
**Ammunition and Explosives Handler Safety
Techniques**

NOVEMBER 2021

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Ammunition and Explosives Handler Safety Techniques

Contents

	Page
PREFACE	v
INTRODUCTION	vii
Chapter 1 GENERAL AMMUNITION AND EXPLOSIVE SAFETY	1-1
Section I – Fundamentals of Ammunition and Explosives Safety	1-1
General Ammunition and Explosive Safety.....	1-1
Joint and Multinational Ammunition and Explosive Operations.....	1-4
Explosive Safety Management Program.....	1-5
Standard Operating Procedures.....	1-7
Section II – Risk Management in Ammunition and Explosive Operations	1-8
Safe Ammunition and Explosive Handling Principles.....	1-8
Hazards Associated with Ammunition and Explosives Operations.....	1-8
Unexploded Explosive Ordnance Hazards.....	1-11
Accident and Incident Control Plans.....	1-12
Reporting Ammunition and Explosive Malfunctions.....	1-12
Chapter 2 ARMS AND AMMUNITION TRANSPORTATION SAFETY	2-1
Transportation of Hazardous Material.....	2-1
Surface Transportation.....	2-3
Air Transportation.....	2-4
Chapter 3 STORAGE SAFETY	3-1
Section I – Ammunition Support Activities	3-1
Theater Ammunition Supply Point.....	3-1
Ammunition Supply Point.....	3-2
Section II – Ammunition Transfer Points	3-2
Section III – Storage Safety Principles	3-3
Storage Compatibility Groups.....	3-4
Explosives Safety Quantity Distance.....	3-4
Environmental Considerations.....	3-4
Section IV – Storage Area Planning	3-5
Site Selection.....	3-5
Assessing Tactical Requirements.....	3-6
General Layout.....	3-6

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	Layout Considerations	3-9
	Unserviceable Ammunition and Explosives Storage	3-11
	Suspended Ammunition and Explosives Storage	3-11
	Captured Enemy Ammunition Storage	3-12
	Salvage and Packing Storage.....	3-13
Chapter 4	MAINTENANCE SAFETY AND SURVEILLANCE	4-1
	Section I – Ammunition and Explosives Maintenance.....	4-1
	Field Maintenance.....	4-1
	Sustainment Maintenance	4-2
	Maintenance Standard Operating Procedures	4-2
	Techniques and Considerations for Handling Contaminated Ammunition and Explosives	4-2
	Section II – Surveillance Operations.....	4-3
	Surveillance Functions	4-3
	Surveillance Inspections	4-4
	Section III – Emergency Destruct Operations.....	4-5
	Approval Authority.....	4-5
	Considerations for Emergency Destruction	4-5
	Planning for Emergency Destruction	4-6
	Safety	4-6
	Methods of Destruction	4-7
Chapter 5	FIRE PROTECTION, PREVENTION, AND SAFETY AWARENESS	5-1
	Section I – Fire Protection Program.....	5-1
	Fire Prevention.....	5-1
	Standard Operating Procedures	5-1
	Pre-Fire Plan	5-2
	Training	5-2
	Safety Violations	5-3
	Common Hazards	5-3
	Procedures for Ammunition and Explosives - Laden Vehicles	5-3
	Auxiliary Firefighting Equipment	5-3
	Section II – Fire Hazards and Symbols.....	5-4
	Fire Divisions and Classes.....	5-4
	Fire Division Symbols.....	5-8
	Posting Fire Symbols	5-8
	Section III – Chemical Hazards and Symbols	5-8
	Symbol 1, Wear Full Protective Clothing	5-9
	Symbol 2, Wear Breathing Apparatus.....	5-9
	Symbol 3, Apply No Water.....	5-9
Appendix A	BRASS CONVERSION	A-1
Appendix B	AMMUNITION IDENTIFICATION.....	B-1
Appendix C	STORAGE COMPATIBILITY GROUPS.....	C-1
	SOURCE NOTES	Source Notes-1
	GLOSSARY	Glossary-1
	REFERENCES.....	References-1
	INDEX	Index-1

Figures

Figure 1-1. Un-barricaded blast effects based on quantity and distance	1-3
Figure 1-2. Barricaded blast effects based on quantity and distance	1-4
Figure 3-1. Basic load ammunition holding area for other than peacetime operations.....	3-9
Figure 3-2. Installation of roof support in an end-opening container.....	3-11
Figure 5-1. Fire division symbol	5-8
Figure 5-2. Supplemental chemical hazard symbols	5-9
Figure 5-3. Protective clothing and apparatus	5-10
Figure B-1. Typical lot number system.....	B-1
Figure B-2. Sample Department of Defense Identification Code (DODIC).....	B-2
Figure B-3. Example of a Department of Defense Ammunition Code (DODAC).....	B-3

Tables

Table 5-1. Fire extinguishing agents	5-4
Table 5-2. Fire divisions and hazard classes	5-5
Table 5-3. Fire symbol hazards and actions	5-5
Table 5-4. Emergency withdrawal distances for nonessential personnel	5-7
Table A-1. Brass conversion chart	A-1
Table B-1. Federal supply class group 13 classes.....	B-2
Table B-2. Ammunition color code, MIL-STD-709D.....	B-4
Table B-3. Application of color-codes for particular ammunition items	B-5
Table C-1. Mixing storage compatibility groups	C-3

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Preface

ATP 4-35.1 provides procedures and safety considerations for handling ammunition and explosives at all levels, regardless of military occupational specialty (MOS) or type of unit.

The principal audience for ATP 4-35.1 is all members of the profession of arms. Commanders and staffs of Army headquarters serving as joint task force or multinational headquarters should also refer to applicable joint or multinational doctrine concerning the range of military operations and joint or multinational forces. Trainers and educators throughout the Army will also use this publication.

Commanders, staffs, and subordinates must ensure that their decisions and actions comply with applicable United States (U.S.), international, and in some cases host-nation laws and regulations. Commanders at all levels will ensure that their Soldiers operate in accordance with the law of armed conflict and applicable rules of engagement. (See FM 6-27/MCTP 11-10C)

ATP 4-35.1 uses joint terms where applicable. Selected joint and Army terms and definitions appear in both the glossary and the text. For other definitions shown in the text, the term is italicized and the number of the proponent publication follows the definition.

ATP 4-35.1 applies to the Active Army, Army National Guard/Army National Guard of the United States and United States Army Reserve unless otherwise stated.

The proponent of ATP 4-35.1 is the United States Army Ordnance School. The preparing agency is the United States Army Combined Arms Support Command, G3 Doctrine Division. Send comments and recommendations on Department of the Army (DA) Form 2028, (*Recommended Changes to Publications and Blank Forms*), to Commander, United States Army Combined Arms Support Command, ATTN: ATCL-TS (ATP 4-35.1), 2221 A Avenue, Fort Lee, VA 23801; or submit an electronic DA Form 2028, by e-mail to: <mailto:usarmy.lee.tradoc.mbx.lee-cascom-doctrine@mail.mil>.

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Introduction

Soldiers, Civilians, and contractors who handle ammunition and explosives for the Army perform a vital role in keeping their units and Army personnel safe while maintaining and providing the effective ammunition and explosives needed to accomplish the mission. Ammunition and explosives handlers, as identified in this manual, include any person who plays a role in handling, storing, moving, and maintaining ammunition and explosives. This includes professional ammunition and explosives handlers such as ammunition officers, technicians, noncommissioned officers, and Soldiers; quality assurance specialists (ammunition surveillance) (QASAS); Civilian munition handlers or managers, and quality assurance/quality control (QA/QC) ammunition inspectors. It also includes any individual tasked to handle ammunition and explosives, regardless of branch or MOS.

This manual is intended to provide ammunition and explosives handlers the information necessary to safely perform ammunition and explosives operations and fully support the operational requirement. The primary focus of ammunition and explosives safety is to reduce the probability and limit the damage caused by unintended initiation. Safety, fire protection, prevention, and safety awareness during ammunition and explosives operations is every Soldier's responsibility. Reader should follow the guidelines in this publication as closely as possible within the constraints and restrictions of the operational or tactical environment.

ATP 4-35.1 contains five chapters.

Chapter 1 describes the role of ammunition and explosives operations within the framework of unified land operations and the sustainment warfighting function. It provides general ammunition and explosives safety principles, and identifies key personnel responsible for assisting units in implementing safety requirements.

Chapter 2 discusses safety considerations related to the transportation of ammunition and explosives. It addresses different considerations and requirements when transporting ammunition and explosives by air, land, or sea.

Chapter 3 discusses safety considerations related to the storage of ammunition and explosives. It addresses the planning considerations leaders should follow when designing and constructing ammunition and explosives storage facilities, as well as basic storage safety principles that leaders at all levels should follow as mission variables permit.

Chapter 4 discusses safety considerations related to the maintenance of ammunition and explosives. It addresses the planning considerations leaders should follow when renovating, modifying, preserving or packaging ammunition and explosives during the range of military operations.

Chapter 5 discusses fire safety and prevention.

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Chapter 1

General Ammunition and Explosive Safety

Ammunition and explosives (AE) are a fundamental component of military operations. They enable commanders to discriminately apply lethal and nonlethal force against an adversary in support of decisive action and unified land operations. Because handling, storing, transporting, and maintaining AE is an inherently dangerous operation, leaders and Soldiers at all levels, regardless of branch or MOS, must understand the basic tenants of AE safety.

SECTION I – FUNDAMENTALS OF AMMUNITION AND EXPLOSIVES SAFETY

1-1. The Army strategic contexts provide Army forces with a useful framework for units below the theater army level for the range of operations in the land domain. The Army strategic contexts provide guidance addressing the appropriate planning, preparation and execution of operations across competition, crisis, and conflict. They provide a framework that enables appropriate preparation for and execution of operations that contribute to how Army forces attain operational objectives.

1-2. The ability to apply lethal force is fundamental across the span of the Army Operational Contexts, and is enabled through effective, synchronized, and safe AE operations. Providing safe ammunition and explosive transportation, storage, and distribution is relevant to the force whether being utilized for effective training, the quick transition from crisis to conflict, or in the application of lethal force during any scale conflict. While AE operations are a component of the sustainment warfighting function, the safe and effective employment of AE is a shared responsibility of all Soldiers, regardless of branch or MOS. For more information about the AE distribution system, refer to ATP 4-35, *Munitions Operations and Distribution Techniques*.

GENERAL AMMUNITION AND EXPLOSIVE SAFETY

1-3. Safety is an inherent responsibility of commanders, leaders, Soldiers, and Department of the Army Civilians at all levels. Under the Army Safety Program, commanders have a specific responsibility to develop, implement, and ensure compliance with unit safety programs and all Department of Defense, federal, state, and local laws, regulations, and safety requirements. Leaders, supervisors, Soldiers, and Department of the Army Civilians share a general responsibility to maintain a safe workplace, employ risk management throughout the military operations process, and comply with laws, regulations, and unit safety programs. *Risk management* is the process to identify, assess, and control risks and make decisions that balance risk cost with mission benefits (JP 3-0).

1-4. Proper AE safety protects Army personnel from injury or loss of life, and protects Army property and equipment from damage or destruction. Army regulation AR 385-10, *The Army Safety Program*, and Department of the Army (DA) Pam 385-64, *Ammunition and Explosive Safety Standards* establish safety standards for all units and personnel tasked with an AE or explosive mission, to include the production, transportation, storage, inspection, maintenance, handling, use, demilitarization, and disposal of AE. Additional guidance is provided in Defense Explosive Safety Regulation (DESR) 6055.09, *Defense Explosive Safety Regulation* and DA Pam 385-30, *Safety Risk Management*. These are applicable to all Army personnel, both professional and non-professional AE handlers alike.

1-5. The stipulations of AR 385-10, DA Pam 385-30, DA Pam 385-64, and DESR 6055.09 apply during both peacetime, contingency operations and times of war. These regulations are not intended to restrict a unit's ability to accomplish its mission. While authoritative, Army regulations allow commanders to accept risk in deviating from established safety standards when mission variables prohibit strict adherence. *Mission variables* are categories of specific information needed to conduct operations (ADP 1-01). When deviating

from AE safety standards, commanders must weigh specific mission variables and the added risk to personnel, property, and equipment against the tactical, operational, or strategic reasons necessitating such deviations. Whenever possible, commanders must emphasize adherence to the highest standards of AE safety in order to minimize the risk to personnel, property, and equipment.

Unfortunately, many in the Army feel that ammunition support is just a case of putting some strong backs to the task of moving ammunition to the combat troops. This is wrong. First of all, credible stock control is absolutely essential, and ammunition troops need strong discipline to maintain accurate records of ammunition lot numbers and type as well as condition. It has been my experience that too many decisions have been made based on incorrect ammunition stock records. Further, ammunition troops need knowledge of field storage of ammunition in accordance with safety regulations. Any resourceful enemy will attempt to destroy ammunition, both to deny it to our forces and to create the damage that exploding ammunition causes. When stored ammunition explodes during combat, that which was stored unsafely in the field causes greater losses than that which was stored properly. In short, ammunition troops need far more than strong backs. They need a thorough knowledge of ammunition supply, policies, and procedures.

Lieutenant General Joseph M. Heiser, Jr.

CARDINAL RULE OF AMMUNITION AND EXPLOSIVE SAFETY

1-6. All operations involving AE follow the cardinal rule of AE safety: expose the minimum number of people, for the minimum period of time, to the least amount of explosive required to perform safe and effective operations.

1-7. During operations AE personnel—

- Allow only tasks that are necessary to an operation.
- Deny entry to nonessential personnel (This restriction does not prohibit official visits by safety, quality control [QC], management, inspection or other personnel authorized by the commander.)
- Enforce established personnel limits at all times.

1-8. One Soldier can perform many AE operations. However, if the tactical situation permits, at least one additional person should be present to assist AE handlers in the event of an emergency. Proper supervision is required for all operations to observe and enforce safety precautions.

TEN PRINCIPLES OF AMMUNITION AND EXPLOSIVE SAFETY

1-9. While mission variables may limit a commander's ability to adhere to the specifications of AR 385-10 and DA Pam 385-64, the following ten principles apply to all AE operations, regardless of whether the unit is operating in peace, during contingency operations, or in war.

- Know your explosive safety responsibilities.
- Know your explosives safety points of contact and contact information.
- Understand and have current explosives safety site plan on hand.
- Train your personnel to perform their AE mission properly. Have policies and procedures in place that cover your AE requirements.
- Make sure all AE locations are properly sited and have current licenses; prepare a DA Form 7632 (*Deviation Approval and Risk Acceptance Document (DARD)*) to authorize any explosives storage safety deviations.
- Know where to find maps depicting AE locations with associated explosives safety quantity distance (ESQD) arcs, exclusion, and/or clear zones.
- Know the outcome of the most recent internal and higher headquarters explosives safety assessment and institute corrective measures as necessary. Be aware of any new construction or modification plans that affect your explosive safety clear zones.
- Know your local policies and procedures for the AE amnesty program including the location of collection points, responsibilities for collection, and frequency of collection.

- Know proper response procedures in the event of a munition mishap including notification and evacuation procedures, personnel accountability, unexploded explosive ordnance (UXO) or explosive ordnance disposal (EOD) support, accident reporting requirements, and malfunction reporting requirements.
- Learn what AE risks exist that could adversely affect your mission or capability and mitigate those risks. Communicate risks up the chain of command.

1-10. Figures 1-1, and 1-2 on page 1-4, identify the effects of an AE explosive involving 8,818 pounds (4,000 kilograms) net explosive weight (NEW) of explosives.

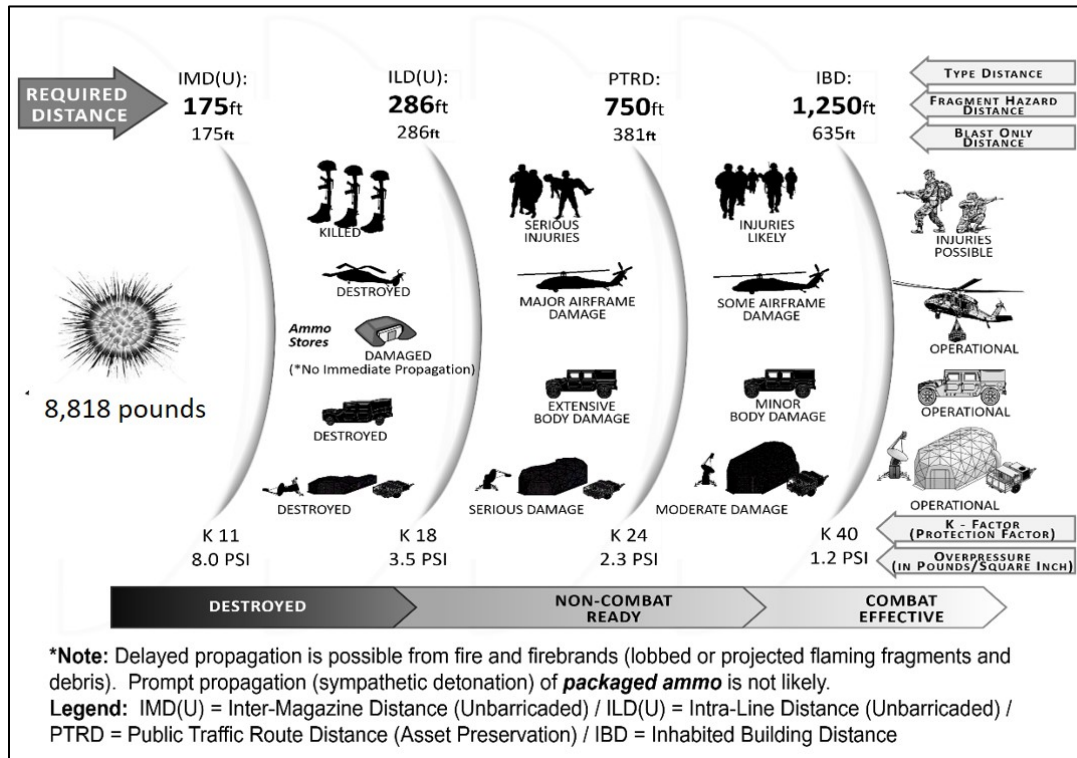


Figure 1-1. Un-barricaded blast effects based on quantity and distance

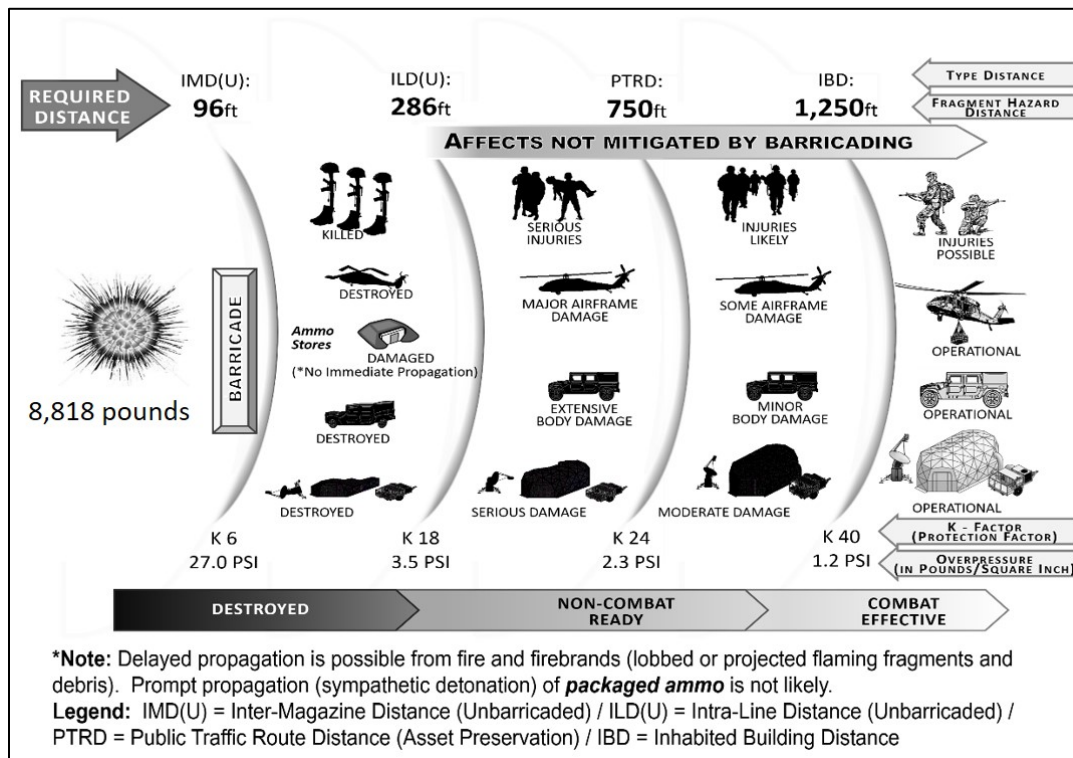


Figure 1-2. Barricaded blast effects based on quantity and distance

EXPLOSIVES SITE LICENSES AND DEVIATIONS

1-11. Locations with AE must be site licensed. DA Pam 385-64 provides guidance for the standards, preparation, and authentication of explosives sites for licensing. While compliance with the explosive safety requirements in DA Pam 385-64 is preferred, mission variables during contingency operations and in war may prohibit strict adherence. DA Pam 385-64 sets the minimum levels of acceptable risk.

1-12. Commanders use a DA Form 7632 when intentionally deviating from established safety standards. The DA Form 7632 identifies and documents all pertinent hazards, the policy or standard, mitigation control measures established, and acceptance of the residual risk by the appropriate level of command.

1-13. A single DA Form 7632 may address multiple risks if supported by accompanying documentation describing each hazard and its associated risk. Units file copies of the DA Form 7632 with their higher headquarters, and safety offices at the Army command and Army Service component command levels. An additional copy is filed with the Defense Ammunition Center and United States (U.S.) Army Technical Center for Explosives Safety.

1-14. For more information on the DA Form 7632, see DA Pam 385-30, *Risk Management*. For more information on the munitions risk assessment utilized in the joint operational environment, see CJCSI 4360.01C.

JOINT AND MULTINATIONAL AMMUNITION AND EXPLOSIVE OPERATIONS

1-15. Whenever a commodity or service is common to two or more Services, the Department of Defense establishes an executive agent in order to assist in the development of common user logistics. The Department of the Army is the executive agent for explosive safety management.

1-16. Within the joint environment, AE management is a shared responsibility between the explosive hazards coordination cell and the joint munitions office.

1-17. Joint force commanders establish an explosive hazard coordination cell to support the land component commander in predicting, tracking, and mitigating explosive hazards within the area of operations. The explosive hazard coordination cell tracks unexploded ordnance hazard areas such as minefields and area with a historically high volume of improvised explosive device activity. The explosive hazard coordination cell is the joint force commander's proponent for munition risk assessment and mitigation.

1-18. The geographic combatant commander establishes the joint munitions office to oversee planning and coordination of AE operations in support of joint forces employed within the area of operations. The joint munitions office typically consists of a mix of AE planners from each Service, and provides oversight of the joint force's AE readiness, particularly of critical and precision AE essential to military operations in the area of operations. While the joint munitions office does not have specific responsibility for overseeing AE safety programs within the area of operations, AE planners must always take compatibility and storage considerations into consideration when planning for the receipt, transportation, storage, maintenance, and use of AE.

1-19. For more information about the explosive hazard coordination cell, refer to JP 3-34, *Joint Engineer Operations*. For more information about the joint munitions office, refer to JP 4-0, *Joint Logistics*. CJCSI 4360.01C establishes policies and practices for integrating explosives safety and munition risk management in the joint operations planning process.

1-20. For more information on AE guidance in NATO operations refer to STANAG 4440, *NATO Guidelines for the Storage of Military Ammunition and Explosives*; STANAG 4657, *NATO Guidelines for the Storage, Maintenance and Transport of Ammunition on Deployed Missions or Operations*; and STANAG 2622, *Minimum Standards of Proficiency for Trained Ammunition Technical Personnel*.

EXPLOSIVE SAFETY MANAGEMENT PROGRAM

1-21. AR 385-10 requires that all Army commands, Army Service component commands, direct reporting units, garrisons, installations, and units at and above the battalion level that have an AE mission develop and maintain a written explosive safety management program. An explosive safety management program is just one component of a unit's overall safety program. The explosive safety management program provides standard operating procedures for the safe production, transportation, storage, inspection, maintenance, handling, use, demilitarization, and disposal of AE.

1-22. The explosive safety management program's personnel are responsible for—

- Keeping leadership informed of the organization's explosive safety management programs posture and A&E safety issues.
- Ensuring explosive deviations are accurate and kept current. During leadership transitions, ensure the incoming leader is informed and renews explosive safety risk acceptance.
- Properly reporting, investigating, and analyzing all AE mishaps.
- Identifying requirements, ensuring resourcing, and compliance with unit explosive training. Document training for unit personnel.
- Conducting periodic evaluations to ensure the effectiveness of the explosive safety management programs.

SAFETY MANAGERS AND SAFETY DIRECTORS

1-23. At and above the brigade level, the unit's occupational safety and health manager is typically responsible for implementing the unit's explosive safety management programs. Safety officers, managers, and directors are responsible for—

- Ensuring all commanders/directors are aware of requirements and maintaining the status of the unit's explosive safety management program.
- Identifying requirements for explosive licenses, explosive safety site plans, DA Form 7632, waivers and exemptions, and certificates of compelling reason.

- Ensuring all potential explosion sites and exposed sites are indicated on approved explosive safety site plans.
- Ensure plans are compliant with safety standards for AE facilities.
- Ensuring training for personnel handling AE is adequate and appropriate.
- Ensuring safety inspections are conducted at least annually for all AE production, storage, and maintenance facilities.
- Monitoring AE transportation operations in order to ensure compliance with military, civilian, and when applicable, host nation laws and regulations.
- Investigating incidents involving AE.

UNIT SAFETY OFFICERS

1-24. At the company and battalion levels, the safety officer, appointed in writing by the commander is responsible for implementing the unit's safety program. Unit safety officers must complete a safety officer course and report directly to the commander on safety-related issues. The unit safety officer or noncommissioned officer is responsible for the following—

- Integrates AE safety procedures into the unit's safety program field safety standard operating procedures (SOP).
- Reviews regulations, doctrine, and technical manuals applicable to the unit. Recommends procedures for increasing safety in unit operations, including the receipt, handling, storage, transportation, and issue of AE.
- Recommends procedural changes to the commander that reduces accident risk, injury, and property loss.
- Organizes a safety committee, if needed, to assist with inspections and the formulation and recommendation of safety procedures.

LEADER AND INDIVIDUAL SOLDIER RESPONSIBILITIES

1-25. Leaders at all levels have a responsibility for risk management and must ensure Soldiers who handle AE perform their duties safely. Leaders take the following proactive steps in reducing risk:

- Ensure subordinates are, in accordance with Army regulations, trained, certified, and licensed.
- Receive explosive safety training to supervise the receipt, handling, storage, transportation, and maintenance of AE.
- Ensure Soldiers are fully aware of hazards throughout all operations.
- Halt unsafe actions when observed.
- Prevent accidents through proper planning and preparation.

1-26. Individual Soldiers have a responsibility for their own personal safety, and for the safety of those around them. Soldiers assist in enforcing unit safety programs by—

- Becoming familiar with the Army's general safety policies for AEs.
- Learning the principles of how AE function, how to handle, store and transport AE safely, and how safely operate materials handling equipment (MHE).

1-27. For more information about explosive safety management programs or the responsibilities of safety officers, managers, directors, leaders, and Soldiers refer to AR 385-10, *The Army Safety Program* and DA Pam 385-64.

1-28. In accordance with AR 385-10, Army personnel who handle AE, whether by MOS or additional duty, are required to complete 9E-F67/920-F35, *Introduction to Ammunition* and 4E-F46/645-F30, *Military Munitions Rule* through the Defense Ammunition Center's website. The military offers both courses online as distance learning courses. 4E-F46/645-F30 requires an annual refresher to remain current. It is also suggested that AE handlers complete the following distance learning courses to better improve their understanding and situational awareness of the hazards associated with AE handling.

- 9E-F64/920-F32, *Environmental Considerations for Ammunition Personnel*.
- 4E-F44/645-F28, *U.S. Army Explosive Safety Familiarization*.

- 4E-F62/645-F46, *Ammunition Publications*.
- 9E-F68/920-F36, *Risk Management & Preparation of SOP for AE*.
- 4E-F65/645-F49, *Application of U.S. Army ESQD Principles*.
- 4E-F26/431-F10, *Introduction to Explosive Safety Management for Safety Professionals*.
- 4E-F28/645-F12, *Ammunition and Explosives Storage Safety*.

1-29. All required and suggested courses outlined in AR 385-10 are accessible through the Defense Ammunition Center's training website (see references).

STANDARD OPERATING PROCEDURES

1-30. Units that receive, transport, store, maintain, and handle AE in support of military operations must have written SOPs. The ammunition officer reviews the SOP and the commander approves the document. The SOP details standards, expectations, and processes used by all unit personnel in all aspects of AE operations.

1-31. An external SOP addresses the procedures units receiving AE support from the supporting unit are required to follow. Typically, an external SOP contains—

- Commander's approval signature.
- Risk assessment.
- Safety officer review and concurrence signature.
- Supervisor or persons-in-charge signature page.
- AE handlers and visitors signature page.
- AE issue and turn-in procedures.
- AE safety and environmental protection procedures.
- Emergency resupply procedures.
- Unit and wartime host nation support procedures.
- Transportation requirements.
 - Vehicle inspections to 10/20 standards.
 - Tie down straps.
 - Tarp.
- Compatibility requirements.

1-32. An internal SOP addresses the procedures the supporting unit must follow in order to properly receive, account for, store, transport, maintain, and issue AE. Typically, an internal SOP contains—

- Commander's approval signature.
- Risk assessment.
- Safety officer review and concurrence signature.
- Supervisor or persons-in-charge signature page.
- AE handlers and visitors signature page.
- Deployment and staging procedures.
- Field setup, including storage, perimeter defense, and storage facility layout plans.
- Procedures for receipt, storage, inspect, issue, and maintenance operations.
- Routine and emergency destruction procedures.
- AE safety and environmental protection procedures.
- AE aerial resupply procedures.
- Requirements for augmentation support (for example, quality assurance specialist ammunition surveillance personnel).
- Information on emergency actions, emergency plans, and pre-accident plans.
 - Fire prevention, protection and coordination.
 - Firefighting.

- Smoking.
- Fire drills.
- Fire exit drills.
- Alarms.

SECTION II – RISK MANAGEMENT IN AMMUNITION AND EXPLOSIVE OPERATIONS

1-33. Risk management is especially important to AE operations. These operations are inherently dangerous regardless of whether they occur during peacetime, contingency operations, or times of war. Leaders at all levels integrate risk management into all phases of the operations process: planning, preparation, execution, and assessment.

1-34. ATP 5-19, *Risk Management*, identifies the principles of risk management:

- Integrate into all phases of missions and operations.
- Make risk decisions at the appropriate level.
- Do not accept unnecessary risk.
- Apply risk management cyclically and continuously.

1-35. When applying the principles of risk management to AE operations, leaders adhere to the cardinal rule. They identify hazards and apply controls that expose the minimum number of people, for the minimum amount of time, to the smallest amount of explosives required to perform safe and effective operations.

SAFE AMMUNITION AND EXPLOSIVE HANDLING PRINCIPLES

1-36. Whenever and wherever possible, follow the explosives safety standards outlined in this ATP and DA Pam 385-64. Leaders must conduct a thorough documentation and assessment of risks before implementing less restrictive guidance. When handling AE in the field, follow these general principles:

- Soldiers controlling or supervising the handling of AE must observe safety precautions. Place skilled, knowledgeable and trained personnel in charge of AE operations.
- In field storage, distribute AE in such a way that an incident will not cause the total stock of any one type of AE to be lost.
- Disperse AE to minimize loss in the event of fire, accidental explosion, or enemy action.
- Take firefighting precautions and ensure firefighting equipment is serviceable. Some AE require special firefighting techniques and materials.
- Prevent accumulations of trash between or under stacks or near any AE storage location.
- Have EOD or EOD trained personnel examine, evaluate, and classify AE of unknown origin and captured AE. Store in a designated collection point.
- Use the existing infrastructure and terrain features to prevent propagation and to reduce the risk of exposure to personnel, equipment, and facilities.
- Store and transport AE containing white phosphorus in an upright position if AE surface temperatures exceed 111 degrees Fahrenheit. Ensure a water barrel or equivalent is on hand to completely submerge leaking white phosphorus items.
- Take all measures to minimize the risk to personnel, material, and AE.
- Segregate damaged AE.
- Save and segregate packing material to use for safe transport and turn-in of unused AE.

HAZARDS ASSOCIATED WITH AMMUNITION AND EXPLOSIVES OPERATIONS

1-37. The following sections discuss general hazards associated with AE operations. Chapters 2 through 4 provide additional information about the hazards associated with transporting, storing, and maintaining AE.

GENERAL AMMUNITION AND EXPLOSIVES HANDLING HAZARDS

1-38. Identification systems assist leaders in identifying specific hazards associated with different types of AE. Appendix B explains in detail the methods for identifying AE using a national stock number (NSN), Department of Defense identification code (DODIC), lot numbers, and the AE color classification system.

1-39. Personnel must handle AE carefully. Any improper, rough, or careless handling may cause unintentional detonation. AE are safe to handle when done so properly and according to specifications. Consider the characteristics of each type of munition or explosive, how it is assembled, its operation, and normal safety precautions. All Soldiers working with AE, regardless of MOS, should observe the following general safety precautions as a minimum:

- If a hazardous operation is observed, stop the action and report it immediately to a supervisor.
- Unsafe actions that are not absolutely essential to ongoing operations should be stopped immediately, and control measures should be implemented to eliminate the hazard or reduce its risk to personnel.
- Do not conduct AE operations without a risk assessment and an approved SOP.
- Do not allow heat or fire producing items such as matches or lighters in storage areas or around AE during receipt, handling, transportation, and maintenance operations.
- Do not smoke in, around, or near AE or explosive storage sites.
- Ensure AE are handled by trained personnel who understand the hazards and risks associated with the types of AE handled. (See DESR 6055.09, AR 385-10, DA Pam 385-64, and DA Pam 742-1.)
- Do not use bale hooks to handle AE.
- Do not tumble, drag, drop, throw, roll, or walk on containers storing AE or explosives.
- Do not tamper with, disassemble, or alter AE.
- Only open AE when required.
- Keep AE in containers as long as possible to prevent exposure to the elements. This is especially important for items packed in barrier bags or sealed metal containers, and on vehicles transporting AE.
- Open AE boxes carefully. Return all inner packaging material to the container, and close it to keep out the elements.
- Repack AE that are opened and unused.
- Do not use familiarity or experience with AE as an excuse for carelessness.
- Do not carry initiation devices in your pocket. Carry detonators, initiators, squibs, blasting caps, and other initiating devices in protective containers. The containers must prevent item-to-item contact. Mark containers to identify their contents.
- Do not drive nails into shipping and storage containers containing AE.
- Do not allow waste materials or litter to accumulate in storage areas.
- Be familiar with fire and chemical symbols, the location of fire points, the fire plan, proper use of fire extinguishers, and location of firefighting crews. Apply risk management in determining what types of fires to fight, and when to evacuate the area.
- Ensure personnel are trained and familiar with the use of proper personal protective fire equipment required in the approved SOP.
- Prohibit the use of cell phones or handheld radios within 100 feet of electronically initiated devices such as missiles, 2.75-inch rockets, and blasting caps.

TOOLS AND EQUIPMENT

1-40. Hand tools are widely used by AE handlers. Only use tools made from non-sparking materials such as bronze, lead, beryllium, alloys, or polymers when handling AE. Do not sharpen tools of lead or beryllium alloys inside AE storage areas. Only use properly maintained non-sparking tools around hazardous concentrations of flammable dust, gases, vapors, or exposed explosives. Use specialized materials, such as copper wool and nonflammable solvents, with non-sparking tools.

1-41. If it is necessary to use ferrous metal hand tools because of their strength, the immediate area should be free from exposed explosives and other highly combustible materials. Personnel may also use ferrous metal tools in specific operations approved by the commander and documented in the unit's risk assessment and SOP. For additional information regarding ammunition tools and equipment refer to AR 700-20, *Ammunition Peculiar Equipment*.

MATERIAL HANDLING EQUIPMENT

1-42. MHE is of primary importance to AE handlers. MHE provides the means to move large and heavy packages of AE quickly and efficiently. Various types of MHE include forklifts, towing tractors, cranes, pallet jacks, trucks, and conveyors.

1-43. MHE presents a number of hazards to AE handlers and other personnel that might be in the area. Constant movement both forward and backward in relatively confined spaces, the frequent lifting of extremely heavy loads to over-head levels, fork extensions with wide arcs of movement, and limited visibility are safety considerations when operating MHE. Commanders, leaders, operators, maintenance, and safety personnel are all responsible for ensuring safe use of MHE.

1-44. Some primary safety considerations to consider when operating MHE include:

- Properly train and license all operators on the MHE in use.
- Performing all scheduled maintenance to include load testing.
- Inspect MHE prior to use in accordance with the appropriate technical manual, operator's manual, or manufacturer's manual and do not use faulty equipment.
- Use ground guides at all times, unless the tactical situation prohibits their use.
- Do not exceed the rated capacity of the equipment.
- Use proper lifting techniques in accordance with general industry lifting standards and section VII, chapter 1 of the online TED 01-00-015, *OSHA Technical Manual*.
- Reduce transportation distances whenever possible.

PALLETIZED AMMUNITION AND EXPLOSIVES HAZARDS

1-45. Visually inspect pallets and containers for broken banding or damage before moving palletized or containerized AE. Repair or replace damaged pallets or containers before using them for AE operations.

1-46. The United States Army Material Command has established several tools to assist units in palletizing AE safely and in accordance with regulations. Both, Army Material Command Drawing 19-48-75-5 and the Conventional Ammunition Packaging and Unit Load Data Index, provide technical drawings and data, respectively, to ensure proper use of pallets and containers for AE operations. Personnel can access both documents on the Defense Acquisition University: Munitions and Explosives Safety page.

1-47. At a minimum, AE handlers should wear protective gloves, safety shoes, and eye protection. Inside the storage magazine re-palletization and replacement of defective banding is authorized. However, if there is not enough space to work safely, the operation is permitted on the adjacent apron.

1-48. Except for the preservation and packaging of small arms AE, containers should not be opened or repaired in any ammunition support activity (ASA). DA Pam 385-64 provides required separation distances based on storage magazine types.

LIGHTNING AND ELECTRICAL HAZARDS

1-49. The fundamental principle for protecting life and property against lightning is to allow a lightning discharge to enter or leave the earth without resulting in damage or loss. Protection from lightning is another essential part of protecting Soldiers, AE, and equipment involved in AE operations.

1-50. Units with an AE mission should establish an electrical storm evacuation plan for all AE areas. AE should be stored in areas that offer lightning protection to minimize or mitigate the risk of exposure to lightning. Field storage planning should consider the use of lightning protection and equipment requirement when possible.

1-51. When using electrical equipment around AE, Soldiers must follow operating instructions precisely. Only use approved electrical equipment around AE. To prevent sparks, all electrical switches, sockets, plugs, and outlets must be of the standard explosion proof type. Use of electrical equipment in facilities containing explosives must comply with DA Pam 385-64 and the latest edition of National Fire Protection Association (NFPA) publication, NFPA 780, located on the National Fire Protection Association website.

1-52. Lightning protection systems are required on facilities or locations used to develop, manufacture, test, handle, hold, store, inspect, or maintain of ammunition or explosives. For more information on protection systems, grounding, bonding, surge protection, testing, and warning systems, see DA Pam 385-64 and NFPA 780.

STATIC ELECTRICITY HAZARDS

1-53. The generation of static electricity is not in itself a hazard. The hazard arises when static electricity accumulates and discharges a spark in the presence of combustible materials, thus providing a source of ignition. This hazard can include sparks discharged from a person. Areas containing combustible dusts, flammable gases or vapors, or ignitable fibers are especially vulnerable to static electricity. Exposed explosives (primers, initiators, detonators, igniters, tracers, incendiary mixtures, and pyrotechnics) are also sensitive to static electricity. See DA Pam 385-64 for procedures to mitigate static electricity hazards.

HAZARDS OF ELECTROMAGNETIC RADIATION TO ORDNANCE

1-54. Electromagnetic transmitters and emitters can generate radiation of sufficient magnitude to exceed specified safety and/or reliability margins in electronically initiated devices. Electronically initiated devices are found in many types of ordnance and can cause radiation induced damage or degradation of performance in ordnance containing these devices. Verify if ordnance packaging meets MIL-STD-464D standards and if it is certified hazard of electromagnetic radiation to ordnance safe on the shipping containers. See DODI 3222.03, for additional information on the hazards of electromagnetic radiation to ordnance.

1-55. Examples of electromagnetic transmitters and emitters include:

- Radios.
- Radar.
- Electronic countermeasures.
- Electronic counter-countermeasures.
- Ground penetrating radar.

UNEXPLODED EXPLOSIVE ORDNANCE HAZARDS

1-56. All Soldiers must be able to recognize and react to UXO hazards. Reactions include avoiding the hazard if possible, securing and marking the site, and reporting the hazard through the chain of command. Under no circumstances should untrained Soldiers approach, disturb, touch, or pick up U.S. or enemy UXOs. This rule is applicable during peacetime, contingency operations, and in war.

1-57. Reporting UXOs on the battlefield requires timely and accurate information. In accordance with ATP 4-32, *Explosive Ordnance Disposal Operations*, the UXO 9 Line report format is—

- Line 1: Date/Time group discovered.
- Line 2: Reporting activity and location (grid).
- Line 3: Contact method: radio frequency and call sign or telephone number.
- Line 4: Type of munition (dropped, placed, projected, or thrown).
- Line 5: Chemical, biological, radiological and nuclear contamination.
- Line 6: Resources threatened.
- Line 7: Impact on mission.
- Line 8: Protective measures taken.
- Line 9: Recommended priority (immediate, indirect, minor, or no threat).

ACCIDENT AND INCIDENT CONTROL PLANS

1-58. Every unit that handles or stores AE must develop plans for controlling accidents and incidents. These plans are part of the command accident/incident control plan, which includes procedures for the following—

- Reporting accidents or incidents.
- Getting assistance from supporting emergency forces.
- Supporting area military and civilian agencies.
- Establishing unit emergency technical escort teams.
- Radiation control.
- AE safety control.
- Reporting AE malfunctions.
- QASAS or ammunition logistics assistance representative, also known as LAR, support.
- Munition handler, transported, and supervisor certification program.
- Availability of EOD support for emergency DEMIL or other incidents.
- Disarmament.
- AE evacuation.
- Unit firefighting teams.
- Unit decontamination teams.

1-59. Training plans, including emergency exercises designed to maintain team efficiency and readiness, are part of the command accident/incident control plan. Such plans encourage personnel assigned to emergency response teams to remain proficient in individual and team duties.

1-60. Personnel reporting and investigating accidents or incidents involving act in accordance with AR 385-10 and DA Pam 385-40. All personnel (supervisory and non-supervisory) who conduct AE related activities are required to receive periodic refresher training to help ensure the requisite level of knowledge of and competency in explosives safety. A list of training courses are in DA Pam 385-64.

REPORTING AMMUNITION AND EXPLOSIVE MALFUNCTIONS

1-61. A *munitions malfunction* is the failure of an AE item to function as expected when fired or launched, or explosive items that fail to function (AR 75-1). Malfunctions include hangfires, misfires, duds, abnormal functioning, and premature functioning of AE items under normal handling, maintenance, storage, transportation, and tactical deployment. Malfunctions do not include accidents or incidents resulting from negligence, vehicular system accidents, fires, and misuse.

1-62. Operator error, equipment failure, environmental conditions, or a defect in the AE item may cause an AE malfunction. The following steps must be taken to determine the cause of the malfunction:

- User immediately secures the site, equipment, and AE. Soldiers should not move or disassemble weapon systems before the weapons logistics assistance representative and QASAS are onsite unless for safety or security reasons. Preserving the site will aid the investigation team in determining the cause of the malfunction.
- Commander of the using unit reports all facts through command channels.
- Higher headquarters may assemble a team to investigate the incident.
- The operational command may suspend use of the AE or equipment involved, dependent upon mission variables.

1-63. The investigating team determines the cause of the malfunction and provides disposition instructions for items involved. The team provides reports including a malfunction report to higher headquarters in accordance with AR 75-1.

Chapter 2

Arms Ammunition and Transportation Safety

The principles of safe transportation of AE are applicable at all levels of war: strategic, operational, and tactical. At the strategic level, the U.S. Transportation Command is the agency responsible for providing common user and commercial air, land, and sea transportation for AE. At the operational level, theater sustainment commands and expeditionary sustainment commands provide oversight of the inter-theater distribution networks used to deliver AE from port to tactical formations. Tactical transportation includes all units from the division to company level, and is the level of where violations of munition safety principles most commonly occur.

TRANSPORTATION OF HAZARDOUS MATERIAL

2-1. Chapter 204 of the Defense Transportation Regulation (DTR) and Title 49, Code of Federal Regulations (CFR), *Transportation*, outline the policies, procedures, and responsibilities for the movement and transportation of hazardous materials by Department of Defense personnel. These regulations are particularly important for the National Guard, and active component units tasked with a defense support to civil authorities mission inside the borders of the United States. These missions include those of the domestic chemical, biological, radiological, nuclear response force.

2-2. As with other explosive safety regulations, the requirements outlined in the DTR 4500.9-R and 49 CFR, *Transportation*, apply to units in peacetime, during contingency operations, and in times of war. Responsible commanders may deviate from established standards after factoring the risk associated with such deviation with mission requirements.

2-3. Commanders are responsible for ensuring the safe and efficient transportation of AE. All personnel involved with the transportation of AE are required to attend training, and obtain certification in accordance with DTR 4500.9-R and Department of Transportation regulations. Safety precautions during limited visibility must receive special emphasis.

SHIPMENT

2-4. The term, shipment, indicates the movement and transfer of AE stocks from one storage facility to another: either into, within, or out of the theater. It includes movement to the ammunition section within a brigade support battalion's distribution company using transportation assets not organic to ammunition units. Shipment includes retrograde of serviceable and unserviceable AE to the theater rear or out of the theater. Normally, theater, corps, or host nation transportation assets are used for transportation. Shipments are not to be confused with issues.

2-5. In routine operations, supporting theater sustainment command or expeditionary sustainment command distribution managers direct AE shipments between storage facilities are by material release order. Distribution managers make up these shipments from operating stocks arriving in the theater or from those stored in the theater ammunition supply point. When directed distribution managers may make shipments out of the theater to support other contingencies.

2-6. In most situations, shipments in the combat or stability and support operations zone are limited to highway transport. The theater or expeditionary sustainment command, through the movement control battalion, assigns transportation missions to supporting sustainment brigades according to theater or corps priorities. Rail and port facilities may be used when available and if feasible. Aircraft are used only when absolutely necessary, usually for emergency resupply, or to resupply special operations units.

2-7. AE shipments to theater ammunition supply points are mostly containerized or palletized in break-bulk and uploaded on trailers or flatracks. In most cases, only containerized AE arrive at the theater ammunition supply points where they are unstuffed, placed in a storage area, or transported forward to an ammunition supply point (ASP) for further distribution. If the mission requires, and if transportation is available, AE are throughput as close to the using units as possible.

2-8. Shipments from the ASP to the ammunition section in the brigade support battalion's distribution company are either in mission configured loads, break-bulk, or single DODIC loads. The ammunition section in the brigade support battalion's distribution company operate the ammunition transfer holding point (ATHP) or modular ammunition transfer point (MATP) depending on the type of brigade they support. The brigade support battalions of Stryker, infantry, and armored brigade combat teams are supported by the MATP. Other brigade's brigade support battalions provide ammunition support through the ATHP. See ATP 4-35 for more information on AE flow in the theater of operations.

SHIPMENT GUIDELINES

2-9. The supply facility begins planning the mechanics of the specific shipment upon receipt of a material release order, shipping instructions, or other shipment authority. The thoroughness of advance planning largely determines the efficiency of any shipping operation. Plans vary depending on the tactical situation, operational environment, type of shipment, and existing workload. Most accidents involving class V items occur during transportation, movement, and handling. A detailed, systematic SOP will make shipment activities safer and more effective. The following actions must be considered when planning a shipment—

- Verify availability of AE for shipment against on-hand assets.
- Select adequate loading points for the operation.
- Verify the condition code and any restrictions or suspension of the AE planned for shipment.
- Determine total gross weight, cube, and security risk classification of the AE.
- Determine AE compatibility for transportation in accordance with applicable motor vehicle/rail compatibility tables.
- Coordinate with supporting unit to ensure advance notice of AE shipments.
- Determine personnel necessary to complete the mission.
- Determine MHE required.
- Determine safety equipment, tools, packaging, and blocking and bracing materials required.
- Establish timeline for entire operation.
- Determine vehicle load plans and placarding requirements prior to start of operation.
- Ensure security of AE throughout entire operation.
- Risk assessment and unit SOP.

2-10. The responsible movement control battalion maintains liaison with local transportation agencies and designates a movement control team, also known as an MCT, to be the single point of contact for each shipping or receiving activity. The movement control team is the link between the shipping activity and the transportation service organization. It receives transportation service requirements from the movement control battalion and processes the requests. The movement control team coordinates the activities of transportation operators and expedites movements of incoming and outgoing carriers.

2-11. The ammunition unit must coordinate with the movement control team to ensure efficient transportation and AE service support. The unit must provide timely, accurate data on pending shipments. This way, the movement control team can supply advance information on the mode of transportation, the time of arrival, and the positioning (spotting) of carriers. The movement control team coordinates with the supporting sustainment brigade, who assigns the mission to a combat sustainment support battalion for execution. The movement control team continues to track and monitor the shipment, ensuring de-confliction of routes

2-12. The movement control team notifies the receiving activity of the departure time, estimated time of arrival, transportation mode and number of transportation units involved, and other information needed to plan for receipt. Supporting transportation agencies should provide an SOP based on the policies and directives of the higher headquarters.

SURFACE TRANSPORTATION

2-13. The most common mode of transportation for AE is surface. Surface modes of transportation include movement by road, rail, and water. Each mode contains its own specific requirements, restrictions, and safety considerations.

ROAD TRANSPORTATION

2-14. Personnel must inspect all vehicles prior to loading to ensure they meet standards. This includes ensuring MHE has been properly load tested, ensuring the brakes have been set before loading and unloading, ensuring drivers chock wheels, and AE are properly prepared and packaged. Government owned motor vehicle inspections are required to be documented using DD Form 626 (*Motor Vehicle Inspection (Transporting Hazardous Materials)*). DA Pam 385-64, describes the safety requirements, inspection criteria, loading procedures, placarding requirements, and compatibility restrictions. Hazard declarations are required for continental U.S. and in host nations during peacetime operations and in some instances during contingency operations.

2-15. During contingency operations and in times of war, it may not be possible to use vehicles that meet peacetime standards for the transportation of AE. In such circumstances, a commander uses risk management principles to ensure the safe and efficient transportation of AE.

- If vehicles that meet peacetime standards are not available, choose vehicles that do not present a fire hazard. Do not use vehicles with leaks, sticking brakes, holes in the floor of the cargo area, or exhaust problems as they increase the risk of fire.
- Ammunition loads must be secured to prevent shifting and loss or damage during transport.
- Vehicles should be equipped with two dry chemical fire extinguishers to allow for fighting vehicles fires.
- Considerations of compatibility will not apply to the transport of combat configured loads or other configurations transported in the direction of the forward line of troops. However, when mission variables permit, consideration should be given to transporting compatibility groups H, J, K, and L on separate vehicles.

RAIL TRANSPORTATION

2-16. Rail remains an important mode of transportation at the strategic and operational levels of warfare, and can facilitate the rapid movement of large quantities of AE from depot to port and from port to an intermediate staging base where it can be unloaded, stored, and issued to units in need. The use of railways to transport AE ultimately reduces the risk to Soldiers, as a single train can move the same amount of AE as several large convoys.

2-17. While 49 CFR, *Transportation*, provides policies and procedures for the transportation of hazardous material on U.S. railways. Foreign railroads are unlikely to be held to the same standards, or forced to conform to the same safety regulations as their U.S. counterparts. Leaders can mitigate the substantially increased risk associated with the use of foreign railways, through a deliberate risk management process and coordination with foreign providers.

2-18. Physical security of AE during rail transportation operations is another concern not easily mitigated through U.S. regulations. When utilizing host-nation rail services, rail security is the responsibility of the senior U.S. commander. The Provost Marshal Office typically coordinates with host nation and host-nation rail services.

2-19. Railcar inspections are a critical part of shipping AE by rail. DTR 4500.9-R, DA Pam 385-64, and 49 CFR, *Transportation*, describe the safety inspection criteria, precautions, loading procedures, blocking and bracing techniques, and the certification and spotting of loaded railcars.

WATER TRANSPORTATION

2-20. While AE supply units may be required to provide technical assistance, Surface Deployment and Distribution Command and transportation units are responsible for loading and off-loading waterborne

vessels in the theater of operations. See DA Pam 385-64 and 49 CFR, *Transportation*, for more information. Coast Guard regulations govern the classification, compatibility, and stowage of AE aboard all waterborne vessels in waters under U.S. jurisdiction. The Coast Guard is usually responsible for the security and supervision of waterborne vessels, including barges.

2-21. The United States Coast Guard regulates transportation of AE by water under U.S. jurisdiction and in water transport vessels engaged in commercial use.

AIR TRANSPORTATION

2-22. Aircraft movements of AE require special procedures, packaging and different standards of compatibility than normal transportation operations. Units coordinate with Air Force loadmasters, movement units, and AE professionals before attempting to process or move AE by military or commercial air. Refer to TM 38-250, for operational procedures regarding aircraft carrying hazardous materials.

2-23. Air shipments of AE may be made at U.S. Army and Air Force airfields, at heliports, and at AE sling-load areas. The Air Force controls air terminal operations at Air Force airfields. AE shipments into and out of Air Force facilities require careful coordination to prevent disruption of service. Airfields must have staging areas where documents may be prepared and bulk shipments received and prepared for shipment.

2-24. Air shipments are preplanned for each aircraft by weight, cube, and compatibility. When possible, the arrival of loaded vehicles will coincide with aircraft availability. Normally, Army/Air Force personnel escort vehicles to the aircraft. The aircraft commander, loadmaster, or crew chief is responsible for supervising the stacking and proper securing of the cargo.

2-25. The class V storage facility is usually responsible for sling-load areas. Personnel must place loaded cargo nets in the landing area so that helicopters can hover to pick them up. Cargo nets may be loaded at the airfield or at the AE supply facility and transported to the airfield.

2-26. Personnel must attach a Hazardous Materials Declaration, or facsimile-formatted document, generally a DD Form 2890, (*DoD Multimodal Dangerous Goods Declaration*), to each pallet of AE shipped by military or commercial aircraft. This document certifies the shipment complies with the provisions of TM 38-250 or 49 CFR, *Transportation*. An individual who has successfully completed the Special Handling Data/Certification Course must sign all copies of the form. For information on aircraft specifications, operating regulations, loading and unloading procedures, and special handling certification, see DA Pam 385-64, TM 38-250, and 49 CFR, *Transportation*.

Chapter 3

Storage Safety

The purpose of field storage is to provide safe AE storage in all operational areas. This chapter contains information on types of AE storage areas. The chapter discusses planning for and storage of AE, with emphasis on meeting safety and storage criteria to the maximum extent possible.

SECTION I – AMMUNITION SUPPORT ACTIVITIES

3-1. Unlike permanent AE storage areas, AE assets in a tactical ammunition support area (ASA), such as an ATHP, MATP, or unit ammunition holding area are most often stored on the ground and on unimproved surfaces. Personnel place AE in storage compatibility categories separated from each other by the minimum ESQD. AE handlers base the minimum ESQD on the NEW for individual items or total gross NEW per individual storage unit, depending on the storage system selected. AE are likely to be stored in one of four types of field storage areas: theater ammunition supply point, ASP, ATHP, MATP, or unit storage. Unit storage is AE issued to the battalion level down to the using unit, and often referred to as unit ammunition holding area storage or as an ammunition holding area. The different types of tactical ASA compatibility categories, ESQD standards, storage systems, and storage planning procedures are discussed later in this chapter.

THEATER AMMUNITION SUPPLY POINT

3-2. The theater ammunition supply point is normally the theater's central AE storage activity. Its mission is to receive, store, and ship containerized and break-bulk AE. It also issues, inspects, configures, manages and maintains theater reserve AE. The modular ammunition platoons generally operate the theater ammunition supply point. A separate ASP, which may be co-located with a theater ammunition supply point, provides area support to operating units.

3-3. To facilitate shipment, theater ammunition supply points are located where there is direct access to airfields, railheads, ports, road networks, and facilities. If this is not feasible, the theater ammunition supply point should be located within a short local-haul distance of such facilities.

3-4. The theater ammunition supply point may be a permanent storage facility (for example, igloo, magazine, bunker, or other fixed or semi-fixed explosives storage building), however it may also be an outdoor open storage area with containers or consist of barricaded open storage cells with containers. Barricades and overhead protection is highly recommended for any open storage locations to reduce the loss of assets from indirect fire, fires, explosions, low angle high speed fragments and prompt propagation. Prompt propagation is the simultaneous detonations of two or more stacks of AE.

3-5. The area selected for the theater ammunition supply point should have as much hard surface as possible. It must also have adequate drainage and a road network capable of supporting heavy vehicle traffic. The design should facilitate the movement of break-bulk and containerized AE onto and off transports (for example, railcars, line-haul vehicles, palletized loading systems). Other logistical units and engineering support may be available to assist AE units in conducting railhead and other transload operations.

3-6. Mission variables help inform the stockage objective of theater ammunition supply points. The theater ammunition supply point primarily receives its stockage objective from the port of debarkation. Mission variables are mission, enemy, terrain, and weather, troops and support available, time available, and civil considerations (also known as METT-TC).

3-7. AE arrive at the theater ammunition supply point on theater transportation assets. They are usually containerized but may include break-bulk or a combination of both. A high percentage of theater ammunition supply point receipts are containerized, AE and transportation personnel must manage containers to guarantee accountability and to retrograde, at a minimum, leased containers for reuse. See ATP 4-35 for a discussion of the flow of AE in the area of operations.

AMMUNITION SUPPLY POINT

3-8. A modular ordnance company or platoon assigned to a sustainment brigade runs the ASP. The ASP provides support to brigades and units not supported by an ATHP or MATP. ASPs receive, store, issue, and maintain a stockage objective of AE to meet a routine surge and emergency requirements for supported units. ASPs base their stockage level on tactical plans, availability of AE, threats to the resupply operations and on mission variables. During the ASP site selection process, commanders should focus on locations that minimize the need for engineer support and as far from inhabited areas as possible (security threats, number of personnel for security and space will dictate distances in theaters of operation). By regulation, a minimum of 1,250 feet is required during non-contingency operations, and 1,146 feet during contingency operations and war. If the site is handling less than 500 pounds NEW, a reduced distance of 450 feet is authorized. It should be located near an improved road network to ensure access by transportation assets when conditions allow.

3-9. The ASP location is dependent on mission variables and operated by an ammunition platoon from a modular ammunition company generally assigned to the sustainment brigade. The ASP provides class V support to units, ATHPs, and MATPs. The actual stock level of an ASP is also dependent on mission variables. The ASP can expand to five- or six square kilometers, or larger, depending on mission variables. Unlike the theater ammunition supply point, ASP stocks are most often stored on the ground on unimproved surfaces. ASPs can receive 100 percent of its requirements from a supporting theater ammunition supply point.

3-10. ASPs are temporary, open storage sites with barricading (for example, earthen berms, earth-filled barriers, and steel bin barricades). Barricades and overhead protection are highly recommended for any open storage locations to reduce the loss of assets from indirect fire, fires, explosions, low angle high speed fragments and prompt propagation. ASPs are located near main supply routes and rails (if feasible) to allow easy access for theater and corps transportation assets. It is essential that ASPs have good road networks that can support heavy vehicle traffic. For additional information, see DA Pam 385-64.

3-11. The basic load ammunition holding area (BLAHA) is an ammunition storage area found at the battalion level and located within the boundaries of a barracks or in the immediate vicinity thereof, in armored vehicles, trucks, trailers, structures, or on pads to ensure mission readiness in deployed environments. A BLAHA may consist of one or more storage sites holding mixed compatibility ammunition and involve acceptance of risks to personnel, facilities and equipment that are greater than that normally permitted. The maximum net explosive quantity must not exceed 8,818 pounds NEW.

SECTION II – AMMUNITION TRANSFER POINTS

3-12. Ammunition transfer points are typically located within the brigade support area. The transfer points are manned and operated by the ammunition section in the brigade support battalion's distribution company. In most brigade combat teams the ammunition section is manned and equipped to operate on or more ammunition transfer point providing the flexibility to support split based operations if required. This section is commonly referred to as the MATP because they support the modular ammunition transfer points. The ammunition section in brigade support battalion's distribution company supporting units other than brigade combat teams operates a single ammunition transfer holding point. It is commonly referred to as the ATHP because they operate the ammunition transfer holding point.

3-13. Ammunition sections operating ammunition transfer points receive mission guidance and respond to the priorities established by the brigade commander. They also receive guidance from the brigade ammunition officer who is responsible for all class V requirements for units organic to the brigade. The ammunition section operating the ammunition transfer point provides AE support to brigade units and is unit task organized to the brigade. As conditions warrant these sections must be prepared to assist the forward

support company, also known as FSC, class V section with AE distribution tasks beyond its organic capability. Ammunition section personnel receive explosives safety and ammunition surveillance (serviceability inspections, suspension and restriction information) support from the brigade ammunition office's ammunition inspector who is responsible for overall operational ammunition and explosives safety for the brigade.

Note: Both types of ammunition sections are part of the brigade support battalion's distribution company. Both ammunition sections store and supply ammunition for the supported brigade. The Stryker, infantry, and armored brigade combat teams receive ammunition support through a MATP. Other types of brigades (for example, combat aviation brigade) receive ammunition support through an ATHP. Under most circumstances the ammunition sections operating the ATHP or MATP provide ammunition support in temporary transfer points located in the brigade support area to facilitate, rapid receipt and issue of ammunition to the supported brigade. These sections are equipped with a computer to access the Standard Army Ammunition System, also known as SAAS, via the web.

3-14. The forward support company provides distribution of all general cargo (class I, II, IV, and IX) and class V daily from the brigade support area to the supported battalion. The brigade's brigade support battalion ammunition section augment the forward support company class V distribution capability when its organic capability is exceeded.

3-15. Using either unit vehicles with MHE, flatracks or crops, or organic ATHP or MATP materials handling equipment, AE are transferred from echelon above brigade trailers or flatracks to vehicles organic to the using unit. Departing empty vehicles backhaul the empty trailers and flatracks.

3-16. The ATHP or MATP should be located near a main supply route or adequate road network to provide access for corps transportation assets and combat user vehicles when conditions allow. The ATHP or MATP must be on firm ground with good drainage and offer easy access for vehicles. In addition, it must allow for easy recovery of pallets, trailers, and flatracks. The site must be large enough to allow MHE to maneuver. Personnel must place flatracks and trailers so the MHE has adequate space to transfer AE. As with any other tactical site, good cover and concealment are extremely important. Barricades and overhead protection is highly recommended for any open storage locations to reduce the loss of assets from indirect fire, fires, explosions, low angle high speed fragments and prompt propagation.

SECTION III – STORAGE SAFETY PRINCIPLES

3-17. Storing each item separately achieves the highest degree of safety in AE storage. However, this is not always feasible due to the security threat, lack of storage space or land available to properly store by storage compatibility groups. Observing the following principles will ensure safety of AE storage regardless of the type of facility:

- Balance safety, mission, and other factors when storing a mix of AE.
- Do not store AE with flammable or combustible material, acids, or corrosives.
- If compatible, personnel may mix different types of AE in storage.
- Do not store AE with an assembled initiating device as they present a significant storage risk. Exceptions include—
 - If the device is packaged in a manner that eliminates risk of accidental detonation.
 - If safety features prevent accidental initiation or detonation of the item.
- Do not store white phosphorus, also known as WP, or like items with other AE, when possible.
- Protect AE from the elements by storing in properly sealed shipping containers, providing appropriate dunnage, adequate shelter and ventilation. This practice reduces maintenance, ensures maximum serviceability and shelf life of stocks and accountability.
- Place AE in appropriate storage compatibility groups (when possible for tactical situations) and separate by minimum ESQD as determined by DA Pam 385-64. At a minimum in a tactical environment, ensure proper magazine distance between AE storage locations to prevent prompt

propagation. Personnel can use barricades to reduce magazine distance and intra-line distance exposures unless otherwise specified in DA Pam 385-64.

- Separate AE into multiple smaller stacks when possible. This will aid in reducing the size of the explosion and aid in preserving other AE stocks.

STORAGE COMPATIBILITY GROUPS

3-18. AE are assigned the appropriate storage compatibility groups for storage at Army activities. See appendix C for more on storage compatibility groups.

3-19. Logistical considerations and combat situations may warrant more risk-taking. When warranted, the Army Service component command commanding general may authorize relaxation of storage compatibility requirements. This applies to a theater ammunition supply point, ASP, ATHP or MATP storage type areas. Compatibility requirements do not apply when storing unit configured basic loads in large-scale combat operations, limited contingency operation, military engagements, or security cooperation and deterrence operations. Another safety element, hazard classification, further separates AE into hazard classes and divisions based on their hazards, physical properties, chemical characteristics and packaging.

EXPLOSIVES SAFETY QUANTITY DISTANCE

3-20. The Army designed ESQD criteria to protect personnel and property in areas adjacent to storage facilities. The criteria also limit the quantity of stocks that may be lost in an explosion. ESQD criteria reduce the possibility of any explosion involving large quantities of explosives and AE.

3-21. ESQD base relationships for specific classes of AE on levels of risk considered acceptable for that item. Personnel must strictly follow the ESQD tables set forth in DA Pam 385-64 during peacetime unless they obtain a deviation. The tables apply to exposures involving nonmilitary personnel, public traffic routes, inhabited buildings, and health and morale facilities.

3-22. Within the range of military operations, military requirements may make full compliance with safety regulations difficult. Compliance with ESQD regulations is of great importance to commanders since their purpose is to minimize losses of personnel, facilities, equipment, stocks and to maintain the full operational capability of facilities. Normal explosives safety criteria, procedures, ESQD separations, and methods of application in DA Pam 385-64 apply except where risk-based storage is approved at the appropriate level in the chain of command. Document risk-based storage on a DD Form 2977 (*Deliberate Risk Assessment Worksheet*) (See ATP 5-19.) If in non-compliance, the unit initiates a DA Form 7632 for deviation approval. Explosives safety ESQD within the range of military operations can be reduced based on certain stipulations, the storage configuration and NEW. See DA Pam 385-64. At a minimum, ensure inter-magazine distance between AE storage locations to prevent prompt propagation. Commanders can utilize barricades to reduce inter-magazine distance.

3-23. To meet readiness requirements, certain units may have their class V uploaded on organic vehicles or stored near the unit. Park uploaded vehicles as far from personnel and inhabited facilities as possible. Placing barricades between uploaded vehicles aids in reducing the risk of damaging other assets in the area. Only store mission essential quantities in vehicles to meet mission needs. DA Pam 385-64 defines ESQD requirements.

ENVIRONMENTAL CONSIDERATIONS

3-24. Commanders must promote and inspire a keen awareness of the environment. Many Federal, state, local, and host-nation laws hold commanders legally responsible for environmental damage caused by inadequate planning or supervision of operations and training. Leaders must comply with environmental provisions in order to avoid adverse environmental impacts. When planning or executing operations consult the following regulations, rules and guidance—

- AR 200-1, *Environmental Protection and Enhancement*.
- ATP 3-34.5, *Environmental Considerations*.
- 40 CFR, *Military Munitions Rule*.

3-25. The operational commander determines the need for, and environmental impact of, the destruction of ammunition or other explosives to prevent capture by the enemy.

3-26. Even during combat operations, Army forces should repair environmental damage occurring because of enemy actions or accidents involving munitions if conditions permit. Containment, cleanup, and restoration of the immediate area allows commanders to use the area for future operations. Commanders must follow guidance in applicable publications and use environmental risk assessment matrices to assess possible damage. These assessments allow leaders to minimize environmental damage while optimizing performance and mission completion.

SECTION IV – STORAGE AREA PLANNING

3-27. After selecting the site and storage system, a storage plan, risk assessment and an SOP must be written or updated for the operation. Good planning helps ensure that operations are safe and efficient. The following checklist will be used when developing the storage plan/concept of operations:

- What is the total stockage objective for the site?
- What is the total net explosives weight needed to meet current and future mission requirements?
- What hazard class and divisions will be stored?
- Will white phosphorous or similar items be stored?
- What is the functional level of support required of the storage area (such as theater ammunition supply point, ASP, ATHP, MAPT or unit storage)? Is sufficient space available for possible future expansion if needed?
- What MHE support do personnel need to move AE on a frequent basis and will those assets remain at the storage area?
- What are the expected average daily receipts and issues?
- Will the site require an explosives laden truck holding area?
- How much time is available before the first AE shipment arrives?
- What is the expected lifetime of the storage area?
- What physical characteristics of the terrain can be used as natural barricades? What characteristics deny or restrict use of certain areas?
- What natural cover and concealment are available?
- What engineer construction and support are available or necessary? How much lead-time is needed to obtain that support?
- Will indirect fire be likely to occur? (current and possible future threats)
- What special security requirements are needed for classified and sensitive items based on the controlled inventory item code? See the Federal Logistics Database or the Joint Hazard Classification System for a detailed explanation of controlled inventory item code and the controlled inventory item code for any AE item. The Joint Hazard Classification System can be accessed through the Munitions History Program at Redstone Arsenal. An account must be requested and approved before access is granted.
- How close are inhabited areas?
- How close are public traffic routes?
- Where is the fuel storage area and what type of fuel storage area is it, bulk fuel, operational or tactical fuel storage? Fuel supplies are required to be placed into secondary containment to mitigate spills and should be placed downhill from the AE site. Required separation distance varies depending on type of fuel storage. See DA Pam 385-64 for additional information.

SITE SELECTION

3-28. Safety and efficiency must be top priorities when selecting a storage site. It is essential that subject matter experts (89B30/40 ammunition inspector, and senior ammunition inspector, ammunition warrant officer, QASAS or ammunition LARs, base camp master planners, and the Corps of Engineers) be involved early in the concept phase, but no later than 30 days into the design phase to preclude possible future

disruptive, safety-driven relocations of established class V facilities. All too often AE storage placement and explosives safety are an afterthought that needlessly places personnel, facilities and equipment at greater risks due to this occurrence.

3-29. Leaders should perform a map and ground reconnaissance of the proposed sites. Reconnaissance ensures the sites are suitable for performing safe operations and providing efficient support to using units. A map reconnaissance provides information on the terrain and the possibility of natural cover and concealment. A ground reconnaissance supports the information gathered from the map reconnaissance and further reveals terrain features. Ground reconnaissance also reveals other conditions that may have changed or may not be identifiable on a map.

3-30. When possible planners submit site recommendations, based on reconnaissance information, for review to the U.S. Army Technical Center for Explosives Safety and to higher headquarters for approval. The commander may not approve the site select for operational and/or tactical reasons. Planners may have to repeat the selection process, or higher headquarters may identify an area for the location of the storage area. Before a higher command selects a location, they should consult explosives safety personnel, such as ammunition warrant officers.

ASSESSING TACTICAL REQUIREMENTS

3-31. Commanders and staff must review tactical conditions and mission variables must to reduce conflict between the tactical and safety requirements of an ideal site. They must often, weigh these requirements are against the operational mission as they are often at odds.

3-32. The tactical situation may require personnel to modify or supplement procedures. The following considerations apply to all storage and supply sites:

- Transportation. Sites should be located near the main supply route and supported units to allow easy access when possible. Leaders must balance the desire to reduce the distance to supported units with security constraints.
- Sites. The site should be easy to defend against ground attack using the fewest personnel and materials possible. The site must be large enough to allow for dispersion of stocks and with the use of proper barricades and overhead protection will provide additional protection against heavy loss by indirect fire, fire or explosion. As with any other tactical site, good cover and concealment are critical.
- Road network. In addition to access and exit roads, sites must contain a good internal road network. Roads must easily allow large vehicle passage under all weather conditions and should require as little maintenance as possible. A one-way traffic pattern is preferred to minimize confusion and congestion.
- Terrain. Establish sites on firm, level ground. Carefully study drainage patterns and soil conditions. A level site that does not drain adequately during wet weather may result in unsafe and inefficient operations. The site must provide easy access for using unit vehicles and recovery of palletized loading system flatracks, pallets, and trailers. Natural barriers at proper intervals are desirable to segregate field storage units and categories of AE. Personnel must consider downwind distances to populated areas if captured enemy chemical AE are stored. Do not store captured enemy AE or chemical AE with other stocks. Provide a separate location if possible, or at a minimum provide inter-magazine distance (refer to DA Pam 385-64).
- Fire safety. Inspect the site for fire hazards. A low level of flammable vegetation and an adequate water supply are favorable considerations.
 - Will white phosphorus or similar items be stored?
 - What is the total net explosives weight needed to meet mission requirements and allow for sufficient time for resupply?

GENERAL LAYOUT

3-33. Fundamental rules apply to the layout of all types of AE supply and storage facilities. First, consider general safety procedures in any site layout. Basic operating procedures are also very similar. Key differences

between theater ammunition supply point field sites and ASP, ATHP, or MATP sites are the theater ammunition supply point generally has larger, more stable storage areas and better road networks.

3-34. Arrange all storage areas into separate sections to enhance safety. The arrangement of stocks in each section should make receipt, issue, and inventory/re-warehousing/configuration as easy as possible. Safety calculations for quantity distances are found in DA Pam 385-64. These calculations are applicable to structures and activities including explosive laden vehicle parking, the administration office, and the bivouac area.

3-35. Each section consists of a number of storage locations or modules, depending on the type of storage system used. Separate each storage locations within each section according to the ESQD requirements in DA Pam 385-64, mission variables permitting.

3-36. The following guidelines should be observed to maintain efficient operations and prevent units from unnecessary waiting:

- Post signs showing traffic direction, entrances, and exits.
- Draw maps of storage areas and provide copies to using units.
- Ensure there is enough dunnage near storage locations for shipment blocking and bracing as well as materials to prevent AE from being placed directly on the ground.
- Provide external SOP to using units that establishes issue and turn-in procedures, any forms required and form examples.
- Arrange for one-way traffic whenever possible; when not possible, provide turn-around points. Ensure adequate space for vehicle holding and assembly areas.
- Ensure the use of ground guides is strictly enforced.

3-37. Layout requirements for each site vary according to the tactical situation, the terrain, the proximity to forward areas, and the type and amount of materiel handled. A good layout is one that achieves the following:

- Provides as much distance as possible between AE storage and inhabited areas, if the layout cannot meet ESQD standards.
- Provides natural or manmade berms, barricades or barriers.
- Provides maximum protection to personnel, facilities, equipment and other AE assets stored. Tactical situation will dictate such as security threats, indirect/direct fire, security personnel availability, land availability.
- Provides for easy, efficient workflow.
- Minimizes movement of AE, tools, and equipment.
- Permits easy entry and exit for heavy traffic.
- Provides effective control of unit operations.
- Permits defense of the area.

Note: When a unit cannot achieve compliance, it must initiate a DA Form 7632 through command channels to the U.S. Army Technical Center for Explosives Safety for data collection and analysis.

3-38. Other prime considerations for selected supply and storage sites include protecting AE storage areas from indirect fire with overhead cover, construction of defensive works and obstacles, organization of unit security and defense, and proper weapons positioning.

3-39. A map overlay will be prepared to include the defense plan and operational layout for the new area. If needed, a route overlay will also be prepared. The advance, main, and rear parties use overlays, and copies must be submitted to higher headquarters.

3-40. The operations office is the nerve center of a storage activity. It is normally the control section of an ordnance company or modular platoon. The office should be located inside the main entrance where all incoming customers can reach it easily. It should be located near the administrative section but a safe distance from the main ASA. Vehicle holding areas for inbound AE shipments and vehicle assembly areas for

outbound AE vehicles will be within walking distance. The operations office must have adequate parking for customer and ordnance company vehicles.

3-41. Parking is provided for inbound, AE-laden vehicles or unit vehicles scheduled for loading in the vehicle holding area. The holding area must have enough maneuver room for large vehicles, and its size must be sufficient to accommodate the largest convoy of vehicles that the site may expect to receive. The vehicle holding area is a transit area, and vehicles remain only long enough to load or unload ammunition.

3-42. The segregation area is a temporary storage area for segregating AE turn-ins and mixed AE shipments. It must be located near the salvage area to allow convenient storage or usage of packing materials. Ensure fire protection distances are sufficient between salvage materials and AE storage.

3-43. Non-explosive material, such as AE residue and salvage materiel, is stored in the inert salvage area. It should be located near the segregation area and the surveillance and maintenance area.

3-44. The demolition area is set aside for the destruction of unserviceable AE. A good access road is necessary to facilitate the delivery and unloading of AE. The road network and the demolition area must be able to support the use of trailers and rough-terrain forklifts required to conduct demolition operations. Do not use land selected for the demolition area for any other purpose. The demolition areas should have little vegetation to minimize the fire hazard. Ammunition handlers conduct demolition operations only after higher headquarters issue AE disposition instructions or commanders determine AE items are unsafe to ship or store.

3-45. The vehicle assembly area provides parking for all outbound vehicles, including empty/loaded AE vehicles assembling into a convoy. The assembly area must be within walking distance of the operations office and meet all requirements of the vehicle holding area. See truck-holding area in DA Pam 385-64 for additional requirements.

3-46. Emergency sling-load AE resupply operations originate at the sling-load operations area. The sling-load area will be located at least 1,800 feet or 550 meters from AE storage locations, working areas, and inhabited areas. Installation size, security and current threat will dictate in other than peacetime operations. When planning sling-load operations, consider the allowable gross weight for cargo or utility aircraft. Commanders should include sling-load operations in unit SOPs/policies/procedures and in the risk assessment. See DA Pam 385-64 and ATP 4-48, *Aerial Delivery*, for sling-load operation requirements.

3-47. The bivouac area is the living area for personnel operating the site. It must be located nearby but outside the fragmentation and blast areas. When locating this site, personnel safety distances from the ASA and the physical security of the bivouac area will be the primary considerations. Tactical situations will dictate distances in other than peacetime operations. However, the minimum level of protection should be applied when possible (refer to DA Pam 385-64, chapter 9).

3-48. Personnel maintain unit vehicles and MHE in the maintenance area. Commanders may designate a separate section of the maintenance area for refueling vehicles. When conducting fueling operations, vehicles and MHE will be at least 100 feet from structures or sites containing explosives. Generators supporting the storage area will be located at least 50 feet from the supported facility, and equipment should be located 50 feet or more from explosives but no less than 25 feet from explosives operations or facilities. All vehicle or MHE maintenance and refueling operations will occur in secondary containment.

3-49. Personnel perform AE inspection, repack, and maintenance in the surveillance and maintenance area. For efficiency, the site should be located between the operations office and the storage areas. Surveillance operations and maintenance areas must be separate from the storage area. During other than peacetime operations this distance may not be feasible to achieve.

3-50. Live AE are stored in the ammunition storage area.

3-51. The captured enemy ammunition (CEA) area is used to store all CEA turned into the storage facility. CEA is always stored separately. Once identified and classified, personnel store CEA using the same principles required for storing U.S. AE. Apply the appropriate inter-magazine distance (preferably inhabited building distance) to prevent the loss of U.S. stocks.

3-52. The storage configuration depicted in figure 3-1 is applicable for a BLAHA utilized for other than peacetime operations. All storage layouts must conform to the U.S. Army Technical Center for Explosive Safety standards published in DESR 6055.09. The layout depicted utilizes earth-filled barriers to separate

one cell from the adjacent cell. Dirt berms or blast walls can also be utilized. Cells can be reduced to accommodate fewer containers or without containers. Details include—

- The total NEW per cell cannot exceed 8,818 pounds or 4,000 kilograms. Adjustments to the NEW must abide by quantity distance standards as established in DA Pam 385-64.
- The barricade height must be line of sight plus one foot above AE stack to AE stack.
- Barricades must be a minimum of three feet wide at the crest.
- AE stacks can be no closer than three feet from the end of the crest of the wing-walls to allow sufficient maneuver space for materiel handling equipment and military vehicles to pass.

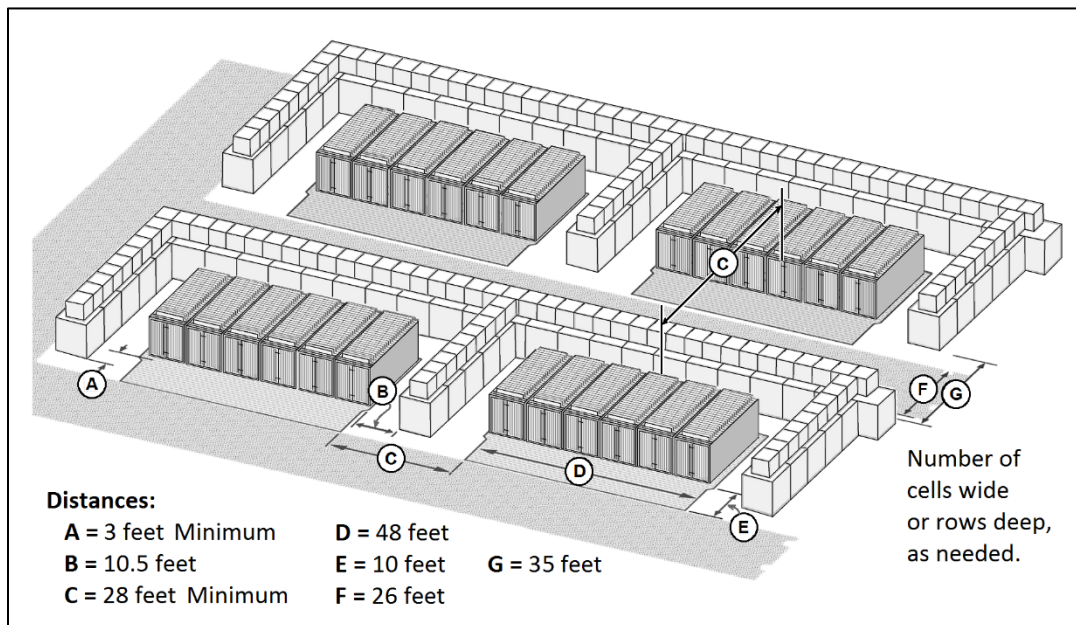


Figure 3-1. Basic load ammunition holding area for other than peacetime operations.

LAYOUT CONSIDERATIONS

3-53. Position AE far enough off the road to allow trucks to be loaded or unloaded without interfering with traffic. Stack containers so AE markings are visible and all containers easily accessed. AE positioned on an inadequate or unstable foundation may topple or sag. Inspectors should look for settling or shifting and make corrections before damage results. See DA Pam 385-64 for more information.

3-54. Some units use a standard identification system to identify and locate AE. Such systems use lettered or numbered locations that always contain certain types of AE.

3-55. Whenever a site is established and similar stocks are required, place them in the same relative locations (ground features and NEW may preclude this). When a standard identification system is used, they may reference a major road or prominent landmark. If a road or landmark is not available, the system should follow a logical alphabetical or numerical progression as personnel enter and move through a specific section of the site.

3-56. The manufacturer identifies AE by lot. The lot number is vital for accountability, issue, and storage. Segregate individual lots in each storage location, clearly separated from other lots. Use a DA Form 3020 (*Magazine Data Card*) to track lot numbers and accountability (gains and losses). Each lot number should have their own separate DA Form 3020 and placed with that lot.

3-57. Climatic considerations such as adequate shelter, dunnage, good drainage and ventilation are necessary to protect stored AE. Personnel can use tarpaulins to protect AE from the effects of rain and intense sunlight. See DA Pam 385-64 for additional guidance.

3-58. In desert and tropical climates, AE should be stored out of direct sunlight. To minimize exposure to sunlight, position containers with long axes pointed in an east-west direction. Priority for shade is as follows—

- Guided missiles and rockets.
- Propelling charges.
- Fuses.
- Pyrotechnics.
- Projectiles.

3-59. When using containers for storage, periodically open the doors so that air can circulate. Do not allow blowing sand or debris to accumulate around containers or pallets.

3-60. The proper use of dunnage increases stack stability. Generally, stacks must be at least four to six inches off the ground to prevent AE from getting wet and to ensure adequate air circulation. See DA Pam 385-64 for more information.

3-61. Personnel must dig ditches around stacks of AE if drainage is a problem. If propellant charges are stacked, personnel should turn the lids down slightly so water does not seep in or accumulate.

3-62. Storage of guided missiles and rockets requires special care. Guided missile assemblies should be stored in permanent structures if possible. Missile bodies have delicate electronic components. If stored in the open, protect the containers with tarps or other suitable cover. In either case, storage areas should have hard, level surfaces, and all humidity indicators must be accessible. Guided missiles and rockets should be stored with all nose ends pointing in the safest direction away from inhabited areas. When using barricades orient the nose ends toward the rear wall or side (wing) walls in addition to pointing the nose ends away from inhabited areas. See DA Pam 385-64 for storage of specific types of AE.

3-63. Employ guards and access control if classified or sensitive components are stored in the open. See AR 190-11, for detailed security information.

3-64. Use natural concealment whenever possible to camouflage AE storage areas. Camouflage requirements may conflict with requirements for firebreaks and AE shelter. The use of camouflage must be consistent with explosive safety and AE storage procedures. See ATP 3-37.34 for general information on the use of camouflage.

3-65. Is overhead protection and barricading needed? Overhead protection and barricading increases survivability of AE stocks in the event of indirect or direct fire. Use a minimum of two feet of earth to provide adequate overhead protection. Utilized sandbags, HESCO barricades or other similar materials to provide adequate overhead protection. If overhead protection is to be placed directly on top of the container use roof supports, as depicted in figure 3-2, to prevent the container sides from buckling due to the weight.

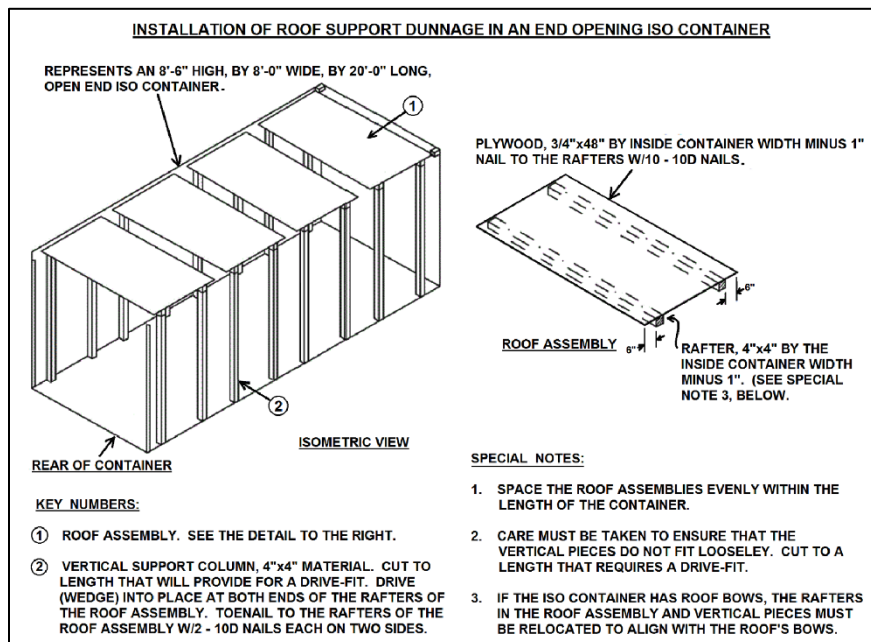


Figure 3-2. Installation of roof support in an end-opening container

UNSERVICEABLE AMMUNITION AND EXPLOSIVES STORAGE

3-66. Unserviceable AE are those not safe for use; either manufactured with defects or rendered unserviceable during operations. Personnel inspect all shipments of AE will be inspected for serviceability. Unit turn-ins not inspected at the time of receipt must be stored in a segregated area for later inspection. AE specialists must be trained to recognize indications of unserviceability and report them.

3-67. AE handlers segregate unserviceable AE from serviceable AE to reduce re-handling and enhance safety. Personnel segregate AE by DODIC and lot number, followed by serviceability classification. If personnel cannot positively AE by lot number they must automatically classify the AE as unserviceable. Exceptions may be made based on the type, quantity, and condition of the AE and mission variables. If available, a QASAS should check the AE for serviceability to ensure items are safe to use. Safety precautions and principles that apply to storage of serviceable AE also apply to storage of unserviceable AE. AE handlers must keep proper records on all unserviceable items stored at a supply facility.

3-68. Personnel must segregate and mark AE to prevent issue. While AE handlers perform minor preservation and packaging at field locations, depot storage facilities usually perform extensive maintenance. The unit performs the packaging and preservation functions if that is all that is required. Time permitting, repairable unserviceable AE are retrograded for repair.

3-69. Ammunition handlers treat AE that is abandoned by using units as unserviceable until inspected. Procedures that apply to unit turn-ins also apply to abandoned AE. Personnel report unserviceable AE through proper channels for disposition instructions. Unserviceable AE must be disposed of as quickly as possible to preclude further deterioration and potentially unsafe conditions. Personnel report hazardous unserviceable AE immediately through proper channels to EOD companies for destruction. Ammunition handlers should designate and clear a demolition area for the safe destruction of AE (subject to environment, inhabited areas, and installation size). For emergency destruction see DA Pam 385-64, table 10-3 for quantity distance requirements using minimum separation and asset preservation criteria.

SUSPENDED AMMUNITION AND EXPLOSIVES STORAGE

3-70. Specific lots of AE and components suspected to be unsafe or otherwise defective are suspended from issue. The problem may be the result of a manufacturing defect, a firing malfunction, an accident, exceed

drop criteria (if applicable) or the deterioration of components. See DA Pam 742-1 for drop criteria. Storing AE by lot number enables the rapid withdrawal from issue of those items that are unsafe, defective, or suspected of being defective.

3-71. The Army gives authority to the commander, Joint Mission Command, to suspend any lot of conventional AE. The authority for missile item is the U.S. Army Aviation and Missile Command. Commanders make decisions about lot suspensions based on a technical inspection and recommendation by QASAS personnel. The local commander may place a local suspension on a suspect lot of AE. A preliminary report or quality deficiency report is forwarded by the unit through the supporting sustainment headquarters to theater Army headquarters. The AE remain in local suspension unless higher headquarters changes its status. See AR 75-1 for instructions for preparing suspension reports.

3-72. Additional notices of suspensions or restrictions are by updates to Munitions History Program. Commanders must ensure that ammunition personnel are informed of suspensions or restrictions as published. Unless the suspension notice orders it, Soldiers do not have to move suspended AE lots in storage to a segregated area. Stacks of suspended AE must be clearly marked using DD Form 1575 (*Suspended Tag-Materiel*) or facsimile-formatted documents (taped to the materiel), to show the items have been suspended or restricted from issue. In facilities employing foreign nationals, AE handlers should produce bilingual tags. Suspended or restricted-issue items returned by the firing units, or items received from other supply facilities, must be segregated upon receipt.

CAPTURED ENEMY AMMUNITION STORAGE

3-73. CEA includes any or all AE products and components produced for or used by a foreign force that is hostile to the United States (that is or was engaged in combat against the United States) in the custody of a U.S. military force or under the control of a Department of Defense (DOD) component. The term includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries. It includes bulk explosives, chemical warfare agents, chemical AE, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster AE and dispensers, demolition charges, and devices and components of the above. CEA can also include North Atlantic Treaty Organization or U.S. manufactured AE that may not have been under U.S. custody or control. Before a unit secures an enemy AE cache for storage it is first inspected by EOD personnel to determine condition, type, and caliber. They also ensure it is safe for handling and movement. Once analysis is complete and if the CEA is assessed to have no intelligence value, 89B30/40 ammunition inspector, and senior ammunition inspector personnel can prepare AE for storage, destruction, or shipment for destruction. Note items of special interest should be reported through intelligence channels. Segregate enemy AE and properly dispose of it. DA Pam 385-64 outlines U.S. Army policy for the handling of CEA.

3-74. All CEA must be considered extremely hazardous and a significant threat to Soldiers and military equipment. Safety is of utmost importance in handling any type of CEA. Personnel will not handle or move until inspected by EOD to ensure the AE is safe for handling and/or movement.

3-75. Units that capture or discover enemy AE must immediately report the event to the next higher headquarters and technical intelligence channels through the G-2/S-2. Next they must request EOD support and disposition instructions for the AE. All Soldiers should understand the importance of adhering to CEA handling, reporting, and transportation requirements. Soldiers segregate captured AE, regardless of nation of origin, in a designated collection point until they receive disposition instructions.

3-76. The disposition of CEA varies with the tactical situation. Personnel can destroy, store, issue to coalition partners, or retrograded CEA to other AE storage activities. Units required to store CEA must clearly mark and segregate the CEA from other types of AE. The storage of CEA will adhere to all standard storage, quantity distance, and safety procedures that pertain to U.S. AE as outlined in this manual.

3-77. Certain types of CEA have high potential for intelligence value. EOD is required to evaluate CEA that will require technical intelligence exploitation. This includes first seen enemy ordnance and ordnance items of interest. Whenever possible, EOD personnel should conduct the level one exploitation of CEA for technical intelligence at the site. Secure items requiring further exploitation should be sent to the senior EOD headquarters within the theater of operations for level two exploitation. Information collected from the site

is processed through the EOD chain of command and disseminated to the intelligence community. See ATP 2-22.4, *Technical Intelligence*, for more information on the collection and dissemination of technical intelligence.

3-78. Notify supporting AE managers if the cache is retrograded, so they can provide QA/QC personnel and transportation assets to support the retrograde operation. These personnel go to the cache to load and transport it to the designated ASA. QA/QC personnel assist in segregating and loading the AE. The designated ASA places the cache into a designated secure area. CEA must not be stored with U.S. AE. If possible, it will be stored separately from all other AE. Soldiers can obtain information on the NEW for foreign AE by coordinating with your supporting G-2/S-2. At a minimum, CEA will be stored at inter-magazine distance to prevent the loss of serviceable AE. If greater space than established inter-magazine distance is available, AE personnel should use the larger distance. The storage of CEA should also be as far away from inhabited areas as possible.

SALVAGE AND PACKING STORAGE

3-79. Salvage material includes such items as boxes, crates, and steel containers. Packaging material includes nose plugs, grommets, metal links, clips, cartridge cases, and brass.

3-80. Based on mission variables, salvage material is normally collected at ASAs and shipped to designated points within the theater of operations for reuse or retrograde. However, if units turn in salvage material at the ATHP or MATP, the transfer point's noncommissioned officer arranges to have it backhauled to an ASA via available transportation. Personnel may use some salvage material at field facilities to repack serviceable AE and components. Personnel inspect salvaged material for explosives, record on stock records, and report to the sustainment headquarters as directed by higher headquarters. The sustainment headquarters receives disposition and shipping instructions, and gives the instructions to the storage facility based on these reports. When shipping inert salvage material from any AE facility, the senior inspector must certify the shipment is free of explosives

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Chapter 4

Maintenance Safety and Surveillance

AE maintenance encompasses all actions necessary to ensure stocks are either serviceable, or that unserviceable stocks are restored to serviceable condition or disposed of properly. Higher headquarters assign maintenance responsibilities based on the unit's primary mission and the availability of skilled personnel, time, tools, equipment, and supplies. This chapter discusses maintenance and surveillance operations, procedures, and functions.

SECTION I – AMMUNITION AND EXPLOSIVES MAINTENANCE

4-1. AE maintenance planning and the supported unit's operational needs must be closely aligned. Maintenance planners must be realistic when considering the availability of supplies and maintenance resources. A reduction in AE maintenance increases the amount of AE taken from the supply system. Conversely, the inability of the supply system to replace unserviceable AE requires a greater maintenance effort. Proper handling, storage and maintenance of AE enhances readiness, reduces replacement requirements, and conserves resources. The maintenance planner must recognize the interdependence of maintenance and AE support.

4-2. Units need a constant supply of serviceable AE. AE maintenance is a vital task that must be performed to sustain readiness. Maintenance includes everything from minor packaging and preservation operations (cleaning, removing rust and corrosion, repairing boxes and crates) to major operations (complete renovation). Provisions must be made to conduct the specific maintenance authorized in the storage location in accordance with DA Pam 385-64. In some cases, AE must be retrograded for maintenance. Since the movement of AE requires transportation and personnel assets, it is inefficient to adopt a maintenance program geared totally to retrograde. QASAS at echelon above brigade perform QA/QC for maintenance operations. The Army divides AE maintenance into field and sustainment levels.

FIELD MAINTENANCE

4-3. All activities that have AE on hand perform maintenance (generally packaging and preservation) to prevent deterioration from rough handling and exposure to the elements. The using unit normally performs maintenance with the technical assistance of an ammunition unit. Ammunition companies perform limited maintenance and surveillance of stocks under their control. Unit capability and mission variables define limits. Besides packaging and preservation, maintenance may include replacing readily removable external parts and components. Field maintenance is largely due to turned-in AE.

4-4. Care and preservation lines may be established, if mission variables and capability permit, where loose or opened AE are visually inspected and properly identified. Inspect containers to ensure that the contents match the information on the outside. Inspect contents for serviceability, compatibility, and hazardous conditions. Palletize serviceable items. Send unserviceable but salvageable items for repair. Request disposition instructions for suspended and non-repairable items. Place scrap material in suitable containers for reuse or send to a salvage area.

4-5. If inspection results in the need to repair or replace a container, the contents must—

- Be removed unless a new stencil or marking is all that is necessary.
- Be returned to the container with enough filler material to allow a tight fit.

4-6. Place stencils or markings identical to the originals on the new container. Seals and bands are replaced (where required), and the container is ready for the palletizing area.

4-7. Palletize AE in accordance with proper Army Material Command drawings and appendices. Generally, no more than one lot is permitted on any one pallet in storage. Once inspected, transfer pallets to a storage or shipping area.

4-8. If an explosive hazard exists, the destruction of unserviceable AE and packaging is carried out only by, or under the supervision of, EOD personnel. Units must request disposition instructions from higher headquarters prior to destruction. See DA Pam 385-64, for more information.

SUSTAINMENT MAINTENANCE

4-9. Army Material Command AE activity generally perform sustainment level maintenance (also known as depot level). Under certain circumstances, an ammunition company with proper approval or authority may perform sustainment maintenance. Sustainment maintenance includes all field maintenance tasks and includes, but is not limited to, the following:

- Removal of extensive rust/corrosion; painting and stenciling of class V materiel; and fabrication of or major repairs to boxes, containers, and crates.
- Replacement of internal/external components that requires the use of operational shields or barricades.
- Demilitarization of AE, when directed.

4-10. Modular ammunition units with storage and issue missions are equipped to perform maintenance functions in accordance with mission variables. The tools, equipment, and supplies needed to support maintenance at that particular level are included in each unit's supply and equipment list. Generally, AE personnel do not perform maintenance where AE is stored. Exceptions may include such operations as opening and repacking boxes and metal containers of AE including, repacking of AE into serviceable boxes and fiber containers, spot painting projectiles. Personnel will not renovate, modify, or demilitarize AE within a magazine. See DA Pam 385-64, for a list of authorized exceptions.

MAINTENANCE STANDARD OPERATING PROCEDURES

4-11. Before starting any maintenance involving AE, an adequate risk assessment and SOP will be developed and approved by the commander or authorized commander's designated representative. Refer to chapter 1 for additional SOP development guidance.

TECHNIQUES AND CONSIDERATIONS FOR HANDLING CONTAMINATED AMMUNITION AND EXPLOSIVES

4-12. When operating in chemical, biological, radiological, or nuclear (also called CBRN) conditions AE may or may not require decontamination before use and handlers need to understand precautions. Units responding to these events initially perform those actions required to allow continuation of the mission and, within mission constraints, save lives. Service members perform individual decontamination of their personal and assigned equipment as outlined in the unit tactical SOP in accordance with FM 3-11, *Chemical, Biological, Radiological, and Nuclear Operations*, and ATP 3-11.32/MCWP 10-10E.8/NTTP 3-11.37/AFTTP 3-2.46, *Multi-Service Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Passive Defense*. Unit personnel under the supervision of trained personnel organic to the unit perform decontamination as soon as possible after a chemical, biological, radiological, or nuclear attack. For more information on techniques for decontamination and health service support in contaminated environments, see ATP 4-02.7/MCRP 4-11.1F/NTTP 4.02.7/AFTTP 3-42.3, *Multi-Service Tactics, Techniques, and Procedures for Health Service Support in a Chemical, Biological, Radiological, and Nuclear Environment*.

4-13. Radiological contamination should be blown off with a stream of air or wiped off with hot, soapy water. Rinse the surface by wiping with a sponge dipped in clean water.

4-14. Cool, soapy water is the preferred decontaminant for all types of contamination on small arms ammunition. Personnel performing chemical decontamination of AE should be aware of the following precautions:

- Do not use chlorine-based decontaminants on ammunition. It removes critical markings from the ammunition. It may also corrode and render ammunition unserviceable. Do not use nonstandard decontaminants that are corrosive. They also may remove critical markings from the ammunition.
- Artillery fuses are difficult to decontaminate due to their corners and crevices. If artillery fuses are stored in ammunition cans, decontaminate the cans as normal.
- Aviation munitions use paint with polyurethane compounds. Chemical agents readily absorb into this type of paint. Thus, the decontamination operations do not have a significant effect unless they take place within minutes after the time of contamination. Timely decontamination reduces the residual contact hazard.

SECTION II – SURVEILLANCE OPERATIONS

4-15. The commander is responsible for the surveillance program. Units execute the program under the guidance and advisement of the QASAS. AE surveillance is the observation, inspection, serviceability determination, and classification of AE and their components for movement, storage, and maintenance. All theater activities that store, maintain, dispose of, or ship AE and its components conduct surveillance activities. QASAS or personnel under the direct supervision of the QASAS perform classification. Commanders in formations without a QASAS may have ammunition warrant officers, and military ammunition inspectors in the grade of staff sergeant or above, or designated civilian technicians who have been a trainer and or certified by the Defense Ammunition Center perform the surveillance program. Surveillance ends when AE are either expended or destroyed.

SURVEILLANCE FUNCTIONS

4-16. Quality Assurance Specialists (Ammunition Surveillance) inspectors, personnel under the direction of a QASAS, military ammunition inspectors, and properly trained and designated Civilian technicians are responsible for ensuring the reliability and serviceability of AE. The surveillance mission encompasses the following duties:

- Inspecting storage facilities, field storage, and all types of storage sites to ensure compliance with storage standards.
- Inspecting surrounding areas for fire hazards and other nonstandard conditions.
- Checking for conditions that could speed up deterioration of items in storage.
- Teaching surveillance and AE safety.
- Preparing and maintaining records and reports to cover all surveillance activities. (Surveillance records and reports are contained in DA Pam 742-1.)
- Observing, inspecting, and investigating AE and components for serviceability.
- Monitoring storage, handling, and maintenance operations and recommending changes to enhance safety and operational effectiveness.
- Advising the commander on AE surveillance matters.
- Inspecting AE to determine quality, safety, and deterioration.
- Maintaining AE drawings and specifications files and indexes.
- Maintaining AE suspension, notifications and safety of use messages.
- Inspecting incoming and outgoing AE shipments for compliance with existing instructions and regulations.
- Providing technical advice to the commander and supported units on AE safety and compliance with AE regulations.
- Leaders ensure that personnel perform surveillance functions according to DA Pam 742-1 and applicable TMs and supply bulletins.
- Assist in planning, administering, and enforcing the explosives safety program.

4-17. AE inspectors provide an invaluable service to the commander and supported units. Inspectors assist in many activities including the following:

- Investigating AE malfunctions and accidents.

- Inspecting and testing lightning protection systems.
- Conducting unit AE inspections.
- Preparing licenses, site plans, and DA Form 7632s for storage facilities when the safety specialist needs assistance or lacks the knowledge.
- Planning construction of storage facilities.
- Planning field storage areas.
- Monitoring uploading/downloading of AE to/from combat vehicles.

4-18. When requested by safety directors and managers, QASAS/Ammunition LARs provide technical assistance in the following areas:

- Development of explosives safety site plans/submissions and explosives licenses.
- Explosives DARD requests and certificates of compelling reasons.
- Reviewing designs for explosive production, manufacture, testing, storage, surveillance, maintenance demilitarization, and disposal facilities for compliance with explosive safety standards.
- Conducting safety inspections of AE handling, storage, use, maintenance, and disposal areas at least annually.
- Monitoring AE uploads and other activities that involve the transportation and storage of AE in other than authorized and licensed storage areas to meet pertinent requirements.
- Reviewing risk assessments, SOPs, and directives for compliance with explosive safety requirements.
- Assisting in the master planning process and reviewing the master plan annually. QASAS/Ammunition LARs ensure the plan does not propose new construction inside explosive safety arcs.
- Monitoring operations involving AE to ensure that Army units understand and comply with explosive safety standards.

SURVEILLANCE INSPECTIONS

4-19. The following inspections are performed by QASAS and/or military inspectors in accordance with DA Pam 742-1—

- Damage in transit inspection.
- Receipt, including transfers, field returns, and CEA.
- Periodic (cyclic) (performed by or under the direct supervision of QASAS).
- Storage monitoring.
- Special.
- Pre-issue.
- Verification.

SERVICEABILITY STANDARDS

4-20. The purpose of an inspection is to find deterioration and determine the serviceability of items. As a rule, AE must not have defects that alter their characteristics, make them unsafe, or prevent them from performing as designed. The inspector must be familiar with all information on the items, including components and packaging. The prime causes of unserviceable AE include heat, moisture, not stored in proper shipping containers and rough handling. Deterioration is faster when moisture combines with a rise in temperature. Serviceability standards are contained in DA Pam 742-1 or item specific references such as the Munitions History Program, TMs, supply bulletins and drawings.

SURVEILLANCE RECORDS AND REPORTS

4-21. Surveillance personnel in the Munition History Program keep a technical history of each lot, serial number, or group of AE. This history includes results of all inspections, tests, investigations, and any unusual

or changing conditions affecting the items. Personnel use these records to evaluate the serviceability and reliability of AE. The Munitions History Program provides a complete history of items being considered for issue, turn-in, demilitarization, or shipment. The Munitions History Program contains the following information—

- Date of manufacture.
- Date of last inspection.
- Date of next inspection.
- Condition of the materiel.
 - Assigned condition code.
 - Restriction (if present) on item.
- Quantity.
- Type of storage.
- Type of defects.
- Cause of defects.
- Results of tests.

4-22. DA Pam 742-1 provides guidance for preparing the following records and reports—

- DA Form 984 (*Munitions Surveillance Report*).
- DA Form 2415 (*Ammunition Condition Report*).
- DA Form 3022 (*Army Depot Surveillance Record*).
- DA Form 3023 (*Gage Record*).
- DD Form 250 (*Materiel Inspection and Receiving Report*).
- DD Form 1575 (*Suspended Tag-Materiel*).
- DD Form 1575-1 (*Suspended Label-Materiel*).
- DD Form 1650 (*Ammunition Data Card*).
- SF 364 (*Report of Discrepancy [ROD]*).

SECTION III – EMERGENCY DESTRUCT OPERATIONS

4-23. Soldiers conduct emergency destruction of AE to prevent enemy use, to prevent disclosure of information about classified AE, and for safety reasons. The object of emergency destruction is to render AE inoperable, destroy AE and documents of value to the enemy, and render any remaining AE too hazardous to use.

APPROVAL AUTHORITY

4-24. Unit standard operating procedures establish the authority to destroy AE. The applicable mission order or SOP must specify who in the chain of command is authorized to order the ASA to destroy AE. Senior commanders may delegate this authority to subordinate commanders when the tactical situation demands. Commanders may also dictate when and how to conduct ASA emergency destruction including the types of items authorized for destruction and the destruction methods.

CONSIDERATIONS FOR EMERGENCY DESTRUCTION

4-25. The decision to destroy, the method used, and the items to be destroyed depends on operational and mission variables and command policy.

TIME AVAILABLE

4-26. The tactical situation will influence the decision for emergency destruction of AE, and the methods by which to accomplish emergency destruction. The time available to make a decision concerning the emergency destruction of AE may prevent the senior leader at the ATHP or MATP from requesting permission from a higher headquarters to conduct emergency destruction and prevent enemy capture and use.

AMOUNT OF AMMUNITION AND EXPLOSIVES TO BE DESTROYED

4-27. The amount of demolition resources and the time required to destroy an AE stockpile directly relates to the amount of AE and its degree of dispersion. Emergency destruction by burning or demolition requires significant preparation, but is more effective. An artillery strike is quicker but less effective at ensuring complete destruction.

AMMUNITION AND EXPLOSIVES SECURITY CLASSIFICATION

4-28. Personnel must evacuate classified AE if possible. If not possible, destroy classified AE first. Personnel use the most reliable demolition method on classified AE to ensure complete destruction.

AVAILABILITY OF MATERIAL AND TRAINED PERSONNEL

4-29. If the ASA has no demolition or flammable material, destruction methods are limited. Only permit personnel trained in and thoroughly familiar with the unit emergency destruction standard operating procedures to conduct demolition operations.

PLANNING FOR EMERGENCY DESTRUCTION

4-30. Planning for emergency destruction begins as soon as a unit is assigned an AE mission, and must be documented in an ASA internal SOP as an annex. To ensure the plan is complete and feasible, units should staff it through technically qualified personnel such as EOD qualified personnel.

4-31. Leaders must train ASA, ATHP, and MAPT personnel in emergency destruction methods and procedures. All personnel must be thoroughly familiar with the unit emergency destruction standard operating procedures and methods of destruction.

4-32. Base priorities for emergency destruction on the tactical situation and the types of AE stored at the ASA, ATHP or MATP. Units should establish emergency destruction priorities in their mission orders and SOPs. Priorities may change based on logistical and tactical requirements. AE vital to the defense of the unit should not be destroyed.

4-33. Emergency destruction priorities include:

- Priority 1: Classified AE, associated manuals, records, reports, test sets, and equipment.
- Priority 2: AE that enemy forces can use in immediate retaliation. This includes AE deployed without a weapon system such as grenades, mines, small rockets, and AE for which the enemy has weapon system capability.
- Priority 3: Casualty producing AE (high explosive and anti-personnel) not included in priorities 1 and 2.
- Priority 4: Non-casualty producing and pyrotechnic AE such as signals and illuminating projectiles.

SAFETY

4-34. Observance of safety precautions is mandatory regardless of the emergency destruction method used or the urgency of the situation. Only trained, experienced personnel should conduct emergency destruction operations. Safety requirements determine the number of personnel engaged in emergency destruction of AE. It is always best to use the cardinal rules of AE handling when planning and executing emergency destruction operations: expose the minimum number of people, to the minimum amount of explosives, for the minimum amount of time consistent with safe and efficient operations. Safety considerations include the amount and type of AE being destroyed and the size of the ATHP or MATP. A minimum of two personnel should be present during emergency destruction operations.

4-35. Mission variables permitting, coordinate with and warn those units endangered by emergency destruction operations to prevent or reduce casualties.

4-36. No matter the method used, take special care when destroying improvised conventional AE, rockets, missiles, and ejection type AE. Improvised conventional AE and ejection type. When detonated or burned, AE may expel their payload. Treat these sub-munitions as UXO. Point rockets and missiles away from friendly troops. During emergency destruction operations, rockets and missile could unintentionally ignite.

4-37. When using electrical or remote firing devices during emergency destruction operations, maintain a minimum distance of 400 meters (1,312 feet) from radio transmitters in order to prevent pre-mature detonation.

METHODS OF DESTRUCTION

4-38. Choose a method of destruction that causes enough damage to the AE to ensure they are not restorable to a useable condition within the combat zone by repair or cannibalization. When appropriate, destruction should be planned to impede enemy troop movement without creating hazards to friendly forces.

4-39. The actual method or methods used in a given situation depend on time, personnel, type of AE, and available means of emergency destruction. Methods of destruction include—

- Fire Support: After expending as much AE on enemy positions as time allows, units request a fire mission on the ASA, ATHP, or MATP location.
- Burning: Burning is not the recommended means of destruction for AE. Although less time consuming, it rarely accomplishes total destruction. Use diesel fuel, gasoline, and paint thinner or other suitable combustible flammable liquid to facilitate a rapid fire.
- Demolition: Properly executed demolition is extremely effective in the destruction of AE. Emergency destruction teams must understand how and where to place demolition charges on different AE to achieve complete destruction or to make the AE unusable by the enemy. Personnel must consider quantity distance factors to reduce the risk to friendly forces.

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Chapter 5

Fire Protection, Prevention, and Safety Awareness

This chapter discusses fire protection and prevention programs and procedures. Topics covered include fire divisions, hazard classifications and fire symbols, common safety violations and hazards, and characteristics of AE fires.

SECTION I – FIRE PROTECTION PROGRAM

5-1. Fire and excessive heat are two of the greatest hazards to explosives. Many AE items are extremely sensitive to heat and react at temperatures substantially lower than required to ignite ordinary wood, paper, or fabrics. Direct heat generated by a fire could initiate a reaction and result in an explosion.

5-2. Every Army activity must have a fire protection program that includes fire protection training, fire suppression, and fire prevention. The program's objective is to eliminate the causes of fire and reduce the potential for loss of life, injury, and property damage. Army policy prohibits fighting fires that involve AE. Firefighting to prevent fire from engaging AE is authorized.

5-3. The commander's awareness and involvement are the most critical component of an effective fire protection program. Preserving life and property is a fundamental duty of all levels of command and supervision.

FIRE PREVENTION

5-4. Each ASA, ATHP, MATP, unit storage/ammunition storage area, and BLAHA must establish a well-planned fire prevention program that includes SOPs, risk assessments, fire prevention training, identification and elimination of hazards, enforcement of fire regulations, and adequate fire protection for facilities. This program requires strong command emphasis and support.

5-5. Frequent surveys and inspections help to establish the best standards and practices for preventing fires. AE fires are among the most feared because of the potential for casualties, destruction, and loss of property and equipment. Most fires involving AE are preventable. Thus, fire safety awareness and training in prevention practices are especially important.

STANDARD OPERATING PROCEDURES

5-6. The fire prevention procedures presented here are fundamental but not all-inclusive. They should be supplemented by additional standards the commander feels are necessary to protect the ASA. At a minimum, the unit SOP will contain the following rules and procedures for personnel working with and around AE:

- Strictly regulate and control smoking near areas where AE, highly combustible materials, or flammable items are stored.
- Designate specific locations and post "authorized smoking area" signs (if smoking can be regulated safely). The commander or safety officer certify smoking areas and equip them with proper receptacles for butts or smoking residue. Provide at least one portable fire extinguisher with a 1A or greater rating at each designated smoking area.
- Smoking is prohibited in, on, or within 50 feet of any motor vehicle, trailer, railcar, or MHE loaded with explosive items.
- Locate the smoking area at least 50 feet from the area containing AE if noncombustible walls do not separate these two areas. Place at least one serviceable fire extinguisher in the area. Do not

permit anyone in contaminated clothing (clothing with explosive or hazardous material) to use the smoking area.

- Do not permit the use of matches or other flame, heat, or spark producing devices in any magazine area or field storage activity. The commander or unit safety officer should provide for exceptions to this in writing.
- Use only flashlights or storage battery lamps approved by the recognized authority in structures that contain AE.
- Locate parking areas to include gasoline, diesel, and gas powered MHE parking, no closer than 100 feet outside ammunition storage areas. Control these areas to reduce fire hazards and provide easy access to firefighters.
- Parking areas for fuel service vehicles should be located a minimum of 50 feet from explosives locations.
- All MHE and any other gasoline, diesel, or gas equipment used in an AE area should be equipped with a fire extinguisher. For additional requirements, see DA Pam 385-64.
- Refuel gasoline and diesel-powered vehicles and equipment at least 100 feet from structures or sites containing explosives.
- Police areas on a daily basis for combustible materials left over from operations. Stack and properly dispose of these materials daily. See DA Pam 385-64 for stacking guidelines and distance requirements.
- Control vegetation or undergrowth as much as the tactical situation permits.
- Enforce key and lock control procedures.
- Ensure SOP incorporates Category I and II security requirements.

PRE-FIRE PLAN

5-7. Any activity that stores or handles AE must have an effective safety program and plan to help prevent and fight fires. Develop pre-fire plans in accordance with AR 420-1. In addition to the requirements of AR 420-1, the overall plan will specify responsible individuals and alternates, their organizations and training, and include a description of the emergency function of each department or outside agency.

5-8. Details of the plan should describe the duties of personnel and will include—

- Reporting the fire.
- Directing orderly evacuation of non-essential personnel.
- Notifying nearby commands and locations of impending dangers.
- Activating means of extinguishing or controlling the fire.
- Communications plan and alarm signals.
- Meeting and advising the firefighters on the details of the fire up to the time of their arrival. Include the types of AE involved and associated hazards.
- When to fight a fire and when to evacuate to a safe distance.
- A rally point.

5-9. The pre-fire plan includes an installation map that identifies storage locations, the road network, and AE hazards at each location, including fire and chemical symbols. Details of the plan may vary depending on the tactical situation. See AR 420-1 for additional guidance.

TRAINING

5-10. Training is a vital part of the fire protection and prevention program. All personnel and firefighters involved with AE must receive training in the precautions and proper methods of fighting fires. Training will include an understanding of individual responsibilities as identified in the pre-fire plan. It should also include instruction in the following—

- A system for reporting fires.
- Procedures for sounding alarms.

- Evacuation procedures and rally point.
- Application and meaning of each type of fire and hazard symbol.
- Type and use of appropriate firefighting equipment.

5-11. Fire drills encourage and increase safety awareness. Instructions to supervisors and personnel will include steps that increase fire safety. All supervisors must be thoroughly familiar with fire hazards and what types of fire to fight, and from what fires to evacuate to a safe distance.

5-12. Hold fire drills within the explosives areas at intervals of six months or less. See DA Pam 385-64, table 6-4 for withdrawal distances. Conduct drills to train firefighting forces and ensure other personnel involved understand their duties and to evaluate fire alarm systems and firefighting equipment.

SAFETY VIOLATIONS

5-13. Serious consequences often result from the lack of training or failure to follow instructions and written safety regulations and procedures. The most common safety violations include—

- Smoking in unauthorized areas.
- Carrying and using matches and other flame or heat producing items in forbidden areas.
- Tampering or playing with AE, particularly grenades, demolition materials, and pyrotechnics.
- Deviating from approved SOPs and regulations.
- Picking up or mishandling unfamiliar or unknown ordnance.

COMMON HAZARDS

5-14. A fire in an AE storage area can start in any number of ways. Most often, fires begin in vegetation and accumulated waste materials, wastepaper, scrap lumber, dunnage, broken pallets, and boxes. Causes include the following—

- Unauthorized use of spark producing tools.
- Use of defective MHE and vehicles.
- Use of faulty or unapproved electrical equipment.
- Failure to provide proper barricades.
- Failure to provide firebreaks or proper firebreaks.
- Use of improper grounding techniques.
- Improper use/disposal of solvents.

PROCEDURES FOR AMMUNITION AND EXPLOSIVES - LADEN VEHICLES

5-15. When any part of a vehicle loaded with ammunition, other than its cargo, catches fire, try to get the vehicle to a clear, isolated area and use a handheld fire extinguisher to fight the fire. Fight the fire until the flames reach the cargo. At that point, evacuate all personnel and equipment to a safe distance. Smoking is prohibited in, on, or within 50 feet of any motor vehicle, trailer, railcar, or MHE loaded with AE.

AUXILIARY FIREFIGHTING EQUIPMENT

5-16. A small fire involving AE may rapidly become intense and lead to an explosion. Use hand-held portable fire extinguishers to fight small fires as long as the fire is outside of the magazine. All fire extinguishers must be easily accessible and maintained in good operating condition. While personnel are handling explosives a minimum of two fire extinguishers suitable for the hazards involved will be available for immediate use. It is vital to attack a small fire at once using authorized fire extinguishing equipment to avoid exposing personnel to the hazards of an imminent explosion. See table 5-1, page 5-4 for more information about the types of firefighting agents that are used on different types of fires.

WATER BARRELS AND SAND

5-17. Water barrels and pails, sand boxes, and shovels provide recognized means of combating class A fires in ASAs where the combustible material consists primarily of grass, wood, dunnage, boxes, and empty containers. Cover barrels to prevent insect breeding and evaporation. Winterize barrels as necessary. At least two metal pails must be available for each barrel. Water barrels may not be needed with the ASA when it meets the following conditions:

- Vegetation control measures are adequate and regularly monitored.
- A pre-fire plan and an organized firefighting force with the equipment capable of combating grass and brush fires are in place.
- Fire stations and storage areas maintain updated fire maps. These maps indicate the location of each storage area and the hazard at each site.
- Storage area work crews are equipped with serviceable extinguishers.
- No storage of white phosphorus or like AE that require the use of water barrels.

5-18. Rakes, shovels, picks, and other equipment needed to fight grass or vegetation fires must be in adequate supply. Utilize plows, graders, and bulldozers if available.

Table 5-1. Fire extinguishing agents

CLASS	AGENT
Class A – Combustible Materials such as wood, paper, and rubbish.	Water.
Class B – Volatile Flammables Materials such as oil, gasoline, grease, or paint.	Carbon dioxide, halon, foam or dry chemical.
Class C – Electrical Electrical equipment.	Carbon dioxide, halon, or dry chemical.
Class D – Combustible Metals Materials such as magnesium potassium.	Dry powder (sodium chloride)

FIREBREAKS

5-19. Firebreaks may be both artificial and specific. Artificial firebreaks include roads, highways, cleared manmade areas, survey lines, and transmission lines. Plan and cut specific firebreaks in advance and maintain them to prevent the progress of any fire. It may not be possible or desirable to cut firebreaks during tactical operations due to mission variables. DA Pam 385-64, chapter 6 provides general guidelines for firebreaks. Maintain a 50-foot firebreak around any AE location, when possible.

SECTION II – FIRE HAZARDS AND SYMBOLS

5-20. Depending on the materials involved, fires that occur in buildings and magazines containing AE vary in intensity and outcome. Certain explosives ignite on contact with a spark or flame or when subjected to frictional heat or concussion. Some substances burn freely. Others, such as propellants, explode while burning or develop heat so intense that firefighting efforts are nearly futile.

5-21. Firefighters must be well acquainted with the hazards in each fire hazard group. They must know which methods of fighting fires are most effective for the materials under their protection. They must be proficient in using the personnel protective devices needed for fighting various types of fires. Remember, AE personnel do not fight fires involving AE.

FIRE DIVISIONS AND CLASSES

5-22. AE are separated into fire divisions based on the relative danger they present to personnel, first responders, and firefighters. Each fire division has different protocols for fighting fires that may occur in and around AE. Table 5-2 outlines the various fire divisions used by the U.S. Army, the predominate hazard, and the hazard class for each type of AE. Table 5-3 provides information on the actions Soldiers should take in

fighting fires within each fire division. Table 5-4, on page 5-7 provides information about emergency withdrawal distances for non-firefighting personnel.

Table 5-2. Fire divisions and hazard classes

<i>Fire Division</i>	<i>Predominate Hazard</i>	<i>Hazard Class</i>
1	Mass explosion	1.1 and 1.5
2	Non-mass explosion, fragment producing	1.2 and 1.6
3	Mass fire, minor blast, or fragment producing	1.3
4	Moderate fire, no blast or fragments	1.4

Table 5-3. Fire symbol hazards and actions

<i>Symbol</i>	<i>Materials</i>	<i>Hazard</i>	<i>Actions</i>
1	1.1 Explosives, ammunition, and liquid propellants	Mass detonation	<ol style="list-style-type: none"> 1. Will not be fought unless a rescue attempt is being made. 2. If there is suitable separation between non-explosive and symbol 1 material, and if approved by the fire chief, firefighting forces may attempt to extinguish the fire. 3. If personal safety is in doubt, take suitable cover.
2	1.2 Ammunition and explosives	Explosion with fragments	<ol style="list-style-type: none"> 1. Give the alarm and attempt to extinguish the fire if in the early stage. 2. Firefighting forces should fight the fire until explosive material becomes involved in the fire or the fire chief determines the risk is too great. If not possible, prevent the fire from spreading. 3. Detonating of items could occur. Provide protections from fragments.

Table 5-3. Fire symbol hazards and actions *(continued)*

Symbol	Materials	Hazard	Actions
3	1.3 Ammunition and explosives	Mass fire	<ol style="list-style-type: none"> 1. May be fought if explosives are not directly involved. 2. If WP munitions are involved, smoke is liberated from the munition. WP munitions may explode. WP should be immersed in water or sprayed with water continuously. 3. For fire involving HC and incendiaries water should not be used unless large quantities are available. Use dry sand or dry powder agent in the early stage. 4. For fires involving pyrotechnics and magnesium incendiary, protect agent facilities and equipment. Do not use CO₂ or water on or near the munitions. Allow magnesium to cool unless upon flammable material. In this case, use a 2-inch layer of dry sand or powder on the floor and rake the burning material into this layer and smother.
4	1.4 Ammunition and explosives	Moderate fire	<ol style="list-style-type: none"> 1. Fight the fire. 2. Expect minor explosions and hot fragments.
Legend: CO ₂ : Carbon Dioxide HC: High Concentrations WP: White Phosphorous			

Table 5-4. Emergency withdrawal distances for nonessential personnel

Hazard Class	Unknown NEW	Known NEW
Unknown, located in facility, truck, and/or tractor-trailer.	4,000 feet	4,000 feet
Unknown, located in railcar	5,000 feet	5,000 feet
HD 1.1 (see note 1)	Same as unknown HD	For transportation: 1. Use 2,500 feet minimum distance for NEW >500 pounds. 2. Use 5,000 feet minimum distance for railcars with New< pounds and 4,000 for feet for other modes. 3. Use 4,000 feet minimum distance for bombs and projectiles with caliber 5 inch (127 millimeter) and greater. For Facilities: 1. Use 2,500 feet minimum distance for NEW> 15,000 pounds. 2. Use 4,000 feet minimum distance for NEW> 15,000 pounds and 50,000 pounds or less. 3. Above 50,000 pounds, use D=105 W ^{1/3} .
HD 1.2 (see note 1)	2,500 feet	2,500 feet
HD 1.3 (see note 2 and 3)	600 feet	Twice the IBD distance with a minimum distance of 600 feet.
HC 1.4	300 feet	300 feet
Notes: 1 For HD 1.1 and 1.2 items, if known, the maximum range fragments and debris will be thrown (including the interaction effects of stacks of items, but excluding lug, strong backs, and nose or tail plates) may be used to replace the withdrawal distances. 2 For accidents involving propulsion units, it is unnecessary to specify emergency withdrawal distance based on the potential flight ranges of these items. 3 Refer to DA Pam 385-64.		
Legend: HD: Hazard Class/Division NEW: Net Explosive Weight		

5-23. Fire Division 1 indicates the greatest hazard, with the hazard decreasing with each ascending number. Fire Divisions 1 through 4 correspond with hazard class/division (HC/D) 1.1, 1.2, 1.5 and 1.6. See DA Pam 385-64 for further discussion of the Hazard Classification System.

5-24. Fire Divisions 1 and 2 include the AE in Hazard Classes 1.1 and 1.2. In a fire, these materials can be expected to detonate with moderate to severe fragmentation hazards. Do not attempt to fight fires involving Division 1 unless a rescue attempt is being made. Attempts to extinguish a Division 2 fire may be made if it is in an early stage, or to fight the fire until the risk becomes too great.

5-25. Fire Division 3 is comparable to Hazard Class 1.3 and presents a mass fire hazard. Personnel in the area will give the alarm and fight the fire if AE are not directly involved.

5-26. Fire Division 4 consists of AE that presents a moderate fire hazard. Firefighters (not AE personnel) fight fires that involve this type of AE with remote streams and portable and mobile fire-extinguishing equipment until they bring the fire under control. See DA Pam 385-64 for more information on fighting fires.

FIRE DIVISION SYMBOLS

5-27. Each fire division is represented by a distinctive fire symbol. The shapes and dimensions for each symbol are identified in figure 5-1. These symbols enable firefighters to recognize possible hazards as they approach the fire scene. The applicable fire division number is shown on the symbol. To facilitate long-range identification, these symbols have different shapes

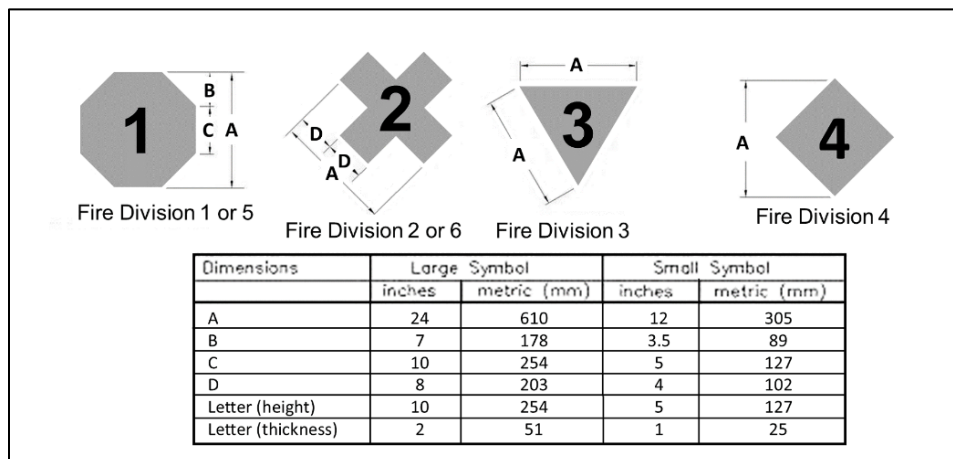


Figure 5-1. Fire division symbol

POSTING FIRE SYMBOLS

5-28. Post the fire symbol that applies to the most hazardous material present at or near explosive locations. When all AE within an ASA are covered by one fire symbol, it may be posted at the entry control point. Symbols must be visible from all approach roads.

5-29. When different HC/D of AE are stored in individual multi-cubicle bays or module cells, appropriate fire symbols will be posted on each bay or cell. Display only one fire symbol at the entrance of each row or service road where like AE requiring the same fire symbol are located.

5-30. Place fire symbols on entrances to arms rooms that are licensed for holding and storing quantities of explosives. In addition, personnel must display the appropriate fire symbol on lockers or similar type containers where licensed explosive AE are stored. However, symbols are not required on the exterior of a building if the building is exempt from ESQD requirements contained in DA Pam 385-64.

5-31. It is not required to post fire symbols on locations having 1,000 rounds or less of HC/D 1.4 small arms ammunition (.50 caliber or less). U.S. forces utilize host nation's symbols if required by agreement. The ASA commander may remove fire symbols for security purposes. In this case, the commander must emphasize giving prompt and exact information to the firefighters regarding any changes in the status of explosives.

5-32. If vehicles and aircraft are parked in a designated explosives parking area, fire symbols need not be posted providing the area is identified on the installation master map and described in a local SOP or vehicle and/or aircraft parking plan.

SECTION III – CHEMICAL HAZARDS AND SYMBOLS

5-33. Identify chemically filled AE storage and operational facilities with appropriate hazard symbols as shown in figure 5-2. The type of hazard symbol selected for this purpose depends not only on the type of chemical agent in the item of AE but also on the absence or presence of explosive components in the item. (During wartime and during certain contingency operations, chemical hazard symbols may not be required. AE personnel should consult their supporting AE activities or safety personnel for more information.)

5-34. Appropriate personal protective equipment are essential when fighting fires involving chemical agents. The protective clothing and apparatus in figure 5-3 on page 5-10 are for firefighting purposes and do not necessarily apply to normal operations. Refer to figure 5-3 on page 5-10 to determine clothing and equipment required when dealing with specific chemicals and fillers. The symbols presented in this figure are described as follows:

SYMBOL 1, WEAR FULL PROTECTIVE CLOTHING

5-35. The following indicates protective clothing as identified:

- Set 1. Red rim and figure. Indicates the presence of highly toxic chemical agents that may cause death or serious damage to body functions. Includes authorized self-contained breathing apparatus, or approved equivalent; impermeable suit; hood; gloves; explosives handler's coveralls; and protective footwear, as applicable. A fire blanket should also be available in case of a fire. (Typically, for captured enemy AE).
- Set 2. Yellow rim and figure. Indicates the presence of harassing agents (riot control agents and smokes). Includes authorized protective mask or self-contained breathing apparatus, explosive handler's coveralls, and protective gloves.
- Set 3. White rim and figure. Indicates the presence of white phosphorus and other spontaneously combustible material. Includes authorized protective mask or self-contained breathing apparatus, flame-resistant coveralls, and flame-resistant gloves.

SYMBOL 2, WEAR BREATHING APPARATUS

5-36. The statement—Wear breathing apparatus— indicates the presence of incendiary and readily flammable chemical agents that present an intense heat hazard. This hazard and sign may be present with any of the other fire or chemical hazards/symbols. Use protective masks that prevent the inhalation of smoke from burning incendiary mixture.

SYMBOL 3, APPLY NO WATER

5-37. Indicates a dangerous reaction will occur if water is used in an attempt to extinguish the fire. This symbol may be posted together with any of the other hazard symbols.

5-38. See DA Pam 385-64 for information on the types of chemical hazards associated with the symbols in figure 5-2.

5-39. Use both chemical hazard and fire hazard symbols when chemical or pyrotechnic AE are assembled with explosive components, chemical AE without explosive components are identified by chemical hazard symbols only.

5-40. Personnel should remove, cover, or reverse hazard signs as soon as chemical agents are removed from a location. This requirement is similar to those for posting fire symbols.

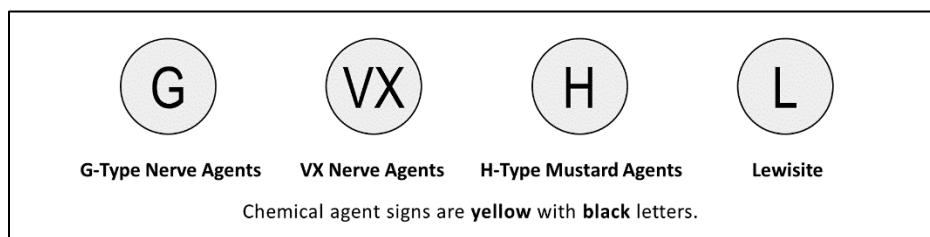


Figure 5-2. Supplemental chemical hazard symbols

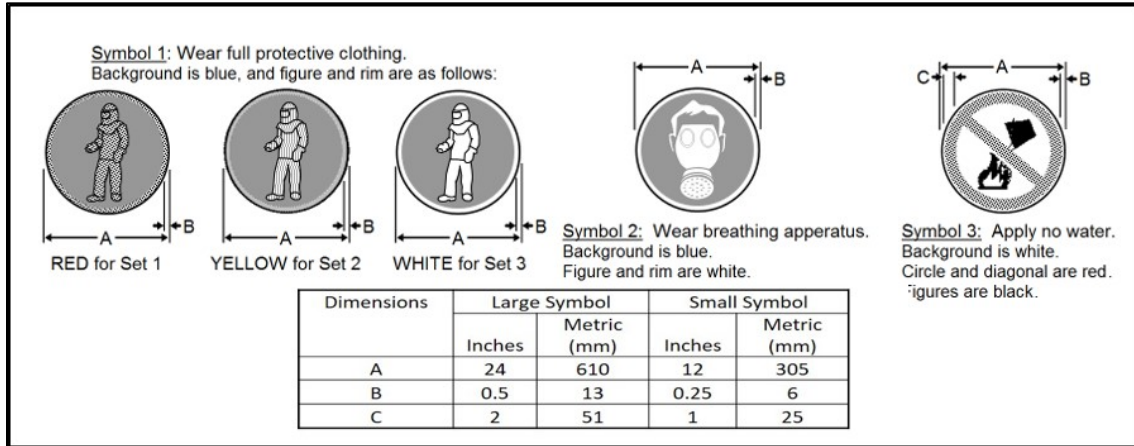


Figure 5-3. Protective clothing and apparatus

Appendix A

Brass Conversion

The data and procedures contained in this appendix are used to compute the weight and/or quantity of expended cartridge cases. Refer to DA Pam 700-16 for items not listed.

TO FIGHT WEIGHT

A-1. Multiply the quantity of expended cartridge cases by the weight. Using the example, brass, short, expended-rounds, .22 caliber, work the formula as shown below.

FORMULA

A-2. Quantity of the item x weight = weight of expended cartridge cases.

COMPUTATION

A-3. 39,875 rounds x .0008 pounds = 31.9 pounds. Work to one decimal place and round down: 31 pounds expended. Table A-1 provides the standard weight for the most common classes of AE.

Table A-1. Brass conversion chart

<i>Class Type</i>	<i>Weight (Pounds)</i>
.22 caliber, brass, short	.0008
.22 caliber, brass, long	.0014
.30 caliber, brass, all	.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
7.26 millimeter, brass, large	.026
9mm millimeter parabellum	.009
20.0 millimeter, brass, small	.2
20.0 millimeter, brass, large	.25
25 millimeter, all	.48
Shotgun, brass, all	.036

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Appendix B

Ammunition Identification

The Department of Defense identifies AE by markings and color-coding on the items themselves, the containers, and the packing boxes. The markings and standard nomenclature of each item, together with the lot number, federal supply class, NSN, DODIC, and Department of Defense Ammunition Code DODAC, completely identify each item and maintain accountable records. This appendix provides a basic explanation of markings and color-coding. Because color-coding is a ready means of identification in the field, it receives greater emphasis here.

MARKINGS

B-1. Markings stenciled or stamped on AE items include all information needed for complete identification. Components in which all explosive, incendiary, or toxic materials are substituted for inert material are identified by impressed INERT markings. Components in which all explosive, incendiary, or toxic materials have been omitted are identified by stamped EMPTY markings.

AE LOT NUMBERS

B-2. The military assigns each item of AE a complete round or item lot number when manufactured or at the logistics assistance program plant. See MIL-STD-1168C for a description of the current system. Figure B-1 breaks down a typical AE lot number showing the new and old systems.

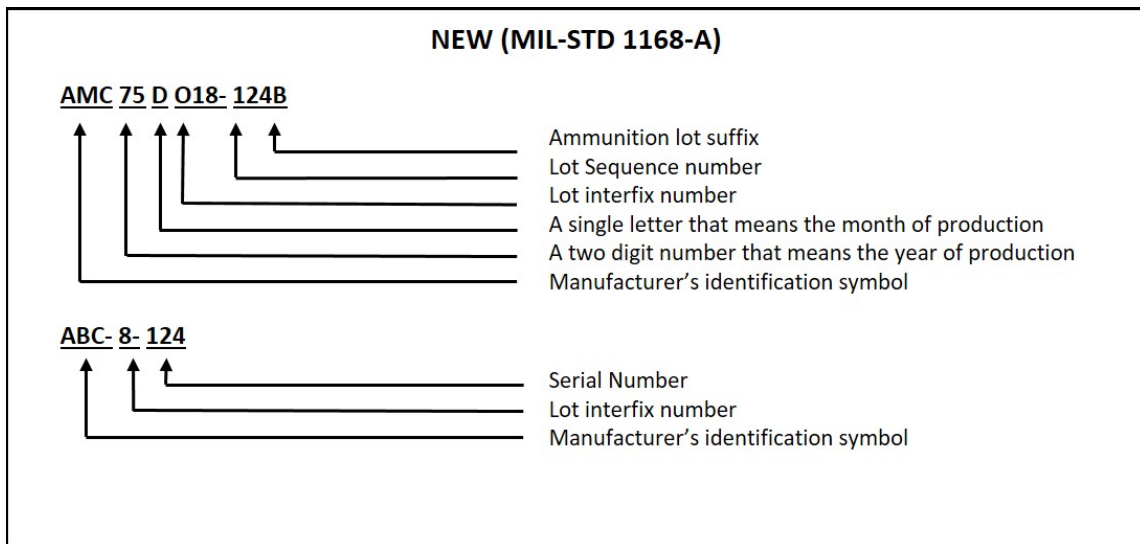


Figure B-1. Typical lot number system.

CONVENTIONAL AMMUNITION AND EXPLOSIVES FEDERAL SUPPLY CLASSES

B-3. Conventional AE is federal supply class 13. Within this supply class, AE is subdivided into two additional numbers. These identify the general type or family in which the item falls. Table B-1 on page B-2 lists the federal supply classes.

Table B-1. Federal supply class group 13 classes

<i>Table Heading</i>	<i>Table Heading</i>
1305	Ammunition, through 30mm
1310	Ammunition, over 30mm up to 75mm
1315	Ammunition, 75mm through 125mm
1320	Ammunition, over 125mm
1330	Grenades
1340	Rockets and Rocket Ammunition
1345	Land Mines
1346	Remote Munitions
1365	Military Chemical Agents
1370	Pyrotechnics
1375	Demolition Materials
1376	Bulk Explosives
1377	Cartridge and Propellant actuated devices and components
1390	Fuses and Primers
1395	Miscellaneous ammunition
1398	Specialized ammunition handling and servicing equipment
Note: There are other FSC, but they are for class V materiel outside the U. S. Army ammunition inventory. (Look in any current copy of the DOD ammunition listing, volumes 1 through 3, for more information.)	
Legend: DOD: Department of Defense FSC: Federal Supply Class mm: millimeter U. S.: United States	

CONVENTIONAL AMMUNITION AND EXPLOSIVES NATIONAL STOCK NUMBERING CONTROL SYSTEM

B-4. Each complete round or item of conventional AE or associated explosive component is identified by its own NSN. The first four numbers of the NSN is the federal supply class. The National Item Identification Number, or NIIN follows the NSN. The NIIN consists of a two-number code identifying the country of manufacture and a seven digit-number item identification.

DEPARTMENT OF DEFENSE IDENTIFICATION CODE

B-5. A DODIC is a four character alphanumeric code. The military adds the code at the end of all NSNs to denote interchangeability of the item. Communications between ammunition units often use an AE item DODIC. See figure B-2 for a conventional NSN with DODIC added, demonstrating interchangeability between various model numbers and the designators of an AE item.

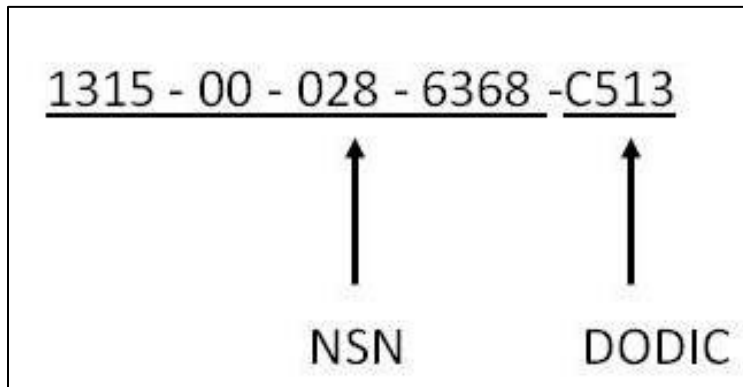


Figure B-2. Sample Department of Defense Identification Code (DODIC)

DEPARTMENT OF DEFENSE AMMUNITION

B-6. The DODAC includes the federal supply class of the AE and the DODIC. The code is used on all using unit DA Form 581s, (*Request for Issue and Turn-in of Ammunition*), DA Form 3151, (*Ammunition Stores Slip*), and most AE reports. The DODAC is used instead of the DODIC to reduce errors with AE transactions. Figure B-3 provides an example DODAC.

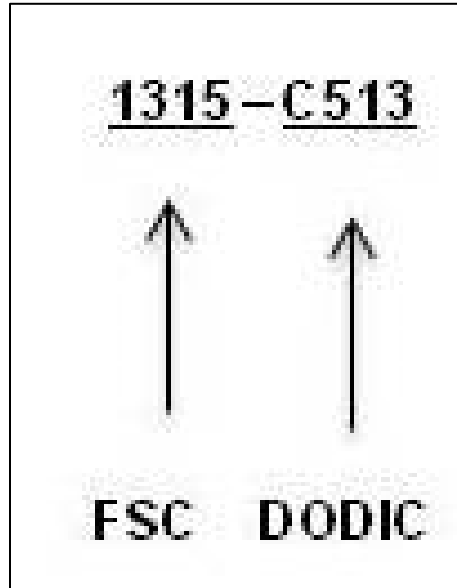


Figure B-3. Example of a Department of Defense Ammunition Code (DODAC)

COLOR CODING

B-7. The main reason AE are painted is to protect it from rust. However, the color of the protective coating and markings also makes AE easy to identify and provides some camouflage. AE 20mm and larger is color-coded in accordance with MIL-STD-709D (*Ammunition Color Coding*). See table B-2 on page B-4 and table B-3 on page B-5.

B-8. Small arms AE is color-coded under MIL-STD-709D, table 1 for Tier 1 AE. Either the small arms projectiles or the bullet tips are painted a distinctive color so they can be identified quickly. Table B-2 on page B-4 shows the color codes for types of small arms AE up to and including .50 caliber. Significant features of the current color-coding standard are as follows:

- Olive drab. Olive drab with yellow markings indicates a high explosive round. However, olive drab is also being used as a basic color for certain new rounds such as the flechette antipersonnel round, and some new illumination rounds for specific field artillery weapons.
- Overpacking. AE overpacked in color-coded bombs, in unit dispensers, or in warheads, must not be color-coded.
- Standard DOD AE Color Code. MIL-STD-709D contains the standard AE color code for 20mm and larger AE. Be aware, though, there is still AE coded as specified by superseded MIL-STD-709C, MIL-STD-709B and MIL-STD-709A. If this is the case, see the appropriate MIL-STD.

Table B-2. Ammunition color code, MIL-STD-709D

Color (1,2)	Federal Standard	Interpretation
Yellow	33538	Indicates the presence of high explosives
Brown	30117 or 30140	Identifies low explosive items or components or indicates the presence of a low explosive
Gray (3,4)	36231	Identifies ammunition that contains irritant, incapacitating or toxic agents when used as an overall body color except underwater ordnance
Gray with dark red band	36231 and 31136	Indicates the ammunition contains an irritant (riot control) agent
Gray with dark green band	36231 and 34108	Indicates the ammunition contains toxic agent other than binary agents
Gray with broken dark green band	36231 and 34108	Indicates the ammunition contains a binary nerve agent
Gray with violet band	36231 and 17100	Identifies ammunition with an incapacitating agent
Black (3,5)	37038	Identifies armor defeating ammunition, except on underwater ordnance, dummy hand grenades and when used for lettering or marking
Silver/aluminum	17178	Identifies countermeasures ammunition
Light green	34558 or 34449	Identifies screening or marking smoke ammunition
Light red	31158	Identifies incendiary ammunition or indicates the presence of highly flammable material for producing damage by fire
White (3,5,6)	37875	Identifies illuminating ammunition or ammunition producing a colored light; exceptions are underwater ordnance, guided missiles, dispensers and rocket launchers and when used for lettering or marking
Light blue	35109	Identifies ammunition used for practice
Orange	32246	
Bronze, gold and brass	17043	Identifies dummy/drill/inert ammunition not for firing but only used for handling, loading, assembly, and testing, training and display. Some dummy hand grenades may be painted black
<p>Footnote: The following have no color coding significance.</p> <ul style="list-style-type: none"> a. Colors specifically applied to identify the color of smoke ammunition or pyrotechnics. b. Unpainted or natural color ammunition. c. Gray black, green, or white on underwater ammunition. d. Gray on air launched missiles. e. Black or white when used for lettering or special marking. f. White on guided missiles, dispensers and rocket launchers. 		

Table B-3. Application of color-codes for particular ammunition items

Ammunition	Colors ¹		
	Body	Markings	Bands
High explosive, except 20mm	Olive drab	Yellow	Yellow ^{2,3,4,5}
High explosive, 20mm	Yellow	Black	None
Explosive binary 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 (API)			
AP			
With bursting charge	Black	Yellow	None
Without bursting charge	Black	White	None
Canister	Olive drab	White	None
Flechette – loaded	Olive drab	White	White ⁶
Chemical			
Filled with toxic chemical binary nerve agent	Gray	Dark Green	One broken dark green ^{7,8,9}
Illuminating			
Separate loading	Olive drab	White	White
Fixed or semi fixed	White	Black	None
Practice			
With low explosive to indicate functioning			Brown
With low explosive to indicate functioning			Yellow
With low explosive to indicate functioning			None
Screening or marking			
Smoke Ammunition			
Filled with other than WP	Light green	Black	None
Filled with WP	Light green	Light red	Yellow ⁷
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 ⁷
Filled with an incapacity agent	Gray	Violet	One violet ⁷
Filled with a toxic chemical binary nerve agent	Gray	Dark green	One broken dark green ^{7,8}
Footnotes:			
¹ Color of the letters and figures normally used for the main identification.			
² Circumferential band of yellow diamond shaped figures on semi-fixed and separate loading improved conventional munitions.			
³ Circumferential band of yellow triangular shaped figures on mass scatter able mine and loaded semi-fixed and separate loading ammunition.			
⁴ Separate loading ammunition for shipboard use has a circumferential yellow band besides yellow markings.			

Table B-3. Application of color-codes for particular ammunition items *(continued)*

<p>Footnotes (continued):</p> <p>⁵ Bombs have one yellow band except thermally protected bombs, which have two yellow bands besides yellow markings</p> <p>⁶ Circumferential band of white diamond shaped figures on ammunition containing flechettes.</p> <p>⁷ Yellow band put on to indicate high explosive burster.</p> <p>⁸ Toxic chemical agent ammunition containing binary nerve agent filling shown by a broken dark green band (1/2 inch segments separated by 1/2 inch spaces).</p> <p>⁹ Both color applications are standard. However, for land ammunition use, separate loading ammunitions olive drab for overall body color with a white band and main identification details marked white. Fixed and semi-fixed ammunition is white for overall body color with main identification details in black.</p>
<p>Legend:</p> <p>HEAT: High explosive antitank</p> <p>HEP: Explosive binary plastic</p> <p>API: High explosive incendiary</p>

Appendix C

Storage Compatibility Groups

The Army assigns AE to one of thirteen storage compatibility groups based on AE storage principles and mixed storage considerations. This appendix discusses the storage compatibility groups in detail.

COMPATIBILITY GROUP CRITERIA

C-1. Criteria used to assign AE to the appropriate storage compatibility group, A-H, J-L, N, or S, are given below. Descriptions include examples of the types of AE within each group. Certain locations within the United States, its territories, and possessions designated by the Army and with site approval from the Department of Defense Explosives Safety Board to store AE in rapid response configurations and BLAHA outside the United States authorized to store AE without regard to compatibility. The maximum NEW at any of these locations storing mixed compatibility AE must not exceed 4000 kilograms (8818 pounds NEW) calculated in accordance with DA Pam 385-64. However, storage of AE in rapid response configurations or BLAHA outside the U.S., when possible, should use storage compatibility to reduce risk. White phosphorus should be stored separately from other AE.

GROUP A

C-2. Group A consists of bulk initiating explosives with sufficient sensitivity to heat, friction, or percussion to qualify them for use as initiating elements in an explosive train. Examples of initiating explosives are wet lead azide, wet lead styphnate, wet mercury fulminate, wet tetacene, and dry cyclotrimethylenetrinitramine and pentaerythritol tetranitrate.

GROUP B

C-3. Group B consists of detonators and similar initiating devices not containing two or more independent safety features. Examples include detonators, blasting caps, small arms primers, and fuses.

GROUP C

C-4. Group C consists of bulk propellants, propelling charges, and devices containing propellant with or without means of ignition. Upon initiation, these items will deflagrate, explode, or detonate. They include single-, double-, and triple-base and composite propellants; rocket motors (solid propellants); and AE with inert projectiles.

GROUP D

C-5. Group D includes black powder, high explosive, and AE containing high explosive without its own means of initiation and without propelling charge, or a device containing an initiating explosive and containing two or more independent safety features. AE in this category will explode or detonate when any item or component is initiated except for devices containing initiating explosives with independent safety features. Examples include bulk trinitrotoluene, Composition B, black powder, and wet cyclotrimethylenetrinitramine or pentaerythritol tetranitrate, bombs, projectiles, cluster bomb units, depth charges, and torpedo warheads. Black powder saluting charges, torpedo warheads, and fuses with two or more safety features are also part of this group.

GROUP E

C-6. Group E consists of AE containing high explosive without its own means of initiating and with propelling charge. Examples include artillery AE, rockets, or guided missiles.

GROUP F

C-7. Group F consists of AE containing high explosive with its own means of initiation and with or without propelling charge. Examples are grenades, sounding devices, and similar items having an inline explosive train in the initiator.

GROUP G

C-8. Group G consists of fireworks; illuminating, incendiary, or smoke AE (including high concentration); or tear-producing, incendiary smoke, or sound effects. This category does not include AE that are water-actuated or that contain white phosphorus or flammable liquid or gel. Examples of Group G AE are flares, signals, incendiary or illuminating AE, and other smoke- or tear-producing devices.

GROUP H

C-9. Group H AE contain fillers that are spontaneously flammable when exposed to the atmosphere. These include white phosphorus, plasticized white phosphorus, or other pyrophoric material.

GROUP J

C-10. Group J are AE containing both explosives and flammable liquids or gels other than those that are spontaneously flammable when exposed to water or the atmosphere. Examples include liquid-or gel-filled incendiary AE, AE devices, flammable liquid-fueled missiles, and torpedoes.

GROUP K

C-11. Group K AE contain both explosives and toxic chemical agents. Items in this category contain chemicals specifically designed for incapacitating effects more severe than lachrymation (for example, excessive secretion of tears). They include artillery or mortar AE, fused or unfused; and grenades, rockets, or bombs filled with lethal or incapacitating chemical agents.

GROUP L

C-12. Group L is comprised of AE not included in other compatibility groups. Types presenting similar hazards may be stored together but not mixed with other groups. Examples include water-activated devices, prepackaged liquid-fueled rocket engines, AE, and damaged or suspect AE of any group.

GROUP N

C-13. Group N consists of AE containing only electronically initiated devices. Examples are bombs and warheads.

GROUP S

C-14. Group S contains AE that present no specific hazards. Included in this category is AE designed or packed to confine or contain any explosive effect to the item or package. If the package has been degraded by fire, all blasts will be limited to the extent they do not significantly hinder firefighting. An incident may destroy all items in a single pack but must not be communicated to other packs so that all are destroyed. Examples of Group S AE are thermal batteries, explosive switches or valves, and other items packaged to meet group criteria.

MEANS OF INITIATION

C-15. An AE item with its own means of initiation is one that has a normal initiating device assembled to it. This configuration presents a significant risk during storage because detonation can occur during accidental functioning of the device. However, the term does not apply when the initiating device is packaged in such a way as to eliminate the risk of detonation or when fuzed end items are configured and packaged to prevent arming. If safety features are in place to prevent initiation or detonation of the explosive filler, the initiating device may be assembled to AE.

MIXING COMPATIBILITY GROUPS

C-16. Table C-1 demonstrates how different storage compatibility groups can be mixed in storage. Groups that are intersected by an “X” (for example, A-A, B-B, B-S, C-S) may be combined in storage. Groups intersected by a “Z” indicates, when warranted by operational considerations or magazine non-availability and when safety is not sacrificed, mixed storage of limited quantities of some items from different groups may be approved in writing. Approval of such storage will be at a level consistent with the risk acceptance authority criteria of DA Pam 385-30, table 4-2. Approval of “Z” storage does not require documentation on a DA Form 7632. The installation or garrison safety office and the unit approved for mixed storage must keep this approval documentation on hand. U.S. Army Technical Center for Explosives Safety determines which items within Group K may be stored together and which must be stored separately. Group K requires not only separate storage from other groups but may also require separate storage within the group. This section discusses exceptions to the table. Compatibility of explosives for transportation are not the same as storage compatibility mixing rules. See DA Pam 385-64, chapter 20 for transportation of AE.

Table C-1. Mixing storage compatibility groups

Group	A	B	C	D	E	F	G	H	J	K	L	N	S
A	X	Z											
B	Z	X	Z	Z	Z	Z	Z					X	X
C		Z	X	X	X	Z	Z					X	X
D		Z	X	X	X	Z	Z					X	X
E		Z	X	X	X	Z	Z					X	X
F		Z	Z	Z	Z	X	Z					Z	X
G		Z	Z	Z	Z	Z	X					Z	X
H								X					X
J									X				X
K										Z			
L													
N		X	X	X	X	Z	Z					X	X
S		X	X	X	X	X	X	X	X			X	X

C-17. When evaluating storage compatibility criteria, consider the following points, if relevant:

- Compliance with compatibility criteria is not required for mission essential or operationally necessary quantities of explosives in HC/D 1.4 or 6.1 (excluding toxic chemical AE); up to 100 pounds NEW HC/D 1.3; and up to 50 pounds NEW HC/D (04)1.2. See DA Pam 385-64 for ESQD requirements.
- Equal numbers of separately packaged components of complete rounds of any single type of AE may be stored together. When so stored, compatibility is that of the assembled round such as white phosphorus filler in Group H, high explosive filler in Groups D, E, or F as appropriate.
- Personnel may assign AE that do not contain explosives but do contain substances properly belonging to another HC/D to the same compatibility group as items containing explosives and the same substances. They may also be stored with them.
- DA may authorize AE items designated —Practice— by NSN and nomenclature to be stored with the fully loaded AE they simulate.

- Army Service component commanders may authorize the mixing of compatibility groups (except items in Groups A, K, and L) in quantities not exceeding 1,000 pounds NEW per storage site.
- Personnel must package all mixed items in approved storage containers. Items must not be unpackaged at the storage location.
- Segregate groups B and F ammunition and explosives in storage from articles of other groups by means that effectively prevent propagation.
- If dissimilar HC/D 1.6 and storage compatibility groups N ammunition and explosives (such as MK 82 and MK 84 bombs) are mixed together and have not been tested to assure non-propagation, the mixed AE are considered to be HC/D 1.2, storage compatibility group D for purposes of transportation and storage. See DA Pam 385-64 about changing ESQD class/divisions when mixing storage compatibility groups N ammunition and explosives with storage compatibility groups B through G.

Source Notes

Chapter 1

- 1-2 “Unfortunately, many in the Army feel ...” Lieutenant General, Retired, Joseph M. Heiser, Jr. *A Soldier Supporting Soldiers*, (Washington, DC: Center of Military History, U.S. Army, 1991), 77. <https://history.army.mil/html/books/070/70-40-1/index.html>

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Glossary

This glossary lists acronyms and terms with Army or joint definitions. Where Army and joint definitions differ, (Army) precedes the definition. Terms for which ATP 4-35.1 is the proponent publication with an asterisk (*) before the term. For other terms, it lists the proponent publication in parentheses after the definition.

SECTION I – ACRONYMS AND ABBREVIATIONS

ADP	Army doctrine publication
AE	ammunition and explosives
AR	Army regulation
ASA	ammunition support activity
ASP	ammunition supply point
ATHP	ammunition transfer holding point
ATP	Army techniques publication
BLAHA	basic load ammunition holding area
CEA	captured enemy ammunition
CFR	Code of Federal Regulations
CJCSI	chairman of the joint chiefs of staff instruction
DA	Department of the Army
DA Pam	Department of the Army Pamphlet
DD	Department of Defense (form)
DESR	Defense Explosive Safety Regulation
DOD	Department of Defense
DODAC	Department of Defense Ammunition Code
DODIC	Department of Defense Identification Code
DTR	Defense Transportation Regulation
EOD	explosive ordnance disposal
ESQD	explosives safety quantity distance
FM	field manual
G3	assistant chief of staff, operations
HC/D	hazard class/division
JP	joint publication
MATP	modular ammunition transfer point
MHE	materials handling equipment
MIL-STD	military standard
MOS	military occupational specialty
NEW	net explosive weight
NFPA	national fire protection association

NSN	national stock number
OSHA	Occupational Safety and Health Administration
QASAS	quality assurance specialist (ammunition surveillance)
QA/QC	quality assurance/quality control
SF	standard form
SOP	standard operating procedures
STANAG	standardization agreement
TED	training and education
TM	technical manual
U.S.	United States
UXO	unexploded explosive ordnance

SECTION II – TERMS

mission variables

Categories of specific information needed to conduct operations. (ADP 1-01)

risk management

The process of identifying assessing, and controlling risks arising from operational factors and making decisions that balance risk cost with mission benefits. (JP 3-0)

References

All websites accessed 22 July 2021.

REQUIRED PUBLICATIONS

These documents must be available to intended users of this publication.

DOD Dictionary of Military and Associated Terms. January 2021.

FM 1-02.1. *Operational Terms*. 09 March 2021.

FM 1-02.2. *Military Symbols*. 10 November 2020.

RELATED PUBLICATIONS

These documents contain relevant supplemental information.

JOINT AND DEPARTMENT OF DEFENSE PUBLICATIONS

Most Department of Defense publications are available on the Executive Services Directorate website

<https://www.esd.whs.mil/dd/dod-issuances/>. Joint publications are available at:

<https://www.jcs.mil/Library/>. Most Military Standards (MIL-STD) are found at:

<https://assist.dla.mil>.

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JP 4-0. *Joint Logistics*. 04 February 2019.

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This page intentionally left blank.

Index

Entries are by paragraph number.

C
captured enemy ammunition,
 general, 3-51
 storage, 3-71

D
deviation approval and risk
 acceptance document, 3-22

E
explosive safety management
 program, 1-21, 1-23, 1-27

F
field maintenance, 4-3, 4-4, 4-5
fire division symbols, 5-27

fire extinguishing agents, table 5-1

H
hazards,
 chemical, 5-33
 electrical, 1-49
 fire, 2-15, 3-32, 3-34, 4-16,
 555-21
 material handling equipment,
 1-42

J
joint munitions office, 1-16

M
malfunction reporting, 1-9, 1-63

modular ammunition transfer
 point, 2-4, 2-8, 3-1, 3-8, 3-9,
 3-12, 3-13, 3-14, 3-15, 3-18,
 3-22, 3-79, 4-24, 4-26, 4-30,
 4-32, 4-34, 4-39, 5-4

Q
quantity distance, 3-20, 3-62,
 3-76, 4-39

S
storage compatibility groups, 3-17,
 3-18, C-1
sustainment maintenance, 4-9,
 4-10

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08 November 2021

By Order of the Secretary of the Army:

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