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***FM 9-13**
HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 4 November 1986

AMMUNITION HANDBOOK

A Guide for Ammunition Specialists

PREFACE

FM 9-13 is intended to serve as a ready reference for ammunition specialists and supervisors during training or when assigned to an ammunition support unit or activity in the field. It is not to be considered a comprehensive textbook on ammunition, but it does provide useful data on important points of ammunition service support in the field. These data are equally applicable in peacetime and wartime.

This manual covers safety, and the storage, maintenance, handling, receipt, issue, turn-in, destruction, and transportation of ammunition in field storage facilities. The requirements of this manual apply to unit, commands, and installations of the US Army. They do not apply to subcommands, installations, and activities under direct control of the US Army Armament, Munitions, and Center Command.

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* This publication supersedes FM 9-13, 28 January 1981.

Chapter 1

SAFETY AND FIRE PREVENTION/FIGHTING

Safety comes first where ammunition and explosives are concerned. This chapter describes the procedures to follow in handling ammunition and explosives safely and in preventing and fighting fires.

SAFETY

HANDLING MUNITIONS

Ammunition and explosives must be handled carefully. Improper, rough, or careless handling may set them off. Personnel working with ammunition must observe the following safety precautions:

- Do not use bale hooks.
- Do not drive nails into shipping or storage containers containing ammunition.

- Do not repair ammunition boxes or containers within 30 meters of an ammunition stack.
- Do not tumble, drag, throw, roll, or walk on containers of ammunition. (Approved containers designed to permit dragging or towing are exceptions to this rule.)
- Do not carry fire-producing items (matches, lighters, etc.) into ammunition storage areas.
- Do not smoke in storage areas.
- Do not allow waste materials or litter to accumulate in storage areas. Waste materials include oily rags, solvents, lubricants, paper, and explosive scraps.
- Do not conduct operations without approved standing operating procedures (SOP). If there are no SOPs, supervisors must ensure that an SOP is prepared before operations begin.
- Do not be careless because of familiarity with munitions.
- Be familiar with the location of fire points within storage areas.
- Be familiar with the fire plan and the organization of the storage area's fire-fighting crew. Supervisors must instruct all personnel on these matters.
- Be able to carry out general first aid procedures.

Munitions must be handled under the direct supervision of trained personnel who thoroughly understand the hazards and risks involved. (See TM 9-1300-206 and DOD 6055.9-STD.) If a hazardous

condition presents immediate danger to life or property, the operation will be stopped by the senior person present and not resumed until the hazard has been corrected.

SAFETY TOOLS

Use safety hand tools of nonsparking or spark resistant material such as bronze, lead, beryllium alloys, "K" monel metal, or wood. Under normal conditions of use, such tools will not produce sparks. Nonsparking or spark resistant tools of lead or beryllium alloys that require sharpening or reshaping, may be ground down only if the grinder has adequate exhaust ventilation.

PALLETIZED AMMUNITION

Most ammunition is stored on pallets. Before moving palletized ammunition, visually inspect the pallets. Be sure any pallets with broken strapping are replaced and unserviceable pallets are repaired or replaced.

Even with the use of mechanical handling equipment (MHE), there is some manual handling of munitions, strapping materials, pallets, and other materials during palletizing and repalletizing. Check TM 9-1300-206 for details on protective clothing and safety equipment. As a minimum, be sure proper protective gloves, shoes, and eye goggles are worn.

If there is not enough space in the magazine to work without being crowded, do the work outside the magazine no closer than 30 meters from any magazine containing explosives.

LOADING AND UNLOADING

Loading and unloading trucks, railroad cars, and aircraft are the major activities of most ammunition storage areas. See Appendix A for dimensions and capacities for cargo bodies. General precautions for each mode of transportation follow

- ***Trucks.*** Use DD Form 626 (Motor Vehicle Inspection) to inspect the vehicle (see TM 9-1300-206). Note: Vehicles to be loaded with munitions should be inspected by ASP personnel. The inspection standards for transporting Class V supplies are not the same as for general cargo. Make sure placarding is correct. See FM 55-70.

  All small items are palletized. Since most ammunition is shipped on pallets, MHE (rough terrain forklifts, cranes, or 4,000-pound capacity forklifts) will be required to handle pallets up to 1 ton in weight. Other equipment, such as slings and conveyors, are also necessary. Make sure all have been load tested. Guidelines for loading are as follows:

- Do not load or unload explosives or ammunition while vehicle motors are running, unless the motor provides power to vehicle accessories.
- Set the brakes during loading or unloading. Chock at least one wheel. If the vehicle pulls a trailer, chock at least one wheel of the trailer. Make sure the gearshift is in neutral for multifuel vehicles; have it in first for gas-powered vehicles.
- Make sure the entire load is in the body of the

vehicle and the tailboard or tailgate is closed and secured. Trailer -loading pads must be used on all loaded trailers when separated from prime mover.

- In magazine storage areas, vehicles with their engines running should not be allowed within 25 feet of magazines or storage structures that have their doors open. If ammunition has been placed outside the magazine or storage structure, make sure it is at least 25 feet from the open doors and is prepared and packaged for shipment IAW DOT regulations. Vehicles may approach the ammunition as closely as possible for loading. Make sure vehicles that have been parked within 25 feet of closed magazines or storage structures for loading have been turned off before the doors are opened. After loading, vehicles should not be started until the doors of the magazine or storage structure are closed.

- ***Railroad Cars.*** When small items are unpalletized, a crew of four to seven is needed for American standard railcars. Railcars in overseas theaters are usually smaller, so smaller crews should be used to avoid crowding.

When loading freight cars for shipment, use the Bureau of Explosives (BOE) Pamphlet No. 6000 published by the Bureau of Explosives of the Association of American Railroads. Make sure it is the latest edition. BOE 6000 governs loading, staying, and bracing for carloads and less than carloads (LCL) not covered in ammunition drawings.

Make sure there are blue flags or signals at

both ends of a railcar when personnel are working in, on, or under it. If a truck is being used along with the railcar, make sure they are both placarded (see FM 55-70). Lower the truck's tailgate (if required) and use a soldier to help guide the truck as close as it can get to the shipping deck or the door of the railcar. Make sure the truck's wheels are chocked after it is parked. If the ammunition is the center of the railcar or the truck, use conveyors between the ammunition stock and the place where it will be restacked. Note: Do not use loaded ammunition boxes to support conveyors. Use pallet jacks or a 4,000 - pound forklift if the load is palletized. A dock plate may also be necessary.

Load and unload large items such as HAWK, MLRS, and Pershing missiles like other items, but follow DARCOM* load drawings carefully.

- ***Aircraft.*** The pilot or the crew chief of an aircraft must supervise the loading and unloading of the aircraft. Use TM 38-250 as a guide to loading and unloading ammunition on and off aircraft (including helicopters at sling-out areas). Make sure the proper placards are displayed. Use DD Form 1387-2 (Special Handling Data/ Certification) when loading munitions on an aircraft. Put a copy of this form on all containers of ammunition, explosives, or other dangerous articles. If the items are palletized, put a copy of this

* DARCOM has been redesignated AMC (Army Materiel Command). Future drawings will be designated AMC load drawings.

form on the top and each side of the pallet. If individual packages or boxes are loaded for shipment, put a copy of DD Form 1387-2 on each box. Note: Only certified personnel are authorized to sign DD Forms 1387-2.

FIRE PREVENTION/FIGHTING

FIRE PREVENTION

The fire prevention procedures given here are basic. They will be supplemented by whatever other standards the commander feels are necessary for adequate protection from fires. Make sure these procedures are included in the unit SOP and are enforced by everyone working around munitions:

- Strictly regulate and control smoking in areas where there are explosives, ammunition, highly combustible materials, or flammable strategic items. If smoking can be safety regulated, designate specific smoking locations, which must then be approved by the commander or designated representative. These areas must be properly equipped and located at correct safety distances (see TM 9-1300-206 for details). Do not allow smoking in vehicles passing through such areas.
- When a smoking area is set up, do the following: When noncombustible walls do not separate a potential smoking area from an area where there are ammunition and explosives, the smoking area must be at least 50 feet from the ammunition or explosives area. Make sure there are suitable ashtrays for cigarette and cigar butts and pipeheels. If the area has electricity, make sure

there are permanent, approved electric lighters. Make sure there is at least one class 1A, portable. fire extinguisher at designated smoking locations. Do not allow anyone whose clothing is contaminated by explosives or other hazardous materials to use smoking areas.

- Matches or other flame or spark-producing devices are not to be permitted in any magazine area or field storage activity. The only exceptions are by written authority of the ASP commander or the commander's representative. When such authority has been granted, personnel should use a metal carrying device, too large to fit into pockets. Into this device should go matches, lighters, and similar materials. Note: No one may carry or use "strike anywhere" (kitchen) matches.
- Only flashlight or storage battery lamps that have been approved by the United States Bureau of Mines (or similar recognized testing laboratory) can be used in structures containing ammunition, explosives, or flammable weapons.
- Make sure overhead transmission lines or power lines are not closer to magazines or storage locations than the height of the pole or 50-feet, whichever is greater. Existing facilities with above-ground electrical service can be modified to provide underground service to storage magazines as long as the electrical cable is buried for at least 50 feet from the magazine or storage location.
- Do not use gasoline or other highly flammable liquids to clean. Use dry cleaning solvent in-

stead. Be sure there is enough ventilation when solvents are used for cleaning. Use TB MED-502 for guidelines.

- Parking areas should be outside the storage area. Control parking to reduce fire hazards and provide fire fighters easy access to all areas.
- Have combustible material left at storage locations after issue or rewarehousing operations picked up daily and properly disposed of.
- Work with heat-producing equipment only with a written permit. The permit must state the location, time, duration, purpose of use, safety details, fire fighting equipment requirements, and who will be doing the work. TM 9-1300-206 gives specific details about permits.
- Vegetation (grass, undergrowth, weeds, and the like), which is or may be a fire hazard, is usually controlled by weed killers, mowing, plowing, cutting, or by livestock grazing under controlled conditions. Make sure weed killers do not contain substances which might spontaneously ignite under hot, dry conditions. Make sure cut vegetation and undergrowth are removed.

Vegetation can be controlled by burning only in calm weather and with proper control. If vegetation is burned, do not start within 50 feet of loaded earth-covered magazines. Do not start a burn within 200 feet of any loaded above-ground magazine or outside storage location (X or Y sites and FSUs). During burning, make sure that all magazine doors and ventilators are closed and that fire-fighting equipment is at the site. Also

make sure there is a firebreak at least 50 feet wide, free of flammable material, around each above-ground magazine and around each outside storage location. Note: Because of the enemy situation there may not be firebreaks in combat storage areas.

FIRE FIGHTING

Fire Plan. Make sure a written fire plan is prepared for each ammunition storage activity. Each plan should include a listing of communications or alarm signals to be used. The plan must specify responsible personnel and the organization of fire fighting teams. Include teams, team alternates, equipment (for toxic and nontoxic munitions), and fire fighting training required.

Be sure a map of the storage area is included in the plan. This map should show where the magazines and outside storage areas are as well as the road network. Each magazine and storage location should list what its ammunition hazard is. The fire and chemical symbols displayed on each unit of ammunition should also show on this map.

Include a description of the emergency functions of each department in the unit and of each outside agency. Describe the responsibilities of everyone concerned. Include at least the following fire reporting procedures; plans for an orderly evacuation of nonessential personnel; procedures to tell other commands nearby of the impending danger; methods for extinguishing or controlling the fire until fire fighting forces can get there, and where to meet and tell fire fighters where the fire is, what type of munitions

there are (including any hazard), and what has gone on before they got there.

Facilities. Each Class V storage area should have a centrally located fire fighting storage facility. Double-check the fire plan to be sure it lists the equipment maintained at the facility. As a minimum, the equipment should include rakes, shovels, grass beaters, brooms, an adequate supply of gunny sacks and sand bags, and hand-pump fire extinguishers. There should also be fire tools boxes painted red and marked "For Fire Only." These tool boxes should be not more than 500 feet from, and should be next to, yard tracks or storage magazines. Fire tool boxes should have, as a minimum, one fire ax, one shovel, one pinch bar, three fire pails, one 5-gallon pump, and a water fire extinguisher (with antifreeze if necessary). For additional fire fighting information see TM 5-315 and TM 9-1300-206.

Make sure the facility and fire fighting equipment are centrally located in the storage area. Whatever the facilities and equipment are, there should still be water barrels and pails ready to use throughout the storage area.

Fire Drills. Have a fire drill at least twice a year. Make sure personnel are drilled in using fire fighting equipment and using emergency exits other than the usual doors, gates, or roadways. This way they will go to them automatically in case of fire or other emergency—an increased safety factor. Note: Never have unannounced fire drills involving the response of motorized emergency vehicles.

Fighting Storage Area Fires. Anyone discovering smoke coming from a magazine or ammunition

stack should sound the alarm as quickly as possible. Any other evidence of fire in a magazine or ammunition stack is also reason enough to sound the alarm. Immediately after sounding the alarm, installation fire fighters should be notified.

When fire is discovered in a Class V storage area, move nonessential personnel to a well-protected place. The distances shown in Table 1-1 are the minimum withdrawal distances. These distances are based on fire division symbols, which will be discussed in this chapter.

Table 1-1. Safe Withdrawal Distances from Munitions Fires.

FIRE DIVISION SYMBOLS	Required Withdrawal Distance
1	2,000 feet. Note: Use inhabited building distance for net explosive weight (NEW) greater than 100,000 pounds.
2	1,800 feet.
3	600 feet. Note: Use inhabited building distance for NEW greater than 500,000 pounds.
4	300 feet.

The fire fighting plan lists who in the unit is to control or put out the fire until the installation fire fighters arrive. This storage area fire fighting force should use the water barrels and pails and other fire fighting tools and equipment that are available. Make sure the storage area fire fighting force is acquainted with the hazards of each fire hazard division (these divisions will be discussed below). Also

make sure this force also knows the best and safest way to fight whatever is burning.

Send at least one member of the fire-fighting force towards where the installation fire department is likely to come. This soldier is to tell the officer-in-charge (OIC) of the installation fire fighters where and how large the fire is. This is crucial because the OIC will not let any of the installation fire fighters go to the fire until accurate information about the hazards of the fire are known. Be sure the OIC has a copy of the area map displaying storage areas with specific hazards, the roadnet, and appropriate fire and chemical symbols as given in the fire plan.

Fire Symbols. To provide a guide for fire fighters, ammunition and explosives are divided into fire divisions. These divisions are related to the danger of fighting fires involving the various types of ammunition and explosives. Fire Division 1 is the greatest hazard. The hazard decreases as shown in Table 1-2.

Table 1-2. Danger by Fire Division.

Fire Division	Hazard Class	Hazard Involved
1	1.1	Mass detonation
2	1.2	Explosion with fragment hazard
3	1.3	Mass fire
4	1.4	Moderate fire

Each fire division has its own symbol, which is a shape that can be recognized by firefighters as they approach a fire. On each symbol is its fire division number (see Figure 1-1). Half-sized symbols may be used on doors and lockers inside buildings.

Figure 1-1 shows that the background of the fire symbols is orange, and the number is black. This coloring is the same as on DOT labels, on placards for Explosives A and B, and on NATO, UNO, and IMCO labels for Class I material (explosives). If possible, symbols should be made of reflecting or luminous materials.

Each fire symbol requires special procedures to be followed. Each is discussed below.

Fire symbols 1 and 2 (for nuclear weapons, see TB 385-2). Materials can be expected to mass detonate with moderate to severe fragmentation hazard. Do not try to fight a fire involving munitions with fire symbols 1 or 2. (The only exception would be to manually activate automatic fire extinguishing equipment if there is any.) In any event, all personnel should leave the area immediately, using as much protective cover as possible.

Installation fire fighters must not get closer than 1,000 feet to fires of less than 50,000 pounds NEW. They should stay a proportionately greater distance, up to 2,000 feet, for fires involving up to 100,000 pounds NEW. Make sure mobile equipment is protected.

Fires involving hazard class 1 or 2 normally will not be fought or approached. Fire fighting forces may approach to extinguish the fire or to protect adjacent buildings as follows:

- If there is adequate distance or effective screening separating burning nonexplosive material from hazard 1 or 2 material, and the fire chief and commander agree on procedures.
- If there has already been an explosion and only

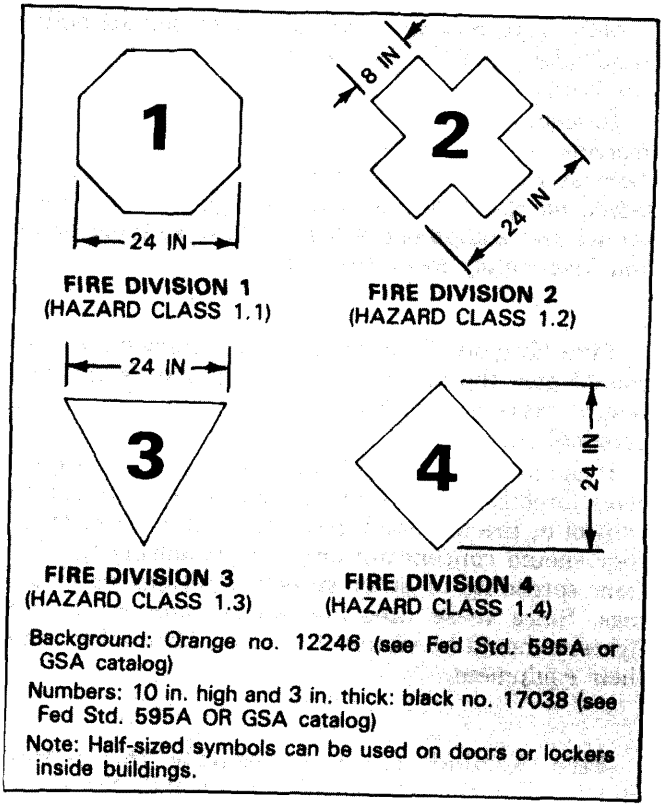


Figure 1-1. Fire Division Symbols.

heat from burning wreckage threatens other buildings, whether containing explosives or not, and the fire chief and commander agree on procedures.

Make sure no one re-enters a magazine or building displaying a fire symbol 1 or 2 to find out the conditions of a fire.

As mentioned before, the safety of the fire fighters depends on the accuracy of information given to them and their leaders. If there is any question of safety, no effort will be made to fight the fire. Personnel and equipment will then take suitable cover and keep safely away from the fire.

Fire Symbol 3. Soldiers in the immediate area should give the alarm and start up the deluge system, if there is one. Make sure no one takes undue personal chances.

If the fire is minor and does not involve the explosives directly and if there seems to be a chance to control it, fire fighting forces can fight it. Even then, they should concentrate only on preventing the fire from spreading to other storage locations or buildings. Since these fires are hotter than most, fire fighters should be careful to protect themselves and their equipment.

Fire Symbol 4. Fires involving this hazard should be fought with portable and mobile fire extinguishing equipment until the fire is brought under control.

Some munitions with special hazards, such as toxic chemicals, require the symbols in Figure 1-2 (see Table 1-3). Note: When fire fighting involves radioactive material, see AR 700-64 and TM 5-315.

When fighting fires involving ammunition with chemical agents as indicated by the symbols (see Figures 1-2), use Table 1-3 to determine right clothing and equipment to use. This equipment and clothing should be on hand in the ASP.

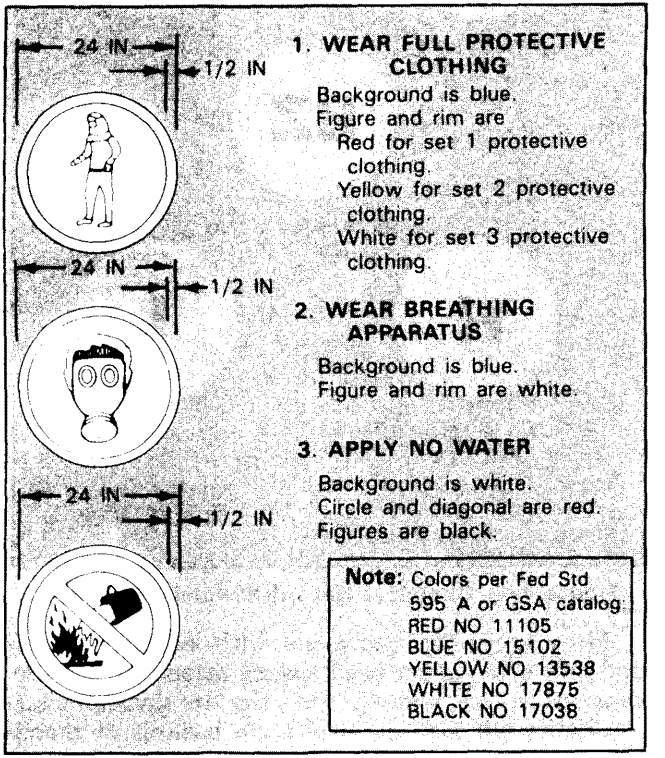


Figure 1-2. Chemical Hazard Symbols.

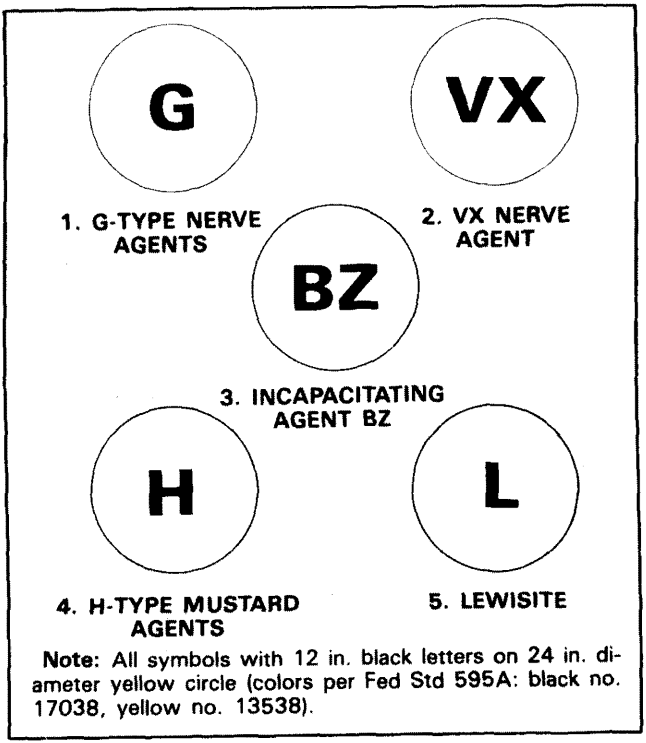


Figure 1-2. Chemical Hazard Symbols. *(continued)*

Fires involving munitions with both explosives and chemical agents need special attention and precautions in fire fighting. Heed the fire division characteristics but also the additional hazards of chemical agents and the special measures they demand. See Table 1-3.

Table 1-3. Special Requirements for Handling and Storing Ammunition Containing Chemicals.

Chemical Agents In Ammo	Full Protective Clothing			Breathing Apparatus	Use No Water	Symbols				
	Set 1	Set 2	Set 3			G	VX	BZ	H	L
GB	X					X				
VX	X						X			
H, HD, HT	X								X	
L	X									X
(See Note)		X								
HC				X	X					
BZ		X						X		
WP, PWP			X							
TH, PT				X	X					
IM, NP				X						
TEA, TPA			X		X					

Note: CL, CG, CK, CN, CNS, CS, BBC, DA, DC, DM, FS, FM

Chapter 2

FIELD STORAGE OF AMMUNITION

The purpose of field storage is to provide ammunition to Army tactical units. Unlike permanent, magazine storage, ammunition assets in field storage are most often stored on the ground on unimproved surfaces. Munitions are placed in field storage categories separated from each other by appropriate minimum field storage quantity distances (QD), which are based on total gross tonnage per individual storage unit (see Appendix C for a DODIC conversion chart). This chapter describes field storage areas, storage categories, site selection for field storage facilities, and storage systems and storage planning.

FIELD STORAGE AREAS

There are four areas where field storage is likely to be used theater storage areas (TSA), corps storage areas (CSA), ammunition supply points (ASP), and ammunition transfer points (ATP).

THEATER STORAGE AREA

The TSA is in the communications zone (COMMZ) where the reserve stocks are stored. It should have direct access to rail networks or be within short line-haul distance from them. In peacetime, the TSA could consist of permanent storage facilities, igloos, or bunkers. In combat environments, the TSA may be open storage.

CORPS STORAGE AREA

Located in the corps rear area, the CSA normally stores up to 10 days of ammunition. Being in the rear, it is more fixed than the forward combat ammunition supply points (ASP) it supports. For this reason, it can have more permanent storage facilities; however, this depends on the tactical situation.

AMMUNITION SUPPLY POINT

ASPS are in the corps forward area. They provide direct support to the combat division or portions of the division and must store about 3 days of ammunition. The tonnage stored varies depending upon the type of unit supported. Based on their mission, forward ASPS are usually temporary. This means ammunition is not stored in igloos or bunkers.

AMMUNITION TRANSFER POINT

The ATP is a transfer point in the brigade rear. The division ammunition officer (DAO) has control of all division ATPs. ATPs stock high-tonnage, high-usage items. Since this is a transfer point, common field storage principles addressed in this manual do not apply. For the purposes of this manual, the ASP will be spoken of most often because it is the most common of the areas.

THEATER OF OPERATION STORAGE

Storage in a theater of operation, field storage, follows as nearly as possible the principles for storage in the Continental United States (CONUS). Such conditions as mobility requirements, scarce facilities, or enemy air power vary a great deal in theaters of operation. Thus the ideal of CONUS storage, including safety, cannot be fully met or maintained. Even so, explosives and ammunition may be satisfactorily and safely stored in the theater if CONUS regulations are adapted to field conditions. Detailed information on these adaptions is in TM 9-1300-206.

STORAGE CATEGORIES

Storage categories are the primary groups into which ammunition is segregated for storage in the field. The groupings are based on:

- How desirable it is to store components of complete rounds in adjacent stacks.
- The hazards of spreading explosions.

- The range of fragments.
- The spread of fires.
- Chemical contamination.

Conventional Ammunition. For storage, conventional ammunition is divided into categories A through G as follows:

- ***Category A.*** Fixed and semifixed artillery ammunition, except incendiary and chemical.
- ***Category B.*** Propelling charges, fuzes, primers, flash reducers, and separate loading artillery projectiles including high explosives (HE) and armor piercing (AP) but not incendiary and chemical projectiles.
- ***Category C.*** Mortar ammunition and hand grenades, except incendiary and chemical.
- ***Category D.*** Pyrotechnics and chemical ammunition of all types, including chemical filled rockets; gas, smoke, and incendiary bombs; gas and smoke artillery ammunition; incendiary and chemical grenades; smoke pots; VX-filled mines; and bulk-packed incendiary and small-arms tracer cartridges.
- ***Category E.*** All demolition explosives, antitank and antipersonnel mines (except VX loaded), and components such as blasting caps, firing devices, detonating cord, and safety fuses.
- ***Category F.*** Rockets, rocket motors, and rifle grenades, except chemical.
- ***Category G.*** The following items of US Air Force Class V supply, all unfuzed high-explosive bombs, aircraft mines, aircraft torpedoes, and

fragmentation bombs; fuzes and/or primer-detonators for the above items; and fragmentation bomb clusters, fuzed or unfuzed. The remainder of Air Force Class V items must be stored in other proper categories.

Special Ammunition. For storage, special ammunition is divided into the following general categories:

- Inert material such as missile and large (heavy) rocket bodies (less rocket motors) and test and handling equipment for nuclear ordnance items.
- Missile and rocket fuels.
- Oxidizers.
- Solid propellants.
- HE material such as detonators, HE warheads, and HE components of explosive nuclear weapons.
- Nuclear material.

SAFETY

Storage categories help provide the basis for safety procedures for ammunition storage. Four of the most important follow.

- Ammunition items with the same storage risks are grouped together in the same storage category.
- Within each storage category, QD tables (see Table 2-1) are the guide for the maximum quantity of ammunition to be stored within each stack and within each field storage unit (FSU) and the minimum distance between stacks, FSUs and categories.

- Most often, only one kind of ammunition is stored in a stack. If more than one kind is stored in a stack, use the storage compatibility mixing chart in TM 9-1300-206 (Chart 5-2). Be sure ammunition is stacked so it is easy to inventory and inspect. Where camouflage is necessary (see more on camouflage later in this chapter), step stacks in towards the top (terraced or pyramid stacking) to cut down shadows. Store components of complete rounds within the same FSU when practical.
- Small arms ammunition may be stored with any category with one exception. Bulk packed incendiary and tracer cartridges must be stored in category D.

SITE SELECTION

There needs to be a primary site and an alternate site planned for.

Primary Site. When selecting a primary site, the following criteria are important. Try to incorporate as many of them into the site as possible. They are listed in order of importance.

- The area is easy to get to by the units supported.
- The area is near the main supply route (MSR) with access roads into the ASP.
- A roadnet within the site allows vehicles to travel under all weather conditions and requires little or no maintenance.
- The ground is as level as possible. It must be able to support the weight of the ammunition as well as be able to drain off quickly. This also

Table 2-1. Quantity Distance Table by Category.

Category	Gross Tons		Minimum Distance Between (in Feet)				
			Stacks		FSU		
	Per Stack	Per FSU	Unbarricaded	Barricaded	Unbarricaded	Barricaded	Categories
(A, B, or D)[1, 2]	Less than 10	400	40	30	300		750
	10-20 max.	400	50	40	300		750
C[3]	Less than 10	300	75	60	300		900
	10-30 max.	300	105	75	300		900
E[3]	Less than 5	50	75	60	300		900
	5-10 max.	50	105	75	300		900
F	20 max.	20	150	75	230	75	1500
	20 max.	30	150	75	230	90	1500
	20 max.	40	150	75	265	99	1500
	20 max.	50	150	75	295	101	1500
	20 max.	60	150	75	330	120	1500
	20 max.	80	150	75	390	135	1500
	20 max.	100	150	75	455	150	1500

G (Class V)[4]		20			200	75	1500
		30			230	90	1500
		40			265	99	1500
		50			299	101	1500
		60			330	120	1500
		80			390	135	1500
		100			455	150	1500

Notes:

1. If desirable, fixed and semifixed smoke ammunition, except WP, may be stored in category A.
2. The minimum distance between a stack of propelling charges and any other stack must be 100 feet whether barricaded or unbarricaded.
3. Whenever storage space is limited, category C ammunition may be combined with category E.
4. Under normal conditions, the Department of the Air Force will store and issue all class V supplies; however, depot commanders should always be prepared to handle these supplies in emergencies.

makes it easier for MHE to operate. More on MHE later in this chapter.

- There should be natural barricades that can separate FSUs and categories.
- The site should be isolated from hospitals and important military installations.
- The site should be unpopulated and downwind of any populated areas if any hazardous chemicals are stored.
- There should be an adequate water supply for fire fighting and bivouacking.
- There should be a minimum of flammable vegetation.
- There should be features, including natural concealment, that make the site easy to defend against enemy ground attack.
- The area should be large enough to spread out ammunition stocks. This protects them against artillery or air attack and makes it easy to expand.

Because of tactical conditions and other influencing factors, an ASP site may not have all ideal features. In fact, higher headquarters may dictate where an ASP will be.

Alternate Site. Pick an alternate ASP site close to the primary one, because there maybe some other unit already in the primary site. Another consideration: the enemy may attack with artillery, mortar fire, or chemical agents as soon as the primary ASP is set up, and the unit may have to evacuate fast. Finally, some units have used their alternate sites as

regular ASPs when their stockage objective expanded-far more than they expected.

STORAGE SYSTEMS

After the site is selected, consider what system to use. There are several basic methods for storage of ammunition in the field. Consider the following:

- The physical characteristics of the site.
- Where hostile forces, uniformed or clandestine, are.
- What the weather is expected to be.
- The time and resources available.
- The expected life of the ASP.
- The space available and what type operation will most easily allow following QD requirements.
- Free movement of vehicles throughout the storage complex. Vehicles must be able to pass other vehicles being loaded or unloaded. There should be no dead-end roads requiring backing or turning around.
- The roads should be stabilized to withstand traffic up to fully loaded 40-ton trailers.

AREA STORAGE

In this system, the area is divided into three sections and subdivided into FSUs and stacks. Ammunition is stacked and is spaced to meet QD requirements, ending up looking like a checkerboard. This system provides efficient use of the total area, but it may require a lot of road and pad construction and stabilization of the earth.

ROADSIDE STORAGE

This system allows ammunition to be stored in stacks along the edges of existing roadways. FSUs and sections are spaced according to QD requirements. Effective use of this method requires a large road network and a total area much larger than the area system needs. However, little construction is necessary. A variation of roadside storage, known as "storage in depth," is very useful if the existing road network is limited. In this method, one or more additional stacks of ammunition are stored behind the roadside stack, away from the road. The use of this system is restricted in wet climates or if there are poor soil conditions or heavy forests. Under these conditions, the stacks of ammunition would not be easy to reach.

AREA AND ROADSIDE STORAGE

A combination of area and roadside storage is often used to lessen the bad aspects of both systems. It allows the most effective use of the existing road network in a limited area. But, while the combination does not require as much land as roadside storage does, it does involve some road and pad construction.

BARRICADED ABOVE-GROUND MAGAZINES

This system is designed for larger ASPS and depots in the theater of operations. It is two or more storage blocks of barricaded above-ground magazines in various sizes, separated from each other by at least 122 meters. Items stored on an individual pad must be compatible (see TM 9-1300-206).

The amount of explosives per pad must meet the net explosive weight (NEW) limitations of TM 9-1300-206.

MODULAR STORAGE SYSTEM

This is a field storage system for conventional ammunition stored on pads within earth-barricaded areas called cells. These cells are joined to form modules, which may, in turn, be arranged to form module blocks (Figures 2-1 and 2-2). Security, real estate, or operational requirements may force the use of this storage system. Unlike the other field storage systems, with modular storage, NEW rather than gross tonnage is used in determining the maximum quantity of ammunition that maybe stored in each cell or module.

Before deciding to use the modular system, consider the advantages and disadvantages over the other field storage systems. Some of the advantages are reduced real estate requirements, improved security with available forces, reduced danger from direct fire on ammunition stocks in small barricaded areas, reduced transportation needs in the ammunition area, and reduced internal roadnet needs. Some of the disadvantages are the possibility of fire or explosion spreading from cell to cell because of heat or fragment dispersion, increased danger to stock from indirect fire and aerial bombs, and the need for more engineer support for initial construction.

The modular method should only be used if the QD requirements of the other field storage systems cannot be met due to security, real estate, or operational limitations.

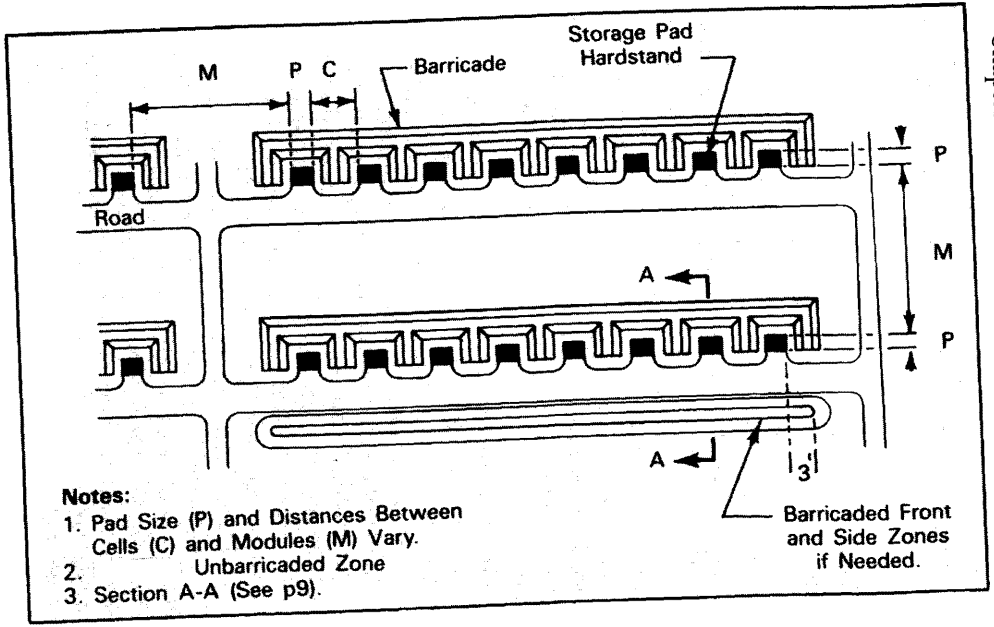


Figure 2-1. Aerial View of a Typical 8-Cell Module Storage Plan.

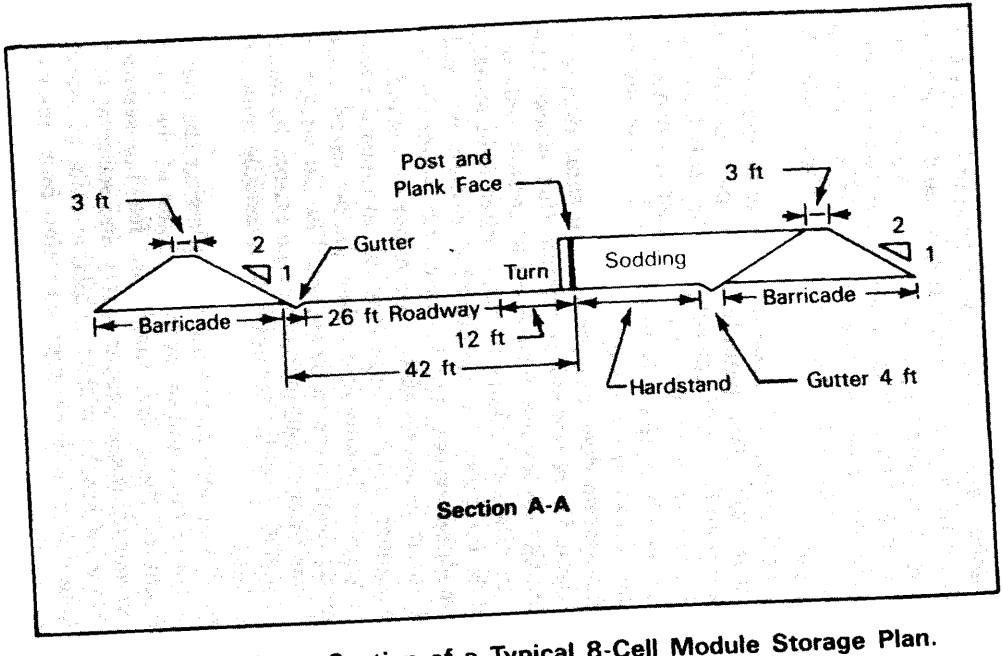


Figure 2-2. Cross Section of a Typical 8-Cell Module Storage Plan.

Where and How To Use Modular Storage. In a theater there may be limited space and/or security, making it impossible to store ammunition as prescribed in QD and compatibility regulations for area, roadside, and area/roadaide storage. When this happens, a modular system of storage may be preferred.

In most cases, this system will only be used when less than 2,000,000 pounds NEW per module or 250,000 pounds NEW per cell, will be stored. It may also be the solution for storing larger quantities in rear areas where space is limited and where several module blocks are needed.

This system does not provide the same degree of protection for personnel or ammunition stocks that normal QD dispersion does. For this reason, only use it as an alternate solution when other field storage methods for class 1.1 ammunition cannot be used. The modular system can be used only when the request for it is approved by the major command.

Barricaded open storage modules are useful when high explosive bombs and other similar cased class 1.1 ammunition have to be stored. The net weight of explosives in each cell of the module cannot be more than 250,000 pounds. All items in a module must be compatible.

Use this system as the others, following the same principles of ammunition storage. Some of the most important of those are, maximum feasible separation, proper drainage, proper safety and security, and dispersion of stocks within available cells to avoid complete loss of a single type munition from one explosion or fire.

Modular System Construction Characteristics. A module is a barricaded area with not more than eight cells separated from each other by barricades. The unbarricaded openings of modules and cells must not face each other. One-cell modules may be built if required, but maximum flexibility of stockage and internal movement should be maintained. A module has tonnage and explosive weight limitations specified by the major command that authorized its use. Normal maximum limits are 2,000,000 pounds NEW per module or 250,000 pounds NEW per cell. See Table 4-5, TM 9-1300-206, for construction dimensions of cells and storage pads.

All barricades are standardized earth mounds. If possible, use natural barricades such as hillsides or steep slopes. Carefully check the earth for large rocks or boulders. Make sure there are none because each increases the missile hazard. The slope of the barricade should not be steeper than 1.5 to 1, and the crest should be at least 3 feet wide. Make barricades tall enough that a straight line drawn from the far top edge of the stack (away from the barricade) at an angle 2 degrees above a horizontal line drawn along the top of the stack will pass through the entire width of the barricade crest. See Figure 2-3.

Locate the center-line of barricades between cells of the module midway between adjacent storage pads. Put back and end (outside) barricades the same distance from the pads as those between the cells.

Make sure the distances between stacks of munitions in adjacent cells and between adjacent modules

follow TM 9-1300-206. Where NEWs are different from those listed in TM 9-1300-206, determine the required separations as follows:

- The footage between stacks in adjacent cells is 1.1 times the cube root of the net weight of most hazardous explosives in the module as determined by the largest required QD separation.
- The footage between adjacent modules is 2.5 times the cube root of the net weight of the most hazardous explosives in either module as determined by the largest required QD separation.

> Note: Contact a civilian or military ammunition inspector for assistance if needed.

The distance between a module and a standard concrete arch or steel arch igloo magazine must be not less than 185 feet barricaded. All straight lines drawn between the module and the igloo must pass through the module barricade and igloo earth cover. The distance from unbarricaded door of an igloo facing a barricaded module must not be less than 360 feet.

Separation distances between a modular storage area and other supply areas, inhabited areas, or roads are the same as required for any other field storage systems (TM 9-1300-206).

Compatibility in Modular Storage. Store only ammunition items of one field storage category (TM 9-1300-206) in a cell. Different kinds of ammunition within one field storage category should be stored in

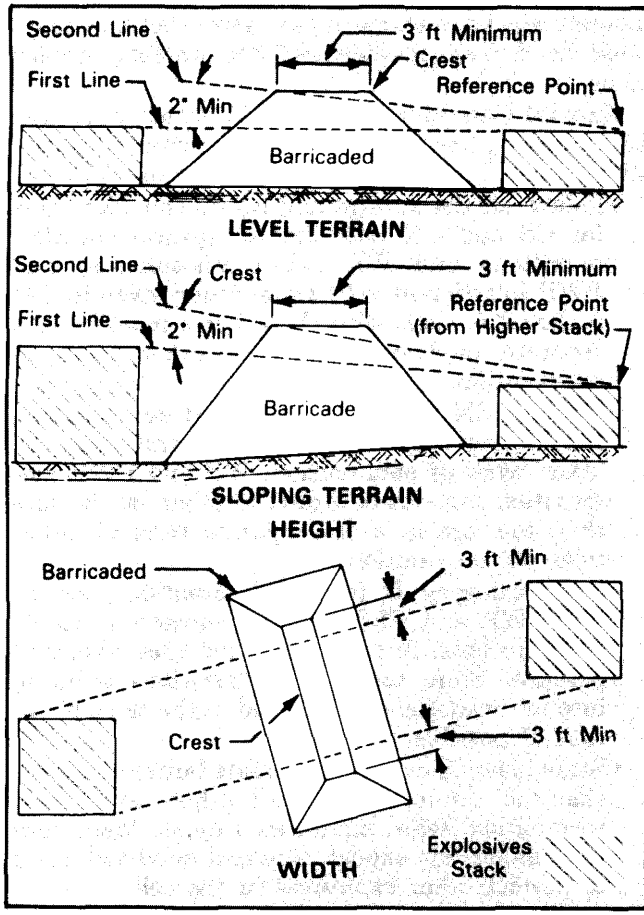


Figure 2-3. Barricade Dimensions Between Explosives Stacks.

separate stacks if stored in the same cell and separated as far as possible without wasting storage space.

Special Considerations for Modular Storage. The following items require special storage considerations when in a modular storage system.

- Follow all the storage and safety considerations for CS and CN (riot control agents) chemical munitions and WP (white phosphorus) and PWP (plasticized WP) ammunition given in TM 9-1300-206. Cells with these items must be in a separate module, away from other types of ammunition.
- CS and CN munitions can be stored together, but be sure they are in a cell separate from all other types of ammunition. WP and PWP ammunition can also be stored together, but be sure they, too, are in a cell separate from all other types of ammunition.
- Store category D (chemical munitions, except WP/PWP and CS/CN) and category F munitions (rockets) in end cells of modules whenever possible. Store category F munitions pointing into barricades and all pointed in the same direction, if possible.
- Store blasting caps in a separate bunker built inside the cell containing all other category E (demolition items, mines, etc.) items. Make sure the bunker has enough side and overhead cover to protect other explosives in the cell.
- Store category B (propellant charges) in a separate module. The module may have one or more cells, depending on the required stockage.

- Store improved conventional munitions (ICM) alone in a separate module. The module may have one or more cells, based on the required stockage objective.
- Store unserviceable, hazardous ammunition awaiting destruction and captured enemy ammunition in a separate module. The module may have one or more cells, based on the requirements.

Review all other provisions of TM 9-1300-206 regarding safety, storage, handling, etc.

STORAGE PLANNING

After the site and the system of storage is known, lay out the site, draw up a storage plan and a destruction plan, and write SOPs for each ASP operation. (See AMC Reg 385-1 and TM 9-1300-206, Chapter 2) A good plan makes a smooth-flowing, safe operation possible.

Organize the ASP into areas with specific functions. This makes it easier to do the mission and isolate hazards, Figure 2-4 is a typical layout and shows the areas most likely needed. Table 2-2 is a list of the ASP areas with important information needed to develop plans.

STORAGE PLAN

Make sure the storage plan agrees with the area layout plan. Use the following checklist when creating the storage plan.

- What is the maximum tonnage expected to be in each storage category?

Figure 2-4. Typical ASP Layout.

Table 2-2. ASP Layout Areas.

Area	Minimum Safety Distances	Purpose	Notes
ASP		The Operations Center for the ASP.	Located at main entrance to ASP for maximum control and service to supported units.
Vehicle Holding Area	Transit area, no QD applied.	A parking area for vehicles waiting to be served. Reduces traffic congestion in your storage sites.	Located near the ASP office where vehicles will not interfere with the flow of traffic.
Segregation Area	Required quantity. distances for ammo storage.	A temporary storage area for segregating hazardous ammo and ammo in mixed lots. Also used to inspect unit turn-in when not possible to inspect at time for receipt.	Unserviceable ammo should be stored by item, lot, and category and a minimum of 700 m from nearest stack of serviceable ammo.
Ammo Storage Area	Required quantity distances	For storing serviceable ammo with respect to its field storage category.	The storage area is divided into storage sections by no., FSUs by letter, and stacks by no. Example: 2D1 is Sec. 2, FSU-D, Stack 1.
Demolition Area	700 m from other areas.	For destroying unserviceable ammo.	Choose an area unusable for other purposes and cleared of vegetation.
Salvage Area	No quantity distance requirement.	For storage of nonexplosive Class V material.	An inert area for boxes, brass, etc.
Assembly Area	Transit area, no QD applied.	A parking area for loaded vehicles being assembled for a convoy.	It may have to be consolidated into the vehicle holding area.
Ammo Sling-out	550 m from ammo storage and bivouac areas.	Provides capability of limited aerial resupply.	Located so aircraft will not pass over storage or bivouac areas: should be at least 25 m square having a stabilized base of PSP matting, etc., which will support the weight of stocks and MHE.
Bivouac Area	700 m from ammo storage or other ammo operations.	The living area for the ASP personnel.	Should be located as far as possible from storage sites for increased safety and a minimum signature.
Survl & Maint Area	IAW TM 9-1300-250, SB 742-1, and other applicable SBs.	To perform ammunition inspection, repack, and minor maintenance.	Depending on the life expectancy of the ASP this area may not be included.

- What are the expected average daily receipts and issues?
- What is the time available before first shipments of ammunition arrive?
- What is the expected lifetime of the ASP?
- What is the system of storage that will be used?
- What are the physical characteristics of the ter - rain that can be used as natural barricades, or that deny or restrict using certain areas?
- What natural cover and concealment are there?
- What engineer construction and other required support is available and necessary?
- What are the area security problems and requirements?
- What are the special security requirements needed for classified ammunition?
- What section, FSU, and stack numbering sequences are needed to be sure placement and retrieval of stocks is fast and accurate?

While the storage plan is being prepared, make sure all storage areas are clearly marked. Make sure signs are posted showing traffic direction, entrances, and exits. Make up and have reproduced a map of the storage areas. Use it to direct customer units to the proper storage area.

To reduce customer waiting, group ammunition by combat arms. Name roads to describe the ammunition stored along them, for example, Artillery Row or Tanker Road.

Prepare and maintain enough directional signs, fire symbols, and FSU stack signs for two ASPS.

ASP Planning. Some guidance based on field experience is given below. Be familiar with it when planning an ASP.

In laying out an ASP, locate the office far enough from the entrance so a convoy can park until the trucks are directed to various stacks. Make a map of the area showing the location of each stack, what items should be stored there, and the amount to be stored. Make sure there is enough dunnage near proposed storage locations to save time when ammunition receipts arrive.

Be sure that traffic flow is smooth. Have one-way traffic wherever possible, few turn-arounds, parking areas at entrances and exits so ammunition can be issued fast, and vehicle holding areas and vehicle assembly areas. Do not allow trucks to back up without a ground guide. Make sure there is a large parking area in case several trucks arrive at once.

Stack Location. Ammunition stacks should be far enough back from the road to allow trucks to be loaded or unloaded without interfering with traffic. Do not jam containers together; stack containers so the markings are plainly seen.

Standard Identifiers. Some units use a standard layout system both as a standard layout practice wherever they are and as a way to identify and locate ammunition. With this system, there are either lettered or numbered locations that always contain certain types of ammunition. Subdepots are designated by letter; storage sections, by number FSUs, by letter; and stacks, by number. For example, if ammunition is stored in subdepot A, section 1, FSU-A,

stack 1; it can be labeled A1A1. Each time a new ASP is established and similar stocks are required, they are placed in the same relative positions as the old ASPS. Of course, ground features must be similar to the old site. There needs to be at least one long road through the area as a reference point before a standard identification system can be used.

Lot Number Storage. All ammunition must be stored by lot number, and each lot number must be separated from other lot numbers. See Appendix D. Ammunition is numbered by lot when it is made. The lot number helps identify the ammunition and is vital for accountability, issue, and storage. Be sure individual lots are marked with tags or signs and each lot is segregated in its storage location—away from other lots.

Protection from the Weather. Basically, four things are necessary to protect ammunition from the weather: adequate shelter, enough dunnage, good drainage, and good ventilation. Tarpaulins (tarps) over stacks help (see Figure 2-5), but unless the tarps are raised clear of the stack (18-in minimum), they will be useless. Tarps can also be used as improvised shelters for VT fuzes and pyrotechnics.

In most areas, stacks have to be at least 4 to 6 inches off the ground. If they are not, the ammunition gets wet and air does not circulate. Rounds get rusty and become unserviceable. Lumber on the ground beneath containers acts as dunnage to raise them the appropriate distance. If there is no lumber, or trees are not available for dunnage, try using empty ammunition boxes or use ration boxes filled

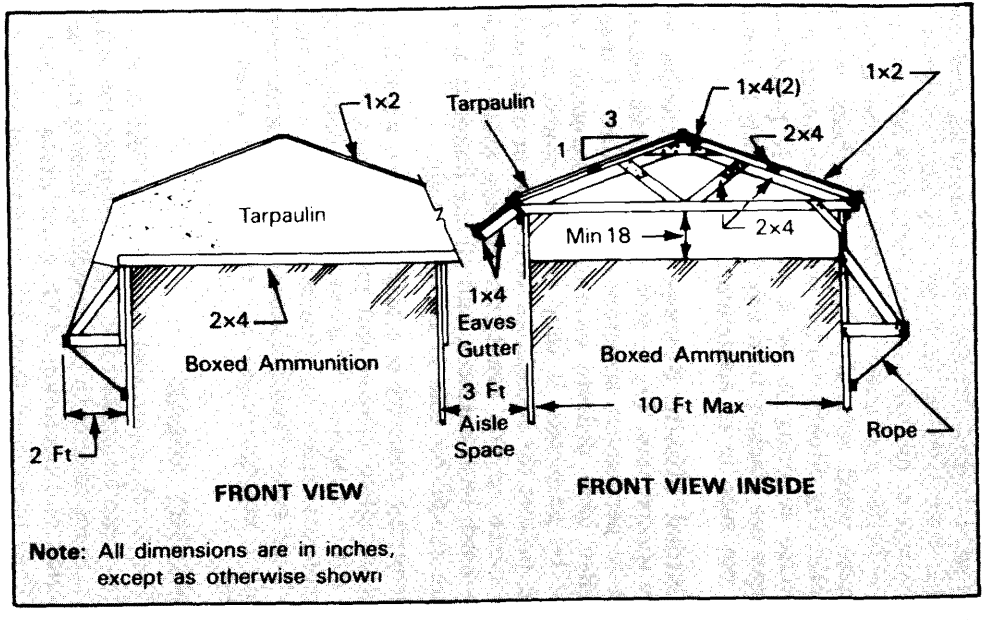


Figure 2-5. Cross Section Details of an A-Frame Ammunition Storage Module.

with sand or dirt. Bricks, wood from crates, and materials from wrecked buildings will also work. Putting strips of lumber between containers lets air circulate better and makes the stack more stable. But because wood rots and falls apart, check it frequently. Dig ditches around stacks of ammunition if drainage is going to be a problem. If propellant charges are stacked, turn lids down slightly so water will not seep in or accumulate.

Guided Missile Storage. Guided missiles require special care. Try to store guided missile assemblies in permanent structures. The bodies of these missiles have delicate electronic components that must be protected. If they must be stored in the open, protect the containers with tarps or other suitable cover. In any event, the storage areas should have hard, level surfaces, and all the humidity indicators should be able to be read easily.

Security. Security is a major concern when handling classified missile and rocket components. Do not store classified components with unclassified components. Keep an accurate check on personnel who must enter classified storage areas or structures. If open storage must be used, there must be guards.

SLING-OUT AREAS

Plan for sling-out areas in or near CSAs or ASPS so there can be limited helicopter resupply for using units. Some factors to be considered during the construction and operation of sling-out areas follow:

- They must be at least 550 meters from ammuni-

tion storage locations, working areas, and inhabited areas.

- Consider prevailing winds because helicopters must come in with the wind and take off into the wind. This is also important in limiting downwind contamination in case there is an accident involving chemical weapons.
- Sling-out areas must be set up where aircraft will never pass over storage locations, inhabited areas, or public roads while coming to the area, landing, taking off, or leaving the storage area.
- Sling-out areas should be at least 25 meters square. They should be made out of the best material available. Perforated steel planking is a good field expedient.
- Have on site only that ammunition to be placed in cargo nets. If the situation dictates, cargo nets may be loaded at the designated stock locations and then transported to the sling-out area.
- Do not use the sling-out area for storing ammunition because compatibility and quantity distances cannot be maintained at the sling-out areas. Clear immediately all incoming shipment and field returns, and store them properly in the storage facility.
- Load and stage cargo nets so aircraft can pick up the load while hovering. Make sure there is a static electricity discharge probe to be used by hookup personnel before they connect the load to the cargo hook. Make sure hookup personnel are properly trained to use the discharge probe.

- Keep MHE clear of the area while aircraft is landing or taking off.
- Make sure there is working fire fighting and other emergency equipment at the area whenever the area is being used.
- Make sure helicopter teams know the proper hook-up procedures and hand and arm signals.

When planning air shipments, be sure to consider the allowable gross weights for military cargo aircraft as shown in Table 2-3.

Table 2-3. Allowable Gross Weights for Military Cargo Aircraft.

Aircraft	Maximum Gross Weight (Pounds)	Payload (Pounds)
C-130	29,000	24,000
C-141	26,500	21,900
C-5A	43,500	38,900

See Appendix B for information on helicopter rearm points.

CAMOUFLAGE

The ASP must be hidden and blended into the countryside. Its location and size must be disguised. Use natural cover and concealment as much as possible. Using camouflage wisely goes a long way toward keeping the ASP from being discovered.

General use of camouflage material is in FM 90-2 and TM 5-200. In ASPs, however, the requirements for camouflage may conflict with the requirements

for firebreaks and ammunition shelters. Commanders must carefully weight their decisions and try to use camouflage as much as possible without violating explosive safety and proper ammunition storage procedures. Camouflaging should not slow the initial or continual operation of the ASP.

MATERIALS HANDLING EQUIPMENT

MHE is equipment that helps ammunition personnel store, handle, and ship ammunition. It makes it possible for vehicles to be loaded or unloaded rapidly upon their arrival and for ammunition to be properly handled. Included are forklift trucks, towing tractors, cranes, pallets, jacks, platform trucks, conveyor systems, etc. The most common of these are described below. Whatever is used, there are two things to consider when planning for MHE: The individual unit pack, size, and weight of the materiel to be shipped; and the type and size of the means of transport. All MHE must be load tested, and date of test stenciled on equipment.

Forklift Trucks. These pick up, carry, and stack unit loads of supplies and equipment and may be powered by gasoline, diesel, liquid petroleum gas, or battery. Under each of these categories, forklift trucks are broken down by lifting capabilities ranging from 2,000 to 15,000 pounds. Electric (battery-powered) forklift trucks are important because they are the only forklift trucks that may operate in the holds of ships transporting ammunition. They can lift from 2,000 to 10,000 pounds and are generally restricted to hard surfaces.

The forklift most commonly used at field storage activities is the rough terrain forklift (RTFL). It is an off-road vehicle with pneumatic tires so it can be used on prepared or unstable surfaces including beaches and other deep sand and can be used for loading and unloading flatbed trailers, landing craft, or other similar small cargo vessels. RTFLs can perform the functions of three types of MHE, a forklift truck, a towing tractor, and an RT crane (when the RT crane attachment is installed in place on the work carriage). The RTFL can be used for fording if the water is not over 5 feet (if there are waves, not more than 5 feet to their crest). The RTFL has front and rear -axle steering, so it can move sideways at 20-degree angles and turn with a short radius. It also has 2-wheel and 4-wheel drive so it can go over paved roads, sand, mud, snow, and steep grades with equal ease.

Towing Tractors. Towing tractors are vehicles that pull trailers. Towing vehicles (truck tractors, etc.) are important for moving ammunition efficiently. To get the most benefit, each tractor should be shuttled so that each can be used with at least two trailers. This reduces the time tractors wait for just one trailer to be loaded or unloaded. There is more information on types and characteristics of towing tractors and trailers in TM 9-500. When ammunition is transported by tractor-trailers, precautions in TM 9-1300-206 should be followed.

Cranes. Cranes raise, shift, and lower heavy weights with a projecting boom, swinging arm, or

other hoisting device that is supported on an overhead track. The crane and the forklift truck equipped with a crane boom both suspend their loads. This makes it unsafe for either to handle a load unless it has been prepared by proper lashing or unless a sling is used, such as a pallet sling for pallets. Cranes in ASPs are used mostly to handle projectiles. Since they can move more than one pallet at a time, they are more efficient than the RTFL, which is limited to one pallet at a time.

Pallets. Essential to the use of MHE are pallets. They are portable platforms of wood or other materials that come in many sizes and are vital to handling, storing, and moving ammunition.

STORAGE SAFETY

Because ammunition is so dangerous, it demands special safety regulations, which are more stringent that those for other classes of supply. Make sure a highly qualified individual has the authority for planning, coordinating, and supervising the ASP safety program. This person must make sure the QD criteria, storage compatibility groupings, are followed. This is the only way to reduce the chance of fire or sympathetic detonation. Consult Chapter 1 for more details on safety programs.

There are times the unit will not be able to observe all these requirements, but it must be kept in mind that, as tonnage is increased and distance reduced, the chance of fires and explosions is increased.

DISPERSION

If assets are dispersed enough, the ASP will not be an inviting target from the air. When possible, store quantities of each type of ammunition in two or three widely separated areas. Then, if the contents of one area are destroyed, the entire supply of any one item will not be lost. When there is not enough space to spread out, it is better to increase the quantity of ammunition in stacks and FSUs than to reduce the safety distances.

INTERSTACK DISTANCE

Interstack distances, the minimum distance between the near edge of adjacent stacks, are setup by appropriate QD tables and help prevent spreading of detonation from blast pressures. Be aware, however, that interstack distances are not always protection from missile fragments resulting from explosions or fire.

Aggressive fire fighting can usually help prevent fire spreading from one stack to another at these distances. In fact, the greater the distance between stacks the less likely fire will spread from stack to stack. With this in mind, try to separate stacks by greater distances than those prescribed. This will help prevent fires and make fire fighting easier.

INTER-FSU DISTANCE

The inter-FSU distance, the distance between the nearest edge of the nearest stacks in adjacent FSUs, also helps prevent fire spreading. When distances cannot be met, use extra care when setting up and maintaining fire protection, fire guards, and fire fighting measures.

INTERCATEGORY DISTANCE

The intercategory distance, the distance from an FSU of one category to the nearest FSU of another category, is based on the hazards of each category of ammunition. This distance cannot be reduced by barricades.

OPTIMUM SAFETY DISTANCE

The optimum safety distance is the limit inside which structural damage from a blast or from missile fragments will be serious. Be sure this distance is considered if ASPS have to be located near gasoline or other storage facilities, hospitals, permanent radio transmitters, railroads, and highways.

BARRICADES

The effect of sympathetic detonation can be reduced if there are sand or earth barricades at least 3 feet wide at the top and 1 foot higher than the stack. Natural barriers of the same dimensions give the same effect. In some cases, barriers can reduce the interstack distance up to 50 percent IAW the applicable QD tables.

CHEMICAL AMMUNITION

Store chemical filled ammunition (Category D) so that each container, item, or bomb can be inspected and easily removed. Keep projectiles containing phosphorus out of the direct sun, and store them with their bases down.

TOXIC AMMUNITION

Store toxic chemical-filled ammunition in the part of the ASP with the lowest elevation and at least 1 mile downwind from inhabited ASP buildings or

other storage areas. Make sure there are no inhabited buildings or storage areas within 2 miles downwind of the storage site. Make sure there is maximum security for this kind of area. Water-filled barrels for immersion of leakers should be placed nearby.

ROCKETS

The safety requirements for storage of rockets are stricter than for most other types of conventional ammunition. Store both small caliber rockets and large caliber, free-flight rockets on the outer edge of the ASP. Point their noses away from all other stored ammunition and from all inhabited areas. Store small caliber rockets so they are pointed into an artificial or natural barrier of sand or earth at least 3 feet thick. Locate the rockets so that there is nothing, other than their own containers, between the rockets and the barrier. Do not make stacks more than one row deep.

CATEGORY G AMMUNITION (BOMBS)

Category G ammunition is usually stored and issued by the US Air Force. However, depot and ASP commanders handle it in emergencies. For this reason, the following restrictions must be studied. The FSU is the smallest storage unit authorized. Fuzed fragmentation bombs in the same FSU may not be stored with other bombs. Components of bombs (fins, fuzes, primer-detonators, etc.) can be stored between the FSUs. If that is done, remember to protect fuzes and primer-detonators from heat and moisture. Category G photoflash bombs can be stored with Category F. If this is done, do not store

them in the same FSU with other Category G-ammunition.

FIREBREAKS

Build firebreaks wide enough (at least 50 feet) to prevent the spread of fire. If they are available, use bulldozers with specially constructed ground clearing machinery. Underbrush and grass can also be burned over. Any burning must be done before ammunition is received.

Chapter 3

ISSUE, RECEIPT, SHIPMENT, AND TURN-IN PROCEDURES

This chapter provides the guidelines, documentation, and procedures for the issue, receipt, shipment, and turn-in of ammunition.

ISSUE

Issue, as used here, is the transfer of ammunition stocks from an ASP or depot to an authorized user.

GUIDELINES

The following guidelines will help ammunition units provide efficient support to using units:

- Issue only serviceable ammunition. See Appendix E for ammunition condition codes.
- Advise using units of limitations on the use of restricted ammunition and ammunition suspended from issue and use except for emergency

combat. Use TB 9-1300-385 or other pertinent directive by HOTLINE message for guidance.

- Never issue ammunition classified by TB 9-1300-385 as "suspended from issue, movement and use" or "suspended from issue and use."
- Closely monitor issues of miscellaneous small lots of artillery ammunition so the using unit will not get overburdened with small lots. This is important to artillery units in combat to reduce registration with the Fire Direction Center due to change in lot numbers.
- Ammunition must be issued in the order of the priorities given below.
  - Priority 1. Smallest lots of ammunition being issued.
  - Priority 2. Ammunition designated as "priority issue."
  - Priority 3. Acceptable substitute from excess stocks. Coordinate with the requisitioner for this substitution.
  - Priority 4. Oldest ammunition of type being issued.
  - Priority 5. All other stocks.

DOCUMENTATION

The forms listed below are necessary for issuing ammunition. Whenever a form has an R after its number, it can be reproduced in the unit.

- ***DA Form 581*** (Request for Issue and Turn-in of Ammunition). The requesting unit prepares this form and presents it to the ASP for issue.

- ***DA Form 1687*** (Notification of Delegation of Authority—Receipt for Supplies). Using units must present a properly completed copy of a DA Form 1687 to the ASP providing support. The ASP uses the form to insure that DA Forms 581 have the proper signatures. See DA Pam 710 series for more details.
- ***DA Form 3151-R*** (Ammunition Stores Slip). The operations office at the ASP prepares a DA Form 3151-R. Use TM 38-L69-11-1* for instructions for filling out. Use this form to track the movement of ammunition within the storage facility, to include issue to and receipt from user units.
- ***DD Form 626*** (Motor Vehicle Inspection (Transporting Hazardous Material)). Inspect using unit vehicles using this form, before and immediately after loading, before they leave the ASP or depot. Instructions are in AR 55-355. There is more information in FM 9-38 and TM 9-1300-206.
- ***DD Form 836*** (Special Instructions for Motor Vehicle Drivers). The ASP shipping officer prepares one form for each driver of a vehicle that leaves the ASP or depot loaded with ammunition. Drivers must keep these forms in their possession at all times while driving ammunition-laden vehicles. Instructions for preparation are

*This TM is being rescinded. It will become Chapter 25, DA Pam 710-2-2. The Supply Support Activity (SSA) Supply System.

in AR 55-355, FM 9-38, TM 9-1300-206, and FM 55-70.

DA Form 3020-R (Magazine Data Card (MDC)). When they issue ammunition from a storage location, checkers post and initial the transaction on the proper MDC. Each checker and the soldier in charge of each respective magazine or stack must ensure the accuracy of the MDC.

PROCEDURES

The requesting unit must have its ammunition issue request, DA Form 581, authenticated by a command-designated officer, before it arrives at the ASP or depot. In the division, the DAO authenticates requests; in the corps artillery, the S4 may do it. Authentication gives tactical commanders a way to control ammunition issues.

The flowchart in Figure 3-1 is a guide for ASP, or depots in planning for and conducting efficient issue operations. Use it when writing SOPs for ammunition issues.

RECEIPT

Receipt, as used here, refers to a shipment from another ASP or depot or directly from the port. ASPs normally receive regular replenishment shipments from the CSA. That may mean one convoy per day, a convoy every other day, or some other arrangement. Some receipts, such as emergency replenishment, are unscheduled and may arrive at the ASP at any time. The ASP must have established procedures for the orderly and efficient receipt of ammunition.

GUIDELINES

The following general guidelines make receiving ammunition safer and easier to control:

- Be aware that mixed lots may be in a single shipment. If they are, there will have to be a detailed inventory after unloading.
- Use advance notices of receipts for planning ASP operation. They will increase efficiency.
- Inspect the ammunition received for damage and safety hazards.
- To prepare for incoming shipments, check the unit SOP for guidance concerning the particular method of transportation the Class V items are arriving on.
- There may be so many items that rewarehousing will be necessary to make room in the planned location to store them. To determine if this is necessary, check the planographs. For magazine storage at a CSA or TSA, also check the magazine drawings; for outdoor storage, check the FSU size. Finish rewarehousing before the shipment arrives.
- Consider the amount of labor and MHE that may have to be used to download the shipment.

Motor Vehicles. Inspect motor vehicles against the destination portion of the DD Form 626, which is carried with each shipment, as each vehicle arrives at the ASP. Asterisked items must be checked, and deficiencies must be corrected before the vehicle comes into the ASP/depot. Make sure the ASP control section gives the storage section personnel a DA Form 3151-R before they leave for the storage area

with a truck. The form gives the location and quantity of ammunition to be stored. Finally use whatever types of MHE on hand (IAW the TOE) and that can be used on the ASP terrain.

Railcars. Make sure that a civilian QASAS or military ammunition inspector (MOS 55X) is on hand when the railcar is spotted and opened. All railcars transporting explosives should be inspected when they enter the ASP and before they are opened for unloading. Make this inspection at a designated inspection area, and make sure technically qualified personnel, such as the QASAS or 55X, do the inspecting. If sabotage or any unsafe condition is suspected, move the car immediately to the suspect-car track so it can be inspected by authorized security and EOD personnel. If the car passes the inspection, downloading can be restarted as soon as possible. The use of MHE, whether forklift or conveyor rollers, depends on the particular situation and requires planning and coordination.

Aircraft and Vessels. The help of other services is necessary for these means of transportation. A QASAS or 55X is also necessary. Transporting with aircraft or vessels uses motor vehicles or railcars at some point to move munitions to and from the actual storage site. Refer to TM 9-1300-206 for more information.

DOCUMENTATION

Use the following documentation when receiving ammunition:

DA Form 3151-R (Ammunition Stores Slip).

The receiving ASP or depot uses this form to record where the incoming shipment is to be stored. Prepare a DA Form 3151-R for all ammunition items arriving at the ASP on a vehicle. TM 38-L69-11-1 has instructions for filling out the form.

- ***DD Form 1348-1*** (DOD Single Line Item Release/Receipt Document). DD Form 1348-1 is prepared by the shipper and is used as a receipt and as documentation of the shipment. It is also used as advance notice of an incoming shipment.
- ***DA Form 5210-R*** (Ammunition Transaction Card, XBT (Intransit-In Receipt)). This card is prepared by the ASP and is forwarded to the proper MMC to notify the MMC that a shipment of ammunition has been received by the ASP.
- ***DD Form 1384*** (Transportation Control and Movement Document (TCMD)). The shipper prepares the TCMD, and it stays with the ammunition during shipment. This form provides vital transportation data to each level, including the receiving ASP, concerning the ammunition shipment.
- ***DD Form 626*** (Motor Vehicle Inspection (Transporting Hazardous Material)). The ASP uses this form to inspect arriving vehicles before they unload. Personnel named by the ASP commander prepare this form IAW AR 55-355. FM 9-38, and TM 9-1300-206.
- ***DA Form 3020-R*** (Magazine Data Card

(MDC)). The ammunition storage unit prepares the MDC for each lot and stack of ammunition stored during receiving operations except when the ammunition received is going to an already existing stack. In this case, the checker must post the transaction to the proper MDC. Checkers and the soldier in charge of each magazine or stack are responsible for the accuracy of this card.

PROCEDURES

The flowchart in Figure 3-2 is a guide for planning and conducting receiving operations. It can also be used for writing SOPs for ammunition receipts.

SHIPMENT

Shipment, as used here, is the movement and transfer of ammunition stocks from one storage activity to another storage activity using transportation assets not organic to the shipping ammunition unit.

GUIDELINES

Efficient ammunition shipping operations are largely the result of thorough advanced planning. Most accidents involving Class V items are during transportation, movement, or handling. When a materiel release order (MRO), shipping instructions, or other authority directing a shipment is received, carefully plan the mechanics of each shipment, because each is different. See Appendix C for a DODIC conversion chart and Appendix F for DOT hazardous materials information.

○ Using Unit ▲ ASP Office ⊕ Inspector
● DAO ⊗ Checker □ INV Control
■ Convoy CMDR Driver

No	Activity	Document	○	●	■	▲	⊗	⊕	□
1	Prepare Request	DA 581							
2	Authenticate Request	DA 581							
3	Travel to ASP - Park in Vehicle Holding Area								
4	Present Request to ASP Office in Triplicate	DA 581							
5	Review Request for Accuracy, Completeness and Proper Authentication	DA 1687							
6	Inspect Empty Vehicles	DD 626							
7	Select Lots and Storage Locations	DA 5203							
8	Prepare Stores Slip for Each Vehicle, in Triplicate	DA 3151-R							
9	Review Suspension File With Lot Selected	DA 3151-R							
10	Review DSR Cards for Inspection/ Condition	DA 3022-R							

11	Verify Condition of Lots Selected for Issue	DA 3151-R
12	Assign Checkers, Loading Crews, MHE	
13	Distribute Stores Slip	DA 3151-R
	a. Original and Copy to Checker	DA 3151-R
	b. 3d Copy with Request Suspense	DA 3151-R
14	Escort Vehicles to Storage Locations	
15	Load, Block, Brace, and Inventory Vehicle	DA 3151-R
16	Sign Stores Slip Jointly; 2d Copy to Driver	D* 3151-R
17	Fill Out Magazine Data Card	DA 3020-R
18	Drive Loaded Vehicles to Assembly Area	
19	Inspect Loaded Vehicles	DD 626 DD 836
20	Return Stores Slip to ASP Office	DA 3151-R
21	Verify Stores Slip, Original With 3d Copy	DA 3151-R
22	Total all Stores Slips	DA 3151-R
23	Enter Total Quantity Issued in Block 10E of Request	DA 581
24	Get Receipt Signature	DA 581
25	Distribute Documentation	DA 581 DA 3151-R
26	Return to Unit	DA 581 DD 626, 836
27	Post Records	
28	Report Issue on Transaction Report	
29	Record and Initiate Resupply Action	

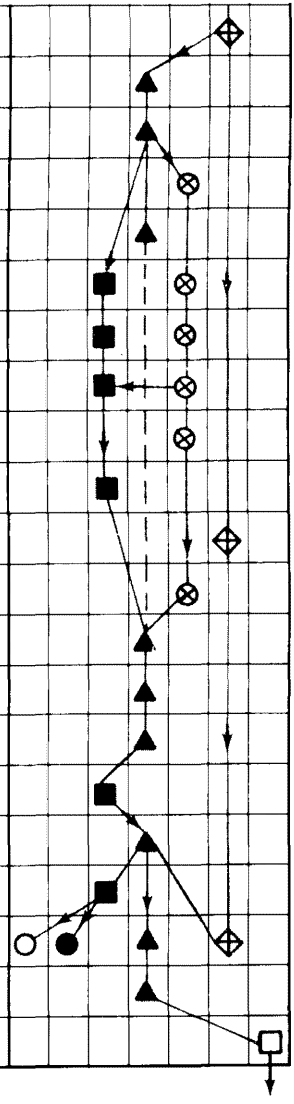
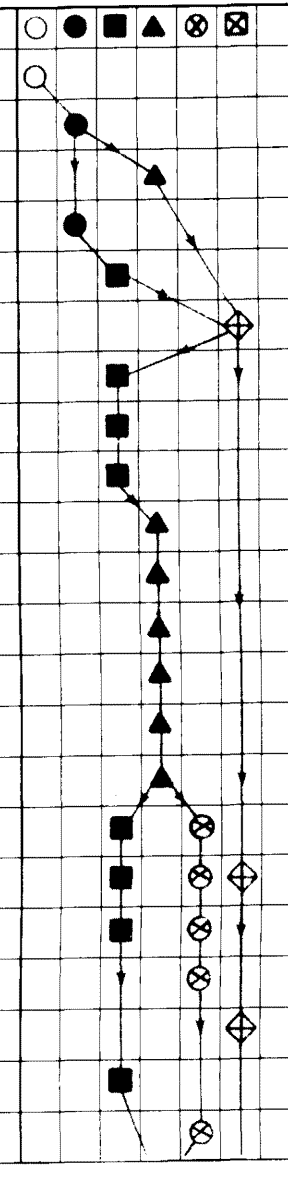


Figure 3-1. Issue Procedures.

○ Inventory Control
● Shipper
■ Convoy CMDR Driver
▲ ASP Office
⊗ Checker
⊕ Inspector

No	Activity	Document
1	Direct Shipment	DD 1348
2	Provide Advanced Notice to Receiver	DD 1348-1
3	Conduct Advanced Planning for Receipt	
4	Ship Ammunition	DD 1384 DD 1348
5	Arrive at ASP/Depot	
6	Inspect Vehicles Prior to Entry	DD 626
7	Correct Deficiencies - If Noted	DD 626
8	Park Loaded Vehicles in Holding Areas	
9	Present Documentation to ASP Office	DD 1348 DD 1384
10	Review Documentation	DD 1348 DD 1384
11	Select Storage Locations	PLANO-GRAPH
12	Prepare Stores Slip for each Vehicle	DA 3151-R
13	Prepare Magazine Data Card for Each Lot/Location	DA 3020-R
14	Assign Checkers, Unloading Crews, MHE	
15	Give Stores Slips and Mag Data Cards to Checkers	
16	Escort Vehicles to Storage Locations	
17	Verify Type, Lot, Condition, Quantity Received	DA 3151-R
18	Sign Stores Slip	DA 3151-R
19	Annotate Magazine Data Card	
20	Conduct Receipt Inspection	
21	Drive Empty Vehicles to Assembly Area	
22	Return Stores Slip to ASP Office	DA 3151-R



23	Verify Stores Slips for Accuracy and Completeness	DA 3151-R	
24	Total Stores Slips by Lot and Location	DA 3151-R	
25	Review Suspension File for Lots Received		
26	Post Lot Locator Records	DA 5203	
27	Cross Check Stores Slip With Receipt Documents	DA 3151-R DD 1348 DD 1384	
28	Recheck Actual Receipts - if Discrepancy Noted		
29	Record Actual Receipts on Receipt Documents	DD 1348 DD 1384	
30	Sign Receipt Documents	DD 1348 DD 1384	
31	Depart ASP with Signed TCMD	DD 1384	
32	Forward Materiel Receipt Document to Inventory Control		
33	Record and File Documentation	All	

Figure 3-2. Receipt Procedures.

Before any plan is begun, a detailed step-by-step SOP must be written, which will make transportation and movement activities much more effective. Consider the following basic factors, although they may vary because of prevailing operational environments, types of shipment, and existing workloads:

- Try to establish close liaison with the supporting local transportation movements office (TMO) to make coordinating external transportation assets easier.
- Bear in mind that most shipments are on a "throughput" basis, as directed by the appropriate MMC. Maintain as much contact as possible with the MMC to get the most advanced notice.
- Ammunition should be palletized for shipment as much as possible to make loading and unloading vehicles easier.
- All carriers must be inspected throughly (IAW DD Form 626) before they are loaded.
- Verify the availability of Class V items for shipment. Immediately report quantities not available to the activity issuing the shipping directive.
- Know the selection of lots and storage locations from which specific quantities are to be loaded.
- Make sure items are compatible. This is critical. For more information, see TM 9-1300-206.
- Once the amount of ammunition to be shipped is known, verify it against on-hand assets, condition codes, and storage locations. The compati-

bility of assets according to the method of transport (compatibility varies depending on whether rail, air, motor vehicle, or vessels are used) must be known, as well as the size, type, and number of vehicles, railcars, etc., in which the ammunition is to be loaded. Be aware of the MHE and the number of soldiers available to do the loading. Make sure palletization and outloading drawings are available as well as the equipment and lumber to follow these drawings.

- Within CONUS, the basic documents that must be followed are DOT Motor Carrier Regulations and AR 55-355. In addition, comply with all local and state rules, regulations, and laws. Follow all the recommended routes through which shipments will pass in order to make sure bridges, tunnels, and congested areas are avoided.
- Within a Theater of Operations (TO), make sure shipments of ammunition comply with theater and DA directives and safety regulations. To a large degree, these directives and safety regulations are the same as those in CONUS.
- Whether CONUS or OCONUS, the following publications apply to shipments: AR 55-38, AR 55-355, AR 190-11, AR 710-2 series, AR 735-11-2, BOE 6000, DOD Reg 5100.76M, FM 9-38, FM 55-70, DOD 4500.32R, and TM 9-1300-206.
- If the shipment is to be handled by commercial carrier or other external transportation assets, alert the supporting transportation movements officer (TMO) as far in advance as possible. Coordinate with the customer unit on type and

quantity of vehicles if the shipment is to be by military vehicles belonging to the customer unit. By making requirements known to the TMO and by keeping up with technical matters, the operation will be more efficient.

Compatibility. There are handling and loading requirements for maintaining transportation compatibility for explosives and other hazardous cargo. Compatibility for transportation has the same priority as for storage, only the standards for which types of items may be mixed are different. Figure 3-3, an extract from BOE 6000, shows which items can be loaded together.

The chart in figure 3-3 (in pocket on inside back cover) uses the Department of Transportation (DOT) shipping names. These names are available in the ammunition data catalog (in microfiche), the DOD Hazardous Classification Guide, or the manufacturer's data on the top of the box being shipped. Once the DOT shipping name is known, cross-reference it to the BOE chart to see if the items can be loaded together.



Motor Vehicles. When a documented request for shipment (DA Form 3151-R, DA Form 581, DA Form 1348, etc.) is received, determine what type and how many vehicles will be necessary. Coordinate this with the TMO or the unit responsible for transporting the ammunition. Determinations are as follows:

- ***Number of Trucks.*** Determining the gross weight to be put on military trucks is up to the using unit and should be coordinated with the

control and QA/QC section of the ASP. Determine the cube/square of the load by measuring the pallets. Make sure the cube and weight are checked for total quantity to be put on the vehicle. If commercial vehicles are to be used, the ASP control section is responsible for determining how much will be loaded on each vehicle and what size vehicles will be used (the TMO provides this information).

- ***Preparation for Loading.*** Know what kind of trucks (2 1/2-ton, S&P, etc.) are going to be used before they arrive at the ASP. Unlike for commercial vehicles, this information is provided by the unit responsible for transporting the ammunition or by the TMO. Furthermore, ASP personnel should have sufficient advance notice so they can plan for the job. See Appendix A.

- ***Palletized Loads.*** Make sure loading procedures follow DA Pam 75-5. Always use outloading drawings, and follow them as closely as possible. After the drawing is obtained, request the materials for blocking and bracing needed. If the item needs to be palletized or repalletized, the procedure in DARCOM Drawing 19-48-4116-20-PA10002 should be followed. Get the specific drawing for a particular kind of ammunition by using the appendixes to DARCOM Drawing 19-48-4116-20-PA10002. These drawings give details on the equipment needed and procedures for unitizing specific items. The ASP SOP should list the safety equipment necessary for these procedures.

MHE is necessary if the ammunition is palletized. What kind of MHE and how much will be needed depend on the terrain, weather, and MHE available. With experience, comes better judgment of what MHE will be needed for an operation. Along with the MHE, additional items of handling gear, such as nylon cargo straps, steel slings, and conveyors are often needed.

- ***Unpalletized Loads.*** These loads are most often shipped to tactical units. This makes planning difficult because of the small quantities and different kinds of boxes being put on one truck. The ASP QA section can advise the best method for loading.
- ***Incoming Inspection.*** When it arrives at the ASP, the motor vehicle should be inspected lAW TM 9-1300-206 or Chapter 216, AR 55-355. DD Form 626 is used when Class A and B shipments will be over public highways; local forms are often made for other situations. Soldiers in the storage section, control section, or qualified personnel should complete blocks 1-22 of the DD Form 626 before the vehicle enters the ammunition storage area. Instructions for filling out this form are on the back of it, and TM 9-1300-206 has additional information, such as the correct fire extinguishers.
- ***Placarding Requirement.*** The proper placards must be on all motor vehicles transporting hazardous cargo over highways. Make sure one placard is displayed on each of the four aides of the vehicle and the trailer, if applicable. Make

sure the placard on the trailer is visible from the front. If vehicles are transporting explosives A or B, try to get reflectorized placards. Display the placard of the most dangerous item being transported. See BOE 6000 for more specific details on how to placard vehicles, and see FM 55-70 and TM 9-1300-206 for the NSN of the different sizes of placards. In an overseas theater, the placards of the host nation or placards that show both English and the native language may have to be used.

- ***Transport Protection.*** The load should be well braced and stayed IAW the proper outloading drawing. If it is not in a closed van, the load needs to be covered with fire-resistant tarps. Tarps are not needed when sealed metal containers are being transported.

- ***Outgoing Inspection.*** When the load is ready, the DD Form 626 should be filled out. Have a QASAS or 55X ammunition inspector fill in blocks 23-30, which includes completion of a DD Form 836. Use Chapter 216, AR 55-355, to fill out the DD Form 836, and use the fire fighting guidance and the DOT shipping name in Appendix F.

Railcars. Before working with railcars, there are several references soldiers need to be familiar with. Follow carefully the guidance for loading compatibilities as given in BOE 6000. There are also specific procedures that govern rail shipments, dealing with safety precautions, loading, blocking, and bracing in

the outloading drawings in DA Pam 75-5 and TM 9-1300-206. Railcar inspection procedures and certification are in TM 9-1300-206 and Chapter 216, AR 55-355.

Aircraft. Air shipment operations can be conducted at any airfield operated by the US Air Force or US Army, at heliports, or at ASP helicopter sling-out areas. The US Air Force controls air terminal operations at its airfields. The Army transportation service controls transfer points operated by the field Army. Technical assistance in this case is supplied by ammunition supply units. Helicopter loading sites (sling-out areas) at Class V installations are operated by that installation. The local TMO can provide technical assistance. For more on aircraft operations, see TM 38-250 and TM 9-1300-206. TM 9-1300-206 has a detailed discussion of sling-out operations.

Plan for sling-out areas in or near CSAs or ASPs so there can be limited helicopter resupply for using units.

Vessels. Loading and unloading of vessels is the specific responsibility of transportation units in the theater of operations and the US Army Military Traffic Management and Terminal Services. They are governed, however, by the regulations of the US Coast Guard. These regulations cover the classification, compatibility, and storage of ammunition and other dangerous cargo aboard a vessel and are in the US Army's FM 55-70. The Coast Guard also secures and supervises vessels, including barges, unless they are specifically exempt.

DOCUMENTATION

The following forms and labels are used when ammunition is shipped

- ***DA Form 3151-R*** (Ammunition Stores Slip). Prepare a DA Form 3151-R for each DODAC in the shipment, so checkers can use them as tally sheets during upload of the ammunition. Fill them out following TM 38-L69-11-1.
- ***DD Form 1384*** (Transportation Movement Control Document (TCMD)). The TCMD is prepared by the shipping ASP. It provides: advance planning information for scheduling transportation, the way to control and identify shipments throughout their movement, and the essential information needed to trace, locate, and divert shipments.
- ***DD Form 626*** (Motor Vehicle Inspection (Transporting Hazardous Material)). The shipping activity uses DD Form 626 to inspect vehicles before and immediately after they are loaded, before they leave the ASP or depot. Use AR 55-355 to fill it out, and use FM 9-38 and TM 9-1300-206 for additional guidance.
- ***DD Form 836*** (Special Instructions for Motor Vehicle Drivers). The driver of each vehicle loaded with ammunition gets a DD Form 836 before leaving the ASP or depot. The transportation officer prepares DD Forms 836 IAW AR 55-355, FM 9-38, and TM 9-1300-206.
- ***DA Form 3020-R*** (Magazine Data Card (MDC)). Checkers post the transaction to the

MDC when ammunition is shipped from a storage location. Both checkers and soldiers in charge of the magazines or stacks make sure the MDC is accurate.

- ***DD Form 1348 Series.*** For shipping, there are many ways the MILSTRIP documents in the DD Form 1348-series are used. Furthermore, the series can be used manually or electronically in automatic data processing (ADP). See TM 38-L69-11-1 for complete information on using of this series of forms. Their primary uses are as materiel release orders, materiel release conformations, materiel release denials, redistribution orders, and advanced notices of shipment.
- ***Shipping Labels.*** The shipping activity marks and labels ammunition that is being shipped with the proper shipping labels IAW AR 725-50, FM 55-70, BOE 6000, TM 738-250, and AR 55-355. The proper way to fill out address labels is in MIL-STD 129H. The proper way to handle hazardous cargo is in AR 55-355 and FM 55-70. Be sure all appropriate placards are put on the vehicle before it is loaded. They must be affixed properly because they will not be taken off until the vehicle is unloaded.

PROCEDURES

The flowchart in Figure 3-4 will help to plan and conduct efficient shipping operations. It can also be used to write SOPs for ammunition shipments. Every shipment and every shipping activity has special requirements that make their operations different, so modify the chart as necessary.

Figure 3-4 shows a routine "throughput" replenishment shipment by motor convoy. With minor changes, it can apply to air or rail shipments, high priority shipments, cross-leveling shipments, and retrograde shipments.

TURN-IN

Turn-in, as used here, is the return to the ASP of unexpended ammunition and salvage items. Ammunition may be turned in to the supporting ASP or depot by using units. Reasons for turn-ins are because operations are complete, missions change, basic loads change, items on hand are suspended, or the serviceability of ammunition items is questionable. ASPS and depots also receive salvage ammunition materiel and such residue from the using unit as expended cartridge cases, grenade pins, containers, wooden boxes, and metal cans. See Appendix G for a brass conversion chart.

GUIDELINES

The following guidelines make turning in ammunition safer and easier to control:

- Encourage using units to return ammunition items in their original packs.
- Discourage using units from opening more rounds and packages than they need and that they may have to turn in later.
- Inspect turn-ins thoroughly. This is because turn-ins may be in mixed lots and varying quantities and there may also be unserviceable and hazardous ammunition.

- Salvage material must get a 100-percent inspection and be certified by the QA section as free of explosives.

DOCUMENTATION

The following documentation is necessary for turn-ins:

- ***DA Form 581*** (Request for Issue and Turn-in of Ammunition). The using unit making a turn-in prepares a DA Form 581 and gives it to the ASP office.
- ***DA Form 3151-R*** (Ammunition Stores Slip). DA Form 3151-R is used for turn-ins as a temporary receipt or a storage document, prepared by the ASP office, that directs the relocation of specific items from the segregation area to specific storage locations.
- ***DD Form 626*** (Motor Vehicle Inspection (Transporting Hazardous Material)). The receiving ASP or depot uses this form to inspect vehicles for hazardous conditions before they are unloaded. Prepare this form IAW AR 55-355, FM 9-38, and TM 9-1300-206.
- ***DA Form 3020-R*** (Magazine Data Card (MDC)). Prepare an MDC for each lot and stack of ammunition turned in except when the returned ammunition goes back to an already existing stack. In this case, the checker simply posts the transaction to the existing MDC for that stack. Checkers and soldiers responsible for each magazine or stack make sure the MDC is accurate.

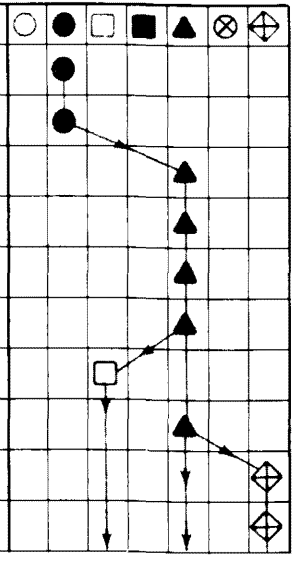
PROCEDURES

The flowchart in Figure 3-5 will help to plan for and efficiently conduct receipts of using unit turn-ins. It can be used when SOPs for turn-ins are written. Salvage turn-ins are handled much the same as the ammunition turn-in procedures in Figure 3-5, with the following exceptions:

- Inspect and certify items to be sure that they contain no explosives.
- Store salvage items in an area designated for all salvage items.
- Keep a separate account in the ASP stock records office. This account reflects the item by quantity or tonnage, condition code, lot number, and DODIC or part number.
- Report turn-ins to higher headquarters IAW established procedures.

○ ASP
● Inventory Control
□ Trans Office
■ Convoy CMDR/Driver
▲ ASP Office
⊗ Checker
⊕ Inspector

No	Activity	Document
1	Decide to Ship	
2	Initiate Materiel Release Order (MRO)	DD 1348
3	Receive MRO	DD 1348
4	Verify Quantity on Hand, Condition	
5	Select Lots, Storage Locations, and Quantity by Lot Suspension Status	
6	Request Transportation w/TCMD	DD 1384
7	Plan Movement, Nominate Carrier	DD 1384
8	Prepare Stores Slips and MILSTRIP Documents	DD 1348-1 DA 3151-R
9	Review Lots on Suspension File	DA 3151-R
10	Review Depot Surveillance Record for Inspection Results	DA 3022-R



11	Perform Pre-issue Inspection, if Required	
12	Verify Condition of Lots Selected	DA 3151-R
13	Return Stores Slip to ASP Office	DA 3151-R
14	Direct Required Maintenance	DA 2407
15	Alert Loading Crew, Checkers, Inspectors, MHE Operators	
16	Direct Convoy to Depot	DA 1384
17	Arrive at Depot - Park in Vehicle Holding Area	DD 1384
18	Present TCMD to ASP Office	DD 1384
19	Inspect Empty Vehicles	DD 626
20	Complete Preparation of Stores Slips	DA 3151-R
21	Distribute Stores Slips	DA 3151-R
	a. Original and Copy to Checker	DA 3151-R
	b. 3d Copy, with Shipping Documents, Suspense	DA 3151-R
22	Escort Vehicles to Storage Locations	DA 3151-R
23	Load, Block, Brace, and Inventory Vehicles	DA 3151-R
24	Sign Stores Slip Jointly; 2d Copy to Driver	DA 3151-R
25	Fill Out Magazine Data Card	DA 3020-R
26	Drive Loaded Vehicles to Assembly Area	DA 3151-R
27	Inspect Loaded Vehicles	DD 626 DD 836
28	Return Stores Slips to ASP Office	DA 3151-R
29	Verify Stores Slip, Original with 3d Copy	DA 3151-R
30	Complete Shipping Document for Each Vehicle	DD 1348-1
31	Total all Stores Slip - by Quantity and DOCIC	DA 3151-R
32	Enter Totals on TCMD and Sign	DD 1384
33	Release Convoy - Jointly	
34	Convoy Departs	
35	Post Records	
36	Provide Notice of Departure to Receiver	DD 1348-1
37	Provide Materiel Release Confirmation to Inventory Control	DD 1348M
38	Record and File Documentation	All

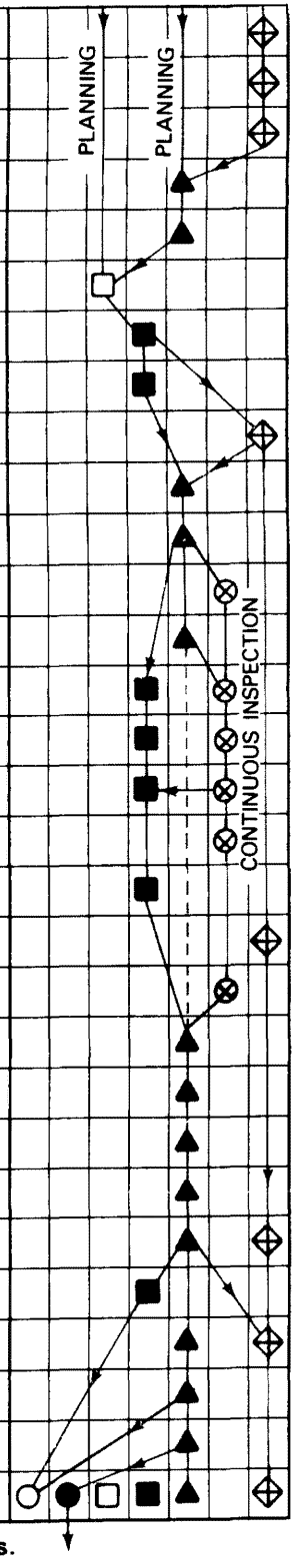
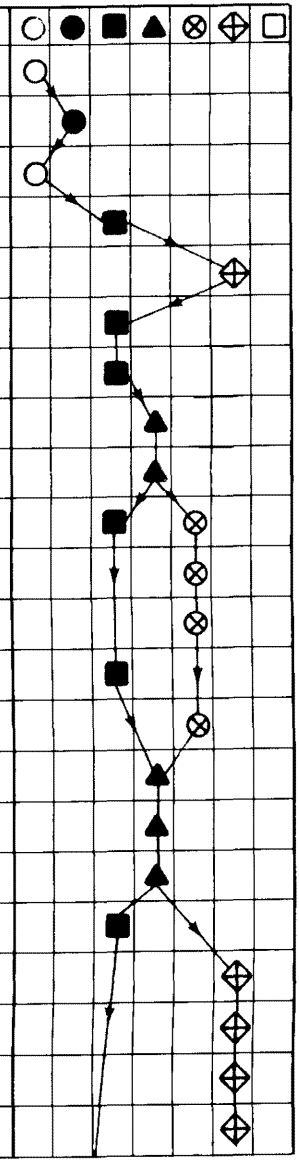


Figure 3-4. Shipping Procedures.

○ Using Unit
● DAO
■ Convoy CMDR/Driver
▲ ASP Office
⊗ Checker
⊕ Inspector
□ INV Control

No	Activity	Document
1	Prepare Turn-In Request	DA 581
2	Approve Turn-In	DA 581
3	Ship Ammunition to ASP/Depot	DA 581
4	Arrive at ASP/Depot	
5	Inspect Vehicles Prior to Entry	DD 626
6	Park Loaded Vehicles in Holding Area	
7	Present Turn-In Documentation to ASP Office	DA 581
8	Review Documentation	DA 581
9	Coordinate Checkers, MHE, and Inspectors	
10	Escort Vehicles to Segregation Area	
11	Unload, Segregate by DODIC and Lot	
12	Prepare Temporary Receipt	DA 3151-R
13	Drive Empty Vehicles to Assembly Area	
14	Return Temporary Receipt to ASP Office	DA 3151-R
15	Total All Stores slips	DA 3151-R
16	Fill In Turn-In Document with Quantity	DA 581
17	Receipt Signature	DA 581
18	Return to Unit	DA 581
19	Conduct Detailed Inspection of Items Received	
20	Assign Condition Codes	
21	Review Suspension File for Lots Received	
22	Notify ASP Office of Inspection Results	DA 3151-R



23	Select Storage Locations		
24	Prepare Stores Slips and Magazine Data Cards	DA 3151-R	
25	Assign Checkers, MHE, and Crews		
26	Relocate Turn-Ins to Storage Locations	DA 3151-R	
27	Fill Out Stores Slips, Magazine Data Card	DA 3151-R DA 3020-R	
28	Return Stores Slips to ASP Office	DA 3151-R	
29	Verify Stores Slips for Accuracy	DA 3151-R	
30	Post Lot Locator Records	DA 5203	
31	Direct Maintenance or Destruction, as Required	DA 2407	
32	Report Turn In on Daily Transaction Report		
33	Record and File Documentation	All	

Figure 3-5. Turn-In Procedures.

Chapter 4

AMMUNITION MAINTENANCE, INSPECTION, AND SURVEILLANCE

This chapter provides general information and guidance for ammunition personnel who are responsible for the maintenance of conventional ammunition, to include its demilitarization. Detailed maintenance and surveillance procedures for specific items of ammunition are in TM 9-1300 series publications. Still more surveillance procedures are covered in SB 742-1. Doctrine and policies that apply to direct support (DS) and general support (GS) ammunition companies are in FM 9-6 and FM 9-38.

MAINTENANCE

REPAIR PARTS, TOOLS, AND EQUIPMENT.

Tables of allowance (TA), tables of organization and equipment (TOE), and the repair parts and special tools lists (RPSTL) of the technical manual for

the specific class of ammunition all authorize the tools and equipment ammunition handlers need. Special tools are also listed in SC 4940-95-CL-A11 for DS units and in SC 4925-95-CL-A03 for GS units. Consumable and expendable supplies needed for maintenance are listed in the proper technical manual. Packing materials are listed as repair parts.

LEVELS

There are three levels of maintenance for which Army ammunition personnel are responsible. They are detailed in technical manuals and related publications and regulations as listed earlier. Levels of ammunition maintenance are briefly discussed below.

Organizational. All activities having conventional ammunition on hand, including using units, perform organizational maintenance. It prevents deterioration of ammunition from rough handling and exposure. It involves cleaning, removing minor rust and corrosion, repairing and replacing boxes, and restenciling containers as prescribed in the proper -10, -12, or -20 technical manual and as required by the maintenance allocation chart (MAC).

Direct Support. TOE 9-64 conventional ammunition companies perform direct support (DS) maintenance. It includes surveillance and limited maintenance of stocks under the companies' control. DS maintenance involves cleaning and protecting individual items and/or packing material; removing light rust; making minor repairs on boxes, containers, and crates; spot painting and restenciling, and replacing

readily removal external parts and components such as fuzes of artillery and mortar ammunition, propelling charges and primed cartridge cases for semifixed and mortar ammunition, grommets, and nose plugs.

Packing containers and packing material authorized at DS level are limited because storage space for them is limited. These materials are listed in TM 9-1300-250.

General Support. TOE 9-74 conventional ammunition companies in the COMMZ perform GS maintenance. GS maintenance units perform that part of the maintenance mission that the DS ammunition company cannot.

DS/GS Maintenance Planning. The objective of all DS/GS planning is the construction of a maintenance line that processes an item as efficiently as possible. The planning process is as follows:

- DS/GS support units perform ammunition maintenance and demilitarization only after they receive a properly validated work authorization. Such work authorization may be a maintenance request (DA Form 2407), an endorsement to the Ammunition Condition Report (DA Form 2415), or a letter of authorization. Instructions for using these forms are in DA Pam 738-750. The maintenance officer may create an assignment sheet (work order) when the validated work authorization does not furnish enough information.
- All the information on the item to be processed

should be collected from the validated work authorization and/or the appropriate data sheets and carefully studied in order to decide how the job can be completed. A process flow sheet should then be prepared. This is a compact chart for recording the proper sequence of everything that has to be done. For more details on making one see TM 9-1300-250. Next, write the SOP to supplement the flow sheet. Get instructions for preparing the SOP in TM 9-1300-250. Depot maintenance work requirements (DMWRs) for renovation, repair, or demilitarization of ammunition provide information concerning the technical features of various maintenance operations. They consist of a series of sheets in pamphlet form. Approval for the DMWR is by the commanding officer of the US Army Armament Muntions and Chemical Command, Rock Island, IL, but a qualified staff member can also be delegated the responsibility for reviewing and the authority for approving the DMWR. When a DMWR is received in the field, it should be used as a guide for making up the maintenance SOP for that particular operation. TM 9-1300-250 provides a sample page of a DMWR.

- When flow sheet and SOP (to include the index of operations and operations format) are done, the ammunition officer with the help of the key NCOs should give the service section a list of all the special tools that will be needed.
- Now, determine the shape of the maintenance line based on the flow sheet. It is usually a

straight line or a "U" shaped line. The straight line is most often used when two roads are available, one at the incoming end of the line and the other at the outgoing. TM 9-1300-250 shows a sample straight-line operation. The U line is usually used when there is only one road available for supplying and removing processed items, TM 9-1300-250 also shows a sample U line operation.

SAFETY

Safety in ammunition maintenance is covered in AR 385-10, TM 9-1300-206, and maintenance manuals for specific items of ammunition. Explosives safety, covering fire fighting procedures, the handling and storing of ammunition, operational precautions, QD requirements, barricades, operational shields, personnel and explosives limits, and safety tools and equipment, is covered in Chapter 1 of this manual.

AMMUNITION INSPECTIONS AND SURVEILLANCE

INSPECTIONS

Inspections in maintenance organizations are one of the requirements of the Ammunition Surveillance and Quality Evaluation Program (see AR 702-6, AR 740-1, and SB 742-l).

A QASAS, or MOS 55X soldier under the guidance of a QASAS, periodically inspects ammunition items to determine the serviceability of the ammunition according to SB 742-1 as well as other pertinent

SBs for the specific classes of ammunition. Inspections to determine serviceability will also be done when ammunition is turned in by using units. An additional inspection will be done after maintenance to see if unserviceable items have been made serviceable. The inspector performs and certifies this inspection before the ordnance goes back to the storage area.

SURVEILLANCE

Ammunition surveillance is the observation, inspection, and classification of ammunition and ammunition components during movement, storage, and maintenance. It includes the inspection of all ammunition, equipment, facilities, and operations. Surveillance is conducted at all theater installations responsible for the storage, maintenance, disposal, and shipment of ammunition and components. Surveillance ends when the ammunition is expended or destroyed.

Within theater ammunition units, surveillance is performed by attached civilian and assigned military ammunition inspectors. The civilians, the QASAS, are inspectors with over a year of technical training plus an apprenticeship. Periodically, throughout their careers, they receive additional resident training. The military inspector (MOS-55X) is recruited from the ammunition career management field and receives additional formal school training. This training concentrates on the practical inspection of conventional ammunition and small missiles. The training and experience of the military inspectors provide adequate technical expertise for them to

work with QASAS. Surveillance will in general be accomplished as specified in SB 742-1.

Responsibilities. Theater Army headquarters has general supervision over ammunition surveillance in the theater of operations. The COSCOM or ammunition group has this function within the corps. The commanding officer of any ammunition service unit conducts a Quality Assurance Ammunition Surveillance Program for all ammunition and ammunition operations under that command. The ammunition inspectors carry out this responsibility. Military inspectors help conduct the surveillance program as directed by the proper battalion or group commander.

Functions. The duties of military and civilian ammunition inspectors are as follows:

- Inspect storage buildings and outdoor storage sites to make sure they comply with all safety standards of storage.
- Inspect surrounding areas for fire hazards and other nonstandard conditions.
- Take and record maximum and minimum temperature and humidity readings.
- Look for nonstandard conditions that could speed up the normal deterioration rate of the items in storage, thus create a hazard.
- Help inspect and test the lightning protection system in magazines or explosives areas.
- Help pick samples to ship to CONUS proving grounds and laboratories for ballistic and surveillance tests or investigations.

- Teach surveillance and ammunition safety.
- Prepare and keep proper correspondence, records, and reports to cover all ammunition activities.
- Observe, inspect, and investigate to determine the current degree of serviceability of ammunition and components.
- Monitor methods of storage, handling, and maintenance, and recommend changes for increased safety or operational effectiveness.
- Recommend to the commanding officer the controls needed to maintain approved standards of security.
- Act as technical advisors to the commanding officer on all ammunition surveillance matters.
- Conduct unit basic load inspections.
- Help investigate ammunition malfunctions and accidents.
- Help plan, coordinate, and administer the explosives safety program. The program includes review, evaluation, and inspection of all operations, procedures, equipment, and facilities used with ammunition and explosives operations to assure application of and compliance with pertinent safety standards.
- Help plan construction of explosives storage facilities based on current QD and storage criteria.
- Help prepare waivers for ammunition facilities as required.

- Prepare and maintain accurate records of all observations, inspections, and investigations performed.
- Maintain files and indexes for all drawings and specifications covering ammunition and methods of packing and storing.
- Inspect all incoming and outgoing shipments of ammunition for sabotage devices; proper blocking, bracing, and loading condition and serviceablilty, and compliance with existing instructions and regulations.
- Inspect dunnage used and methods of storage for compliance with specifications, drawings, and safety regulations.
- Furnish safety advice to the unit's operating elements. Inspect all facilities and methods used in connection with storage, handling, shipping, assembling, loading, preserving, maintaining, salvaging, and destroying ammunition for compliance with existing regulations.
- Maintain and update ammunition suspension file, both local and worldwide. Refer to Appendix E for ammunition condition codes.

Chapter 5

DESTRUCTION OPERATIONS

This chapter is for soldiers who have to destroy conventional ammunition. It is divided into two parts, routine destruction and emergency destruction.

ROUTINE DESTRUCTION

PROCEDURES

Before any destruction, the surveillance section must fill out a DA Form 2415 (Ammunition Condition Report). The form must then be submitted to the proper authority in order to get disposition on the ammunition. (see DA Pam 738-750 for preparation and distribution details). The only exception is when the ammunition or explosives are an immediate danger to ammunition storage personnel and property. In this case, the commanding officer of the

ammunition company can order the destruction and submit a DA Form 2415 as a follow up. Procedures to be followed must be included in the destruction SOP.

Local regulations concerning the destruction of ammunition should be reviewed and adhered to by the surveillance section as well.

The ammunition inspector, to include civilian QASAS and/or military MOS 55X personnel, is responsible for disposition instructions. The ammunition unit commander is in charge of the actual destruction of the materiel.

TRAINING

All ammunition unit commanders must ensure that all unit personnel are properly trained in the procedures and safety standards for the routine destruction of ammunition explosives. Such training must be routinely scheduled to keep soldiers ready. See FM 5-25, TM 9-1300-205, and TM 9-1375-213-12 for details. Local EOD teams can be contacted to provide technical assistance during hands-on training sessions.

The training program for routine destruction must include at least the following

- Methods and procedures for priming and capping (nonelectric and electric).
- Methods and procedures for destruction by detonation and burning.
- Guidelines for selecting the site.
- General and specific safety procedures for destroying ammunition.

DESTRUCTION SITE

Site Selection. Site selection involves different factors depending on whether destruction is to be by burning or by detonation.

- ***Destruction by Burning.*** The overriding consideration in selecting a burning site should be to get the greatest practical distance from all storage locations, inhabited buildings, public highways, etc. Make sure the site is not less than the inhabited building distance given on the QD tables for whatever type and quantity of ammunition being destroyed from all structures and public roads. See TM 9-1300-206 for details. Insure the area is cleared of all flammable material and vegetation.

  Also consider prevailing winds and the possibility of mass detonation during burning operations. Whenever possible, use natural barricades between the burning site and other buildings or storage locations.

- ***Destruction by Detonation.*** There is only one specification that is different than site selection for destruction by burning. It is that the site should be at least 2,400 feet from public highways, railways, inhabited buildings, storage locations, etc. Note that the 2,400 foot distance does not apply when a deactivation furnace is used to destroy small amounts of fuzes, primers, small arms cartridges, etc. See TM 9-1300-206 for details.

  If the minimum safety distance of 2,400 feet cannot be met, put the ammunition in a pit or

trench to limit fragmentation range. Make sure the pit is at least 4 feet deep and the ammunition is covered with at least 2 feet of dirt.

It is possible for an electric blasting cap circuit to be set off by a strong electric current. To minimize this danger, make sure the site is away from all electrical transmitters.

Because it is possible that the proposed site will conflict with existing or proposed Army airspace, get clearance for the proposed site from the appropriate Army airspace representative. See AR 95-50 for more information.

Site Preparation. Remove all dry vegetation and other flammable materials within a radius of 200 feet from the destruction point. If the unit is in combat service support operations at the forward ASP, it may not be practical to do this due to tactical or operational considerations. Keep firefighting equipment for combating grass fires readily available, and, if practical, the ground at the point of destruction should be wet down with water at the close of each day's operation. An area that was burned on less than 24 hours earlier cannot be burned on again, unless it has been soaked with water and has been inspected by surveillance section personnel or EOD personnel. Concrete pads may not be used for burning or detonation.

Keep at least 300 feet between the personnel shelter and the destruction pit or site. There may not be a demolition site at a forward storage location (CSA/ASP). If there is not, keep personnel behind barricades or in trenches that have overhead cover.

Make sure anyone who will be burning wears fire-resistant outer clothing, if available in the supply system. If it not available, flameproof clothes by soaking them in one of the following solutions: a 15-percent solution of diammonium phosphate or ammonium sulfate, or a solution of 2-pounds of ammonium sulfate and 4 pounds of ammonium chloride in 3 gallons of water.

Make sure at least two people perform the destruction, but keep the number involved to a minimum. Make sure there is two-way radio communications or a land-line telephone at the destruction site.

Some components of ammunition, such as tracers containing mercury chloride, release toxic matter when burned. Propelling charges may contain lead or decoppering agents, which also release toxic fumes. It is critical to keep soldiers upwind from the burn and wearing adequate and proper respiratory protective devices (field protective mask). Nitroglycerin exuding from commercial dynamite can be absorbed through the skin. Make sure soldiers know how to protect themselves against these hazards.

DESTRUCTION AREA OPERATION

Make sure there is an ammunition destruction SOP, either as an annex to the unit SOP or as a separate SOP. Make sure it includes all the following procedures: allowable explosive weight authorized in an individual destruct operation or shot; priming and capping method to be used responsibilities of destruction team personnel; what to do for range safety and what emergency procedures to take for misfires and emergencies. Any demolition range used

to conduct routine destruction shall comply with the requirements of the ammunition destruction SOP.

See TM 9-1300-206 for specific procedures for specific ammunition types, such as grenades, mines, artillery ammunition. The following procedures are involved in a routine destruction of ammunition and explosives:

- Upon receipt of authority from higher headquarters, the ammunition officer reviews the unit destruction SOP and alerts the appropriate unit personnel.
- The ammunition officer then ensures that the operations section contacts the unit motor pool to request the required number of vehicles to transport munitions and soldiers to the disposal area.
- The designated safety officer conducts a safety briefing for destruction team members including the procedures to be followed during conduct of the exercise. The safety officer also makes sure that all required equipment and emergency gear is available for use at the destruction site. Team leaders check equipment and make sure any problems are corrected.
- Items to be destroyed are loaded on unit vehicles according to proper transportation compatibility requirements, using prepared DA Form 3151-R to maintain a correct inventory and record of the ammunition moved. This form should be filled out by the operations NCOIC or personnel designated by the operations NCOIC.

- Upon arrival at the destruction site, stage vehicles at individual shot locations. Designated team members should remove the munitions from their packaging and place them in the designated location for destruction. It is permissible to store empty boxes, pallets, and fiber containers at a designated holding area. They can also be returned to the inert salvage area at the ASP.

- The team primes each individual shot. If nonelectric firing method is used, the safety officer and one additional person, other than whoever sets off the firing train, inspect the primed shots. Upon command from the safety officer, the designated individual initiates the firing train. The individual who initiates it will make sure the fuse lighter is functional and that the safety fuse is burning properly and then immediately return to the safety area. If there is a nonelectric misfire, wait 30 minutes before repriming the shot. When charges are to be "tamped," make sure they are fitted with detonating-cord leads long enough to keep the caps from being covered.
- If an electric firing method is used, the individual designated to fire the shot rechecks the firing line, returns to the firing point, and hooks the electric wires up to the blasting machine when the safety officer says so. The designated individual then fires the shot on command from the safety officer. If there is an electric misfire, the individual responsible for firing the shot disconnects the firing line from the power

source, shunts the wires, waits 30 minutes, visually rechecks the firing line, and if necessary, reprimes the shot.

- After the shot, make sure the area is searched for any items that may not have been completely destroyed. In the event of a "kick out," (ammunition items not destroyed but thrown clear) have individual items reprimed and detonated in place.
- When demolition is finished, load all equipment aboard unit transportation and return it to the proper storage location. Before equipment is stored, team members clean all of it, and the destruction team NCOIC inspects all of it.
- Load pallets and all packing materials on unit vehicles and return them to the inert salvage area for reinspection and certification by salvage crew personnel. The salvage NCOIC uses DA Form 3151-R to the record receipt of salvage, The completed DA Form 3151-R is returned to the operations section so the information can be recorded on the stock records, and the form is filed. All other materials (e.g., banding, cardboard inserts) should be policed up and disposed of IAW local guidance.

AMOUNTS AND KINDS OF PRIMING EXPLOSIVES

Plastic explosives are preferred over such general demolition explosives such as TNT because the general explosives often produce either a low-order detonation or kick outs. Furthermore, plastic explosives such as composition C-4 and FLEX-X allow for

much better contact between the priming explosive and the munitions to be destroyed. For how much explosive to use, see Table 5-1.

Table 5-1. Explosive Weights for Destruction of Items by Detonation.

Item To Be Destroyed	Explosive Weight (lbs) Per Individual Item		
	TNT	COMP-C	TETRYTOL
Grenades, Hand or Rifle, and Small Rockets	1/2 lb	1/2 lb	1/2 lb
75-mm, 76-mm, 90-mm, and Mortar Cartridges	1 1/2 lbs	1 lb	1 1/4 lbs
105-mm, 152-mm, and 155-mm, Projectiles	2 1/2 lbs	2 lbs	2 lbs
175-mm and 8-Inch Projectiles	3 lbs	2 1/2 lbs	2 1/2 lbs

NONTOXIC CHEMICAL AMMUNITION

When they are disposed of by burning or detonation, many nontoxic chemical agents, munitions, or their components produce hazards. Precautions must be taken to make sure the operation is safe. Make soldiers aware of the dangers of chemical munitions and fillers. The carelessness of one person may result in injury or death, not only of that person but of other soldiers at the disposal area. Do not let destruction team members take short cuts and deviations from the procedures in the SOP.

Restrict detonation of nontoxic munitions to the smoke and incendiary classes. The reason is that illumination and CS items contain low explosive ejection charges. Base-plates and payloads from these munitions may be ejected at high velocity and are hazardous to soldiers in the area.

When destroying munitions containing WP or PWP use a slightly larger amount of priming explosive than called for in Table 5-1 to rupture the case completely and disperse the filler. This will allow the WP to burn out more completely. Place priming explosives underneath the rounds to help insure complete burn out. Do NOT destroy WP or PWP munitions in the same shot hole or area used for other kinds of munitions. WP/PWP particles may be driven into the ground and later uncovered and reignited.

Table 5-2 provides data on time and weather conditions for the destruction of these agents and munitions.

Nontoxic chemical chemicals have the following first aid procedures (see Table 5-2):

- ***WP.*** Make sure WP first aid kits are at the site. These kits contain copper sulfate pads that keep oxygen from the injury, which stops the reaction. Evacuate casualties immediately to the nearest medical facility.
- ***Smokes (FM and FS).*** These compositions probably will not produce a reaction that requires treatment. If soldiers without a protective mask are overcome by a very strong smoke concentration, move them to fresh air until they recover. The liquid from these agents, particularly

from FS, is very corrosive, and any spilled on the body must be immediately washed away with large amounts of water followed by rewashing with soap and water.

- ***Incendiaries.*** There is no unusual first aid treatment for accidents that happen when soldiers handle this type of material. Treat burns like burns from flames. If TPA causes burns, they will be severe and will require prompt treatment from medical personnel. Do not put water

Table 5-2. Conditions for the Destruction of Nontoxic Chemical Agents and Munitions.

Factor	Condition		
	Excellent	Fair	Unsatisfactory
Temp	75° and above	55°F to 75°F	Under 55°F
Sky	Clear	Clear to partly cloudy	Cloudy
Wind	4-15 MPH	5-20 MPH	Under 3 MPH or over 20 MPH
Time (Hours)	1000-1600	Unsatisfactory at all other times	Unsatisfactory at all other times

TO USE:
1. Determine factors at the site.
2. Decide condition based on table.
3. Make decision to destroy or not. Sometimes ammunition has to be destroyed, even under less than excellent conditions. It becomes a judgment call then, and considering safety, should still be done between 1000 and 1600 hours.

on TPA burns; it will react with the incendiary particles and make the burn worse.

TOXIC CHEMICAL AMMUNITION

Toxic chemical ammunition poses serious problems that require special methods of destruction. For this reason, EOD is responsible for chemical munition destruction. This includes any captured toxic-agent-filled ordnance items. During normal destruction of toxics at depots, AMCCOM or MICOM (for large rockets and missiles) provide instructions.

EMERGENCY DESTRUCTION

The objective of emergency destruction is to destroy munitions and documents of value to the enemy and render what is left too hazardous to use. Emergency destruction is done on order or with permission from the proper authority IAW local SOP.

EMERGENCY DESTRUCT PLAN

Immediately after ammunition storage area is established, make sure there is a plan for emergency destruction, either as an annex in the unit SOP or as a separate SOP. Make sure the plan is staffed through technically qualified personnel (normally EOD) so it is complete and feasible.

PRIORITIES

The priorities for emergency destruction are based on the types of munitions stored at the storage facility. These priorities are

- ***Priority 1.*** All classified munitions and associated manuals, records, reports, test sets, and equipment.

- ***Priority 2.*** All ammunition and associated components (e.g. fuzes, propelling charges, primers) that can be used in enemy weapons or by individual troops and other specifically designated items.
- ***Priority 3.*** All other ammunition stored.

METHODS

Any of the following methods can be used to destroy assets to prevent enemy capture and use: friendly artillery fire or air strike, detonation, burning, or mutilation.

The method picked depends on how much time there is and what ammunition is stored. Remember, executing an emergency destruction plan is a command decision and is based on the tactical situation.

TRAINING

As with routine destruction, personnel making up the emergency destruction teams must be trained. Since the team members are constantly changing, make sure new team members get trained promptly and completely.

BASIC PROCEDURES

If emergency destruction is to be successful, there must be a good destruction plan SOP, well-trained teammembers, destruction materials, and transportation that are all readily available. Destruction materials and transportation assets should be "earmarked," or reserved, for this particular purpose. Three destruction methods are given here, detonation, burning and mutilation.

Detonation. All bulk demolitions and associated components, such as blasting caps, firing devices, detonation cord, M10 universal destructors, etc., are stored in the category E field storage class. Items from this supply that are to be used for emergency destruction should be identified not only at the field storage units but also on appropriate stock records.

Make sure only the best stocks are reserved for use in the event of emergency destruction. Do this by making sure all stocks are rotated based on changes in ammunition condition codes (see appropriate notices of ammunition reclassification messages (ARMS) and current copies of TB 9-1300-385).

It is common to store stocks reserved for ED use in at least one FSU (Category E) per storage section. This puts the reserved assets much closer to the individual storage locations, and thus reduces the time the destruction teams need to prepare individual storage locations.

Each section will be readied for destruction by use of a ring-main or a series of individual ring-mains when destroying by detonation. See FM 5-25 for set-up of the ring-main and for priming and capping procedures.

Make sure teams use the combination priming system (nonelectric and electric) to initiate the explosive train(s). Commanding officers fire the individual explosive trains. After the area has been cleared of personnel, they function the nonelectric system first and then the electric system.

Note: The combination firing system is two independent nonelectric firing systems (two nonelectric caps, two safety fuses, and two fuse lighters) and two independent electric firing systems (two electric caps, two firing lines, and two power sources (blasting machines or vehicle batteries)).

Burning. Some items stored in the ammunition storage activity cannot be destroyed by demolition (see TM 9-1300-206, Appendix E, for a comprehensive listing). In these cases, destruction by burning is approved. Since burning cannot be controlled once it has been initiated, and it is more hazardous to the destruction team, use it only after all other assets have been destroyed by detonation.

Combustible material, such as wooden boxes and pallets, may be put on top of the stacks, soaked with a fuel mixture, and ignited with a nonelectric or electric firing system, with incendiary grenades, or by cryptographic destroyers.

Stacks of propelling charges can be destroyed by using a simple train of combustible material or by the method above.

Fuel containers filled with a fuel mixture can be put on top of stacks, primed with a bunch line of detonating cord, and ignited by using a combination firing system. Another way to ignite the fuel containers is with small arms fire, using incendiary bullets.

Stacks of ammunition can be thoroughly soaked

with a fuel mixture and ignited using incendiary grenades or cryptographic destroyers.

Mutilation. If there is time, items that are lightly constructed (rocket motors, propelling charge containers, etc.) can be destroyed by unpalletizing them and running vehicles or forklifts over them.

> Note: Forklifts and vehicles will not be driven over complete rocket rounds. For example, warheads should be detached from rocket motors before motors are destroyed by mutilation. Remember, no destruction method or methods will completely destroy all the material.

TABLES FOR DIMENSIONS AND LOADING CAPACITIES FOR CARGO BODIES

The major activity of most ammunition storage areas is loading trucks, railcars, and aircraft. Critical to the planning and execution of this task is knowing how much can be loaded in each kind of cargo body. This appendix provides that information in the following tables:

Table	Title
A-1	Truck Cargo Decks
A-2	Dump Truck Bodies
A-3	Cargo Trailer Bodies
A-4	Stake Semitrailer Cargo Bodies
A-5	Van Semitrailer Cargo Bodies
A-6	Commercial Truck Bodies
A-7	Commercial Semitrailer Bodies
A-8	Army Helicopter Compartments
A-9	Other Aircraft's Compartments

Table A-1. Truck Cargo Decks.

Vehicle Type	Length (in)	Width (in)	Under Bows		Top of Side Racks	
			(in)	(ft^3)	(in)	(ft^3)
3/4-ton						
M37	78.0	64.0	54.0	134.8	35.4	84.3
M37B1	78.0	64.0	54.0	146.1	35.4	95.7
1 1/4-ton						
M561	87.8	81.0	62.4	235.4	41.4	152.4
M715	92.8	64.0	55.5	182.0	38.5	129.0
M880	98.6	69.9	N/A	N/A	N/A	N/A
M881	98.6	69.9	N/A	N/A	N/A	N/A
M882	98.6	69.9	N/A	N/A	N/A	N/A
M883	98.6	69.9	N/A	N/A	N/A	N/A
M884	98.6	69.9	N/A	N/A	N/A	N/A
M885	98.6	69.9	N/A	N/A	N/A	N/A
M890	98.6	69.9	N/A	N/A	N/A	N/A
M891	98.6	69.9	N/A	N/A	N/A	N/A
M892	98.6	69.9	N/A	N/A	N/A	N/A

2 1/2-ton						
M35A2	146.8	88.0	60.0	441.9	36.5	272.8
M35A2C	147.0	87.6	60.0	440.5	36.5	272.0
M36	210.0	88.0	71.8	759.3	36.4	389.2
M36A2	210.0	88.0	71.8	759.3	36.4	389.2
M135	147.0	80.0	60.0	391.0	36.4	237.7
M211	147.0	88.0	60.0	442.5	36.5	273.2
M602	147.0	88.0	53.0	446.3	36.5	273.2
5-ton						
M41	165.0	88.0	60.0	446.2	36.5	———
M54	168.0	88.0	60.0	480.2	36.5	286.1
M54A1	168.0	88.0	60.0	480.2	36.5	286.1
M54A1C	168.0	88.0	60.0	482.5	36.5	287.5
M54A2	168.0	88.0	60.0	480.2	36.5	286.1
M54A2C	168.0	88.4	55.5	482.5	36.5	287.5
M55	244.0	88.0	61.3	751.5	36.5	453.5
M55A1	244.0	88.0	61.3	751.5	36.5	453.5
M55A2	244.0	88.0	61.3	751.5	36.5	453.5
M328A1	219.3	97.8	50.5	626.7	———	———
M656	181.0	88.0	60.0	546.0	27.0	248.8
M812A2	210.0	120.0	79.0	1,152.0	———	———

(continued)

Table A-1. *(continued)*

Vehicle Type	Length (in)	Width (in)	Under Bows		Top of Side Racks	
			(in)	(ft^3)	(in)	(ft^3)
M813	168.0	88.3	57.2	468.0	36.5	298.8
M813A1	168.0	88.3	57.4	468.0	36.5	298.8
M814	243.0	87.8	60.0	733.0	36.3	449.6
M821	218.8	97.8	48.8	604.3	——	——
M923	168.0	88.3	57.4	468.0	36.5	298.8
M924	168.0	88.3	57.4	468.0	36.5	298.8
M925	168.0	88.3	57.4	468.0	36.5	298.8
M926	168.0	88.3	57.4	468.0	36.5	298.8
M927	243.0	87.3	60.0	736.5	36.5	449.6
M928	243.0	87.3	60.0	736.5	36.3	449.6
10-ton						
M125	180.0	96.0	62.0	590.0	42.0	398.1
M125A1	180.0	96.0	62.0	590.0	42.0	398.1
M977	216.0	90.0	48.0	540.0	——	——
M985	216.0	90.0	48.0	54.0	——	——

Table A-2. Dump Truck Bodies.

Vehicle Type	Cargo Deck		Cargo Body Loading Height and Capacity			
			Top of Side Panels		Top of Cab Shield	
	Length (in)	Width (in)	(in)	(ft^3)	(in)	(ft^3)
2 1/2-ton						
M47*	108.0	70.0	24.5	——	48.5	212.2
M59	108.0	70.0	24.5	——	49.0	214.3
M215*	108.0	70.0	24.5	——	56.0	245.0
M34A2*	132.0	70.0	24.5	——	47.1	251.8
5-ton						
M51*	123.0	82.0	25.0	——	51.0	297.6
M51A1	123.0	82.0	25.0	——	51.0	297.6
M51A2	123.0	82.0	25.0	——	51.0	297.6
M817*	124.8	81.9	25.0	——	51.8	306.3
M929*	124.8	81.9	28.0	——	51.8	306.3
20-ton						
F5070	191.5	85.1	34.3	——	58.5	537.0
M917	216.0	84.0	31.0	——	73.0	753.6

*(W or W/O Winch)

Table A-3. Cargo Trailer Bodies.

Vehicle Type	Cargo Deck		Cargo Body Loading Height and Capacity					
			Under Bows		Top of Side Racks		Top of Side Panels	
	Length (in)	Width (in)	(in)	(ft^3)	(in)	(ft^3)	(in)	(ft^3)
1/4-ton								
M100	71.5	37.8	N/A	N/A	N/A	N/A	18.0	29.7
M416	72	41.3	N/A	N/A	N/A	N/A	18.0	31.8
3/4-ton								
M101	94.8	65.3	49.0	170.5	33.3	114.6	18.3	60.9
M101A1	94.8	65.3	49.0	170.5	33.3	114.6	18.3	60.9
M104	110.0	74.0	59.3	273.2	45.3	207.7	18.0	79.1
M104A1	110.0	74.0	59.3	273.2	45.3	207.7	18.0	79.2
M105	109.8	74.0	60.0	276.0	45.0	205.9	18.0	79.0
M105A1	109.8	74.0	60.0	276.0	45.0	205.9	18.0	79.0
M105A2	109.8	74.0	60.0	276.0	45.0	205.9	18.0	79.0

Table A-4. Stake Semitrailer Cargo Bodies.

Vehicle Type	Cargo Deck		Cargo Body Loading Measurements	
	Length (in)	Width (in)	Height (in)	Capacity (ft^3)
6-ton				
M118	268.8	88.5	48.0	660.8
M118A1	268.8	88.5	48.0	660.8
12-ton				
M127	335.8	88.8	47.8	824.8
M127A1	335.8	88.8	47.8	824.8
M127A1C	335.8	88.8	48.0	828.3
M127A2C	335.8	88.8	48.0	828.3
M270A1	459.8	84.0	48.0	1,090.7
34-ton				
M872	484.8	93.0	49.0	1,278.5
M872A1	484.8	93.0	49.0	1,278.5
M872A2	484.8	93.0	49.0	1,278.5
M872A3	484.8	93.0	49.0	1,278.5

Table A-5. Van Semitrailer Cargo Bodies.

Vehicle Type	Cargo Deck		Cargo Body Loading Measurements	
	Length (in)	Width (in)	Height (in)	Capacity (ft^3)
6-ton				
M119	264.0	89.6	73.8	1,010.2
M119A1	264.0	89.6	73.8	1,010.2
M146	264.0	90.0	76.0	1,045.0
12-ton				
M128	335.5	89.0	78.5	1,356.4
M128A1	333.5	89.0	78.5	1,356.4
M128A1C	336.0	89.0	78.5	1,358.4
M128A2C	337.5	89.5	78.5	1,372.2

Table A-6. Commercial Truck Bodies.

Vehicle Type	Cargo Deck		Cargo Body Loading Height and Capacity					
			Top of Side Racks		Top of Cab		Under Body Top	
	Length (in)	Width (in)	(in)	(ft^3)	(in)	(ft^3)	(in)	(ft^3)
1/4-ton								
1976 Dodge (X39598)	77.0	66.1	N/A	N/A	42.8	123.6	N/A	N/A
1/2-ton								
1967 Ford (X54805)	87.0	66.3	N/A	N/A	N/A	N/A	50.0	162.3
1974 Chevrolet (X39598)	79.0	71.8	N/A	N/A	42.3	136.4	N/A	N/A
1974 IHC (X39598)	80.0	54.8	N/A	N/A	44.3	109.9	N/A	N/A

(continued)

Table A-6. *(continued)*

Vehicle Type	Cargo Deck		Cargo Body Loading Height and Capacity					
			Top of Side Racks		Top of Cab		Under Body Top	
	Length (in)	Width (in)	(in)	(ft^3)	(in)	(ft^3)	(in)	(ft^3)
1/2-ton								
1975 Dodge (X39598)	77.0	66.1	N/A	N/A	42.8	123.6	N/A	N/A
3/4-ton								
1970 IHC (X54942)	97.0	67.0	N/A	N/A	N/A	N/A	41.0	149.6
1971 Chevrolet (X54531)	121.0	73.0	N/A	N/A	N/A	N/A	72.0	363.6
1973 Dodge (X54805)	96.0	70.0	N/A	N/A	N/A	N/A	50.0	189.8
1974 Chevrolet (X54531)	121.3	76.3	N/A	N/A	N/A	N/A	68.5	360.4

3/4-ton *(Continued)*								
1974 Dodge (X54805)	96.0	70.1	N/A	N/A	N/A	N/A	50.5	191.8
1-ton								
1965 Dodge (X39877)	93.8	54.3	N/A	N/A	38.8	114.3	N/A	N/A
1971 Dodge (X39893)	78.0	51.0	N/A	N/A	43.0	90.0	N/A	N/A
1974 IHC (X29893)	78.0	49.5	N/A	N/A	41.5	92.7	N/A	N/A
1975 Dodge (X56038)	92.3	73.0	N/A	N/A	30.5	118.9	N/A	N/A
1975 IHC (X56083)	92.0	73.0	N/A	N/A	36.0	139.9	N/A	N/A
2 1/2-ton								
1969 Chevrolet (X554764)	136.1	73.0	42.0	339.2	37.0	298.8	N/A	N/A

(Continued)

Table A-6. *(Continued)*

Vehicle Type	Cargo Deck		Cargo Body Loading Height and Capacity					
			Top of Side Racks		Top of Cab		Under Body Top	
	Length (in)	Width (in)	(in)	(ft^3)	(in)	(ft^3)	(in)	(ft^3)
3 3/4-ton								
1969 Dodge (X56312)	162.3	86.0	42.0	339.2	37.0	298.8	N/A	N/A
4-ton								
1970 Dodge (X61792)	143.6	89.3	N/A	N/A	N/A	N/A	78.6	583.2
1972 IHC (X61792)	138.5	85.5	N/A	N/A	N/A	N/A	72.5	496.8
1975 IHC (X61792)	138.0	85.3	N/A	N/A	N/A	N/A	73.5	500.6

(Continued)

4-1/2-ton								
1971 IHC (X61792)	161.3	86.0	N/A	N/A	N/A	N/A	72.0	577.7
1972 IHC (X55764)	157.5	85.0	N/A	N/A	N/A	N/A	78.0	589.4
1973 IHC (X56312)	162.5	86.3	N/A	N/A	42.6	345.7	N/A	N/A
1974 GMC (X61792)	157.5	90.5	N/A	N/A	N/A	N/A	72.5	598.0
1975 GMC (X55764)	157.5	85.0	N/A	N/A	N/A	N/A	78.0	589.4
5-ton								
1973 IHC (X56483)	163.3	87.8	N/A	N/A	46.0	381.6	N/A	N/A
1974 IHC (X56483)	168.0	88.0	N/A	N/A	44.8	383.2	N/A	N/A

Table A-7. Commercial Semitrailer Bodies.

Vehicle Type	Cargo Deck		Cargo Body Loading Measurements and Capacity		
	Length (in)	Width (in)	Height (in)	Van Body (in)	Stake Body (ft^3)
12-ton					
1963 Spencer (S72161)	336.0	90.0	42.0	N/A	735.0
1969 Trayler (S72161)	356.0	90.0	42.0	N/A	778.8
1973 Stroughton (S73942)	356.0	89.8	93.8	1,753.3	N/A
1974 Stroughton (S73942)	356.5	91.8	91.0	1,723.4	N/A
20-ton					
1969 Rogers (S72178)	383.5	89.3	68.0	N/A	1,347.7

Table A-8. Army Helicopter Compartments.

Aircraft	Cargo Compartment			
	Length (in)	Width (in)	Height (in)	Capacity (ft^3)
CH-47A	366.0	90.0	78.0	1,486.8
CH-47B	366.0	90.0	78.0	1,486.8
CH-47C	366.0	90.0	78.0	1,486.8
CH-47D	366.0	90.0	78.0	1,486.8
CH-54A with pod	344.8	105.5	78.5	1,604.5
CH-54B with pod	344.8	105.5	78.5	1,604.5
UH-1A	80.5	53.0	48.0	118.5
UH-1B	80.5	53.0	48.0	118.5
UH-1C	80.5	53.0	48.0	118.5
UH-1D	92.0	84.0	49.0	191.3
UH-1H	92.0	84.0	49.0	191.3
UH-1M	80.5	53.0	48.0	118.5
UH-1V	92.0	84.0	49.0	191.3
UH-60A	138.0	73.0	52.8	308.5

Table A-9. Other Aircraft's Compartments

Aircraft	Maximum Cargo Load (pounds)
CH-47A	10,500
CH-47B	15,136
CH-47C	17,136
CH-47D	19,887
CH-54A with/pod	13,773
CH-54B with/pod	16,980
UH-1A	850
UH-1B	2,939
UH-1C	3,320
UH-1M	3,820
UH-1D	3,344
UH-1H	3,344
UH-1V	3,344
UH-60A	3,000

Appendix B

HELICOPTER REARM POINTS AND READY AMMUNITION AREAS

This appendix provides general guidelines for the layout, construction, and operation of helicopter rearm points. More information is in TM 9-1300-206. Figure B-1 shows typical layouts for three helicopter rearm points and a three-dimensional view of one of the plans.

There needs to be some way to get rockets from the ready ammunition storage site to the rearm pads where combat aircraft are to be armed and rearmed. It is all right to use improvised trailers or carts with the following three restrictions. The rated load weight of the trailer or cart must not be exceeded. The load of rockets must be secured and balanced to prevent their tumbling off or tipping over. The trailers or carts must be covered to protect the rockets from bad weather.

HELICOPTER REARM POINT LAYOUT

Aircraft Parking Area. Farthest from the ammunition, this area is set aside for parking aircraft not containing explosives and not being loaded.

Rearm Pads. Next closest to the ammunition, rearm pads are specifically for loading or unloading combat aircraft with ammunition and explosives. Rearm pads should have revetments for storing the ammunition while waiting for the helicopter to set

Figure B-1. Typical Layouts for Rearm Points.

Figure B-1. Typical Layouts for Rearm Points. *(Continued)*

down and should include adequate area for the combat aircraft to land and be loaded with ammunition and explosives.

Ready Ammunition Storage Site. This facility is separated from the helicopter rearm pad by a barricade. This area contains the ready ammunition necessary to support the arming and rearming of aircraft. The site has separate cubicles or barricaded areas for assembling and disassembling rockets and arming or disarming aircraft flares.

Basic Load Ammunition Storage. In this area, furthest from the rearm pad, is the specific quantity of ammunition authorized and required to be on hand within the unit: the basic load. A basic load can include such diverse items as 2.75-inch rockets, 40-mm ammunition, small arms ammunition, flares, and smoke grenades.

LOT NUMBER CONTROL

In a ready ammunition storage area and nearby the helicopter rearm pad, store ammunition by lot integrity so all lots on hand can be properly accounted for. Maintain proper lot records so ammunition malfunctions can be reported properly. One way to maintain lot integrity is not to mix items. Make sure lots are not mixed at ready ammunition storage sites, basic load storage sites, or rearm points, and make sure lots within the same launcher are not mixed.

OPERATIONS AND SAFETY

GROUNDING AIRCRAFT

Grounding aircraft prevents accidental initiation of rockets from stray electrical energy. Ground air-

craft electrically during arming and disarming operations and when they are armed and parked in revetments. The equipment needed to ground aircraft follows:

Ground rod, GP-8 NSN 5975-00-187-5304
1/4-in braid (25 ft) NSN 6145-00-164-015
Alligator clips

SHORTING ROCKETS

Fin protector springs short circuit the igniter leads, thus preventing accidental ignition. Make sure shorting wire clips and fin protectors are installed on all rockets immediately after unloading an aircraft launcher. Check to be sure the shorting wire clip or metal fin protector is properly installed on all rocket motors and complete rockets whenever the rockets are not in the launcher.

HANDLING ROCKETS

Complete rounds, rocket motors, or fuze-warhead combinations, that have been dropped may cause premature functioning of the fuze and warhead and detonation of the rocket motor. This could result in loss of loss of life and aircraft.

There are two ways of handling rockets that will result in their rejection. One way is if a 2.75-inch rocket motor or complete rocket, crated or uncrated, is dropped from higher than 2 feet. The other is if a fuze-warhead combination, crated or uncrated, is dropped from higher than 5 feet.

Any items rejected for the reasons above must be turned in to the supporting ASP or depot. The DA

Form 581 (Request for Issue and Turn-In of Ammunition) must reflect the reason for unserviceability and turn-in.

ASSEMBLING ROCKETS

Assemble rockets motors, warheads, and fuzes IAW the instructions in TB 9-1340-201 or the instructions packed in the box with the rockets. Returned unfired rockets and rockets that remain on aircraft after a mission must have their warheads retorqued prior to use on the next mission.

PROTECTING ASSETS

Build barricades around basic load storage areas, ready ammunition storage areas, and ammunition stored at rearm points. Use TM 9-1300-206 as a guide.

Barricades should be at least 3 feet thick in order to most effectively lessen the hazards involved if there is an explosion or fire.

Cover, if possible, all ammunition stored at rearm pads so it will be protected from the weather.

STORING ROCKETS

Do not store ready rockets directly on top of each other at the rearm pads and in the ready ammunition storage areas. This places too much weight on the bottom layers.

If rockets have to be removed from their packing boxes, store rockets on storage racks built at the site.

Because the rocket motor might go off, place rockets so that their nose ends are pointed towards the back of the barricade.

DETERMINING EXPLOSIVE LIMITS

The number of ready rockets stored at the rearm points and in the ready ammunition storage areas must be kept to a minimum at all times. The following limits are a guide to meet operational needs. Do not go over them.

Rearm pad limits. Each rearm pad is limited to one fully armed aircraft plus the number of rockets required to rearm one additional aircraft. The ammunition for the second aircraft must be stored outside the pad, properly barricaded and covered.

Ready ammunition storage area limits. Each cubicle is limited to 2,000 pounds NEW per cubicle. The following example illustrates this limitation:

1340-H490 (10 lb NEW) = 200 rounds per cubicle
(200 multiplied by 10 = 2,000 pounds)

The NEW is computed based on the weight of explosive filler in item of ammunition. For rocket ammunition, the NEW is the combined explosive weight; that is, the propellant in the motor and the filler in the warhead.

Expect the items in Table B-1 helicopter rearm operations.

Table B-1. Common Items in Helicopter Rearm Operations.

Item	New (per Round)
TOW missile	12.18 lbs
Rocket, 2.75-in, HE, H489 or H490	10 lbs
Rocket, 2-75-in, HE, H488 or H534	11 lbs
Cartridge, 40-mm, HE, B468	2 oz
Small arms ammunition	None

Use Table B-2 to find the minimum distances permitted between rearm points, ready ammunition storage areas, and other activities requiring safety distance separations.

Table B-2. Distances Between Rearm Points and Ammunition Storage Areas.

From	To	Required Distance (in feet)	
		Barricaded	Unbarricaded
Rearm point	Rearm point	120*	120*
Rearm point	Inhabited buildings and unarmed aircraft	400	800
Rearm point	Public highways	240	480
Rearm point	POL storage or refuel facilities	450	800
Ready ammunition storage area	Rearm point	75	140
Ready ammunition storage area	Inhabited building and unarmed aircraft	505	1,010
Ready ammunition storage area	Public highways	305	610
Ready ammunition storage area	POL storage or refuel facilities	505	1,010

*This distance is based on rotor clearance.

Appendix C

DODIC CONVERSION CHART

This chart lists information on some commonly used DODICs. It may be helpful in planning for loading, storing, and shipping operations. The complete listing of DODICs is provided on the Army Class V identification lists (available on microfiche). Weights and quantities per pack may vary depending on the complete NSN.

For munitions, items are arranged by DODIC sequence. For missiles, items are alphabetically arranged by missile name and, under each kind of missile, by DODIC.

MUNITIONS

DODIC	Nomenclature	Rds Per Box	Wt Per Box (pounds)
A068	Ctg, 5.56-mm, tracer	1,640	64
A071	Ctg, 5.56-mm, ball	1,680	72
A127	Ctg, 7.52-mm ball and Tr M60 mg	800	79
A131	Ctg, 7.62-mm ball and Tr	800	79
A360	Ctg, 9-mm ball	3,840	115
A400	Ctg, .38-cal, ball	2,400	92
A475	Ctg, .45-cal, ball	2,000	95
A557	Ctg, .50-cal, ball and Tr	200	75
A588	Ctg, .50-cal, ball and Tr	180	74
A589	Ctg, .50-cal, APT and API-T	170	70
A652	Ctg, 20-mm, TP-T	100	92
A653	Ctg, 20-mm, HEI & TP-T	100	92
A655	Ctg, 20-mm, HEI-TP-T	100	93
A680	Ctg, subcal, 22-mm, practice	200	77
A681	Ctg, subcal, 22-mm, practice	200	77
A682	Ctg, subcal, 22-mm, practice	200	77
A683	Ctg, subcal, 22-mm, practice	200	77
A896	Ctg, 20-mm, TP & TP-T	100	93
A919	Ctg, 20-mm, HEI	100	92

B470	Ctg, 40-mm, HE M384 LKD	50	53
B480	Ctg, 40-mm, practice, M385 LKD	50	69
B519	Ctg, 40-mm, practice, XM781	72	53
B546	Ctg, 40-mm, HEDP M433	72	53
B568	Ctg, 40-mm, HE	72	55
B569	Ctg, 40-mm, HE, M39F	72	53
B610	Ctg, 35-mm, CS E8	1	unknown
B630	Ctg, 60-mm, WP	9	55
B632	Ctg, 60-mm, HE	12	55
C226	Ctg, 81-mm, illuminating	3	60
C236	Ctg, 81-mm, HE without fuze, M374	3	53
C256	Ctg, 81-mm, HE with fuze	3	51
C276	Ctg, 81-mm, WP, smoke	3	51
C445	Ctg, 105-mm, HE without fuze	2	120
C449	Ctg, 105-mm, illuminating, howitzer	2	120
C454	Ctg, 105-mm, WP, howitzer	2	121
C462	Ctg, 105-mm, HE, howitzer M444	2	120
C463	Ctg, 105-mm, HE, howitzer XM 548	2	122
C506	Ctg, 105-mm, APDS-T, L36A1	2	126
C508	Ctg, 105-mm, HEAT-T	2	132
C512	Ctg, 105-mm, WP, smoke	2	137
C513	Ctg, 105-mm, howitzer, APERS	2	122

(continued)

MUNITIONS *(continued)*

DODIC	Nomenclature	Rds Per Box	Wt Per Box (pounds)
C518	Ctg, 105-mm, HEP-T	2	137
C521	Ctg, 105-mm, APPSDS-T	2	122
C705	Ctg, 4.2-inch, HE, without fuze	2	82
C706	Ctg, 4.2-inch, illuminating	2	76
C708	Ctg, 4.2-inch, WP, smoke	2	76
D381	Ctg, 152-mm, HEAT-T	1	97
D390	Ctg, 152-mm, cannister	1	97
D505	Proj, 155-mm, illuminating	8	862
D533	Chg, propelling, 155-mm, WB, M119	1	50
D540	Chg, propelling, 155-mm, GB	2	54
D541	Chg, propelling, 155-mm, WB	1	30
D544	Proj, 155-mm, HE	8	797
D550	Proj, 155-mm, WP, smoke	8	830
D562	Proj, 155-mm, ICM, M449E2	8	831
D563	Proj, 155-mm, ICM, M483A1	8	831
D579	Proj, 155-mm, HE, RA, M549	8	830
D592	Ctg, 155-mm, HE-T	1	97
D675	Chg, propelling, 8-inch, GB	1	31

D676	Chg, propelling, 8-inch, WB	1	51
D680	Proj, 8-inch, HE	6	1,253
D684	ICM, 8-inch, M404	6	1,253
G881	Gren, hand, fragmentation, M67	30	47
G935	Gren, hand, WP, smoke	16	46
G940	Gren, hand, smoke, green	16	42
G945	Gren, hand, smoke, yellow	16	42
G950	Gren, hand, smoke, red	16	42
G955	Gren, hand, smoke, violet	16	42
H050	Launcher and gren, HE, smoke, and WP	8	80
H110	Rkt, incendiary, 66-mm, TPAq	16	unknown
H459	Rkt, 2.75-inch, APERS	8	85
H490	Rkt, 2.75-inch, HE	25	776
H519	Rkt, 2.75-inch, WP, smoke	4	127
H534	Rkt, 2.75-inch, HE	25	996
H557	Rkt, 66-mm, LAW	15	128
K143	Mine, APERS, M18	6	53
K146	Mine, APERS, M26	18	60
K181	Mine, AT, M21	4	56
K182	Mine, AT, M24	4	55
L116	Signal kit, personal, distress	200	116
L305	Signal, illuminating, green star	36	55
L306	Signal, illuminating, red star cluster	36	55

(continued)

MUNITIONS *(continued)*

DODIC	Nomenclature	Rds Per Box	Wt Per Box (pounds)
L307	Signal, illuminating, white star cluster	36	55
L311	Signal, illuminating, red star, parachute	36	55
L312	Signal, illuminating, white star, parachute	36	55
L314	Signal, illuminating, green star cluster	36	55
L323	Signal, smoke, red, parachute	36	55
L324	Signal, smoke, green, parachute	36	55
L495	Flare, surface, trip M49	16	51
M023	Ch, demo, C4	30	47
M024	Ch, demo, PETN	20	52
M028	Demo kit, Bangalore	1	198
M030	Ch, demo, TNT, 1/4-lb	192	71
M031	Ch, demo, TNT, 1/2-lb	100	69
M032	Ch, demo, TNT, 1-lb	50	71
M039	Ch, demo, cratering, 40-lb	1	52
M060	Ch, demo, 50-ft. roll	3	115
M130	Cap, blasting, electric	500	47
M131	Cap, blasting, nonelectric	5,000	82
M420	Ch, shaped, 15-lb	4	66
M421	Ch, demo, shaped, 40-lb.	1	76

M456	Cord, detonating	4,000	82
M591	Dynamite, military, M1	100	117
M626	Firing device, demo	150	78
M629	Firing device, demo	150	50
M630	Firing device, demo	250	71
M631	Firing device, demo	80	44
M670	Fuze, blasting, time	8	62
M757	Chg, demo, M183	2	57
M766	Igniter, blasting, time	250	47
N248	Fuze, MT, M565	16	54
N276	Fuze, MTSQ, M501	16	53
N278	Fuze, MTSQ, M564	16	55
N285	Fuze, MTSQ, M577	16	56
N308	Fuze, PD, M524 series	16	42
N331	Fuze, CP, M57	20	77
N335	Fuze, PD	16	55
N402	Fuze, proximity, M532	16	42
N411	Fuze, proximity, M514	25	97
N412	Fuze, proximity, M513	25	96
N463	Fuze, proximity, M728	16	63
N477	Fuze, proximity, M514A1	25	98
N523	Primer, percussion, M82	500	62
N525	Primer, percussion, MK2A4	500	37

MISSILES

DODIC	Nomenclature	Rds Per Box	Wt Per Box (pounds)
Chaparral			
PA44	1410-00-930-8358 GM, MIM-72A	1	300
PC20	1410-00-421-1632 GM, MIM-72B	1	300
PC21	1410-00-555-6185 GM, MIM-72C	1	300
PC22	1410-00-095-3248 GM, MIM-72E	1	300
PC23	1410-00-205-7187 GM, MIM-72G	1	300
PH80	1420-00-052-9449 Guidance Sec, AN/DAW-1B	1	30
PH80	1420-00-555-6186 Guidance Sec, AN/DAW-1A	1	58
PT36	1420-00-155-3321 Guidance Sec, AN/DAW-1B	1	58
TH79	1420-00-176-1221 Guidance Sec, MK28, MOD 1	1	61
TH79	1420-00-478-5899 Guidance Sec, MK28, MOD 2	1	61
TH79	1420-00-916-6777 Guidance Sec, MK28, MOD D	1	61
HAWK			
PA75	1410-00-137-2921 GM, MIM-23C	1	3,200
PC08	1410-00-234-3266 GM ICPT Aerial MIM-23B-3	1	3,200
PH23	1427-00-163-8959 GM & Lchr Surface Attack M222	1	67
PH22	1427-00-163-8960 GM & Lchr Surface Attack M223	1	67

Lance			
PG44	1420-00-937-0860 GM, Main Assy M5 w/E Lance Fueled	1*	4,020
PG46	1420-00-005-7706 Set, GM (Lance)	1*	79
Z546	1420-00-157-4939 GM, Main Assy M5 (Lance Unfueled)	1*	2,538
MLRS			
H104	1340-01-122-3506 Rocket Pd 298 mm Tactical w/Warhead	6	5,000
Pershing			
PH77	1420-00-964-9396 Guidance Sec, IM Cont	1	2,727
PH78	1420-00-078-3465 Guidance Sec, GM	1	4,555
PH83	1420-00-064-6745 Guidance Sec, GM Pers	1	2,727
Z507	1420-01-049-5320 Guidance Sec, GM	1	2,359
Redeye			
PJ01	1425-00-930-9923 Intercept - Aerial GM Sys M41A2 (Monopak)	1	76.4
PJ01	1425-00-183-5990 Intercept - Aerial GM Sys M41A2 (Unipak)	1	51
PJ01	1425-01-078-9258 Intercept - Aerial GM Sys M41A3 (Monopak)	1	76.4
PJ01	1425-01-078-9259 Intercept - Aerial GM Sys M41A3 (Unipak)	1	51

*Unit of Issue

(continued)

MISSILES *(continued)*

DODIC	Nomenclature	Rds Per Box	Wt Per Box (pounds)
Stinger			
PH91	#1427-01-212-4998 Missile Round Stinger Post Complete	1	73.6
PJ02	1425-01-024-9982 Guided Missile Sys Intercept - Aerial Stinger	1	86.8
PJ03	1425-01-213-3261 Guided Missile Sys Intercept - Aerial Stinger Post Weapon Round	1	86.8
PL90	#1427-01-024-9967 Missile Round Stinger Complete	1	73.6
Z587	1440-01-170-8618 Gripstock Control Group - GM Launch 0A9135/7	1	7.75
TOW			
PA66	1410-00-087-1521 TOW Ms BGM-71A	1	84.16
PB18	1410-00-087-1527 GM, Prac BTM-71A	1	84.16
PB91	*1410-00-007-2507 GM, Surface Attack BGM-71A1	1	84.16
PB95	1410-00-007-2508 GM, Prac BTM-71A1	1	84.16
PB96	*1410-01-137-9976 GM, BTM-71A2	1	84.16
PB94	*1410-01-139-1512 GM, BGM-71A2	1	84.16

PB93	*1410-01-135-2092 GM, BGM-71B	1	92.40
PB98	1410-01-180-6790 GM, BGM-71C-1	1	86
PB92	*1410-01-106-8514 BGM-71C	1	86
PB99	1410-01-180-6791 BTM-71A-3	1	84.16
PB97	1410-01-181-6032 BGM-71A-3	1	84.16
Vulcan			
PB82	1410-00-987-9432 GM Antitank w/Heat 140 mm Warhead	1	110
Vulcan			
A655	1305-00-926-4058	100	92
A792	1305-00-152-3059	100	93

*In use by the Army

≠When ordering this missile round, also order Gripstock 1440-01-170-8618

Appendix D

AMMUNITION IDENTIFICATION BY MARKINGS AND COLOR CODING

Ammunition is identified by markings and color coding on the items themselves, the containers, and the packing boxes. In this appendix color codings are presented in greater detail than markings because they are a more ready means of identification. The markings, the standard nomenclature of each item, together with its lot number, Federal Supply Class (FSC), national stock number (NSN), Department of Defense Identification Code (DODIC), and Department of Defense Ammunition Code (DODAC), completely identify each item and are used to maintain accountable records. Communications between ammunition units frequently use an ammunition item's DODIC; for instance, A071, which is 5.56 small arms ammunition (see SB 708-3). Color coding can be used as a quick way to visually check and identify

ammunition. Look in TM 9-1300-200 and MIL-STD-709C for more details. This appendix also gives a basic explanation of markings and color coding.

MARKINGS

AMMUNITION LOT NUMBER

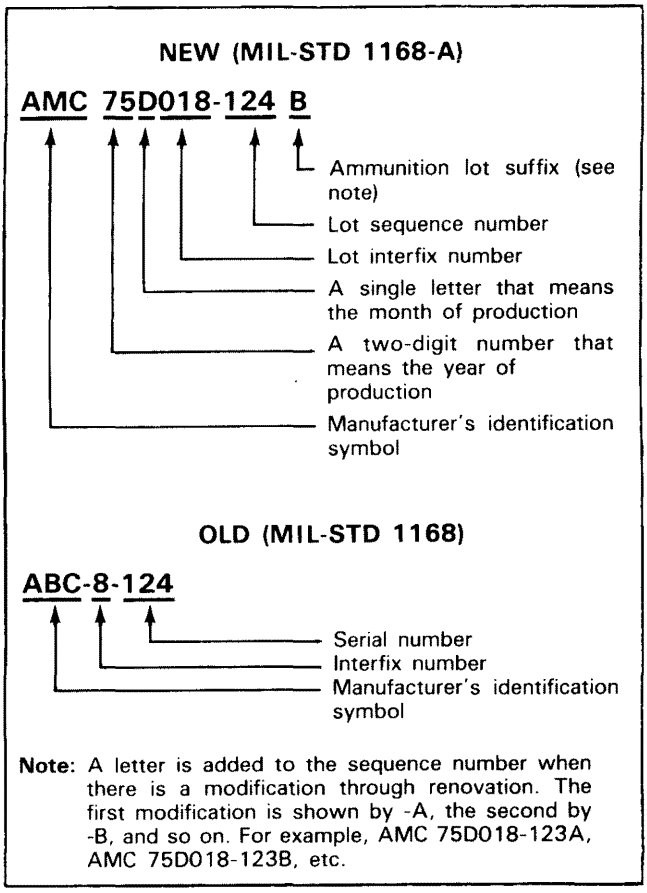
Each item of ammunition is assigned a complete round or item lot number when it is manufactured or is at the load and assembly (LAP) plant. See MIL-STD 1168-A for complete description of the current system. See MIL-STD 1168 for a complete discussion of the old lot numbering system. Figure D-1 is a basic break-down of a typical ammunition lot number showing both the new and the old systems.

CONVENTIONAL AMMUNITION FEDERAL SUPPLY CLASSES

Conventional ammunition is Federal Supply Group 13. Within this group, ammunition is further broken down by two more numbers that identify the general type or family the item falls into. Table D-1 is a list of FSCs.

CONVENTIONAL AMMUNITION NATIONAL STOCK NUMBERING (NSN) SYSTEM

Each complete round or item of conventional ammunition or associated explosive component is identified by its own national stock number (NSN). A conventional ammunition NSN is made up of the FSC, a two-number code of the country that makes the item, and the seven-number National Item Identification Number (NIIN). See Figure D-2.



Note: A letter is added to the sequence number when there is a modification through renovation. The first modification is shown by -A, the second by -B, and so on. For example, AMC 75D018-123A, AMC 75D018-123B, etc.

Figure D-1. Typical Lot Number System, and MIL- STD 1168.

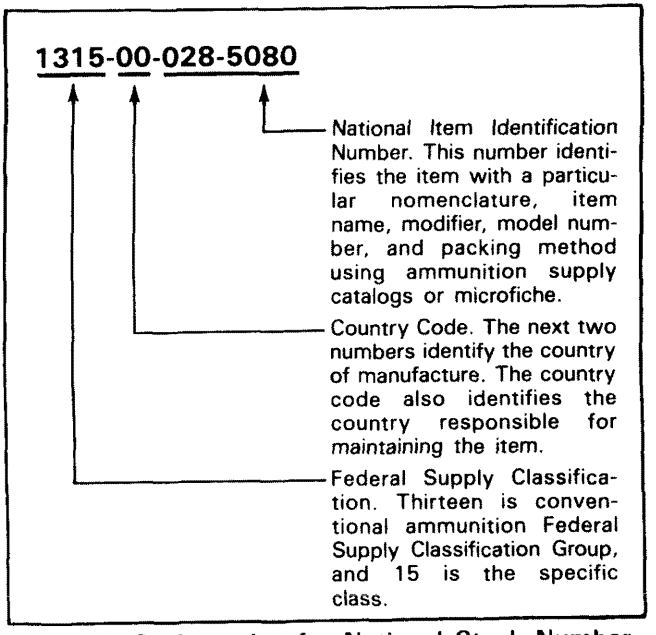


Figure D-2. Example of a National Stock Number.

Department of Defense Identification Code (DODIC). A DODIC is a single letter and three numbers or two letters and two numbers in the case of small guided missiles. It is attached at the end of all NSNs to denote interchangeability of the item. Figure D-3 shows a conventional NSN with DODIC added showing interchangeability between various model numbers and the designators of an ammunition item.

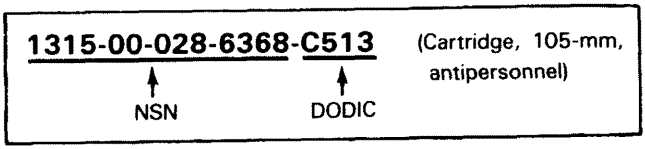


Figure D-3. Sample DODIC.

Department of Defense Ammunition Code (DODAC). This code includes the FSC of the ammunition, and the DODIC. The code is used on all using-unit DD Forms 581 (Request for Issue and Turn-In), DA Form 3151-R (Ammunition Stores Slip), and most ammunition reports. It is used instead of the DODIC to reduce errors with ammunition transactions. See Figure D-4.

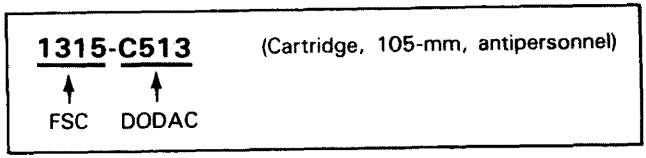


Figure D-4. Example of a DODAC.

COLOR CODING

The main reason ammunition is painted is to protect it from rust. But, at the same time, the color of the protective coating and markings makes ammunition items easy to identify and provides some camouflage. Ammunition 20mm and larger is color-coded IAW MIL-STD 709C (See Tables D-2 and D-3 pp 152 and 154). Figure D-5 shows typical markings for an artillery round of ammunition.

Small arms ammunition is not color coded under MIL-STD 709C; however, either the small arm projectiles themselves or at least the bullet tips are painted a distinctive color so they can be identified at a glance. Figures D-6 through D-13 show the color codes for types of small arms ammunition up to and including .50 caliber. See also TM 9-1300-200 for more details.

The following significant features of the current color coding standard should be noted:

- ***Olive Drab (OD).*** With yellow markings, olive drab indicates an HE round. However, OD is also being used as a basic color for certain new rounds such as improved conventional munitions (ICM), the flechette antipersonnel round, and some new illumination rounds for specific field artillery weapons.
- ***Overpacking.*** Ammunition overpacked in color coded bombs, in unit dispensers, or in warheads will not be color coded.
- ***Camouflage.*** Ammunition containing toxic chemical, incapacitating, or riot control chemical agents shall never be camouflaged by painting.
- ***Standard Department of Defense (DOD) Ammunition Color Code.*** The present standard ammunition color code for 20mm and larger ammunition is in MIL-STD 709C. Be aware, though, that there is still ammunition coded as specified by MIL-STD 709-B and MIL-STD 709-A. If this might be the case, see the appropriate MIL-STD or TM 9-1300-200.

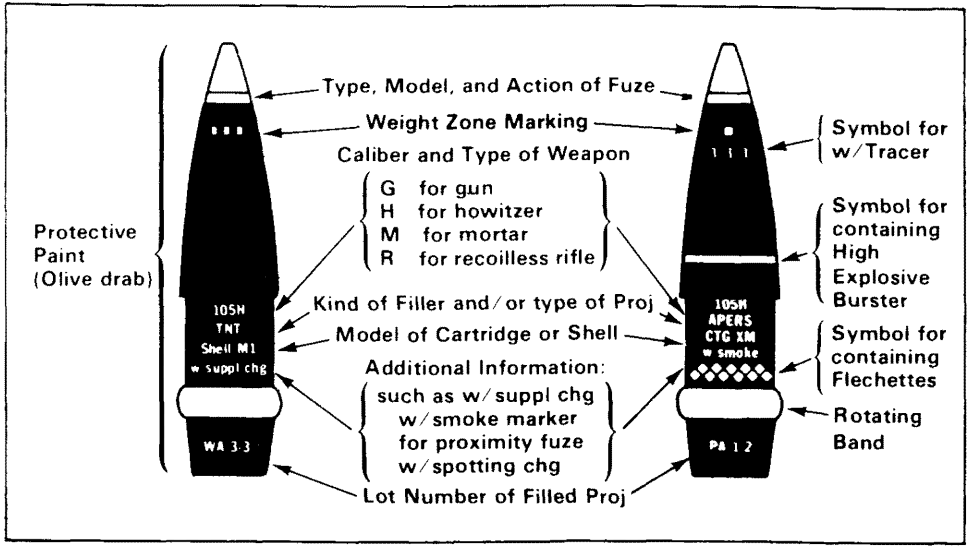


Figure D-5. Typical Artillery Markings.

Table D-2. Ammunition Color Code, MIL-STD 709C

Color[1,2]	Fed. Std No. 595	Interpretation
Yellow	33538	Identifies high-explosive (HE) ammunition or indicates the presence of a high explosive.
Brown	30117 or 30140	Identifies low-explosive items of components or indicates a low explosive. Normally a brown band around the item.
Gray[3,4]	36231	Identifies chemical ammunition containing a toxic chemical incapacitating or riot control agent. Used as a basic color.
Dark red	31136	Identifies a riot control agent filler.
Dark green[3]	34108	Identifies a toxic chemical agent filler. Used for markings and bands.
Violet	17100	Identifies an incapacitating agent filler. Used for markings or bands.
Black[3,5]	37038	Identifies armor defeating ammunition or indicates armor defeating capability.
Silver/aluminum	17178	Identifies countermeasure ammunition (e.g., radar echo, leaflets).
Light green[3]	34558 or 34449	Identifies screening or marking smoke ammunition.

Light red	31158	Identifies incendiary ammunition or indicates highly flammable material (liquids, jellies, solids) that produces damage by fire.
White[3,5,6]	37875	Identifies illuminating ammunition or ammunition that produces a colored light.
Light blue	35109	Identifies practice ammunition.
Orange	32246	May be used to identify ammunition used for tracking and recovery in tests or in training operations (e.g. underwater mines and torpedos).
Bronze, gold, brass	17043	Identifies completely inert ammunition for use in activities such as assembly, testing, handling, drills, etc., and not to be delivered in a delivery system.

Footnotes: The following have no color coding significance:

1. Colors specifically applied to identify the color of smoke ammunition or pyrotechnics.
2. Unpainted or natural color ammunition.
3. Gray, black, green, or white on underwater ammunition.
4. Gray on air-launched missiles.
5. Black or white when used for lettering or special marking.
6. White on guided missiles, dispensers, and rocket launchers.

Table D-3. Application of Color Codes for Particular Ammunition Items, MIL-STD 709C.

Ammunition	Colors		
	Body	Markings[1]	Bands
High explosive (HE), except 20mm	Olive drab	Yellow	Yellow[2,3,4,5]
High explosive (HE), 20mm	Yellow	Black	None
Explosive binary munitions	Olive drab	Yellow	Broken yellow[6]
High explosive plastic (HEP)	Olive drab	Yellow	Black
High explosive antitank (HEAT)	Black	Yellow	None
Antipersonnel and antitank mines	Olive drab	Yellow	Yellow[3]
Incendiary	Light red	Black	None
High explosive incendiary (HEI)	Yellow	Black	Light red
Armor piercing incendiary (API)	Black	White	Light red
Armor piercing (AP)			
With bursting charge	Black	Yellow	None
Without bursting charge	Black	White	None
Canister	Olive drab	White	None
Flechette-loaded	Olive drab	White	White[7] Yellow[8]

Footnotes:

1. Color of the letters and figures normally used for the main identification.
2. Circumferential band of yellow diamond-shaped figures on semifixed and separate-loading improved conventional munitions.
3. Circumferential band of yellow triangular-shaped figures on mass scatterable mine and loaded semifixed and separate-loading ammunition.
4. Separate loading ammunition for shipboard use has a circumferential yellow band besides yellow markings.
5. Bombs have one yellow band except thermally protected bombs, which have two yellow bands besides yellow markings.
6. Circumferential broken yellow band (one-half-inch segments with one-half-inch gaps) on explosive binary munitions.
7. Circumferential band of white diamond-shaped figures on ammunition containing flechettes.
8. Yellow band put on when the ammunition contains explosives used to fracture the projectile.

(continued)

Table D-3. *(continued)*

Ammunition	Colors		
	Body	Markings[1]	Bands
Chemical			
Filled with a toxic chemical binary nerve agent	Gray	Dark green	One broken dark green[9,10,11]
Illuminating			
Separate loading	Olive drab	White	White
Fixed or semifixed	White	Black	None
Practice			
With low explosive to indicate functioning			Brown
With high explosive to indicate functioning			Yellow
Without explosive to indicate functioning			None
Screening or marking			
Smoke ammunition			
Filled with other than white phosphorus	Light green	Black	None
Filled with white phosphorus	Light green	Light red	Yellow[9] Light red[12]

Inert ammunition not designed to be delivered in a delivery system.	Bronze	Black	None
Chemical			
Filled with a riot control agent	Gray	Red	One red[9]
Filled with an incapacitating agent	Gray	Violet	One violet[9]
Filled with a toxic chemical agent other than binary agents.	Gray	Dark green	One dark green[9]
Filled with a toxic chemical binary nerve agent	Gray	Dark green	One broken dark green [9,10]

Footnotes:

9. Yellow band put on to indicate high-explosive burster.
10. Toxic chemical agent ammunition containing a binary nerve agent filling shown by a broken dark-green band (one-half-inch segments separated by one-half-inch spaces).
11. Both color applications are standard. However, for land ammunition use, separate loading ammunition is olive drab for overall body color with a white band and main identification details marked white. Fixed and semifixed ammunition is white for overall body color with main identification details in black.
12. Separate loading ammunition for shipboard use has black markings and a light-red band.

Type	Characteristics
Ball	None
Ball heavy cartridge, for M16A2 and SAW	Green
Rifle grenade	Red rose petal crimp
Tracer	Orange for M856 cartridge for M16A2 *rifle; red for* M196 cartridge for M16A1
High-pressure test (HPT)	Plain tip/silver cartridge case

Dummy		Copper colored cartridge with fluted case, no primer
Blank		Rose petal crimped case with groove around cartridge case, no primer composition and no bullet
Dummy, Inert-loaded		Total cartridge black

Notes:

1. Heavy ball cartridge for the M16A2 rifle is not designed to fire accurately in the M16A1 rifle.
2. Light ball cartridge is authorized only for rifle M16A1.
3. Rifle grenade cartridge may have various colors applied to the rose-petal crimp.
4. HPT cartridge has "HPI" embossed on head.
5. The only clear feature of the blank cartridge is the groove.

Figure D-6. 5.56-mm Cartridges.

Type	Characteristics
Ball	No color
Armor-piercing (AP)	Black
Tracer	Orange
High-pressure Test (HPT)	Silver cartridge case with ball bullet
Dummy	Copper colored cartridge with case ridges or flutes, no primer

Blank		No bullet, long slender nose
Match		"MATCH" stamped on case head
Ball, frangible		Green bullet tip with white ring
Dummy, Inert-loaded		Cartridge all black
Duplex		Green

Figure D-7. 7.62-mm Cartridges.

Type	Characteristics
Ball	None

Figure D-8. 9-mm Cartridge.

Ball	None
Armor-piercing (AP)	Black
Incendiary (INC	Blue
Tracer (TR)	Orange or red

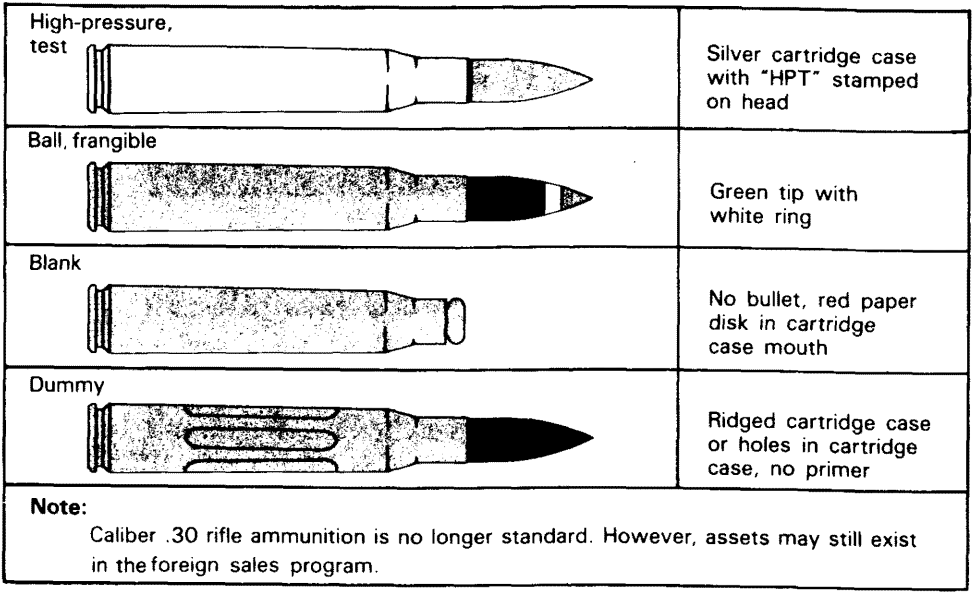


Figure D-9. Caliber .30 Cartridges, Colors and Shapes.

Type	Characteristics
Grenade	Rose petal crimp
Rifle grenade	Rose petal crimp
Ball	No color
Tracer	Orange or red
Dummy	No color, hole in cartridge case

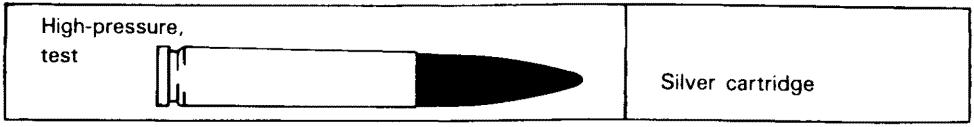


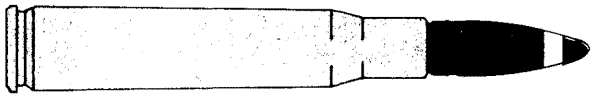
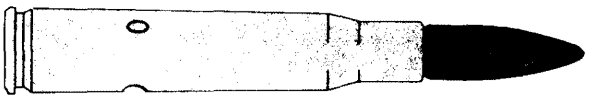
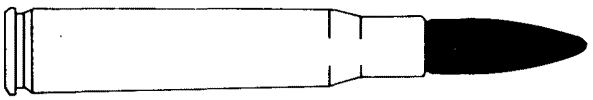
Figure D-10. Caliber .30 Carbine Cartridges, Colors and Shapes.



Figure D-11. Caliber .38 Cartridge.

Type	Characteristics
Ball	None
Tracer (TR)	Orange or red
Dummy	Holes in cartridge case
Blank	None
High-pressure test	Silver cartridge

Figure D-12. Caliber .45 Cartridges.

Type	Characteristics
Ball 	No color
Armor-piercing (AP) 	Black
Armor-piercing incendiary (API) 	Silver
Armor-piercing incendiary w/tracer (API-T) 	Red with silver ring
Incendiary (INC) 	Blue or dark blue with light blue ring
Tracer (TR) 	Orange, brown, red, or purple
Dummy 	Holes drilled in case
Blank 	No bullet, red sealer disk in cartridge case mouth
High-pressure test (HPT) 	Silver cartridge case, "HPT" stamped on head

Notes:

1. Current color tip code for new tracer cartridges is orange.
2. Color tip for incendiary cartridge depends on cartridge model or type designator as found in the supply catalogs or microfiche.

Figure D-13. Caliber .50 Cartridges.

Appendix E

AMMUNITION CONDITION CODES (ACC)

Ammunition codes are single letters that are used to classify ammunition materiel. They identify the degree of serviceability, condition, and completeness (readiness for issue and use). They also identify actions underway to change the status of materiel.

Code A - Serviceable (Issue Without Qualification). New, used, repaired, or reconditioned materiel that is serviceable and issuable without limitation of restriction to all customers. Normal requirements, at time of issue, for additional packaging or packing do not constitute a restriction.

Code B - Serviceable (Issue With Qualification). New, used, repaired, or reconditioned materiel that is serviceable and issuable for its intended purpose but is restricted from issue to specific units, activities, or geographic areas because of its limited use or short shelf life. The item manager, ARMCOM, prescribes the criteria used to determine the shelf life of a specific commodity or specific item for inclusion within this code.

Code C - Serviceable (Priority Issue). Items that are serviceable and issuable to selected customers but that must be issued before condition code A and B materiel so they will not be lost as a usable asset. This includes, but is not limited to, items with a year or less shelf life limit and items that have deteriorated but are suitable for issue as directed by the item manager.

Code D - Serviceable (Test/Modification). Materiel that is in the serviceable inventory but is directed by the item manager to be tested, altered, modified, converted, or disassembled. This does not include items which can be inspected or tested within normal outloading time immediately prior to use. Code D may include:

- Material of nonstandard design or condition and depot stocks requiring surveillance, laboratory or functional testing, and/or technical evaluation by higher authority as a condition to classification.
- Renovated lots awaiting ballistic test results, overage lots (lots that exceed shelf life), and lots overdue for trace or function tests.

Code E - Unserviceable (Limited Restoration). Materiel needing only limited expense or effort to restore it to a serviceable condition by the reporting ASP or depot, such as cleaning, painting, packaging, restenciling, etc. It normally does not include items that require replacement of components, modification, or alteration.

Code F - Unserviceable (Reparable). Economically reparable materiel requiring repair, overhaul,

or reconditioning. Code F also includes items that are radioactively contaminated and require special handling, and items that require operations more hazardous or complex than care and preservation. It normally involves replacement of components.

Code G - Unserviceable (Incomplete). Materiel requiring additional parts or components to complete the end item before its issue.

Code H - Unserviceable (Condemned). Material that has been determined to be unserviceable and is uneconomical to repair.

Code I - (Not to be assigned.)

Code J - Suspended (In Stock). Material in stock that has been suspended from issue, because its true condition is unknown and it is being or will be classified.

Code K - Suspended (Returns). Materiel returned from customers or users and awaiting condition classification.

Code L - Suspended (Litigation). Stocks held pending litigation or negotiation with contractors or common carriers.

Code M - Suspended (In Work). Material that has been identified on inventory control records but that has been turned over to a maintenance facility or contractor for processing.

Code N - Suspended (Ammunition Suitable for Emergency Combat Use Only). Ammunition stocks suspended from issue except for emergency combat use.

Appendix F

DOT HAZARDOUS MATERIALS INFORMATION

Included in this appendix are three lists. First is the proper DOT information, codes, markings, etc., needed for preparing shipments of ammunition. Second is an alphabetical list of ammunition items under each of the six commodity groups, complete with firefighting advice. Third is an alphabetical list of all the items in the various commodity groups.

DOT SHIPMENT INFORMATION

The chart on the following page contains the elements of DOT information that are required to prepare ammunition for shipment and to fill out the various forms necessary when shipping ammunition (see Chapter 3).

These elements are established by and defined in Title 49, Code of Federal Regulations. There is an explanation of the codes in the current edition of the Ammunition Consolidated Catalog or in the microfiche of that catalog. The DOT proper shipping name and fire fighting group is established by AR 55-355 for transporting hazardous material by motor vehicle.

Code	DOD Marking	Shipping Name	Fire Fighting Group
AB	Ammunition for Cannon w/Explosive Projectiles	Ammunition for cannon with explosive projectile	IV
AC	Ammunition for Cannon w/Gas Projectiles	Ammunition for cannon with gas projectile	VI
AD	Ammunition for Cannon w/Illuminating Projectiles	Ammunition for cannon with illuminating projectile	IV
AF	Ammunition for Cannon w/Inert Loaded Projectiles	Ammunition for cannon with inert projectile	IV
AG	Ammunition for Cannon w/Smoke Projectiles	Ammunition for cannon with smoke projectile	IV
AH	Ammunition for Cannon w/Solid Projectiles	Ammunition for cannon with solid projectile	IV
AI	Ammunition for Cannon w/o Projectile	Ammunition for cannon without projectile	III
AK	Ammunition for Small Arms w/Explosive Projectiles	Ammunition for small arms with explosive projectile	IV
AL	Black Powder	Black powder	V

AN	(QTY) Blasting Caps - Handle Carefully	Blasting caps (show actual number)	II (1,000 or fewer); V (more than 1,000)
AP	Boosters (Explosive)-Handle Carefully	Booster, explosive	IV
AQ	Bursters (Explosive)-Handle Carefully	Bursters, explosive	V
AR	Cannon Primers - Handle Carefully	Cannon primers	II
AU	Combination Fuzes, Handle Carefully	Combination fuzes	II
AV	Combination Primers, Handle Carefully	Combination primers	II
AW	Cordeau Detonating Fuse Handle Carefully	Cordeau detonating fuse	I
AZ	Detonating Fuzes Class A Explosive, Handle Carefully, Do Not Store or Load With any High Explosives	Detonating fuze, class A explosive	IV

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Code	DOD Marking	Shipping Name	Fire Fighting Group
BB	Detonating Fuzes, Class C Explosives, Handle Carefully	Detonating fuze, class C explosive	II
BD	(QTY) Electric Blasting Caps Handle Carefully	Electric blasting caps or blasting caps—electric (show actual number)	II (1,000 or fewer); V (more than 1,000)
BE	Electric Squibs	Electric squib	I
BF	Explosive Bombs	Explosive bomb	V (Non-Fragmentation); IV (Fragmentation)
BG	Explosive Cable Cutters Handle Carefully-Keep Fire Away	Explosive cable cutters	I
BH	Explosive Mines	Explosive mines	V
BI	Explosive Projectiles	Explosive projectile	V
BJ	Explosive Release Devices, Handle Carefully-Keep Fire Away	Explosive release devices	IV

BN	Flammable Liquid, N.O.S.	Flammable liquid, N.O.S.	III
BO	Flammable Solid	Flammable solid	III
BQ	Fuse Lighters	Fuse lighters	I
BS	Hand Grenades	Grenade, hand, explosive	V
BT	High Explosive-Dangerous	High explosive	V
BW	Igniters	Igniters	II (DOT Class C); III (DOT Class B); IV (DOT Class A)
BX	Igniters, Jet Thrust, Class A Explosives	Igniter, jet-thrust (JATO)	IV
BY	Igniter, Jet Thrust, Class B Explosives	Igniter, jet-thrust (JATO)	III
CB	Jet Thrust Unit, Class A Explosives	Jet thrust unit (JATO)	V
CE	Percussion Caps-Handle Carefully	Percussion cap	II
CF	Percussion Fuzes Handle Carefully	Percussion fuzes	II

(Continued)

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Code	DOD Marking	Shipping Name	Fire Fighting Group
CJ	Propellant Explosive, Class A	Propellant explosive	V
CK	Propellant Explosive (Solid) Class B	Propellant explosive, solid	II
CN	Fusees, Handle Carefully-Keep Fire Away	Fusee	I
CP	Rifle Grenades	Grenade, rifle, explosive	V
CQ	Rocket Ammunition w/Empty Projectiles	Rocket ammunition with empty projectile	IV
CR	Rocket Ammunition w/Explosive Projectiles	Rocket ammunition with explosive projectile	IV
CT	Rocket Ammunition w/Gas Projectiles	Rocket ammunition with gas projectile	VI
CU	Rocket Ammunition w/Incendiary Projectiles	Rocket ammunition with incendiary projectile	IV
CV	Rocket Ammunition w/Inert Loaded Projectiles	Rocket ammunition with solid projectile	IV

CW	Rocket Ammunition w/Smoke Projectiles	Rocket ammunition with smoke projectile	IV
CX	Rocket Ammunition w/Solid Projectile	Rocket ammunition with solid projectile	IV
CZ	Safety Fuse	Safety fuse or fuse, safety	I
DA	Safety Squibs	Safety squib	I
DB	Signal Flares, Handle Carefully, Keep Fire Away	Signal flare	I
DC	Small Arms Ammunition	Small arms ammunition	I
DD	Small Arms Ammunition Irritating (Tear Gas) Cartridges	Small arms ammunition, irritating cartridge	VI
DE	Small Arms Primers, Handle Carefully	Small arms primer	II
DF	Smoke Pots, Handle Carefully, Keep Fire Away	Smoke pot	III
DG	Smoke Signals, Handle Carefully, Keep Fire Away	Smoke signal	I
DH	Special Fireworks; Handle Carefully, Keep Fire Away	Fireworks, special	III

(Continued)

(continued)

Code	DOD Marking	Shipping Name	Fire Fighting Group
DK	Time Fuzes, Handle Carefully	Fuze, time	II; I (w/o booster)
DR	Common Fireworks, Handle Carefully, Keep Fire Away	Fireworks, common	I
DS	Chloroacetophenone, Solid	Chloroacetophenone, solid	IV
DU	Chloroacetophenone Liquid	Chloroacetophenone, liquid	IV
DX	Grenade, Tear	Grenade, tear gas	IV
DZ	Phosphorus, White	Phosphorus, white, dry	III
EA	Explosive Power Devices, Class C, Handle Carefully, Keep Fire Away	Explosive power devices, class C I	I
ED	Starter Cartridges, Jet Engine, Class C Explosives, Handle Carefully, Keep Fire Away	Starter cartridges	I
EK	Rocket Motors, Class A Explosives	Rocket motor	V
EM	Rocket Motors, Explosives	Rocket motor	III

EN	Ammunition for Small Arms w/Incendiary Projectiles	Ammunition for small arms with incendiary projectile	IV
ET	Explosive Torpedo	Explosive torpedo	V
EQ	Hand Signal Device, Handle Carefully, Keep Fire Away	Hand signal device	I
EW	Cartridges, Practice Ammunition	Cartridge, practice ammunition	I
EX	Tracers, Handle Carefully	Tracer	II
FA	Detonators, Handle Carefully	Detonators, class A explosives	IV
FB	Detonators, Handle Carefully	Detonators, class C explosives	II
FC	Flexible Linear Charge, Metal Clad, Handle Carefully	Flexible linear shaped charge, metal clad	V
FD	Electrolyte (Acid) Battery Fluid	Electrolyte battery fluid	V
FE	Smoke Candles	Smoke candles	III
XA	Oxidizing Material, N.O.S.	Oxidizing material, N.O.S.	VI

(Continued)

(continued)

Code	DOD Marking	Shipping Name	Fire Fighting Group
XB	Nitrogen	Nitrogen	
XC	Helium	Helium	
XD	Accumulator, Pressurized	Hydraulic accumulator or accumulator pressurized	
XE	ARGON	Argon	
XF	Rocket Engines (Liquid) Class B Explosives	Rocket engine, liquid	III
XG	Actuating Cartridges, Explosive, Valve, Handle Carefully	Actuating cartridge, explosive	I
XH	Detonating Primers Handle, Carefully	Detonating primer	II
XJ	Empty Cartridge Case, Primed, Handle Carefully	Empty cartridge case, primed	I
XK	Battery, Electric Storage, Wet	Battery, electric, storage, wet	
XL	Jet Thrust Units, Class B Explosives	Jet thrust unit	III

XM	Igniters, Rocket Motors, Class B Explosives	Igniter, rocket motor	II
XN	Smoke Grenades, Handle Carefully, Keep Fire Away	Smoke grenades	II
XS	Poisonous Gas, N.O.S.	Poisonous gas, N.O.S.	VI
XT	Igniter Fuse, Metal Clad	Igniter fuse, metal clad	II
XU	Explosive Power Devices, Class B, Handle Carefully, Keep Fire Away	Explosive power device, class B	II
XV	Actuating Cartridges, Explosive, Fire Extinguisher, Handle Carefully	Actuating cartridge explosive	I
XW	Ammunition For Cannon w/Empty Projectiles	Ammunition for cannon with empty projectile	IV
XX	Ammunition, Nonexplosive*		

*Ammunition, nonexplosive, is technically not a DOD marking, and containers need not be marked as such for transportation. If containers are marked "Ammunition Nonexplosive" they need not be marked again.

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Code	DOD Marking	Shipping Name	Fire Fighting Group
XY	Chemical Ammunition, Non-explosive, Containing Poison A Material	Chemical ammunition, Nonexplosive	VI
XZ	Mild Detonating Fuse, Metal Clad, Handle Carefully	Fuse, mild detonating, metal clad	I
YA	Methylhydrazine	Methylhydrazine	VI
YB	Nitrogen Tetroxide Liquid	Nitrogen tetroxide liquid	VI
YD	Ethylene Oxide	Ethylene oxide	V
YE	Explosive Rivets	Explosive rivet	I
YF	Electrolyte (Acid), Battery Fluid (Not Over 47% Acid)	Electrolyte, battery fluid	
YG	Igniters, Rocket Motor, Class A Explosives	Igniter, rocket motor	IV
YH	Irritating Agent M.O.S.	Irritating agent M.O.S.	VI
YI	Chemical Ammunition Non-explosive (Containing an Irritating Material)	Chemical ammunition, non-explosive (containing an irritating material)	VI

COMMODITY GROUPS WITH FIRE FIGHTING ADVICE AND ITEMS

Group I — Relatively no hazard. Normal operating distance for firefighters.

- Actuating Cartridges (Explosives Switches or Actuating Valves)
- Adapter Grenade Projection
- Ammunition for Cannon Caliber 20mm except HE, HE1, HE-T and AP-1
- Blank and Mortar Ignition Cartridges
- Cartridges for CAD Items 500 Grains or Less (DOT Class c)
- Cartridge Case, Empty, Primed
- Cartridge, Explosive Bolt, 500 Grains or Less
- Catapult Charges and/or Cartridges
- Common Fireworks (Smoke Grenades, Railway and Highway Fuses, Hand Signal Devices, etc.)
- Cordeau Detonant Fuze (Primacord)
- Explosive Cable or Line Cutter (DOT Class C)
- Explosive Power Devices (DOT Class C)
- Explosive Release Devices
- Explosive Rivets
- Fuze Igniters or Lighters
- Grenades, Empty, Primed
- Perchlorates, Peroxides and Nitrates (DOT Oxidizing Materials)
- Phosphorous in Water, White or Yellow (DOT Flammable Solid)
- Practice Mines NM, 17 (DOT Class C Common Fireworks)
- Practice Rifle Grenades
- Pyroforic Solutions and Fuels (DOT Flammable Liquid)

(Continued)

Safe and Arming Mechanism
Safety Fuse
Signals (DOT Class C Common Fireworks)
Small Arms Ammunition
Squibs, Electric or Delay
Starter Cartridge Jet Engine (DOT Class C)
Starter, Fire, NP3 (DOT Special Fireworks)
Tear Agents CS, CN, CN-DM Burning Mixture in Bulk, Liquid, Solutions, Capsules, Pellets, and Grenades
Time Fuzes (Mechanical Without Booster)
Zirconium Powder (ES)

Group II— Principally fire and light missile (fragment) hazard. Maintain the following minimum distances:
Firefighters-Operating distance.
Public in Open—500 feet.
Special Precautions—Take available cover to protect against light missiles (fragments).

Antipersonnel Practice Mines, M8
Black Powder Igniters with Empty Cartridge Baga
Blasting Caps, 1,000 or Less (DOT Class C)
Blasting Caps (1,000 or Less) with Metal Clad Mild Detonating Fuze (DOT Class C)
Blasting Caps (1,000 or Less) with Safety Fuse (DOT Class C)
Cartridge Kit, Bomb Ejection
Delay Element for Percussion and/or Detonating Fuzes (DOT Class C)
Detonators
Explosive Power Devices (DOT Class B)

(Continued)

Flexible Linear Shaped Charges, Metal Clad (DOT Clam C)
Fuzes, All Types (DOT Class C)
Grenades, Hand, Illuminating
Initiators, All types (DOT Class C)
Percussion Caps (DOT Class C)
Power Actuated Devices, All Types(DOT Class C)
Primers, All types(DOT Class C)
Projectiles, Illuminating (DOT Special Fireworks)
Propellant, Explosives, Solid (DOT Class B)

Group III— Principally a fire hazard with intense heat. Maintain the following minimum distances:
Firefighters-Operating distance.
Public in Open—500 feet.
Special Precautions—Protect against intense heat and other specified hazards.

Ammunition for Cannon Without Projectile Including Cartridge for CAD Items.
Over 500 Grains (DOT Class B)
Bombs, Incendiary, TH, PTl in Bombs or Clusters
Bomb, Photoflash, M122
Cartridge, Photoflash (DOT Special Fireworks)
Cartridge, Signal, for Practice Bomb
Charge, Propelling, Earth Rod
Chemical Ammunition Group C, When Not Assembled with Explosives Components (DOT Flammable Solid)
Cryptographic Equipment Destroyer
Flammable Gee (Hydrogen, Gas or Liquid)
Flammable Liquid (Ethyl, Methyl and Furfuryl Alcohol, Methylacetylene, Ethylene Oxide, Nitromethane and N-Propyl-Nitrate)

(Continued)

Flare, Aerial, Infrared (DOT Special Fireworks)
Grenade, Hand, Incendiary, AN-M14
Hydrogen Peroxide (DOT Corrosive Liquid)
Igniters, Jet Thrust, JATO (DOT Class B)
Jet Thrust Unit, JATO (DOT Class B)
Jet Thrust Unit, Rocket Engine (DOT Class B)
Liquid Oxygen (DOT Nonflammable Gas)
Signals (Special Fireworks, DOT Class B)
Simulator (DOT Special Fireworks)
Starter, Cartridge, Jet Engine (DOT Class B)
Tracer, Flare, Tracking
Tracer, Guided Missile

Group IV— Principally a missile (fragment) hazard. Maintain the following minimum distances:
Firefighters- 1,200 feet.
Public in Open—2,000 feet.
Special Precautions—Prepare to fight incipient fires started by the explosion.

Ammunition for Cannon With Explosives Projectiles, Including 20mm HE and HEI
Ammunition for Cannon with Illuminating Projectiles.
Ammunition for Cannon with Incendiary Projectiles.
Ammunition for Cannon with Projectiles 81mm or Less (excluding 81mm, M56)
Ammunition for Cannon with Smoke Projectiles
Ammunition for Cannon with Solid, Inert Loaded, or Empty Projectile
Ammunition for Small Arms with Explosive Bullets
Ammunition for Small Arms with Explosive Projectiles

(Continued)

Booster (DOT Class A)
Charge, Spotting, Practice, Black Powder (DOT Class A)
Catapults
Detonating Fuzes, Including Conversion Set, External C1uster Stowage (DOT Class A)
Explosive Bombs (Fragmentation)
Explosive Mines (Antipersonnel Including Cast-Iron Type)
Cartridge, Explosive Bolt over 500 Grains
Grenade, Hand and Rifle, Excluding Offensive and Incendiary, AN-M14 and Pentolite Loaded
Igniters, Jet Thrust, JATO (DOT Class A)
Rocket Ammunition with Explosive Projectile
Rocket Ammunition with Illuminating Projectile
Rocket Ammunition with Incendiary Projectile.
Rocket Ammunition with Smoke Projectile, Assembled with Explosive Components
Rocket Ammunition with Solid, Inert, Loaded, or Empty Projectiles or Without Projectiles

Group V— Principally a blast hazard. Maintain the following minimum distances:
Firefighters— 1,200 feet.
Public in Open—2,000 feet.
Special Precautions—Prepare to fight incipient fires started by exploding load.

Cartridge, Heavy Mortar, HE and 81mm including 81mm M56 (DOT Clam A)
Black Powder
Blasting Caps (More than 1,000)

(Continued)

Blasting Caps (More than 1,000) with Metal Clad Mild Detonating Fuze
Blasting Caps (More than 1,000) with Safety Fuse
Bursters (DOT Class A)
Demolition Blocks, All Types, High Explosive
Explosive Bomb (Except Fragmentation)
Explosive Bomb, Photoflash (Except M122 Without Burster)
Explosive Bomb, Simulator, Ml 15
Explosive Mine
Explosive Projectile
Explosive Torpedo, Including Bangalore
Firecracker, M80
Grenade, Rifle, AT, Pentolite Loaded
High Explosives in Bulk Containers
High Explosive (Liquid)
Hand Grenade, Offensive (DOT Class A)
Initiating Explosives, Wet (DOT Class A)
Jet Thrust Unit, JATO (DOT Class A)
Propellant Explosives (DOT Class A)
Shaped Charge, HE
Snake, Demolition
Supplementary Charge, HE
Torpedoes, HE (All Types)
Warheads, HE for Guided Missiles and Torpedoes

Group VI— This group is principally a toxic hazard. Items assigned to this group, which have explosive components and a missile (fragment) or severe fire hazard associated with them, are identified by an asterisk(*), with notes below the listing referring to the proper group for the minimum distances to be

observed. Maintain the following minimum distances:

Firefighters-May approach from the direction from which the wind is blowing when protected with a selfcontained breathing apparatus and special or protective clothing as specifically prescribed for the particular commodity involved.

Public—Evacuate downwind areas. When poison or nerve gases are involved, 2 miles downwind and 1 mile upwind and sidewind will be evacuated. Personnel will not reenter the area until it is declared safe by decontamination team chief.

Special Precautions—When technical escorts accompany shipments, the minimum distances and additional precautions may be prescribed by escort personnel.

AC, Hydrogen Cyanide
*Alkyl Boranes[1]
*Aniline[2]
BBC, Bromobenzylcyanide
Beryllium Powder (Poison)
CG, Phosgene

Footnotes:

1. These items, in addition, are a fire hazard with intense heat end shall be noted under Other Specific Precautions on the form.
2. When these items contain explosive components, minimum distances shown for group IV shall be noted under Other Specific Precautions on the form to warn against the fragment hazard.

(Continued)

*Chemical Ammunition Containing Class A Poisons, Liquid, or Gases[z]
*Chemical Ammunition Containing Class B Poisons, Liquid, or Gases[z]
*Chemical Ammunition Containing Class C Poisons, Liquid, or Gases[z]
Chlorine Trifluoride[1,3]
CK, Cyanogen Chloride
CL, Chlorine
CN, Chloracetophenone (tear gas)
*CNB, Solution of CN in Benzine and Carbon Tetrachloride[l]
CNC, Solution of CN in Chloroform
CNS, Solution of CN and Chloropicrin in Chloroform
CS,O-chlorobenzylrnalononitrile
DA,Diphenylchloroarsine
DC,Diphenylcyanoarsine
*Diborane[l]
DM, Adamsite
DP, Diphosgene
Ed, Ethyldichloroarsine
*Fluorine[l, 3]
FM, Titanium Tetrachloride
FS, Sulphur Troxide-Chlorosulfonic Acid Solution
G-Agents (Nerve Gas)
HC, Hexachloroethane, Grained Aluminum, and Zinc Oxide Mixture
HD, Mustard (Distilled)
HL, Mustard Lewisite Mixture
HN-(1,2&3), Nitrogen Mustard
HT, Mustard (T Mixture)
*Hydrazine[1]
L, Lewisite

(Continued)

MD, Methyldichlorarsine
*Methyl Hydrazine[1]
*Monomethylhydrazine[1]
Nitric Acid
*Nitrogen Dioxide[1]
*Nitrogen Tetroxide[1]
PD, Phenyldichlorarsine
* Pentaborane[1]
*Perchloryl Fluoride[1]
Poisonous Liquids, Solids, or Gases (DOT Classes A, B, or C Not Listed Herein)
PS, Chloropicrin
SA, Arsine
*Unsymmetrical Dimethylhydrazine (UDMH)[1]
VX, Nerve Gas

Footnotes:

1. These items, in addition, are a fire hazard with intense heat and shall be noted under Other Specific Precautions on the form.
2. When these items contain explosive components, minimum distances shown for group IV shall be noted under Other Specific Precautions on the form to warn against the fragment hazard.
3. Do not use water on this item.

COMMODITY GROUPS, ALPHABETICAL LISTING

Item	Commodity Group
AC, Hydrogen Cyanide	VI
Actuating Cartridges (Explosives Switches or Actuating Valves)	I
Adapter Grenade Projection	I
Alkyl Boranes	VI
Ammunition for Cannon, Caliber 20mm except HE, HEI, HE-T, and AP-1	I
Ammunition for Cannon with Explosives Projectiles, Including 20mm HE and HEI	IV
Ammunition for Cannon with Illuminating Projectiles	IV
Ammunition for Cannon with Incendiary Projectiles	IV
Ammunition for Cannon with Projectile, 81mm or Less Excluding 81mm M56	IV
Ammunition for Cannon Without Projectile, Including Cartridge for CAD Items over 500 Grains (DOT Class B)	III
Ammunition for Cannon with Smoke Projectiles	IV
Ammunition for Cannon with Solid, Inert Loaded, or Empty Projectile	IV
Ammunition for Small Arms with Explosives Bullet	IV
Ammunition for Small Arms with Explosive Projectile	IV
Aniline	VI
Antipersonnel Practice Mines M8	II
BBC, Bromobenzylcyanide	VI
Beryllium Powder (Poison B)	VI
Black Powder	V
Black Powder Igniters with Empty Cartridge Bags	II
Blank and Mortar Ignition Cartridges	I
Blasting Caps, 1,000 or Less, (DOT Class C)	II

(Continued)

Blasting Caps, 1,000 or Less, with Metal-Clad Mild Detonating Fuse (DOT Class C)	II
Blasting Caps, 1,000 or Less, with Safety Fuse (DOT Class C)	II
Blasting Caps, More than 1,000	V
Blasting Caps, More than 1,000, with Metal-Clad Mild Detonating Fuse	V
Blasting Caps, More than 1,000, with Safety Fuse	V
Bombs, Incendiary, TH PT1, in Bombs or Clusters	III
Bombs, Photoflash M122	III
Boosters (DOT Class A)	IV
Bursters (DOT Class A)	V
Cartridges for CAD Items 500 Grains or Less (DOT Class C)	I
Cartridge Case, Empty, Primed	I
Cartridge, Explosive Bolt, 500 Grains or Less	I
Cartridge, Explosive Bolt over 500 grains	IV
Cartridge, Heavy Mortar HE Over 81mm, Including 81mm M56 (DOT Class A)	V
Cartridge Kit, Bomb Ejection	II
Cartridge, Photoflash (DOT Special Fireworks)	III
Cartridge, Signal, Practical Bomb	III
Catapults	IV
Catapult Changes and/or Cartridges	I
CG, Phosgene	VI
Charges, Propelling, Earth Rod	III
Charge, Spotting, Practice, Black Powder (DOT Class A)	IV
Chemical Ammunition Containing Class A Poisons, Liquid or Gases	VI
Chemical Ammunition Containing Class B Poisons, Liquid or Gases	VI
Chemical Ammunition Containing Class C Poisons, Liquid or Gases	VI
Chemical Ammunition Group C When Not Assembled with Explosives Components (DOT Flammable Solid)	III

Appendix G

BRASS CONVERSION CHART

Use the data and procedures in this appendix to compute the weight and/or quantity of expended cartridge cases.

Case Type	Weight (pounds)
.22 caliber, brass, short	.0008
.22 caliber, brass, long	.0014
.30 caliber, brass, carbine	.0101
.30 caliber, steel, carbine	.0081
.30 caliber, brass, all others	.0286
.38 caliber, brass, all	.009
.45 caliber, brass, all	.0124
.45 caliber, steel, all	.012
.50 caliber, brass, all	.121
.50 caliber, steel, all	.111
5.56 millimeter, brass, all	.0135
7.62 millimeter, brass, all	.026
20.0 millimeter, brass, small	.2
20.0 millimeter, brass, large	.25
Shotgun, brass, all	.036

To Find Weight: Multiply the quantity of expended cartridge cases by the weight. Using the example, brass, short, expended-rounds, .22 caliber, work the formula as follows:

Formula:

Quantity of the item	x	Weight	=	Weight of expended cartridge cases

Computation:

39,875 rounds	X	.0008 pounds	=	31.9 pounds

Work to one decimal place and round down: 31 pounds expended.

To Find Quantity: Divide the weight of the expended cartridge cases by the weight. Using the example, brass, expended-cartridges weight of .38 caliber, work the formula as follows:

Formula

Total Weight	+	Weight of the item	=	Quantity of expended cartridge cases

Computation:

82.0 pounds	+	.009 pounds	=	9,111.1 rounds

Work to one decimal place and round down: 9,111 rounds.

TERMS

ammunition (ammo) - (From the French *la munition or l'ammunition.)* **1.** A generic term that includes all kinds of missiles to be thrown against an enemy, such as bullets, projectiles, rockets, grenades, torpedoes, bombs, and guided missiles. It includes their necessary propellants, primers, fuzes, detonators and charges of conventional explosive, nuclear explosive, chemical or other materials. **2.** In the broadest sense, the term is not limited to those materials to be thrown, nor to be used against an enemy, but includes, in addition to the items and materials given in sense 1, all explosives, explosive devices, pyrotechnics, and pyrotechnic devices. The purpose is not limited and includes, in addition to direct use against an enemy, such uses as illumination, signaling, saluting, mining, digging, cutting, accelerating, decelerating, separating, catapulting, personnel or material, operating or stopping mechanisms, demolition, decoying, practice, training, guarding, game hunting and purse sport. **3.** In the most restricted sense, the term includes a complete round and all its components, that is, the material required for firing a weapon such as a pistol, rifle, or cannon, from which a projectile is thrown for inflicting damage upon an enemy. Generally the term is used

or taken in its broadest sense (sense 2) unless a more restricted sense is indicated or is implied.

Ammunition Data Card (DD Form 1650) - Identification card prepared for each individual lot manufactured, giving the type and composition of the ammunition and identifying its components by lot number and manufacturer. When necessary, may also include instructions for holding the ammunition.

ammunition lot - A quantity of rounds or components, each of which is manufactured by one manufacturer under uniform conditions and is expected to function uniformly. The lot is designated and identified by an ammunition lot number and an ammunition data card. *See also: Ammunition Data Card.*

arm - To make ammunition ready for detonation, as by removal of safety devices or alignment of the explosive elements in the explosive train of the fuze.

arming plug, antitank mine - A device assembled on a mine, antitank after fuzing, which can be set to either a safe position or an armed position. In the armed position, enough pressure will cause the fuze to function.

armor-piercing (AP) - A description of ammunition, bombs, bullets, projectiles or the like which are designed to penetrate armor and other resistant targets.

artillery ammunition - Ammunition for cannon above 30 millimeters (1.181 in) in caliber.

ball ammunition - Nonarmor-piercing small arms ammunition in which the projectile is solid. It is for use against personnel and light material targets or for training purposes.

band, rotating - Soft metal band around projectile near its base. The rotating band centers the projectile and makes it fit tightly in the bore, thus preventing the escape of gas, and, by engaging the rifling, gives projectile its stabilizing spin.

band, rotating, pre-engraved - A rotating band fitted to a projectile with grooves to fit the rifling of the weapon. The grooves are formed in the manufacture of the projectile. This practice is followed in the manufacture of ammunition for recoilless weapons. *See also: band, rotating.*

bandoleer - A closed loop of fabric, with pockets designed to accommodate small arms ammunition. Used by individual soldiers for carrying ammunition, by suspending one or more bandoleers over their shoulders.

bangalore torpedo - A metal tube or pipe that is packed with a high explosive charge. A bangalore torpedo is chiefly used to clear a path through barbed wire or mine fields.

base cover - A metal plate, caulked, crimped, or welded to the base of a projectile to prevent leakage of propellant gases into the charge. Not ordinarily used on small projectiles. Also called base plate.

base ejection (BE) - A term for projectiles in which provision is made for ejecting the contents through the base by internal force powerful enough to remove the base plug and contents simultaneously. Usually the force is applied by an expelling charge, which is functioned by a fuze. Various types of special purpose projectiles such as illuminating, leaflet, and some smoke projectiles, are base ejection.

base of projectile - The rearmost section of a projectile. For projectiles having a rotating band, it is the section to the rear of the band.

belt, link - Ammunition feed belt for an automatic weapon in which metal links connect the cartridges and, with them, form the belt.

black powder (BP) - A low explosive consisting of an intimate mixture of potassium or sodium nitrate, charcoal, and sulphur. It is easily ignited and is friction sensitive (but not as sensitive as primer mixes). It is not intended to be initiated by friction in ammunition items. Formerly extensively used as a military propellant, but now its military use is almost exclusively in propellant igniters and primers, in fuzes to give short delay, in powder train time fuzes, in blank ammunition, and as spotting charges in practice ammunition.

blank ammo - An indication that ammunition does not contain projectile but does contain a charge of low explosive, such as black powder, to make a noise.

blister gas - Any of several war gases which produce burning, inflammation, or destruction of tissue, either externally or internally. Also called blistering gas. Such gases were formerly listed as vesicants. Examples: lewisite and mustard, distilled.

boattail - **1.** Having a tapered-in base; boat-tailed. **2.** The base of a projectile when shaped like the frustum (point of a cone). *See: base of projectile.*

bomb - In a broad sense, an explosive or other lethal agent together with its container or holder, that is planted or thrown by hand, dropped from an aircraft, or projected by some other slow-speed device (as by lobbing it from a mortar), and used to destroy, damage, injure, or kill.

booster - **1.** Assembly of metal parts and explosive charge provided to augment the explosive component of a fuze, causing detonation of the main explosive charge of the munition. May be an integral part of the fuze. The explosive in the booster must be sufficiently sensitive to be actuated by the small explosive elements in a fuze, and powerful enough to cause detonation of the main explosive filling. **2.** Auxiliary propulsion system, used in the early launching phase of a missile, in addition to the principal propelling means. It may be released from the missile when its impulse has been delivered.

bourrelet - The cylindrical surface of a projectile on which the projectile bears while in the bore of

the weapon. Conventionally the bourrelet is located between ogive and the body of the projectile and has a slightly larger diameter than the body. In some cases the bourrelet extends the full length of the body. In some projectile designs the conventional bourrelet becomes the front bourrelet, a rear bourrelet being provided behind the rotating band. In other designs a middle bourrelet is provided just forward of the rotating band.

bullet - A projectile able to be fired from a small arm, i.e., rifle or pistol.

burster - An explosive element used in chemical ammunition to open the container and disperse the contents.

canister (cnstr) - **1.** A special short-range antipersonnel projectile designed to be fired from rifled guns. It consists of a casing of light sheet metal, which is loaded with preformed submissiles such as small steel balls. The casing is designed so that the rotation causes it to open at or just beyond the muzzle of the gun. The submissiles are then dispersed in a cone, giving effective coverage of the area immediately in front of the gun. *See cartridge,* etc. **2.** In certain special projectiles, the subassembly or inner container where the payload is, such as in a smoke canister.

canister, smoke - A chemical filler in ogival or cylindrical containers for loading into projectiles of chemical shells. When ignited, a colored or white smoke is produced.

cannelure - **1.** A groove in a bullet for a lubricant or into which the cartridge case is crimped; a groove in a cartridge case providing a grip for the extractor (also called an extractor groove). **2.** Ringlike groove for locking the jacket of an armor-piercing bullet to the core. **3.** Ringlike groove in the rotating band of a gun projectile to lessen the resistance offered to the gun rifling and to prevent fringing (also called a fringing groove). *See crimping groove.*

cannon - A complete assembly, consisting of a tube, a breech mechanism, and a firing mechanism or base cap, all of which are components of a gun, howitzer, or mortar. May also include muzzle appendages.

cap, blasting - A small tube, usually copper or aluminum, closed at one end and loaded with a charge or charges of high explosives, at least one of which is capable of detonating from the spit or sparks from the safety fuse. Electric blasting caps are blasting caps provided with a means for electrical firing.

cartridge (ctg) - An assemblage of the components required to function a weapon once; for example, ammunition for a gun which contains in a unit assembly all of the components required to function once, and which is loaded into the gun at one time.

cartridge, ball - A cartridge in which the projectile is a ball. *See ball ammunition, cartridge (first definition).*

cartridge, blank - A cartridge, consisting of cartridge case, primer, and propellant or black powder, but no projectile. Blank ammunition is used in training, in signaling, and in firing salutes.

cartridge, ignition - An explosive cartridge forming part of the propellant system for mortars. It serves as the inner zone charge and also provides the flame necessary for igniting additional increment charges.

charge, spotting - A small charge, usually black powder, in a practice bomb, practice mine, etc., to show the location of its point of functioning. Also occasionally used in service ammunition.

chemical agent, chloroacetophenome (CN) - Tear gas, causing irritation of eyes, skin, and upper respiratory passages. Has no permanent effects. Used for training and riot control. *See individual agents.*

chemical agent, hexachloroethane mixture (HC) - A smoke-producing agent, consisting of a mixture of grained aluminum, zinc oxide, and hexachloroethane. The smoke is produced by the burning mixture, induced by a suitable ignition charge. Used to produce a screening smoke.

chemical agent, lewisite (L) - A moderately delayed action casualty gas. A blister gas, toxic lung irritant, and systemic poison. Produces immediate and strong stinging sensation of the skin. Dichloro (2-chlorovinyl) arsine.

chemical agent, mustard, distilled (HD) - A delayed action casualty gas. A blister gas, which

acts as cell irritant and cell poison. (Distilled refers to a purifying process greatly reducing the odor, making it harder to detect).

chemical agent, mustard gas (H) - A delayed action casualty gas. A blister gas, which acts as cell irritant and cell poison. Contains about 30 percent sulfur impurities, giving it a pronounced odor.

chemical ammunition - Any ammunition, bombs, projectiles, bullets, flares, etc., containing a chemical agent or agents. Such agents include war gases, smokes, and incendiaries.

crimping - **1.** Mechanical operation on metal or other material by which the material is permanently deformed, usually by small undulations, frills, or wrinkles. **2.** The process by which the cartridge case is secured to the projectile, either by a continuous folding in of the neck of the cartridge case into the crimping groove or by a series of crimps somewhat below the cartridge case mouth. **3.** In blank small arms ammunition, the closing in of the neck of the cartridge case to secure the wadding over the charge.

crimping groove - A groove around a projectile base which provides a means of crimping the cartridge case to the projectile.

cryptographic equipment destroyer, incendiary - An item designed to be filled with an incendiary mixture and to burn cryptographic equipment and associated material.

deflagrate - Exothermic reaction that propagates from burning gases to the unreacted material by conduction, convection, and radiation.

detonator -1. An explosive train component that can be activated by either a nonexplosive impulse or a primer and can reliably initiate high order detonation in a subsequent high explosive component of the train. When activated by a nonexplosive impulse, a detonator includes a primer. In general, detonators are classified by method of initiation; such as percussion, stab, electric, flash, etc. See specific definitions. **2.** An explosive charge placed in certain equipment and set to destroy the equipment under certain conditions.

detonator, electric - Electrical leads and explosive elements for detonating an explosive charge.

detonator, friction - A blasting cap fuse and a pull fuse lighter for detonating an explosive charge.

detonator, percussion - A blasting cap and explosive elements designated for detonating an explosive charge.

detonator, stab - A detonator that initiates the detonation wave in the explosive train by a pin stab.

drill ammunition - Inert ammunition for training the weapons' crew.

firing table - A table giving the data needed for firing a gun accurately on a target under standard conditions. It also includes the corrections that must be made for special conditions, such as winds or variations of temperature.

fixed ammunition - Ammunition with primer and propellant in a cartridge case permanently crimped or attached to a projectile. Loaded into the weapon as a unit. Usually called a cartridge.

flechette - (French, "a small arrow.") **1.** An aerial dart. **2.** A small fin-stabilized missile, a large number of which can be loaded in artillery canister. *See canister.*

folding fin (FF) - A fin on a rocket, missile, etc., hinged to permit outward extension when the missile is in flight.

fuse - A term for an igniting or explosive device in the form of a cord, consisting of a flexible fabric tube and core of low or high explosive. Used for blasting and demolition and in certain munitions. A fuse with black powder or other low explosive core is called a blasting time fuse. A fuse with PETN or other high explosive core is called detonating cord.

fuse, blasting, time - A flexible, water-resistant, fabric-covered cord containing a black powder core that burns at a known rate, providing a time delay proportional to the length of fuse. Used for igniting a blasting cap or an explosive charge.

fuze - A device with explosive components used to initiate a train of fire or detonation in ammunition by an action such as hydrostatic pressure, electrical energy, chemical action, impact, mechanical time, or a combination thereof. Fuzes are used primarily in bombs and projectiles.

fuze, base - Any fuze installed in the base of a projectile.

fuze cavity - A socket or hole in a bomb, projectile, etc., for receiving a fuze or a portion of a fuze.

fuze, combination - A fuze combining two different types of fuze mechanisms, especially one combining impact and time mechanisms.

fuze, dummy - An initiation of a fuze that has the same shape, weight, and center of gravity as the fuze but has no explosives or moving parts. Used for training.

fuze, mechanical time (MT) - A fuze actuated by a clock mechanism preset to a specific time. Excludes fuze, bomb; fuze, mine; and fuze, hand grenade.

fuze, point detonating (PD) - A fuze in the nose of a projectile and designed to be actuated on impact.

fuze, point initiating, base detonating (PIBD) - A fuze with initiating components in the nose of a projectile and detonating components in the base of a projectile, activated on impact.

fuze, proximity, variable time (VT) - A fuze where primary initiation occurs by sensing the

presence, distance, and/or direction of the target through the characteristics of the target itself or its environment.

fuze, safety - Two terms have been commonly used to describe the safety built into a fuze to prevent premature functioning at the time of use and to provide the required safety in transportation. *Bore safety* applies only to fuzes used in artillery or mortar projectiles or rockets, and refers to the safety feature that prevents functioning while the fuze is in the bore of the gun or in the launching tube. Such fuzes are said to be "bore safe." *Detonator safety* relates to fuzes for any application. It refers to the safety feature that prevents functioning of the succeeding element(s) of the explosive train if the detonator functions while the fuze parts are in the safe position. Such a fuze is said to be "detonator safe." In general the terms are interchangeable with respect to artillery, mortar, and rocket fuzes, but bore safety applies only to those types of fuzes.

fuze, superquick (MTSQ) - A fuze that functions with the least possible delay after impact. The delay is in microseconds.

G-agent - Any one of a group of war gases known as nerve gases. The group is known as the "G-series."

gauge - The interior diameter of the barrel of a shotgun expressed by the number of spherical lead bullets fitting it that make a pound; as a twelve-gauge shotgun.

gilding metal - A copper alloy used to jacket small arms bullets, to form detonator or primer cups, and to form rotating bands for artillery projectiles. This metal can be easily engraved by the lands as the projectile moves down the bore. Gilding metal is approximately 90 percent copper and 10 percent zinc.

grenade - A small explosive or chemical missile, originally to be thrown by hand, but now also to be projected from special grenade launchers, usually fitted to rifles or carbines. Grenades may be classified as either rifle or hand. Many variations of these have been used, including improvisations.

grenade, chemical - A general term for any grenade filled with a chemical agent.

grenade, chemical, burning - A general term for any grenade that releases its agent by bursting.

grenade, illuminating - A grenade to be placed or projected and to light up an area by burning. It may be used also as a trip flare or as a incendiary device.

grenade, incendiary - A grenade filled with incendiary materials used to start fires or used primarily for incendiary purposes.

grenade, practice - A grenade used for practice. The grenade may contain a small charge of black powder to give a puff of smoke when it goes off.

grenade, riot - A grenade of plastic or other nonfragmenting material, containing a charge of tear gas and a detonating fuze with short delay. When the grenade functions, the gas is released by bursting.

grenade, smoke - A grenade containing a smoke-producing mixture used for screening or signaling. Sometimes charged with colored smoke.

grenade, training - An inert hand grenade used in throwing training. Formerly called dummy grenade.

grenade, white phosphorus - A grenade that contains a main charge of white phosphorus and a small explosive burster charge for scattering the main charge. Used for smoke and some incendiary effect.

grommet - A device made of rope, plastic, rubber, or metal to protect the rotating band of projectiles.

hypervelocity armor-piercing discarding sabot (HVAPDS) - A type of HVAP projectile in which the sabot will become separated from the core a short distance from the muzzle of the gun. Separation of the sabot from the core means the core becomes a freeflight projectile with lowered air resistance.

igniter - Any device, chemical, electrical, or mechanical, used to ignite.

igniter, time blasting fuse - A device containing a firing mechanism and suitable ignition material for igniting a blasting time fuse.

igniter train - A step-by-step arrangement of charges in pyrotechnic munitions so that the initial fire from the primer is transmitted and intensified until it sets off the main charge.

illuminant composition - A mixture of materials for use in the candle of a pyrotechnic device, producing a high-intensity light.

increment - An amount of propellant added to, or taken away from, a propelling charge of semifixed or separate loading ammunition to allow for differences in range. Increments are commonly packed in propellant bags made of cartridge cloth.

inert - Descriptive of condition of a munition, or component thereof, which contains no explosive, pyrotechnic, or chemical agent.

irritant gas - A nonlethal gas that irritates the skin and makes tears flow. Any one of the family of tear gases used for training and riot control.

linked ammunition - Cartridges fastened to one another side by side with metal links, forming a belt that feeds easily into a machine gun.

low explosive (LE) - An explosive that, when used in its normal manner, deflagrates or burns rather than detonates. That is, the rate of advance of the reaction zone into the unreacted material is less than the velocity of sound in the unreacted material. Low explosives include propellants, certain primer mixtures, black powder, photoflash powders, and delay compositions.

Whether an explosive reacts as a high explosive or a low explosive depends on how it is initiated and confined. For example, a double base propellant, when initiated in the usual manner, is a low explosive. However, this material can be made to detonate if the propellant is initiated by an intense shock. Conversely, a high explosive like TNT, under certain conditions, can be ignited by flame and will burn without detonating.

low-order burst - The functioning of a projectile or bomb when the explosive fails to attain a high-order detonation. Usually evidenced by the breaking of the container into a few large fragments instead of a large number of small fragments.

mine - An encased explosive or chemical charge designed to be positioned so that it detonates when its target touches or moves near it or when touched off by remote control. General types are land and underwater.

mine, antipersonnel (APERS) - A land mine for use against personnel, made with a small amount of high explosive, generally less than 1 pound, in a metallic or nonmetallic container. It is fitted with a detonating fuze arranged for actuation by pressure or release of pressure by pull on a trip wire, or by release of tension (cutting) of a taut wire. Two types are available, the blast type, which explodes in place, and the bounding type (called a bounding mine), which projects a

fragmenting body into the air that, upon detonation, scatters fragments over a wide area.

mine, antitank (AT) - A land mine that is an explosive charge in a metallic or nonmetallic case, with provision for a main fuze, and usually for secondary antiremoval fuzes. Designed to function when a tank or other vehicle runs over it. Provided with a charge designed to produce disabling effects on a tank.

mine, land - A container filled with high explosive or chemicals, placed on the ground or lightly covered, and fitted with a fuze or a firing device or both. It is usually set off by the weight of vehicles or troops passing over it.

napalm (NP) - Powdered aluminum soap used to gelatinize oil or gasoline for napalm bombs or flame throwers.

nerve gas - A chemical agent absorbed into the body by breathing, by ingestion, or through the skin. Affects the nervous and respiratory systems and various body functions.

ogive - The curved or tapered front of a projectile. As a geometric body, a convex solid of revolution in which the generating area is bounded by an arc of a circle the center of which lies on the side of the axis or revolution opposite to the arc. When applied to a projectile contour the radius of the arc is expressed in caliber, such as a 7-caliber ogive. With a bullet, bomb, or other projectile having a fuze forming the nose, the ogive is included between a point where the projectile begins to curve or taper and a point on

the line where fuze and body meet. In other types of projectiles, the nose of the projectile is included as part of the ogive.

practice ammunition - Ammunition used for target practice or similar types of training. For gun and rocket type weapons, practice ammunition contains a propelling charge and either an inert filler or a spotting charge in the projectile. Other types of practice ammunition, such as bombs or mines, usually contain a spotting charge or some form of charge to indicate functioning.

primer - **1.** A relatively small and sensitive initial explosive train component. When it is actuated, it initiates functioning of the explosive train. It does not reliably initiate high explosive charges. In general, primers are classified in accordance with the method of initiation; percussion, stab, electric, friction, etc. **2.** Refers to the assembly which ignites propelling charges.

primer, artillery - A primer that ignites the propellant charge of an artillery weapon. In ammunition using a cartridge case, the primer is in the cartridge case. For separate loading ammunition, the primer is inserted in the breech block. It is a charge of heat producing material, such as black powder, together with means for igniting the charge, and a metal housing so it can be handled as a unit. Artillery primers are classified by the method of initiation, as percussion, electric, friction, and combination percussion-electric.

primer, electric - A primer for electric current initiation.

primer, electric and percussion - A primer for initiation either by impact of a firing pin or by electric current.

primer, friction - A primer fixed by pulling a toothed wire or plug through an explosive mixture.

primer mixture - An explosive mixture containing a sensitive explosive and other primer ingredients.

priming composition - A mixture of materials that is very sensitive to impact or percussion and, when so exploded, undergoes very rapid autocombustion. The products of such an explosion are hot gases and incandescent solid particles. Priming compositions are used to ignite primary high explosives, black powder igniter charges, propellants in small arms ammunition, etc.

projectile, dummy - A projectile that has no explosive charge. Dummy projectiles are used for practice and training.

projectile, high explosive plastic (HEP) - A thin-walled projectile, filled with plastic explosive. The projectile "squashes" against an armed target before detonation, and defeats the armor by producing spans which are detached with considerable velocity from the back of the target plate.

projectile, illuminating - A projectile, with a time fuze, that releases a parachute flare at any desired height. Used for lighting up an area.

propellant - A propellant agent: specifically, a low-explosive substance or mixture, which, by burning, produces gases at controlled rates and provides the energy necessary to propel a projectile or missile. Propellants are either liquid or solid. Liquid propellants, used primarily in rocket engines, may be classified as monopropellants, bipropellants, and sometimes multipropellants, depending on the number of unmixed chemicals fed into the combustion chamber. Solid propellants, used primarily in guns and rocket motors, are classified by the number of basic explosives they contain. A single base propellant contains only one explosive ingredient. A common example of this is pyropropellant. A double-base propellant contains two explosive ingredients, commonly nitrocellulose and nitroglycerin. Ballistite, the standard propellant used in US mortars, is double based.

propellant powder - A low explosive of fine granulation that, by burning, produces gases at a controlled rate thus providing energy for propelling a projectile. Restricted to small arms propellants, for which the grain size is small. In larger grain form it is called simply propellant.

pyrotechnic signal - Signal *(see signal)* designed

for military use to produce a colored light or smoke, signifying some kind of information.

pyrotechnics - Military and nonmilitary items that produce a bright light for illumination, or colored lights or smoke for signaling. Pyrotechnics are consumed in their use.

quickmatch - Fast burning fuse made from a cord impregnated with black powder.

recoilless ammunition - Ammunition intended for use in recoilless rifles. Provision is made in the ammunition for release of propellant gases so there will not be any recoil.

renovation - Restoration of ammunition to serviceability condition by operations more extensive or hazardous than reconditioning. Usually means replacement of components.

rocket, aircraft (AR) - A rocket especially designed to be launched from an airplane.

sabot - Lightweight carrier in which a subcaliber projectile is centered to permit firing the projectile in the larger caliber weapon. The sabot diameter fills the bore of the weapon from which the projectile is fired. One common type of sabot is discarded a short distance from the muzzle and is known as a discarding sabot. A sabot is used with a hypervelocity armor-piercing projectile having a tungsten carbide core. In this case, the core is considered the subcaliber projectile.

saluting ammunition - In cartridge nomenclature, a cartridge, blank intended for salutes.

screen, smoke - A smoke cloud produced by chemical agents or smoke generators. Used to conceal friendly troops and/or to deny observation by enemy troops.

semifixed ammunition - Ammunition in which the cartridge case is not permanently fixed to the projectile, so that the zone charge *(see zone charge)* within the cartridge case can be adjusted for the desired range. Semifixed ammunition is loaded into the weapon as a unit.

sensitivity - The characteristic of an explosive component which expresses its sensitivity to initiation by externally applied energy.

separate loading ammunition - Ammunition in which the projectile, propellant charge (bag loaded), and primer are handled and loaded separately into the gun. There is no cartridge case with this type of ammunition.

setback - The relative rearward movement of component parts in a projectile, missile, or fuze as it moves forward during its launching. These movements, and the setback force which causes them, are used in the arming and eventual functioning of the fuze.

set forward - The relative forward movement of components that occurs in a projectile, missile, or bomb in flight when it impacts. The effect is due to inertia and is opposite to "setback" *(see setback).*

shear pin - A pin or wire in a fuze, designed to hold parts in fixed positions until forces exerted

on one or more of the parts are enough to shear the pin or wire. Setback or set forward (impact) forces usually cause shearing. The shear member is kept from breaking during transportation by a safety device.

shoulder, case - The portion of the cartridge case between the neck and the body.

signal - A pyrotechnic that produces a sign by illumination, smoke, sound, or a combination of these effects to provide identification, location, warning, etc.

signal, illumination - A pyrotechnic that produces a sign with light to provide identification, location, warning, etc.

signal, smoke - A pyrotechnic that produces a sign with smoke to provide identification, location, warning, etc.

simulator, booby trap - Used during maneuvers and in troop training to provide a small pyrotechnic device that can be installed as a "safe" booby trap. Used to give training in installing and using booby traps and in impressing the need for caution in troops who may be exposed to booby traps.

small arms ammunition - Ammunition for small arms; rounds of a caliber up to and including 30 millimeters (1.181 in).

spall -1. Fragment(s) torn from either surface of armor plate, as the result of the impact of kinetic energy ammunition or the functioning of chemical energy ammunition. **2.** Specifically, a

small explosive device that looks like a detonator *(see detonator)* but loaded with low explosive, so that its output is primarily heat (flash). It is usually electrically initiated and initiates the action of pyrotechnic devices and rocket propellants.

standoff - In shaped charge ammunition: the distance or spacing between the base of the liner and the target at the time of initiation. Built-in standoff is determined by the spacing between the base of the liner and the impact surface of the tip of the projectile. Free space is determined by the same distance at the time of functioning, allowing for the nose crushing. Air space refers to the same spacing in underwater weapons.

star - A pyrotechnic that burns as a single light.

starting mix - In pyrotechnics, an easily ignited mixture that transmits flame from an initiating device to a less readily ignitible composition.

sustainer - A propulsion system that travels with, and does not separate from, the missile. Usually applied to a rocket motor or rocket engine when used as the principal propulsion system—as distinguished from an auxiliary system, such as the JATO unit.

sympathetic detonation - Explosion caused by a detonation wave from another explosion.

tear gas - A chemical which burns and causes a powerful lachrimal effect (tears) and also affects the upper respiratory system.

triple base propellant - Propellant *(see propellant)* with three principal active ingredients, such as nitrocellulose, nitroglycerin, and nitroguanidine.

unarmed - The condition of a fuze (or other firing device) in which the necessary steps to make it function have not been taken. It is when the fuze is safe for handling, storing, and transporting. The fuze is partially armed if only some of the steps have taken place.

warhead - That portion of a rocket or guided missile that contains the load that the vehicle is to deliver. It may be empty or contain high explosives, chemicals, instruments, or inert materials. It may also include a booster, fuze(s), adaption kits, and/or buster.

web - In a grain of propellant, the minimum thickness of the grain between any two adjacent surfaces is called the web or the web thickness. In a cord the diameter is the web. In a single perforated grain there is one web, but a multiperforated grain there is an inner web and an outer web. The mean of these values is known as the average web. In designs of solid or single perforated grains, the propellant is entirely consumed when the web is burned through. In multiperforated grains this is not true; slivers are formed at this stage, which then burn to completion.

weight zone - A classification of certain projectiles of 75 millimeters and larger into groupings

(zones) by weight. The weight zone is painted on each projectile as crosses or squares.

white phosphorus (WP) - See chemical ammunition.

zone charge - The number of increments of propellant in a propellant charge of semifixed rounds, corresponding to the intended zone of fire. For example, zone charge 5 has 5 increments of propellant.

ABBREVIATIONS

ACC	ammunition condition code
ACR	Ammunition Condition Report
ADP	automatic data processing
AP	ammunition point, armor piercing
APERS	antipersonnel mine
AR	aircraft rocket
ARTEP	Army Training and Evaluation Program
ASP	ammunition supply point
AT	antitank mine
ATP	ammunition transfer point
BE	base ejection
BP	black powder
CN	chloroacetophenome
cnstr	canister
COMMZ	communications zone
CONUS	Continental United States

COSCOM	corps support command
CSA	corps storage area
CSR	controlled supply rate
ctg	cartridge
DA	Department of the Army
DAO	division ammunition officer
DISCOM	division support command
DOD	Department of Defense
DODAAC	DOD activity address code
DODAC	DOD Ammunition Code
DODESB	DOD Explosive Safety Board
DODIC	DOD identification code
DS	direct support
DSR	depot surveillance record
EOD	explosive ordnance disposal
FF	folding fin
FM	field manual
FSU	field storage unit
GMLR	guided missile/large rocket
GS	general support
H	mustard gas
HC	hexachlorethane
HD	distilled mustard gas
HE	high explosive
HEP	high explosive plastic
HEAT	high explosive, antitank
HVAP	hypervelocity armor piercing
IAR	inventory adjustment report

IAW	in accordance with
ICM	improved conventional munitions
L	lewisite
LE	low explosive
MCC	movement control center
MHE	materials handling equipment
MLRS	Multiple Launch Rocket System
MMC	Material Management Center
MSR	main supply route
MT	mechanical time (fuze)
MTSQ	mechanical time superquick (fuze)
NBC	nuclear, biological, chemical
NEW	net explosive weight
NP	napalm
NSN	national stock number
PD	point detonating fuze
PIBD	point initiating, base detonating (fuze)
PWP	plasticized white phosphorus
QA/QC	quality assurance/quality control
QD	quantity distance
RAP	rear area protection
RSR	required supply rate
RT	rough terrain
RTCC	rough terrain container crane
RTCH	rough terrain container handler
RTFL	rough terrain fork lift
S&P	stake and platform

S&T BN	supply and transportation battalion
SIMU	suspended from issue, movement and use
SIU	suspended from issue and use
SOP	standing operating procedure
SPI	special inspections
ST	short ton
STANAG	Standardization Agreement
TAACOM	Theater Army Area Command
TB	technical bulletin
TCMD	transportation control movement document
TM	technical manual
TMO	transportation movement officer
TO	transportation order
TOE	table of organization and equipment
TSA	theater storage area
UBL	unit basic load
UIC	unit identification code
VT	variable time, proximity (fuze)
WARS	Worldwide Ammunition Reporting System
WP	white phosphorous

References

ARMY REGULATIONS (AR)

55-38	Reporting of Transportation Discrepancies in Shipments
55-228	Transportation by Water of Explosives and Hazardous Cargo
55-355	Military Traffic Management Regulation
75-1	Malfunctions Involving Ammunition and Explosives
75-15	Responsibilities and Procedures for Explosive Ordnance Disposal
95-50	Airspace and Terminal Instrument Procedures
190-11	Physical Security of Arms, Ammunition and Explosives
385-10	Army Safety Program
385-30	Safety Color Code Markings and Signs
385-40	Accident Reporting and Records
385-60	Coordination with Department of Defense Explosives Safety Board
385-64	Ammunition and Explosives Safety Standards
385-65	Identification of Inert Ammunition and Ammunition Components
700-58	Packing Improvement Report

700-64	Radioactive Commodities in the DOD Supply Systems
702-6	Ammunition Stockpile Reliability Program (ASRP)
710-2	Supply Policy Below the Wholesale Level
710-9	Guided Missile and Large Rocket Ammunition Issues, Receipts and Expenditure Reports
725-50	Requisitioning, Receipt, and Issue System
735-11-2	Reporting of Item and Packaging Discrepancies
740-1	Storage and Supply Activity Operations
740-32	Responsibilities for Technical Escort of Dangerous Materials (OPNAVINST 8070.1 AFR 136-4/ MCO 4030.25)
755-2	Disposal of Excess, Surplus, Foreign Excess, Captured, and Unwanted Materiel

BUREAU OF EXPLOSIVES' (BOE) TARIFF

6000	Bureau of Explosives. Tariff (BOE, 1920 L Street, NW, Washington, DC 20036)

DEPARTMENT OF THE ARMY (DA) FORMS

285	US Army Accident Investigation
581	Request for Issue and Turn-In of Ammunition

984	Munition Surveillance Report
1687	Notification of Delegation of Authority - Receipt for Supplies
2028	Recommended Changes to Publications and Blank Forms
2415	Ammunition Condition Report
3151-R	Ammunition Stores Slip

DEPARTMENT OF THE ARMY (DA) LABEL

85	Storage and Care of Explosives (Magazines Placard)

DEPARTMENT OF THE ARMY PAMPHLETS (DA Pam)

75-5	Index of Storage and Outloading Drawings for Ammunition
310-1	Consolidated Index of Army Publications and Blank Forms
710 series	(No title)
738-750	The Army Maintenance Management System (see latest edition)

DEPARTMENT OF DEFENSE (DOD)

	Consolidated Data Ammunition Catalog, Volumes 1, 2, and 3 (Microfiche)

DEPARTMENT OF DEFENSE (DD) FORMS

626	Motor Vehicle Inspection
836	Special Instructions for Motor Vehicle Drivers

1348-1	DOD Single Line Item Release/ Receipt Document
1384	Transportation Control and Movement Document
1387-2	Special Handling Data/Certification

DEPARTMENT OF DEFENSE REGULATION (DOD REG)

4500.32R	Military Standard Transportation and Movement Procedures (Volumes 1 and 2)
5100.76M	Physical Security of Sensitive Conventional Arms, Ammunition, and Explosives

DEPARTMENT OF DEFENSE STANDARD (DOD...STD)

6055.9	Ammunition and Explosive Safety Standards (Assistant Secretary of Defense; Manpower, Installations, and Logistics; ATTN: DOD Explosives Safety Board, Washington, DC 20025)

FIELD MANUALS (FM)

3-9	Military Chemistry and Chemical Compounds
5-20	Camouflage
5-25	Explosives and Demolitions
9-6	Ammunition Service in the Theater of Operations

9-15	Explosive Ordnance Disposal Service and Unit Operations
9-16	Explosive Ordnance Reconnaissance
9-38	Conventional Ammunition Unit Operations
19-30	Physical Security
21-11	First Aid for Soldiers
55-40	Army Combat Service Support Air Transport Operations
55-70	Army Transportation Container Operations

MILITARY STANDARDS (MIL-STD)

12	Abbreviations for Use on Drawings and Technical Type Publications (Director; AMC Packaging, Storage, and Containerization; Tobyhanna Army Depot; Tobyhanna; PA 18466)
129H	Military Standard - Marking for Shipment and Storage (see address directly above).
444	Ammunition Terms (Standardization Division, Armed Forces Supply Support Center, Washington, DC 20025)
709C	Ammunition Color Coding (Commander, Picatinney Arsenal, ATTN: SARPA-AD-E-C-3, Dover, NJ 07801)

1168-A	Military Standard Ammunition Lot Numbering (Commander, Picatinney Arsenal, ATTN: SARPA-QA-A-P, Dover, NJ 07801)

STANDARD FORM (SF)

364	Report of Discrepancy (ROD)
431	Placard, Explosive A
432	Placard, Explosive B

SUPPLY BULLETINS (SB)

3-30-series	(Serviceability standard for CB materiel)
38-26	Nonnuclear Ammunition Supply Rates (U)
38-100	Preservation, Packaging, Packing, and Marking Materials, Supplies, and Equipment Used by the Army
700-20	Army Adopted/Other Items Selected for Authorization/List of Reportable Items
708-3	Department of Defense Ammunition Code
708-21	Federal Supply Classification Part I, Groups and Classes
742-1	Ammunition Surveillance Procedures
742-1300-94-2	Propellant and Propelling Charges Ammunition Surveillance Procedures

755-140-1	Disposition of Used Ammunition Packing Material and Certain Specified Ammunition Components

SUPPLY CATALOGS (SC)

4925-95-CL-A03	Shop Equipment, Ammunition Renovation Field Maintenance Detachment, Less Power
4940-95CL-11	Tool Set, Ammunition: Field Maintenance Ordnance Ammunition Company

TECHNICAL BULLETINS (TB)

MED 502	Occupational and Environmental Health Respiratory Protection Program
9-1300-256	Ammunition: National Stock Numbers and Department of Defense Codes
9-1300-385	Munitions Suspended or Restricted
34-9-114	Marking of Ammunition and Its Packaging of Caliber Below 20 mm
385-2	Nuclear Weapons Firefighting Procedures
700-2	Department of Defense Explosives Hazard Classification Procedures
700-8010-1	Military Handbook: Protective Finishes

TECHNICAL MANUALS (TM)

3-240	Field Behavior of Chemical, Biological, and Radiological Agents

3-250	Storage, Shipment, Handling, and Disposal of Chemical Agents and Hazardous Chemicals
3-366	Flame Fuels
5-200	Camouflage Materials
5-280	Foreign Mine Warfare Equipment
5-315	Firefighting and Rescue Procedures in Theaters of Operation
9-500	Data Sheets For Ordnance Type Materials (US Army Armament, Munitions, and Chemical Command, Rock Island, IL 61299)
9-1300-200	Ammunition, General
9-1300-206	Ammunition and Explosives Standards
9-1300-214	Military Explosives
9-1300-250	Ammunition Maintenance
9-1345-203-12&P	Operator's and Organizational Maintenance Manual (Including Repair Parts and Special Tools List): Land Mines
9-1370-203-20&P	Operator's and Organizational Maintenance Manual (Including Repair Parts and Special Tools List) for Military Pyrotechnics
9-1375-213-12	Operator's and Organizational Maintenance Manual (Including Repair Parts and Special Tools List): Demolition Materials
9-1901-1	Ammunition for Aircraft Guns

38-L69-11-1	Standard Army Ammunition System (SAAS) Level 4 Manual: System Stock Control Procedures*
38-230-1	Packaging of Materiel: Preservation (Vol I)
38-230-2	Packaging of Materiel: Preservation (Vol II)
38-250	Packaging and Materials Handling Preparation of Hazardous Materials for Military Air Shipment
43-0001-27	Army Ammunition Data Sheets for Small Caliber Ammunition
43-0001-28	Army Ammunition Data Sheets for Artillery Ammunition; Guns, Howitzers, Mortars, Recoilless Rifles, Grenade Launchers, and Artillery Fuzes
43-0001-29	Army Ammunition Data Sheets for Grenades
43-0001-30	Army Ammunition Data Sheets for Rockets, Rocket Systems, Rocket Fuzes, and Rocket Motors
43-0001-36	Army Ammunition Data Sheets for Land Mines
43-0001-37	Army Ammunition Data Sheets: Military Pyrotechnics
43-0001-38	Army Ammunition Data Sheets for Demolition Materials

* This TM is being rescinded. It is now Chapter 25, DA Pam 710-2-2. The Supply Support Activity (SSA) Supply System.

743-200-1 Storage and Materials Handling

US ARMY MATERIEL COMMAND (DARCOM/AMC) DRAWING

19-48-4116 - 20-PA10002 (Director, US Army Defense Ammunition Center and School, ATTN: SARAC-DEO, Savannah, IL 61074)

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NOTES:

1. Explosives, class A, and explosives, class B, must not be loaded or stored with chemical ammunition containing incendiary charges or white phosphorus either with or without bursting charges.
2. Bursters (explosive), boosters (explosive), or supplementary charges (explosive) without detonators when shipped by, to, or for the Departments of the Army, Navy, and Air Force of the United States Government may be loaded with any of the articles named except those in columns c, d, 3, 9, 11, 12, 13, 14, 15, and 16.
3. Detonators, class C explosives, may also be loaded and transported with articles named in columns 3, 9, 11, 12, 13, and 14. Loading and transportation of detonating primers, or detonators, except as prescribed in § 177.835, in any quantity with articles named in columns b, c, e, or f is prohibited.
4. Does not include blasting agents; ammonium nitrate-fuel oil mixtures; ammonium nitrate, fertilizer grade, which may be loaded, transported, or stored with high explosives or with detonators containing not more than 1 gram of explosive each, excluding ignition and delay charges.
5. Corrosive liquids must not be loaded above or adjacent to flammable solids, oxidizing materials, ammunition for cannon with or without projectiles, or propellant explosives, except that shippers loading truckload shipments of corrosive liquids and flammable solids or oxidizing materials packages who have obtained prior approval from the Department may load such materials together when it is known that the mixture of contents would not cause a dangerous evolution of heat or gas.
6. Normal uranium, depleted uranium, and thorium metal in solid form may also be loaded and transported with articles named in columns a, b, c, d, e, f, and g.

Instructions:

The letter X at an intersection shows that these materials must NOT be loaded or stored together. Example: Detonating fuzes, class A, with or without radioactive components, (g), must not be loaded or stored with high explosives or propellant explosives, (b).

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