
MUNITIONS HANDLER SAFETY TECHNIQUES

JULY 2026

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Preface

ATP 4-35.1 discusses procedures and safety considerations for handling munitions at all levels, regardless of military occupational specialty 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, international, and, in some cases, host-nation laws and regulations. Commanders at all levels will ensure that their Service members operate in accordance with the law of armed conflict and the rules of engagement. (See FM 6-27 for legal compliance.)

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 definitions shown in the text, the term is italicized, and the number of the proponent publication follows the definition. This publication is not the proponent for any Army terms.

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 Doctrine Division, United States Army Combined Arms Support Command. Send comments and recommendations on a DA Form 2028 (Recommended Changes to Publications and Blank Forms) to Commander, United States Army Combined Arms Support Command, ATTN: ATCL-TDID (ATP 4-35.1), 2221 Adams Ave, Building 5020, Fort Lee, VA, 23801-1809; or submit an electronic DA Form 2028 by e-mail to usarmy.lee.tradoc.list.cascom-g3-5-7-tdid-doc@army.mil.

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Introduction

Soldiers, civilians, and contractors who handle munitions for the Army perform a vital role in keeping their units and Army personnel safe while maintaining and providing the munitions needed to accomplish the mission. Munitions handlers, as identified in this manual, include any person who plays a role in handling, storing, moving, and maintaining munitions. This includes officers, technicians, noncommissioned officers, and Soldiers; quality assurance specialists (ammunition surveillance); civilian munitions handlers or managers, and quality assurance/quality control ammunition inspectors. It also includes any individual tasked to handle munitions, regardless of branch or military occupational specialty.

This manual is intended to provide munitions handlers the information necessary to safely conduct munitions operations and fully support operational requirements. The primary focus of munitions safety is to reduce the probability of and limit the damage caused by unintended initiation. All personnel participating in munitions operations are responsible for safety awareness and fire protection and prevention. Readers should adhere to guidelines in this publication as closely as possible within the constraints and restrictions of the operational or tactical environment.

ATP 4-35.1 contains four chapters and three appendices:

Chapter 1 describes the role of ammunition and explosives operations within the framework of large-scale combat operations. It provides the fundamental principles of munitions management and safety, and also addresses planning considerations for munitions support.

Chapter 2 discusses general safety considerations related to the processes, procedures, and activities involved in munitions management. These considerations include transportation, site selection, storage, surveillance, maintenance, and supply activities.

Chapter 3 discusses safety considerations related to munitions management at the strategic and tactical level. It provides an overview of munitions operations, focused on mitigating risks associated with handling munitions.

Chapter 4 discusses basic fire safety and prevention. It provides implementation measures and ways to promote safety awareness.

Appendix A provides an overview of storage fundamentals according to the compatibility of munitions.

Appendix B provides general guidelines for the layout, construction, and operation of helicopter rearm points. It focuses on safe and efficient techniques to deliver rockets from the ready ammunition storage site to the rearm pads where combat aircraft are armed and rearmed.

Appendix C provides an overview of munitions markings and color-coding standards.

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Chapter 1

Fundamentals of Munitions Safety

Munitions are a fundamental component of military operations. They enable commanders to discriminately apply lethal force against an adversary in support of military operations. This chapter discusses hazards associated with different types of munitions and the measures taken to mitigate those risks, including the use of specialized equipment, safety devices, and emergency response procedures. It also highlights the crucial role of leadership, communication, written policies, training, and continuous improvement in fostering a safety-conscious culture.

MUNITIONS SAFETY

1-1. Munitions operations activities are inherently dangerous tasks. All organizations and echelons, regardless of branch or military occupational specialty (MOS), must ensure that munitions handlers understand the basic principles of munitions safety. Leaders, supervisors, Soldiers, and Department of the Army (DA) Civilians share a general responsibility to maintain a safe workplace. They must employ risk management throughout the operations process and comply with laws, regulations, and unit safety programs.

1-2. Safety is an inherent responsibility of commanders, leaders, Soldiers, and DA Civilians at all levels. Commanders under the Army Safety Program have a specific responsibility to develop, implement, and ensure compliance with unit safety programs and all Department of Defense (DOD), federal, state, and local laws, regulations, and safety requirements.

1-3. Commanders must emphasize adherence to the highest standards of munitions safety to minimize the risk to personnel, property, and equipment. Commanders must weigh the increased risk to personnel, property, and equipment against any tactical reasons requiring deviation from munitions safety standards.

1-4. The mission of munitions support units is to provide the required type and quantity of munitions to combat units at the required time and location. Effective, synchronized, and safe munitions operations are fundamental to the Army's ability to apply lethal force during operations. Munition units are organized to meet mission support requirements. In peacetime, they operate out of fixed sites with all associated support and facilities in place. When deployed, they may operate in an unfriendly or hostile environment to support a combat force.

1-5. Additional guidance on munitions safety is provided in Defense Explosives Safety Regulation (DESR) 6055.09, Code of Federal Regulations (CFR) 40 series, DA Pam 385-10, DA Pam 385-30, and DA Pam 385-64. These policies are applicable to all Army personnel, both professional and non-professional munitions handlers alike. The stipulations within these publications apply during peacetime, contingency operations, and times of war. However, 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.

1-6. Follow the cardinal safety rule in all munitions operations—expose the minimum number of people to the minimum amount of explosives for the minimum amount of time. This fundamental rule provides the maximum protection possible to people and property.

1-7. Mission variables may limit a commander's ability to adhere to the specifications of AR 385-10 and DA Pam 385-64. The following principles apply to all munitions operations, regardless of whether the unit is operating during peace, contingency operations, or war:

- Know your explosives safety responsibilities.
- Know your explosives safety points of contact and their information.
- Understand and have a current explosives safety site plan on hand.
- Train your personnel to perform their munitions mission properly. Have policies and procedures in place that cover your munitions requirements.

- Make sure all munition locations are properly sited and have current licenses. Prepare a DA Form 7632 (*Deviation Approval and Risk Acceptance Document [DARAD]*) to authorize any explosives storage safety deviations.
- Know where to find maps depicting munition locations with associated explosives safety quantity distance (ESQD), commonly known as QD, 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 munitions amnesty program including the location of collection points, responsibilities for collection, and frequency of collection.
- Know proper response procedures in the event of a munitions mishap. These include notification and evacuation procedures, personnel accountability, unexploded explosive ordnance or explosive ordnance disposal (EOD) support, accident reporting requirements, and malfunction reporting requirements.
- Allow only tasks that are necessary for an operation.
- Always enforce established personnel limits. Restriction does not prohibit official visits by safety, quality control, management, inspection, or other personnel authorized by the commander.
- Determine risks that could adversely affect your mission or capability and mitigate those risks. Communicate these risks up the chain of command to gain guidance and decisions to accept or mitigate risks.

EXPLOSIVE SAFETY MANAGEMENT PROGRAM

1-8. An explosive safety management program (ESMP) is just one component of a unit's overall safety program. This program provides standard operating procedures (SOPs) for the safe production, transportation, storage, inspection, maintenance, handling, use, demilitarization, and disposal of munitions. The ESMP is a crucial initiative led by high-ranking commanders. It is imperative for subordinate units and associated activities to fully support and align with the objectives of this program. Contractors are also expected to seamlessly integrate into the ESMP. The ESMP ensures—

- Coordination of essential elements of explosives safety.
- Risks are identified, assessed, mitigated, and accepted.
- Deviations are planned and approved at the authorized level of leadership in accordance with DA Pam 385-30.
- Fire prevention and protection.
- Explosives safety policy, directives, and SOPs are in place.
- Technical certification, proficiency training and rehearsals.

1-9. AR 385-10 requires that all Army commands, Army Service component commands, direct reporting units, garrisons, installations, and battalion-level and above units with a munitions mission develop and maintain an approved written ESMP. A commander may adopt the installation ESMP if it aligns with the unit's mission instead of developing a standalone ESMP. DA Pam 385-64 provides guidance for developing an ESMP.

1-10. The Department of Defense Explosive Safety Board (DDESB) with executive director and voting representatives selected by each military Service recommends new and updated explosives and chemical agent safety regulations and standards. Additionally, the DDESB performs DOD explosives safety management functions and manages the DOD program that integrates and applies explosives safety management tenets and requirements into DOD planning, decision-making, and day-to-day operations.

1-11. DESR 6055.09 establishes explosives safety standards for DOD. The Office of the Under Secretary of Defense for Acquisition and Sustainment develops and maintains explosives and chemical agent safety standards and regulations through the DDESB. These standards are designed to manage explosives-related risk associated with DOD operations and installations by providing protection criteria to minimize serious injury, loss of life, and damage to property.

RISK MANAGEMENT

1-12. The Army uses risk management to help maintain combat power while ensuring mission accomplishment in current and future operations. *Risk management* is the process to identify, assess, and control risks and make decisions that balance risk cost with mission benefits (JP 3-0). Risk management applies to both operations and non-operational activities.

1-13. Effective risk management is critical for munitions operations due to their inherent danger. This is true whether munitions operations occur during peacetime, contingency operations, or in armed conflict. The techniques taught in training can be successful in combat and stability operations but may be deemed unacceptable in peacetime operations. Leaders at all levels integrate risk management into all phases of the operations process:

- Planning.
- Preparation.
- Execution.
- Assessment.

1-14. Figure 1-1 illustrates the cyclical steps of risk management. Steps 1 and 2 of risk management are assessment steps. These are the identification and assessment of hazards. Steps 3 through 5 are management steps. ATP 5-19 describes 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.

1-15. ATP 5-19 provides guidelines for risk management. When applying the principles of risk management to munitions operations, leaders adhere to the cardinal principle. Leaders and managers identify hazards and apply controls to achieve this principle to perform safe and effective munitions operations.

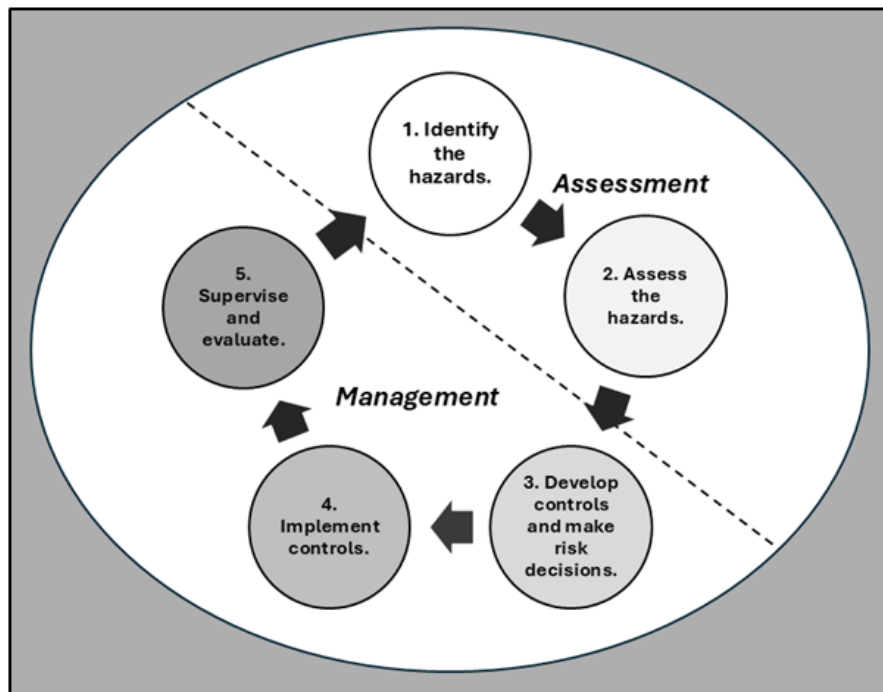


Figure 1-1. Risk management steps

GENERAL SAFETY PRECAUTIONS

1-16. Explosives safety and munitions risk management is a systematic approach that integrates risk analysis into operational planning, military training exercises, and contingency operations. The goal is to identify

potentially adverse consequences associated with munitions operations, risk reduction alternatives, and risk acceptance criteria for senior officials to make the risk decision. See CJCSI 4360.01D for more information on explosives safety and munitions risk management.

1-17. The operational environment dictates how munition support operations will take place. With accurate information and sound recommendations, the commander assumes acceptable risks to support the maneuver commander. In addition to robust training and experience, leaders must be present and focus on all aspects of the operation. Regardless of MOS, it is crucial for all munition handlers to observe the following general safety precautions:

- If a hazardous operation is observed, stop the action and report it immediately to a supervisor. Unsafe actions that are not essential to ongoing operations must be stopped immediately and control measures must be implemented to eliminate the hazard or reduce its risk to personnel.
- Do not conduct munitions operations without a risk assessment and an approved SOP.
- Do not allow heat or fire-producing items (matches or lighters) in storage areas. Always provide 50 feet of distance between munitions and any open fire source.
- Do not smoke in, around, or near munitions or explosive storage sites.
- Ensure munitions are handled by trained personnel who understand the hazards and risks associated with the types of munitions handled. Refer to DESR 6055.09, AR 385-10, DA Pam 385-64, and DA Pam 742-1.
- Do not use bale hooks to handle munitions.
- Do not tumble, drag, drop, throw, roll, or walk on containers storing munitions or explosives.
- Do not tamper with, disassemble, or alter munitions.
- Only open munitions when required.
- Keep munitions 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 munitions.
- Open munitions boxes carefully. Return all inner packaging material to the container and close it to keep out the elements.
- Repack munitions that are opened and unused.
- Do not use familiarity or experience with munitions as an excuse for carelessness.
- Do not carry initiation devices in the 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 munitions.
- 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 including missiles, 2.75-inch rockets, and blasting caps. Post signage to warn personnel.
- Smoking areas must be designated and at least 50 feet from the storage.

COMMON HAZARDS

1-18. Personnel must handle munitions carefully. Improper, rough, or careless handling can cause unintentional detonation. Munitions 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.

Palletized Munitions

1-19. It is important to inspect pallets and containers before preparing munition loads to prevent accidental spills or damage to munitions. Personnel need to visually inspect pallets and containers for broken banding or damage. Repair or replace damaged pallets or containers before using them for munitions operations.

1-20. United States Army Materiel Command has established several tools to assist units in palletizing munitions safely in accordance with regulations. Both the Army Materiel Command Drawing 19-48-75-5 and the Conventional Ammunition Packaging and Unit Load Data Index (commonly known as CAPULDI) provide technical drawings and data respectively, to ensure proper use of pallets and containers for munitions operations. These manuals are important resources when handlers are conducting maintenance and repackaging of returned ammunitions and general transportation activities. Both publications are available on the Defense Ammunition Center website.

1-21. At a minimum, munitions handlers must wear protective gloves, safety shoes, and eye protection. Re-palletization and replacement of defective banding is authorized inside the storage magazine. However, if there is not enough space to work safely, operations are permitted on the adjacent apron or areas designated for these activities. Do not open or repair containers in the ammunition supply point (ASP) except for the preservation and packaging of small arms munitions.

Lighting and Electrical Hazards

1-22. Protection from lightning is another essential part of protecting Soldiers, munitions, and equipment involved in munitions operations. Units with a munitions mission should establish an electrical storm evacuation plan for all munition storage areas. Store munitions in areas that offer lightning protection to minimize or mitigate the risk of exposure to lightning. During field storage planning, consider the use of lightning protection equipment when possible.

1-23. Lightning protection systems are required on facilities or locations used to develop, manufacture, test, handle, hold, store, inspect, or maintain munitions or explosives. Units should also utilize additional lightning protection methods including grounding, bonding, and surge protection. For more information on lightning protection, see DA Pam 385-64 and National Fire Protection Association (NFPA) 780.

1-24. Soldiers must follow operating instructions precisely when using electrical equipment around munitions. Only use approved electrical equipment and devices. 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 NFPA 780.

Static Electricity Hazards

1-25. 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 dust, flammable gases, vapors, or ignitable fibers are especially vulnerable to static electricity. Exposed explosives including primers, initiators, detonators, igniters, tracers, incendiary mixtures, and pyrotechnics are sensitive to static electricity. See DA Pam 385-64 for procedures to mitigate static electricity hazards.

Electronic Radiation Hazards

1-26. Electromagnetic transmitters and emitters in electronically initiated devices can generate radiation exceeding specified safety and reliability margins. Electronically initiated devices are found in many types of munitions and can cause radiation-induced damage or degradation of performance in munitions containing them. Ensure munition packaging meets military standard (MIL-STD)-464D to prevent degradation due to radiation. Refer to DODI 3222.03 for additional information on the hazards of electromagnetic radiation to munitions. Examples of electromagnetic transmitters and emitters include, but are not limited to—

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

Radio Transmission Hazards

1-27. Radio transmissions can potentially affect stored missiles and rocket rounds in the following ways:

- Electromagnetic Interference (EMI). Radio transmissions can generate electromagnetic fields that can penetrate storage facilities and affect the electronics systems of stored missiles and rockets. This can cause errors or malfunctions in the systems, even if they are not actively being used.
- Radio Frequency Interference (RFI). RFI can occur when radio transmissions interfere with the radio frequency signals used by the guidance systems of stored missiles and rockets. This can cause errors or malfunctions in the systems, even if they are not actively being used.
- Static discharge. Radio transmissions can cause static electricity to build up on the surfaces of stored missiles and rockets, potentially leading to static discharge and damage to electronic components.
- Magnetic field effects. Radio transmissions can generate magnetic fields that can affect the magnetic components of stored missiles and rockets (like compasses or magnetometers).
- Corrosion. Radio transmissions can cause corrosion on the surfaces of stored missiles and rockets, particularly if they are made of ferrous metals.

1-28. Types of radio transmissions that can affect stored missiles and rocket rounds include—

- High-power microwave emissions. These emissions can be used to disrupt or destroy the electronic systems of stored missiles and rockets.
- Ultra-high frequency and very high frequency transmissions. These transmissions can be used to jam or disrupt the guidance systems of stored missiles and rockets.
- Radar transmissions. Radar transmissions can be used to guide missiles and rockets, but they can also be used to jam or disrupt the guidance systems of stored missiles and rockets.
- Cellular and Wi-Fi transmissions. Cellular and Wi-Fi transmissions can cause EMI and RFI in stored missiles and rockets.

1-29. Factors that increase the risk of radio transmissions affecting stored missile and rocket rounds include—

- Proximity to transmission sources. Storage facilities located near transmission sources, including radio towers or radar stations, are more likely to be affected by radio transmission.
- Type of storage facility. Storage facilities with poor shielding or inadequate electromagnetic protection are more likely to be affected by radio transmission.
- Type of missile or rocket. Missiles and rockets with sensitive electronic systems are more likely to be affected by radio transmission.
- Length of storage. Missiles and rockets stored for extended periods are more likely to be affected by radio transmission.

1-30. The following techniques can be used to mitigate the effects of electronic radiation and radio transmission waves to protect munitions:

- Shielding. Shielding can be used to protect stored missiles and rockets from EMI and RFI.
- EMI/RFI filtering. EMI/RFI filtering can be used to reduce the effects of radio transmission on stored missiles and rockets.
- Storage in Faraday cages. Storage in Faraday cages can be used to protect stored missiles and rockets from EMI/RFI.
- Regular maintenance. Regular maintenance can be used to detect and prevent errors or malfunctions caused by radio transmission.
- Storage in remote locations. Storage in remote locations, away from transmission sources, can reduce the risk of radio transmission affecting stored missiles and rocket rounds.

Movement Hazards

1-31. Movement hazards refer to potential dangers or risks encountered during travel, transportation, and distribution of munitions. The likelihood and severity of this hazard varies in the mode of transportation and environmental conditions. It also refers to the uncoordinated and unsafe movement of personnel within the activity area. The proper use of ground guides, flags and marking, and the use of personnel protective equipment can significantly reduce risks of accidents.

Fire Hazard

1-32. Fire and excessive heat are two of the greatest hazards to explosives. There are munitions and munitions-related items that are extremely sensitive to heat and react at temperatures substantially lower than

those required to ignite ordinary wood, paper, or fabrics. Direct heat generated by a fire could initiate a reaction and result in an explosion.

1-33. Electronic devices equipped with lithium batteries have a high risk of unexplained combustion without warning. For example, e-cigarettes and vaping devices are known to combust and cause burn injuries to personnel and fire damage to nearby items. Lithium-ion battery fires are classified as Class B fires. Use a standard ABC or dry chemical fire extinguisher to extinguish lithium-ion battery fires. Refer to chapter 4 of this publication to learn more on munitions fire safety considerations.

STANDARD OPERATING PROCEDURES

1-34. Units that receive, transport, store, maintain, and handle munitions in support of military operations must have written SOPs. The munitions officer reviews the SOP and the commander approves it. The SOP should include detailed standards, expectations, and processes relevant to all unit personnel in all aspects of munitions operations and support.

1-35. DA Pam 700-107 provides guidance for creating a unit SOP for munition operations. This pamphlet discusses responsibilities for all DA Civilians, military service members, and contractors who perform services involving ammunition or explosives. This also includes inert or nonexplosive components. The local contracting officer must be involved in the decision process as to how it will be applied to contractors, including amendments or alterations to the existing contract.

1-36. Tactical munitions units fall under the SOP of their higher headquarters. The higher headquarters provides guidance to subordinate units in developing SOPs for supported units to facilitate the munitions support process. SOPs must be tailored to actual operational conditions. The SOP should enable units to meet high demand and continuous support of any military operations. The SOP should also be flexible and focus on simple, realistic, effective munitions support, especially during time-sensitive combat or stability operations.

EXTERNAL STANDARD OPERATING PROCEDURES

1-37. An external SOP provides procedures for the units receiving munitions support. Typically, an external SOP includes (but is not limited to)—

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

INTERNAL STANDARD OPERATING PROCEDURES

1-38. An internal SOP provides procedures for the supporting unit to operate efficiently and effectively. Typically, an internal SOP includes (but is not limited to)—

- Commander's approval signature.
- Technical training and certifications.
- Risk management procedures.
- Safety officer review and concurrence signature.
- Supervisor or persons-in-charge signature page.
- Munitions handlers and visitors signature page.

- Deployment and staging procedures.
- Field setup (including storage, perimeter defense, and storage facility layout plans).
- Procedures for receipt, storage, inspection, issue, and maintenance operations.
- Routine and emergency destruction plans and procedures.
- Munitions safety and environmental protection procedures.
- Munitions aerial resupply procedures.
- Requirements for augmentation support. For example, quality assurance specialist (ammunition surveillance) (QASAS).
- Information on emergency actions, emergency plans, and pre-accident plans:
 - Fire prevention, protection, and coordination.
 - Firefighting plan.
 - Smoking standards.
 - Fire drills.
 - Alarm procedures.
- Communications, engineer, and transportation support.
- Protecting munitions from the elements.
- Emergency resupply procedures.
- Link to command and control element.

PLANNING FOR MUNITIONS SUPPORT

1-39. Army operations require munitions units to be effective, efficient, and highly mobile organizations. Battles may be nonlinear and require rapid movement, multiple relocations, and the ability to support and sustain maneuver forces in a variety of mission profiles. In large-scale combat operations, munition support must be flexible and versatile to adapt to a changing operational environment, relying on real-time intelligence and situational awareness to make informed decisions. Effective communication, coordination, and collaboration among military and civilian agencies and stakeholders are crucial for the success of the maneuver forces.

1-40. Munitions units must be able to rapidly adjust to the operational environment and pace of military operations. Depending on the size of the supported force, the munitions unit can carry out support operations in either a company or modular configuration. Modular configurations will be used based on operational needs. This may mean the deployment of a single modular platoon to support a brigade or several platoons or companies to support a mature theater. These units must be self-sustaining for a period, able to operate as part of a multifunctional organization, and 100 percent mobile using organic assets.

1-41. Munitions support planners must stay ahead of the situation as operational campaigns unfold by reinforcing successes with priority of support, planning for forward logistics bases, and extending lines of support. As tactical developments render earlier support plans obsolete, munitions support planners formulate new ones.

1-42. Units may not have time for detailed last-minute planning when deploying quickly. The unit commander must identify the logistics support structures that will sustain the unit. This type of contingency planning must be done in peacetime so that the unit can develop a detailed SOP and plans. Planning factors include (but are not limited to)—

- Mission variables.
- Local points of contact for unit support (for example, engineer, signal, security, defense, maintenance, and transportation).
- Status charts for unit personnel, equipment, and munitions, including organic basic load.
- Replacements for equipment, personnel, authorized stockage list, and prescribed load list.
- Factors affecting the munitions mission (for example, stockage objectives, chain of command, site locations/grid coordinates of supported units, QASAS, and hazardous materials [HAZMAT] certified personnel).
- Equipment staging location and procedures.
- Organization of march units.
- Organization of duties for advance and rear parties and reconnaissance element.
- Densities and speeds for different types of moves.

- Maintenance of records, including munitions accountability and serviceability.
- Command and control procedures.
- Actions to take in the event of attack.
- Accident and maintenance procedures.
- Field feeding and refueling procedures.
- Communications methods.
- Load plans for personnel, equipment, and munitions-related supplies.
- Night operations.
- Continuity of operations plan.
- Sufficiency of directional signs, fire symbols, and fire system unit stack signs for three storage locations.
- Retrograde operations.
- Identification of QASAS source organization and method of acquiring support.

TRAINING FOR MUNITIONS SUPPORT

1-43. Leaders at all levels must ensure that munition handlers and dedicated transporters are properly trained in munitions operations and related safety standards. All personnel must receive routine refresher training to help retain the requisite knowledge and competence in explosives safety.

1-44. Units with a munitions mission should constantly train individual and collective tasks. Training plans, including emergency exercises, are designed to maintain team efficiency and readiness and are part of the command accident/incident control plan. These plans encourage personnel assigned to emergency response teams to remain proficient in individual and team duties.

1-45. When training for munitions operations, ensure that personnel refer to AR 385-10, AR 700-28, DA Pam 385-64, AMC-R 350-4 and DDESB Technical Paper (TP)-27. These publications provide guidance on training and certification requirements for all munitions handlers. They apply to all skill levels whether by role or function, MOS, or additional duty.

1-46. AMC-R 350-4 discusses required certifications for military personnel with MOS 890A (Ammunition Warrant Officer), 89B (Ammunition Specialist), and 89D (EOD Specialist). Unit commanders or designated unit representatives ensure military personnel meet the specific annual requirements to maintain certification in their assigned MOS training.

1-47. AMC-R 350-4 also identifies that unit commanders provide a roster including name, rank, MOS, and current certification status to United States Materiel Command and the installation certification board when military personnel are assigned. These munitions personnel may temporarily augment or be assigned for garrison operations.

1-48. Military personnel do not have to be certified by the installation certification board to perform ammunition operations. However, United States Materiel Command must maintain adequate training records that reflect the required skill sets and training to accomplish the assigned ammunition mission. Military personnel must take any refresher training courses required for an assigned position.

1-49. DDESB TP-27 defines training requirements for explosives safety personnel and provides recommendations to ensure that explosives safety personnel can execute their duties and functions. DDESB TP-27 aligns training to the duties. It also identifies the minimal level of training required to perform munitions core competencies. Courses, including those focused on munitions safety, are available through the U.S. Army Defense Ammunition Center.

SAFETY PERSONNEL

1-50. Munitions safety personnel are responsible for ensuring the safe handling, storage, transportation, and disposal of munitions, explosives, and other munitions-related materials. They may work in various settings, including military installations, ammunition depots, manufacturing facilities, and consulting companies. They are critical in preventing accidents and protecting both personnel and the surrounding environment from the risks associated with munitions. For more information about the responsibilities of safety officers, managers, directors, leaders, and Soldiers refer to AR 385-10, and DA Pam 385-64

MANAGERS AND DIRECTORS

1-51. At brigade level and above, the unit's occupational safety and health manager is typically responsible for implementing the unit's munitions safety management programs. The safety officers, managers, and directors are responsible for—

- Ensuring all commanders and directors are aware of requirements and maintaining the status of the unit's ESMP.
- Identifying requirements for explosive licenses, explosive safety site plans, storage site-selection waivers and exemptions, and certificates of compelling reason.
- Ensuring all potential explosion sites and exposed sites are indicated on approved explosive safety site plans.
- Ensuring plans are compliant with safety standards for munitions facilities.
- Ensuring training for personnel handling munitions is adequate and appropriate.
- Ensuring safety inspections are conducted at least annually for all munitions production, storage, and maintenance facilities.
- Monitoring munitions transportation operations to ensure compliance with military, civilian, and host-nation laws and regulations.
- Investigating incidents involving munitions.

UNIT SAFETY OFFICER

1-52. Unit safety officers are appointed in writing by the commander and are responsible for developing and implementing safety programs to prevent accidents and injuries. Safety officers are the primary points of contact for all safety-related concerns within their unit. Unit safety officers must complete a safety officer course and report directly to the commander on all safety-related activities. General responsibilities of a unit safety officer include—

- Developing and maintaining a unit safety program which aligns with higher command, regulations, and policies. This includes written procedures, training materials, and checklists.
- Reviewing regulations, doctrine, and technical manuals applicable to the unit.
- Identifying potential hazards within the unit area of operations or activities.
- Recommending changes in procedures, techniques, and processes to increase safety related to general military operations.
- Regularly inspecting work areas, equipment, and procedures to identify hazards and ensure compliance with safety standards. This is often unannounced to get a true picture of daily operations.
- Analyzing risks, developing mitigation strategies, and recommending procedural changes to the commander that reduce accident risk, injury, and property loss.
- Organizing a safety committee (if needed) to assist with inspections and the formulation and recommendation of safety procedures.

UNIFORMED AMMUNITION INSPECTORS

1-53. MOS 89B30 ammunition inspectors may serve in the theater sustainment command, expeditionary sustainment command, sustainment brigade, division sustainment brigade (DSB), brigade combat team support operations (SPO) section, and the modular ammunition platoon. They provide explosives safety oversight of ammunition operations within their command's area of operations and provide their commanders with recommendations to reduce or eliminate explosives safety risks.

1-54. General duties of the ammunition inspector assigned to theater sustainment command, expeditionary sustainment command, sustainment brigade, and DSB include—

- Providing the commander and staff with recommendations on ammunition storage site selection within their operational area.
- Integrating munitions safety procedures into the command's operations orders and plans.
- Reviewing risk assessments for sites within the operational area.
- Reviewing explosives safety regulations, doctrine, and technical manuals applicable to the operation.
- Identifying potential hazards within the command's ammunition storage activities (ASAs).

- Recommending changes in procedures, techniques, and processes to increase safety relative to munition operations and handling.

1-55. The brigade combat team ammunition inspector manages explosives safety and ammunition serviceability at the modular ammunition transfer point (MATP) or ammunition transfer and holding point (ATHP) and within the brigade's units. General duties of the brigade ammunition inspector include—

- Integrating munitions safety procedures into the brigade's field or tactical safety SOP.
- Reviewing explosives safety regulations, doctrine, and technical manuals applicable to brigade ammunition operations.
- Monitoring ammunition suspensions and restrictions to identify necessary actions that may include, but are not limited to—
 - Notifying the MATP/ATHP and subordinate units in possession of suspended or restricted ammunition.
 - Identifying conditions that restricted munitions may or may not be fired.
 - Performing or coordinating for the inspection of suspended munitions if directed within the notice.
 - Coordinating with the brigade SPO for the turn-in and resupply of the suspended or restricted ammunition.
- Providing the commander and staff with location recommendations for the brigade's MATP/ATHP.
- Developing an MATP/ATHP site layout that protects the stored munitions and nearby facilities, equipment, and personnel.
- Developing explosives safety risk assessments when net explosives weight exceeds or is approaching a storage site's capacity.
- Regularly inspecting the brigade MATP/ATHP and unit ammunition storage and handling areas, equipment, and procedures to identify hazards and ensure compliance with safety standards.
- Recommending changes in procedures, techniques, and processes to increase safety relative to munitions operations.
- Analyzing risks and developing mitigation strategies for the commander that reduce accident risk, injury, and property loss.

1-56. 89B40 senior ammunition inspectors and 89B30 ammunition inspectors may serve in the modular ammunition platoon. They manage explosives safety and ammunition serviceability at the ASAs operated by the platoon and their responsibilities include—

- Integrating munitions safety procedures into the unit's field or tactical internal and external SOPs.
- Overseeing operations to ensure all safety procedures are followed.
- Developing ASA site layouts that protect the stored munitions and nearby facilities, equipment, and personnel.
- Developing explosives safety risk assessments when net explosives weight exceeds or is approaching the capacity of a storage site within the ASA.
- Monitoring ammunition suspensions and restrictions to identify necessary actions that may include, but are not limited to—
 - Coordinating with the platoon leader or ammunition warrant officer to locate, properly segregate, and label suspended munitions.
 - Coordinating with supported units to turn-in suspended or restricted munitions if directed.
- Clearing ammunition for issue by reviewing selected stocks for suspensions and restrictions and identifying conditions that restricted munitions may or may not be fired.
- Performing turn-in inspections of ammunition to identify the serviceable or unserviceable condition of the munitions being returned to storage.
- Performing limited inspections of munitions in storage required to maintain serviceability.
- Performing safety inspections of conveyances used to move munitions (inbound and outbound).
- Reviewing explosives safety regulations, doctrine, and technical manuals applicable to the operation.
- Regularly inspecting ASA storage, equipment, and operational procedures to identify hazards and ensure compliance with safety standards.

- Recommending changes in procedures, techniques, and processes to increase safety relative to munitions operations.
- Analyzing risks and developing mitigation strategies for the platoon leader or commander that reduce accident risk, injury, and property loss.

LEADER AND INDIVIDUAL SOLDIER

1-57. Leaders at all levels have a responsibility for risk management and must ensure munitions handlers perform their duties safely. Leaders take the following proactive steps in reducing risk:

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

1-58. Every munitions handler, user, and leader has a responsibility for their own personal safety and the safety of those around them. They are expected to assist in enforcing unit safety programs by—

- Becoming familiar with general safety policies for munitions.
- Learning the principles of munitions function, handling, storage, and transport and safe materials handling equipment (MHE) operation.

LEVEL OF EXPERIENCE

1-59. The level of experience of munitions safety personnel may differ based on their specific roles and the organization they work for. As personnel accumulate experience in the field, regulatory knowledge, and additional education, their responsibilities usually increase. While there are no standardized criteria for experience level, the following factors may help identify the level of trust and confidence required based on the severity and importance of the responsibilities:

- **Entry Level.** New personnel enter the explosives safety career field without prior experience. They learn the fundamentals of explosives safety and gain the experience needed to advance in the explosives-safety career field. Individuals are exposed to several different positions and many different duties related to explosives safety management.
- **Midgrade Level.** Entry-level explosives safety personnel may advance to intermediate level when they have completed required training and demonstrate adequate experience and successful performance. These personnel may manage an organization's ESMP and expect a variety of assignments and self-development opportunities that broaden their knowledge of explosives safety operations.
- **Senior Level.** Senior-level explosives safety personnel manage the ESMP at major headquarters or serve as subject matter experts on general officer staffs. Senior-level explosives safety personnel develop policies and procedures and conduct reviews of their unit's ESMP. Additionally, they participate in accident, incident, and mishap investigations. They broaden their knowledge by attending institutional training and education programs and provide support to joint, interagency, intergovernmental, and multinational partners.

Chapter 2

General Munition Safety Considerations

In peacetime, munitions safety standards outlined in DA Pam 385-64 must be followed. During combat operations, peacetime standards may not be fully met or maintained due to threat level, mission, mobility requirements, and physical condition of facilities. Regardless of operational environment, munitions handlers must take all measures possible to minimize risk to personnel, materiel, facilities, and stocks. This chapter discusses general safety considerations in transportation, distribution, storage, surveillance, and maintenance of munitions.

TRANSPORTATION ACTIVITY

2-1. The principles of safe munitions transportation are applicable at all levels of warfare. At both the national and theater strategic level, United States Transportation Command is the agency responsible for providing common-user and commercial air, land, and sea transportation for munitions. At the operational level, theater sustainment commands and expeditionary sustainment commands provide oversight of the intertheater distribution networks used to deliver munitions from port to tactical formations. Tactical transportation includes all units from the division to company level. It is the level where violations of munition safety principles most commonly occur.

2-2. Commanders are responsible for ensuring the safe and efficient transportation of munitions. They may deviate from established standards after factoring the risk associated with such deviation with mission requirements. All personnel involved with the transportation of munitions must complete required training and obtain certification.

2-3. Munitions are considered HAZMAT. DTR 4500.9-R and Title 49 CFR outline the policies, procedures, and responsibilities for the movement and transportation of HAZMAT by DOD personnel. The requirements outlined in these policies apply to units during peacetime, contingency operations, and armed conflict. These regulations are particularly important for the National Guard and any Regular Army units tasked with defense support of civil authorities missions inside the borders of the United States.

SHIPMENT

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

2-5. Shipments to theater ASPs are mostly containerized or palletized in breakbulk and uploaded on trailers or flat racks. In most cases, only containerized munitions arrive at the theater ASPs where they are unpacked, placed in a storage area, or transported forward to an ASP for further distribution. If the mission requires, and if transportation is available, munitions are throughput as close to the using units as possible.

2-6. Shipments from the division ASP to the munitions section in the BSB distribution company are either in mission configured loads, breakbulk, or single Department of Defense identification code (DODIC) loads. The munitions section in the BSB distribution company operates an ATHP or MATP depending on the type of brigade it supports.

2-7. Stryker, mobile, aviation, and armored brigades are supported by an MATP. The fires brigade receives munitions support through an ATHP. See ATP 4-35 for more information on munitions flow in the theater of operations.

SURFACE TRANSPORTATION

2-8. The most common mode of transportation for munitions is surface. Surface modes of transportation include movement by road, rail, and water. Each mode contains its own specific requirements, restrictions, and safety considerations. DTR 4500.9-R, Part II implements DOD policies governing the use of DOD-owned and controlled lift assets and establishes criteria for cargo movement to include training and certification to move or transport HAZMAT.

Road Transportation

2-9. All vehicles must be inspected before loading munitions to ensure they meet the required standards, policies, and statutes. The inspection includes the following:

- MHE has been properly load tested.
- Receiving equipment's parking brakes are activated before loading and unloading, and wheels are stabilized with chock blocks.
- Government-owned motor vehicle inspections are required and documented using DD Form 626 (*Motor Vehicle Inspection [Transporting Hazardous & Sensitive Materials]*) by qualified personnel.
- Refer to the vehicle technical manual for before operations inspection and during operations checks.
- DA Pam 385-64 describes vehicle safety requirements, inspection criteria, loading procedures, placarding requirements, and compatibility restrictions. Hazard declarations are required for vehicle operation in the continental United States and in host nations during peacetime and, in some instances, during contingency operations.

2-10. During contingency operations and armed conflict, it may not be possible to use vehicles that meet peacetime standards for the transportation of munitions. In such circumstances, commanders use risk management principles to ensure the safe and efficient transportation of munitions:

- 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.
- Use vehicles with anchors to ensure munitions can be secured to prevent shifting and loss or damage during transport.
- Vehicles must have two dry chemical fire extinguishers.

2-11. 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, consider transporting compatibility groups H, J, K, and L on separate vehicles.

2-12. Motor vehicles are inspected as they arrive at the storage facility using DD Form 626 (carried with each shipment). The driver must have a valid vehicle operating permit and HAZMAT qualification unless exempted by a host-nation agreement. Also, the following items on the vehicle will be inspected:

- Cargo area for excessive debris and petroleum, oil, and lubricant products.
- Steering for safe operation.
- Windshield and wipers for adequate operation.
- Fire extinguishers for serviceability.
- Brakes and lights (especially for night operations) for proper operation.
- Exhaust system for accumulation of grease, oil, or gasoline and carbon monoxide fumes leaking into the cab.
- Fuel tanks and lines for leaks.
- Trailer coupling device for serviceability.
- Tires for any dangerous condition.

2-13. Motor vehicles are inspected again before they leave the ASP to ensure munition loads are securely blocked and braced, secured with cargo straps, covered with tarps to protect from dirt and debris, and that they are loaded with the correct munitions.

WARNING

Under no circumstances will a vehicle be allowed into an ASP with a deficiency that endangers the load, personnel, or the ASP.

Rail Transportation

2-14. 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 munitions 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 munitions ultimately reduces the risk to Soldiers, as a single train can move the same amount of munitions as several large convoys.

2-15. While 49 CFR provides policies and procedures for the transportation of HAZMAT 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 authorities.

2-16. Physical security of munitions 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 the host nation and host-nation rail services.

2-17. Railcar inspections are a critical part of shipping munitions by rail. DTR 4500.9-R, DA Pam 385-64, and 49 CFR describe safety inspection criteria, precautions, loading procedures, blocking and bracing techniques, and the certification and spotting of loaded railcars.

Water Transportation

2-18. While munitions supply units may be required to provide technical assistance, the U.S. Army Transportation Command and transportation units are responsible for loading and off-loading waterborne vessels in the theater of operations (this includes munitions). See DA Pam 385-64 and 49 CFR for more information.

2-19. The United States Coast Guard regulates transportation of munitions by water under U.S. jurisdiction and in water transport vessels engaged in commercial use. They govern the classification, compatibility, and stowage of munitions aboard all waterborne vessels. They are usually responsible for the security and supervision of waterborne vessels, including barges.

AIR TRANSPORTATION

2-20. Aircraft movements of munitions require special procedures, packaging, and different standards of compatibility than normal transportation operations. Units coordinate with Air Force loadmasters, movement units, and munitions professionals before attempting to process or move munitions by military or commercial air. Refer to TM 38-250 for operational procedures regarding aircraft carrying HAZMAT.

2-21. The United States Air Force is responsible for managing air terminal operations at Air Force airfields. Careful coordination is required for the transportation of munitions shipments to and from Air Force facilities to prevent any disruptions in service. Airfields must have designated staging areas for the preparation of documents and the handling of bulk shipments.

2-22. 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.

2-23. Personnel must attach a HAZMAT declaration or facsimile-formatted document, generally a DD Form 2890 (*DOD Multimodal Dangerous Goods Declaration*) to each pallet of munitions shipped by military or commercial aircraft. This document certifies that the shipment complies with the provisions of TM 38-250 or 49 CFR. 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. ATP 4-48 provides doctrine on Army aerial delivery operations.

Sling Load Delivery

2-24. The helicopter sling load method of carrying cargo and equipment overcomes many of the obstacles that hinder other modes of movement. Helicopter sling load operations are used extensively in the ship-to-shore movement of cargo and equipment during amphibious operations. Sling loads can also move supplies and equipment over the battlefield, execute vertical replenishment of ships, and facilitate firepower emplacement.

2-25. The munitions storage facility is usually responsible for sling-load areas. Personnel must place loaded cargo nets in the landing area to allow helicopters to hover over and pick them up. Cargo nets may be loaded at the airfield or at the munitions supply facility. Refer to ATP 4-48 and TM 4-48.10 for sling load procedures.

Airdrop Delivery

2-26. Airdrop delivery is a versatile and effective means of providing critical supplies and aid to areas where conventional ground transportation may be impractical or impossible. Airdrop requires careful coordination, planning, and execution to ensure safe and successful delivery of munitions to the intended recipients and locations. Refer to ATP 4-48 for more information on airdrop delivery.

SITE SELECTION AND STORAGE

2-27. Safety and efficiency must be top priorities when selecting a storage site. Subject matter experts need to be involved early in the concept phase, and no later than 30 days into the design phase to preclude possible future disruptive, safety-driven relocations of established Class V (munitions and explosives) facilities. Munitions storage placement and explosives safety are often an afterthought; this needlessly places personnel, facilities, and equipment at greater risks. Subject matter experts who may be consulted in this process include—

- 89B30 munitions inspectors.
- 89B40 senior munitions inspectors.
- Munitions warrant officers.
- QASAS.
- Explosive safety specialists.
- Base camp master planners.
- Army Corps of Engineers representatives.

2-28. Area reconnaissance provides useful intelligence in selecting ASP site locations. Planners should conduct a combination of map, ground, and aerial reconnaissance of proposed storage sites. Map reconnaissance provides information on the terrain and the possibility of natural cover and concealment. Ground and aerial reconnaissance support the information gathered from the map reconnaissance and reveal other conditions at the site that may have changed or may not be identifiable on a map.

2-29. When possible, planners submit site recommendations based on reconnaissance information to the United States Army Technical Center for Explosives Safety (USATCES) for review and to higher headquarters for approval. Commanders may not approve a site selected for operational 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 selecting a location, higher headquarters should consult with explosives safety personnel on the ground.

NON-ENDURING SITES

2-30. ASAs and MATPs may have to relocate frequently during large-scale combat operations. The operational tempo and utilization of temporary non-enduring sites may make it unfeasible for munitions units to obtain approved explosives safety site plans or licenses for the site. Munitions personnel will still need to provide the highest level of protection possible. They should develop an explosives safety site plan to record and communicate safe net explosive weight (NEW) limits per storage site. The explosives safety site plan is copied to the sustainment headquarters responsible for the sited area. Reporting would be as follows:

- Brigade MATPs/ATHPs and ASPs in the division support area report to the DSB SPO.
- Corps storage areas report to the corps sustainment command SPO.
- Storage areas in the theater or joint area report to the theater sustainment command SPO.

Note. The theater sustainment command commander can delegate explosive safety management to the theater ammunition battalion.

2-31. Operating tempo at a non-enduring site may also impact the unit's ability to generate a deviation approval and risk acceptance document (DARAD). Deviations from safety standards will require the operating unit to prepare a risk assessment and adhere as closely as possible to an acceptable level of risk as identified in DA Pam 385-64.

2-32. The risk assessment should include the storage site posing the risk, the exposed site at risk, the potential for damage or injuries, and potential courses of action to mitigate the risk. Risk assessments are approved or accepted by the commanders and routed in accordance with the procedures above.

2-33. When a combatant commander identifies an ASA site as enduring, the operating unit will begin coordination to obtain an DDESB-approved explosives safety site plan for explosive licensing and will be required to document any deviations utilizing a DARAD. These documents will be completed and processed through the command to the Defense Ammunition Center and USATCES for DDESB submission. For additional information see DESR 6055.09.

Note. After cessation of hostilities, units should request civilian explosives safety support at enduring sites to develop and process the explosives safety site plan and, if necessary, any required DARADs.

RISK-BASED SITING

2-34. In certain situations, risk-based site plans provide commanders and responsible authorities with the ability to determine (in consideration of applicable mitigating measures) and accept risk. This allows the conduct of operations that, absent a waiver, would not be allowed under the standard Army site plan approval process.

2-35. The DDESB approved the use of a risk-based methodology for approving explosive safety site plans that do not meet explosives safety quantity and distance criteria. Army organizations are authorized to use DDESB-approved risk-based methodologies. The Safety Assessment for Explosives Risk software tool is an approved method.

2-36. The use of risk-based methodologies requires completion of a DA Form 7632. Risk-based site plans will follow the approval chain for DARADs as outlined in DA Pam 385-64. Once the DARAD is approved, it will be submitted along with the risk-based site plan to USATCES for review and approval. USATCES will submit the Army-approved risk-based site plan to the DDESB for review and approval. Once the DARAD is approved at the local command level, ensure a copy is routed to the major command headquarters safety office.

ASSESSING TACTICAL REQUIREMENTS

2-37. Commanders and staff review tactical conditions and mission variables to reduce conflict between the tactical and safety requirements of an ideal site. They weigh these requirements, that are often at odds with

the operational mission. The tactical situation may require personnel to modify or supplement procedures. The following considerations apply to all storage and supply sites:

- **Transportation.** Storage sites should be located near main supply routes and supported units to allow easy access. Leaders must balance the desire to reduce the distance to supported units against security constraints.
- **Security and Protection** (favorable for defense). The site should be easy to defend against ground attack using the fewest personnel and materials possible. As with any other tactical site, good cover and concealment are critical. The site must be large enough to allow for—
 - Dispersion of stocks.
 - Proper barricades and overhead protection.
 - Additional protection against heavy loss by indirect fire, fire, or explosion.
- **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 should provide easy access for using unit vehicles and recovery of palletized loading system flat racks, pallets, and trailers. Natural barriers at proper intervals are desirable to segregate field storage units and categories of munitions.
- **Fire Safety.** Inspect the site for fire hazards. A low level of flammable vegetation and an adequate water supply are favorable considerations.
- **Amount and Types of Munitions.** What is the total needed to meet mission requirements and allow for sufficient time for resupply? Will white phosphorus or similar items be stored?

STORAGE AREAS

2-38. Prime considerations for selected supply and storage sites include the protection of munitions storage areas from indirect fire with overhead cover, construction of defensive works and obstacles, organization of unit security and defense, and proper weapons positioning.

2-39. Prepare a map overlay to include the defense plan and operational layout for the new area. Also prepare a route overlay if needed. The advance, main, and rear parties use overlays, and copies must be submitted to higher headquarters.

2-40. All storage layouts must conform to the USATCES standards published in DESR 6055.09. The layout depicted uses earth-filled barriers to separate cells (dirt berms or blast walls can also be used). Cells can be reduced to accommodate fewer containers or to store munitions without containers.

2-41. The 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. Munitions stacks cannot be closer than three feet from the end of the crest of the wing-walls to allow sufficient maneuver space for MHE and military vehicles to pass.

2-42. The height of the barricade must be at least one foot above munitions stacks. Barricades must be a minimum of three feet wide at the crest. Additional details on barricades appears in the protection and survivability section.

STORAGE SITE LAYOUT CONSIDERATIONS

2-43. Fundamental rules apply to the layout of all types of munitions supply and storage facilities. General safety procedures must be considered in any site layout. Expeditionary Ammunition Supply Point–Software provides a means to automate the design, planning, and safety validation of ASPs (link provided in references). The key differences between theater munitions supply point field sites and ASP, ATHP, or MATP sites are the theater munitions supply point generally has larger, more stable storage areas and better road networks. Refer to Chapter 3 of this publication for storage safety considerations at the strategic level.

2-44. 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.

2-45. Each section consists of several storage locations or modules, depending on the type of storage system used. Separate each storage location within each section according to the ESQD requirements in DA Pam 385-64, mission variables permitting.

2-46. Follow these guidelines to maintain an efficient operation and prevent long wait times:

- 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 material to prevent munitions from being placed directly on the ground.
- Provide copies of the SOP to using units. Ensure the SOP details issue and turn-in procedures, lists any required forms, and provides form examples.
- Arrange for one-way traffic whenever possible. When one way traffic is not possible, provide turn-around points.
- Ensure adequate space for vehicle holding and assembly areas.
- Strictly enforce the use of ground guides.

2-47. Layout requirements for each site vary according to the tactical situation, terrain, proximity to forward areas, and the type and amount of materiel handled. An ideal layout achieves the following:

- Provides as much distance as possible between munitions 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 munitions assets stored.
- Provides for easy, efficient workflow.
- Minimizes movement of munitions, tools, and equipment.
- Permits easy entry and exit for heavy traffic.
- Provides effective control of unit operations.
- Permits area defense.

Note. When a unit cannot achieve compliance, it must initiate a DA Form 7632 through command channels to USATCES for data collection and analysis.

2-48. Position munitions far enough off the road to allow trucks to be loaded or unloaded without interfering with traffic. Stack containers so that munitions markings are visible and all containers can be easily accessed. Munitions 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.

2-49. Whenever a site is established and similar stocks are required, place them in the same relative locations (ground features and NEW may preclude this). Some units use a standard identification system to identify and locate munitions. Such systems use lettered or numbered locations containing certain types of munitions. When a standard identification system is used, it 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.

2-50. The manufacturer identifies munitions 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 its own separate form placed with the lot.

2-51. Climate-related considerations including adequate shelter, dunnage, good drainage, and ventilation are necessary to protect stored munitions. Personnel can use tarpaulins to protect munitions from the effects of rain and intense sunlight. See DA Pam 385-64 for additional guidance.

2-52. When using containers for storage, periodically open the doors so the air can circulate. Do not allow blowing sand or debris to accumulate around containers or pallets.

2-53. The proper use of dunnage increases stack stability. Generally, stacks must be at least three inches off the ground to prevent munitions from getting wet and to ensure adequate air circulation. See DA Pam 385-64 for more information.

2-54. Personnel must dig ditches around stacks of munitions 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.

2-55. Employ guards and access control if classified or sensitive components are stored in the open. See AR 190-11 for detailed security information.

2-56. When safeguarding munitions storage areas, employ natural concealment for camouflage where feasible. It is important to note that camouflage requirements might not always align with the necessity of firebreaks and munitions shelters. The application of camouflage must adhere to strict guidelines regarding explosive safety and munitions storage procedures. See ATP 3-37.34 for general information on the use of camouflage.

2-57. Overhead protection and barricading increases survivability of munitions stocks in the event of indirect or direct fire. Use a minimum of two feet of earth to provide adequate overhead protection. Use 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 to prevent the container sides from buckling due to the weight.

LICENSING

2-58. DA Pam 385-64 provides guidance for the standards, preparation, and authentication of explosives sites for licensing. Explosives licenses are required and maintained for each location where ammunition and explosives will be processed or stored on a permanent, routine, or recurring basis and do not have an Army or DDESB-approved explosives safety program. For those locations that require a required explosive safety submission (commonly known as RESS), the license will be interim authorization for munitions to be stored or processed until the RESS is approved. While compliance with explosive safety requirements is required, mission variables during contingency operations and in war may prohibit strict adherence. DA Pam 385-64 sets the minimum levels of acceptable risk.

DEVIATIONS FROM SAFETY STANDARDS

2-59. Commanders use a DA Form 7632 when intentionally deviating from established safety standards. The DARAD identifies and documents all pertinent hazards, the policy or standard, established mitigation control measures, and acceptance of the residual risk by the appropriate level of command.

2-60. Every effort should be made to comply with explosives safety requirements. A DARAD must be completed in any situation where an organization needs to deviate from a munition safety standard. For example, if the minimum explosives safety quantity distances (either internal or external) cannot be obtained, then the situation calls for a DARAD. According to the duration of risk, a DARAD can be an event waiver (1 month or less), waiver (1 month to 5 years), or an exemption (permanent or greater than 5 years). A DARAD can also be used to document other explosives safety deficiencies, for example lack of lightning protection or mitigation system of a storage area, or any substantial risk to munition operations. Information on explosives safety DARAD is contained in AR 385-10 and DA PAM 385-30.

2-61. A single DARAD may address multiple risks if supported by accompanying documentation describing each hazard and its associated risk. Units file copies of the DARAD with their higher headquarters and safety offices at the Army Service component command levels. An additional copy is filed with the Defense Ammunition Center and USATCES.

EXPLOSIVE SAFETY QUANTITY DISTANCE

2-62. The Army designed ESQD criteria to protect personnel and property in areas adjacent to storage facilities. These 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 munitions. Quantity distance is the balance between the type and amount of explosives at a location and the protection of assets and personnel from the unacceptable effect of unintended explosion.

2-63. ESQD is based on specific classes of munitions and the level of risk considered acceptable for that item. During peacetime, personnel must strictly follow the ESQD tables set forth in DA Pam 385-64 unless they obtain a deviation approval in writing. The tables apply to exposures involving nonmilitary personnel, public traffic routes, inhabited buildings, and health and morale facilities.

Note. A greater distance than the minimum required will provide greater protection and survivability of nearby assets.

2-64. If these distances are not maintained, an explosive event can propagate rapidly between sites, resulting in the destruction of all ammunition and explosives assets, rendering the unit incapable of performing its mission, and denying access to the area until EOD can render safe damaged items. Although prompt propagation is not expected, collateral damage to ammunition in nearby storage sites and operating facilities may be so severe that the assets may become unserviceable.

2-65. Distances are measured from the leading exterior edge of any munition container to the nearest edge of any site exposed to the munitions. Figure 2-1 illustrates proper measurement of distances of munitions to an inhabited building. The following are examples of distances and application:

- Internal distance. Required for the separation of operating facilities and storage sites in the confines of an ammunition storage area. Internal distances are the minimum required by DA PAM 385-64 and technical data packages approved by the DDESB.
- Intermagazine distance. Required between two storage locations in an ammunition holding area (AHA).
- Intraline distance. Maintained from a potential explosion site (for example, a pad in an ASP) to an associated explosion site (for example, an ammo surveillance or ammo maintenance site). Intraline distance can be barricaded or unbarricaded.
- External distance. Required for the separation of personnel and facilities that are outside the confines of an ammunition storage area and are not directly related to or associated with the ammo storage area mission. These external distances are described as—
 - Inhabited building distance. Examples are the installation boundary; dining facilities; billeting; morale, welfare, and recreation facilities; medical facilities; tactical operations center; fuel and water storage; and other life support facilities.
 - Public traffic route distance. Examples are on base roads (external to the ammo area), power lines, navigable rivers, open-air recreational facilities, and open-air training ranges.

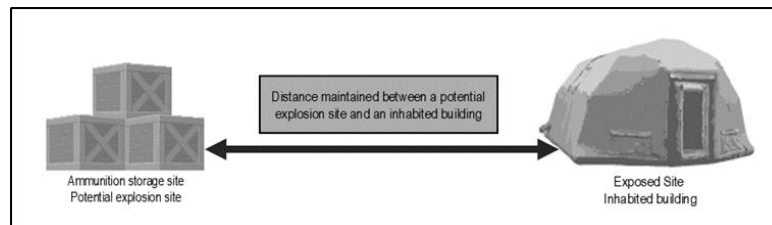


Figure 2-1. Measuring distance concept

2-66. Within the range of military operations, tactical requirements may make full compliance with safety regulations difficult. Compliance with ESQD regulations is of great importance to commanders because their purpose is to minimize losses of personnel, facilities, equipment, and 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. Record risk-based storage on a DD Form 2977 (*Deliberate Risk Assessment Worksheet*). If non-compliant, the unit initiates a DA Form 7632 for deviation approval.

2-67. 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.

2-68. Separation distances are based on ammunition being stored in the interior armored compartment with the door and other openings closed while parked in an authorized location. If ammunition is stored in compartments external to the crew compartment, it is not afforded light armor protection status and is considered non-armor. Table 2-1 references spacing distance requirements for light armored vehicles.

2-69. For example, for a light armored vehicle that is approximately 7 meters long by 3 meters wide, if there are five of these vehicles parked together, side by side, with 110 NEW of hazard class/division (HD) 1.1 ammo stored internally in each, the internal footprint would be approximately 2.91 meters between vehicles, making the parking area footprint 7 by 26.64 meters (five vehicles times 3 meters and four spaces between them of 2.91 meters each). The external distance would be 277 by 296.64 meters (add 270 meters to each figure).

Table 2-1. Light armor vehicle table distance (in meters)

NEQ/NEW⁽¹⁾⁽²⁾ per vehicle	Spacing⁽³⁾ between vehicles	Spacing⁽³⁾ from non-Armor vehicles	External⁽⁴⁾ distance
4.4 lbs (2 kg)	0.99	4.75	270
6.6 lbs (3 kg)	1.14	4.97	270
8.8 lbs (4 kg)	1.25	5.13	270
11 lbs (5 kg)	1.35	5.26	270
22 lbs (10 kg)	1.70	5.68	270
44 lbs (20 kg)	2.14	6.14	270
66.1 lb (30 kg)	2.45	6.42	270
88.2 lbs (40 kg)	2.70	6.63	270
110.2 lbs (50 kg)	2.91	6.80	270
1. The NEQ/NEW is the total explosives weight of all ammo in a vehicle. NEQ/NEW includes all ammo combined, treated as HD 1.1 (excluding HD 1.4 materials [small arms]). 2. The design of the vehicle should supply equal barricading. 3. At this distance, explosives are not expected to propagate. At this distance, light armor or non-armor may be damaged beyond serviceability. 4. The presence of barricades does not reduce required external distances.			
NEQ net explosive quantity	NEW net explosive weight	HD hazard class/division	

2-70. 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 storage locations to prevent prompt propagation. Commanders can use barricades to reduce inter-magazine distance.

PROTECTION AND SURVIVABILITY

2-71. Provide protection, cover, and concealment in tactical environments to minimize the vulnerability of stored munitions to enemy detection and attack. Applying camouflage may involve using natural vegetation, camouflage netting, or other materials to blend the storage system with the surrounding.

2-72. Although field storage systems lack the physical protection of enclosed facilities, they still require adequate security and protection measures to prevent unauthorized access, theft, sabotage, and tampering. This may include fencing, electronic surveillance, and controlled access points with guards.

2-73. Munitions operations may be conducted in jungles, mountainous areas, deserts, cold regions, and urban areas. Each environment presents its own challenges requiring specialized knowledge, skills, techniques, and equipment for survivability. ATP 3-37.34 explains the fundamentals of cover, camouflage, and concealment.

COVER, CAMOUFLAGE, AND CONCEALMENT

2-74. Camouflage and concealment discipline avoids activities that change the appearance of an area or reveal the presence of military equipment. To help maintain munitions storage viability, a unit must integrate

all available camouflage and concealment means into a cohesive plan. Camouflage and concealment discipline involves regulating light, heat, noise, spoil, trash, and movement

2-75. The primary goal of camouflage and concealment activities is to avoid enemy detection; however, this is not always feasible. In some cases, camouflage and concealment activities may succeed by merely preventing an enemy from identifying a target. Simply avoiding identification is often sufficient to increase survivability.

2-76. Protect storage from environmental conditions like temperature, humidity, precipitation, and sunlight. Munitions managers also may consider protection from enemy's aerial view, line of sight, and indirect fire. Protection may be built using earthmoving equipment, sandbags, or prefabricated materials like HESCO defensive barriers.

2-77. Overhead cover dramatically increases survivability of munitions in the battlefield. Construct overhead cover to protect munitions from indirect fire and fragmentation. Overhead cover also provides some protection from direct fire delivered from a higher position (for example, from a hill) or from enemy aircraft.

DISPERSION

2-78. The concept of munitions dispersion involves organizing and distributing munitions within the storage facilities to minimize the impact of accidental explosions. This technique aims to reduce the concentration of explosives in a single location as to decrease the potential for catastrophic damage and improve overall safety.

2-79. If munitions are adequately dispersed, the storage area is not an inviting target from the air. If possible, quantities of each type of ammunition should be stored in two or three widely separated sections. If the contents of one section are destroyed, the entire supply of any one item will not be lost. When space is not sufficient to disperse the ammunition, construct earthen barricades to help reduce the hazard.

2-80. Key principles of munitions dispersion in storage include—

- Compartmentalization. The storage facilities are divided into smaller compartments or bunkers to contain the spread of explosions and limit the damage in the event of an accident.
- Spacing. Ensuring adequate distance between munitions storage areas to prevent chain reactions throughout the facility.
- Redundancy. Duplicating critical storage infrastructure including blast walls, fire suppression systems, and safety protocols to provide multiple layers of protection in case of failure.

BARRICADE

2-81. A barricade is an artificial barrier that provides limited protection by channeling the blast and fragmentation emanating from an explosion. 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 (the simultaneous detonation of two or more stacks of munitions).

2-82. Properly constructed and located barricades reduce the internal footprint of a munition storage or any other munitions operation or site. They do not reduce the external footprint. Barricades will stop high-velocity, low-angle fragments but are ineffective in preventing high, lobbed fragments. For this reason, there is no reduction in the external distance based on the presence of barricades.

2-83. Barricades are typically built of earth construction. A natural land feature can be used as a barricade if there is line-of-sight plus 1 foot between the ammo locations, and the top of the natural feature is at least 12 inches thick. The HESCO barricades meet the requirements of a properly constructed barricade. Figure 2-2 on page 24 shows the construction of a barricade from natural material like dirt or sand to create a berm, and a manufactured construction product like the HESCO barricade. Barricades must be at least .3 meters or 12 inches higher than the explosive hazard.

Note. Do not use concrete, heavy steel, stones, or debris heavier than 10 pounds or larger than 6 inches in diameter in the fill or cover due to the added fragmentation or spalling hazard they create.

2-84. Typical ASP storage sites in a contingency environment include widely spaced open storage pads and protective construction using earthen berms or barricade systems, like HESCO barricades and steel bin barricades. Use of barricades will allow the sites (called cells or modules) to be located much closer together.

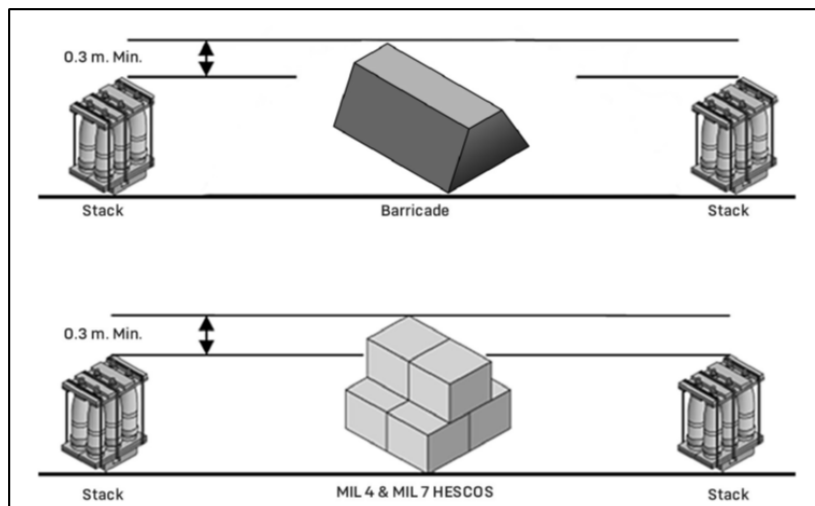


Figure 2-2. Barricade examples

2-85. ATP 4-32.2 provides techniques on barricade protective measures. Barricade types include the following:

- **Circular.** A circular barricade is the best choice for small explosive hazards because circular barriers provide complete protection for personnel and equipment. A circular barricade 8 feet in diameter, 3 feet tall, and 3 sandbags thick requires approximately 400 sandbags.
- **Semicircular.** Use a semicircular barricade for small and medium-sized explosive hazards. Semicircular barricades channel the blast and fragmentation through the open side and away from the protected area.
- **Wall.** Use the wall barricade when the explosive hazard is too large to contain by using a circular or semicircular barricade. The number of wall barricades needed will depend on how much equipment and how many personnel must be protected.

2-86. Figure 2-3 illustrates the potential damage and effects of a blast in a munition storage area with barricades installed. Use barricades to lessen blast effects and limit necessary evacuation areas. Estimated probable damage from explosive hazards dictates barricade requirements. Building artificial barricades is time consuming and resource intensive. Depending on the size or the amount of the explosive hazard, consider constructing barricades immediately to protect the entire area, or constructing barricades next to exposed assets.

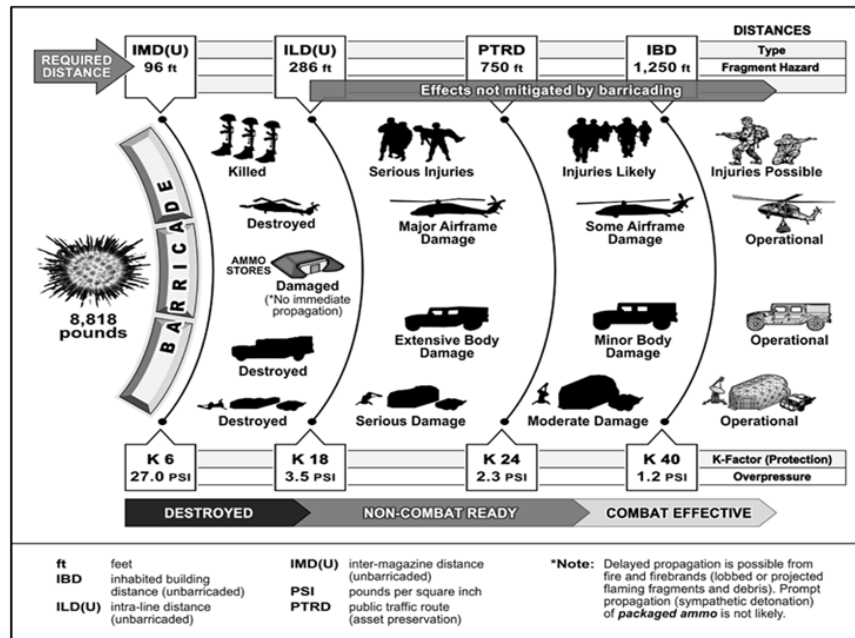


Figure 2-3. Barricaded blast damage effects on nearby assets

2-87. Figure 2-4 illustrates the potential damage and effect of accidental storage blast to combat assets without barricade protection.

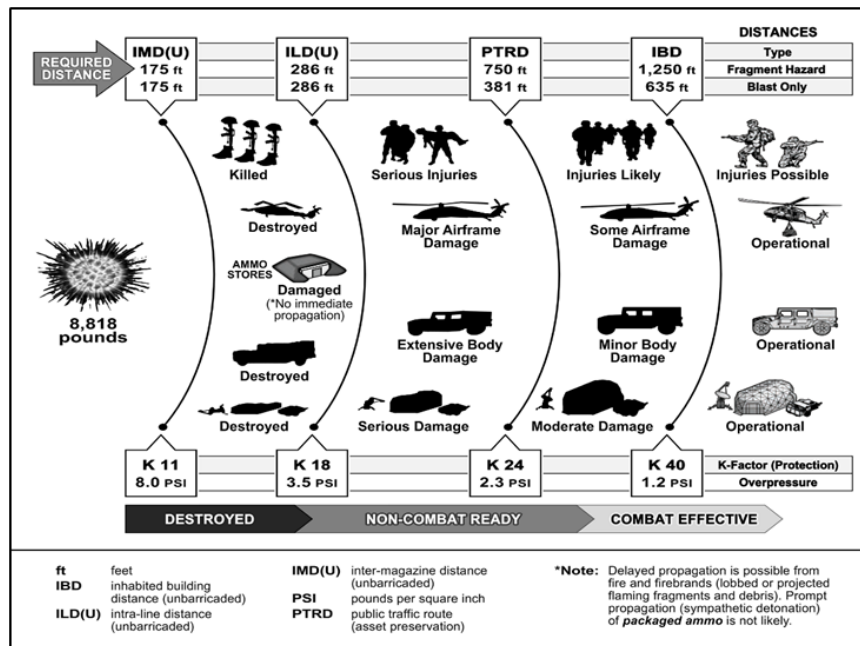


Figure 2-4. Unbarricaded blast damage effects on nearby assets

DECOYS

2-88. Decoys represent physical imitations of systems or positions to confuse the enemy. The goal is to divert enemy resources into reporting or engaging false targets, and to draw enemy's fire away from high-value assets. Decoys are generally expendable, and they can be either simple or elaborate. Their design depends on

several factors, including the target to be decoyed, a unit's tactical situation, available resources, and the time available.

2-89. Decoy methods in munitions support involve creating simulated or fake storage facilities to deceive potential adversaries. It is not necessary to have specially manufactured equipment for this type of visual deception. Decoys can be preconstructed or made from field-expedient materials. Except for selected types, preconstructed decoys are not widely available.

2-90. A typical unit can construct effective, realistic decoys to replicate its key equipment and features through imaginative planning. Figure 2-5 illustrates a general idea of a decoy. Decoys of this type are extremely large scale and are constructed to deceive both day and night observation.

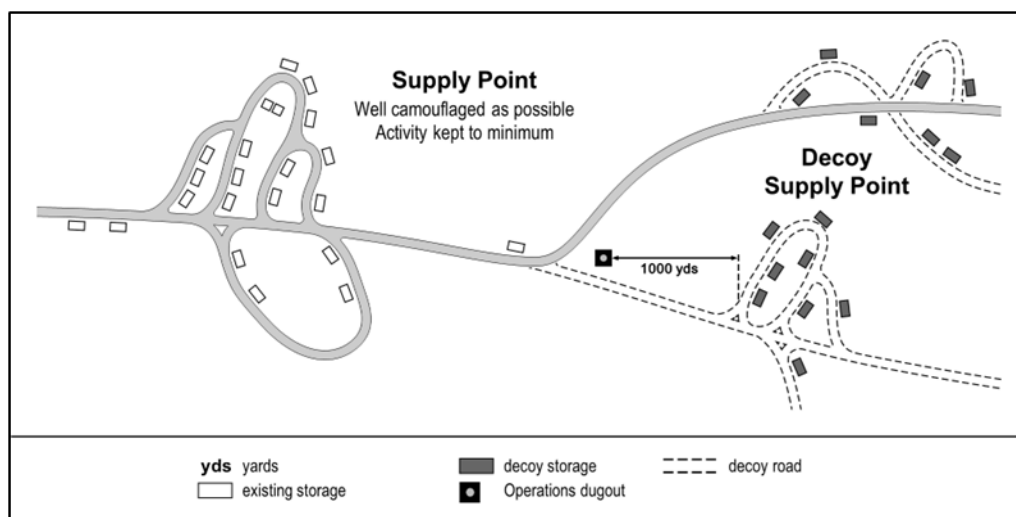


Figure 2-5. Notional decoy

MUNITIONS SURVEILLANCE AND MAINTENANCE

2-91. Munitions maintenance encompasses all actions necessary to ensure that stocks are serviceable and that unserviceable stocks are restored to serviceable condition or disposed of properly. Maintenance responsibilities are assigned to munitions units based on the unit's primary mission and the availability of skilled personnel, time, tools, equipment, and supplies.

SURVEILLANCE

2-92. Surveillance is the observation, inspection, serviceability determination, and classification of munitions and their components for movement, storage, and maintenance. It ensures that munitions are serviceable and safe for use. The ammunition surveillance program is vital to ensuring the reliability of munitions. The program is executed by ammunition surveillance personnel. The program includes prescribed visual inspections including initial receipt, readiness inspection, and combat load operations along with explosives safety functions.

2-93. Ammunition surveillance personnel perform the following ammunition surveillance functions in accordance with DA PAM 742-1, including—

- Inspecting munitions.
- Assisting using units in munitions requirements.
- Ammunition condition code assignment.
- Applying munitions suspensions and restrictions.
- Inspecting munitions-laden conveyances.
- Advising commanders on munitions-related requirements.
- Inspecting storage locations.

2-94. The unit commander with the munition support activity will appoint a senior ammunition surveillance inspector in charge to ensure that the surveillance program functions are executed. Only those personnel who are trained and/or certified by the Defense Ammunition Center may supplement and assist QASAS:

- Ammunition warrant officers (MOS 890A).
- Military ammunition inspectors (MOS 89B) in the rank of staff sergeant or higher.
- Designated civilian technicians (including local nationals).

2-95. Units execute the program under the guidance of the QASAS. All theater activities that store, maintain, dispose of, or ship munitions and their components conduct surveillance activities. Surveillance ends when munitions are either expended or destroyed.

2-96. The theater sustainment command is normally responsible for general supervision of munitions surveillance in the theater. The corps sustainment command is responsible for supervision within the corps. The ammunition ordnance battalion and DSB supervise this function in their commands. In established theaters, surveillance activities are under the control of Defense Ammunition Center QASAS who are assigned to the joint security area.

2-97. QASAS or personnel under the direct supervision of the QASAS perform classification. Commanders in formations without a QASAS may have ammunition warrant officers, military ammunition inspectors in the grade of staff sergeant or above, or designated civilian technicians who have been trained and certified by the Defense Ammunition Center to perform the surveillance inspections.

2-98. Commanders are responsible for their surveillance program. QASAS are responsible for developing, managing, and executing munitions surveillance programs at the installation or activity where they are assigned. They inspect and determine the reliability of the munitions stock. Leaders ensure that personnel perform surveillance functions according to DA Pam 742-1 and applicable technical manuals and supply bulletins.

Surveillance Inspector Duties

2-99. The QASAS or surveillance inspector assumes these 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 munitions 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 munitions and components for serviceability.
- Monitoring storage, handling, and maintenance operations and recommending changes to enhance safety and operational effectiveness.
- Advising the commander on munitions surveillance matters.
- Inspecting munitions to determine quality, safety, and deterioration.
- Maintaining munitions drawings and specifications files and indexes.
- Maintaining munitions suspension notifications and safety of use messages.
- Inspecting incoming and outgoing munitions shipments for compliance with existing instructions and regulations.
- Providing technical advice to the commander and supported units on munitions safety and compliance with munitions regulations.
- Assisting in planning, administering, and enforcing the explosives safety program.

2-100. The QASAS or surveillance inspector provides an invaluable service to the commander and supported units. Inspectors assist in many activities including—

- Investigating munitions malfunctions and accidents.
- Inspecting and testing lightning protection systems.
- Conducting unit munitions inspections.

- Preparing licenses, site plans, and DA Form 7632 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 munitions to/from combat vehicles.

2-101. When requested by safety directors and managers, QASAS or logistics assistance representatives provide technical assistance including—

- Developing explosives safety site plans/submissions and explosives licenses.
- Explosives DARAD requests and certificates of compelling reasons.
- Reviewing designs for explosive production, manufacture, testing, storage, and surveillance.
- Maintenance, demilitarization, and disposal facilities for compliance with explosive safety standards.
- Conducting safety inspections of munitions handling, storage, use, maintenance, and disposal areas at least annually.
- Monitoring munitions uploads and other activities that involve the transportation and storage of munitions 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.
- Ensuring the plan does not propose new construction inside explosive safety arcs.
- Monitoring operations involving munitions to ensure that Army units understand and comply with explosive safety standards.

Inspections

2-102. The purpose of an inspection is to identify deterioration and determine the serviceability of items. As a rule, munitions must not have defects that alter their characteristics, make them unsafe, or prevent them from performing as designed.

2-103. The inspector must be familiar with all the munitions and related materials including components and packaging. The prime causes of unserviceable munitions include heat, moisture, not being stored in proper shipping containers, and rough handling.

2-104. Deterioration occurs more quickly when moisture combines with a rise in temperature. Serviceability standards are contained in DA Pam 742-1 or item-specific references including the Munitions History Program (MHP), technical manuals, supply bulletins, and drawings.

2-105. Inspection procedures include observation, tests (gauging or strength tests), and functional tests.

2-106. The QASAS or qualified military personnel perform the following types of inspections in accordance with DA Pam 742-1:

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

2-107. The inspector must determine if defects can be corrected and at what maintenance level they must be done. Serviceability is not assumed because the item can be fired by the weapon it was designed for. Serviceable ammunition must function correctly when fired. Inspectors must look for indications of—

- Moisture.
- Rust or corrosion on projectiles and fuzes.
- Corrosion and cracks on cartridge cases.
- Deterioration of propellants.

- Loose closing caps.
- Moisture or dampness inside containers.

Surveillance Records and Reports

2-108. Surveillance personnel in the MHP keep a technical history of each lot, serial number, or group of munitions. 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 munitions. The MHP provides a complete history of items being considered for issue, turn-in, demilitarization, or shipment. All the following entries in the MHP web-based application need to be filled:

- 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.

2-109. The inspector must complete the applicable forms below to support the MHP for record. DA Pam 742-1 provides guidance for preparing the following forms for records and reporting:

- 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 (*Material 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*).

Physical Defects Standard

2-110. Inspectors evaluate material that shows deterioration or damage based on their training, experience, and judgment. Deterioration of materiel in storage is natural and varies depending on the protective coating, packaging, and storage conditions.

2-111. Deterioration is progressive and can move from an incidental stage to a minor, major, or critical stage if maintenance is not performed.

2-112. These categories of deterioration are used to establish a uniform system of examination for deterioration or damage. Surveillance defect standards, that include ammunition defects, are classified into the following four categories:

- **Critical.** A defect that is likely to result in hazardous or unsafe conditions for individuals using, maintaining, or depending on the item, or a defect that is likely to cause the destruction of and/or serious damage to the weapon or launcher under normal training or combat conditions.
- **Major.** A defect other than critical that is likely to result in failure in tactical use or precludes or reduces materially the usability of the item for its intended use.
- **Minor.** A defect other than critical or major that is not likely to result in failure during use or reduce the intended use of the item but should be corrected prior to issue.
- **Incidental.** Defects not of the critical, major, or minor types will be classified as incidental and corrected when maintenance is performed on the item. Incidental defects will not normally be

reported to the life cycle management command unless specifically requested but will be recorded on the card.

2-113. Further guidance on classifying metal, plastic, and rubber component deterioration, mixed ammunition, damaged packaging, and placing defects into one of the four defect categories can be found in DA Pam 742-1 and other applicable supply bulletins and technical manuals.

MUNITIONS MAINTENANCE

2-114. Munitions maintenance planning must be closely aligned with the supported unit's operational needs. Maintenance planners must be realistic when considering the availability of supplies and maintenance resources. Munitions maintenance and supply are undeniably linked; a reduction in munitions maintenance increases the amount of munitions taken from the supply system. Conversely, the inability of the supply system to replace unserviceable munitions requires a greater maintenance effort. Proper handling, storage, and maintenance of munitions enhances readiness, reduces replacement requirements, and conserves resources. Maintenance planners must recognize the interdependence of maintenance and munitions support.

2-115. Munitions maintenance is a vital task that must be performed to sustain readiness and provide units with a constant supply of serviceable munitions. 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, munitions must be retrograded for maintenance. The movement of munitions requires transportation and personnel assets; it is inefficient to adopt a maintenance program geared totally toward retrograde. QASAS at echelons above brigade perform quality assurance/quality control for maintenance operations.

MUNITIONS SUSPENSION

2-116. Munitions may be determined to be unserviceable and unsuitable for use regardless of military operations, whether in training or real-world missions. Specific lots of munitions and components suspected of being unsafe or otherwise defective are suspended from issue. The reasons for unserviceability may be due to deterioration of components, age, storage conditions, firing malfunction, accident, manufacturing defects, or exceeding drop criteria. Storing munitions by lot number enables the rapid withdrawal from issue of those items that are unsafe, defective, or suspected of being defective.

2-117. The Army gives authority to the commander of the Joint Munitions Command to suspend any lot of conventional munitions. The authority for missile munitions is the U.S. Army Aviation and Missile Command. These commanders make decisions about lot suspensions based on technical inspections and recommendations by QASAS personnel. The local commander may place a local suspension on a suspicious lot of munitions. A preliminary report or quality deficiency report is forwarded by the unit through the supporting sustainment headquarters to the theater Army headquarters. The munitions remain in local suspension unless the higher headquarters changes their status. See AR 75-1 for instructions for preparing suspension reports.

2-118. Additional notices of suspensions or restrictions are by updates to the MHP. Commanders must ensure that ammunition personnel are informed of suspensions or restrictions as they are published. Soldiers do not have to move suspended munitions lots in storage to a segregated area unless the suspension notice orders it. Stacks of suspended munitions must be clearly marked using DD Form 1575 or facsimile-formatted documents (taped to the materiel), to show the items have been suspended or restricted from issue. In facilities employing foreign nationals, munitions 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.

MUNITIONS OPERATIONS IN AUSTERE ENVIRONMENTS

2-119. The effect of weather, solar radiation, daily temperature changes, and high humidity may rapidly degrade the performance and safety of explosives. Munitions are designed for use under stated climatic conditions. Munitions lifecycle and reliability are significantly reduced if they are improperly stored in extreme climatic conditions. In cases of severe climatic change, munitions may rapidly become unserviceable and dangerous to use.

2-120. Munitions operations may be conducted in jungles, mountainous areas, deserts, cold regions, and urban areas. Each environment presents its own challenges requiring specialized knowledge, skills, techniques, and equipment for providing munitions support to the combatant commander.

DESERT AND TEMPERATE WEATHER

2-121. High temperatures and large variations in temperatures can degrade the performance and safety of a variety of munitions, particularly those containing propellants. Every effort should be made to reduce this effect. Use covered storage and correct stacking procedures to provide adequate ventilation, and, if possible, store munitions in an air-conditioned environment. A light paint color on containers may significantly reduce the temperature inside them.

2-122. Munitions should be stored out of direct sunlight in desert and tropical climates. To minimize exposure to sunlight, position containers with long axes pointed in an east-west direction. Shade munitions in the following priority (listed highest to lowest priority):

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

2-123. The effects of moisture at higher temperatures are worse than the effects of moisture at low temperatures. The increased effects resulting from high moisture and high temperature can lead to failure of ignition systems, reduction in propellant efficiency, and degradation of various munitions fills. Alternatively, low humidity environments can result in an increased risk from electrostatic discharge hazards and may also dry out critical seals and other components.

2-124. Munitions should not be stored directly on the ground except for tactical use but should be placed on pallets to provide clear distance from the ground to ensure ventilation. The proper use of dunnage increases stack stability. Generally, stacks must be at least three inches off the ground to prevent munitions from getting wet and to ensure adequate air circulation. See DA Pam 385-64 for more information.

2-125. 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.

2-126. If propellant charges are stacked, personnel should turn the lids down slightly, so water does not seep in or accumulate. Provide proper drainage around stacks of munitions if water pooling is a problem.

2-127. To mitigate the adverse effects of a lightning strike and accidental ignition, all potential explosive sites should be provided with lightning protection. Munitions containers used for storage are considered a “Faraday cage or shield” thereby not requiring additional lightning protection. However, they must be effectively grounded.

2-128. 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 missiles in 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.

ARCTIC AND COLD WEATHER

2-129. Munitions safety in arctic environments presents unique challenges due to extreme weather conditions, logistical constraints, and the need to operate in remote and austere locations. Support units must be prepared to handle the added volume of munitions. Severe cold conditions also make it more difficult to prepare ammunition storage areas. ATP 3-90.96 describes sustainment operations in the arctic region. Sustainment operations in the arctic are critically affected by—

- The long and difficult terrain distances over which support must be rendered.
- The lack of ground communications systems, even near population centers.
- The general lack of civil and industrial facilities that can be adapted for military purposes.
- Environmental factors including winter cold, low-bearing capacity soils in summer, permafrost phenomena, vegetation cover, and terrain barriers.

2-130. Success of munitions operations in undeveloped arctic areas is dependent on planning and preparation. Planners and commanders must include full consideration of resources and their accessibility:

- Environmental protection.
- Personnel cold-weather gear.
- Equipment winterization and maintenance.
- MHE requirements.
- Snow removal equipment.
- Transportation requirements.
- Security.

2-131. Munitions storage facilities must withstand extreme cold temperatures to prevent damage to munitions caused by freezing. Insulated storage containers may be necessary to maintain proper storage conditions and prevent degradation of munitions. Regularly monitor and evaluate storage areas and handling practices to identify areas to improve and ensure compliance with safety standards and policies. Consider these techniques to protect munitions in sub-zero temperatures:

- Stack all munitions stored in the open on pallets or dunnage to keep them from freezing to the ground.
- Locate stacks in areas that minimize the effects of drifting snow.
- If possible, install snow fences to help offset blowing snow. They must be installed well upwind and have space allowed for the drift to form. Remove drift after the wind event.
- Mark locations of munitions that are subject to drifting snow with poles and small flags because a snowstorm may bury these items.
- Accurately survey supply activity areas to prevent snowplows or other equipment from damaging munitions buried in the snow.
- Select ground with adequate drainage for storage sites during summer seasons.
- Use cold weather procedures when operating MHE.
- Maintain proficiency in munitions management and operations at night, in fog, snowstorms, and conditions of low visibility.
- Specific types of munitions require a climate-controlled environment. If required, use only approved environment control units to maintain temperature and humidity in the storage area.
- Use desiccants or moisture-absorbing materials to keep munitions dry and prevent corrosion.

CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR ENVIRONMENT

2-132. Munitions leaders and all handlers at the tactical level must be capable of surviving chemical, biological, radiological, and nuclear attacks and continuing operations in hazardous conditions. Integrate the guidance from FM 3-11 and the 3-11 series of ATPs into unit SOPs and training plans to increase survivability and supportability.

Decontamination

2-133. In chemical, biological, radiological, and nuclear conditions, it is essential to understand that munitions may or may not require decontamination before use. Units responding to these events must immediately execute the necessary actions to enable the mission to proceed and, within mission constraints, save lives. Leaders must be well-versed in decontamination principles, types, and techniques. They must also have a comprehensive understanding of all available resources including manpower, time, and equipment, as well as the unit's capacity to maintain operations.

2-134. Once a unit is contaminated, there are practical reasons for performing at least some decontamination as soon as possible. Leaders will follow the guidelines in this section when deciding the actions that best support the mission. Leader decisions to decontaminate should consider resources available within the context of mission variables. Before the decision is made, the following factors must be addressed:

- Lethality.
- Performance degradation.
- Equipment limitations.
- Spread of contamination.

2-135. *Decontamination* is the process of making any person, object, or area safe by destroying, neutralizing, making harmless, or absorbing and removing chemical or biological agents or by removing radioactive material clinging to or around it (JP 3-11).

2-136. Individual protective equipment and collective protection shelters offer only a temporary solution. Decontamination is the more permanent solution. Leaders must know when, where, and how to perform decontamination procedures by following these four principles:

- Decontaminate as soon as possible.
- Decontaminate only what is necessary.
- Decontaminate as far as forward as possible (limit spread).
- Decontaminate by priority.

2-137. Service members perform individual decontamination of their equipment as outlined in the unit tactical SOP in accordance with FM 3-11 and ATP 3-11.33. Leaders must be prepared to make an assessment based on the following information:

- Operational situation.
- Available decontamination resources and mission variables.
- Effects of decontamination on unit's ability to perform its mission.

2-138. 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. Cool, soapy water is the preferred decontaminant for all types of contamination on small arms munitions. Personnel performing chemical decontamination of munitions should be aware of the following precautions:

- Do not use chlorine-based decontaminants on munitions. It removes critical markings from the munitions. It may also corrode and render munitions unserviceable.
- Do not use nonstandard decontaminants that are corrosive. They also may remove critical markings from the munitions.
- Artillery fuses are difficult to decontaminate due to their corners and crevices. If artillery fuses are stored in munitions cans, decontaminate the cans as normal.
- Aviation munitions use paint with polyurethane compounds. Chemical agents readily absorb into this type of paint; 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.

Contaminated Munitions Resupply

2-139. Munitions units must make every effort to provide uncontaminated munitions to units. If uncontaminated munitions are not available, the available munitions must be decontaminated before they are issued or sent into a clean environment.

2-140. Munitions support personnel must thoroughly understand decontamination roles and procedures. Because of limited decontamination capability, available assets must be used effectively. When possible, weathering can reduce contamination to acceptable levels.

2-141. Protective overwraps on munitions containers protect the round in storage, reduce the effects of chemical agents, and make decontamination easier. If munitions are not packaged with protective overwrap, makeshift coverings like tarpaulins or plastic sheets provide some protection and speed up decontamination. Protected munitions must be stored on a pallet that can be decontaminated.

2-142. Contaminated stocks are normally not issued but are kept separate from clean stocks until decontaminated. In emergency situations, certain contaminated items may be issued. Contaminated items are issued only if they provide a decisive tactical advantage. Also, they are issued first to units that are contaminated.

2-143. Only under the most extreme conditions are contaminated munitions issued to an uncontaminated unit. The decision to issue contaminated items is made by the authorized combatant commander. The decision to issue contaminated stocks is based on the following considerations:

- Mission variables.
- Criticality of items.

- Type of contamination.
- Extent of contamination.
- Resources available for decontamination.

2-144. Contaminated munitions must be transported with great care. Coordination must allow for flexibility in routing, marshalling, serializing, and communicating. Vehicles carrying contaminated munitions stocks produce vapor clouds. Vapor clouds are hazardous to the terrain, local population, and following vehicles. These three measures can reduce the hazards of transporting contaminated munitions:

- Limit contamination as much as possible.
- Cover all loads with NBC-protective covers.
- Coordinate movement of contaminated munitions stocks with responsible mounted mission command.

Chapter 3

Munitions Support and Safety

This chapter provides general information on munitions support at the strategic level and munitions safety at the tactical level. At the strategic level, this chapter provides a general description of strategic-level munitions support. At the tactical level, the focus shifts to the practical application of safety procedures in real-world operational environments. The chapter also identifies specific hazards associated with different types of munitions and the measures taken to mitigate those risks, including the use of specialized equipment, safety devices, and emergency response procedures. The chapter highlights the crucial role of leadership, communication, and continuous improvement in fostering a safety-conscious culture at the tactical level.

STRATEGIC LEVEL AND JOINT MUNITIONS SUPPORT

3-1. The Department of the Army is the lead agency for DOD munitions. The Army follows standardization agreements (STANAGs) when operating with North Atlantic Treaty Organization (NATO) members. These agreements provide guidelines on safe storage, maintenance, and transportation of munitions. STANAGs identify the standards of proficiency for ammunition technicians. Refer to STANAG 2622, STANAG 4440, and STANAG 4657 for more information on munitions guidance in NATO.

3-2. Within the joint environment, munitions management is a shared responsibility between the explosive hazards coordination cell and the joint munitions office. The combatant commander establishes the joint munitions office to oversee the planning and coordination of munitions operations in support of joint forces employed within the area of responsibility. The joint munitions office typically consists of a mix of munitions planners from each Service. This office provides oversight of joint force munitions readiness (particularly of critical and precision munitions), but it does not have specific responsibility for overseeing munitions safety programs.

THEATER AMMUNITION BATTALION

3-3. The theater ammunition battalion provides explosives safety management oversight and may provide site licensing for ASAs in theater. The battalion may be attached to a sustainment brigade. The battalion—

- Provides mission command and staff planning for two to five ammunition companies and functional oversight of all ASPs within the theater support area.
- Provides munitions planning expertise for theater through division levels as requested and coordinates and plans future ASP site selections.
- Gathers and conducts analysis on trends and efficiency of stock operations.
- Monitors supply status and stocks at the ASPs.
- Provides oversight and technical assistance, ammunition surveillance, and ammunition maintenance program.

MODULAR AMMUNITION COMPANY

3-4. The modular ammunition company is attached to an ordnance battalion (ammunition) or a combat sustainment support battalion. The modular ammunition company's ammunition safety SOP nests with the higher headquarters. Modular ammunition companies operate ASPs at theater, field army, corps, and other levels as required by the operational commander. This company provides ammunition general support to units as designated in the operations order. Modular ammunition companies and their ammunition lift platoons operate ASPs and provide receipt, storage, issue, and reconfiguration of ammunition items.

MODULAR AMMUNITION PLATOON

3-5. Modular ammunition platoons receive, configure, inspect, manage, issue, ship, and retrograde munitions stocks with the assistance of transportation enablers. These platoons operate ASPs at the theater, corps, and

division level. All the Soldiers are MOS trained and typically certified to work with or for USAMC. Their parent modular ammunition company provides site-specific ammunition safety SOPs.

3-6. Modular ammunition platoons are normally attached to a modular ammunition company, but they may be directly attached to a combat sustainment support battalion to provide munitions support to echelons above brigade. A modular ammunition platoon will support a brigade under most conditions. The modular ammunition platoon may have either a general or direct support relationship with units operating within its supported area and must maintain close coordination with all supported units. Modular ammunition platoon personnel perform a wide range of duties:

- Assist ammunition inspectors and surveillance personnel in execution of their duties.
- Conduct inventories as required or directed.
- Execute authorized demilitarization and destruction of unserviceable munitions.
- Perform limited field maintenance and decontamination of ammunition stocks.
- Assist in firefighting operations and storage site maintenance.
- Perform supply operations like packing, crating, and banding munitions for transportation and storage, inventories, and decontamination of ammunition stocks.

THEATER AMMUNITION SUPPLY POINT

3-7. The theater ASP is normally under a theater support command. One or more platoons from a modular ammunition company operate the theater ASP. The point's ammunition safety SOP is written by the modular ammunition company specifically for the ASP. The theater ASP's mission is to receive, store, and ship containerized and breakbulk munitions. It also issues, inspects, configures, manages, and maintains theater reserve munitions. A subordinate ASP (which may be co-located with the theater ASP) provides area support to operating units.

TACTICAL MUNITIONS SUPPORT

3-8. The corps and division are the tactical formations that conduct large-scale combat operations. The corps commander task-organizes and maneuvers divisions to destroy enemy land forces and seize key terrain and critical infrastructure.

MUNITIONS SAFETY AT THE CORPS LEVEL

3-9. A *corps* is an echelon of command and tactical formation that employs divisions, multifunctional brigades, and functional brigades to achieve objectives on land (ADP 3-90). The corps may serve as the senior Army tactical formation during large-scale combat operations, commanding two to five Army divisions together with supporting brigades and commands.

3-10. The corps ASP is the primary source of high-tonnage ammunition for the corps. It may be operated by one or more modular ammunition companies or by one or more medium or heavy lift modular ammunition platoons. The number of units assigned to operate a corps ASP depends on the authorized ammunition stockage level. The corps ASP (through coordination with a division ASP) may throughput shipments to MATPs and ATHPs.

3-11. The corps ASP provides the division ASPs with bulk or configured ammunition and the MATPs and ATHPs with munitions in mission-configured loads. The corps ASP provides area ammunition support to units operating in the corps rear. One corps ASP is normally required to support two to five Army divisions. Stockage objectives for the corps ASP are based on projected theater combat rates. When a corps support area's wartime stockage objective exceeds munitions for five army divisions, a second corps ASP or field army ASP should be established.

DIVISION AMMUNITION SUPPLY POINT

3-12. The division ASP is the primary source of high-tonnage ammunition for the division and brigades. It may be operated by one modular ammunition company or by one or more medium or heavy lift modular ammunition platoons. Modular ammunition units have a general support relationship with units operating within their supported area. The division ASP establishes ammunition supply and maintenance procedures and can inspect, process, and ship CEA consistent with the policies and directives of the Army Service component command and the corps.

DIVISION SUSTAINMENT BRIGADE

3-13. The DSB is assigned to a division. The DSB employs sustainment capabilities to create desired effects in support of the division commander's objectives. The DSB and its subordinate units provide sustainment support to all units assigned or attached to the division. The DSB may command up to seven battalions based on operational and mission variables. Additional combat sustainment support battalions and companies may be attached to a DSB to sustain large-scale combat operations. Munitions holding areas must include storage protection for safety.

BRIGADE SUPPORT BATTALION AND LIGHT SUPPORT BATTALION

3-14. BSBs and light support battalions provide logistics support to maneuver brigades and normally operate closer to the forward line of troops. They have the capability to establish ammunition transfer points (MATP or ATHP depending on the type of supported brigade) operated by the supply and distribution company's ammunition section. These personnel require the same training and certifications as discussed in chapter 2.

MANEUVER UNITS

3-15. Maneuver brigades are the end user for most munitions. They provide the division commander close combat capabilities to execute missions to achieve military objectives during engagements and battles in support of campaigns.

3-16. Each unit's tactical SOP provides guidance and techniques for the safe handling and temporary storage of munitions. In garrison, the unit arms room is a critical area where munitions are stored, handled, and issued to the individual Soldier. Safety in the unit arms room is essential to prevent accidents, injuries, and fatalities. Commanders must ensure compliance with installation senior commander safety office guidelines, tactical SOP, local laws, and regulations.

INDIVIDUAL SOLDIER

3-17. Every Soldier has a responsibility in munitions safety. All Soldiers, regardless of rank, must follow the unit tactical SOP for proper handling and packing of munitions.

NON-89 SERIES MOS PERSONNEL

3-18. In sustainment companies, many personnel that handle munitions will not be ammunition specialists. However, they are still responsible for the highly specialized care and management of ammunition, explosives, and their components. Unit supply and transportation personnel will perform stock control and accounting duties of receiving, storing, issuing, and inspecting munitions for the unit.

3-19. It is imperative to cross-train non-89-series MOS personnel in the forward support companies as ammunition handlers. The forward support company must coordinate and schedule ammunition handler classes for the unit or have individual personnel go through the installation course in garrison.

3-20. Having additional trained munitions handler personnel increases flexibility across the unit. This allows more than one section to transport ammunition safely if not enough 89-series MOS personnel are available. Having extra ammunition handlers in the distribution, maintenance, and headquarters platoons can be the key to success in combat operations.

3-21. It is recommended that maneuver companies should have no less than one NCO and one Soldier ammunition handler certified to operate the battalion AHA as the ammunition issue point to line units. This allows maneuver companies to transport their ammunition safely as required and understand equipment standards found on DD Form 626.

3-22. Cross-training ammunition handlers to perform different tasks within munition support operations improves the ASP readiness to support the maneuver commander. Consider training all munition handlers in these critical tasks:

- Ammunition compatibility.
- Ammunition cargo tie-down.
- Ammunition loading/unloading operations.

- Emergency response information for HAZMAT.
- Proper filling of DD Form 626.

EMERGENCY DESTRUCTION

3-23. Soldiers conduct emergency destruction of munitions to prevent enemy use, to prevent disclosure of information about classified munitions, and for safety reasons. The objective of emergency destruction is to render munitions inoperable, destroy munitions and documents of value to the enemy, and render any remaining munitions too hazardous to use.

Planning

3-24. Planning for emergency destruction begins as soon as a unit is assigned a munitions mission and must be documented in an ASP internal SOP as an annex. Units should staff the plan through technically qualified personnel like EOD personnel to ensure it is complete and feasible.

3-25. Leaders must train ASP, ATHP, and MATP personnel in emergency destruction methods and procedures. All personnel must be thoroughly familiar with the unit emergency destruction SOPs and methods of destruction.

3-26. Units should establish priorities for emergency destruction in their mission orders and SOPs. Base priorities for emergency destruction on the tactical situation and the types of munitions stored at the ASP, ATHP, or MATP. Priorities may change based on logistical and tactical requirements. Munitions that are vital to the defense of the unit should not be destroyed. The priority level corresponds to the general order for destruction:

- Priority 1. Classified munitions and associated manuals, records, reports, test sets, and equipment.
- Priority 2. Munitions that enemy forces can use in immediate retaliation. This includes munitions deployed without a weapon system including grenades, mines, small rockets, and munitions that are compatible with enemy weapon systems.
- Priority 3. Casualty producing munitions (high explosive and anti-personnel) not included in priorities 1 and 2.
- Priority 4. Non-casualty producing and pyrotechnic munitions including signals and illuminating projectiles.

Approval Authority

3-27. Unit SOPs establish the authority to destroy munitions. The applicable mission order or SOP must specify who in the chain of command is authorized to order the ASP to destroy munitions. Senior commanders may delegate this authority to subordinate commanders when the tactical situation demands. Commanders may also dictate when and how to conduct ASP emergency destruction including the types of items authorized for destruction and the destruction methods.

3-28. Through tactical SOPs, the command may dictate when to conduct emergency destruction, including the types of items authorized for destruction and the destruction methods. The decision to destroy, the method to be used, and the items to be destroyed all depend on mission variables involving command policy and the tactical situation. The experience and confidence of personnel, demolition resources, and the time required to destroy an ammunition stockpile are directly related to the amount of ammunition to be destroyed and its degree of dispersion.

Considerations for Emergency Destruction

3-29. Critical considerations that need to be taken into account before conducting emergency destruction of munitions are listed below. These may be modified by the current tactical situation when planning and influence the method used for destruction.

Time Available

3-30. The primary consideration is time available; this will drive the decision for emergency destruction of munitions, as well as the method and the priority. If time allows, the decision to authorize destruction must

be made at a higher command level. However, time constraints may prevent senior leaders at the ATHP or MATP from seeking permission from higher headquarters to carry out emergency destruction.

Quantity

3-31. The amount of demolition resources and the time required to destroy a munitions stockpile is directly related to the amount of munitions and their degree of dispersion. Emergency destruction by burning or demolition requires significant preparation but is effective. An artillery strike is quicker but less effective at ensuring complete destruction.

Security Classification

3-32. Personnel must evacuate classified munitions if possible. If not possible, destroy classified munitions first. Personnel use the most reliable demolition method on classified munitions to ensure complete destruction.

Material and Trained Personnel

3-33. Observance of safety precautions is paramount regardless of the emergency destruction method used or the urgency of the situation. Only trained and experienced personnel should conduct emergency destruction operations. Safety requirements determine the number of personnel engaged in the operation.

3-34. It is always best to implement the cardinal principle of munitions handling when planning and executing emergency destruction operations. Safety considerations include the amount and type of munitions being destroyed and the size of the ATHP or MATP.

3-35. If the ASP has no demolition or flammable material, destruction methods are limited. Only permit personnel trained in and thoroughly familiar with the unit emergency destruction SOP to conduct demolition operations. A minimum of two personnel should be present during emergency destruction operations. Mission variables permitting, coordinate with and warn those units endangered by emergency destruction operations to prevent or reduce casualties.

Methods of Emergency Destruction

3-36. Choose methods of destruction that ensure the munitions cannot be restored to a usable condition within the combat zone by repair or cannibalization. Destruction should be planned to impede enemy troop movements without creating hazards for friendly troops.

3-37. The methods for destroying munitions can be used individually or in combination. The actual method or methods used in a tactical situation depend on time, personnel, type of munitions, and available means of destruction.

3-38. Firing is the simplest and most effective way of preventing enemy capture. If possible fire ammunition into enemy-held territory.

3-39. Concealment is the least desirable destruction method. It is viable when the lack of time precludes using other methods. Concealment may be an excellent destruction method if the terrain provides adequate covering or if bodies of water are available for dumping munitions. Puncture hermetically sealed metal cans before throwing them into the water if time permits. The concealment of key components like fuzes can prevent or at least delay their use by the enemy.

3-40. Burning is less time-consuming than demolition. However, it is not recommended for all munitions because it rarely accomplishes complete destruction. If time is a significant consideration, burning may be used to destroy boxed munitions. Munitions must be surrounded with combustible/flammable material. To guarantee an extremely brisk fire, diesel fuel, gasoline, paint thinner, or other suitable combustible or flammable liquid should be used.

3-41. Open-burn is primarily used to destroy bulk propellants, raw explosives (for example, contaminated explosive waste that cannot be treated in approved contained technology), or explosive-contaminated packaging that may not be able to be transported or be demilitarized safely using other available technologies.

Note. The type and quantity of munitions being burned determines the radius of the danger area around the burning site. A minimum 1,524-meter (0.9-mile) safe area must be established when surrounding units and personnel are warned and under protective cover. Maximum emergency withdrawal distance for nonessential personnel.

3-42. Numerous factors must be considered before using demolition to destroy munitions. These considerations include:

- Type and quantity of munitions being destroyed.
- The fragmentation hazard.

3-43. The protective cover provided to personnel in the area determines the radius of the danger area surrounding the destruction of munitions by demolition. Distance may be adjusted based on the tactical situation, terrain, and available protective cover for exposed personnel.

3-44. Follow procedures outlined in TM 43-0002-33 for demolition of improved conventional munitions (like high explosive cartridges, projectiles, propelling charges, grenades, and mines) in combat operations. The proper positioning of the demolition charge will ensure destruction of munitions. There are two systems that are used to initiate demolition charges—

- The electrical blasting system is the standard and preferred system for depots and ASP.
- If the electrical blasting system is not feasible, use the nonelectrical blasting system.

3-45. Open detonation is used to destroy munitions that are recovered during an explosives or munitions emergency, munitions determined unsafe for storage or transport, and munitions that cannot be demilitarized by other means because of their size and explosive content.

3-46. Destruction of unserviceable munitions and packaging that poses an explosive hazard to personnel is done by or under the supervision of EOD personnel. Routine disposal of unserviceable munitions and packaging is done by or under the supervision of surveillance personnel. The general criteria for disposal operations are in DA Pam 385-64.

3-47. When external demolition teams or EOD personnel are not available to perform the demolition, local personnel must be assigned, by name, to specific destruction functions and thoroughly trained in advance. Commanders request appropriate explosive organizations (for example, demolition teams and EOD personnel) to provide training to selected personnel on essential demolition and destruction procedures.

RETROGRADE PLANNING

3-48. Operational planning incorporates a vast array of critical issues and concerns. One of the key issues planners must address during the initial phases is how to recover and retrograde ammunition remaining after combat operations end. Upon completion of combat operations or the start of stabilization and enabling civil authority, the labor-intensive task of identifying, preparing, repackaging, collecting, loading, and shipping ammunition begins.

3-49. Serviceable and unserviceable munitions may be mixed after military operations. Munitions handlers and users must give the munitions extra care in handling to prevent accidental detonation. Munitions will require a serviceability or classification inspection. A QASAS or other qualified person under the supervision of a QASAS must make condition code decisions.

3-50. If proper packing materials are not available, munitions must be inspected to determine their serviceability. If the munitions are in serviceable condition but have no lot number, a local lot number may be assigned. These munitions are considered serviceable.

UNEXPLODED ORDNANCE

3-51. Military personnel conduct live-fire training and testing on military installations in the United States and abroad. As a result, munitions may be present on both land and in the water. These munitions are dangerous and can explode if approached or disturbed. Follow the 3R principle of explosives safety (recognize, retreat, report). These principles will protect personnel to include residents from the potential

dangers associated with munitions:

- Recognize. Be aware if you have encountered unexploded ordnance.
- Retreat. Do not approach, touch, move, or disturb unexploded ordnance and carefully leave the area.
- Report. Submit a nine-line report on the explosive hazard to EOD (see table 3-1).

3-52. EOD units provide support across the battlefield with the capability to render safe and dispose of all explosive ordnance, including improvised explosive devices and weapons of mass destruction that present a threat to operations. EOD units serve as a combat multiplier by rendering safe munitions that restrict freedom of movement and deny access to or threaten supplies, facilities, and other critical assets.

3-53. During the preparatory and execution phases of the operations cycle, EOD disposes of hazards to include foreign or U.S. munitions, unexploded explosive ordnance, and mines. However, breaching and clearance of explosive hazards is primarily the engineers' responsibility.

3-54. Only EOD personnel and military patrol explosive detector dogs will support a request from civil authorities for technical assistance and disposal of explosives. When requested, military police canine units and emergency services may aid the responding EOD unit or the civil authority requesting the aid.

Table 3-1. Nine-Line EOD Format

Line Number	Description
Line 1	Date time group discovered (command policy will dictate Local or Zulu time).
Line 2	Reporting Activity (UIC / Unit designation). Location: mandatory 8-digit grid (include landmarks, reference points, or street addresses).
Line 3	Contact Method: radio frequency/call sign or telephone number (if using phone number, provide name).
Line 4	Type of Munition: (Dropped, Projected, Placed, or Thrown).
Line 5	NBC Contamination: Yes or No known or suspected NBC contamination. If yes, report type of agent if known / identified.
Line 6	Resources Threatened: (What resource is threatened - is it a critical asset?).
Line 7	Impact on Mission: (How the unexploded explosive ordnance is affecting the mission).
Line 8	Protective Measures Taken: (Unit emplaced protective measures).
Line 9	Recommended Priority: (Immediate, Indirect, Minor, or No Threat)
NBC nuclear, biological, and chemical UIC unit identification code	

CAPTURED ENEMY AMMUNITION

3-55. Planning for CEA is an analytical process based on assessed enemy resources and facilities. Requirements for the disposition of CEA may exceed the capabilities of munitions units. CEA may also include NATO and U.S. manufactured munitions that may not have been under U.S. custody or control.

3-56. The capturing unit may be required to help destroy or coordinate the movement of CEA. Once the CEA is transferred to the collection point, the capturing unit is relieved of these responsibilities.

3-57. The ammunition company will require close support from EOD before any CEA handling operation to ensure the safety of personnel. EOD units identify and request disposition of first-seen ordnance and CEA of intelligence value and, if required, attempt render-safe procedures. The EOD unit submits required reports through command channels. CEA must be analyzed and identified by EOD or a QASAS/qualified military inspector to ensure it is safe to transport to a theater ASP. Hazardous enemy munitions must be segregated from U.S. munitions.

3-58. CEA is considered excess. One of three options must be taken when munitions are excess on the battlefield: use, destroy, or secure and retrograde. When an enemy munitions cache is secured for storage, it is first inspected to determine condition, type, and caliber.

3-59. If munitions from a cache are retrograded, corps munitions managers should be notified to provide quality assurance/quality control personnel and transportation assets to support the operation. These personnel go to the cache to load and transport it to the designated ASP. Quality assurance/quality control personnel assist in segregating and loading the munitions. The ASP places the cache in a designated secure

area. Items of particular interest are noted and quickly reported through intelligence channels for technical intelligence analysis.

3-60. The collection point is responsible for the CEA's receipt, storage, issue, shipment, and accountability. Once the CEA is received at the ASP, an ammunition inspector inspects it and determines its serviceability. The storage should be as far away as possible from inhabited areas.

3-61. All Army activities holding CEA must account for it using manual procedures in accordance with the basic accounting principles of DA Pam 700-16. Serviceable CEA must be separated from unserviceable CEA within the CEA designated storage location.

3-62. Store CEA separately from US stocks. CEA is stored at a minimum of inter-magazine distance to prevent a mix up with serviceable munitions. If greater space than established inter-magazine distance is available, then use the larger area to establish an ESQD of inhabited building distance.

3-63. The ASP commander reports and requests disposition instructions through sustainment and security channels as directed by the servicing materiel management branch. If the CEA is retrograded, the procedure used is the same as for U.S. munitions. CEA collected for exploitation is managed by DODD S-3325.01 and DODI S-3325.04.

CHEMICALLY FILLED MUNITIONS

3-64. Chemically filled munitions, also known as chemical weapons, contain toxic chemicals to kill, injure, or incapacitate people. These munitions include bombs, rockets, landmines, projectiles, artillery shells, mortars, and missiles.

3-65. Figure 3-1 illustrates the hazard symbol for type of chemical agent in the munitions and the absence or presence of explosive components. During wartime and certain contingency operations, chemical hazard symbols may not be required. Munitions personnel should consult supporting munitions activities or safety personnel for more information.

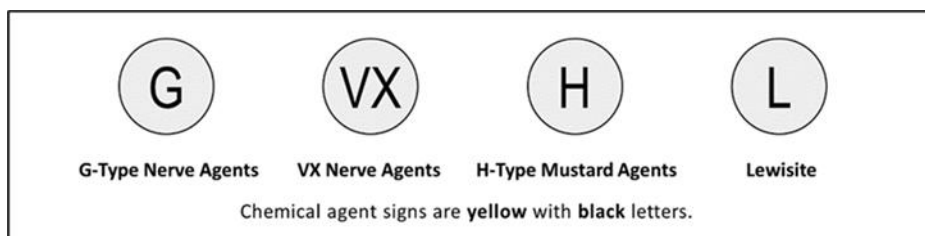


Figure 3-1. Chemical hazard symbols

3-66. Appropriate personal protective equipment is essential when fighting fires involving chemical agents. The protective clothing and apparatus illustrated in figure 3-2 are for firefighting purposes when dealing with specific chemicals and fillers. They do not necessarily apply to normal or combat operations.

3-67. Use both chemical hazard and fire hazard symbols when chemical or pyrotechnic munitions are assembled with explosive components. Chemical munitions without explosive components are identified by chemical hazard symbols only.

3-68. Personnel should remove, cover, or reverse hazard signs as soon as chemical agents are removed from a location. This requirement is like those for posting fire symbols.

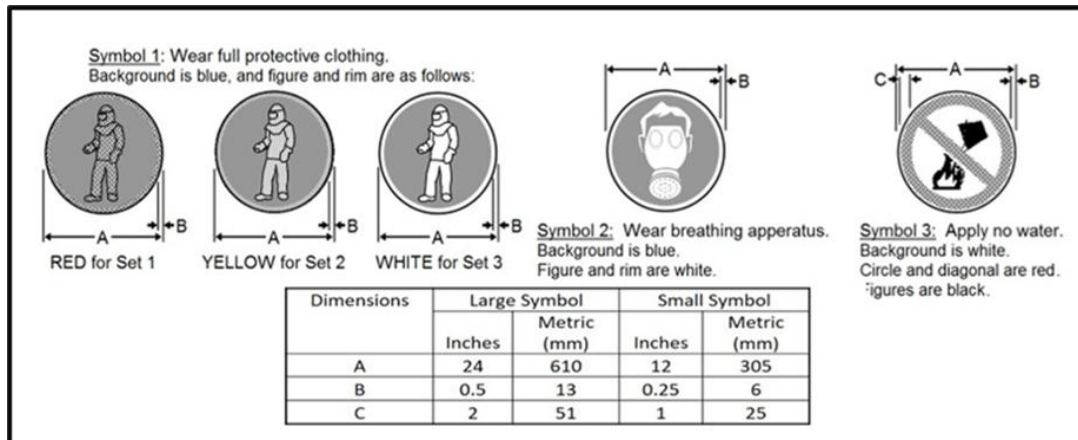


Figure 3-2. Protective clothing and apparatus

SYMBOL 1, WEAR FULL PROTECTIVE CLOTHING

3-69. Set 1 (red rim and figure). This symbol indicates the presence of highly toxic chemical agents that may cause death or serious damage to body functions. Personal protective equipment 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 CEA).

3-70. Set 2 (yellow rim and figure). This symbol indicates the presence of irritants like riot control agents and smokes. Personal protective equipment includes authorized protective mask or self-contained breathing apparatus, explosive handler's coveralls, and protective gloves.

3-71. Set 3 (white rim and figure). This symbol 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

3-72. Indicates the presence of incendiary and readily flammable chemical agents that present an intense heat hazard. This hazard and sign may be present with other fire or chemical hazards/symbols. Use protective masks that prevent the inhalation of smoke from burning incendiary mixtures.

SYMBOL 3, APPLY NO WATER

3-73. Indicates a dangerous reaction will occur if water is used to extinguish the fire. This symbol may be posted together with any of the other hazard symbols.

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Chapter 4

Fire Prevention and Protection

Fire prevention, protection, and suppression encompass all efforts aimed at preventing or stopping fires. Fire prevention programs and fire safety policies exist at all levels. All levels of command are responsible for the Army's fire protection plan. This chapter discusses general fire prevention and protection techniques to minimize the risk of fire, protect personnel and munitions, and ensure an effective response in the event of fire.

FIRE PREVENTION

4-1. Fire prevention focuses on proactive measures to include written policies, techniques, and procedures to avoid fire accidents and unintentional explosions. Refer to DA Pam 385-64 and AR 385-10 for Army regulatory guidance and NFPA for national fire prevention standard codes in the United States. Firefighting to prevent fire from reaching munitions is authorized.

4-2. Each storage site must establish a well-planned fire prevention program. The objective of the program is to eliminate causes of fire and reduce the potential for loss of life, injury, and property damage. Preserving life and property is a fundamental duty of all levels of command and supervision. This program requires strong command emphasis and support. Command awareness and involvement are the two most critical components of an effective fire protection program. The program should include the following components:

- Standing operating procedures.
- Fire plan.
- Hazard identification.
- Routine training.
- Fire protection techniques.
- Evacuation and response procedures.

STANDING OPERATING PROCEDURES

4-3. The fire prevention procedures presented here are basic. They should be supplemented by any additional standards the commander feels are needed to protect the ASP. The SOP will contain the following techniques and procedures when working with or around munitions:

- Provide strict smoking policy to prohibit smoking in areas where munitions, highly combustible materials, or flammable items are stored. Designate specific smoking locations and post "authorized smoking area" signs. The smoking area must be at least 50 feet from the area containing munitions.
- The commander or safety officer certifies the designated smoking area and ensures that it is equipped with proper receptacles for butts or smoking residue and at least one portable fire extinguisher with a 2A (5 pounds) or greater rating.
- Smoking is prohibited in, on, or within 50 feet of any motor vehicle, trailer, railcar, or MHE loaded with explosive items.
- Strictly prohibit the use of matches or other flame, heat, or spark-producing devices in any magazine area or storage activity. Only the commander may give exception to this policy in writing using the standard Army memorandum style.
- Use only flashlights or storage battery lamps approved by the U.S. Bureau of Mines and listed by the underwriters laboratories or other recognized authority in structures that contain ammunition or explosives.
- Use dry solvent for cleaning purposes, not gasoline or other flammable liquids. Ensure that adequate ventilation is available when using solvent.
- Designate parking areas at least 100 feet outside storage areas. Control these areas to reduce fire hazards and provide easy access to firefighters.
- Maintain organized munitions areas that are free of trash, debris, combustible materials, and clutter.
- Any equipment, tools, or devices should not produce heat exceeding temperatures of 228°F.

- Control vegetation or undergrowth with weed killers or by mowing or plowing. Livestock grazing may be used under special, controlled conditions. Remove all cut vegetation and undergrowth.
- Ensure that weed killers do not contain substances that might spontaneously ignite in hot, dry conditions.
- Carefully consider controlled burning to eliminate vegetation and undergrowth. Allow no burns within 200 feet of any explosive location. Firefighting equipment and personnel should be standing by during these operations.
- Do not permit anyone in contaminated clothing (clothing with explosive or HAZMAT) to use the smoking area.
- All MHE and any other diesel or gas equipment used in the munitions area should be equipped with a fire extinguisher.
- Refuel gasoline and diesel-powered vehicles and equipment at least 100 feet from structures or sites containing explosives.
- Police areas daily 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.

FIRE PLAN

4-4. Frequent surveys and inspections help to establish the best standards and practices for preventing fires. Fires from munitions are among the most feared because of the potential for casualties, destruction, and loss of property and equipment. They also impede the progression of military operations.

4-5. Advanced planning is essential for fire prevention. Any activity that stores or handles munitions must have a fire plan that is a system of actions for preventing and fighting fires. Develop fire plans in accordance with AR 420-5, Occupational Safety and Health Standard 1910.39, and NFPA 1620.

4-6. The fire plan specifies responsible individuals and alternates, training requirements, and describes the emergency function of each department or outside agency. Details of the plan should describe the duties of personnel and establish procedures for—

- Personnel responsibilities.
- Firefighting teams.
- Communications and alarm signals.
- Emergency first responders.

4-7. The plan should also describe procedures for—

- 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.
- Briefing firefighters on the details of the fire. Include the types and quantities of munitions, locations, and associated hazards.
- Evacuation and actions at rally points.

4-8. The fire plan includes an installation map that identifies storage locations, the road network, and munitions hazards at each location, including fire and chemical symbols. Include reporting to the proper chain of command and local emergency responders like 9-1-1 (U.S.) or the host nation's equivalent agencies. Details of the plan may vary depending on the tactical situation.

HAZARD IDENTIFICATION

4-9. Fires in munitions storage areas 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 may originate from—

- Spark-producing tools.
- Defective materiel handling equipment and tactical vehicles.
- Faulty electrical equipment.

- Adverse weather (for example, heat and lightning).
- Improper use or disposal of solvents.
- Improper grounding techniques.
- Improper lightning protection system.

ROUTINE TRAINING

4-10. Training is a vital part of the fire protection and prevention program. All personnel and firefighters involved with munitions must receive training in the precautions and proper methods of fighting fires. Training includes understanding individual responsibilities as identified in the pre-fire plan, and common knowledge to perform shared tasks:

- Reporting fires (military method).
- Procedures for sounding alarms.
- Evacuation procedures and rally points.
- Application and meaning of each type of fire and hazard symbol.
- Use of appropriate firefighting equipment.
- 9-1-1 reporting procedures.

4-11. 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, the types of fires to fight, and from what fires to evacuate. See DA Pam 385-64 for withdrawal distances.

4-12. Hold fire drills where munitions are located or stored at intervals of six months or less. Conduct drills to train firefighting teams and key personnel on responsibilities to evaluate fire and inspect and operate the fire alarm systems and firefighting equipment.

FIRE PROTECTION TECHNIQUES

4-13. Chapter 2 discusses munition protection and survivability and provides information on the employment of several munition protection techniques. These protection techniques increase the survivability of munitions stored in vehicles, ATHP, MATP, and ASP. Some of the techniques are:

- Putting up barricades.
- Storing munitions within required distances between munitions and buildings. Dispersing munitions in wider areas to minimize loss of munition stocks, fire, and injuries to personnel.
- The use of decoys to deceive enemies from destroying stocks.
- The employment of cover, camouflage, and concealment.

4-14. In addition to the techniques mentioned, firebreaks are effective in preventing the spread of fire. Firebreaks can be natural or man-made. Natural firebreaks include streams, rivers, lakes, drainages, and exposed bodies of rocks. Man-made firebreaks include roads, highways, cleared areas, survey lines, and transmission lines.

4-15. DA Pam 385-64 provides general guidelines for firebreaks. Maintain a 50-foot firebreak around any munition location when possible. 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. When not possible, keep vegetation growth to maximum height of 1.5 to 2 inches, and remove overgrowth and canopies to help prevent fire from spreading.

4-16. Rakes, shovels, picks, and other equipment needed to fight grass or vegetation fires must be available in adequate supply. Use plows, graders, and bulldozers if available.

Fire Suppression

4-17. TM 3-34.30 states that Army firefighting capabilities consist of general firefighting and tactical firefighting. General firefighting skills are embedded into all Army safety programs. These include annual drivers training, unit fire safety, and unit fire prevention training. Tactical firefighting requires more specialized capabilities and is typically provided by engineer, host-nation, or other identified firefighting units. This section provides basic information on general firefighting techniques in putting out small fires in locations where munitions are handled or stored.

Water Barrels and Sand

4-18. Water barrels, water pails, sand boxes, and shovels can be used to combat class A fires in ASPs where the combustible material consists primarily of grass, wood, dunnage, boxes, and empty containers. Cover barrels to prevent insect breeding and evaporation and winterize barrels as necessary. At least two metal pails must be available for each barrel. Water barrels may not be needed at the ASP 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 munitions that require the use of water barrels.

Fire Extinguisher

4-19. A small fire involving munitions may rapidly become intense and lead to an explosion. Use hand-held portable fire extinguishers to fight small fires if the fire is outside of the magazine. Ensure all munition handlers are trained in the correct use of hand portable fire extinguishers. Refer TB 5-4200-200-10 for hand portable extinguishers training.

4-20. It is vital to attack a small fire immediately using authorized fire extinguishing equipment to avoid smoke inhalation and imminent explosion. See table 4-1 for more information on the types of fire extinguishers required for different types of fires and fuel.

4-21. All fire extinguishers must be easily accessible and maintained in good operating condition. NFPA 10 requires fire extinguishers to be inspected once a month. A minimum of two fire extinguishers suitable for the fire hazards involved must be available for immediate use.

Table 4-1. Fire extinguisher class

<i>Fire Extinguisher Class</i>	<i>Description</i>	<i>Fire Extinguisher Agent (content)</i>
Class A	Fires in ordinary combustible materials (wood, cloth, paper, rubber, and various plastics).	Water, Halon.
Class B	Fires in flammable liquids, combustible liquids, petroleum greases, tars, oils, oil-based paints, solvents, lacquers, alcohols, and flammable gases.	Carbon dioxide, halon, foam or dry chemical.
Class C	Fires that involve energized electrical equipment.	Carbon dioxide, halon, or dry chemical.
Class D	Fires in combustible metals, (magnesium, titanium, zirconium, sodium, lithium, and potassium).	Dry powder (sodium chloride)
Class K	Fires in cooking appliances that involve combustible cooking media (vegetable or animal oil and fats).	Dry powder, carbon dioxide, or wet chemical.

EVACUATION AND EMERGENCY RESPONSE

4-22. It is important to note that the safety of personnel should always be the top priority during an evacuation, and all evacuation procedures should be in accordance with established safety protocols and regulations. Table 4-2 provides information on emergency withdrawal distances for non-firefighting personnel.

4-23. Develop an emergency action plan in writing that is unique to the munition support activity. The Occupational Safety and Health Administration website provides holistic guidance in developing emergency

action plans. Minimum requirements of an emergency action plan in accordance with 29 CFR 1910.38 include—

- Evacuation procedures and emergency escape route assignments. All personnel in the immediate vicinity of fire need to understand when and how to fight fire and when to evacuate.
- Procedures for employees who remain to perform critical operations before they evacuate. Pre-identify personnel to perform tasks like firefighting with portable handheld fire extinguishers, reporting, first-aid, personnel accountability, directing emergency vehicles, and other critical actions.
- Accounting for all personnel after emergency evacuation has been completed. These personnel quickly sweep the area, offices, and restrooms to ensure everyone gets out and is accounted for. They report to the commander or leader in charge.
- Rescue and medical duties of pre-selected personnel.
- Reporting procedures and the means of reporting fire and other emergencies. There are preferred procedures for reporting emergencies including dialing 911, an internal emergency number, or pulling a manual fire alarm, but there are many other possibilities.

4-24. In the event of a fire in an ammunition storage area, the immediate priority is the safety and evacuation of personnel. Here are important actions that should be taken to ensure the safe evacuation of personnel:

- The first action is to activate the fire alarm system to alert all personnel in the vicinity of the fire and initiate the evacuation process. Table 4-2 on page 50 provides emergency withdrawal distances.
- Exercise the evacuation plan. Ensure that all personnel are familiar with the evacuation plan and know the nearest exits and assembly points.
- Ensure that all personnel exit the area safely and do not re-enter until given the all-clear by the appropriate authorities.
- Conduct a headcount to ensure that all personnel are accounted for during the evacuation process.
- Provide medical assistance to any personnel who may have been injured during the evacuation process. Proceed with medical evacuation to the next higher level of care as needed.
- Report the incident to the fire department by dialing 9-1-1 (or equivalent if located overseas). Notify fire and emergency services when a designated explosives parking area is being used (including parked vehicles and aircraft).
- Conduct a debriefing to identify any areas for improvement in the evacuation process and to ensure that all personnel are aware of their roles and responsibilities in future emergencies.

FIRE DIVISION AND SYMBOLS

4-25. Fires that occur in buildings and magazines containing munitions vary in intensity and outcome depending on the materials involved. Certain explosives ignite on contact with a spark or flame or when subjected to frictional heat or concussion. Some substances burn freely. Others, like propellants, explode while burning or develop heat so intense that firefighting efforts are nearly futile.

4-26. Firefighters must be well acquainted with the hazards in each fire hazard group. They must know the methods of fighting fires that 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. Munitions personnel do not fight fires involving munitions.

Table 4-2. 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, 4)	Same as unknown HD	For transportation— 1. Use 2,500-foot minimum distance for NEW >500 pounds. 2. Use 5,000-foot minimum distance for railcars with NEW < pounds and 4,000 feet for other modes. 3. Use 4,000-foot minimum distance for bombs and projectiles with caliber 5 inch (127 millimeter) and greater. For Facilities— 1. Use 2,500-foot minimum distance for NEW > 15,000 pounds. 2. Use 4,000-foot 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, 4)	2,500 feet	2,500 feet
HD 1.3 (see note 2, 3, 4)	600 feet	Twice the inhabited building distance with a minimum distance of 600 feet.
HD 1.4 (see note 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. 4. Refer to 49 CFR part 173.		
HD	hazard class/division	NEW net explosive weight

FIRE DIVISION AND HAZARD CLASS

4-27. Munitions 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 munitions. Table 4-3 outlines the various fire divisions, predominate hazard, and the hazard class for each type of munition. See DA Pam 385-64 for further discussion of the hazard classification system.

4-28. Each fire division is represented by a distinctive fire symbol. The shapes for each symbol are illustrated and identified in table 4-3. 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.

Table 4-3. Firefighting action matrix

Fire Division	Hazard Class	Symbol	Hazard	Actions
1	1.1		Mass detonation	1. Do not fight unless a rescue attempt is being made. 2. Firefighters may attempt to extinguish the fire if there is suitable separation between non-explosive and symbol 1 material and if approved by the fire chief. 3. If personal safety is in doubt, take suitable cover.
2	1.2		Explosion with fragments	1. Give the alarm and attempt to extinguish the fire if in the early stage. 2. Firefighters 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. Detonation of items could occur. Provide protection from fragments.
3	1.3		Mass fire	1. May be fought if explosives are not directly involved. 2. If white phosphorus munitions are involved, smoke is liberated from the munition. White phosphorous munitions may explode. White phosphorous should be immersed in water or sprayed with water continuously. 3. For fire involving highly combustible material and incendiaries, water should not be used unless a large quantity is 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		Moderate fire	1. Fight the fire. 2. Expect minor explosions and hot fragments.

POSTING FIRE SYMBOLS

4-29. Post the fire symbol that applies to the most HAZMAT present at or near explosive locations. When all munitions within an ASP are covered by one fire symbol, it may be posted at the entry control point. Symbols must be visible from all approach roads.

4-30. When different HDs of munitions 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 munitions requiring the same fire symbol are located.

4-31. 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 munitions 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.

4-32. It is not required to post fire symbols on locations having 1,000 rounds or less of HD 1.4 small arms ammunition (.50 caliber or less). U.S. forces use host-nation symbols if required by agreement. The ASP

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.

4-33. 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.

Appendix A

Storage Compatibility Groups

This appendix provides an overview of storage fundamentals according to the compatibility of munitions. Munitions are grouped in HDs to accurately indicate their damage-causing potential in an unintentional detonation or fire.

COMPATABILITY GROUP CRITERIA

A-1. Munitions are categorized into thirteen storage compatibility groups (SCGs). The SCG is a letter designation assigned to indicate what may be stored or transported together without significantly increasing either the probability of an accident or the magnitude of an accident's effects. The SCG assigned to a particular type of munition can also be found in the joint hazard classification system under the column "HC/DIV CG." This information can also be found in the quick reference publication Hazard Classification of U.S. Military Explosives and Munitions (commonly known as the Yellow Book).

A-2. The HD criteria are somewhat relaxed for some AHA storage. AHA mixing rules for HD require only that the NEW for all ammunition in HDs 1.1, 1.2, and 1.3 shall be added together and considered as HD 1.1. The NEW for ammunition classified as HD 1.4 may be disregarded.

A-3. Although the SCG and HD criteria have been relaxed for AHA sites, storage should be in full compliance with peacetime storage criteria whenever possible.

A-4. 49 CFR part 173 provides definitions for HD. The HD is a numerical designator within a hazard class indicating an item's associated hazards and potential for causing casualties and property damage. For example, hazard class 1 (explosives) has six divisions:

- Division 1.1. These are explosives that have a mass explosion hazard (a mass explosion affects the entire load instantaneously). Examples include—
 - Artillery projectiles.
 - Fragmentation grenades.
 - Missiles (not all).
- Division 1.2. High explosive filled items that, when detonated, are NOT expected to explode all the others in the same location at the same time. This presents a fragment hazard. Examples include—
 - Mortar rounds (not all).
 - Linked ammunition.
 - Simulators.
- Division 1.3. Munitions that have a significant fire hazard. When started, the fire typically cannot be put out. This may have a minor fragment or explosion hazard. Examples include—
 - Propelling charges.
 - Signals.
 - Rocket motors.
- Division 1.4. Munitions that have a minor explosion hazard. The explosive effects are mainly confined to the package and no projection of fragments of a significant size is expected. Examples of this division include—
 - Signal cartridges.
 - Small arms ammunition.
 - Machine gun ammunition.
- Division 1.5. Munitions that have a mass explosion hazard but are insensitive to normal handling, transportation, and handling. It has a little probability for detonation under normal conditions.
- Division 1.6. This division is comprised of articles which predominately contain extremely insensitive substances and that demonstrate a negligible probability of accidental initiation or propagation.

A-5. Table A-1 on page 54 provides a description for each SCG and examples of the types of munitions within each group.

Table A-1. Storage compatibility group criteria

Group	Definition
Group A	These munitions consist 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 dry cyclotrimethylenetrinitramine and pentaerythritol tetranitrate, wet lead azide, wet lead styphnate, wet mercury fulminate, wet tetracene, and dry cyclotrimethylenetrinitramine and pentaerythritol tetranitrate
Group B	These munitions consist of detonators and similar initiating devices not containing two or more independent safety features. Examples include detonators, blasting caps, small arms primers, and fuzes.
Group C	These munitions consist 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 munitions with inert projectiles.
Group D	Includes black powder, high explosive, and munitions 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. Munitions 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	These munitions consist of munitions containing high explosive without its own means of initiating and with propelling charge. Examples include artillery munitions, rockets, or guided missiles.
Group F	These munitions consist of munitions 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	These munitions consist of fireworks; illuminating, incendiary, or smoke munitions (including high concentration); or tear-producing, incendiary smoke or sound effects. This category does not include munitions that are water-actuated or that contain white phosphorus or flammable liquid or gel. Examples include flares, signals, incendiary or illuminating munitions, and other smoke or tear-producing devices.
Group H	These munitions contain fillers that are spontaneously flammable when exposed to the atmosphere. These include white phosphorus, plasticized white phosphorus, or other pyrophoric material.
Group J	These munitions contain 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 munitions, munitions devices, flammable liquid-fueled missiles, and torpedoes.
Group K	These munitions 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 munitions (fused or unfused), and grenades, rockets, or bombs filled with lethal or incapacitating chemical agents.
Group L	This group consists of munitions 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, munitions, and damaged or suspect munitions of any group.
Group N	This group consists of munitions containing only electronically initiated devices. Examples are bombs and warheads.
Group S	This group contains munitions that present no specific hazards. Included in this category are munitions 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 that 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 munitions are thermal batteries, explosive switches or valves, and other items packaged to meet group criteria.

A-6. There are certain locations within the United States, its territories, and possessions designated by the Army to store munitions without regard to compatibility. However, these sites or locations are approved by DDESB authorities to store munitions in rapid response configurations and basic load AHAs outside the United States.

A-7. The maximum NEW at any of these locations storing mixed compatibility munitions must not exceed 4000 kilograms (8818 pounds NEW) calculated in accordance with DA Pam 385-64. However, storage of mixed munitions in rapid response configurations or mixed munitions stored in a basic load AHA outside of

the U.S. should use storage compatibility to reduce risk when possible. White phosphorus should be stored separately from other munitions.

MIXING COMPATABILITY GROUPS

A-8. Table A-2 demonstrates how different SCGs can be mixed in storage. Groups that are intersected by an “X” indicate that these groups may be combined in storage (for example, A-A, B-B, B-S, C-S may be combined in storage). Otherwise, mixing is either prohibited or restricted.

A-9. A “Z” at an intersection indicates that 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 “Z” storage will be at a level consistent with the risk acceptance authority criteria of DA Pam 385-30, but does not require documentation on a DA Form 7632. Documentation of approval must be kept on hand by the installation or garrison safety office.

A-10. Mixed storage of items within groups where no X or Z exists at that pair’s intersection beyond prohibitions and limitations still require a Certificate of Risk Acceptance per DA Pam 385-30.

A-11. USATCES will determine which items may be stored with group K. Group K may also require separate storage within the group.

A-12. Articles of compatibility Groups B and F will each be segregated in storage from articles of other compatibility groups by means that are effective in preventing propagation of those articles through fire or detonation.

A-13. Rules for explosives compatibility for transportation are not the same as storage compatibility mixing rules. See DA Pam 385-64 for transportation of munitions.

Table A-2. Storage compatibility mixing chart

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

A-14. Consider the following points when evaluating storage compatibility criteria:

- Compliance with compatibility criteria is not required for mission essential or operationally necessary quantities of explosives in HD 1.4 or 6.1 (excluding toxic chemical munitions) up to 100 pounds NEW HD 1.3 and up to 50 pounds NEW HD (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 munition may be stored together. When so stored, compatibility is that of the assembled round (for example, white phosphorus filler in Group H, high explosive filler in Groups D, E, or F as appropriate).

- Personnel may assign munitions that do not contain explosives but do contain substances belonging to another HD to the same compatibility group as items containing explosives and the same substances. They may also be stored with them.
- DA may authorize munitions items designated “Practice” by the national stock number (NSN) and nomenclature to be stored with the fully loaded munitions 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.
- See DA Pam 385-64 about changing ESQD class/divisions when mixing SCG N ammunition and explosives with SCGs B through G.

A-15. Munitions with self-initiation (munitions that have an initiating device assembled to them) present a significant risk during storage because detonation can occur during accidental functioning of the device. However, the term self-initiation 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. Initiating devices may be assembled to munitions if safety features are in place to prevent initiation or detonation of the explosive filler.

Appendix B

Forward Arming and Refueling Point

This appendix provides general safety precautions at forward arming and refueling points. This appendix will not provide information on refueling operations. More information on forward arming operations is found in ATP 3-04.17.

HELICOPTER REARM POINT

B-1. Forward arming and refueling points provide fuel and ammunition to combat aircraft closer to the area of operations. They are designed to extend the range and sustain the operations of air assets. The layout must facilitate efficient operations with a high priority on safety and can vary depending on the specific requirements of the air asset, mission, and operational environment.

B-2. Helicopter rearm points have the necessary equipment to rearm helicopters as required for the type of operation. This may include ammunition handling equipment, weapons handling equipment, and other specialized equipment. The rearm point is allowed to use improvised trailers or carts with the following three restrictions:

- The rated load weight of the trailer or cart must not be exceeded.
- The load of rockets must be secured and balanced to prevent the load from tumbling off or tipping over.
- The trailers or carts must be covered to protect the rockets from environmental conditions.

AIRCRAFT PARKING AREA

B-3. This area is farthest from the munitions. It is designated for parking aircraft that do not contain explosives and are not being loaded.

REARM PADS

B-4. Next closest to the ready ammunition storage site, rearm pads are specifically for loading or unloading combat aircraft with ammunition and explosives. Rearm pad setup affects the overall aircraft turnaround time. During combat missions, enough ammunition for at least one arming sequence should be placed on the rearm pad before an aircraft arrives. The munitions should be laid out in the order they will be loaded. A full load of munitions must be ready to load in case the aircraft expended its entire initial load.

READY AMMUNITION STORAGE SITE

B-5. This area contains the ready ammunition necessary to support the arming and rearming of aircraft and is separated from the helicopter rearm pad by a barricade. The site has separate cubicles or barricaded areas for assembling and disassembling rockets, aircraft flares, and malfunctioned ammunition. The ready ammunition storage area contains ammunition required to support the mission beyond the minimum for one load.

BASIC LOAD AMMUNITION STORAGE.

B-6. The basic load storage area is a separate area from the ready ammunition storage area. In this area, furthest from the rearm pad, is the specific quantity of ammunition authorized and required to be on hand within the unit's basic load. A basic load can include diverse items like hellfire guided missiles, 2.75-inch rockets, 30mm ammunition, small arms ammunition, flares, and smoke grenades.

B-7. 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 munitions.

LOT NUMBER CONTROL

B-8. Store ammunition by lot integrity so all lots on hand can be properly accounted for. Maintain proper lot records so ammunition malfunctions can be reported properly. One way to maintain lot integrity is to not mix items. Ensure lots are not mixed at ready ammunition storage sites, basic load storage sites, or rearm points, and ensure lots within the same launcher are not mixed.

GROUNDING AIRCRAFT

B-9. Grounding aircraft prevents accidental initiation of rockets from stray electrical energy. Ground aircraft electrically during arming and disarming operations and when they are armed and parked in revetments.

HANDLING ROCKETS

B-10. Handling rockets requires a high level of expertise, training, and adherence to strict safety protocols. This is due to the potential hazards associated with their handling, storage, and transportation. The following paragraphs provide some general guidelines.

SHORTING ROCKETS

B-11. Fin protector springs short circuit the igniter leads, thus preventing accidental ignition. Ensure shorting wire clips and fin protectors are installed on all rockets immediately after unloading an aircraft launcher. Check to be sure the shorting wire clip or metal fin protector is properly installed on all rocket motors and complete rockets whenever the rockets are not in the launcher.

HANDLING DROPPED ROCKETS

B-12. Complete rounds, rocket motors, or fuze-warhead combinations that have been dropped may cause premature functioning of the fuze and warhead and detonation of the rocket motor. This could result in loss of life and aircraft.

B-13. There are two ways of handling rockets that will result in their rejection. One way is if a 2.75-inch rocket motor or complete rocket (crated or uncrated) is dropped from higher than 2 feet. The other is if a fuze-warhead combination (crated or uncrated) is dropped from higher than 5 feet. Any items rejected for the reasons above must be turned into the supporting ASP or depot. The DA Form 581 (*Request for Issue and Turn-In of Ammunition*) must reflect the reason for unserviceability and turn-in.

ASSEMBLING ROCKETS

B-14. Assemble rocket motors, warheads, and fuzes in accordance with the instructions in the instructions packed in the box with the rockets. Returned unfired rockets. Rockets that remain on aircraft after a mission must have their warheads retorqued prior to use on the next mission.

PROTECTING ROCKETS

B-15. Build barricades around basic load storage areas, ready ammunition storage areas, and ammunition stored at rearm points. Barricades should be at least three feet thick to most effectively lessen the hazards involved if there is an explosion or fire. If possible, put covering on all ammunition stored in rearm pads to protect them from the weather.

STORING ROCKETS

B-16. Rockets should be stored in a secure, ventilated area with appropriate temperature and humidity control to prevent damage or deterioration. They should be stored vertically with safety locks engaged and secured to prevent accidental discharge.

B-17. Store unpackaged rockets on storage racks that are built at the site. Orient the rockets so that their nose ends point towards the back of the barricade.

B-18. Do not store ready rockets directly on top of each other at the rearm pads or in the ready ammunition storage areas. Storing rockets on top of each other puts too much weight on the bottom layers.

B-19. Maintain only a minimum number of ready rockets stored at the rearm points and in the ready ammunition storage areas.

B-20. Do not go over the following limits:

- Rearm pad limits. Each rearm pad is limited to one fully armed aircraft plus the number of rockets required to rearm one additional aircraft. The ammunition for the second aircraft must be stored outside the pad, properly barricaded and covered.
- Ready ammunition storage area limits. Each cubicle is limited to 2,000 pounds NEW per cubicle. Below is an example to illustrate a calculation of a NEW rearm pad limitation:

1340-H490 (10 lb. NEW) = 200 rounds per cubicle

(200 multiplied by 10 = 2,000 pounds)

Note. For additional NEW information on rockets refer to TM 43-0001-30, and for the Hellfire guided missile refer to TM 9-1425-475-23&P. For information on NEW computation, refer to DA Pam 385-64 and DESR 6055.09.

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Appendix C

Munitions Identification

This chapter discusses the intricacies of munition identification codes, color-coding systems, and labeling standards. It provides information on standardized symbology employed to convey crucial information about a munition's type, filling, hazards, and handling requirements. The chapter will also highlight the importance of proper marking techniques and the maintenance of clear and durable markings throughout a munition's lifespan, even in harsh operational environments.

MARKING

C-1. The Department of Defense identifies munitions by placing 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 for maintaining accountable records. Markings stenciled or stamped on munitions items include all information needed for complete identification. Inert markings are placed on munitions that substitute all explosive, incendiary, or toxic materials for inert material. Components marked EMPTY have all explosive, incendiary, or toxic materials removed.

LOT NUMBERS

C-2. The military assigns each item of munitions 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 C-1 breaks down a typical munitions lot number showing the new and old systems.

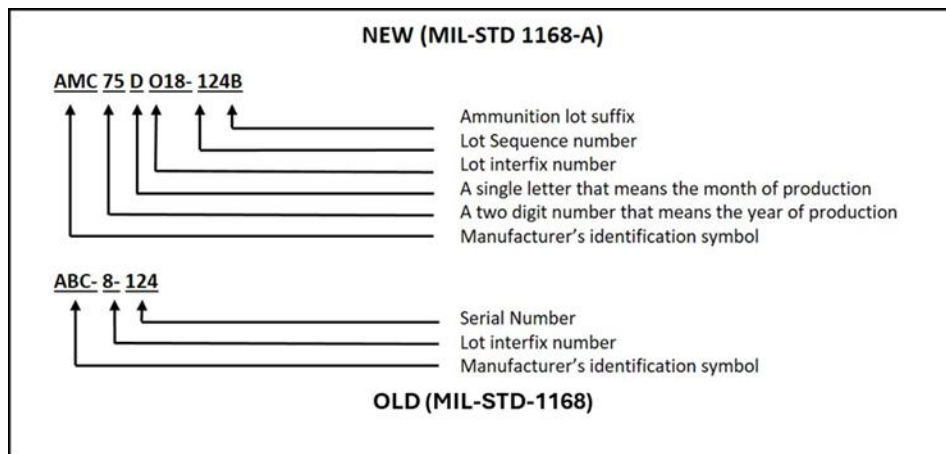


Figure C-1. Typical lot number system

FEDERAL SUPPLY CLASSES

C-3. Conventional munitions are federal supply group 13 with further categorization into federal supply classes for identification and management purposes (see Table C-1 on page 62). Within this supply class, munitions are subdivided to identify the general type or family that the item falls into.

Table C-1. Federal supply class

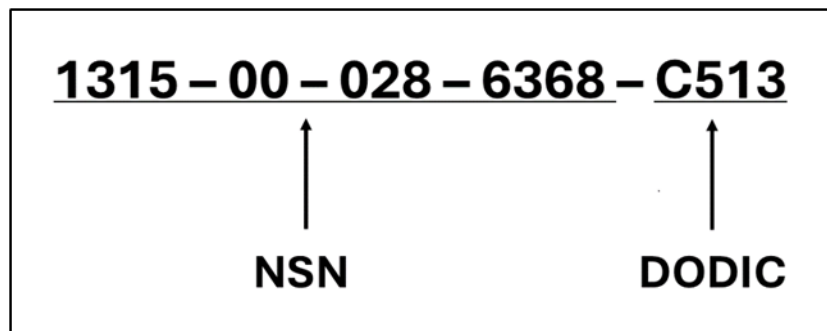
Supply Class	Type
1305	Ammunition, through 30mm
1310	Ammunition, over 30mm up to 75mm
1315	Ammunition, 75mm through 125mm
1320	Ammunition, over 125mm
1330	Grenades
1340	Rockets and Rocket Ammunition
1345	Land Mines
1346	Remote Munitions
1365	Military Chemical Agents
1370	Pyrotechnics
1375	Demolition Materials
1376	Bulk Explosives
1377	Cartridge and Propellant actuated devices and components
1390	Fuzes and Primers
1395	Miscellaneous ammunition
1398	Specialized ammunition handling and servicing equipment
Note: There are other federal supply classes, 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.)	
DOD Department of Defense mm millimeter U.S. United States	

NATIONAL STOCK NUMBERING CONTROL SYSTEM

C-4. Each complete round or item of conventional munitions or associated explosive component is identified by its own NSN. The first set of numbers of the NSN is called the federal supply class. The national item identification number follows the supply class code. The national item identification number consists of a two-number code identifying the country of manufacture and a seven digit-number item identification. Figure C-2 illustrates an example of NSN.

DEPARTMENT OF DEFENSE IDENTIFICATION CODE

C-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 munition specific DODICs. See figure C-2 for a conventional NSN with DODIC added, demonstrating interchangeability between various model numbers and the designators of a munitions item.

**Figure C-2. Example of Department of Defense identification code**

DEPARTMENT OF DEFENSE AMMUNITION CODE

C-6. The DODAC includes the federal supply class of the munition and the DODIC. The code is used on all unit DA Forms 581, DA Forms 3151 (*Ammunition Stores Slip*), and most munitions reports.

C-7. The DODAC is used instead of the DODIC to reduce errors with munitions transactions. Figure C-3 provides an example DODAC.

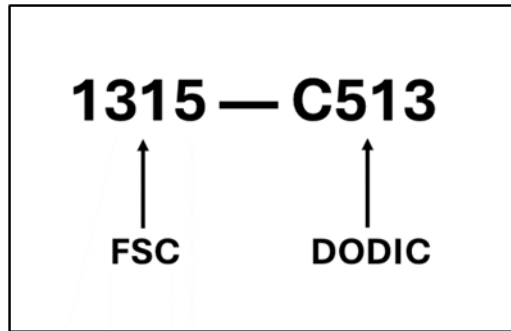


Figure C-3. Example of Department of Defense ammunition code

COLOR CODE

C-8. The main reason munitions are painted is to protect them from corrosion. However, the color of the protective coating and markings also makes munitions easy to identify and provides some camouflage.

C-9. Small arms munitions are color-coded under MIL-STD 709D for Tier 1 munitions (see table C-2 on page 64). Either the small arms projectiles or the bullet tips are painted a distinctive color so they can be identified quickly.

Table C-2. Color code and description, MIL-STD-709D

<i>Color (1,2)</i>	<i>Federal Standard</i>	<i>Interpretation</i>
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.
The following have no color-coding significance: 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.		

C-10. Munitions 20mm and larger are color-coded in accordance with MIL-STD 709D (see Table C-3).

Note. Be aware that there are still munitions in circulation that are color coded as specified by rescinded MIL-STDs and technical manuals. Call your ammo MOS qualified personnel or QASAS for assistance.

Table C-3. Color codes and marking for specific munitions

Ammunition	Colors		
	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)			
With bursting charge	Black	Yellow	None
Without bursting charge	Black	White	None
Canister	Olive drab	White	None
Flechette – loaded	Olive drab	White	White 7
Chemical			
Filled with toxic chemical binary nerve agent	Gray	Dark Green	One broken dark green 9,10,11
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 9
Inert ammunition not designed to be delivered in a delivery system	Bronze	Black	None
Chemical			
Filled with a riot control agent	Gray	Red	One red 9
Filled with an incapacity agent	Gray	Violet	One violet 9
Filled with a toxic chemical binary nerve agent	Gray	Dark green	One broken dark green 9,10

Table C-3. Color codes and marking for specific munitions (*continued*)

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 scatterable mine and loaded semi-fixed and separate loading ammunition. 4. Separate loading ammunition for shipboard use has a circumferential yellow band besides yellow markings. 5. Bombs have one yellow band except thermally protected bombs, that have two yellow bands besides yellow markings 6. Circumferential broken yellow band (1/2-inch segments with ½ inch gaps) on explosive binary munitions. 7. Circumferential band of white diamond shaped figures on ammunition containing flechettes. 8. Yellow band put on when the ammunition contains explosives used to fracture the projectile. 9. Yellow band put on to indicate high explosive burster. 10. Toxic chemical agent ammunition containing binary nerve agent filling shown by a broken dark green band (1/2-inch segments separated by ½ inch spaces). 11. 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. 12. Separate loading ammunition for shipboard use has black markings and a light red band.		
API high explosive incendiary	HEAT high explosive antitank	HEP explosive binary plastic

Glossary

SECTION I – ACRONYMS AND ABBREVIATIONS

ADP	Army doctrine publication
AHA	ammunition holding area
AR	Army regulation
ASA	ammunition storage activity
ASP	ammunition supply point
ATHP	ammunition transfer and holding point
ATP	Army techniques publication
BSB	brigade support battalion
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
DARAD	deviation approval and risk acceptance document
DD	Department of Defense (form)
DDESB	Department of Defense explosive safety board
DDESB TP	Department of Defense explosive safety board technical paper
DESR	Defense Explosives Safety Regulation
DOD	Department of Defense
DODAC	Department of Defense ammunition code
DODI	Department of Defense instruction
DODIC	Department of Defense identification code
DSB	division sustainment brigade
EMI	electromagnetic interference
EOD	explosive ordnance disposal
ESMP	explosive safety management program
ESQD	explosive safety quantity distance
HAZMAT	hazardous materials
HD	hazard class/division
JP	joint publication
mm	millimeter
MATP	modular ammunition transfer point
MHE	materials handling equipment
MHP	Munitions History Program
MIL-STD	military standard

MOS	military occupational specialty
NATO	North Atlantic Treaty Organization
NEW	net explosive weight
NFPA	National Fire Protection Association
NSN	national stock number
QASAS	quality assurance specialist (ammunition surveillance)
RFI	radio frequency interference
SCG	storage compatibility group
SOP	standard operating procedure
SPO	support operations
STANAG	standardization agreement
TM	technical manual
U.S.	United States
USAMC	United States Army Materiel Command
USATCES	United States Army Technical Center for Explosives Safety

SECTION II – TERMS

combatant commander

A commander of one of the unified or specified combatant commands established by the President. (JP 3-0)

decontamination

The process of making any person, object, or area safe by destroying, neutralizing, making harmless, or absorbing and removing chemical or biological agents or by removing radioactive material clinging to or around it. (JP 3-11)

explosive hazard

A condition where danger exists because explosives are present that may react in a mishap with potential unacceptable effects to people, property, operational capability, or the environment. (JP 3-42)

mission variables

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

munition

A device with explosives; propellants; pyrotechnics; or chemical, biological, radiological, or nuclear material for use in operations including demolitions. (JP 3-42)

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24 July 2026

By Order of the Secretary of the Army:

CHRISTOPHER C. LANEVE

*General, United States Army
Vice Chief of Staff*

Official:

A handwritten signature in black ink, appearing to read 'M. Sannito', with a stylized flourish at the end.

MATTHEW L. SANNITO

*Administrative Assistant
to the Secretary of the Army
2620107*

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