Ammunition	TM 9–1901
Bombs for Aircraft	TM 9–1980
Chemical Bombs and Clusters	TM 3–400
Demolition Materials	TM 9–1946
Employment of Land Mines	FM 20–32
Flame Throwers and Fire Bomb Fuels	TM 3–366
Hand and Rifle Grenades	FM 23–30
JATOS, General	TM 9–1955
Land Mines	TM 9–1940
Military Chemistry and Chemical Agents	TM 3–215
Military Explosives	TM 9–1910
Military Pyrotechnics	TM 9–1981

Miscellaneous Chemical Munitions ..... TM 3–300
Pricing Guide—Ammunition ..... ORD 5–3–6
Reducer, Flash, M1: Change in Authorized Use When Firing Charge, Propelling, M19, in Gun, 155-mm. M2 ..... TB ORD 565
Reducer, Flash, M2 (T2): Clarification of Authorized Use When Firing Charge, Propelling, M4 or M4A1, in Howitzer, 155-mm M1 or M45 (T186E1) ..... TB ORD 590
Rockets ..... TM 9-1990
Small-Arms Ammunition ..... TM 9-1990
Type M3 Initiator ..... TO 11P3-2-1
Type M4 Delay Initiator ..... TO 11P3-2-2-1
Type M5 Initiator ..... TO 11P3-2-3-1
Type M6 Delay Initiator ..... TO 11P3-2-4-1

4. Safety

Accident Experience; Reporting and Records ..... SR 385–10–41
Accident Reporting ..... SR 385–10–40
Coordination with Armed Services Explosives Safety Board ..... SR 385–15–1
Fire Report ..... SR 385–45–20
Identification of Inert Ammunition and Ammunition Components ..... SR 385–410–1
Miscellaneous: Precautions in Handling Gasoline ..... AR 850–20
Regulations for Firing Ammunition for Training, Target Practice, and Combat ..... AR 385–63

5. Camouflage

Camouflage, Basic Principles ..... FM 5–20

6. Decontamination

Decontamination ..... TM 3–220
Defense Against CBR Attack ..... FM 21–40

7. Destruction

Explosives and Demolitions ..... FM 5–25
Land Mines and Components; Demolition Explosives and Related Items; and Ammunition for Simulated Artillery, Booby Trap, Hand Grenade; and Land Mine Fire ..... ORD 3 SNL R–7

8. Disposal

Disposal of Supplies and Equipment: Ammunition ..... SR 755–140–1
Disposal of Supplies and Equipment: Disposition of Foreign Excess Personal Property ..... AR 755–10
Explosive Ordnance Reconnaissance and Disposal ..... FM 9–40
Explosives: Disposal by Dumping at Sea ..... SR 75–70–10
Explosives: Responsibilities for Explosive Ordnance Disposal ..... AR 75–15
Tool Set, Maintenance (Field), Explosive Ordnance, Disposal Squad ..... ORD 3 SNL J–8, Sec 1

9. Maintenance and Renovation

Abrasive, Cleaning, Preserving, Sealing, Adhesive, and Related Materials Issued for Ordnance Matériel ..... TM 9–850
Ammunition Renovating Tools ..... ORD 3 SNL J–11, Sec 2
Ammunition Renovation ..... TM 9–1905
Cleaners, Preservatives, Lubricants, Recoil Fluids, Special Oils, and Related Maintenance Materials ..... ORD 3 SNL K–1
Tool Set, Maintenance (Field), Ammunition Renovation Platoon ..... ORD 3 SNL J–8, Sec 4

10. Surveillance

Ammunition Inspection Guide ..... TM 9–1904
Inspection of Ordnance Matériel in Hands of Troops ..... TM 9–1100
Inspection of Separate Loading Propelling Charges and Bulk Propellants ..... SR 742–140–1
Reports ..... SB 9–AMM 8

11. Supply

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12. Shipment and Storage

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Army Shipping Document . . . . . TM 38–705
Instruction Guide: Ordnance Preservation, Packaging, Packing, Storage, and Shipping . . . . . TM 9–1005
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Transportation by Water of Explosives and Hazardous Cargo . . . . . AR 55–228

13. Other Publications

Battlefield Illumination . . . . . TC 30 (1952)
Instructions: Small-Arms Accidents, Malfunctions and Their Causes . . . . . TM 9–2210
Installations: Report of Loss, Theft, and Recovery of Government Property . . . . . SR 210–10–10
Introduction . . . . . ORD 1
Military Publications: Distribution of Department of the Army Publications and Blank Forms . . . . . AR 310–90

*Copies may be obtained from Aberdeen Proving Ground, Aberdeen, Md.

Military Security: Safeguarding Security Information.... AR 380–5
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For explanation of abbreviations used, see SR 320-50-1.

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