1.0. General.

As a senior noncommissioned officer, the safety of you and other munitions personnel and surrounding property rests in your hands. It is very important that you require and enforce safety as an everyday practice. Requiring safe practices to be in place at all times will ensure the mission is accomplished efficiently and effectively without injury to personnel or damage to munitions or equipment.

2.0. Hazard Analysis and Risk Assessment.

All operations involving munitions and explosives will be reviewed to identify and manage the risk associated with the operations. All munitions and explosive operations, without exception, will require an operational/task hazard analysis before beginning the operation. Personnel conducting the hazard analysis will be knowledgeable in:

- Munitions and explosives safety.
- The task to be performed.
- The methods used to conduct a hazard analysis.

A risk assessment will be performed on all new or modified industrial operations and facilities involving munitions and explosives. Based upon this assessment, engineering design criteria for the facility and/or operation will be developed in selecting appropriate equipment, shielding, engineering controls, and protective clothing for personnel. The assessment will review the following factors:

- Initiation sensitivity.
- Quantity of materials.
- Heat output.
- Rate of burning.
- Potential ignition and initiation sources.
- Protection capabilities of shields, various types of clothing, and fire protection systems.
- The physiological effects of hot vapors and combustion products on exposed personnel.

3.0. Personnel Qualifications.

Personnel working with explosives will be knowledgeable in the tasks to be performed. They must understand the hazards, standards, requirements, and precautions that apply to their work.

4.0. Written Standards.

Written standards must be developed and used for each explosives operation. These standards may be included in Army publications such as regulations or technical manuals, or in higher headquarters standard publications.

4.1. Standing Operating Procedures (SOPs).

SOPs for all explosives operations ensure soldiers have the information necessary to perform their tasks safely. Each soldier will read the SOP prior to the start of the operation. SOPs must be readily available at the work site. Applicable parts of the SOP will be clearly posted at all work stations in the operation, such as bays within a building. When posting within the work site is not practical, the SOP will be posted at the entrance to the site.

All SOPs for explosives operations will identify potentially hazardous items or conditions. Soldiers working with explosives observing hazardous or potentially hazardous conditions will immediately notify their supervisor. Supervisors will correct the operations or practices which, if allowed to continue, could reasonably be expected to result in death or serious physical harm to personnel, cause major system damage, or endanger the installation's ability to accomplish its mission.

Procedures will be written in English and in the language that civilian workers understand if they do not understand English.

Written procedures are not required for explosives ordnance disposal (EOD) emergency operations in connection with an approved render-safe procedure.

5.0. Personnel and Explosives Limits.

Operations must be conducted in a manner that exposes the minimum number of people to the smallest quantity of explosives for the shortest period of time consistent with the operations being conducted. Examples are as follows:

- Tasks not necessary to the operations will be prohibited within the immediate area of the hazard produced by the operation.

- Personnel limits must be clearly posted for each operation and must not be exceeded during the operation. Posting personnel limits is not required in a magazine used exclusively for the storage of explosives or in licensed facilities when the license specifies these limits. Limits for explosives operations will be included in the SOP.

- Where concurrent operations must be performed in a single building, the layout will be planned to separate the dissimilar hazards by substantial dividing walls, barricades, or other means to ensure maximum personnel protection.

- Personnel not needed for the operations will be prohibited from visiting. This does not prohibit official visits by safety, quality control (QC), management, or inspection personnel, up to established personnel limits.

- Each soldier will ensure explosives limits for the work site are not exceeded. Limits will be expressed in total net explosive weight (NEW) and number of units, or the number of trays, boxes, pallets, or other units that are more easily controlled.

- Explosives limits will be based on the minimum quantity of explosive sufficient for the operation. Limits will not exceed the quantity used during half a work shift, and will be consistent with quantity-distance (Q-D) separation criteria.

- The maximum amount of explosives of each hazard class/division (HC/D) allowed will be clearly posted in each room, cubicle, magazine, or building used for storing explosives. For operating locations, post the explosives limits for the operation being conducted. Separate posting of explosives limits is not required at licensed locations if the license is conspicuously posted.

6.0. Handling and Movement Precautions.

Explosives will only be handled by trained personnel who understand the hazards and risks involved in the operation. Supervisors will be trained to recognize and abate hazards associated with their operations. The following safety precautions apply to the handling and movement of all explosives or munitions:

- Detonators, initiators, squibs, blasting caps (electrical and non-electrical), and other initiating devices will be carried in protective containers. The containers must prevent item-to-item contact and be marked to identify the contents.

- Bale hooks will not be used to handle explosives.

- Nails may be used to secure covers or repair explosives containers only if there is no hazard to the explosive item or of penetrating protective coverings.

- Nails and other packing materials will comply with technical packing orders, military specifications, or Department of Transportation (DOT) specifications applicable to the item.

- Munitions will not be tumbled, dragged, dropped, thrown, rolled, or walked. Containers designed with skids may be pushed or pulled for positioning, unless otherwise marked on the container.

- Conveyors, chutes, hand trucks, and forklifts may be used in atmospheres and locations where they will not create hazards.

- Sectionalized roller conveyors moving explosives will be supported and the sections interlocked or secured. Boxes of explosives will not be used to support conveyors.

- Safety handtools will be constructed of wood or other non-sparking or spark-resistant materials such as bronze which, under normal conditions of use, will not produce sparks. Only properly maintained safety handtools will be used for locations having hazardous concentrations of flammable dusts, gases, or vapors or exposed explosives.

    - Handtools or other implements used in the vicinity of hazardous materials must be handled carefully and kept clean. All tools will be checked for damage at the start and on completion of work.

    - If the use of ferrous metal handtools is required because of strength characteristics, the immediate area should be free from exposed explosives and other highly combustible materials except in specific operations approved by the MACOM Safety Office.

    - Safety handtools containing copper or zinc, such as brass or bronze, will not be used in proximity to lead azide or residuals from the treatment of lead azide.

7.0. General Housekeeping.

General housekeeping procedures must also be established and followed when handling hazardous materials. This section details basic general housekeeping requirements.

7.1. Waste Materials.

Waste materials, such as oily rags; hazardous materials, such as explosives scrap; and wood, paper, and combustible packing materials, will not be mixed. Each of these categories of waste will be carefully controlled and placed in separate approved, properly marked containers. The containers will be placed outside the facilities, except for containers required at the work location during operations. Working location containers will be emptied as needed but at least once each 8-hour shift. Containers for explosives waste will have covers, preferable self-closing. Explosives hazardous waste includes scrap powder, initiating or sensitive explosives, sweeping from open explosives areas, and rags contaminated with these explosives.

- Receptacles should have enough liquid, normally water or oil, to cover the scraps or rags if this does not add to the hazard.

- No. 10 mineral oil is useful for covering white phosphorous (WP), pyrotechnic, tracer, flare, and similar mixtures. If water is used to cover such materials, scrap should be put in so it is immediately immersed to reduce any production of dangerous gases.

Hazardous waste material will be removed from operating buildings to the disposal area or an isolated temporary collection point, at frequent intervals and before leaving at the end of the duty day or shift. When isolated collection points are used, time and quantity limits that comply with environmental regulations will be set up to ensure timely movement of the material to the disposal area. Hazardous material should not be “stored” in the disposal area but disposed of as soon as possible after arrival.

Hazardous wastes will be disposed of in authorized facilities. Disposal operations will be covered by SOP. The Department of Public Works (DPW) will include disposal facilities on waste disposal permits, as required by the Environmental Protection Agency (EPA).

7.2. Cleaning.

A regular cleaning program will be established. Frequency, especially in operating buildings, will depend on local conditions to ensure safety. General cleaning will not be done during an explosives operation or while explosives are in operating buildings. Where there are exposed explosives or a risk from accumulating explosives, structural members, radiators, heating coils, pipes, and electrical fixtures will be kept clean.

7.3. Sweeping Compounds.

Sweeping compounds containing wax or oil will not be used on conductive flooring. Cleaning agents that include caustic alkalies must not be used in locations containing exposed explosives because sensitive explosives compounds may form. Where there may be exposed explosives on the floor, hot water or steam is the preferred cleaning method. When sweeping compounds must be used, they will be nonabrasive. Sweeping compounds may be combustible but will not be volatile (closed cup flashpoint will not be less than 230° F).

8.0. Field Safety.

Safety must be followed not only in a garrison environment, but also in a field environment. This section outlines field safety requirements.

- Using units must keep munitions and explosives properly packed to the maximum extent possible. This practice is critical to safety and quality.

- Munitions and explosives must remain packed until immediately before use. Unpack only the quantity expected to be immediately fired.

- Properly repack munitions before transporting on motor vehicles, aircraft, or watercraft.

- It is especially important to replace safety devices before repacking; for example, shorting clips on 2.75-inch rockets, electrical shunts on Hoffman devices, and pads protecting primers on gun and mortar munitions.

- Munitions that have misfired or have been classified as unserviceable must be indelibly marked and segregated from serviceable munitions.

9.0. Fire Prevention.

Fire and excessive heat are two of the greatest hazards to explosives. This section will discuss in detail fire prevention, protection, and suppression.

Matches or other flame- or spark-producing devices are not permitted in any magazine area or explosives area except by written authority of the commanding officer or his designated representative. When such authority has been received, a metal carrying device, too large to fit into the pockets, should be used for matches, lighters, and similar materials. Using or even carrying "strike anywhere" (kitchen) matches is prohibited.

Smoking in areas containing explosives, munitions, highly combustible materials, or flammable strategic items must be strictly regulated and controlled. Where it is believed that smoking can be safely regulated, specifically designated smoking locations, approved by the commander or his designated representative, must be established. Smoking is not permitted in vehicles passing through such areas.

All flashlight or storage-battery lamps used in buildings containing munitions, explosives, or flammable vapors must be of a type approved by the U.S. Bureau of Mines or by a similarly recognized testing laboratory for that specific kind of exposure.

Vegetation, grass, undergrowth, weeds, or the like that is or may become a fire hazard will be controlled by weed killer, by mowing, plowing, or cutting, by livestock grazing under supervised conditions or, in calm weather and with proper control, by burning. Weed killers must not contain chlorates or other substances that may ignite spontaneously under hot, dry conditions. Cut vegetation and undergrowth should be removed. Burning should not be permitted within 50 feet of any earth-covered magazine containing explosives or munitions or within 200 feet of any above-ground magazine or outdoor storage site or pad containing explosives and munitions. During burning operations, all windows, doors, and ventilators must be closed. During burning operations around magazines, firefighting equipment must be available at the site.

Reserve supplies of dunnage should not be stored haphazardly inside the magazine area. In no case should it be stored within the 50-foot firebreak around the magazine.

A firebreak at least 50 feet wide and free from flammable material must be maintained around each above-ground magazine and each outdoor storage pad containing munitions or explosives. The earth adjacent to and extending over earth-covered magazines must be cleared of dry debris. Any temporary magazine of fire-resistant construction in which the combustible framing, plates, or sills are exposed must be protected by a 50-foot firebreak in all directions, that contains no materials or vegetation capable of supporting combustion. Erosion must be prevented to the extent possible by means of diversion terraces, drop inlets, and lines channels. Magazines with a fire-resistant exterior covering that completely covers the combustible framing, plates and sills, and outdoor ammunition storage pads containing munitions more resistant to fire such as heavy case HE bombs, must be protected by a firebreak beginning at the magazine or pad and extending 50 feet in all directions. This firebreak need not be clear of vegetation, but the vegetation must

be controlled by mowing or grazing to prevent rapid transmission of fire to the magazine or pad. Excess vegetation and dry debris on earth-covered magazines, and shrubs, sprouts, and trees whose weight or root system may damage the magazine must be removed. A clear space must be maintained by mowing or clipping around earth covered ventilators in a manner that will prevent rapid transmission of fire and provide visibility of the ventilator flag from ground level. Firebreaks around the entire magazine area, such as along railroad tracks, must be maintained wherever necessary. Plowed or bladed firebreaks may be used only where exceptional fire hazards exist and must be protected from erosion by wind or water by means of approved soil-conserving measures.

Gasoline or other highly flammable liquids may not be used for cleaning purposes. Dry-cleaning solvent, (Stoddard solvent) should be used where solvents are required for cleaning. Dry cleaning solvent is flammable, differing principally from gasoline in having a higher flash-point. Since many of the industrial organic solvents have pronounced toxic properties, particularly in vapor form, care must be taken in the selection of degreasing substances and apparatus. To minimize health hazards, less toxic solvents should be substituted for the more toxic ones where possible. Carbon tetrachloride should not be used unless its use is absolutely necessary and has been approved by local medical personnel under careful control, which must include ventilation, respiratory protection, and protection against skin contact. Other solvents such as toluene and benzene are both toxic and flammable and should likewise be controlled. TB MED 502 should be consulted. Adequate ventilation must be provided.

Munitions boxes, containers, dunnage, and lumber in the vicinity of explosives renovation, handling, or storage operations must be stacked neatly. Stacks of such combustible materials must be limited to small areas between firebreaks in order to limit the spread of fire. Under average conditions, solid stacks of such materials should be limited to 1,500 square feet, separated from similar areas by 50-foot line breaks in which vegetation has been cut and is to be controlled. Bulk stacking of such materials should not be closer than 100 feet to magazines or other buildings containing high explosives, except that working quantities within practicable limits may be stacked in the vicinity of explosive magazines but not closer than 50 feet.

The above-listed requirements may be supplemented by additional standards the commander deems necessary to secure adequate protection against fires.

9.1. Firefighting Facilities.

A small fire involving explosives or munitions may rapidly become an intense conflagration or an explosion. It is, therefore, important to extinguish a small fire immediately. Immediate use of authorized hand equipment and extinguishers must be made; however, personnel must not be exposed to the hazards of an imminent explosion.

Water barrels, pails, sand boxes, and shovels provide a recognized means of combating incipient fires in explosives and munitions storage areas where the combustible material consists principally of grass, wood, dunnage, munitions boxes, etc. Where used, at least one water barrel

and two pails or two water-type extinguishers, winterized when necessary, and treated to repel mosquitoes, should be available for immediate use by workers in and around magazines.

Under normal conditions, water barrels and pails are not recommended in extensive explosives and munitions storage areas if—

- Vegetation is controlled.

- Working crews in the magazine area are equipped with two water-type hand extinguishers, preferably of the 2½-gallon capacity, pressurized anti-freeze type and the 4-gallon back pack hand pump type, or with multipurpose dry chemical extinguishers with a minimum classification of 3A. Locomotives operating regularly in the magazine area must be equipped with either the fire extinguishers described above or suitable brush-beaters such as fire swats.

- The installation has a firefighting plan and an organized firefighting force equipped with pumpers or brush trucks, tanks trucks, and other necessary equipment to combat grass and brush fires. Provision should be made for rapid movement of the equipment to the scene of the fire.

- A fire map is maintained at the fire stations, and a copy is kept in the vicinity of the storage area indicating the location of each storage site, magazine, etc., and indicating the general hazard at each location or site. This is a valuable tool in determining quickly what the firefighters may require in the line of equipment as well as the type of hazard involved. As changes are made in the sites, they should be so noted on the map.

Two hand fire extinguishers should be ready for immediate use when munitions or explosives are being handled or work is being done in the immediate vicinity of them. They need not be permanently located in a magazine, although this should be done if practicable. The extinguishers must be in an accessible location and be properly maintained. Serious fires may be avoided by the prompt use of hand fire extinguishers. They are required primarily for use during the early stages of a fire involving combustibles such as grass, dunnage, or other combustibles which, if not extinguished, might reach explosives. Personnel other than the one using the extinguisher should seek safety immediately, reporting the fire route.

9.2. Firefighting Instructions.

The following procedures apply when a fire involving munitions or explosives is discovered:

- A person who discovers smoke coming from a closed magazine or observes other evidence that a magazine is on fire will give the alarm as quickly as possible and evacuate to a safe distance. He will not enter a burning building or magazine, nor open the building or magazine door if a fire is noticed inside the structure.

- If a fire is discovered in grass or other combustible material surrounding a magazine, the alarm should be given immediately and the guard should do all that is possible, using extinguishers, water from nearby water barrels, or grass firefighting tools to extinguish or control the fire until the firefighting forces arrive.

- It is important to extinguish grass fires, especially when they are close to magazines. If a fire has actually gained headway in a magazine, firefighting forces should either combat the fire or seek the nearest suitable protection, depending on the type of munitions or explosives within the magazine.

9.3. Firefighting Hazards.

In order to provide a guide for firefighting forces, munitions and explosives are divided into fire divisions in accordance with the relative danger encountered. The four divisions are identified by the numerals 1, 2, 3, and 4, each displayed on a distinctively shaped placard to be visible at long range.

There is no requirement to post a fire symbol for flammable liquids on an Army post or in an area where munitions and explosives are stored. It is left to the discretion of the Commander if he desires to do so.

9.4. Fire Symbols.

Depending on the type of munitions and storage location, fire symbols will be posted as follows:

- The fire symbol that applies to the most hazardous material present will be posted on or near all non-nuclear explosives locations. It will be visible from all approach roads. One symbol posted on or near the door end of an earth-covered magazine is normally enough. One or more symbols may be needed on other buildings. When all munitions within a storage area are covered by one fire symbol, it may be posted at the entry control point.

- When different class/divisions of explosives are stored in individual multicubicle bays or module cells, they may be further identified by posting the proper fire symbol on each bay or cell.

- When facilities containing explosives are located in a row on one service road and require the same fire symbol, only one fire symbol at the entrance to the row is required.

- Fire symbols will be placed on entrances to small rooms in buildings that are licensed for storing or holding quantities of explosives. Where the licensed explosives are stored in a locker or similar container, the container will also be marked with the appropriate fire symbol. They are not required on the exterior of the building, providing the building is exempt from Q-D.

- Warehouse and other facilities utilized for storing containers from which explosives have been removed, but which have not been decontaminated to remove explosive residue must be placarded with a number "4" fire symbol.

- All railroad cars and motor vehicles containing munitions or explosives, while on Army installations, must be identified with the appropriate fire hazard symbols. Installation railroad cars and motor vehicles that are not destined for off-post movement must display at least two fire symbols. When use of public highways located on installations is anticipated, even though the vehicle will not leave the installation, it must be placarded accordingly. Installation transport vehicles destined for off-post shipment and commercial railroad cars and motor vehicles must have DOT placards displayed in accordance with DOT regulations when they contain munitions or explosives. Fire symbols and/or DOT placards must be placed on all transport vehicles immediately prior to loading and must be removed from the transport vehicle immediately upon completion of unloading.

Where dependence for identification on fire hazards has to be placed on DOT placards, "Explosive A" placarded transport vehicles (rail cars, motor vehicles, and freight containers) must be treated as Fire Division 1.1 and 1.2 hazards, and "Explosive B" placard transport vehicles as Fire Division 1.3 hazards. Transport vehicles containing "Explosive C" and placarded in compliance with DOT regulations are treated as Fire Division 1.4. Transport vehicles containing small arms munitions are not required by the DOT to be placarded; therefore, such vehicles are treated as Fire Division 1.4 and must display the appropriate fire symbol while on the installation. All on-post munitions shipments should display fire symbols in lieu of DOT placards.

Not all DOT Class B items relate to DOD Hazard Class/Division 1.3 material. Some fielded 1.2 items are classified DOT Class B. They must be identified as DOD Hazard Class/Division 1.2 as soon as they arrive at a military controlled installation.

Buildings in which small laboratory quantities of various energetic materials (Class 1.1, 1.2, 1.3, 1.4, or other) are held/stored in tested and approved containers/operational shields designed to contain or otherwise eliminate blast, fragment, and intense thermal effect hazards to firefighting personnel entering into the area in which these energetic materials are held/stored, may be posted with a locally developed fire symbol in lieu of the standard fire symbols. If these symbols are used, the written fire plan will include instructions to firefighting personnel detailing the location, typical quantities, and type of containment/shielding used for the explosives and any special firefighting procedures to be used. Familiarization tours of these facilities will be conducted for firefighting personnel.

9.5. Description of Fire Symbols.

Fire Divisions 1 through 4 are synonymous with Hazard Classes 1.1 through 1.4. Fire Division 1 indicates the greatest hazard. The hazard decreases with ascending Fire Division numbers as follows:

Fire Division	Hazard Involved
1	Mass detonation
2	Explosion with fragment hazard
3	Mass fire
4	Moderate fire

Each of the four Fire Divisions is indicated by a distinctive symbol that firefighting personnel can recognize as they approach a scene of fire. The applicable Fire Division number is shown on each symbol. For the purpose of identifying these symbols from long range, the symbols differ in shape as identified in Figure 1. For application on doors, on lockers inside buildings, on motor vehicles, and on railroad cars, half-sized symbols may be used. Symbols to indicate special hazards, such as those posed by toxic chemicals, must be used in addition to the firefighting symbols. Fires involving munitions and explosives will be fought according to their DOD Hazard Class/Division, and the state of the fire.

Munitions containing both explosives and chemical agents require special attention and precautions in firefighting. Such munitions may belong to different Fire Hazard Classes depending on the kind and quantity of explosives they contain. Fires involving munitions containing both explosives and chemical agents will be fought in accordance with their Fire Hazard Class characteristics, taking cognizance of the additional hazards resulting from the effects of the chemical agents and the associated special measures required in the fighting of those fires (e.g., fires of WP munitions).

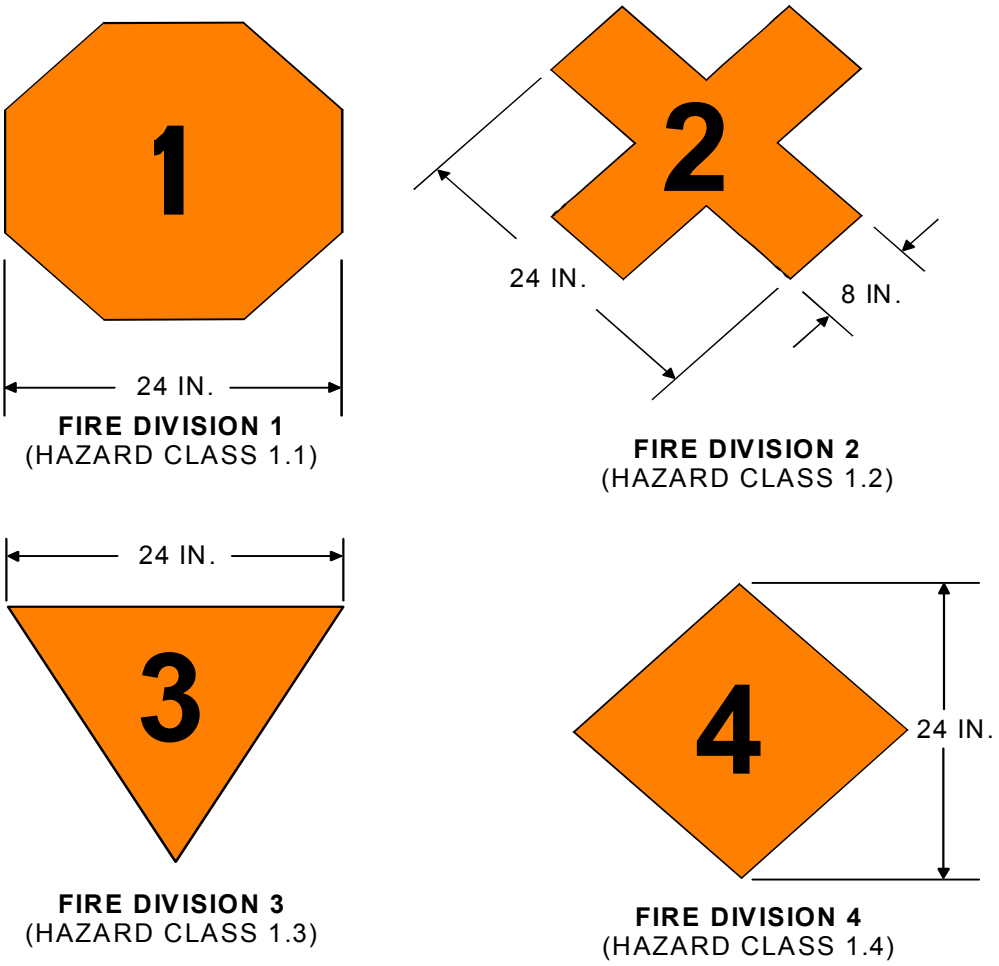


Figure 1. Fire Symbols

9.6. Exceptions on Posting Fire Symbols.

- Fire symbols need not be posted in locations having 1,000 or fewer rounds of Class/Division 1.4 small arms munitions (.50 caliber or less).

- Use symbols in this regulation unless host nation symbols differ and, by agreement, host nation symbols are used.

- The responsible commander may, for security purposes, remove fire symbols. In such situations, increased emphasis should be placed on giving the fire department prompt and exact information about changes in the status of explosives. Where fire symbols are not displayed on individual structures or where topography and/or vegetation would prevent seeing a fire symbol until arrival at a storage site, a master list and/or map must be maintained. The map should indicate storage site locations, fire symbols, chemical symbols, and empty sites if applicable. This list and/or map must be kept current and must be posted at all access road entrances, control stations, and control points servicing the storage location. This list and/or map shall be furnished to emergency forces.

9.7. Posting Hazard Symbols.

If chemical or pyrotechnic munitions are assembled with explosive components, then hazard symbols must be used together with fire hazard symbols. Chemical munitions which do not have explosive components will be identified by the hazard symbol only. Requirements for posting hazard symbols are the same as for fire symbols.

9.8. Chemical Hazard Symbols.

Chemical agent or agent-filled munitions storage and operational facilities must be identified with appropriate hazard symbols. The type or types of hazard symbols (Figure 2) selected for this purpose will depend not only upon the type of chemical agent in the munitions but also on the absence or presence of explosive components in the munitions. Posting of chemical and fire division symbols must comply with the following:

- When magazines or outdoor sites are used for storing different types of chemical agents or agent-filled munitions, each separate magazine or storage pad must have the appropriate hazard markers posted where they are plainly visible at each road of approach or access to the facility.

- If a Chemical Hazard Symbol 1 (full protective clothing plus protective mask) is required and posted, the posting of a Hazard Symbol 2 (breathing apparatus) would be redundant and is not required.

- If a Chemical Hazard Symbol 1, Set 1 (butyl rubber suit), is required, no other hazard Symbol 1 signs would be required due to compatibility requirements.

- If a situation should arise that mixed munitions stored in a single storage location could require a chemical hazard Symbol 1, Set 2 and/or Set 3, the Set 3 should be considered as having the highest degree of protection due to the flame-resistant gloves and coveralls. In such a situation, the Chemical Hazard Symbol 1, Set 2, would be optional.

- Chemical Hazard Symbol 3 will be posted as applicable.

- When a complete row of magazines within a magazine storage area is used for storage of only one type of chemical agent or agent-filled munitions, hazard markers may be posted at the access road entrance(s) servicing that row of magazines in lieu of being posted on each magazine.

- Facilities used for manufacturing, filling, processing, laboratory work, inspection workshop, etc., will be identified by posting hazard markers at entrances into the area where only a single building is involved or at entrances and on each separate building where more than one building is involved. If more than one hazard or class of munitions is in a workshop, each class will be separated into bays and properly identified with correct hazard symbols posted outside the entrance.

The Chemical Hazard Symbols are identified in Figure 2. Protective clothing and apparatus prescribed by Symbols 1 and 2 are for firefighting purposes and do not necessarily apply to normal operations.

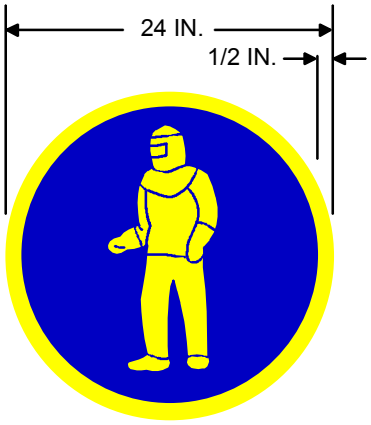
When the Chemical Hazard Symbol that orders the wearing of full protective clothing (Symbol 1) is colored with a red rim and figure, the symbol indicates the presence of highly toxic chemical agents that may cause death or serious damage to body functions. The following full protective clothing, identified as Set 1, will be used: M9 series protective gas mask or self-contained breathing apparatus with applicable hood or approved equivalents, impermeable suit, hood, gloves and boots, cotton undergarments, explosive handler's coveralls, and other protective footwear as applicable. A fire blanket should also be available in case of a fire.

When the Chemical Hazard Symbol that orders the wearing of full protective clothing (Symbol 1) is colored with a yellow rim and figure, the symbol indicates the presence of harassing agents (riot control agents and smokes). The following protective clothing, identified as Set 2, will be used: M9 series protective gas mask or self-contained breathing apparatus, coveralls, and protective gloves.

When the Chemical Hazard Symbol that orders the wearing of full protective clothing (Symbol 1) is colored with a white rim and figure, the symbol indicates the presence of white phosphorus and other spontaneously combustible material. The following protective clothing, identified as Set 3, will be used: flame-resistant coveralls, flame-resistant gloves and M9 series protective gas mask or self-contained breathing apparatus.

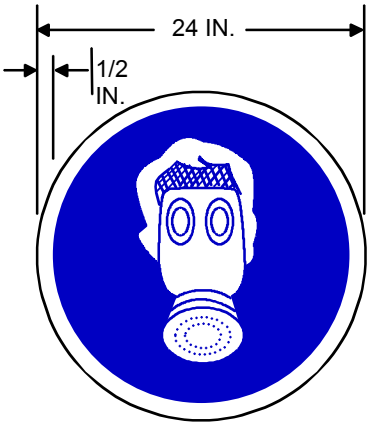
The Chemical Hazard Symbol that orders the wearing of breathing apparatus (Symbol 2) indicates the presence of incendiary and readily flammable chemical agents. These agents present an intense radiant heat hazard and may be posted together with any of the other symbols, if required. Protective masks to prevent inhalation of smoke from burning incendiary mixtures will be used.

The Chemical Hazard Symbol warning against applying water (symbol 3) indicates that a dangerous reaction will occur if water is used in an attempt to extinguish the fire. This chemical hazard symbol may be posted together with any of the other symbols, if required.



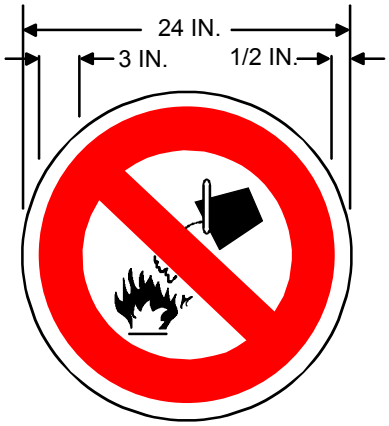
SYMBOL 1.
WEAR FULL PROTECTIVE CLOTHING

COLOR*:
BACKGROUND IS BLUE.
FIGURE AND RIM IS:
RED FOR SET 1 PROTECTIVE CLOTHING
YELLOW FOR SET 2 PROTECTIVE CLOTHING
WHITE FOR SET 3 PROTECTIVE CLOTHING



SYMBOL 2.
WEAR BREATHING APPARATUS

COLOR*:
BACKGROUND IS BLUE.
FIGURE AND RIM ARE WHITE.

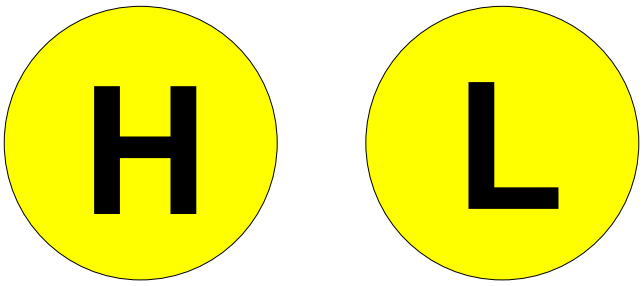


SYMBOL 3.
APPLY NO WATER

COLOR*:
BACKGROUND IS WHITE.
CIRCLE AND DIAGONAL ARE RED.
FIGURES ARE BLACK.

***NOTE:**
COLORS PER FED STD 595 A OR GSA CATALOG:
RED NO. 11105
BLUE NO. 15102
YELLOW NO. 13538
WHITE NO. 17875
BLACK NO. 17038

1. G-TYPE NERVE AGENTS
2. VX NERVE AGENT
3. INCAPACITATING AGENT BZ



4. H-TYPE MUSTARD AGENTS
5. LEWISITE

NOTE:
ALL SYMBOLS WITH 12 IN. BLACK LETTERS ON 24 IN. DIA. YELLOW CIRCLE. (COLORS PER FED STD 595A: BLACK NO. 17038, YELLOW NO. 13538)

Figure 2. Chemical Hazard Warning Symbols

9.9. Fires Involving Classification, Holding, and Storage Yards.

Fires can be readily extinguished if discovered in the incipient stages, but every effort should be made to obtain prompt movement of undamaged cars from yards where fire has broken out. All personnel must be trained in the use of portable fire equipment, with instructions concerning the dangers where explosives are involved.

Fire-tool boxes painted red and plainly marked FOR FIRE ONLY should be installed at intervals of not more than 500 feet adjacent to yard tracks. These boxes should contain, as a minimum, one fire ax, one shovel, one pinch bar, three fire pails, and one 5-gallon, pump-type water fire extinguisher. A non-freezing water fire extinguisher must be used when the temperature is below freezing. A properly maintained water barrel should be placed alongside the tool box. If water hydrants are available, hose carts equipped with hose, adapters, and spanner wrenches should be supplied. Fire boxes are not required when both fire hydrants and a firefighting force are available.

9.10. Personnel Responsibilities.

Personnel working with munitions are required to observe the following precautions:

- Do not carry fire- or spark-producing devices into munitions and explosive storage areas unless authorized in writing.
- Do not smoke, except in authorized areas. After smoking, ensure that burning tobacco is completely extinguished.
- Do not have fires for heating or cooking, except in authorized areas.
- Do not allow litter, packing material, dunnage, dry leaves, grass or twigs, etc., to accumulate within firebreak areas.
- Pick up any debris within a storage area.
- Do not accumulate oily rags or other material subject to spontaneous ignition, except in a covered metal box. Have such materials collected daily and removed from the area.
- Do not conduct operations without approved standing operating procedures (SOPs) and proper supervision.
- Use only permissible lighting in munitions storage sites.
- Do not become careless by reason of familiarity with munitions.
- In case of fire, sound an alarm immediately. Be ready to show the location of fire to firefighting personnel.

- Ensure that each operator knows what to do in case of fire within a storage area.

- The person in charge should instruct all personnel on the existing fire plan to aid firefighting crews and to prevent loss of life and property in case of an accident.

- Do not carry firearms, cameras, or camera flashing equipment in munitions and explosive facilities unless authorized in writing.

10.0. Port Operations.

For port operations to be successful, it requires preparation at the home station. This preparation includes proper blocking and bracing munitions and explosives properly, as well as planning the best movement routes and times. This section will apply to the hazard safety considerations of loading vehicles, vehicle holding sites, railhead operations, and road movement.

10.1. Vehicle Loading.

Before deciding to upload vehicles before movement, you must consider the conditions expected at the point of embarkation and disembarkation. Tactical vehicles, other than trucks, are not designed to carry munitions under conditions required for safe transport. The time, effort, and material required to make them safe must be considered in the decision process. The following steps will be followed for vehicle loading.

- The loading operation will be conducted during daylight hours or under strong illumination at night. At no time will loading operations be conducted under conditions of darkness.

- Vehicles will be loaded in accordance with vehicle load drawings. These drawings can be obtained from the Director, USADACS, ATTN: SMAC-DET, Savanna, IL 61074.

- Vehicles will pass an inspection conducted by a person certified to release shipments of hazardous materials. This inspection will be as close as possible to the inspection required for trucks carrying A&E. Vehicles which fail to pass the inspection will be repaired and required to pass the inspection before being loaded with A&E.

- Vehicles that are waiting to be loaded will be kept at IBD from the loading site prior to the beginning of the loading operation. Once the vehicle is loaded and properly blocked and braced, it will be moved to the vehicle holding area.

- The loading site will not have more vehicles in it at one time than it can safely handle.

10.2. Vehicle Holding Site.

A vehicle holding site will be selected before movement. This site will have lightning protection, in accordance with Chapter 13, DA PAM 385-64, and be approved by the DDESB. Unless vehicles or groups of vehicles can be sited at magazine distance, the whole vehicle holding site will be counted as one site for Q-D purposes. Magazine distance will prevent immediate propagation from one vehicle or group of vehicles to another, but will not prevent delayed propagation caused by firebrands or prevent destruction of vehicles.

10.3. Railhead Operations.

Vehicles loaded with A&E will not be brought to the railhead until it is time for loading them on the railcars. A loadmaster will be appointed in writing to control the arrival of vehicles for loading. As each car or cut of cars is loaded, it will be moved to a rail holding yard or sent to the port. Loaded cars will not be kept at the railhead longer than necessary. Vehicles will be secured to the railcar to prevent movement before moving the car. Railheads and rail holding yards will be properly sited and have lightning protection in accordance with Chapter 12, DA PAM 385-64.

10.4. Road Movement.

This section discusses the requirements for road movement of vehicles carrying munitions or explosives. They are as follows:

- Vehicles moving over the road to port will have as a minimum two 10BC fire extinguishers. Vehicle occupants will have ready access to the fire extinguishers. Fire extinguishers will not be locked up during movement.

- Rest stops will be planned to allow the parking of vehicles with A&E as far away as possible from public gathering places, such as rest rooms, picnic areas, and so forth. Vehicles will not be left unattended at rest stops. People unrelated to the movement will be kept as far away as possible from vehicles loaded with A&E. During prolonged rest stops (over two hours), fire extinguishers will be placed at 100 feet intervals between vehicles. These fire extinguishers will be at least 50BC in size and have at least a 5A rating.

- Vehicle occupants will not smoke within 100 feet of A&E loaded vehicles. During rest stops people smoking will be kept at least 100 feet from vehicles carrying A&E.

- Vehicles that break down during movement will not be left unattended.

- In the event of an accident, any fires that occur will be fought until they are in among the A&E.

- Vehicles will be grounded before the beginning of refueling operations. Vehicles will be grounded together to equalize the potential between the fuel truck and the vehicle being fueled.

- Vehicles will be staged so that A&E loaded vehicles do not accumulate at any one location in large quantities. This is especially important at the port. Normal Q-D requirements will be difficult, if not impossible, to observe at most contingency ports. The arrival of vehicles will be timed, if at all possible, to prevent the accumulation of vehicles on the docks at the port.

11.0. Summary.

This lesson has discussed the safety precautions pertaining to hazardous materials. It covered general safety precautions, personnel qualifications, fire prevention, protection, and suppression, and ended with a brief discussion on port operation hazards.

Student Check

This exercise will reinforce the information covered in this lesson. Answer the following questions. Cite the appropriate paragraph in the lesson that supports your answer.

1. What must personnel conducting a hazard analysis be knowledgeable in?

ANSWER:_____

_____

_____

REFERENCE:_____

2. What language will SOPs be written in?

ANSWER:_____

_____

_____

REFERENCE:_____

3. Who will ensure explosives limits for the work site are not exceeded?

ANSWER:_____

_____

_____

REFERENCE:_____

4. When can nails be used to secure covers of explosives containers?

ANSWER:_____

_____

_____

REFERENCE:_____

5. What oil is used for covering white phosphorous?

ANSWER:_____

_____

_____

REFERENCE:_____

6. What is the preferred method for cleaning when exposed explosives may be on the floor?

ANSWER:_____

_____

_____

REFERENCE:_____

7. How must munitions that have misfired be marked?

ANSWER:_____

_____

_____

REFERENCE:_____

8. Burning is not permitted within how many feet of any earth-covered magazine?

ANSWER:_____

_____

_____

REFERENCE:_____

9. Stacked dunnage should not be stacked closer than how many feet from magazines containing high explosives?

ANSWER:_____

_____

_____

REFERENCE:_____

10. How many hand-held fire extinguishers should be ready for immediate use when munitions are being handled or work is being done in the immediate vicinity of them?

ANSWER:_____

_____

_____

REFERENCE:_____

11. Warehouse facilities utilized for storing containers from which explosives have been removed, but which have not been decontaminated for explosive residue must be placarded with what fire symbol?

ANSWER:_____

_____

_____

REFERENCE:_____

12. What locations do not require posted fire symbols?

ANSWER:_____

_____

_____

REFERENCE:_____

13. What type of hazard is associated with Fire Division 3?

ANSWER:_____

_____

_____

REFERENCE:_____

14. You see a Chemical Hazard Warning Symbol 1. What protection must you take?

ANSWER:_____

_____

_____

REFERENCE:_____

15. When should vehicle loading operations take place?

ANSWER:_____

_____

_____

REFERENCE:_____

Student Check
Solution

1. Answer: Munitions and explosives safety, the task to be performed, and the methods used to conduct a hazard analysis.
   Reference: Paragraph 2.0.

2. Answer: English and in the language that civilian workers understand.
   Reference: Paragraph 4.1.

3. Answer: Each soldier.
   Reference: Paragraph 5.0.

4. Answer: Only if there is no hazard to the explosive item or of penetrating protective coverings.
   Reference: Paragraph 6.0.

5. Answer: 10 mineral oil.
   Reference: Paragraph 7.1.

6. Answer: Hot water or steam.
   Reference: Paragraph 7.3.

7. Answer: It must be indelibly marked.
   Reference: Paragraph 8.0.

8. Answer: 50 feet.
   Reference: Paragraph 9.0.

9. Answer: 100 feet.
   Reference: Paragraph 9.0.

10. Answer: Two.
    Reference: Paragraph 9.1.

11. Answer: 4.
    Reference: Paragraph 9.4.

12. Answer: In locations having 1,000 or fewer rounds of Class/Division 1.4 small arms munitions.
    Reference: Paragraph 9.5.

13. Answer: Mass Fire.
    Reference: Paragraph 9.7.

14. Answer: Full protective clothing.
    Reference: Paragraph 9.8, Figure 2.

15. Answer: During daylight hours or under strong illumination at night.
    Reference: Paragraph 10.1.