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THE ARMY, THE NAVY, AND THE
DEFENSE LOGISTICS AGENCY

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Transportation

★*PREPARING HAZARDOUS MATERIALS FOR MILITARY AIR SHIPMENTS*

This manual implements AFPD 24-2, *Preparation and Movement of Air Force Material*. It provides guidance and procedures for preparing hazardous materials for shipment by military aircraft to ensure that such materials are packaged, marked, labeled, and prepared properly for transportation. This manual includes the shipment of nuclear materials, except for nuclear weapon major assemblies and nuclear components packaged and shipped per Department of Energy-Defense Nuclear Agency (DOE-DNA) TP 45-51 and its supplements. It includes labeling requirements, instructions for transporting passengers with hazardous materials and instructions for notifying the aircraft commander regarding the hazardous materials that are on the aircraft. It implements Department of Defense (DoD) Regulation 4500.32-R, *Military Standard Transportation and Movement Procedures (MILSTAMP)* Volume I, March 1987 with Changes 1-6, and Department of Transportation (DOT) Exemptions 7573 and 9232 (DOT-E 7573 and DOT-E 9232) for commercial aircraft under contract to the Air Mobility Command (AMC). The use of a name of any specific manufacturer, commercial product, commodity or service in this publication does not imply endorsement by the military services.******Penalties and Disciplinary Action.** DoD personnel who knowingly violate this manual are subject to disciplinary action based on the seriousness of the offense according to the Uniform Code of Military Justice, the Federal Personnel Manual (FPM) supplement 751, and Agency Code of Penalties (AFI 36-704, AR CPR S1, NAV CMMI 751.1, MC NCPI 750, and DLAR FPM chapter 751.) Penalties may be civil or criminal and may include fines or imprisonment. See attachments 1 and 2 for terms, abbreviations, and acronyms used in this manual.

SUMMARY OF REVISIONS

This is a complete revision incorporating applicable changes to the Department of Transportation (DOT) Title 49 *Code of Federal Regulations* (CFR) and the *International Civil Aviation Organization* (ICAO) *Technical Instruction.* This revision amends policy statements in Chapters 1-3, hazard classification and communication information in table A4.1, and packaging requirements in attachments 5-13. A list of hazardous substances and corresponding Reportable Quantities is included in table A4.3. Other major changes include designation of new passenger eligibility criteria (2.2), consolidation of passenger movement requirements (A22), expanded explanation of training standards (A25), and modification of domestic provisions for use of prior authorized packagings (1.7). Holders of AFR 71-4 (15 January 1988) should retain a copy in order to use DOT specification (non-POP) packaging for Grandfathered shipments (see paragraph 1.7). This manual reorganizes text to comply with Air Force Manual format and changes many procedures. These changes clarify requirements and further standardize DoD packaging and shipping with the commercial sector.

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Chapter 1

GENERAL GUIDANCE

1.1. Applicability. Handlers, packers, inspectors, and preparers (certifiers) of hazardous materials comply with rules designed to maximize safety and security of the aircraft, aircrew, cargo and passengers. They must know the exceptions, exemptions, and waivers to federal laws and related government directives that are unique to military airlift operations and how to apply them.

- This manual governs the transport of hazardous material as cargo on military fixed and rotary wing aircraft. Apply the requirements specified in this manual unless modified or updated according to 1.2.1.
- Hazardous materials required as operational equipment of the aircraft for ground/air servicing as identified in applicable aircraft flight publications are not regulated by this manual.
- The provisions of this manual are directive in nature, and must be complied with by those personnel whose positions or jobs entail responsibility for the functions covered.
- Ensure compliance with current applicable DOT and EPA requirements when transporting hazardous materials outside of the Defense Transportation System. Hazardous waste shipments entering or exiting a domestic location must comply with 40 CFR Parts 260-265, including preparation of a hazardous waste manifest.

1.2. Responsibilities Assigned.

1.2.1. **Office of Primary Responsibility (OPR)** will publish emergency changes of an operational or technical nature that do not change policies or major procedures without service coordination. Coordinate all policy changes with Service focal points. Issue hazardous cargo information, clarifications, updates, procedural and policy changes to Air Force activities and Service focal points. Focal points retransmit changes to their respective service or agency shippers.

1.2.2. **Service Focal Points** jointly establish procedures and prepare any documentation necessary to implement this manual. Users contact their Service focal points for all clarifications and waivers. Service focal points are:

- **Air Force.** AFMC LSO/LOP, 5215 Thurlow Street, Wright-Patterson AFB, OH 45433-5540, (937) 257-4503/1984 DSN: 787-4503/1984.
- **Army.** U.S. Army Safety Center/CSSC-PP, Fort Rucker, AL 36362-5363, (205) 255-3261 DSN: 558-3261.
- **Navy.** Commander, Naval Supply Systems Command, Code 4122D, P.O. Box 2050, 5450 Carlisle Pike, Mechanicsburg, PA 17055-0791, (717) 790-5099 DSN: 430-5099. Navy activities obtain waivers from Naval Inventory Control Point, Code 0541.3, P.O. Box 2020, 5450 Carlisle Pike, Mechanicsburg, PA 17055-0788, (717) 790-2784 DSN: 430-2784.
- **Marine Corps.** Commandant of Marine Corps (LPP-2), Headquarters, U.S. Marine Corps, 2 Navy Annex, Washington, DC 20380-1775, (703) 696-1061 DSN: 426-1061.

- **Defense Logistics Agency.** HQ Defense Logistics Agency/MMLSD, 8725 John J. Kingman Road, Suite 2533, Fort Belvoir VA 22060-6221, (703) 767-3673/3541 DSN: 427-3673/3541.

1.2.3. **Preparers** certify that hazardous materials are properly classified, described, packaged, marked and labeled, and in proper condition for military airlift according to the applicable regulations of the Department of Transportation and this manual. Preparers include Technical Specialists. These individuals are qualified based on their training in handling and preparing the hazardous material in the performance of their duties.

1.2.4. **Handlers** maintain safe operations when transporting hazardous materials and proficiency in job specific responsibilities. Handlers include warehouse workers, load planners, load selectors, special handling personnel, and aircraft load teams.

1.2.5. **Originating Shipping Activities** establish quality control programs that ensure packing, marking, labeling, and certifying of hazardous materials comply with this manual and safety of airlift criteria.

- The shipping activity will conduct a visual examination of the exterior shipping container and review of the shipping documents.
- Open exterior containers only when there is physical evidence to support suspected damage of the inner receptacles or if the external markings do not correspond to the type of container.
- Reseal opened containers according to the applicable test report or special packaging instruction (SPI). Changes to the inner configuration of a POP tested package must meet the authorized variations in 49 CFR 178.601. Any changes other than an authorized variation, voids the POP certification and will result in retesting, repacking, and remarking the container.

1.2.5.1. **Originating Activity Inspectors:**

- Inspect each package to ensure the container is correct and is in good condition.
- Check shipper's certification for overall accuracy including correct packaging paragraph.
- Immediately remove damaged or improperly prepared packages from the transportation system.
- Ensure hazardous materials are packaged in UN specification POP containers when required.
- Periodically inspect cylinders or spheres to ensure they have been retested and marked as required by 49 CFR 173.34(e) and DoD DLAR 4145.25/AR 700-68/NAVSUPINST 4440.128/MCO 10330.2B/ AFR 67-12, *Storage and Handling of Compressed Gases and Cylinders*. Do not offer for transportation any cylinder or sphere not meeting this requirement.

1.2.6. **Inspectors Other Than Originating Shipping Activity:**

- Visually inspect all exterior containers and equipment for damage or leakage. Reject packages showing evidence of leakage (moisture or staining) or other suspected damage until corrective action is taken to make sure the item is safe for air shipment (see paragraph 1.9).
- Remove improperly prepared or damaged containers from the transportation system and advise the shipper to immediately coordinate corrective action. Properly store suspect packages containing explosive material pending repair or disposition.
- Ensure hazardous materials are packaged in UN specification POP containers when required.
- Review all Shipper's Declarations for Dangerous Goods for accuracy. Make sure special instructions and warning labels are complete and being followed.
- Do not violate compatibility requirements (attachment 18) in the consolidation or makeup of cargo loads.
- Prepare SF 361, **Transportation Discrepancy Report,** according to DoD 4500.9-R, DTR, Part II, or **Report of Discrepancy**, according to DLAI 4140.55/AR 735-11-2/SECNAVINST 4355.18A/AFJMAN 23-215.

1.2.7. **Mobility Movement Inspection Function.** The Tanker Airlift Control Element (TALCE), Departure Airfield Control Group (DACG), or Transportation Control Unit (TCU) provides qualified inspectors for tactical or contingency deployments, redeployments, and exercises (see 1.2.6).

1.2.8. **Installation or Activity Commanders (or their designated representatives).**

- Train personnel according to paragraph 1.3.
- Appoint preparers as certifying officials to complete the Shipper's Declaration for Dangerous Goods Certification. This authorization must include the scope of the individuals authority and qualified training according to attachment 25. Document the authorization in writing, electronically, or other auditable method.

1.2.9. **Air terminal or base operations personnel.** Notify the aircraft commander (or designated representative), in writing, of all hazardous materials aboard the aircraft. The activity responsible for delivering the cargo to the aircraft provides this notification in the absence of an established air terminal or base operation. The briefing agency must meet the requirements of attachment 21.

1.2.10. **Contracting Officers.** Ensure all DoD contracts and purchase requests for hazardous materials include the

provisions of the supplement to the Federal Acquisition Regulation (FAR), Paragraph 52.228-7007 (Safety, Ammunition, and Explosives). Contractors get copies of specifications, standards, and publications from the procuring agency or as directed by the contracting officer.

1.3. **Hazardous Material Training Requirements.** Commanders assign hazardous material workers and ensure each successfully completes relevant training. Train hazardous material workers according to attachment 25. The minimum areas that must be addressed by all levels of training for individuals who may effect the safety of hazardous materials in transportation are:

- Hazardous material general awareness and familiarization
- Safety procedures to include emergency response
- Function specific responsibilities directly relevant to the individuals role in hazardous material transportation.

1.4. Steps for Preparing Hazardous Materials. To ensure compliance with all safety, security, and legal requirements, preparers follow a logical sequence:

- **Step 1.** Determine whether the airlift mission is channel or mobility. Chapters 1 and 2 cover general rules applicable to all hazardous material shipments by military aircraft. Chapter 3 covers policy and procedural exceptions specific to tactical, contingency, or emergency operations.
- **Step 2.** Determine the proper shipping name (PSN), hazard classification, identification number and packing group from attachment 4. Identify if a reportable quantity (RQ) designation applies.
- **Step 3.** Determine the basic packaging paragraph from table A4.1. Identify the packaging configuration from attachments 5 through 13. Check general requirements identified in attachment 3. Comply with any special handling instructions.
- **Step 4.** Mark and label the package according to attachments 14 and 15.
- **Step 5.** Complete the hazardous material certification according to attachment 17.
- **Step 6.** Before loading, determine compatibility and placarding according to attachments 16 and 18.

1.5. Transportability Design Criteria. Configure hazardous materials (items and articles) to ensure transportability on military aircraft. Items in their shipping configuration and skidded or wheeled equipment must meet the transportability design criteria identified in MIL-STD-1791, *Designing for Internal Aerial Delivery in Fixed Wing Aircraft.*

1.6. General Packaging Requirements. Package hazardous materials in containers authorized by this manual, Title 49 *Code of Federal Regulations* (CFR) Part 173, the *International Civil Aviation Organization* (ICAO) *Technical Instructions*, or the *International Air Transport Association* (IATA) *Dangerous Goods Regulation*. Attachment 3 applies to all military air shipments.

1.7. UN Specification Performance Oriented Packaging (POP). Prepare hazardous materials in UN specification POP certified containers unless exempted by a specific packaging paragraph in this manual. DoD activities use the PC-POP III Computer Program to locate tested and authorized DoD packaging configurations. If the hazardous material is procured in a manufacturer's UN specification POP certified container, use that container. Ensure compliance with all other requirements of this manual, including air-eligiblity. If the managing activity has specified a container Special Packaging Instruction (SPI), use that UN specification POP certified container. Frustrate hazardous cargo not correctly packaged and marked to the POP requirements. For additional information concerning POP or performance test requirements see DLAD 4145.41/AR 700-143/AFJI 24-210/NAVSUPINST 4030.55/MCO 4030.40A, *Packaging of Hazardous Material*. Service focal points are unable to waive UN specification POP requirements.

1.7.1. **Exempt Items.** The following materials are exempt from UN specification POP testing requirements. The packaging paragraph from table A4.1 will specify required packaging.

- Compressed gas cylinders
- Radioactive material
- Dry ice
- Magnetized material
- Life-saving appliances
- Mercury contained in manufactured articles
- Packages whose net mass exceeds 400 kg (882 pounds) or with a capacity exceeding 450 liters (119 gallons)

1.7.2. **Grandfathered Items.** Government-owned goods packaged before 1 January 1990 are exempt from UN specification POP requirements. Ship these items under the packaging requirements in effect at the time of packaging. Annotate the shipping papers "Government-owned goods packaged before 1 January 1990." See attachment 17 for certification instructions.

1.7.3. **Domestic Shipments.** Shippers may use DOT specification packaging conforming to the requirements of Title 49 CFR in effect on 30 September 1996, for domestic shipment only, until 1 October 1999. Ensure the

packaging was filled with hazardous material prior to 1 October 1996. See attachment 17 for certification instructions.

1.8 Fueled Vehicles and Equipment. Limit quantity of fuel within a vehicle or wheeled support equipment to a minimum. Do not exceed the maximum fuel in tank limits specified in attachment 13. Commanders must consider availability of fuel at the destination and operational requirements for mission readiness when determining fuel levels and ship with less than the maximum allowable amount when applicable. The preparer (certifying official) must ensure any unnecessary fuel is drained prior to shipment.

1.9. Damaged or Improper Shipments. Do not transport any damaged, leaking, or improperly packed, marked, or labeled item or material.

- Return shipments not in UN specification POP containers when required, at originator's expense. The originating activity may provide the shipper with the appropriate POP marking to correct the shipment. Consider urgency of need when determining the best method for correcting a deficient shipment.
- Report deficiencies on SF 361, **Transportation Discrepancy Report,** or SF 364, **Report of Discrepancy.** Report leaks from packages, equipment, and self-propelled vehicles during loading or unloading, or in flight as a packaging deficiency.
- Immediately report any release of a hazardous substance in a quantity equal or greater than its reportable quantity to the Environmental Protection Agency (EPA) by calling the US Coast Guard National Response Center at 800-424-8802 or 202-267-2675.
- Consult local installation operating procedures for hazardous material emergency planning, response, and reporting requirements.
- Do not move dropped or damaged explosive items. The Transportation or Packaging Office will immediately contact safety or munitions personnel to determine disposition.

1.10. Empty Containers, Cylinders, Radioactive Packages and Nonhazardous Materials. Inspect packagings, that formerly contained a hazardous material covered by this manual, to determine the presence or absence of hazardous material. If there is presence of hazardous material, purge the hazardous material or the package is regulated in the same manner as prescribed for the item if full. Except for the requirements identified in attachments 15 and 17, an empty packaging or container is not regulated by this manual. A container is considered empty if:

- A hazardous article has been removed from its container and there is no possibility of remaining residue (i.e., empty torpedo or missile containers).
- If the container has been purged of the hazardous material it previously contained.

1.10.1. Empty Cylinders. Compressed gas cylinders are empty if the pressure in the cylinder is less than 40 pounds per square inch absolute (psia). Psia equals the gauge pressure plus atmospheric pressure (14.7 psi). However, if the cylinder contains the residue of a material that is flammable or poisonous, regardless of psia, ship it regulated as a full container.

- Before shipment, inspect empty cylinders for dents, bulges, oxidation pits, or other damage. Handle faulty cylinders as required by the latest DOT regulations or DLAR 4145.25/AR 700-68/NAVSUPINST 4440.128B/MCO 10330.2B/AFR 67-12, *Storage and Handling of Compressed Gases and Liquid in Cylinders.*
- Tightly close valves of cylinders before offering for transportation. The requirements of A3.3.2.2 apply to the protection of the valves.

1.10.2. Empty Radioactive Material Packaging. Empty the contents of the packaging as far as practical and ensure:

- The requirements of A11.11 are met.
- The packaging is in unimpaired condition and is securely closed so that there will be no leakage of radioactive material under normal transportation conditions.
- Internal contamination is not over 100 times the limits specified in A3.3.6.11.
- The packaging is prepared for shipment according to the requirements of A11.12.

1.10.3. Identifying Nonhazardous Material. An item listed in table A4.1 may not be regulated because it does not meet the definition of the hazard class. In this situation, when the item is determined to be nonhazardous, the shipper must alert the carrier by annotating, "NONHAZARDOUS" in the address block of the DD Form 1387, **Military Shipment Label.** In the absence of a DD Form 1387, the shipper will use an equivalent means of notification. Ship the item as general cargo and a Shipper's Declaration for Dangerous Goods form is not required.

1.11. Stowing Hazardous Materials.

- Ensure hazardous materials are compatible (attachment 18) when stored in transit.
- Ensure hazardous materials are accessible in flight.

- Ensure hazard warning labels are visible to aircrew and unloading personnel.
- Do not stow hazardous materials (except dry ice) on the same aircraft pallet with foodstuff, feed, or any other edible material intended for consumption by humans or animals (see paragraph 3.6.3).

1.12. Protective Equipment. The aircraft operator will ensure appropriate equipment is available to protect aircrew and passengers when transporting materials whose vapors are toxic, irritating or corrosive. Aircraft must have a closed oxygen system or protective mask for each person aboard. The shipper will provide any required special equipment to meet unique cargo safety requirements. While the exact equipment required depends on the materials being transported, following are the recommended minimum (or equivalent substitutions):

- Two pairs of rubber gloves.
- One pair of asbestos or leather (with wool inserts) gloves.
- One plastic or rubber apron.
- A five-pound (2.3 kg) package of incombustible absorbent material.
- Three large plastic bags.
- One oxygen or protective mask.
- The base must ensure availability of protective equipment to cope with ground emergencies involving the cargo during loading operations. Coordinate respiratory and other personal protection requirements with the medical service.

1.13. Unitized, Palletized, Containerized, or Consolidated Loads. Shippers must ensure aerial ports can handle loads. Ensure load configurations are:

- As stable as a single container.
- Individually packaged as prescribed by table A4.1, marked, labeled, and certified to the requirements of this manual and MIL-STD-129.
- Designed to provide installed equipment in approved holders meeting airlift restraint criteria.
- Compatible as required by attachment 18.
- Developed not using fiberboard or plywood sideboards unless specifically required by this manual.
- Marked and labeled on the outer most container according to attachments 14 and 15.
- The requirements of this paragraph apply to Mobility Readiness Spares Package (MRSP).

1.13.1. Accessibility. Do not ship containerized loads of hazardous material that are not easily accessible to the aircrew during flight. The aircrew must have access to all hazardous materials in case of an in-flight incident. Ensure air transportation personnel have access to the contents for inspection. Provide a key to unescorted, locked containers to the aircraft commander or designated representative. Ship only the following hazardous materials in inaccessible containers or tactical shelters:

- Recompression vans, support vans, and shelters used by the Underwater Construction Team. Hazardous items inside these escorted containers have been identified to and approved for shipment byAFMC LSO/LOP.
- Fire extinguishers secured in appropriate holders or brackets, or properly packaged according to this manual.
- Support equipment or other mechanical apparatus. Completely drain (residual fuel not to exceed 17 oz) items fueled by a flammable liquid with a flash point above 38 degrees C (100 degrees F). Tightly seal fuel lines and tank to prevent residual fuel leaks. Drain and purge items fueled by a flammable liquid with a flash point at or below 38 degrees C (100 degrees F). Installed batteries must be nonspillable type and secured upright.
- Items shipped under the PSN "life saving appliances" and packaged according to this manual.
- Air conditioners and environmental control units, magnetic material, radioactive material, and thermometers.

1.14. Procedures for Airdropping Hazardous Materials. Prepare airdrop loads according to the TO 13C7/FM 10-500 series. Prepare, mark, label, certify, and accept airdrop hazardous cargo the same as air landed cargo.

1.15. Nuclear Weapons Material. Use the detailed information and procedures for preparing nuclear weapons material in DOE-DNA TP 45-51/Army TM 39-45-51/Navy SWOP 45-51/Air Force TO 11N-45-51, *Transportation of Nuclear Weapons Material* (including supplements). This document provides a chart indicating the air shipment compatibility of nuclear material with nonnuclear explosives and hazardous materials. Also, determine the inter-compatibility of explosives and hazardous materials according to attachment 18. Packaging and handling of nuclear material not specifically outlined in the above document must meet the requirements of this manual.

1.16. Air Standardization Coordinating Committee (ASCC) Air Standards. Member nations (Australia, Canada, New Zealand, United Kingdom, and United States) agree in Air Standards 44/9 to accept the categorization and authorization by participating nations of explosives, radioactive materials, and dangerous cargo for onward carriage in their own military aircraft. Label

shipments according to the ICAO *Technical Instructions*, IATA *Dangerous Goods Regulation* or by nationally approved labels. Certify the shipment meets all requirements for air transport.

1.17. NATO STANAG 3854, Policies and Procedures Governing the Air Transportation of Dangerous Cargo. Participating nations agree to apply the United Nations International System for the Classification of Dangerous Cargo for air transportation. This includes the labeling (supplemented where necessary by ICAO or IATA labels) and certification. National regulations are still the authority for preparing, packing, aircraft stowing, and restraining dangerous cargo. Apply the national handling regulations of the carrier when transferring dangerous cargo from one nation to another for onward carriage.

NOTE: Paragraphs 1.16 and 1.17 are subject to international military standardization agreements. Do not make changes or deviations without authorization as prescribed in AFI 60-103 or NAVAIR Instruction 5711.1.

Chapter 2

DEVIATIONS, WAIVERS, AND SPECIAL REQUIREMENTS

2.1. Deviations and Waivers. Deviations and waivers are a departure from established procedures in this manual.

2.2. Passenger Movement Deviations. Do not transport passengers with hazardous materials coded as cargo aircraft only in table A4.1, column 7 and table A4.2 Passenger Eligibility "P" Codes. See attachment 22 for deviation authority, additional passenger information ,and supplemental oxygen requirements.

2.3. Packaging and Compatibility Waivers. Waivers are exceptions to the packaging or compatibility requirements of this manual.

2.3.1. **Packaging Waivers.** The shipper must obtain a waiver for any hazardous item or packaging not authorized in attachments 5 through 13. Submit waiver requests to your Service focal point (see paragraph 1.2.2) by letter, message, or telephone. Confirm waivers requested by telephone with a letter or message. Ensure receipt of the letter or message prior to issuing the waiver. A copy of the waiver must accompany the shipment. The DoD does not have authority to issue packaging waivers to UN specification POP requirements. Do not jeopardize safety for convenience or ease of operation. To obtain a waiver, the shipper must:

- Provide a detailed description of the package.
- Provide the PSN, hazard class, identification number, packing group, and net quantity of the material.
- Provide a detailed explanation why the established requirements can not be met.

2.3.2. **Compatibility Waivers for Military Aircraft.** Shippers submit waiver requests to their Service focal point (see paragraph 1.2.2) for approval. For Air Force aircraft, the Service focal point forwards the waiver request, with their coordination, to HQ AMC/SEG/DOJC Scott AFB IL 62225-5363. Waiver requests must contain the following information:

- Reason incompatible materials require shipment together.
- Reason for air movement and why other transportation modes cannot be utilized.
- Statement that if one item detonates or leaks, incompatible items (in the same container or on the same aircraft) will not cause a propagation detonation, fire, corrosive effect, or contamination of the aircraft. Provide a brief description (include tests, if performed) which support your safety conclusions. Also, provide any additional safety controls the carrier must exercise.
- Provide intended date of movement, routing, and type of airlift required.
- Provide national stock numbers; model numbers of explosive items; PSNs; hazard classes; identification numbers; quantity or net explosive weight (individual and total as applicable); and packaging paragraphs.
- Provide points of contact at origin and destination bases.

2.3.3. **Compatibility Waivers for AMC-Contracted (Commercial) Aircraft.** Do not move incompatible items by AMC-contracted aircraft unless authorized by a DOT exemption. If an emergency situation exists to airlift incompatible items by AMC-contracted aircraft, provide the information required by paragraph 2.3.2 to HQ AMC/DOJC/SEG who will request an exemption from the DOT if warranted.

2.3.4. **Operational Necessity Waivers.** Variations to the requirements of this manual are authorized for a specific mission when strategic and compelling reasons exist. The Service/MAJCOM having operational control of the aircraft must approve the operating procedures.

USTRANSCOM must approve operating procedures for strategic lift assets operated by HQ AMC. This paragraph applies to the following conditions:

- For recovery of downed aircraft.
- For emergency rescue operations.
- For movement of portable generators to support critical and key functions where power has been disrupted.
- Movement of fueled support equipment (SE) to replace inoperative equipment supporting an ongoing mobility exercise or operational plan. Equipment may be transported with fuel not to exceed one-half tank.
- Shipments in accordance with the requirements of MCR 55-89, *Phoenix Banner, Phoenix Silver, and Copper Operations.*

2.3.5. **Intelligence or Criminal Investigations.** Variations to the requirements of this manual are authorized for airlift of hazardous materials involved in intelligence or criminal investigations. Qualified personnel of those agencies responsible for the cargo must certify that all safety precautions have been taken to transport the materials safely. The shipper must ensure compliance with as many requirements of this manual as possible. This authorization is valid only for movement out of an austere environment. At the first secure in-route airfield, the cargo must be prepared according to this manual or paragraph 2.3.1.

2.4. DOT Exemptions. A DOT exemption is authority to deviate from the requirements of 49 CFR 100-199. Use exemptions as authority for shipment by military air, if applicable. Follow all requirements of the exemption.

- The shipping activity must provide a copy of the exemption for each shipment.
- The exemption must accompany the cargo in the Defense Transportation System.
- Maintain a copy of the exemption at each facility where it is used in connection with the transportation of the hazardous material.
- Do not use DOT packaging exemptions for international shipments unless the item is exempted from UN specification POP requirements (see 1.7.1).
- Forward requests for new exemptions according to the DTR, Volume II. Request copies of existing exemptions according to 1.2.2.

2.5 Competent Authority Approvals (CAA). A CAA is issued by the U.S. Competent Authority (U.S. Department of Transportation). CAA is used when required by the packaging paragraph or when the item does not meet the United Nations specification requirements for overseas shipment. Use CAA as authority for military air shipments. Types issued are:

- Explosive hazard classification CAA for some explosives and munitions' group items. A copy of this CAA does not have to accompany military air shipments.
- Packaging CAA for items as specified by the US Competent Authority. These items include certain Class 1 packing methods identified in 49 CFR and some nonexplosive items that fall outside the POP testing criteria. The shipping activity must provide a copy of the CAA for each shipment. The CAA must accompany the cargo in the Defense Transportation System.
- The Inventory Control Point for the item (national stock number managing activity) must submit the CAA request to the Service/Agency focal point according to the DTR, Volume II. Request copies of existing CAA's according to 1.2.2.

2.6. DoD Certification of Equivalency (COE). A COE is a certification that the proposed packaging equals or exceeds the requirements of 49 CFR 100-199. Use COEs as authority for shipment by military air, if applicable.

- The shipping activity must provide a copy of the COE for each shipment.
- The COE must accompany the cargo in the Defense Transportation System.
- Do not use COEs for international shipments unless the item is exempted from UN specification POP requirements (see 1.7.1).
- Forward requests for new COE's according to the DTR, Volume II. Request copies of existing COE's according to 1.2.2.

2.7. Limited and Excepted Quantities. Use good quality packaging specified in attachment 19 to ship small quantities of hazardous materials aboard military aircraft. Personnel may use UN specification POP packaging even though it's not required.

2.8. Emergency Response Information. Do not offer for transportation, accept for transportation, transfer, store, or otherwise handle hazardous materials unless emergency response information is available at all times. The shipper must provide a 24-hour emergency response telephone number that is monitored at all times by personnel who are knowledgeable of the hazards and characteristics of the materials being shipped. This information is required in the event of an emergency involving the material. Enter the phone number on the manifest (or on the Shipper's Declaration for Dangerous Goods attached to the manifest) immediately following the description of the hazardous material, in a clearly visible location. Enter the phone number only one time if the number applies to each hazardous material on the

manifest. Indicate the telephone number is for emergency response information by annotating the words "EMERGENCY CONTACT," followed by the telephone number (including the area code or international access code). DoD activities use the following telephone numbers:

- For Class 1 material, contact The Army Operations Center, (703) 697-0218/0219. Ask for the Watch Officer.
- For radioactive material, contact Rock Island Arsenal, (309) 782-3510. Ask for the Staff Duty Officer.
- For all other hazardous materials, contact The DoD Emergency Response Hotline, 1-800-851-8061.
- Shipments originating from non-DoD activities use a company, safety organization, or other contact telephone number applicable to the material shipped.

2.9. Complying With Special Cargo Requirements. Ensure Class 6.1, PG I, hazard zone A; Class 2.3, hazard zone A; Class 1, compatibility group K; Fissile Class III Radioactive Materials; infectious substances and biological research materials requiring a technical escort comply with the extensive protective measures outlined in attachment 24.

Chapter 3

TACTICAL, CONTINGENCY, OR EMERGENCY AIRLIFT

3.1. Purpose. Shippers must identify procedural exceptions for movement of hazardous materials under tactical, contingency, or emergency conditions. This chapter does not apply to helicopters being used for insertion or extraction of combat troops to, from, or within a combat area.

3.2. Applicability. This chapter imposes a considerable increase in risk to the aircraft, air crew, and customers. Real world situations may dictate use, but mission validators must evaluate the strategic and compelling reason to increase the risk.

- The MAJCOM having operational control of the deploying unit justifies the applicability of this chapter by indicating the nature of the movement in the airlift request.
- Ensure that this chapter is used for operations that support DoD agencies and allies in providing sustained, immediate, and responsive air movement, and delivery of personnel and material to, within, or from objective areas. Included are Joint Chiefs of Staff (JCS), component, and unilateral mobility exercises designed to simulate and evaluate responsiveness to tactical, contingency, or emergency situations requiring airlift.
- Apply these provisions to notional tasking of Standard Air Munitions Package/Standard Tank Rack Adapter and Pylon Package (STAMP/STRAPP) and deployable munitions packages, as directed by HQ AFMC/DRW.
- Observe all practical ground and flight rules and brief each aircraft commander (or representative designated by the commander) according to attachment 21. It is not necessary to include a summary of the hazardous cargo on the cargo manifest (military aircraft only).
- Do not transport hazardous cargo aboard tactical or strategic aeromedical evacuation aircraft. The field commander may allow the transportation of casualties on aircraft carrying hazardous cargo in extreme circumstances that may result in potential loss of life.
- Theater commanders in coordination with USTRANSCOM evaluate acceptable risk relative to the urgency of need to determine if the procedures of this chapter will continue to apply to sustained logistical resupply airlift.

3.3. Use of Commercial Airlift. Use DOT exemptions 7573 and 9232 (DOT-E 7573 and DOT-E 9232), as outlined in attachment 23, as required for commercial airlift.

3.4. Packaging Requirements. Comply with UN specification POP requirements (except when otherwise specified) and the packaging configurations specified in attachments 5 through 13. Do not remove hazardous materials from their required packaging except as authorized in this chapter.

3.4.1. Compliance with Technical Orders. Personnel must comply with all technical orders and technical publications to ensure correct storage of hazardous materials when they are removed from their packaging and stored in the racks or containers of tactical equipment or vehicles.

3.4.2. Basic Combat Load or Individual Issue. Personnel are permitted to carry their basic combat load or individual issue of hazardous materials removed from its required packaging under the following conditions:

- Personnel will engage an enemy force immediately upon deplaning at the objective or will be airdropped.
- All efforts have been made to ensure individual hazardous materials are safe from accidental initiation (i.e., grenades in fiber containers, safety pins secured, etc.).
- Ensure all small arms ammunition remain in the individual carrier (for example, bandoleers, ammunition belts, pouches), and all weapons remain clear until the aircraft has landed.
- Ensure all NBC equipment remain in the individual carrier (for example, protective mask bag, mobility bag), and accompany the individual at all times. First aid kit components must remain within individual kit carriers or pouches.
- Prepare all hazardous material other than small arms ammunition, nuclear, biological, and chemical (NBC) equipment, and first aid kits for shipment according to this manual, consolidate in one central location on the aircraft as directed by the loadmaster, and distribute to personnel before landing.
- The troop commander or team chief must brief the loadmaster concerning the individual issue of hazardous materials. A Shipper's Declaration for Dangerous Goods is not required.
- Personnel not immediately engaging the enemy force when deplaning, but will assume a tactical mission on arrival, may deploy with their basic load or individual issue of hazardous materials. However, these items, including small arms ammunition, must be collected by the troop commander before the anti-hijack briefing. On arrival at the aircraft, the troop commander must brief the loadmaster on the hazardous materials and assist the loadmaster, as directed, in the tiedown before departing. The hazardous materials will be redistributed on arrival at destination. A Shipper's Declaration for Dangerous Goods is not required.
- Explosives and other hazardous materials must not be handled by personnel during flight operations.

3.5. Passenger Eligibility. Personnel moving under the authority of this chapter are participants in the tactical, contingency, or emergency operation and not considered passengers. Passenger deviation requirements do not apply. This authority does not apply to medical evacuees or passengers. If passenger seats are released to nonparticipants, the cargo must not be prepared using a provision authorized under the authority of this chapter and the requirements of 2.2 apply.

3.6. Load Configurations.

3.6.1. **Compatibility for Chapter 3 Movements.** Review operational plans and implement procedures to minimize the exposure of personnel to hazards of the cargo when more than one aircraft is available. Separate incompatible explosives and other hazardous materials (and personnel) to the maximum extent possible, as the mission allows. Use attachment 18, paragraph A18.4 for incompatible hazardous materials transported on the same aircraft.

3.6.2. **Complete Round Rigging (CRR).** CRR (unassembled on lapes/airdrop platform) allows deploying units to airlift normally incompatible items. CRR encompasses all items necessary for mission completion (i.e., primers, propelling charges, projectiles, fuses, etc.). CRR will allow loss of one or more pallets without jeopardizing total mission accomplishment.

- Use CRR for airdrop missions only.
- Use only CRR load configurations shown in TO 13C7/FM 10-500 series for low and high velocity parachute airdrop. Remove hazardous material from required packaging only when specifically identified in the TO/FM.
- Ensure CRR by low altitude parachute extraction (LAPE) method is according to approved TO/FM rigging procedures.
- Do not use CRR for mobility exercises due to the increased risk to the air crew and aircraft.

3.6.3. **Meals Ready to Eat (MRE).** If required, load MRE's on the same 463L pallet with hazardous materials (other than Class 2.3, 6.1, or 6.2). Separate hazardous materials (except Class 1) from the MREs by the greatest distance possible, but not less than 44 inches in all directions. Do not load hazardous materials above the MRE's. Do not open, handle, or activate fuel sources shipped along with the MRE's inside the aircraft. Flameless Ration Heaters (FRH) packed as a component of the MRE, regardless of the number shipped, are not regulated by this manual. Prepare FRHs shipped separately from the MRE as regulated hazardous material according to this manual.

3.7. Fuel for Vehicles and Equipment. Transport fuel needed to operate vehicles and equipment at the deployment site in air eligible UN specification POP containers listed in paragraph A7.3. If required, stow these containers in the vehicle or equipment according to paragraph 1.11. Prevent metal-to-metal contact between containers not secured in racks by using cushioning material or fiberboard. Only use DOT 5L jerricans under the following conditions:

- Allow sufficient ullage (outage) and tightly secure DOT 5L jerrican caps to prevent leakage.
- Secure DOT 5L jerricans in permanently configured and approved holders on vehicles or equipment.
- Total combined fuel quantity for a vehicle or equipment equipped with DOT 5L jerricans can not exceed the capacity of the item's fuel tank times two (2).
- Ship DOT 5L jerricans drained but not purged according to paragraph A7.3.

3.7.1. **Fuel-in-Tank Limitations.** Transport fueled vehicles, self-propelled units, wheeled engine-powered support equipment, and all other types of support equipment according to attachment 13, paragraphs A13.5 and A13.6. Units transported under the provisions of this chapter may contain additional quantities of fuel in tank based on operational necessity. See attachment 17 for certification requirements.

3.7.2. **Bulk Fuel.** Do not transport servicing trucks, trailers, semitrailers, or storage tanks containing bulk fuel, or any bulk hazardous material by air (except as authorized in paragraph 3.7.3). Purge the bulk tank of hazardous material according to service technical manuals. Drain (but need not purge unless directed by technical directives) bulk fuel tanks used to transport nonflammable liquids or flammable liquids with a flash point exceeding 38 degrees C (100 degrees F). Provide air circulation in the cargo compartment of pressurized aircraft.

3.7.3. **Additional Fuel.** Transport flammable liquid fuel in MIL-D-23119 collapsible fabric drums, not to exceed 500 gallon rated capacity. Ship all other collapsible fabric drums completely drained. Prepare according to paragraph A7.3.

3.8. Lithium Batteries. Do not transport damaged lithium batteries or those suspected of damage. This paragraph provides exceptions for transporting lithium batteries under the provisions of this chapter only. See attachment 13, paragraph A13.8 for packaging instructions and certification reference.

3.8.1. **New Lithium Batteries.** Prepare lithium batteries according to attachment 13 or as follows:

- New lithium batteries in electronic equipment installed in a battery box or compartment require no additional packaging.
- Individuals may handcarry (pockets, rucksack, backpacks, etc.) spare lithium batteries required to sustain the immediate operation (as determined by the troop commander). Pack handcarried lithium batteries in original wrapping or in nonconductive material to prevent external short circuiting. Shipper's Declaration for Dangerous Goods certification is not required.
- For airdrop missions, pack electronic equipment handcarried in a rucksack, in a shipping (airdrop) container, or as a door bundle depending on mission requirements.
- The troop commander briefs the aircraft commander or designated representative on the location of the lithium batteries and the total quantity, including lithium batteries being handcarried by individuals.

3.8.2. **Used Lithium Batteries.** Handle used lithium batteries in electronic equipment installed in a battery box or compartment as specified in paragraph 3.8.1. Wrap batteries, not installed in equipment and airlifted from a forward area (i.e., close proximity to combat or simulated area), in nonconductive material to prevent short circuit. Properly package (i.e., individually wrap in nonconductive material) and place batteries in an outer container with one inch of inert material surrounding each battery according to attachment 13, paragraph A13.8. Do not transport used lithium batteries by military airlift if surface transportation is available.

3.9. Chemically Contaminated Cargo. Decontaminate items to the greatest extent possible in the theater in which they became contaminated. Destroy reusable wood and fiberboard containers in the theater in which they became contaminated. Decontaminate reusable shipping containers other than wood and fiberboard (drums, etc.) before reusing. Double wrap palletized cargo that is susceptible to exposure to contamination. Remove the outside wrap if exposed to contamination (the inner wrap should protect the cargo). Destroy the contaminated outside wrap in the theater in which it became contaminated. The following procedures apply to chemically contaminated cargo:

3.9.1. **Handling Instructions.** Handle carefully, wear protective equipment when necessary. Contamination could include nerve, blister, or blood chemical agents. Take precautions (protective clothing and breathing apparatus) when handling or opening contaminated containers and working on contaminated items. Open containers in a controlled, protected, and well-ventilated area.

3.9.2. **Packaging Requirements.** Package contaminated items in a hermetically sealed barrier bag, placed in an open head metal drum (1A2) with an air-tight gasket. In the absence of a hermetically sealed barrier bag, wrap and place the contaminated material in an open head metal drum with an air-tight gasket then overpack into an open head metal drum (1A2) with an air-tight gasket. The outer drum must meet PG I requirements.

3.10. Marking, Labeling, and Certification. Mark, label, and certify hazardous materials transported under

the provisions of this chapter according to attachments 14, 15, and 17.

3.11. Diverting Hazardous Materials to Nontactical Airlift. Prepare and forward redeployed hazardous materials prepared according to this chapter if off-loaded intransit as follows:

- The operating command forwards cargo on subsequent SAAM aircraft to support same movement directive (when possible).
- When a SAAM is not available, contact the Traffic Management Office/Installation Transportation Officer (TMO/ITO) who establishes mode of transportation by most expeditious means.
- Move cargo diverted to channel airlift on first available aircraft. Do not repackage unless transporting the cargo on a commercial aircraft not operating under DOT-E 7573 or DOT-E 9232. Use attachment 18 for compatibility requirements for channel airlift.

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TERMS EXPLAINED

A_1--The maximum activity of special form radioactive material permitted in a type A package.

A_2--The maximum activity of radioactive material, other than special form or low specific activity radioactive material, permitted in a type A package. These values are either listed in A11.5 or may be derived using the procedure in A11.4.

Atmospheric Pressure--Atmospheric pressure is 101.3kPa (14.7 psi).

Bag--A flexible packaging made of paper, plastic film textiles, woven material or other similar materials.

Bottle--An inner packaging having a neck of relatively smaller cross section than the body and an opening capable of holding a closure for retention of the contents.

Box--A packaging with complete rectangular or polygonal faces made of metal, wood, plywood, reconstituted wood, fiberboard, plastic, or other suitable material.

Bulk Packaging--A packaging, with no intermediate form of containment, that has a maximum capacity greater than 400 kg (882 lbs) or 450 L (119 gallons).

Class 1 (Explosives)--Any substance or article (including a device) which is designed to function by explosion (i.e., an extremely rapid release of gas and heat). Unless the substance or article is otherwise classed in table A4.1, the term "explosive" may also refer to an item that is able to produce a chemical reaction within itself and is able to function in a similar manner even if not designed to function by explosion. Explosives in Class 1 are divided into six divisions as follows:

- ***Division 1.1***--Consists of explosives that have a mass explosion hazard. A mass explosion is one which affects almost the entire load instantaneously.
- ***Division 1.2***--Consists of explosives that have a projection hazard but not a mass explosion hazard.
- ***Division 1.3***--Consists of explosives that have a fire hazard and a minor blast hazard or a minor projection hazard (or both), but not a mass explosion hazard.
- ***Division 1.4***--Consists of explosive devices that present a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.
- ***Division 1.5***--Consists of very insensitive explosives. This division is comprised of substances which have a mass explosion hazard but are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal transportation conditions.
- ***Division 1.6***--Consists of extremely insensitive articles which do not have a mass explosion hazard. This division is comprised of articles which contain only extremely insensitive detonating substances and which demonstrate a negligible probability of accidental initiation or propagation. The risk from these articles is limited to the explosion of a single article.

Class 2.1 (Flammable Gas)--Any material that is a gas (boiling point) at 20 degrees C (68 degrees F) or less and has a pressure of 101.3 kPa (14.7 psi), in addition to one of the following properties:

- Is ignitable at 101.3 kPa (14.7 psi) when in a mixture of 13 percent or less by volume with air.
- Has a flammable range of 101.3 kPa (14.7 psi) with air of at least 12 percent regardless of the lower limit.
- The limits specified above shall be determined at 101.3 kPa (14.7 psi) of pressure and a temperature of 20 degrees C (68 degrees F) according to ASTM E681-85 Standard Test Method for Concentration Limits of Flammability of Chemicals.

Class 2.2 (Nonflammable, Nonpoisonous Compressed Gas, Including Compressed Gas, Liquefied Gas, Pressurized Cryogenic Gas, and Compressed Gas in Solution)--Any material or mixture which has an absolute pressure of 280 kPa (41 psia) inside the container at 20 degrees C (68 degrees F) and does not meet the definition of a Class 2.1 or 2.3.

Class 2.3 (Gas Poisonous by Inhalation)--Any material that is a gas (boiling point) at 20 degrees C (68 degrees F) or less and has a pressure of 101.3 kPa (14.7 psi), in addition to one of the following properties:

- The material is known to be so toxic to humans as to pose a hazard to health during transportation.

- In the absence of adequate data on human toxicity, the material is presumed to be toxic to humans because when tested it has an LC50 (inhalation toxicity) value of not more than 5000 parts per million (ppm).

Class 3 (Flammable Liquid)--A flammable liquid is any liquid having a flash point equal to or below 60.5 degrees C (141 degrees F), except:

- Any liquid meeting the definition of a Class 2 material.
- Any mixture having one or more compounds with a flash point above 60.5 degrees C (141 degrees F) that makes up at least 99 percent of the total volume of the mixture. Distilled spirits of 140 proof or lower are considered to have a flash point no lower than 23 degrees C (73 degrees F).

Class 4.1 (Flammable Solids)--Flammable solids consist of solids (other than those classed as explosives) which are readily combustible under conditions encountered in transport, or may cause or contribute to fire through friction.

Class 4.2 (Spontaneously Combustible Material)--Liquids or solids which are prone to spontaneous heating under normal conditions encountered in transport or to heating in contact with air, thus being liable to ignite.

Class 4.3 (Dangerous When Wet Material)--Solids that are liable to become spontaneously flammable or emit flammable gases when they come into contact with water.

Class 5.1 (Oxidizers)--A material that may cause or enhance the combustion of other material, generally by yielding oxygen.

Class 5.2 (Organic Peroxides)--Any organic compound containing oxygen (O) in the bivalent -O-O- structure, and which may be considered a derivative of hydrogen peroxide where one or more of the hydrogen atoms have been replaced by organic radicals. Organic peroxides are thermally unstable substances which may undergo exothermic self-accelerating decomposition. These substances may be prone to explosive decomposition or rapid burning; be sensitive to impact or friction; react dangerously with other material; or cause damage to the eyes. A material which meets this definition must be classed in Class 5.2, unless it also meets the definition of a Class 1 material, or unless the available oxygen content of an organic peroxide formulation is less than the amount specified (by the percentage equation) in 49 CFR 173.128.

- Type A: An organic peroxide that can detonate or deflagrate rapidly as packaged for transport. Transportation of type A organic peroxides is forbidden.
- Type B: An organic peroxide that, as packaged for transport, neither detonates nor deflagrates rapidly, but can undergo a thermal explosion.
- Type C: An organic peroxide that, as packaged for transport, neither detonates or deflagrates rapidly and cannot undergo a thermal explosion.
- Type D: An organic peroxide which exhibits the following characteristics:
  - Detonates only partially, but does not deflagrate rapidly and is not affected by heat when confined.
  - Does not detonate, deflagrates slowly, and shows no violent effect if heated when confined.
  - Does not detonate or deflagrate, and shows a medium effect when heated under confinement.
- Type E: An organic peroxide that neither detonates or deflagrates, and shows low or no effect when heated under confinement.
- Type F: An organic peroxide that will not detonate in a cavitated state, does not deflagrate, shows low or no effect if heated when confined, and has low or no explosive power.
- Type G: An organic peroxide that will not detonate in a cavitated state, will not deflagrate, shows no effect when heated under confinement, has no explosive power, is thermally stable (self-accelerating decomposition temperature above 60 degrees C (140 degrees F)); and, for desensitized liquid formulations, is desensitized with a compatible organic liquid which boils above 150 degrees C (300 degrees F).

Class 6.1 (Poisonous Material)--A material, other than a gas, which is known to be so toxic to humans as to afford a hazard to health during transportation, or is presumed to be toxic to humans because it falls within one of the test categories identified in 49 CFR 173.132.

***Class 6.2 (Infectious Substances)*:**

- An infectious substance is a viable microorganism, or its toxin, which causes or may cause disease in humans or animals, and includes those agents listed in 42 CFR 72.3 of the Department of Health and Human Services

regulations, or any other agent that has the potential to cause severe disabling or fatal disease. The terms "infectious substance" and "etiologic agent" are synonymous.

- A diagnostic specimen is any human or animal material including, but not limited to, excreta, secreta, blood, and its components, tissue, and tissue fluids, being shipped for purposes of diagnosis. Does not include live infected animals.
- A biological product is a material prepared and manufactured according to 9 CFR, part 102 (Licenses for Biological Products), 9 CFR, part 103 (Biological Products for Experimental Treatment of Animals), 9 CFR, part 104 (Permits for Biological Products), 21 CFR, part 312 (Investigational New Drug Application), or 21 CFR, parts 600 to 800 (Biologics), and may be shipped according to this manual.

Class 7 (Radioactive Material)--Any material having a specific activity greater than 0.002 micro curies per gram (uCi/g) (see definition of "specific activity").

Class 8 (Corrosive Material)--A liquid or solid that causes visible destruction or irreversible alterations in human skin tissue on contact. In case the packaging leaks, the liquid will have a severe corrosion rate on other materials such as steel and aluminum. The main hazard from Class 8 liquids and vapors is the corrosive effect on humans and the aircraft or cargo. Some Class 8 materials have very dangerous additional hazards such as toxicity, flammability, and explosiveness.

Class 9 Material--A material that may pose an unreasonable risk to health, safety, or property during transport, but does not meet any of the definitions of the other hazard classes specified in this manual. This class includes:

- A material that has an anesthetic, noxious, or other similar property which can cause extreme annoyance or discomfort to passengers and crew in the event of leakage during transportation, so as to prevent the correct performance of the crews assigned duties.
- A material that meets the definition of a hazardous waste or a hazardous substances.

Closed Transport Vehicle--A transport vehicle equipped with a securely attached exterior enclosure that restricts the access of unauthorized persons to the cargo space containing the radioactive materials during normal transport. The enclosure may be either temporary or permanent. In the case of packaged materials, the enclosure may be of the "see-through" type and must limit access from top, sides, and ends.

Combination Packaging--A combination of packaging, for transport purposes, consisting of one or more inner packagings secured in a nonbulk outer packaging. It does not include a composite packaging.

Combustible Liquid--A combustible liquid is any liquid that does not meet the definition of any other classification specified in this manual and has a flash point above 60.5 degrees C (141 degrees F) and below 93 degrees C (200 degrees F). Any mixture having one or more components with a flash point of 93 degrees C (200 degrees F) or higher, that makes up at least 99 percent of the total volume of the mixture is not a combustible liquid.

Compatibility Group Letter--A designated alphabetical letter used to categorize different types of explosive substances and articles for stowage and segregation.

Composite Packaging--Packaging consisting of an outer packaging and inner receptacle, so constructed that the inner receptacle and the outer packaging form an integral packaging. Once assembled it remains thereafter an integrated single unit; it is filled, stored, shipped, and emptied as such.

Compressed Gas in Solution--A nonliquified compressed gas dissolved in a solvent.

Consumer Commodity--A material that is packaged and distributed in a form intended or suitable for retail sale for puposes of personal care or household use. This does not include material designed for military or industrial use that is not readily available from commercial retail sources.

Contingency--An emergency involving military forces caused by natural disasters, terrorists, subversives, or by required military operations. Due to the uncertainty of the situation, contingencies require plans, rapid response, and special procedures to ensure the safety and readiness of personnel, installations, and equipment.

Conveyance--Any aircraft for the purposes of this manual.

Crate--An outer packaging with incomplete surfaces.

Cryogenic Liquid--A refrigerated liquefied gas having a boiling point colder than -90 degrees C (-130 degrees F) at 101.3 kPa (14.7 psi) absolute. A material meeting this definition is subject to requirements of attachment 6, regardless of whether it also meets the definition of a nonflammable, nonpoisonous compressed gas. The material is partially described as "(* * *), refrigerated liquid (cryogenic liquid)" in table A4.1, (with the asterisks replaced by the name of the gas).

Cylinder--A pressure vessel designed for pressures higher than 40 psia and having a circular cross section.

Depleted Uranium--Uranium containing less uranium^{235} than the naturally occurring distribution of uranium isotopes.

Dermal Toxicity--A material with an LD50 for acute dermal toxicity of not more than 1000 mg/kg.

Design--The description of a special form material, a package, or a packaging, that enables those items to be fully identified. The description may include specifications, engineering drawings, reports meeting regulatory requirements, and other relevant documentation.

Diagnostic Specimens--See Class 6.2 (Infectious Substances).

Dilutent Type A--An organic liquid that does not damage the thermal stability or increase the hazard of the organic peroxide and with a boiling point not less than 150 degrees C (302 degrees F) at atmospheric pressure. Type A dilutents may be used for desensitizing all organic peroxides.

Dilutent Type B--An organic liquid that does not damage the thermal stability or increase the hazard of the organic peroxide and with a boiling point, at atmospheric pressure, of less than 150 degrees C (302 degrees F) but at least 60 degrees C (140 degrees F), and a flash point greater than 5 degrees C (41 degrees F). Type B dilutents are only used when specified in table A9.1. The boiling point of a type B dilutent must be at least 50 degrees C (122 degrees F) above the control temperature of the organic peroxide. A type A dilutent may be substituted for a type B dilutent in equal concentration.

Division--A subdivision of a hazard class.

Domestic Addressee--The continental United States, Alaska, Hawaii, the District of Columbia, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, the Virgin Islands, American Samoa, Guam, and other US Territories.

Drum--A flat-ended or convex-ended cylindrical packaging made of metal, fiberboard, plastic, plywood, or other suitable materials.

Emergency--An emergency operation is the movement of personnel, equipment and supplies of an organization so they can respond to a non combat (i.e. natural disaster) event requiring special and immediate action.

Enriched Uranium--Uranium containing more uranium^{235} than the naturally occurring distribution of uranium isotopes.

Exclusive Use--(Also referred to in other publications as "sole use" or "full load.") The sole use of a conveyance by a single consignor for which all initial, intermediate, and final loading and unloading are carried out according to the direction of the consignor or consignee. Specific instructions for maintaining exclusive use shipment controls must be issued in writing and included with the shipping paper information provided to the carrier by the consignor.

Filling Density--Designates the percent ratio of the weight of gas in a container to the weight of water that the container will hold at 15.5 degrees C (60 degrees F) (one pound of water equals 27.737 cubic inches at 15.5 degrees C).

Fissile Material--Any material consisting of or containing one or more fissile radionuclides. Fissile radionuclides are plutonium^{238}, plutonium^{239}, plutonium^{241}, uranium^{233}, and uranium^{235}. Neither natural nor depleted uranium are fissile

material. Fissile materials are classified according to the controls needed to provide nuclear criticality safety during transportation, as provided in A4.3.7. Certain exclusions are provided in A3.3.6.8.

Flash Point--The minimum temperature at which a liquid within a test vessel gives off vapor in sufficient concentration to form an ignitable mixture with air near the surface of the liquid. Flash points are determined by the testing prescribed in 49 CFR 173.120.

Freight Container--A reusable container having a volume of 1.81 cubic meters (64 cubic feet) or more, designed and constructed to permit lifting with its contents intact, and intended primarily for containment of packages in unit form during transportation. A small freight container has either one outer dimension less than 1.5 meters (4.9 feet) or an internal volume of not more than 3.0 cubic meters (106 cubic feet). All other freight containers are designated as "large freight containers."

Gross Weight:

- Weight of a vehicle, fully equipped and serviced for operation, including the weight of the fuel, lubricants, coolant, vehicle tools and spares, crew, personal equipment, and load.
- Weight of a container or pallet including freight (contents) and binding.

Handlers--Personnel who only handle hazardous materials or hazardous materials documentation.

Hazard Class--The category of hazard assigned to a hazardous material based on defining criteria. Hazard classes are: explosives (Class 1), compressed gases (Class 2), flammable liquids (Class 3), flammable solids (Class 4), oxidizers and organic peroxides (Class 5), poisons and infectious substances (etiologic agents) (Class 6), radioactive materials (Class 7), corrosive materials (Class 8), and miscellaneous dangerous goods (Class 9).

Hazard Zone--One of four levels of hazard (hazard zones A through D) assigned to gases and one of two levels of hazard (hazard zones A and B) assigned to liquids that are poisonous by inhalation. A hazard zone is based on the LC50 value for acute inhalation toxicity of gases and vapors.

Hazardous Cargo Inspectors--DoD personnel whose duties require them to review the integrity of the packaging and accuracy of documentation for all hazardous materials being transported within the Defense Transportation System (DTS) or by commercial carriers.

Hazardous Cargo Preparers--DoD personnel whose duties require them to sign legally binding documentation certifying that hazardous materials are properly classified, packaged, marked and labeled, and in all respects meet the legal requirements for transportation within the DTS or by commercial carriers.

Hazardous Materials--A substance or material that is capable of posing an unreasonable risk to health, safety, and property when transported and has been so designated by this manual. May also be referred to as hazardous cargo or dangerous goods. ***NOTE:*** For identification, listing and rules pertaining to hazardous WASTE, refer to Title 40 CFR, Parts 260-265, *Protection of Environment*, established by the U.S. Environmental Protection Agency (EPA).

Hazardous Substance--A material, including its mixtures and solutions, that meets ALL of the following conditions:

- Listed in table A4.3 as originated in Appendix A to 49 CFR 172.101.
- In a quantity, in one package, which equals or exceeds the reportable quantity (RQ) listed in table A4.3.
- When in a mixture or solution:
  - For radio nuclides, conforms to paragraph 6 of the appendix to 49 CFR 172.101.
  - For other than radio nuclides, is in a concentration by weight which equals or exceeds the concentration corresponding to the RQ of the material shown in figure A1.1.

RQ	RQ	Concentration by Weight	
Pounds	**Kilograms**	**Percent**	**PPM**
5,000	2270	10	100,000
1,000	454	2	20,000
100	45.4	0.2	2,000
10	4.54	0.02	200
1	0.45	0.002	20

Figure A1.1. Quantity Required To Be a Hazardous Substance Mixture or Solution.

Hazardous Waste--Any material that is subject to the hazardous waste MANIFEST requirements of the EPA specified in 40 CFR 262.

Highway Route Controlled Quantity--A quantity within a single package that is over 3,000 times the A_1 (Special Form) or A_2 (Normal Form) value of the radionuclides specified in A11.4; or over 1000 TBq (27,000 Ci), whichever is least.

Inert Solid--A solid that does not damage the thermal stability or increase the hazard of the organic peroxide.

Inhalation Toxicity:

- A dust or mist with a lethal concentration where 50 percent of the test subjects die (LC50) for acute toxicity on inhalation of not more than 10 mg/L.
- A material with a saturated vapor concentration in air at 20 degrees C (68 degrees F) of more than one-fifth of the LC50 acute toxicity on inhalation of vapors and with an LC50 for acute toxicity on inhalation of vapors of not more than 5000 mL/m3 (5000 parts per million (PPM)).
- An irritating material, with properties similar to tear gas which causes extreme irritation, especially in confined spaces.

Inner Packaging--Packaging for which an outer packaging is required for transport. It does not include the inner receptacle of a composite packaging.

Inner Receptacle--Receptacle which requires an outer packaging in order to perform its containment function. The inner receptacle may be an inner packaging of a combination packaging or the inner receptacle of a composite packaging.

Jerrican--A metal or plastic packaging of rectangular or polygonal cross-section.

Kit--A set of materials or articles used for a specific purpose, shipped as a single item and assigned a single National Stock Number or Part Number by the Service/Agency Item Manager. A kit may include one or more different hazardous materials. Hazardous components may or may not be compatible but may be transported together as a kit.

Limited Quantity of Radioactive Materials--A quantity of radioactive material which is not over the limits specified in A11.15 and conforms to the requirements specified in A11.11.

Liquefied Compressed Gas--A gas, which under charged pressure, is partially liquid at a temperature of 20 degrees C (68 degrees F).

Low Specific Activity (LSA) Material:

- Uranium or thorium ores and physical or chemical concentrates of those ores.
- Unirradiated natural or depleted uranium or unirradiated natural thorium.
- Tritium oxide in aqueous solutions provided the concentration is not over 5.0 millicuries (mCi) per milliliter (mL).
- Material in which the radioactivity is essentially uniformly distributed and where the estimated average concentration of contents is:
    - Not over 0.0001 millicurie per gram (mCi/g) of radionuclides for which the A_2 quantity is not more than 0.05 Ci.
    - Not over 0.005 mCi/g of radionuclides for which the A_2 quantity is more than 0.05 Ci but not more than 1 Ci.

- Not over 0.3 mCi/g of radionuclides for which the A_2 quantity is more than 1 Ci.
- Objects of nonradioactive material externally contaminated with radioactive material, provided that the radioactive material is not readily dispersible. The surface contamination, when averaged over an area of 1 square meter, must not exceed 0.0001 mCi (220,000 disintegrations per minute) per square centimeter of radionuclides for which the A_2 quantity is not more than 0.05 Ci or 0.001 mCi (2,200,000 disintegrations per minute) per cm^2 for other radionuclides. These items must be suitably wrapped or enclosed.

Magnetic Material--Any packaged material that has a magnetic field strength of 0.002 gauss or more measured at 2.1 m (7 ft) from any surface of the package.

Natural Thorium--Thorium with the naturally occurring distribution of thorium isotopes (essentially 100 weight percent $thorium^{232}$).

Natural Uranium--Uranium with the naturally occurring distribution of uranium isotopes (approximately 0.711 weight percent $uranium^{232}$, and the remainder essentially $uranium^{238}$).

Non-Bulk Packaging--A packaging that has a maximum net mass less than 400 kg (882 lbs) and a maximum capacity less than 450 L (119 gallons).

Nonfixed Radioactive Contamination--Radioactive contamination that can be readily removed from a surface by wiping with an absorbent material. Nonfixed (removable) radioactive contamination is not significant if it is not over the limits specified in A3.2.6.16.1.

Nonliquefied Compressed Gas--A gas, other than gas in solution, which under charged pressure is entirely gaseous at a temperature of 20 degrees C (68 degrees F).

Normal Form Radioactive Material--Radioactive material that has not been demonstrated to qualify as "special form radioactive material."

Oral Toxicity--Liquid with a lethal dose where 50 percent of the test subjects die (LD50) for acute oral toxicity of not more than 500 mg/kg or a solid with an LD50 for acute oral toxicity of not more than 200 mg/kg.

ORM-D--For the purposes of this manual, ORM-D material, are only those materials with flammable properties (liquids, solids, and gases) that present a limited hazard during transportation due to their form, quantity, and packaging. Each ORM-D material is listed in table A4.1. ORM-D classification is only authorized for domestic shipments. International shipments must not be transported under the classification "ORM-D."

Outage or Ullage--The amount of packaging falls short of being liquid full, usually expressed in percent by volume.

Outer Packaging--The outermost enclosure of a composite or combination packaging together with any absorbent materials, cushioning, and any other components necessary to contain and protect the inner receptacles or inner packagings.

Overpack--1) A container used to hold one or more air eligible packages to form a single unit for convenience of handling or storage during transportation. 2) Placement of containers that do not meet air eligibility pressure requirements into an outer POP approved packaging.

Package--For radioactive materials, the packaging together with its radioactive contents as presented for transport.

Package or Outside Package--A package plus its contents.

Packaging--A receptacle and any other components or materials necessary for the receptacle to perform its containment function in conformance with the minimum packing requirements of this manual. For radioactive materials, the assembly of components necessary to ensure compliance with the packaging requirements of this manual. It may consist of one or more receptacles, absorbent materials, spacing structures, thermal insulation, radiation shielding, and devices for cooling or

absorbing mechanical shocks. The conveyance, tie down system, and auxiliary equipment may sometimes be designated as part of the packaging.

Packers--Personnel who package hazardous materials, but do not sign legally binding documents.

Packing Group--The degree of danger presented by the hazardous material.

- Packing Group I indicates great danger.
- Packing Group II indicates medium danger.
- Packing Group III indicates minor danger.

Polymerizable Material--Any material that may polymerize (combine or react with itself) with an evolution of a dangerous quantity of heat or gas.

Pounds Per Square Inch (PSI)--The amount of force exerted on one square inch of the container or cylinder wall.

Pounds Per Square Inch Absolute (PSIA)--The absolute value of the force exerted on the container or cylinder wall. Absolute pressure is atmospheric pressure plus gauge pressure.

Pounds Per Square Inch Gauge (PSIG)--The gauge pressure is the pressure taken by a pressure gauge that represents the force exerted within the container or cylinder. Gauge pressure is always that pressure above atmospheric pressure.

Primary Hazard--The hazard class of the material as assigned by table A4.1.

Pyrophoric Material--This material is a liquid or solid that, even in small quantities and without an external ignition source, can ignite within five minutes of coming in contact with air. This material is the most likely to spontaneously combust.

Radiation Level--The radiation dose-equivalent rate expressed in millisievert per hour or mSv/h (millirem per hour or mrem/h. Neutron flux densities may be converted into radiation levels according to 49 CFR 173.403 (v).

Radioactive Article--Any manufactured instrument or article such as clock, electronic tube or apparatus, or a similar instrument or article having radioactive material as a component part.

Radioactive Contents--The radioactive material, together with any contaminated liquids or gases, within the package.

Radioactive Material--Any material having a specific activity greater than 70 Bq per gram (0.002 microcuries per gram) (uCi/g)(see definition of "specific activity").

Receptacle--A containment vessel for receiving and holding materials, including any means of closing.

Refrigerant Gas (Dispersant Gas)--This term applies to all flammable, nonflammable, nonpoisonous refrigerant gases, dispersant gases (fluorocarbons), or mixtures listed in table A4.1; or any other compressed gas meeting one of the following conditions:

- A nonflammable mixture containing not less than 50 percent fluorocarbon content, having a vapor pressure not over 1792 kPa (260 psig) at 54 degrees C (130 degrees F).
- A flammable mixture containing not less than 50 percent fluorocarbon content, not over 40 percent by weight of a flammable component, having a vapor pressure not over 1792 kPa (260 psig) at 54 degrees C (130 degrees F).

Reportable Quantity--The quantity of material, as set forth in 40 CFR 302.4, the release of which requires notification pursuant to 40 CFR Part 302.

Residue--The hazardous material remaining in a packaging after its contents have been removed to the maximum extent possible and before the packaging has been purged to remove any hazardous vapors.

Secondary Hazard--A distinct and separate hazardous item that is a component part of a larger item that is considered the primary hazard.

Self-Heating Material--This material, when in contact with air and without an energy supply, is liable to self-heat.

Self-Reactive Material--At normal or elevated temperatures, this material is liable to undergo a strong exothermic reaction. Exothermic reaction can be caused by excessively high transport temperatures or by contamination.

Service Pressure--This term refers to the authorized pressure marking on the container. For example, for a cylinder marked "DOT 3A1800" the service pressure is 12410 kPa (1800 psi).

Shipping Activity--Unit, organization, or activity that originally offers a hazardous material into the Defense Transportation System.

Shipping Paper--The Air Cargo Manifest which includes minimum hazardous material information as required by DoD 4500.32R. In the absense of an Air Cargo Manifest, the Shipper's Declaration for Dangerous Goods form may serve as a shipping paper.

Single Packaging--Nonbulk packaging other than a combination or composite packaging.

Special Form Radioactive Material--Radioactive material that satisfies the following conditions:

- It must be either a single solid piece or be contained in a sealed capsule that can be opened only by destroying the capsule.
- The piece or capsule must have at least one dimension not less than 5 mm (0.197 inch).
- It must satisfy the test requirements of 49 CFR 173.469. Special form encapsulations designed according to the requirements of the DOT in effect on 30 June 1983 and constructed before 1 July 1985 may still be used. Special form encapsulations, either designed or constructed after 30 June 1985, must meet the requirements of 49 CFR 178.350.

Specific Activity of a Radionuclide--The activity of the radionuclide per unit mass of that nuclide. The specific activity of a material in which the radionuclide is essentially uniformly distributed is the activity per unit mass of the material.

Subsidiary Risk--An additional hazardous property of a material other than the primary hazard as identified in table A4.1.

Tactical--A tactical operation is the movement of personnel, equipment and supplies of an organization so they can accomplish their immediate military combat objective.

Technical Name--A recognized chemical name or micro biological name currently used in scientific and technical handbooks, journals, and texts. Generic descriptions are authorized provided they readily identify the general chemical or micro biological group.

Transport Index--The dimensionless number (rounded up to the first decimal place) placed on the label of a package to designate the degree of control to be exercised by the carrier during transportation. The transport index is determined by:

- The number expressing the maximum radiation level in mrem/h at one meter (3.3 feet) from the external surface of the package.
- For fissile class II packages or packages in a fissile class III shipment, the number expressing the maximum radiation level at one meter (3.3 feet) from the external surface of the package, or the number obtained by dividing 50 by the allowable number of packages that may be transported together, whichever is larger.

Type A Package--A type A packaging (see definition for type A packaging) together with its limited radioactive contents. A type A package does not require competent authority approval since its contents are limited to A_1 or A_2.

Type A Packaging--A packaging designed to retain the integrity of containment and shielding required by this manual under normal conditions of transport, as demonstrated by the tests set forth in 49 CFR 173.465 or 173.466.

Type B (M) Package--A type B packaging (see definition for type B packaging), together with its radioactive contents, that for international shipments requires multilateral approval of the package design and may require approval of the conditions of shipment. Type B(M) packages are those type B package designs that have a maximum normal operating pressure of more

than 7 kg/cm^2 (100 pounds/in^2 gauge) or a relief device that allows the release of radioactive material to the environment under the hypothetical accident conditions specified in 10 CFR, part 71.

Type B (U) Package--A type B packaging (see definition for type B packaging), together with its radioactive contents, that for international shipments requires unilateral approval only of the package design and of any stowage provisions that may be necessary for heat dissipation.

Type B Package--A type B packaging (see definition for type B packaging) together with its radioactive contents.

Type B Packaging--Is a packaging designed to retain the integrity of containment and shielding required when subjected to the normal conditions of transport and hypothetical accident test conditions set forth in 10 CFR, part 71.

Uncompressed Gas--For the purposes of this manual, gas at a pressure not exceeding the ambient atmospheric pressure at the time and location the containment system is closed. All other radioactive gases are considered to be compressed.

Unirradiated Thorium--Thorium containing not more than 10^{-7} grams uranium^{233} per gram of thorium^{232}.

Unirradiated Uranium--Uranium containing not more than 10^{-6} grams plutonium per gram of uranium^{235} and a fission product activity of not more than 0.25 mCi of fission products per gram of uranium^{235}.

Wetted Explosive--This material, when dry, is a Class 1 material other than those of compatibility group A. Items in compatibility group A have been wetted with sufficient water, alcohol, or plasticizer to suppress explosive properties. Wetted explosives also includes items specifically authorized by name in table A4.1 or which have been assigned a PSN and hazard class by the DOT.

ABBREVIATIONS AND ACRONYMS

AFMC	Air Force Materiel Command
AFSC	Air Force Specialty Code
ALC	Air Logistics Center
ALCE	Airlift Control Element
AMC	Air Mobility Command
ASCC	Air Standardization Coordinating Committee
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATOC	Air Terminal Operations Center
CAA	Competent Authority Approval
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COE	Certification of Equivalency
CONUS	Continental United States
CRAF	Civil Reserve Air Fleet
CRR	Complete Round Rigging
DACG	Departure Airfield Control Group
DLA	Defense Logistics Agency
DMET	Defense Management Education and Training
DoD	Department of Defense
DOT	Department of Transportation
DSN	Defense Switched Network
DTS	Defense Transportation System
EOD	Explosive Ordinance Disposal
EPA	Environmental Protection Agency
ERG	Emergency Response Guidebook
FAR	Federal Acquisition Regulation
FPM	Federal Personnel Manual
FRH	Flameless Ration Heater
IAEA	International Atomic Energy Agency
IATA	International Air Transportation Association
IBD	Inhabited Building Distance
ICAO	International Civil Aviation Organization
ID	Identification
IHC	Interim Hazard Classification
IMDG	International Maritime Dangerous Goods
IRFNA	Inhibited Red Fuming Nitric Acid
ISO	International Standards Organization
ITO	Installation Transportation Officer
JCS	Joint Chiefs of Staff
kPa	Kilopascal
LAPE	Low Altitude Parachute Extraction
LSA	Low Specific Activity
MAJCOM	Major Command
MILVAN	Military Van
MOS	Military Occupational Specialty
MRE	Meals Ready to Eat
MRSP	Mobility Readiness Spares Package
MTMC	Military Traffic Management Command
NA	North American
NBC	Nuclear, Biological, and Chemical
NEW	Net Explosive Weight
N.O.S.	Not Otherwise Specified

OPR	Office of Primary Responsibility
PCB	Polycholorinated Biphenyls
PG	Packing Group
POD	Port of Debarkation
POE	Port of Embarkation
POP	Performance Oriented Packaging
ppm	Parts Per Million
PSI	Pounds Per Square Inch
PSIA	Pounds Per Square Inch Absolute
PSIG	Pounds Per Square Inch Gauge
PSN	Proper Shipping Name
RQ	Reportable Quantity
SAAM	Special Assignment Airlift Mission
SCF	Standard Cubic Feet
SCFH	Standard Cubic Feet per Hour
SE	Support Equipment
SMPT	School of Military Packaging Technology
SPI	Special Packaging Instruction
STAMP	Standard Air Munitions Package
STRAPP	Standard Tank Rack Adapter and Pylon Package
TALCE	Tanker Airlift Control Element
TCN	Transportation Control Number
TCU	Transportation Control Unit
TMO	Traffic Management Office
UCT	Underwater Construction Team
UN	United Nations
USG	United States Government
USTRANSCOM	United States Transportation Command
WRSK	War Readiness Spares Kit

GENERAL AND HAZARD CLASS SPECIFIC PACKAGING REQUIREMENTS

A3.1. General Packaging Requirements. The general requirements of attachment 3 are in addition to the specific packaging requirements outlined in attachments 5 through 13. Hazardous material packaging must be authorized by this manual, 49 CFR Part 173, the ICAO *Technical Instructions*, or the IATA *Dangerous Goods Regulation* and meet the requirements outlined in this attachment.

A3.1.1. **Transportability.** Securely close and construct containers to prevent leakage due to changes in temperature, humidity, and altitude during transportation and in-transit handling.

A3.1.1.1. Primary and secondary items and their containers (unit or exterior) must provide protection without deformation, leakage, or rupture against:

- Temperature changes (-40 to 65.5 degrees C [-40 to +150 degrees F]).
- Pressure changes due to altitude changes (sea level to 3.7 km (12,000 feet)).
- Pressure changes due to explosive decompression from 3.7 to 15.24 km (12,000 to 50,000 feet).

A3.1.1.2. Do not entirely fill containers designed to hold liquids. Leave sufficient interior space (outage) to prevent leakage of contents or distortion of containers due to change of temperature during transportation, storage, and handling. For flammable liquids and other volatile liquids with a high coefficient of expansion, a minimum outage of 2 percent at 54 degrees C (130 degrees F), is required. Do not fill a UN specification POP packaging to a gross mass greater than the authorized gross mass marked on the packaging.

A3.1.1.3. Provide adequate protection for material susceptible to damage by freezing during both ground and air operations.

A3.1.2. **Compatibility.** All containers must be designed and constructed of materials that do not react with, or are not decomposed by, the material contained therein. Plastic containers or liners must prevent permeation of contents. Plastic packaging or receptacles used for liquid hazardous materials must be capable of withstanding, without failure, the test specified in 49 CFR 173, appendix B, *Procedure for Testing Chemical Compatibility and Rate of Permeation in Plastic Packagings and Receptacles.*

A3.1.3. **Ullage (Outage).** When filling packagings with liquid hazardous material, leave sufficient space to ensure that neither leakage nor permanent distortion of the packaging will occur as a result of an expansion of the liquid caused by temperature or pressure changes.

A3.1.4. **Closures.** Stoppers, corks, or other such friction-type closures must be held in place securely, tightly, and effectively. Secure screw-type closures on any inside plastic container to prevent the closures from loosening due to vibrations or substantial changes in temperature. The closure may be secured with pressure-sensitive tape, self-shrinking plastic, wire, a device designed to prevent the cap from loosening, or other positive means (that is, secondary seal).

A3.1.5. **Inner Packaging.** Pack, secure, and cushion inner packagings of combination packagings to prevent breakage or leakage and to control movement within the outer container. Cushioning material must not react dangerously with the contents of the inner packagings. Inner packagings are required as specified by the applicable packaging paragraph. If inner packagings are not required, the packaging paragraph will state that inner packagings are not necessary. See attachment 20 for absorbent cushioning requirements.

A3.1.6. **Metal Containers.** Unless otherwise specified, the maximum capacity of metal drums is 208 L (55 gallons). Do not accept for shipment metal containers having corrosion or dents at the chime or seam, soldered, or welded area.

A3.1.7. **Indicators.** Valves and indicators (with protective caps when required), which are necessary to ensure safe transportation, must be installed in the shipping container. Examples are relief valves (vacuum or pressure), humidity indicators, or leak indicators with adequate sensitivity to alert monitor or crew of imminent danger.

A3.1.8. **Polymerizable Material.** Transportation of any liquid, solid, or gaseous material that may polymerize (combine or react with itself) or decompose so as to cause dangerous evolution of heat or gas under normal transportation conditions is prohibited. Such materials may be offered for transportation when properly stabilized or inhibited.

A3.1.9. **Solids in a Liquid Single Packaging.** A single or composite packaging which is tested and marked for liquid hazardous materials may be filled with a solid hazardous material to a gross mass, in kilograms, not exceeding the rated capacity of the packaging in liters, multiplied by the specific gravity marked on the packaging, or 1.2 if not marked. In addition:

- A single or composite packaging which is tested and marked for PG I liquid hazardous materials may be filled with:
  - A PG II solid hazardous material to a gross mass, in kilograms, not exceeding the rated capacity of the packaging in liters, multiplied by 1.5, multiplied by the specific gravity marked on the packaging, or 1.2 if not marked; or

  - A PG III solid hazardous material to a gross mass, in kilograms, not exceeding the rated capacity of the packaging in liters, multiplied by 2.25, multiplied by the specific gravity marked on the packaging, or 1.2 if not marked.
- A single or composite packaging which is tested and marked for PG II liquid hazardous materials may be filled with a PG III solid hazardous material to a gross mass, in kilograms, not exceeding the rated capacity of the packaging in liters, multiplied by 1.5, multiplied by the specific gravity marked on the packaging, or 1.2 if not marked.

A3.2. **Air-Eligible Packaging Requirements.**

A3.2.1. **Combination Packaging Pressure Standard.** Inner receptacles (including closures) used to retain a hazardous liquid or semi-solid in a combination packaging must be capable of withstanding (without leaking) an internal air gauge pressure of not less than 95 kilopascal (kPa) (14 psi); or 75 kPa (11 psi) for PG III liquids in Class 3 or Class 6.1 and Consumer Commodities; or a pressure related to the vapor pressure of the liquid contained in the receptacle, whichever is greater. This standard may be determined through actual test data or the shipper's evaluation and transportation experience. Repack or overpack liquid hazardous materials in containers that do not meet the internal hydraulic pressure standard, into United Nations (UN) specification POP certified containers that meet this requirement. Determine the pressure related to the vapor pressure of the liquid by one of the following methods:

- The total gauge pressure measured in the receptacle (that is, the vapor pressure of the liquid and the partial pressure of the air, or other inert gases, less 100 kPa (15 psi) at 55 degrees C (131 degrees F), multiplied by a safety factor of 1.5. The total gauge pressure is determined on the basis of a filling temperature of 15 degrees C (59 degrees F) and a degree of filling such that the receptacle is not liquid full at a temperature of 55 degrees C (131 degrees F).
- times the vapor pressure at 50 degrees C (122 degrees F) less 100 kPa (15 psi).
- times the vapor pressure at 55 degrees C (131 degrees F) less 100 kPa (15 psi).

A3.2.2. **Single Packaging Pressure Requirement.** Single packagings containing liquid hazardous material must meet the hydraulic pressure test requirements of 49 CFR 178.605. A test pressure of not less than 250 kPa (36 psi) for liquids of PG I; 80 kPa (12 psi) for PG III liquids in Class 3 or Class 6.1; and 100 kPa (15 psi) for all other liquids is required. If shipping liquid hazardous materials in containers that do not meet the internal hydraulic pressure requirement, repack or overpack into UN specification POP certified containers that do meet the requirement.

A3.2.3. **Overpacking Containers.** Pack containers holding liquids that do not meet the pressure requirement for air transport, into an outer container that does meet the requirement. Separate interior containers by absorbent cushioning material as required by attachment 20. Do not overpack pressurized containers in sealed metal drums. See Figure A17.1 for certification instructions.

A3.3. General Requirements Applicable to Hazard Class. In addition to A3.1 and A3.2, the following general requirements apply to each hazard class:

A3.3.1. **Class 1.**

A3.3.1.1. **Forbidden Explosives.** Do not offer explosives listed below for air shipment:

- An explosive that has not been approved according to A3.3.1.2.
- Bulk fulminates or other detonating compounds in dry condition.
- Explosive compounds that ignite spontaneously or undergo marked decomposition when subjected to a temperature of 75 degrees C (167 degrees F) for 48 hours.
- An explosive mixture or device containing a chlorate and also containing:
  - An ammonium salt including a substituted ammonium or quaternary ammonium salt.
  - An acidic substance including a salt of a weak base and a strong acid.
- Leaking, dropped, or otherwise damaged explosives and ammunition.
  - Air terminal personnel must not repack leaking or otherwise damaged shipments of explosives and ammunition unless an ammunition inspector is present.
  - Onward shipment of suspected or damaged explosives may be made provided the shipment is inspected, repacked, and certified to be in proper condition for safe transport. Qualified personnel must sign the certification.
- Propellants that are unstable, condemned, or deteriorated.
- Nitroglycerin, diethylene glycol dinitrate, or any other liquid explosives not specifically authorized by attachment 5.
- A loaded firearm except as authorized by chapter 3.
- Fireworks that combine an explosive and a detonator.
- Fireworks containing yellow or white phosphorus.

- A toy torpedo whose outside dimension exceeds 23 mm (0.906 in), or a toy torpedo containing a mixture of potassium chlorate, black antimony (antimony sulphide), and sulphur if the weight of the explosive material in the device exceeds 0.26 g (0.01 oz).
- Explosives specifically forbidden in table A4.1.

A3.3.1.2. **Explosive Classification Approval.** Explosives, explosive devices, and munitions, including commercial and foreign, to be eligible for military air transportation must be tested, approved, and assigned a DoD classification according to TB 700-2, NAVORDINST 8020.3, TO 11A-1-47, DLAR 8220.1, *DoD Explosive Hazard Classification Procedures*. Explosives assigned an Interim Hazard Classification (IHC) must have a copy of the approved IHC accompany the shipment. Ship commercial or foreign explosives that do not have a DoD classification only under the following conditions:

- The explosive is designated in writing by DOT as "not regulated".
- The explosive is classified as 1.4S by a DOT or foreign issued CAA. A copy of the CAA must accompany the shipment.

A3.3.1.3. **Explosive Safety.** Comply with AFI 91-201 (Air Force), TM 9-1300-206 (Army), and NAVSEA OP 5 (Navy) for safety precautions, standards, and rules when operating in an environment with explosives.

A3.3.2. **Class 2.**

A3.3.2.1. **Cylinder Requirements.** Comply with Title 49 CFR and this manual for shipping compressed gas cylinders, including safety relief devices. Requirements covering cylinders also apply to spherical pressure vessels. Reference DLAR 4145.25/AR 700-68/ NAVSUPINST 4440.128B/MCO 10330.2B/AFR 67-12 for additional data on compressed gas cylinders.

- Cylinders or spherical pressure vessels must not contain gases or materials capable of combining chemically so as to endanger its serviceability. Make sure all cylinders, including closing devices and cushioning materials, are in good condition so that their contents are well protected during transit.
- Close each cylinder containing poisonous materials with a plug or valve meeting the following requirements:
  - Each plug or valve must have a taper-threaded connection directly to the cylinder and be capable of withstanding the test pressure of the cylinder.
  - Each valve must be of the packless type with nonperforated diaphragm, except that for corrosive materials, the valve may be of the packed type, provided the assembly is made gas-tight by means of a seal cap with gasketed joint attached to the valve body of the cylinder to prevent loss of material through or past the packing.
  - Each valve outlet must be sealed by a threaded cap or threaded solid plug.
  - Cylinders, valves, plugs, outlet caps, luting, and gaskets must be compatible with each other and with the material.

A3.3.2.2. **Valve Protection.** Protect all valves of containers charged with compressed gas by one of the following methods:

- By a securely attached metal cap of sufficient strength to protect the valve from injury during transit.
- By boxing or crating the cylinder or sphere to give proper protection to the valve.
- By recessed valve or otherwise protected valve so that it cannot be subjected to a blow when the container is dropped on a flat surface.
- By valves strong enough to avoid injury during transit for cylinders or spheres containing nonliquefied gas under pressure not over 2068.5 kPa (300 psig) at 21 degrees C (70 degrees F).

A3.3.2.3. **Cylinders Containing Poisonous Material.** Overpack cylinders containing a poisonous material, which have a wall thickness at any point of less than 2.03 mm (0.080 inch) and do not have fitted value protection, in a 4C1, 4D, 4F, 4G, 4H1, or 4H2 box. The box must meet the requirements of A3.1. Ensure box and valve protection is of sufficient strength to protect all parts of the cylinder and valve (if it has a valve) from deformation and breakage resulting from a drop of 2.0 m (7 ft) or more onto a concrete floor, impacting at an orientation most likely to cause damage. If the cylinder is not overpacked, equip the cylinder with a protective cap or other means of valve protection sufficient to protect the valve from deformation and breakage resulting from a drop of 2.0 m (7 ft) or more onto a concrete floor, impacting at an orientation most likely to cause damage.

A3.3.2.4. **Cylinders Requiring an Outside Container.** Ship DOT 2P, 2Q, 3E, 3HT, 4BA spherical type, 4D, 4DA, 4DS, 9, 39, 40, and 41 cylinders in strong outside containers. Ensure the package is capable of protecting the cylinder and all its parts from deformation or breakage resulting from a 1.2 m (4 foot) drop on a solid concrete floor. Do not pack cylinders, spheres, or containers under pressure in metal drums or airtight outside packages. DOT 4BA spherical cylinders may be securely mounted on pallets to provide protection for the spheres and any attachments.

A3.3.2.5. **Pressure and Filling Requirements.**

- Ensure the pressure in the container at 21 degrees C (70 degrees F) is not more than the service pressure for which the container is marked or designated, except as provided below.

- When cylinders with a marked pressure limit are prescribed, other cylinders made under the same specification, but with a higher marked service pressure limit are authorized. For example, a cylinder marked DOT 4B500 may be used where DOT 4B300 is specified.
- The pressure in the cylinder or sphere at 54 degrees C (130 degrees F) must not exceed 1 1/4 times the service pressure except cylinders of acetylene, liquefied nitrous oxide, and liquefied carbon dioxide which must not exceed the allowable charging pressure of the cylinder.
- The pressure of a cylinder containing a poisonous material must not exceed the service pressure of the cylinder at 55 degrees C (131 degrees F). Provide sufficient outage to ensure the cylinder is not liquid full at 55 degrees C (131 degrees F).
- Use the service pressure identified for a current specification for containers made before the effective date of specifications.
- Except for carbon dioxide, nitrous oxide, and vinyl fluoride, inhibited, the liquid portion of the gas (if any) must not completely fill the cylinder at 54 degrees C (130 degrees F). The liquid portion of vinyl fluoride, inhibited, may completely fill the cylinder provided the pressure is not over 1 1/4 times the service pressure (see definition for filling density).
- Use the service pressure identified in figure A3.1 for authorized cylinders not marked with a service pressure.
- DOT 3A, 3AX, 3AA, 3AAX, and 3T cylinders may be charged with compressed gases other than liquefied, dissolved, poisonous, or flammable gases to a pressure of 10 percent over their marked service pressure, provided the following conditions are met:
  - Equip each cylinder with frangible disc safety devices (without fusible metal backing) having a bursting pressure not over the minimum prescribed test pressure.
  - Determine the elastic expansion at the time of the last test or retest by the water-jacket method.
  - Do not exceed either the average wall stress or the maximum wall stress limitations in figure A3.2.
- Use figure A3.3 for filling density requirements of Liquified Petroleum Gases. Any filling density prescribed in figure A3.3 may be increased by 2 percent for liquefied petroleum gas in DOT 26 or DOT 3 cylinders (or in DOT 3A cylinders marked for 1,800 pounds or higher service pressure, subject to the bullet above).
- Use figure A3.4 for filling density requirements when shipping cryogenic liquids of argon, helium, neon, nitrogen, and oxygen. Ship hydrogen (minimum 95 percent parahydrogen) according to figure A3.5.

Specification Marking	Service Pressure Kilopascal (Pounds Per Square Inch)
DOT-3	12411.0 (1800)
DOT-3E	12411.0 (1800)
DOT-4	2068.5 (300)
DOT-8	1723.8 (250)
DOT-9	1379.0 (200)
DOT-25	2068.5 (300)
DOT-33	3309.6 (480)
DOT-38	1723.8 (250)
DOT-40	1379.0 (200)
DOT-41	1654.8 (240)

Figure A3.1. Cylinder Specification and Service Pressures.

Type of Steel	Wall Stress Average	Limitation Maximum
Plain carbon steels over 0.35 carbon and medium manganese steels.	53,000	58,000
Steels of analysis and heat treatment specified in DOT Specification 3AA.	67,000	73,000
Plain carbon steels less than 0.35 carbon made before 1920.	45,000	48,000

Figure A3.2. Wall-Stress Limitations.

Minimum Specific Gravity of the Liquid Material at 60 degrees F (15.5 degrees C)	Maximum Filling Density in Percent of the Water Capacity of the Container	Minimum Specific Gravity of the Liquid Material at 60 degrees F (15.5 degrees C)	Maximum Filling Density in Percent of the Water Capacity of the Container
0.271-0.289	26	0.504-0.510	42
0.290-0.306	27	0.511-0.519	43
0.307-0.322	28	0.520-0.527	44
0.323-0.338	29	0.528-0.536	45
0.339-0.354	30	0.537-0.544	46
0.355-0.371	31	0.545-0.552	47
0.372-0.398	32	0.553-0.560	48
0.399-0.425	33	0.561-0.568	49
0.426-0.440	34	0.569-0.576	50
0.441-0.452	35	0.577-0.584	51
0.453-0.462	36	0.585-0.592	52
0.463-0.472	37	0.593-0.600	53
0.473-0.480	38	0.601-0.608	54
0.481-0.488	39	0.609-0.617	55
0.489-0.495	40	0.618-0.626	56
0.496-0.503	41	0.627-0.634	57

Figure A3.3. Prescribed Filling Density for Liquefied Petroleum Gas.

Pressure control valve setting (maximum start-to-discharge pressure, kPa (psig.)	Maximum permitted filling density (percent by weight)					
	Air	Argon	Nitrogen	Oxygen	Helium	Neon
310.3 (45)	82.5	133	76	108	12.5	109
517 (75)	80.3	130	74	105	12.5	104
724 (105)	78.4	127	72	103	12.5	100
1172 (170)	76.2	122	70	100	12.5	92
1585.8 (230)	75.1	119	69	98	12.5	85
2034 (295)	73.3	115	68	96	12.5	77
2482 (360)	70.7	113	65	93	12.5	
3103 (450)	65.9	111	61	91	12.5	
3723 (540)	62.9	107	58	88	12.5	
4309 (625)	60.1	104	55	86	12.5	
Design Service Temperature (degrees F)	-320	-320	-320	-320	-452	-411
(degrees C)	-196	-196	-196	-196	-269	-246

Figure A3.4. Filling Density for Cryogenic Liquids Except Hydrogen.

Column 1	Column 2
Design service temperature	Minus 253 degrees C (-423 degrees F) or colder
Maximum permitted filling density, based on cylinder capacity at -253 degrees C (-423 degrees F)(see note)	6.7 percent

The pressure control valve must be designed and set to limit the pressure in the cylinder to not more than	117 kPa (17 psig)

Figure A3.5. Filling Density for Cryogenic Liquids of Hydrogen.

NOTE: The filling density for hydrogen, cryogenic liquid, is defined as the percent ratio of the weight of lading in a package to the weight of water that the packaging will hold at -253 degrees C (-423 degrees F). The volume of the packaging at -253 degrees C (-423 degrees F) is determined in cubic inches. The volume is converted to pounds of water (1 pound of water = 27.737 cubic inches). Each cylinder must be constructed, insulated, and maintained so that the total rate of venting must not be over 30 standard cubic feet (SCF) of hydrogen per hour during transportation.

A3.3.2.6. **Mandatory Color-Code Identification.** Exact color-code identification of any material contained in a compressed gas cylinder is mandatory and must meet MIL-STD-101.
A3.3.2.7. **Foreign Containers.** Foreign containers must meet the requirements of this manual and 49 CFR 173.301(i).
A3.3.3. **Class 3.**
A3.3.3.1. **Inner Container Quantity Requirements.** For inner containers of a combination package, the maximum quantity per inner container must not exceed 19 L (5 gallons). Suitably separate all inner containers. For PG I material, the maximum quantity per outer container must not exceed 38 L (10 gallons). For PG II material, the quantity per outer container must not exceed 76 L (20 gallons). For PG III material, the quantity per outer container must not exceed 208 L (55 gallons). These quantity requirements do not apply if the inner container meets the pressure test requirement of A3.2.2.
A3.3.3.2. **Combustible Liquids.** The requirements in this manual do not apply to materials classed as combustible liquid. See attachment 14 for marking requirements.
A3.3.3.3. **Pads and Swabs.** Pads and swabs soaked with a flammable liquid and sealed in a bag are not subject to the requirements of this manual.
A3.3.3.4. **Alcoholic Beverages.** Alcoholic beverages in packagings of five liters or less are not subject to the requirements of this manual.
A3.3.4. **Class 4.**
A3.3.4.1. Unless otherwise specified by a packaging paragraph, package a material identified as PG III in table A4.1 in a container that meets the PG I or II performance level.
A3.3.4.2. Flameless Ration Heaters packaged as a component of meals-ready-to-eat are not subject to the requirements of this manual.
A3.3.4.3. Lump charcoal briquettes, packaged in a form suitable for consumer use, generally will not meet the classifying criteria of a Class 4.2 spontaneously combustible material. If the charcoal briquettes do not meet the definition of a Class 4.2 material, it is not subject to any other requirements of this manual. Ensure the specific type and form of charcoal being shipped does not meet the definition of a Class 4.2 material and passed the self-heating test for carbon (which indicates that it is not spontaneously combustible).
A3.3.5. **Class 5.**
A3.3.5.1. Do not pack Class 5 materials in the same outside container with corrosive liquids, unless the corrosive liquids are in bottles cushioned by incombustible absorbent material in tightly closed metal containers. Class 5 materials in securely closed metal cans and in quantities not over 118 ml (4 ounces), are acceptable for air shipment if packed in the same compartment with other securely packed materials necessary for a complete fumigant.
A3.3.5.2. Unless otherwise specified by a packaging paragraph, package a material identified as PG III in table A4.1 in a container that meets the PG I or II performance level.
A3.3.6. **Class 7.**
A3.3.6.1. **General Design Requirements.** Except for limited quantities or excepted instruments or articles, design each package used for shipment of radioactive materials so that:

- The package can be easily handled and properly secured during transport.
- Each lifting attachment on the package, when used in the intended manner, with a minimum safety factor of three, does not impose an unsafe stress on the structure of the package. In addition, design the lifting attachment so that failure under excessive load does not impair the ability of the package to meet all other requirements of this attachment and attachment 11. Remove, make inoperable for tranport, or design with equivalent strength for lifting each attachment or other feature on the outer surface of the packaging that could be used to lift the package.
- The external surface, as far as practical, may be easily decontaminated.
- The outer layer of packaging avoids, as far as practicable, pockets or crevices where water might collect.
- Each feature that is added to the package at the time of transport, and is not a part of the package, does not reduce the safety of the package.

- The package will be capable of withstanding the effects of any acceleration, vibration, or vibration resonance that may occur during transportation without any deterioration in the effectiveness of the of any of the closing devices or in the integrity of the package and without loosening or unintentionally releasing the nuts, bolts, or other securing devices.
- The packaging materials and any components will be physically and chemically compatible with each other and the contents.
- All valves through which the package contents could escape will be protected against unauthorized operation.

A3.3.6.2. **Additional Design Requirements for Type A and B Packages.**

- In addition to meeting the general design requirements each Type A packaging must also meet the design requirements of 49 CFR 173.412 and test requirements of 49 CFR 173.461.
- Each type B(U) or type B(M) package must meet the design and test requirements of 10 CFR Part 71.

A3.3.6.3. **Radiation Level and Thermal Limitations.**

- Design each package of radioactive materials so that:
  - The radiation level is not more than 2 mSv/h (200 mrem/h) at any point on the external surface of the package.
  - The transport index is not over 10.
- Design, construct, and load each package of radioactive material so that:
  - The heat generated within the package due to the radioactive contents will not, at any time during transportation, affect the integrity of the package under normal transportation conditions.
  - The temperature of the accessible external surfaces of the loaded package will not, assuming still air in the shade at an ambient temperature of 38 degrees C (100 degrees F), exceed either a temperature of 50 degrees C (122 degrees F) in other than an exclusive use shipment or 82 degrees C (180 degrees F) in an exclusive use shipment.

A3.3.6.4. **General Transportation Requirements.**

- Secure each shipment of radioactive materials to prevent shifting during normal transportation conditions.
- Except as specifically required by a CAA, a package of radioactive materials may be carried among packaged general cargo without special stowage provisions, if:
  - The heat output in watts is not over 0.1 times the minimum package dimension in centimeters.
  - The average surface heat flux of the package is not over 15 watts per square meter (W/m^2) and the immediately surrounding cargo is not in sacks or bags or otherwise in a form that would seriously impede air circulation for heat removal.
- Aircraft in which radioactive materials have been spilled may not again be placed in service or routinely occupied until radiation dose rate at any accessible surface is less than 0.005 mSv/h (0.5 mrem/h) and there is no significant removable radioactive surface contamination as determined in A3.3.6.11. When contamination is present or suspected, segregate the package and any other materials it has touched as far as practical from personnel contact until needed radiological advice or assistance is obtained. For personnel safety, take care to avoid possible inhalation, ingestion, or contact with radioactive materials that may have leaked or spilled from its package. Leave any loose radioactive materials and associated packaging materials in a segregated area pending disposal instructions from responsible radiological authorities.
- Do not offer for military airlift:
  - Any type B(U) or type B(M) package with an accessible surface temperature in excess of 50 degrees C (122 degrees F).
  - Any continuously vented type B(M) packages, which require external cooling by an auxiliary cooling system or packages subject to operational controls during transport.
  - Any liquid pyrophoric radioactive materials.
- Do not transport exclusive use shipments of packages having a surface radiation level in excess of 2 mSv/h (200 mrem/h) except by special arrangement.

A3.3.6.5. **Approval of Special Form Radioactive Material.**

- Each shipper of special form radioactive materials must maintain on file for at least 1 year after the latest shipment, a complete safety analysis, including documentation of any tests demonstrating that the special form material meets the requirements of 49 CFR 173.469. An International Atomic Energy Agency (IAEA) certificate of competent authority issued for the special form material may be used to satisfy this requirement.
- Before the first export shipment of a special form radioactive material from the United States, each shipper must obtain a competent authority certificate for the specific material. For special form material manufactured outside the United States an IAEA certificate of component authority from the country of origin may be used to meet this

requirement. For special form materials manufactured in the United States each shipper must obtain a US competent authority certificate for the specific material. Submit each petition for a US competent authority certificate according to 49 CFR 173.471 and include the following information:

- A detailed description of the material or, if a capsule, a detailed description of the contents. Make a particular reference to both physical and chemical states.
- If a capsule is used, a detailed statement of its design and dimensions, including complete engineering drawings and schedules of material, and methods of construction.
- A statement of tests performed and their results; evidence based on calculative methods to show that the material is able to pass the tests; or other evidence that the special form radioactive material complies with 49 CFR 173.469.

- Unless otherwise required, the shipper is exempt from maintaining the documentation required in the bullets above if that documentation is maintained by the Inventory Control Point (national stock number managing activity).
- The documentation requirements specified in the bullets above do not apply in those cases where A_1 equals A_2 and the material is not described on the shipping papers as "Radioactive Material, Special Form, N.O.S."

A3.3.6.6. **Stowage on Aircraft or Storage Incident to Transportation.**

- Do not ship radioactive yellow II or radioactive yellow III material on the same aircraft or store in any one area, such as a transit area, terminal building, storeroom, or assembly yard, if the sum of the transport indexes in any individual group of packages exceeds 50.
- If the total transport index for all packages exceeds 50, separate the packages into groups. Store groups of these packages so as to maintain a spacing of at least 6 meters (20 feet) from other groups of packages containing radioactive materials.
- Ensure separation of yellow II or yellow III material from packages containing undeveloped film according to the distances shown in 49 CFR 175.703.

A3.3.6.7. **Uranium Hexafluoride (Fissile and Low Specific Activity).** In addition to any other applicable requirements of attachment 3 and attachment 11, package uranium hexafluoride, fissile or low specific activity, according to the following requirements:

- Before initial filling and during periodic inspection and test, clean packages according to American National Standard N14.1.
- Design, fabricate, inspect, test, and mark packagings according to American National Standard N14.1 in effect at the time the packaging was manufactured.
- Ensure uranium hexafluoride is in solid form when offered for transportation.
- The volume of the solid uranium hexafluoride at 20 degrees C (68 degrees F) must not exceed 61 percent of the volumetric capacity of the package.
- Ensure the pressure in the package at 20 degrees C (68 degrees F) is less than 101.3kPa (14.8 psia).
- Periodically inspect, test, and mark packages of uranium hexafluoride according to American National Standard N14.1-1987.
- Perform each repair to a package of uranium hexafluoride according to American National Standard N14.1-1987.

A3.3.6.8. **Specific Requirements for Fissile Shipments.**

- Fissile material packaging must meet the test requirements of 10 CFR Part 71.
- Mixing fissile material packages with other types of radioactive materials, including fissile class I with fissile class II packages is authorized if the total transport index is not over 50.
- See attachment 24 for Fissile Class III shipments.

A3.3.6.9. **Fissile Materials--Exceptions.** The requirements of A3.3.6.8 do not apply to:

- A package not containing more than 15 grams of fissile radionuclides.
- A package containing irradiated natural or depleted uranium including the products of irradiation if the irradiation has taken place only in the thermal reactor.
- A package containing homogeneous solutions or mixtures where:
  - The minimum ratio of the number of hydrogen atoms to the number of atoms of fissile radionuclides (H/X) is 5200.
  - The maximum concentration of fissile radionuclides is 5 grams per liter (g/l).
  - The maximum mass of fissile radionuclides in the package is 500 grams, except that for a mixture where the total mass of plutonium and uranium^{233} is not over 1 percent of the mass of uranium^{235}, the limit is 800 grams.
- A package containing uranium enriched in uranium^{235} to a maximum of 1 percent by weight, and with a total plutonium and uranium^{233}content of up to 1 percent of the mass of uranium^{235}, if the fissile radionuclides are

distributed homogeneously throughout the package contents, and do not form a lattice arrangement within the package.

- A package containing any fissile material if it does not contain more than 5 grams of fissile radionuclides in any 10 liter volume, and if the material is packaged to maintain this limit of fissile radionuclide concentration during normal transport.
- A package containing not more than one kg of plutonium of which not more than 20 percent by mass may consist of plutonium^{239}, plutonium^{241}, or any combination of those radionuclides.
- A package containing liquid solutions of uranyl nitrate enriched in uranium^{235} to a maximum of 2 percent by weight, with total plutonium and uranium^{233} not more than 0.1 percent of the mass of uranium^{235}.

- A package containing thorium or uranium with not more than 0.72 percent by weight of fissile material used for shipment solely within the United States.

A3.3.6.10. **Requirements for Foreign-Made Packages.** In addition to the requirements of attachment 11, each shipper of a foreign-made type B, type B(U), type B(M) or fissile material package for which a competent authority certificate is required by the IAEA *"Regulations for the Safe Transport of Radioactive Materials, Safety Series No. 6"* must meet the requirements of 49 CFR 173.473.

A3.3.6.11. **Radioactive Contamination.**

- **Contamination Control.** Keep the level of nonfixed (removable) radioactive contamination on the external surfaces of each package offered for shipment as low as practical. The level of nonfixed radioactive contamination may be determined by wiping an area of 300 cm^2 of the surface concerned with an absorbent material, using moderate pressure, and measuring the activity on the wiping material. Take sufficient measurements in the most appropriate locations to yield a representative assessment of the nonfixed contamination levels. The amount of radioactivity measured on any single wiping material, when averaged over the surface wiped, must not exceed the limits given in table A3.3 at any time during transport. Other methods of assessment of equal or greater efficiency may be used. When other methods are used, take the detection efficiency of the method used into account and in no case must the nonfixed contamination on the external surfaces of the package exceed 10 times the limits listed in table A3.3.
- **Inspecting Aircraft for Contamination.** Periodically check aircraft used to routinely carrying radioactive materials for radioactive contamination. Determine frequency of the checks based on the likelihood of contamination and the extent to which radioactive materials are carried aboard the aircraft. An aircraft must be taken out of service if the radiation dose rate at any accessible surface is 0.005 mSv/h (0.5 mrem/h) or if there is significant removable radioactive surface contamination as outlined above.

Table A3.3. Removable External Radioactive Contamination--Wipe Limits.

Contaminant	Maximum permissible limits	
	uCi/cm^2	depletion per minute (dpm)/cm^2
Beta-gamma emitting radionuclides; all radionuclide with half-lives less than 10 days; natural uranium; natural thorium; uranium^{-235}; uranium^{-238}; thorium^{-232}; thorium^{-228}; and thorium^{-230} when contained in ores or physical concentrates.	10^{-5}	22
All other alpha emitting radionuclides	10^{-6}	2.2

A3.3.7. **Class 8.**

- For inner containers of a combination packaging containing liquid Class 8 material, unless otherwise specified by the packaging paragraph, the maximum quantity per container must not exceed 3.8 L (1 gallon). Suitably separate all inner containers. This quantity requirement does not apply if the inner container meets the pressure test requirement of A3.2.2. Do not pack bottles containing corrosive liquids in the same outside container with other hazardous materials.
- Unless otherwise specified by a packaging paragraph, package a liquid material identified as PG III in table A4.1 in a container that meets the PG I or II performance level.

A3.3.8. **Class 9.** Any package that has a magnetic field strength of more than 0.00525 gauss measured at 4.6 m (15 ft) from any surface of the package is forbidden on military aircraft.

A3.4. **Household Goods (HHG) Shipments.** DoD 4500.34-R, *Personnel Property Traffic Management Regulation* establishes requirements for the movement of HHG and specifies that hazardous materials are not authorized for military airlift. One exception is that engine power-driven equipment (motorcycle, moped, lawnmower, boat, snowmobile, etc.) may be transported as HHG under the following requirements:

- Completely drain all fuel.
- Run until the engine stalls.
- Drain all oil and water.
- Allow fuel tanks and lines to remain open for 24 hours prior to pickup.
- Disconnect nonspillable gel-type batteries and tape the ends to prevent short circuit. Batteries may remain in the equipment holder, but ensure they are firmly secured and remain upright in the shipping container. Do not ship batteries with acid or alkali.
- Engine power-driven equipment prepared in this manner are not regulated by this manual. A Shipper's Declaration for Dangerous Goods is not required.

ITEMS LISTING

A4.1. General Requirements. This attachment contains :

- An alphabetical listing of the hazardous materials subject to the requirements of this manual. See paragraph 1.10.3 for material determined to be nonhazardous.
- Classification criteria for hazard classes. See attachment 1 for definitions.
- Identification of items prohibited for military air transportation.
- Listing of Hazardous Substances and applicable Reportable Quantities.

A4.2. Using Table A4.1. Table A4.1 identifies "hazardous materials" for the purpose of military air transportation. To use table A4.1, locate the proper shipping name (PSN) of the hazardous material and follow the information identified on the same line with the PSN. Use Table A4.1 to identify the follwing:

- Eligibility of material for shipment
- Proper shipping name (PSN)
- Hazard class and division
- Identification number
- Packing group (PG)
- Subsidiary Risk
- Special provisions applicable to the material, including passenger eligibility
- Basic packaging paragraph

A4.2.1. **Column 1: Symbols.** Column 1 contains symbols that pertain to the PSN.

- The letter "D" means that the PSN applies only to domestic shipments. These items are also identified by "NA" numbers in column 4. For international shipments, select an alternate PSN that is not preceded by a "D".
- The "*" (asterisk) identifies that a technical name is required in association with the PSN.
- The "+" (plus) fixes the proper shipping name, hazard class and packing group for that entry without regard to whether the material meets the definition of that class or packing group or meets any other hazard class definition.

A4.2.2. **Column 2: Proper Shipping Names (PSN).** PSNs are listed alphabetically in all bold capital letters in table A4.1. Use either singular or plural wording. New and revised PSNs in 49 CFR, part 172, ICAO *Technical Instructions*, or IATA *Dangerous Goods Regulation* are authorized PSNs under this manual, provided the packaging requirements do not change. Words which appear in lower case italicized letters are descriptive words that do not constitute part of the PSN.

- **Technical or Chemical Group Names.** Provide a technical or chemical group name in association with the PSN when required by an "*" in column 1.
  - **Organic Peroxides.** Use technical names listed below the appropriate generic PSN (in lower case letters) in table A4.1. See A4.3.6 for PSN assignment based on technical name.
  - **Mixtures and Solutions.** If the hazardous material is a mixture or solution of two or more hazardous materials, enter the technical names of at least two components most contributing to the hazards of the mixture or solution in parentheses after the PSN.
- **The Word "OR" in Table A4.1.** The word "or" in a sequence of PSNs means that PSNs in the sequence are synonymous. Therefore, use of any one of the PSNs in the series is appropriate. Select only one PSN in the series when classifying the shipment.
- **The Word "SEE" in Table A4.1.** When one item references another item (by use of the word "see") and both names are in capital letters, use either name as the PSN. Forbidden designations and passenger restrictions applicable to the referenced entry also apply to the "see" entry.
- **Concentration Ranges.** When a shipping name includes a concentration range as part of the shipping description, the actual concentration shipped (if it is in the range stated) may be used in place of the concentration range. For example, ship a hydrogen peroxide solution containing 30 percent peroxide as either "Hydrogen peroxide aqueous solution (with not less than 20 percent but not more than 40 percent hydrogen peroxide)" or "Hydrogen peroxide aqueous solution (with 30 percent hydrogen peroxide)."
- **Hazardous Wastes.** The PSN for a hazardous material that is a hazardous waste must include the word "waste" preceding the name of the material (i.e., waste, acetone). Comply with all requirements of this manual identified for the hazardous material when shipped as waste.

A4.2.3. **Column 3: Hazard Class and Division.** Column 3 contains:

- Primary hazard class and division numbers. When this manual references hazard class, that includes any division number if appropriate. For Class 1 (explosives), the compatibility group is also given. See A4.3 for additional information on class/divisions.
- Identification of "FORBIDDEN" items. Do not transport "FORBIDDEN" items by military aircraft.

A4.2.4. **Column 4: Identification Number.** Column 4 lists the identification number assigned to each PSN.

- Ship items classified with "UN" (United Nations) or "ID" (identification) numbers domestically or internationally.
- Ship items classified with "NA" (North American) numbers domestically only, or to and from Canada or Mexico. Use of "UN" numbers is preferred even for domestic shipment.
- New or revised UN or NA numbers in 49 CFR, part 172, ICAO *Technical Instructions*, or IATA *Dangerous Goods Regulation* are recognized for use with this manual.

A4.2.5. **Column 5: Packing Group (PG).** Column 5 specifies one or more packing groups assigned to each PSN and hazard class. Hazard classes 2, 7, and ORM-D do not have packing groups. See A4.4 for additional information on PG.

A4.2.6. **Column 6: Subsidiary Risk.** Column 6 identifies the hazard class/division of any subsidiary risk posed by a material. Subsidiary risk may vary, depending on the applicable PG.

A4.2.7. **Column 7: Special Provisions.** Column 7 specifies codes for special provisions that are applicable for each PSN, hazard class, and PG. Special provision codes may vary, depending on the PG. Requirements of the special provision codes are identified in table A4.2. The codes reflect four categories: numeric codes, codes beginning with "A", codes beginning with "N", and codes beginning with a "P".

- Use codes beginning with a "P" to determine passenger eligibility for transport with hazardous materials.
- Use all other codes to determine packaging provisions, restrictions, and exceptions from requirements for particular quantities or forms of materials.
- When an additional packaging requirement is prescribed, the requirement is mandatory.

A4.2.8. **Column 8: Packaging Paragraph.** This column lists the applicable packaging paragraph. "FORBIDDEN" items are also identified in this column. Except when otherwise identified, prepare hazardous material shipments according to the specified packaging paragraph. If a packaging paragraph in table A4.1 specifies packaging that is not applicable to the form of the material (i.e., the packaging specified is for a solid material and the material shipped is in liquid form) use the following guidance to select the appropriate paragraph:

- Use either packaging paragraph A8.3 (liquids) or A8.4 (solids) as appropriate.
- Use either packaging paragraph A9.7 (liquids) or A9.8 (solids) as appropriate.
- Use either packaging paragraph A10.5 (liquids) or A10.6 (solids) as appropriate.
- Use either packaging paragraph A12.3 (liquids) or A12.4 (solids) as appropriate.

A4.3. Classifying Hazardous Materials.

A4.3.1. **Hazard Class Names.** The hazard class and division is a numerical identification which describes the class (type) of primary hazard involved and if appropriate, its division within the class. Use DoD 6050.5, *Hazardous Material Information System*, product Material Safety Data Sheet, or other manufacturer's information if assistance in determining the hazard classification is needed. Figure A4.1 lists class and division numbers and the corresponding class and division names.

HAZARD CLASS/ DIVISION NUMBER	HAZARD CLASS/ DIVISION NAME	HAZARD CLASS/ DIVISION NUMBER	HAZARD CLASS/ DIVISION NAME
1.1	Explosives (with mass explosion hazard)	4.1	Flammable solid
1.2	Explosives (with a projection hazard)	4.2	Spontaneously combustible material
1.3	Explosives (with predominately a fire hazard)	4.3	Dangerous when wet material
1.4	Explosives (with no significant blast hazard)	5.1	Oxidizer
1.5	Very insensitive explosives; blasting agents	5.2	Organic peroxide
1.6	Extremely insensitive detonating substances	6.1	Poisonous (toxic) material
2.1	Flammable gas	6.2	Infectious substances (etiologic agents)
2.2	Nonflammable gas	7	Radioactive material
2.3	Poisonous gas	8	Corrosive material
3	Flammable liquid	9	Miscellaneous hazardous material

Figure A4.1. Hazard Classes.

A4.3.2. **Items Not Specifically Listed.** If a material is not specifically listed in table A4.1, determine the PSN by comparing the characteristics of the items with the definitions of the various hazard classes in this manual. Assign a "Not Otherwise Specified" (N.O.S.) name based on the hazard class of the material. Examples are: "FLAMMABLE LIQUID, N.O.S.; CORROSIVE SOLID, N.O.S." Attachment 1 contains hazardous class definitions. If a technical name is required, it may be determined by looking at the item or material safety data sheet.

A4.3.3. **Tentative PSN Assignment.** A material for which the hazard class must be determined by testing, or a material that is a hazardous waste, the shipper may assign a tentative shipping name, based on:

- The defining criteria of the hazard class.
- The hazard precedence prescribed in A4.3.
- The shipper's knowledge of the material.
- A3.3.1.2 for new explosives.
- If a N.O.S. PSN is assigned, a technical name is not required.

A4.3.4 **Precedence of Hazard.** Assign any material specifically identified and listed in table A4.1 the hazard class identified in column 3 of table A4.1. Classify a hazardous material that is not specifically identified and listed in table A4.1 (or is a mixture of materials), and meets the definition of more than one hazard, according to the following order of precedence:

- Class 7 (Radioactive material, other than limited quantities). When limited quantities are involved the other hazardous properties take precedence.
- Class 1 (Explosives).
- Class 2.3 (poisonous gas).
- Class 2.1 (flammable gas). See also Class 9.
- Class 2.2 (nonflammable gas). See also Class 9.
- Class 5.2 (organic peroxide).
- Class 6.2 (infectious substances or etiologic agents).
- Class 4.1 (flammable solid). Only self-reactive substances and wetted explosives. For other Class 4.1 materials, see figure A4.2.
- Class 4.2 (substances liable to spontaneous combustion). Only pyrophoric substances. For other Class 4.2 materials, see figure A4.2.
- Class 6.1 (poisonous substances), PG I, poisonous by inhalation only. For other Class 6.1 materials, see figure A4.2.

A4.3.4.1. Classify the following hazard classes according to figure A4.2, *Precedence of Hazard*:

- Class 3 (flammable liquids).
- Class 4.1 (flammable solids), other than Class 4.1 in A4.3.4.
- Class 4.2 (substances liable to spontaneous combustion), other than Class 4.2 in A4.3.4.
- Class 4.3 (substances which, in contact with water, emit flammable gases).

- Class 8 (corrosive material).
- Class 5.1 (oxidizers).
- Class 6.1 (poisonous substances), other than Class 6.1 in A4.3.4.
- Combustible liquid (combustible liquid does not have a class number).
- Class 9 (miscellaneous hazardous material).
    - Small quantities of compressed gas such as starter fluid (Class 2.1) or fire extinguisher (Class 2.2) installed on a vehicle do not take precedence over the flammable liquid (Class 3).

A4.3.4.2. **How To Use Figure A4.2.** Find one of the hazard classes (including the appropriate PG) of your material in the horizontal or vertical column. For example, Class 4.2, PG II in the vertical column. Then find the other hazard class (including the appropriate PG) in the other column. For example, Class 8, solid, PG II in the horizontal column. Where these two columns intersect identifies the primary hazard class to use when shipping this material. The PG of the primary hazard class is also identified at the intersection of the two columns. In the example, the primary hazard class is 4.2 and the PG is II. Include the other class as the subsidiary hazard. In our example, the subsidiary hazard would be Class 8. The PG for the subsidiary hazard is not applicable to the shipment.

A4.3.5. **Material With More Than One Hazard.** For a material with more than one hazard, and one of the hazards is Class 6.1, PG III, do not consider the Class 6.1 in determining the classification of the material. However, where a pesticide has the hazards of Class 3, PG III and Class 6.1, PG III, the primary hazard must be Class 6.1, PG III.

Precedence of Hazards and Packing Groups for Classes 3, 4 and 8 and for Class 5.1 and 6.1

Class or		4.2	4.2	4.3	4.3	4.3	5.1	5.1	5.1	6.1	6.1	6.1	6.1	8	8	8	8	8	8
Class							(s)	(s)	(s)	(d)	(o)		***	(l)	(s)	(l)	(s)	(l)	(s)
	Packing Group	II	III	I	II	III	I	II	III	I	I	II	III	I	I	II	II	III	III
3	I						**X**	**X**	**X**	3, I	3, I	3, I	3, I	3, I	**X**	3, I	**X**	3, I	**X**
3	II						**X**	**X**	**X**	3, I	3, I	3, II	3, II	8, I	**X**	3, II	**X**	3, II	**X**
3	III						**X**	**X**	**X**	6.1, I	6.1, I	6.1, II	3, III*	8, I	**X**	8, II	**X**	3, III	**X**
4.1	II	4.2, II	4.2, II	4.3, I	4.3, II	4.3, II	5.1, I	4.1, II	4.1, II	6.1, I	6.1, I	4.1, II		**X**	8, I	**X**	4.1, II	**X**	4.1, II
4.1	III	4.2, II	4.2, III	4.3, I	4.3, II	4.3, III	5.1, I	4.1, II	4.1, III	6.1, I	6.1, I	6.1, II		**X**	8, I	**X**	8, II	**X**	4.1, III
4.2	II			4.3, I	4.3, II	4.3, II	5.1, I	4.2, II	4.2, II	6.1, I	6.1, I	4.2, II		**X**	8, I	**X**	4.2, II	**X**	4.2, II
4.2	III			4.3, I	4.3, II	4.3, III	5.1, I	5.1, II	4.2, III	6.1, I	6.1, I	6.1, II		**X**	8, I	**X**	8, II	**X**	4.2, III
4.3	I						5.1, I	4.3, I	4.3, I	6.1, I	4.3, I	4.3, I		4.3, I	4.3, I	4.3,I	4.3, I	4.3, I	4.3, I
4.3	II						5.1, I	4.3, II	4.3, II	6.1, I	4.3, I	4.3, II		8, I	8, I	4.3, II	4.3, II	4.3, II	4.3, II
4.3	III						5.1, I	5.1, II	4.3, III	6.1, I	6.1, I	6.1, II		8, I	8, I	8,II	8, II	4.3, III	4.3, III
5.1**	I**									5.1, I	5.1, I	5.1, I		5.1, I	5.1, I	5.1, I	5.1, I	5.1, I	5.1, I
5.1**	II**									6.1, I	5.1, I	5.1, II		8, I	8, I	5.1, II	5.1, II	5.1, II	5.1, II
5.1**	III									6.1, I	6.1, I	6.1, II		8, I	8, I	8, II	8, II	5.1, III	5.1,III
6.1(d)	I													8, I	6.1, I	6.1, I	6.1, I	6.1, I	6.1, I
6.1(o)	I													8, I	6.1, I	6.1, I	6.1, I	6.1, I	6.1, I
6.1(i)	II													8, I	6.1, I	6.1, II	6.1, II	6.1, II	6.1, II
6.1(d)	II													8, I	6.1, I	8, II	6.1, II	6.1, II	6.1, II
6.1(o)	II													8, I	8, I	8, II	6.1, II	6.1, II	6.1, II

Figure A4.2. Precedence of Hazard.

(**l**) = liquid
(**s**) = solid
(**i**) = inhalation
(**o**) = oral
(**d**) = dermal

X = an impossible combination
***** = For pesticides only, the primary hazard must be Class/division 6.1, PG III.

****** = Hazard Class 5.1 liquids are to be assessed by analogy with listed substances in table A4.1 and assigning the substance to PG I, II, or III as appropriate.
******* = For classification see A4.5.4.

A4.3.6. **Hazard Classification of Class 5.2 Organic Peroxides.** Class 5.2 organic peroxides are categorized into one of seven "types" in a system of generic proper shipping names. The generic PSN for the organic peroxide describes the physical state of the material (i.e., liquid or solid), provides an indication of controlled temperature requirements, and includes the "type" of the organic peroxide. The seven types of organic peroxides are described in attachment 1. Transport all Class 5.2 material under one of the generic proper shipping names listed in table A4.1 beginning with the words "ORGANIC PEROXIDE". Technical names are listed below each PSN in lower case letters. To determine the correct PSN:

- Find the technical name in table A9.1 and select the UN identification number assigned to the technical name that best describes the item (in terms of concentration ranges, physical characteristics, etc).
- Turn to the "ORGANIC PEROXIDE" listed in table A4.1. These entries constitute the "generic" organic peroxide proper shipping names.
- Match the UN identification number for the technical name with a UN identification number associated with the generic PSN.
- The generic PSN associated with organic peroxides will include the "type" under which the organic peroxide falls. Organic peroxide types are defined in attachment 1.

A4.3.7. **Hazard Classification of Fissile Materials.** Except as provided in A3.3.6.9, classify each package of fissile materials as fissile class I, II, or III. Determine the numerical values for package assignments as fissile class I, the transport indexes for fissile class II packages, and the conveyance limitations for fissile class III shipments according to 10 CFR Part 71.

- **Fissile Class I.** Packages may be transported in unlimited numbers, and in any arrangement, and require no nuclear criticality safety controls during transportation. A transport index is not assigned to fissile class I packages for the purpose of nuclear criticality safety control, although, the external radiation levels may require a transport index number.
- **Fissile Class II.** Packages may be transported together in any arrangement, but in numbers that are not over an aggregate transport index of 50. For the purposes of nuclear criticality safety control, individual packages may have a transport index of not less than 0.1 and not more than 10. However, the external radiation levels may require a higher transport index number. These shipments require no nuclear criticality safety control by the shipper during transportation.
- **Fissile Class III.** Shipments of packages of fissile materials that do not meet the requirements of fissile class I or fissile class II and are controlled in transit as prescribed in A3.3.6.8 by appropriate arrangements between the shipper and the carrier.

A4.4. Determining Degree of Hazard (PG). For most material, the PG is assigned in column 5 of table A4.1. Packing groups I, II, and III indicate the degree of hazard associated with the materials and are used to identify the severity of Performance Oriented Packaging (POP) tests associated with the packaging for the item. Poisonous by inhalation material are assigned hazard zones (see attachment 1) in table A4.1. If unknown, the PG or hazard zone may be determined according to this paragraph. Class 2, and 7 do not have packing groups.

A4.4.1. **Class 2 Hazard Zone.** The hazard zone of a Class 2.3 material is given in column 7 of table A4.1. When column 7 of table A4.1 provides more than one hazard zone or is blank, determine the hazard zone from figure A4.3. There are no hazard zones for Class 2.1 and 2.2.

Hazard Zone	Inhalation Toxicity (parts per million)
A	LC50 less than or equal to 200 ppm
B	LC50 greater than 200 ppm and less than or equal to 1000 ppm
C	LC50 greater than 1000 ppm and less than or equal to 3000 ppm
D	LC50 greater than 3000 ppm or less than or equal to 5000 ppm

Figure A4.3. Determination of Hazard Zone for Class 2.3.

A4.4.2. **Class 3 Packing Groups.** When table A4.1 lists more than one PG for a material, or indicates that the PG is to be determined on the basis of the PG criteria for Class 3, determine the PG by using figure A4.4. To use figure A4.4, match the initial boiling point of the material to the flash point, and assign the corresponding PG. Flash points may be determined from the material safety data sheet, DoD 6050.5 *Hazardous Material Information System*, the National Fire Protection Guide, or markings on the package. For example, a Class 3 material with an initial boiling point of 38 degrees C (100 degrees F) and a flash point of 25 degrees C (77 degrees F) would be assigned a PG III. If the initial boiling point is less than or equal to 35 degrees C (95 degrees F), assign PG I. Viscous Class 3 material (i.e., paints, varnishes, enamels, lacquers, adhesives, and

polishes) in PG II with a flash point of less than 23 degrees C (73 degrees F) may be grouped in PG III provided the requirements of 49 CFR 173.121(b) are met.

PG	Flash Point (closed-cup)	Initial Boiling Point
I		less than or equal to 35 C (95 F)
II	less than 23 C (73 F)	greater than 35 C (95 F)
III	equal to or greater than 23 C (73 F) but less than or equal to 60.5 C (141 F)	greater than 35 C (95 F)

Figure A4.4. Criteria for Class 3 PG.

A4.4.3 **Class 4 Packing Groups.** When table A4.1 indicates that the PG of the material is to be determined on the basis of test criteria for Class 4 material, the test methods and appropriate criteria must comply with 49 CFR, appendix E to part 173.
A4.4.4. **Class 5 Packing Groups.** When column 5 of table A4.1 is blank for a solid in Class 5.1, determine the PG based on the test criteria found in 49 CFR, part 173, appendix F. If column 5 is blank for a liquid in Class 5.1, packing groups can be assigned by a comparison to existing entries in table A4.1.
A4.4.5. **Class 6 Packing Groups and Hazard Zone.** When table A4.1, column 5 provides more than one PG and hazard zone for a specific Class 6.1 material, determine the PG and hazard zone by applying the following criteria:

- Determine the PG assignment for other than inhalation of vapors by using figure A4.5.

PG	Oral Toxicity LD50(mg/kg)	Dermal Toxicity LD50(mg/kg) LC50 (mg/L)	Inhalation Toxicity by dusts and mists
I	< 5	<40	<0.5
II	> 5, < 50	>40, <200	<0.5, <2
III	solids: > 50, <200, liquids > 50, <500	>200, <1000	> 2, <10

Figure A4.5. PG Assignment For Other Than Inhalation of Vapors.

- Determine the PG and hazard zone assignments for inhalation of vapors by using figure A4.6.

PG (Hazard Zone)	Vapor Concentration and Toxicity
I (Hazard Zone A)	V $\geq$500 LC_{50} and $LC^{50} \leq$ 200 mL/m^3
I (Hazard Zone B)	V $\geq$10 LC_{50} and $LC^{50} \leq$1000 mL/m^3 , and the criteria for PG I, hazard zone A are not met
II (Hazard Zone C)	V $\geq LC_{50}$ and $LC^{50} \leq$3000 mL/m^3, and the criteria for PG I, hazard zones A and B are not met
III (Hazard Zone D)	V $\geq$.2 LC_{50} and $LC^{50} \leq$ 5000 mL/m^3, and the criteria for packing groups I and II, hazard zones A, B, and C are not met

Figure A4.6. Inhalation Toxicity.

- "V" is the saturated vapor concentration in air of the material in mL/m^3 at 20 degrees C (68 degrees F) and standard atmospheric pressure.

- When the PG determined by figure A4.5 and figure A4.6 is different for two or more (oral, dermal, inhalation) requirements, the PG assigned to the material is the highest degree of toxicity identified.
- Compute the PG and hazard zone for Class 6.1 mixtures that are poisonous (toxic) by inhalation as identified in 49 CFR 173.133 (b).

A4.4.6. **Class 8 Packing Groups.** When table A4.1 lists more than one PG for a material, determine the PG according to 49 CFR 173.137.

A4.5. Hazardous Substances. Table A4.3 identifies materials that are designated hazardous substances under Section 101 (14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). See attachment 1 for a detailed definition of a hazardous substance. Ensure review of table A4.3 to determine if a material is a hazardous substance.

- Determine if the material is a hazardous substance by identifying the reportable quantity (RQ) in table A4.3. The RQ is used to determine if material is a hazardous substance. The material is a hazardous substance if the amount in one package equal or exceeds the RQ quantity. Table A4.3 specifies, in pounds and kilograms, the minimum quantity of the material that constitutes an RQ. For example: sodium arsenate (RQ-1.0/0.454) means the RQ is 1.0 pounds or 0.454 kilograms.
- A substance or solution is a "hazardous substance" when the concentration by weight equals or exceeds the concentration listed in figure A1.1.
- If the technical name of the hazardous substance appears in table A4.1, then the technical name is the PSN. If the hazardous substance does not appear in table A4.1 and is not a forbidden material, select an appropriate generic (N.O.S.) PSN. Specify the technical name in parenthesis after the PSN. See attachment 17 for certification requirements.

A4.6. Table A4.1 Alphabetical Listing of Items:

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	Accellerene; see **p-NITROSODIMETHYLANILINE**						
	Accumulators, electric; see **BATTERIES, WET,** *etc.*						
D	**ACCUMULATORS, PRESSURIZED, PNEUMATIC** *or* **HYDRAULIC** *(containing nonflammable gas) see also,* **ARTICLES, PRESSURIZED**, *etc.*	2.2	NA1956			P5	A6.9
	ACETAL	3	UN1088	II		P5	A7.3
	ACETALDEHYDE	3	UN1089	I		P3, A3	A7.3
	ACETALDEHYDE AMMONIA	9	UN1841	III		P5	A13.13
	ACETALDEHYDE OXIME	3	UN2332	III		P5	A7.3
	ACETIC ACID, GLACIAL *or* **ACETIC ACID SOLUTION**, *with more than 80% acid, by mass*	8	UN2789	II		P5, A3, A6, A7, A10	A12.3
	ACETIC ACID SOLUTION, *with more than 10%, but not more than 80% acid, by mass*	8	UN2790	II		P5, A3, A6, A7, A10	A12.3
	ACETIC ANHYDRIDE	8	UN1715	II	3	P5, A3, A6, A7, A10	A12.3
	Acetic oxide; see **ACETIC ANHYDRIDE**						
	Acetoin; see **ACETYL METHYL CARBINOL**						
	ACETONE	3	UN1090	II		P5	A7.3
	ACETONE CYANOHYDRIN, STABILIZED	6.1	UN1541	I		P2, 2, A3, N34	A10.7
	ACETONE OILS	3	UN1091	II		P5	A7.3
	ACETONITRILE	3	UN1648	II		P5	A7.3
	Acetyl acetone peroxide with more than 9% by mass active oxygen	FORBIDDEN					FORBIDDEN
	Acetyl benzoyl peroxide, solid, or with more than 40% in solution	FORBIDDEN					FORBIDDEN
	ACETYL BROMIDE	8	UN1716	II		P4	A12.3
	ACETYL CHLORIDE	3	UN1717	II	8	P5, A3, A6, A7, N34	A7.3
	Acetyl cyclohexanesulphonyl peroxide, with *more than 82% wetted with less than 12% water*	FORBIDDEN					FORBIDDEN
	Acetylene dichloride; see **DICHLOROETHYLENE**						
	ACETYLENE, DISSOLVED	2.1	UN1001			P4	A6.4
	Acetylene (liquefied)	FORBIDDEN					FORBIDDEN

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	Acetylene silver nitrate	FORBIDDEN					FORBIDDEN
	Acetylene tetrabromide; see **TETRABROMOETHANE**						
	Acetylene tetrachloride; see **TETRACHLOROETHANE**						
	ACETYL IODIDE	8	UN1898	II		P5	A12.3
	ACETYL METHYL CARBINOL	3	UN2621	III		P5	A7.3
	Acetyl oxide; see **ACETIC ANHYDRIDE**						
	Acetyl peroxide, solid or more than 25% in solution	FORBIDDEN					FORBIDDEN
	Acids, liquid, N.O.S.; see **CORROSIVE LIQUIDS, N.O.S.**						
	Acraldehyde, inhibited; see **ACROLEIN, INHIBITED**						
	ACRIDINE	6.1	UN2713	III		P5	A10.6
	ACROLEIN DIMER, STABILIZED	3	UN2607	III		P5	A7.3
	ACROLEIN, INHIBITED	6.1	UN1092	I	3	P1, 1	A10.7
	ACRYLAMIDE	6.1	UN2074	III		P5	A10.6
	ACRYLIC ACID, INHIBITED	8	UN2218	II	3	P5	A12.3
	ACRYLONITRILE, INHIBITED	3	UN1093	I	6.1	P3	A7.3
	Activated carbon; see **CARBON, ACTIVATED**						
	Activated charcoal; see **CARBON, ACTIVATED**						
	Actuating cartridge, explosive; see **CARTRIDGES, POWER DEVICE**						
	ADHESIVES, *containing flammable liquid*	3	UN1133	II		P5	A7.3
	ADIPONITRILE	6.1	UN2205	III		P5	A10.5
	Aeroplane flares; see **FLARES, AERIAL**						
	AEROSOLS, FLAMMABLE, N.O.S., *each not exceeding 1L capacity*	2.1	UN1950			P4	A6.3
	AEROSOLS, FLAMMABLE, N.O.S., *containing poisonous gases of substances in Division 6.l, Packing Group I or II (including tear gas devices)*	FORBIDDEN					FORBIDDEN

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	AEROSOLS, FLAMMABLE, N.O.S., *(each not exceeding 1L capacity) containing substance in Division 6.1, Packing Group III*	2.1	UN1950		6.1,	P4	A6.3
	AEROSOLS, FLAMMABLE, N.O.S., *containing substances in Class 8, Packing Group I or II*	FORBIDDEN					FORBIDDEN
	AEROSOLS, FLAMMABLE, N.O.S., *(each not exceeding 1L capacity) containing substances in Class 8, Packing Group III*	2.1	UN1950		8	P4	A6.3
	AEROSOLS, FLAMMABLE, N.O.S., *(each not exceeding 1L capacity) containing substances in Division 6.1, Packing Group III and substances in Class 8, Packing Group III*	2.1	UN1950		6.1, 8	P4	A6.3
	AEROSOLS, FLAMMABLE, N.O.S., *containing toxic gas*	FORBIDDEN					FORBIDDEN
	AEROSOLS, NONFLAMMABLE, N.O.S., *(each not exceeding lL capacity)*	2.2	UN1950			P4	A6.3
	AEROSOLS, NONFLAMMABLE, N.O.S., *containing substances in Division 6.1, Packing Group I or II (other than tear gas devices)*	FORBIDDEN					FORBIDDEN
	AEROSOLS, NONFLAMMABLE, N.O.S., *(each not exceeding lL capacity) containing substances in Division 6.1, Packing Group III*	2.2	UN1950		6.1	P4	A6.3
	AEROSOLS, NONFLAMMABLE, N.O.S., *containing substances in Class 8, Packing Group I or II*	FORBIDDEN					FORBIDDEN
	AEROSOLS, NONFLAMMABLE, N.O.S., *(each not exceeding 1L capacity) containing substances in Class 8, Packing Group III*	2.2	UN1950		8	P5, A34	A6.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	AEROSOLS, NONFLAMMABLE, N.O.S., *(each not exceeding lL capacity) containing substances in Division 6.1, Packing Group III and substances in Class 8, Packing Group III*	2.2	UN1950		6.1, 8	P5	A6.3
	AEROSOLS, NONFLAMMABLE, N.O.S., *containing toxic gas*	FORBIDDEN					FORBIDDEN
	AIR BAG INFLATORS *or* **AIR BAG MODULES**, *or* **SEAT-BELT PRE-TENSIONERS** *or* **SEAT-BELT MODULES**	9	UN3268			P5	A13.14
	AIR, COMPRESSED	2.2	UN1002			P5	A6.3, A6.6
	AIR, REFRIGERATED LIQUID *(cryogenic liquid) pressurized or nonpressurized*	2.2	UN1003		5.1	P4	A6.11
	Aircraft evacuation slides; see **LIFE-SAVING APPLIANCES**						
	AIRCRAFT HYDRAULIC POWER UNIT FUEL TANK *(containing a mixture of anhydrous hydrazine and monomethyl hydrazine) (M86 fuel)*	3	UN3165	I	2.3, 8	P3	A7.5
	Aircraft Survival Kits; see **LIFE-SAVING APPLIANCES**						
	ALCOHOLATES SOLUTION, N.O.S. *in alcohol*	3	UN3274	II	8	P5	A7.3
	Alcohol, denatured; see **ALCOHOLS, N.O.S.** *or* **ALCOHOLS, TOXIC, N.O.S.**						
	ALCOHOLIC BEVERAGES *containing more than 70% alcohol by volume*	3	UN3065	II		P5	A7.3
	ALCOHOLIC BEVERAGES *containing more than 24% but not more than 70% alcohol by volume*	3	UN3065	III		P5	A7.3
	Alcohol, industrial; see **ALCOHOLS, N.O.S**. *or* **ALCOHOLS, TOXIC, N.O.S.**						
*	**ALCOHOLS, N.O.S.**	3	UN1987	I		P3	A7.3
				II		P5	
				III		P5	
*	**ALCOHOLS, TOXIC, N.O.S.**	3	UN1986	I	6.1	P3	A7.3
				II	6.1	P4	
				III	6.1	P5	

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	ALDEHYDES, N.O.S.	3	UN1989	I		P3	A7.3
				II		P5	A7.3
				III		P5	A7.3
*	**ALDEHYDES, TOXIC, N.O.S.**	3	UN1988	I	6.1	P3	A7.3
				II	6.1	P4	A7.3
				III	6.1	P5	A7.3
	ALDOL	6.1	UN2839	II		P5	A10.5
D	**ALDRIN**, *liquid*	6.1	NA2762	II		P5	A10.5
D	**ALDRIN**, *solid*	6.1	NA2761	II	3	P5	A10.6
*	**ALKALI METAL ALCOHOLATES, SELF-HEATING, CORROSIVE, N.O.S.**	4.2	UN3206	II	8	P4	A8.4
				III	8	P5	A8.4
	ALKALI METAL ALLOYS, LIQUID, N.O.S.	4.3	UN1421	I		P3, A2, A3, N34	A8.3
	ALKALI METAL AMALGAMS	4.3	UN1389	I		P3, A2, A3, N34	A8.3
	ALKALI METAL AMIDES	4.3	UN1390	II		P5, A6, A7, A8, A19, A20	A8.4
	ALKALI METAL DISPERSIONS *or* **ALKALINE EARTH METAL DISPERSIONS**	4.3	UN1391	I		P3, A2, A3	A8.3
	Alkaline corrosive liquids, N.O.S.; see **CAUSTIC ALKALI LIQUIDS, N.O.S.**						
	Alkaline corrosive solids, N.O.S.; see **CORROSIVE SOLIDS, N.O.S.**						
*	**ALKALINE EARTH METAL ALCOHOLATES, N.O.S.**	4.2	UN3205	II		P4	A8.4
				III		P5	A8.4
	ALKALINE EARTH METAL ALLOYS, N.O.S.	4.3	UN1393	II		P5, A19	A8.4
	ALKALINE EARTH METAL AMALGAMS	4.3	UN1392	I		P3, A19, N34, N40	A8.4
*	**ALKALOIDS, LIQUID, N.O.S.** *or* **ALKALOID SALTS, LIQUID**, **N.O.S.**	6.1	UN3140	I		P3, A4	A10.5
				II		P5	A10.5
				III		P5	A10.5
*	**ALKALOIDS, SOLID**, **N.O.S.** *or* **ALKALOID SALTS, SOLID, N.O.S**., *poisonous*	6.1	UN1544	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	ALKYL SULFONIC ACIDS, LIQUID *or* **ARYL SULFONIC ACIDS, LIQUID** *with more than 5% free sulphuric acid*	8	UN2584	II		P5	A12.3
	ALKYL SULFONIC ACIDS, LIQUID *or* **ARYL SULFONIC ACIDS, LIQUID** *with not more than 5% free sulfuric acid*	8	UN2586	III		P5	A12.3
	ALKYL SULFONIC ACIDS, SOLID, *or* **ARYL SULFONIC ACIDS, SOLID,** *with more than 5% free sulfuric acid*	8	UN2583	II		P5	A12.4
	ALKYL SULFONIC ACIDS, SOLID, *or* **ARYL SULFONIC ACIDS, SOLID,** *with not more than 5% free sulfuric acid*	8	UN2585	III		P5	A12.4
	ALKYLPHENOLS, LIQUID, N.O.S.	8	UN3145	I		P3	A12.3
	(including C2-C12 homologues)			II		P5	A12.3
				III		P5	A12.3
	ALKYLPHENOLS, SOLID, N.O.S.	8	UN2430	I		P5	A12.4
	(including C2-C12 homologues)			II		P5	A12.4
				III		P5	A12.4
*	**ALKYLSULFURIC ACIDS**	8	UN2571	II		P4	A12.3
	Allethrin; see **PESTICIDES, LIQUID, TOXIC, N.O.S.**						
	ALLYL ACETATE	3	UN2333	II	6.1	P5	A7.3
	ALLYL ALCOHOL	6.1	UN1098	I	3	P2, 2	A10.7
	ALLYLAMINE	6.1	UN2334	I	3	P2, 2	A10.7
	ALLYL BROMIDE	3	UN1099	I	6.1	P3	A7.3
	ALLYL CHLORIDE	3	UN1100	I	6.1	P3	A7.3
	Allyl chlorocarbonate; see **ALLYL CHLOROFORMATE**						
	ALLYL CHLOROFORMATE	6.1	UN1722	I	3, 8	P2, 2, A3, N41	A10.7
	ALLYL ETHYL ETHER	3	UN2335	II	6.1	P4	A7.3
	ALLYL FORMATE	3	UN2336	I	6.1	P3	A7.3
	ALLYL GLYCIDYL ETHER	3	UN2219	III		P5	A7.3
	ALLYL IODIDE	3	UN1723	II	8	P5, A3, A6, N34	A7.3
	ALLYL ISOTHIOCYANATE, STABILIZED	6.1	UN1545	II		P5, A3, A7	A10.5
	ALLYLTRICHLOROSILANE, STABILIZED	8	UN1724	II	3	P5, A7, N34	A12.3
	ALUMINIUM ALKYL HALIDES	4.2	UN3052	I		P3	A8.6
	ALUMINIUM ALKYL HYDRIDES	4.2	UN3076	I		P3	A8.6
	ALUMINIUM ALKYLS	4.2	UN3051	I		P3	A8.6

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	ALUMINIUM BOROHYDRIDE *or* **ALUMINIUM BOROHYDRIDE IN DEVICES**	4.2	UN2870	I	4.3	P3	A8.6
	ALUMINIUM BROMIDE, ANHYDROUS	8	UN1725	II		P5	A12.4
	ALUMINIUM BROMIDE, SOLUTION	8	UN2580	III		P5	A12.3
	ALUMINIUM CARBIDE	4.3	UN1394	II		P4, A20, N41	A8.4
	ALUMINIUM CHLORIDE, ANHYDROUS	8	UN1726	II		P5	A12.4
	ALUMINIUM CHLORIDE, SOLUTION	8	UN2581	III		P5	A12.3
	Aluminium dross, wet or hot	FORBIDDEN					FORBIDDEN
	ALUMINIUM FERROSILICON POWDER	4.3	UN1395	II	6.1	P4, A19	A8.4
				III	6.1	P5, A19, A20	A8.4
	ALUMINIUM HYDRIDE	4.3	UN2463	I		P3, A19, N40	A8.4
	ALUMINIUM NITRATE	5.1	UN1438	III		P5, A1, A29	A9.8
	Aluminium phosphate solution; see **CORROSIVE LIQUIDS, N.O.S.**						
	ALUMINIUM PHOSPHIDE	4.3	UN1397	I	6.1	P3, A8, A19, N40	A8.4
	ALUMINIUM PHOSPHIDE PESTICIDES	6.1	UN3048	I		P5, A8	A10.6
	ALUMINIUM POWDER, COATED	4.1	UN1309	II		P5	A8.4
				III		P5	A8.4
	ALUMINIUM POWDER, UNCOATED	4.3	UN1396	II		P4, A19, A20	A8.4
				III		P5, A19, A20	A8.4
	ALUMINIUM PROCESSING BY-PRODUCTS	4.3	UN3170	II		P4	A8.4
				III		P5	A8.4
	ALUMINIUM RESINATE	4.1	UN2715	III		P5	A8.4
	ALUMINIUM SILICON POWDER, UNCOATED	4.3	UN1398	III		P5, A1, A19	A8.4
	Amatols; see **EXPLOSIVE, BLASTING, TYPE B**						
*	**AMINES, FLAMMABLE, CORROSIVE N.O.S.**	3	UN2733	I	8	P3	A7.3
	or **POLYAMINES, FLAMMABLE, CORROSIVE N.O.S.**			II	8	P4	A7.3
				III	8	P4	A7.3
*	**AMINES, LIQUID, CORROSIVE, FLAMMABLE N.O.S.** *or* **POLYAMINES, LIQUID, CORROSIVE, FLAMMABLE, N.O.S.**	8	UN2734	I	3	P3, A3, A6, N34	A12.3
				II	3	P4	A12.3
*	**AMINES, LIQUID, CORROSIVE, N.O.S.** *or* **POYLAMINES, LIQUID, CORROSIVE, N.O.S.**	8	UN2735	I		P3, A3, A6, N34	A12.3
				II		P4	A12.3
				III		P5	A12.3
*	**AMINES, SOLID, CORROSIVE, N.O.S.** *or* **POLYAMINES, SOLID, CORROSIVE N.O.S.**	8	UN3259	I		P5	A12.4
				II		P5	**A12.4**
				III		P5	A12.4

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	2-AMINO-4-CHLOROPHENOL	6.1	UN2673	II		P5	A10.6
	2-AMINO-5-DIETHYLAMINOPENTANE	6.1	UN2946	III		P5	A10.5
	2-(2-AMINOETHOXY) ETHANOL	8	UN3055	III		P5	A12.3
	N-AMINOETHYLPIPERAZINE	8	UN2815	III		P5	A12.3
	AMINOPHENOLS *(o-m-p-)*	6.1	UN2512	III		P5	A10.6
	AMINOPROPLYDIETHANOLAMINE *see* **AMINES, LIQUID, CORROSIVE, N.O.S.**						
	AMINOPYRIDINES (o-m-p)	6.1	UN2671	II		P5	A10.6
	AMMONIA, ANHYDROUS, LIQUEFIED *or* **AMMONIA SOLUTIONS** *relative density less than 0.880 at 15 degrees C in water, with more than 50% ammonia*	2.3	UN1005		8	P2, 4	A6.5
	AMMONIA SOLUTIONS, *relative density between 0.880 and 0.957 at 15 degrees C in water, with more than 10%, but not more than 35% ammonia*	8	UN2672	III		P5	A12.3
	AMMONIA SOLUTIONS, *relative density less than 0.880 at 15 degrees C in water, with more than 35%, but not more than 50% ammonia*	2.2	UN2073			P5	A6.3, A6.5
	AMMONIUM ARSENATE	6.1	UN1546	II		P5	A10.6
	Ammonium azide	FORBIDDEN					FORBIDDEN
	AMMONIUM BIFLUORIDDE, SOLID *see* **AMMONIUM HYDROGEN DIFLUORIDE, SOLID**						
	AMMONIUM BIFLUORIDDE, SOLUTION *see* **AMMONIUM HYDROGEN DIFLUORIDE, SOLUTION**						
	Ammonium bromate	FORBIDDEN					FORBIDDEN
	Ammonium chlorate	FORBIDDEN					FORBIDDEN
	AMMONIUM DICHROMATE	5.1	UN1439	II		P5	A9.8
	AMMONIUM DINITRO-O-CRESOLATE	6.1	UN1843	II		P5	A10.6
	AMMONIUM FLUORIDE	6.1	UN2505	III		P5	A10.6
	AMMONIUM FLUOROSILICATE	6.l	UN2854	III		P5	A10.6
	Ammonium fulminate	FORBIDDEN					FORBIDDEN
	Ammonium hydrate; see **AMMONIA SOLUTIONS,** *etc.*						
	AMMONIUM HYDROGENDIFLUORIDE, SOLID	8	UN1727	II		P5, N34	A12.4
	AMMONIUM HYDROGENDIFLUORIDE, SOLUTION	8	UN2817	II	6.1	P4, N34	A12.3
				III	6.1	P5	A12.3

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	AMMONIUM HYDROGEN SULPHATE	8	UN2506	II		P5	A12.4
	AMMONIUM HYDROXIDE; *see* **AMMONIA SOLUTIONS**, etc.						
	AMMONIUM METAVANADATE	6.1	UN2859	II		P5	A10.6
D	**AMMONIUM NITRATE FERTILIZERS, N.O.S.**	5.1	NA2072	III		P5	A9.8
	AMMONIUM NITRATE FERTILIZER; *which is more liable to explode than ammonium nitrate with 0.2 combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance*	FORBIDDEN					FORBIDDEN
	AMMONIUM NITRATE FERTILIZERS; *uniform nonsegregating mixtures of ammonium nitrate/ammonium sulfate, with more than 45%, but not more than 70% ammonium nitrate and not more than 0.4% of total combustible material*	5.1	UN2069	III		P5, A1, A29	A9.8
	AMMONIUM NITRATE FERTILIZER; *uniform nonsegregating mixtures of nitrogen/phosphate or nitrogen/potash types or complete fertilizers of nitrogen/phosphate/potash type, with not more than 0.4% total added combustible material or with not more than 45% ammonium nitrate with unrestricted combustible material.*	9	UN2071	III		P5	A13.3
	AMMONIUM NITRATE FERTILIZERS; *uniform nonsegregating mixtures of ammonium nitrate with added matter which is inorganic and chemically inert towards ammonium nitrate, with not less than 90% ammonium nitrate and not more than 0.2% combustible material (including organic material calculated as carbon), or with more than 70%, but less than 90% ammonium nitrate and not more than 0.4% total combustible material*	5.1	UN2067	III		P5	A9.8

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	AMMONIUM NITRATE FERTILIZERS *uniform; nonsegregating mixtures of ammonium nitrate with calcium carbonate and/or dolomite, with more than 80% but less than 90% ammonium nitrate and not more than 0.4% total combustible material*	5.1	UN2068	III		P5	A9.8
	AMMONIUM NITRATE FERTILIZERS*; uniform nonsegregating mixtures of nitrogen/phosphate or nitrogen/potash types or complete fertilizers of nitrogen/phosphate/potash type, with more 70%, but less than 90% ammonium nitrate and not more than 0.4% total combustible material*	5.1	UN2070	III		P5, A1, A29	A9.8
D	**AMMONIUM NITRATE-FUEL OIL MIXTURE** *(containing only prilled Ammonium Nitrate and fuel only)*	1.5D	NA0331	II		P4	A5.6
	AMMONIUM NITRATE, LIQUID *(hot concentrated solution)*	FORBIDDEN					FORBIDDEN
	AMMONIUM NITRATE, *with more than 0.2% combustible substances, including any organic substance calculated as carbon to the exclusion of any other added substance*	1.1D	UN0222	II		P4	A5.7
	AMMONIUM NITRATE*, with not more than 0.2% of combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance*	5.1	UN1942	III		P5, A1, A29	A9.8
	Ammonium nitrite	FORBIDDEN					FORBIDDEN
	AMMONIUM PERCHLORATE	1.1D	UN0402	II		P4, 107	A5.8
	AMMONIUM PERCLORATE	5.1	UN1442	II		P5, 107, A9	A9.8
	AMMONIUM PERSULPHATE	5.1	UN1444	III		P5, A1, A29	A9.8
	AMMONIUM PICRATE, *dry or wetted with less than l0% water, by mass*	1.1D	UN0004	II		P4	A5.8
	AMMONIUM PICRATE, WETTED *with not less than 10% water, by mass*	4.1	UN1310	I		P4, 23, A2, N41	A8.4
	AMMONIUM POLYSULPHIDE, SOLUTION	8	UN2818	II	6.1	P4	A12.3
				III	6.1	P5	A12.3
	AMMONIUM POLYVANADATE	6.1	UN2861	II		P5	A10.6
	Ammonium silicofluoride; see **AMMONIUM FLUOROSILICATE**						

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	AMMONIUM SULPHIDE SOLUTION	8	UN2683	II	6.1, 3	P4	A12.3
	Ammunition, blank; see **CARTRIDGES FOR WEAPONS, BLANK**						
	Ammunition, fixed, semi-fixed or separate loading; see **CARTRIDGES FOR WEAPONS**, *etc.*						
	AMMUNITION, ILLUMINATING, *with or without burster, expelling charge or propelling charge*	1.2G	UN0171	II		P4	A5.9
	AMMUNITION, ILLUMINATING, *with or without burster, expelling charge or propelling charge*	1.3G	UN0254	II		P4	A5.9
	AMMUNITION, ILLUMINATING, *with or without burster, expelling charge or propelling charge*	1.4G	UN0297	II		P5	A5.9
	AMMUNITION, INCENDIARY *liquid or gel, with burster, expelling charge or propelling charge*	1.3J	UN0247	II		P3	A5.9
	Ammunition, incendiary (water-activated contrivances) with burster, expelling charge or propelling charge; see **CONTRIVANCES, WATER-ACTIVATED**, *etc.*						
	AMMUNITION, INCENDIARY, WHITE PHOSPHOROUS, *with burster, expelling charge or propelling charge*	1.2H	UN0243	II		P3	A5.9
	AMMUNITION, INCENDIARY, WHITE PHOSPHOROUS, *with burster, expelling charge or propelling charge*	1.3H	UN0244	II		P3	A5.9
	AMMUNITION, INCENDIARY, *with or without burster, expelling charge, or propelling charge*	1.2G	UN0009	II		P4	A5.9
	AMMUNITION, INCENDIARY, *with or without burster, expelling charge, or propelling charge*	1.3G	UN0010	II		P4	A5.9
	AMMUNITION, INCENDIARY, *with or without burster, expelling charge, or propelling charge*	1.4G	UN0030	II		P5	A5.9
	AMMUNITION, PRACTICE	1.4G	UN0362	II		P5	A5.9
	AMMUNITION, PRACTICE	1.3G	UN0488	II		P4	A5.9
	AMMUNITION, PROOF	1.4G	UN0363	II		P5	A5.9
	Ammunition, rocket; see **WARHEADS, ROCKE**T, etc.						
	Ammunition, SA (small arms); see **CARTRIDGES FOR WEAPONS**, *etc.*						

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	Ammunition, smoke (water-activated contrivances), white phosphorus, with burster, expelling charge or propelling charge; see **CONTRIVANCES, WATER-ACTIVATED,** *etc.*						
	Ammunition, smoke (water-activated contrivances), without white phosphorus or phosphides, with burster, expelling charge or propelling charge; see **CONTRIVANCES, WATER-ACTIVATED,** *etc.*						
	AMMUNITION, SMOKE, WHITE PHOSPHORUS, *with burster, expelling charge, or propelling charge*	1.3H	UN0246	II		P3	A5.9
	AMMUNITION, SMOKE, WHITE PHOSPHORUS, *with burster, expelling charge, or propelling charge*	1.2H	UN0245	II		P3	A5.9
	AMMUNITION, SMOKE, *with or without burster, expelling charge or propelling charge*	1.3G	UN0016	II	8	P4	A5.9
	AMMUNITION, SMOKE, *with or without burster, expelling charge or propelling charge*	1.4G	UN0303	II	8	P5	A5.9
	AMMUNITION, SMOKE, *with or without burster, expelling charge or propelling charge*	1.2G	UN0015	II	8	P4	A5.9
	Ammunition, sporting; see **CARTRIDGES FOR WEAPONS**, *etc. (UN0012,UN0328, UN0339)*						
	AMMUNITION, TEAR-PRODUCING, **NONEXPLOSIVE**, *without burster or expelling charge, nonfuzed*	6.1	UN2017	II	8	P4	A10.6
	AMMUNITION, TEAR-PRODUCING, *with burster, expelling charge or propelling charge*	1.2G	UN0018	II	8, 6.1	P4	A5.9
	AMMUNITION, TEAR-PRODUCING, *with burster, expelling charge or propelling charge*	1.3G	UN0019	II	8, 6.1	P4	A5.9
	AMMUNITION, TEAR-PRODUCING, *with burster, expelling charge or propelling charge*	1.4G	UN0301	II	8, 6.1	P5	A5.9
	AMMUNITION, TOXIC, NON-EXPLOSIVE, *without burster or expelling charge, nonfuzed*	6.1	UN2016	II		P3, 5	A10.6
	Ammunition, toxic (water-activated contrivances), with burster, expelling charge or propelling charge; see **CONTRIVANCES, WATER-ACTIVATED**, *etc.*						
*	**AMMUNITION, TOXIC**, *with burster, expelling charge, or propelling charge*	1.2K	UN0020	II	6.1	P3, 5	A5.9

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*	**AMMUNITION, TOXIC,** *with burster, expelling charge, or propelling charge*	1.3K	UN0021	II	6.1	P3, 5	A5.9
	AMYL ACETATES	3	UN1104	III		P5	A7.3
	AMYL ACID PHOSPHATE	8	UN2819	III		P5	A12.3
	AMYL ALCOHOLS	3	UN1105	II		P5	A7.3
				III		P5	A7.3
	AMYLAMINES	3	UN1106	II	8	P5	A7.3
				III	8		A7.3
	AMYL BUTYRATES	3	UN2620	III		P5	A7.3
	AMYL CHLORIDES	3	UN1107	II		P5	A7.3
	n-AMYLENE	3	UN1108	I		P3	A7.3
	AMYL FORMATES	3	UN1109	III		P5	A7.3
	AMYL MERCAPTANS	3	UN1111	II		P5, A3	A7.3
	AMYL METHYL KETONE	3	UN1110	III		P5	A7.3
	AMYL NITRATE	3	UN1112	III		P5	A7.3
	AMYL NITRITE	3	UN1113	II		P5	A7.3
	AMYLTRICHLOROSILANE	8	UN1728	II		P5, A7, N34	A12.3
	Anaesthetic ether; see **DIETHYL ETHER**						
	Anhydrous ammonia; see **AMMONIA, ANHYDROUS, LIQUEFIED**						
	Anhydrous hydrazine; see **HYDRAZINE, ANHYDROUS**						
	Anhydrous hydrofluoric acid; see **HYDROGEN FLUORIDE, ANHYDROUS**						
	Anhydrous hydrofluoric acid, see **HYDROGEN FLUORIDE ANHYDROUS**						
+	**ANILINE**	6.1	UN1547	II		P5	A10.5
	ANLINE HYDROCHLORIDE	6.1	UN1548	III		P5	A10.5, A10.6
	ANISIDINES	6.1	UN2431	III		P5	A10.5, A10.6
	ANISOLE	3	UN2222	III		P5	A7.3
	ANISOYL CHLORIDE	8	UN1729	II		P5	A12.3
	Anti-freeze liquid; see **FLAMMABLE LIQUIDS, N.O.S.**						
	Anti-knock compound, mixture; see **MOTOR FUEL ANTI-KNOCK MIXTURES**						
	Antimonious chloride, see **ANTIMONY TRICHLORIDE**						
	ANTIMONY COMPOUNDS, INORGANIC, LIQUID, N.O.S.	6.1	UN3141	III		P5	A10.5

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	ANTIMONY COMPOUNDS, INORGANIC, SOLID, N.O.S.	6.1	UN1549	III		P5	A10.6
	ANTIMONY LACTATE	6.1	UN1550	III		P5	A10.6
	ANTIMONY PENTACHLORIDE, LIQUID	8	UN1730	II		P5	A12.3
	ANTIMONY PENTACHLORIDE, SOLUTIONS	8	UN1731	II		P5	A12.3
				III		P5	A12.3
	ANTIMONY PENTAFLUORIDE	8	UN1732	II	6.1	P4, A3, A6, A7, A10, N3	A12.3
	ANTIMONY POTASSIUM TARTRATE	6.1	UN1551	III		P5	A10.6
	ANTIMONY POWDER	6.1	UN2871	III		P5	A10.6
	Antimony sulphide a chlorate, mixtures of	FORBIDDEN					FORBIDDEN
D	**ANTIMONY TRIBROMIDE, SOLID**	8	NA1549	II		P5	A12.4
D	**ANTIMONY TRIBROMIDE, SOLUTION**	8	NA1549	II		P5	A12.3
	ANTIMONY TRICHLORIDE, LIQUID	8	UN1733	II		P5	A12.3
	ANTIMONY TRICHLORIDE, SOLID	8	UN1733	II		P5	A12.4
D	**ANTIMONY TRIFLUORID**E, **SOLID**	8	NA1549	II		P5	A12.4
D	**ANTIMONY TRIFLUORIDE SOLUTION**	8	NA1549	II		P5	A12.3
	Acqua ammonia, see **AMMONIA SOLUTION**						
	ARGON, COMPRESSED	2.2	UN1006			P5	A6.3,A6.6
	ARGON, REFRIGERATED LIQUID *(cryogenic liquid*)	2.2	UN1951			P5	A6.11
	ARSENIC	6.1	UN1558	II		P5	A10.6
	ARSENIC ACID, LIQUID	6.1	UN1553	I		P3	A10.5
	ARSENIC ACID, SOLID	6.1	UN1554	II		P5	A10.6
	ARSENICAL DUST	6.1	UN1562	II		P5	A10.6
*	**ARSENICAL PESTICIDES, LIQUID**, **FLAMMABLE, TOXIC,** *flashpoint less than 23 degrees* C	3	UN2760	I	6.1	P3	A7.3
				II	6.1	P4	A7.3
*	**ARSENICAL PESTICIDES, LIQUID, TOXIC, FLAMMABLE, N.O.S.,** *flashpoint not less than 23 degrees C*	6.1	UN2993	I	3	P3	A10.5
				II	3	P4	A10.5
				III	3	P5	A10.5
*	**ARSENICAL PESTICIDES, LIQUID, TOXIC**	6.1	UN2994	I		P3	A10.5
				II		P5	A10.5
				III		P5	A10.5
*	**ARSENICAL PESTICIDES, SOLID, TOXIC, N.O.S.**	6.1	UN2759	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6
	ARSENIC BROMIDE	6.1	UN1555	II		P5	A10.6

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	ARSENIC COMPOUNDS, LIQUID, N.O.S.,	6.1	UN1556	I		P3	A10.5
	including Arsenates, N.O.S., Arsenites, N.O.S.,			II		P5	A10.5
	Arsenic sulphides, N.O.S., and Organic			III		P5	A10.5
	compounds of arsenic, N.O.S.						
	ARSENIC COMPOUNDS, SOLID, N.O.S.,	6.1	UN1557	I		P5	A10.6
	including Arsenates, N.O.S., Arsenites, N.O.S.,			II		P5	A10.6
	Arsenic sulphides, N.O.S., and Organic			III		P5	A10.6
	compounds of arsenic, N.O.S.						
	Arsenic, fuming liquid, see **ARSENIC TRICHLORIDE**						
	Arsenic hydride, see **ARSINE**						
	ARSENIC PENTOXIDE	6.1	UN1559	II		P5	A10.6
D	**ARSENIC SULPHIDE**	6.1	NA1557	II		P5	A10.6
	Arsenic sulphide and a chlorate,	FORBIDDEN					FORBIDDEN
	mixtures of						
	ARSENIC TRICHLORIDE	6.1	UN1560	I		P2, 2	A10.7
	ARSENIC TRIOXIDE	6.1	UN1561	II		P5	A10.6
D	**ARSENIC TRISULPHIDE**	6.1	NA1557	II		P5	A10.6
	ARSINE	2.3	UN2188		2.1	P1, 1	A6.15
	ARTICLES, EXPLOSIVE, EXTREMELY	1.6N	UN0486	II		P5, 101	A5.10
	INSENSITIVE *or* **ARTICLES, EEI**						
*	**ARTICLES, EXPLOSIVE, N.O.S.**	1.4S	UN0349	II		P5, 101	A5.11
*	**ARTICLES, EXPLOSIVE, N.O.S.**	1.4B	UN0350	II		P5, 101	A5.11
*	**ARTICLES, EXPLOSIVE, N.O.S.**	1.4C	UN0351	II		P5, 101	A5.11
*	**ARTICLES, EXPLOSIVE, N.O.S.**	1.4D	UN0352	II		P5, 101	A5.11
*	**ARTICLES, EXPLOSIVE, N.O.S.**	1.4G	UN0353	II		P5, 101	A5.11
*	**ARTICLES, EXPLOSIVE, N.O.S.**	1.1L	UN0354	II		P3, 101	A5.11
*	**ARTICLES, EXPLOSIVE, N.O.S.**	1.2L	UN0355	II		P3, 101	A5.11
*	**ARTICLES, EXPLOSIVE, N.O.S.**	1.3L	UN0356	II		P3, 101	A5.11
*	**ARTICLES, EXPLOSIVE, N.O.S.**	1.1C	UN0462	II		P4, 101	A5.11
*	**ARTICLES, EXPLOSIVE, N.O.S.**	1.1D	UN0463	II		P4, 101	A5.11
*	**ARTICLES, EXPLOSIVE, N.O.S.**	1.1E	UN0464	II		P4, 101	A5.11
*	**ARTICLES, EXPLOSIVE, N.O.S.**	1.1F	UN0465	II		P4, 101	A5.11
*	**ARTICLES, EXPLOSIVE, N.O.S.**	1.2C	UN0466	II		P4, 101	A5.11
*	**ARTICLES, EXPLOSIVE, N.O.S.**	1.2D	UN0467	II		P4, 101	A5.11
*	**ARTICLES, EXPLOSIVE, N.O.S.**	1.2E	UN0468	II		P4, 101	A5.11
*	**ARTICLES, EXPLOSIVE, N.O.S.**	1.2F	UN0469	II		P4, 101	A5.11
*	**ARTICLES, EXPLOSIVE, N.O.S.**	1.3C	UN0470	II		P4, 101	A5.11
*	**ARTICLES, EXPLOSIVE, N.O.S.**	1.4E	UN0471	II		P5, 101	A5.11

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
*	**ARTICLES, EXPLOSIVE, N.O.S.**	1.4F	UN0472	II		P5, 101	A5.11
	ARTICLES, PRESSURIZED HYDRAULIC *containing nonflammable gas*	2.2	UN3164			P5	A6.5, A6.6, A6.9
	ARTICLES, PRESSURIZED, PNEUMATIC *containing nonflammable gas*	2.2	UN3164			P5	A6.5, A6.6, A6.9
	ARTICLES, PYROPHORIC	1.2L	UN0380	II		P3	A5.11
	ARTICLES, PYROTECHNIC *for technical purposes*	1.1G	UN0428	II		P4	A5.12
	ARTICLES, PYROTECHNIC *for technical purposes*	1.2G	UN0429	II		P4	A5.12
	ARTICLES, PYROTECHNIC *for technical purposes*	1.3G	UN0430	II		P4	A5.12
	ARTICLES, PYROTECHNIC *for technical purposes*	1.4G	UN0431	II		P5	A5.12
	ARTICLES, PYROTECHNIC *for technical purposes*	1.4S	UN0432	II		P5	A5.12
	Asbestos; see **BLUE ASBESTOS, WHITE ASBESTOS**, *or* **BROWN ASBESTOS**, *etc.*						
	Asphalt, cut back; see **TARS, LIQUID,** *etc.*						
	ASPHALT, *at or above its flashpoint*	FORBIDDEN					FORBIDDEN
	Automobile, motorcycle, tractor, or other self-propelled vehicle, engine, or other mechanical apparatus; see **ENGINES**, **INTERNAL COMBUSTION** *or* **BATTERY-POWERED VEHICLE**						
	Azidodithiocarbonic acid	FORBIDDEN					FORBIDDEN
	Azidoethyl nitrate	FORBIDDEN					FORBIDDEN
	Azido guanidine picrate (dry)	FORBIDDEN					FORBIDDEN
	5-Azido-1-hydroxy tetrazole	FORBIDDEN					FORBIDDEN
	Azido hydroxy tetrazole (mercury and silver salts)	FORBIDDEN					FORBIDDEN
	3-Azido-1, 2-propylene glycol dinitrate	FORBIDDEN					FORBIDDEN
	1-Aziridinylphosphine oxide-(tris); see **TRIS-(1-AZIRIDINYL) PHOSPHINE OXIDE**, **SOLUTION**						
	AZODICARBONAMIDE	FORBIDDEN					FORBIDDEN
	*2,2'-Azodi-(2,4-dimethyl-4-*methoxyvaleronitrile) *see* **SELF-REACTIVE SOLID TYPE D, TEMPERATURE CONTROLLED**						
	*2,2'-*Azodi-(2,4 *dimethylvaleronitrile) see* **SELF-REACTIVE SOLID TYPE D**, **TEMPERATURE CONTROLLED**						
	1,1'-Azodi-(hexahydrobenzonitrile) see **SELF-REACTIVE SOLID TYPE D**						

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	Azodiisobutyronitrile, see **SELF-REACTIVE SOLID TYPE C, TEMPERATURE CONTROLLED**						
	2,2'-Azodi-(2-methylbutyronitrile), see **SELF-REACTIVE SOLID TYPE D, TEMPERATURE CONTROLLED**						
	Azotetrazole (dry)	FORBIDDEN					FORBIDDEN
	BARIUM	4.3	UN1400	II		P4, A19	A8.4
	BARIUM ALLOYS, PYROPHORIC	4.2	UN1854	I		P3	A8.6
	BARIUM AZIDE, *dry or wetted with less than 50% water, by mass*	1.1A	UN0224	II	6.1	P3, 111, 117	A5.13
	BARIUM AZIDE, *wetted with not less than 50% water, by mass*	4.1	UN1571	I	6.1	P4, A2	A8.11
	BARIUM BROMATE	5.1	UN2719	II	6.1	P4	A9.8
	BARIUM CHLORATE	5.1	UN1445	II	6.1	P4, A9, N34	A9.8
	BARIUM COMPOUNDS, N.O.S.	6.1	UN1564	II		P5	A10.6
				III		P5	A10.6
	BARIUM CYANIDE	6.1	UN1565	I		P5, N74, N75	A10.6
	BARIUM HYPOCHLORITE *with more than 22% available chlorine*	5.1	UN2741	II	6.1	P5, A7, A9, N34	A9.8
	BARIUM NITRATE	5.1	UN1446	III	6.1	P5	A9.8
	BARIUM OXIDE	6.1	UN1884	II		P5	A10.6
	BARIUM PERCHLORATE	5.1	UN1447	II	6.1	P5	A9.8
	BARIUM PERMANGANATE	5.1	UN1448	II	6.1	P5	A9.8
	BARIUM PEROXIDE	5.1	UN1449	II	6.1	P5	A9.8
	Barium selenate; see **SELENATES**						
	Barium selenite; see **SELENITES**						
D	**BARIUM STYPHNATE**	1.1A	NA0473	II		P3, 111, 117	A5.13
	BATTERIES, CONTAINING SODIUM	4.3	UN3292	II		P5	A8.19
	BATTERIES, DRY CONTAINING POTASSIUM HYDROXIDE SOLID, *electric storage*	8	UN3028	III		P5	A12.4
	BATTERIES, WET, FILLED WITH ACID, *electric storage*	8	UN2794	III		P5	A12.5
	BATTERIES, WET, FILLED WITH ALKALI, *electric storage*	8	UN2795	III		P5	A12.5
	BATTERIES, WET, NONSPILLABLE, *electric storage*	8	UN2800	III		P5	A12.5

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	Battery, Dry					A67	
	BATTERY FLUID, ACID	8	UN2796	II		P5, A3, A7, N6, N34	A12.3, 12.5
	BATTERY FLUID, ALKALI	8	UN2797	II		P5, N6	A12.3,A12.5
	BATTERY-POWERED EQUIPMENT *(wet battery)*	9	UN3171			P5	A13.7
	BATTERY-POWERED VEHICLE *(wet battery)*	9	UN3171			P5	A13.7
	Battery, wet, with wheelchair; see **BATTERY-POWERED EQUIMENT** *or* **BATTERY-POWERED VEHICLE**						
+	**BENZALDEHYDE**	9	UN1990			P5	A13.3
	BENZENE	3	UN1114	II		P5	A7.3
	Benzene diazonium chloride (dry)	FORBIDDEN					FORBIDDEN
	Benzene diazonium nitrate (dry)	FORBIDDEN					FORBIDDEN
	1,4-Benzenediol, see **HYDROQUINONE**						
	Benzene-1,3-disulphohydrazide, not more than 52% as a paste see **SELF-REACTIVE SOLID TYPE D**						
	Benzene phosphorus dichloride; see **PHENYLPHOSPHORUS DICHLORIDE**						
	Benzene phosphorus thiodichloride; see **PHENYLPHOSPHORUS THIODICHLORIDE**						
	Benzene sulphohydrazide see **SELF-REACTIVE SOLID TYPE D**						
	BENZENESULPHONYL CHLORIDE	8	UN2225	III		P5	A12.3
	Benzenethiol; see **PHENYL MERCAPTAN**						
	Benzene triozonide	FORBIDDEN					FORBIDDEN
	BENZIDINE	6.1	UN1885	II		P5	A10.6
*	**BENZOIC DERIVATIVE PESTICIDES, LIQUID**,	3	UN2770	I	6.1	P3	A7.3
	FLAMMABLE, TOXIC, *flashpoint*			II	6.1	P4	A7.3
	less than 23 degrees C						
*	**BENZOIC DERIVATIVE PESTICIDES, LIQUID,**	6.1	UN3003	I	3	P3	A10.5
	TOXIC, FLAMMABLE, N.O.S., *flashpoint*			II	3	P4	A10.5
	not less than 23 degrees C			III	3	P5	A10.5
*	**BENZOIC DERIVATIVE PESTICIDES, LIQUID**,	6.1	UN3004	I		P3	A10.5
	TOXIC			II		P4	A10.5
				III		P5	A10.5

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
*	**BENZOIC DERIVATIVE PESTICIDES, SOLID, TOXIC**	6.1	UN2769	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6
	BENZONITRILE	6.1	UN2224	II		P5	A10.5
	BENZOQUINONE	6.1	UN2587	II		P5	A10.6
	BENZOTRICHLORIDE	8	UN2226	II		P5	A12.3
	BENZOTRIFLUORIDE	3	UN2338	II		P5	A7.3
	Benzoyl azide	FORBIDDEN					FORBIDDEN
	BENZOYL CHLORIDE	8	UN1736	II		P4	A12.3
	BENZYL BROMIDE	6.1	UN1737	II	8	P4, A3, A7, N34, N33	A10.5
	BENZYL CHLORIDE	6.1	UN1738	II	8	P4, A3, A7, N43, N33	A10.5
	BENZYL CHLOROFORMATE	8	UN1739	I		P3, A3, A6, N41	A12.3
	BENZYLDIMETHYLAMINE	8	UN2619	II	3	P5	A12.3
	4-(benzyl(ethyl)amino)-3-ethoxybenzenediazonium zinc chloride see **SELF-REACTIVE SOLID TYPE D**						
	BENZYLIDENE CHLORIDE	6.1	UN1886	II		P5	A10.5
	BENZYL IODIDE	6.1	UN2653	II		P5	A10.5
	4-(benzyl(methyl)amino)3-ethoxybenzenediazonium zinc chloride see **SELF-REACTIVE SOLID TYPE D, TEMPERATURE CONTROLLED**						
	BERYLLIUM COMPOUNDS, N.O.S.	6.1	UN1566	II		P5	A10.6
				III		P5	A10.6
	BERYLLIUM NITRATE	5.1	UN2464	II	6.1	P5	A9.8
	BERYLLIUM, POWDER	6.1	UN1567	II	4.1	P5	A10.6
	Biphenyl triozonide	FORBIDDEN					FORBIDDEN
*	**BIPYRIDILIUM PESTICIDES, LIQUID, FLAMMABLE, TOXIC,** *flashpoint less than 23 degrees C*	3	UN2782	I	6.1	P3	A7.3
				II	6.1	P4	A7.3
*	**BIPYRIDILIUM PESTICIDES, LIQUID, FLAMMABLE, TOXIC,** *flashpoint not less than 23 degrees C*	6.1	UN3015	I	3	P3	A10.5
				II	3	P4	A10.5
				III	3	P5	A10.5
*	**BIPYRIDILIUM PESTICIDES, LIQUID, TOXIC**	6.1	UN3016	I		P3	A10.5
				II		P4	A10.5
				III		P5	A10.5

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
*	**BIPYRIDILIUM PESTICIDES, SOLID, TOXIC**	6.1	UN2781	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6
	BISULFATE, AQUEOUS SOLUTION	8	UN2837	II		P5, A7, N34	A12.3
				III		P5, A7, N34	A12.3
	BISULPHITES, AQUEOUS SOLUTIONS, N.O.S.	8	UN2693	III		P5	A12.3
	BLACK, POWDER, COMPRESSED *or* **GUNPOWDER, COMPRESSED** *or* **BLACK POWDER, IN PELLETS** *or* **GUNPOWDER, IN PELLETS**	1.1D	UN0028	II		P4	A5.14
	BLACK POWDER *or* **GUNPOWDER,** *granular or as a meal*	1.1D	UN0027	II		P4	A5.14
	Blasting agent, n.o.s.; see **EXPLOSIVES, BLASTING**						
	Blasting cap, assemblies; *see* **DETONATOR ASSEMBLIES NONELECTRIC,** *for blasting*						
	Blasting caps, electric; see **DETONATORS, ELECTRIC,** *for blasting*						
	Blasting caps, nonelectric; see **DETONATORS, NONELECTRIC,** *for blasting*						
	Bleaching powder; see **CALCIUM HYPOCHLORITE MIXTURES**, *etc.*						
	BLUE ASBESTOS *(crocidolite) or* **BROWN ASBESTOS** (*amosite, mysorite*)	9	UN2212	II		P5	A13.15
	BOMBS, PHOTO-FLASH	1.1F	UN0037	II		P4	A5.10
	BOMBS, PHOTO-FLASH	1.1D	UN0038	II		P4	A5.10
	BOMBS, PHOTO-FLASH	1.2G	UN0039	II		P4	A5.10
	BOMBS, PHOTO-FLASH	1.3G	UN0299	II		P4	A5.10
	BOMBS, SMOKE, NONEXPLOSIVE, *with corrosive liquid, without initiating device*	8	UN2028	II		P4	A12.6
	BOMBS, *with bursting charge*	1.1F	UN0033	II		P4	A5.10
	BOMBS, *with bursting charge*	1.1D	UN0034	II		P4	A5.10
	BOMBS, *with bursting charge*	1.2D	UN0035	II		P4	A5.10
	BOMBS, *with bursting charge*	1.2F	UN0291	II		P4	A5.10
	BOMBS WITH FLAMMABLE LIQUID, *with bursting charge*	1.1J	UN0399	II		P3	A5.15
	BOMBS WITH FLAMMABLE LIQUID, *with bursting charge*	1.2J	UN0400	II		P3	A5.15
	BOOSTERS WITH DETONATOR	1.1B	UN0225	II		P4	A5.16

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	BOOSTERS WITH DETONATOR	1.2B	UN0268	II		P4	A5.16
D	**BOOSTERS WITH DETONATOR**	1.4B	NA0350	II		P5, 115	A5.16
	BOOSTERS, *without detonator*	1.1D	UN0042	II		P4	A5.17
	BOOSTERS, *without detonator*	1.2D	UN0283	II		P4	A5.17
	BORNEOL	4.1	UN1312	III		P5, A1	A8.4
+	**BORON TRIBROMIDE**	8	UN2692	I	6.1	P2, 2, A3, A7, N34	A12.12
	BORON TRICHLORIDE	2.3	UN1741		8	P2, 3	A6.5
	BORON TRIFLUORIDE	2.3	UN1008			P2, 2	A6.6
	BORON TRIFLUORIDE ACETIC ACID COMPLEX	8	UN1742	II		P4	A12.3
	BORON TRIFLUORIDE DIETHYL ETHERATE	8	UN2604	I	3	P3, A19	A12.3
	BORON TRIFLUORIDE DIHYDRATE	8	UN2851	II		P5	A12.4
	BORON TRIFLUORIDE DIMETHYL ETHERATE	4.3	UN2965	I	8, 3	P3, A19	A8.3
	BORON TRIFLUORIDE PROPIONIC ACID COMPLEX	8	UN1743	II		P4	A12.3
	Box toe gum; see **NITROCELLULOSE**						
	BROMATES, INORGANIC, N.O.S.	5.1	UN1450	II		P5	A9.8
	BROMATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	UN3213	II		P4	A9.7
	BROMINE CHLORIDE	2.3	UN2901		8, 5.1	P2, 2	A6.5
+	**BROMINE** *or* **BROMINE SOLUTIONS**	8	UN1744	I	6.1	P2, 1, A3, A6, N34, N43	A12.12
	Bromine azide	FORBIDDEN					FORBIDDEN
+	**BROMINE PENTAFLUORIDE**	5.1	UN1745	I	6.1, 8	P1, 1	A9.11
+	**BROMINE TRIFLUORIDE**	5.1	UN1746	I	6.1, 8	P2, 2	A9.11
	BROMOACETIC ACID, *solid*	8	UN1938	II		P5, A7, N34	A12.4
	BROMOACETIC ACID, *solution*	8	UN1938	II		P4	A12.3
+	**BROMOACETONE**	6.1	UN1569	II		P2, 2	A10.4
	BROMOACETYL BROMIDE	8	UN2513	II		P5	A12.3
	BROMOBENZENE	3	UN2514	III		P5	A7.3
	BROMOBENZYL CYANIDES, *liquid*	6.1	UN1694	I		P3	A10.5
	BROMOBENZYL CYANIDES, *solid*	6.1	UN1694	I		P5	A10.6
	2-BROMOBUTANE	3	UN2339	II		P5	A7.3
	BROMOCHLOROMETHANE	6.1	UN1887	III		P5	A10.5
	4-BROMO-1, 2-DINITROBENZENE	FORBIDDEN					FORBIDDEN
	2-BROMOETHYL ETHYL ETHER	3	UN2340	II		P5	A7.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	BROMOFORM	6.1	UN2515	III		P5	A10.5
	1-BROMO-3-METHYLBUTANE	3	UN2341	III		P5	A7.3
	BROMOMETHYLPROPANES	3	UN2342	II		P5	A7.3
	2-BROMO-2-NITROPROPANE-1,3,-DIOL	6.1	UN3241	III		P5	A10.6
	1Bromo-3-Nitrobenzene (unstable at 56 degrees C)	FORBIDDEN					FORBIDDEN
	2-BROMOPENTANE	3	UN2343	II		P5	A7.3
	2-BROMOPROPANE	3	UN2344	II		P5	A7.3
	3-BROMOPROPYNE	3	UN2345	II		P5	A7.3
	Bromosilane	FORBIDDEN					FORBIDDEN
	Bromotoluene-alpha; see **BENZYL BROMIDE**						
	BROMOTRIFLUOROETHYLENE	2.1	UN2419			P4	A6.5
	BROMOTRIFLUOROMETHANE *(R13B1)*	2.2	UN1009			P5	A6.3,A6.5
	BRUCINE	6.1	UN1570	I		P3	A10.6
	BURSTERS, *explosive*	1.1D	UN0043	II		P4	A5.18
	BUTADIENES, INHIBITED	2.1	UN1010			P4	A6.3,A6.5
	BUTANE *or* **BUTANE MIXTURES**; *see also* **PETROLEUM GASES, LIQUEFIED**	2.1	UN1011			P4	A6.3,A6.7
	Butane, butane mixtures and mixtures having similar properties in cartridges each not exceeding 500 grams; see **RECEPTACLES, SMALL, CONTAINING GAS**, *etc.*						
	BUTANEDIONE	3	UN2346	II		P5	A7.3
	BUTANOLS	3	UN1120	II		P5	A7.3
				III		P5	A7.3
	BUTOXYL	3	UN2708	III		P5	A7.3
	BUTYL ACETATES	3	UN1123	II		P5	A7.3
				III		P5	A7.3
	BUTYL ACID PHOSPHATE	8	UN1718	III		P5	A12.3
	BUTYL ACRYLATE	3	UN2348	III		P5	A7.3
	Butyl alcohols; see **BUTANOLS**						
	N-BUTYLAMINE	3	UN1125	II	8	P5	A7.3
	N-BUTYLANILINE	6.1	UN2738	II		P5	A10.5
	BUTYL BENZENES	3	UN2709	III		P5	A7.3
	N-BUTYL BROMIDE	3	UN1126	II		P5	A7.3
	n-Butyl chloride; see **CHLOROBUTANES**						
	N-BUTYL CHLOROFORMATE	6.1	UN2743	I	8	P2, 2	A10.7

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
D	**SEC-BUTYL CHLOROFORMATE**	6.1	NA2742	I	3, 8	P2, 2	A10.7
	TERT-BUTYLCYCLOHEXYLCHLOROFORMATE	6.1	UN2747	III		P5	A10.5
	BUTYLENE; *see also* **PETROLEUM GASES, LIQUEFIED**	2.1	UN1012			P4	A6.7
	1,2-BUTYLENE OXIDE, STABILIZED	3	UN3022	II		P5	A7.3
	Butyl ethers; see **DIBUTYL ETHERS**						
	Butyl ethyl ether; see **ETHYL BUTYL ETHER**						
	N-BUTYL FORMATE	3	UN1128	II		P5	A7.3
	TERT-BUTYL HYPOCHLORITE	4.2	UN3255	I	8	P3	A8.4
	tert-butyl hydroperoxide, more than 90% with water	FORBIDDEN					FORBIDDEN
	N-n-BUTYL IMIDAZOLE	6.1	UN2690	II		P5	A10.5
	TERT-BUTYL ISOCYANATE	6.1	UN2484	I	3	P3, 1, A7	A10.7
	N-BUTYL ISOCYANATE	6.1	UN2485	II	3	P4, 2, A7	A10.7
	BUTYL MERCAPTANS	3	UN2347	II		P5, A3	A7.3
	N-BUTYL METHACRYLATE	3	UN2227	III		P5	A7.3
	BUTYL METHYL ETHER	3	UN2350	II		P5	A7.3
	BUTYL NITRITES	3	UN2351	I		P3	A7.3
				II		P5	A7.3
				III		P5	A7.3
	Butyl phosphoric acid; see **BUTYL ACID PHOSPHATE**						
	BUTYLPROPIONATE	3	UN1914	III		P5	A7.3
	BUTYLTOLUENES	6.1	UN2667	III		P5	A10.5
	BUTYLTRICHLOROSILANE	8	UN1747	II	3	P4, A7, N34	A12.3
	5-TERT-BUTYL-2,4,6-TRINITRO-M-XYLENE *or* **MUSK XYLENE**	4.1	UN2956	III		P5	A8.5
	BUTYL VINYL ETHER, INHIBITED	3	UN2352	II		P5	A7.3
	1,4-BUTYNEDIOL	6.1	UN2716	III		P5, A1	A10.6
	BUTYRALDEHYDE	3	UN1129	II		P5	A7.3
	BUTYRALDOXIME	3	UN2840	III		P5	A7.3
	BUTYRIC ACID	8	UN2820	III		P5	A12.3
	BUTYRIC ANHYDRIDE	8	UN2739	III		P5	A12.3
	BUTYRONITRILE	3	UN2411	II	6.1	P4	A7.3
	BUTYRYL CHLORIDE	3	UN2353	II	8	P5	A7.3
	Cabazide	FORBIDDEN					FORBIDDEN
	Cable cutters, explosive; see **CUTTERS, CABLE, EXPLOSIVE**						

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	CACODYLIC ACID	6.1	UN1572	II		P5	A10.6
	CADMIUM COMPOUNDS	6.1	UN2570	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6
	CAESIUM *or* **CESIUM**	4.3	UN1407	I		P3, A19, N34, N40	A8.4
	CAESIUM HYDROXIDE	8	UN2682	II		P5	A12.4
	CAESIUM HYDROXIDE SOLUTION	8	UN2681	II		P5	A12.3
				III		P5	A12.3
	CAESIUM NITRATE *or* **CESIUM NITRATE**	5.1	UN1451	III		P5, A1, A29	A9.8
	CALCIUM	4.3	UN1401	II		P5	A8.4
	CALCIUM ARSENATE	6.1	UN1573	II		P5	A10.6
	CALCIUM ARSENATE AND CALCIUM ARSENITE MIXTURES, SOLID	6.1	UN1574	II		P5	A10.6
D	**CALCIUM ARSENITE, SOLID**	6.1	NA1574	II		P5	A10.6
	Calcium bisulphite solutions; see **BISULPHITES, INORGANIC, AQUEOUS SOLUTIONS, N.O.S.**						
	CALCIUM CARBIDE	4.3	UN1402	I		P3, A1, A8, N34	A8.4
				II		P5, A1, A8, N34	A8.4
	CALCIUM CHLORATE	5.1	UN1452	II		P5, N34	A9.8
	CALCIUM CHLORATE, AQUEOUS SOLUTION	5.1	UN2429	II		P5, A2, N41	A9.7
	CALCIUM CHLORITE	5.1	UN1453	II		P5, A9, N34	A9.8
	CALCIUM CYANAMIDE *with more than 0.1% of calcium carbide*	4.3	UN1403	III		P5, A1, A19	A8.4
	CALCIUM CYANIDE	6.1	UN1575	I		P5, N79, N80	A10.6
	CALCIUM DITHIONITE *or* **CALCIUM HYDROSULPHITE**	4.2	UN1923	II		P5, A19, A20	A8.4
	CALCIUM HYDRIDE	4.3	UN1404	I		P3, A19, N40	A8.4
	CALCIUM HYDROSULPHITE; *see* **CALCIUM DITHIONITE**						
	CALCIUM HYPOCHLORITE, DRY *or* **CALCIUM HYPOCHLORITE MIXTURES, DRY** *with more than 39% available chlorine (8.8% available oxygen)*	5.1	UN1748	II		P5, A7, A9, N34	A9.8

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	CALCIUM HYPOCHLORITE, **HYDRATED** *or* **CALCIUM HYPOCHLORITE, HYDRATED MIXTURES,** *with not less than 5.5% but not more than 10% water*	5.1	UN2880	II		P5	A9.8
	CALCIUM HYPOCHLORITE MIXTURES, DRY *with more than 10%, but not more than 39% available chlorine*	5.1	UN2208	III		P5, A1, A29, N34	A9.8
	CALCIUM MANGANESE SILICON	4.3	UN2844	III		P5, A1, A19	A8.4
	CALCIUM NITRATE	5.1	UN1454	III		P5	A9.8
	CALCIUM OXIDE	8	UN1910	III		P5	A12.4
	CALCIUM PERCHLORATE	5.1	UN1455	II		P5	A9.8
	CALCIUM PERMANGANATE	5.1	UN1456	II		P5	A9.8
	CALCIUM PEROXIDE	5.1	UN1457	II		P5	A9.8
	CALCIUM PHOSPHIDE	4.3	UN1360	I	6.1	P3, A8, A19, N40	A8.4
	CALCIUM, PYROPHORIC *or* **CALCIUM ALLOYS, PYROPHORIC**	4.2	UN1855	I		P3	A8.12
	CALCIUM RESINATE	4.1	UN1313	III		P5, A1, A19	A8.4
	CALCIUM RESINATE, FUSED	4.1	UN1314	III		P5, A1, A19	A8.3
	Calcium selenate; see **SELENATES**						
	Calcium selenate; see **SELENITES**						
	CALCIUM SILICIDE	4.3	UN1405	II		P5, A19	A8.4
				III		P5, A1, A19	A8.4
	CAMPHOR OIL	3	UN1130	III		P5	A7.3
	CAMPHOR, *synthetic*	4.1	UN2717	III		P5, A1	A8.4
	Cannon primers; see **PRIMERS, TUBULAR**						
	CAPROIC ACID	8	UN2829	III		P5	A12.3
	Caps, blasting; see **DETONATORS,** *etc.*						
	Caps, prime; see **PRIMERS, CAP TYPE**						
*	**CARBAMATE PESTICIDES, LIQUID, FLAMMABLE**, **TOXIC**, *flashpoint less than 23 degrees C*	3	UN2758	I	6.1	P3	A7.3
				II	6.1	P4	
*	**CARBAMATE PESTICIDES, LIQUID, TOXIC, FLAMMABLE,** *flashpoint not less than 23 degrees C*	6.1	UN2991	I	3	P3	A10.5
				II	3	P4	
				III	3	P5	

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*	**CARBAMATE PESTICIDES**,	6.1	UN2992	I		P3	A10.5
	LIQUID, TOXIC			II		P4	A10.5
				III		P5	A10.5
*	**CARBAMATE PESTICIDES,**	6.1	UN2757	I		P5	A10.6
	SOLID, TOXIC			II		P5	A10.6
				III		P5	A10.6
	Carbolic acid; see **PHENOL, SOLID**, *or* **PHENOL, MOLTEN**						
	Carbolic acid solutions; see **PHENOL SOLUTIONS**						
	CARBON, ACTIVATED	4.2	UN1362	III		P5	A8.4
	CARBON, *animal or vegetable origin*	4.2	UN1361	II		P5	A8.4
				III		P5	A8.4
	Carbon bisulphide; see **CARBON DISULPHIDE**						
	Carbon black (animal or vegetable origin); see **CARBON**						
	CARBON DIOXIDE	2.2	UN1013			P5	A6.3, A6.5, A6.6
	CARBON DIOXIDE AND NITROUS OXIDE MIXTURES	2.2	UN1015			P5	A6.3,A6.5
	CARBON DIOXIDE AND OXYGEN MIXTURES	2.2	UN1014			P5	A6.3,A6.5
	CARBON DIOXIDE, REFRIGERATED LIQUID *(cryogenic liquid)*	2.2	UN2187			P5	A6.3,A6.11
	CARBON DIOXIDE, SOLID *or* **DRY ICE**	9	UN1845	III		P5	A13.9
	CARBON DISULPHIDE	FORBIDDEN					FORBIDDEN
	CARBON MONOXIDE	2.3	UN1016		2.1	P3, 4	A6.6
	CARBON MONOXIDE AND HYDROGEN MIXTURE	2.3	UN2600		2.1	P3, 6	A6.6
D	**CARBON MONOXIDE, REFRIGERATED LIQUID** *(cryogenic liquid)*	2.3	NA9202		2.1	P3, 4	A6.11
	CARBON TETRABROMIDE	6.1	UN2516	III		P5	A10.6
	CARBON TETRACHLORIDE	6.1	UN1846	II		P5, N36	A10.5
	Carbonyl chloride; see **PHOSGENE**						
	CARBONYL FLUORIDE	2.3	UN2417		8	P2, 2	A6.6
	CARBONYL SULPHIDE	2.3	UN2204		2.1	P2, 3	A6.5
	Cartridge cases, empty primed; see **CASES, CARTRIDGE, EMPTY WITH PRIMER**						

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	Cartridges, actuating for aircraft ejector seat catapult, fire extinguisher, canopy removal or apparatus; see **CARTRIDGES, POWER DEVICE**						
	Cartridges, explosive; see **CHARGES, DEMOLITION**						
	CARTRIDGES, FLASH	1.1G	UN0049	II		P4	A5.19
	CARTRIDGES, FLASH	1.3G	UN0050	II		P4	A5.19
	CARTRIDGES FOR WEAPONS, BLANK	1.1C	UN0326	II		P4	A5.20
	CARTRIDGES FOR WEAPONS, BLANK	1.2C	UN0413	II		P4	A5.20
	CARTRIDGES FOR WEAPONS, BLANK; *or* **CARTRIDGES, SMALL ARMS, BLANK**	1.3C	UN0327	II		P4	A5.20
	CARTRIDGES FOR WEAPONS, BLANK; *or* **CARTRIDGES, SMALL ARMS, BLANK**	1.4C	UN0338	II		P5	A5.20
	CARTRIDGES FOR WEAPONS, BLANK*; or* **CARTRIDGES, SMALL ARMS, BLANK**	1.4S	UN0014	II		P5	A5.20
	CARTRIDGES FOR WEAPONS, INERT PROJECTILE *or* **CARTRIDGES, SMALL ARMS**	1.2C	UN0328	II		P4	A5.20
	CARTRIDGES FOR WEAPONS, INERT PROJECTILE *or* **CARTRIDGES, SMALL ARMS,**	1.4S	UN0012	II		P5, 112	A5.20
	CARTRIDGES FOR WEAPONS, INERT PROJECTILE *or* **CARTRIDGES, SMALL ARMS**	1.4C	UN0339	II		P5	A5.20
	CARTRIDGES FOR WEAPONS, INERT PROJECTILE *or* **CARTRIDGES, SMALL ARMS**	1.3C	UN0417	II		P4	A5.20
	CARTRIDGES FOR WEAPONS, *with bursting charge*	1.1F	UN0005	II		P4	A5.20
	CARTRIDGES FOR WEAPONS, *with bursting charge*	1.2F	UN0007	II		P4	A5.20
	CARTRIDGES FOR WEAPONS, *with bursting charge*	1.4F	UN0348	II		P5	A5.20
	CARTRIDGES FOR WEAPONS, *with bursting charge*	1.4E	UN0412	II		P5	A5.20
	CARTRIDGES FOR WEAPONS, *with bursting charge*	1.1E	UN0006	II		P4	A5.20
	CARTRIDGES FOR WEAPONS, *with bursting charge*	1.2E	UN0321	II		P4	A5.20
	Cartridges, illuminating; see **AMMUNITION ILLUMINATING**, *etc.*						
	CARTRIDGES, OIL WELL	1.3C	UN0277	II		P4	A5.21
	CARTRIDGES, OIL WELL	1.4C	UN0278	II		P5	A5.21
	CARTRIDGES, POWER DEVICE	1.3C	UN0275	II		P4	A5.22
	CARTRIDGES, POWER DEVICE	1.4C	UN0276	II		P5 , 110	A5.22
	CARTRIDGES, POWER DEVICE	1.2C	UN0381	II		P4	A5.22
	CARTRIDGES, POWER DEVICE	1.4S	UN0323	II		P5, 110, 112	A5.22

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	Cartridges, safety; see **CARTRIDGES, FOR WEAPONS, INERT PROJECTILES**						
	Cartridges, safety, blank; see **CARTRIDGES FOR WEAPONS, BLANK**						
	CARTRIDGES, SIGNAL	1.3G	UN0054	II		P5	A5.19
	CARTRIDGES, SIGNAL	1.4G	UN0312	II		P5	A5.19
	CARTRIDGES, SIGNAL	1.4S	UN0405	II		P4	A5.19
	CARTRIDGES, SMALL ARMS; *see* **CARTRIDGES FOR WEAPONS, INERT PROJECTILE**						
	CARTRIDGES, SMALL ARMS, BLANK*; see* **CARTRIDGES FOR WEAPONS, BLANK**						
	Cartridges, sporting; see **CARTRIDGES FOR WEAPONS, INERT PROJECTILE**						
	Cartridges, starter, jet engine; see **CARTRIDGES, POWER DEVICE**						
	CASES, CARTRIDGE, EMPTY WITH PRIMER	1.4S	UN0055	II		P5	A5.23
	CASES, CARTRIDGE, EMPTY WITH PRIMER	1.4C	UN0379	II		P5	A5.23
	CASES, COMBUSTIBLE, EMPTY, WITHOUT PRIMER	1.3C	UN0447	II		P5	A5.23
	CASES, COMBUSTIBLE, EMPTY, WITHOUT PRIMER	1.4C	UN0446	II		P5	A5.23
	Casinghead gasoline; see **GASOLINE**						
	CASTOR BEANS *or* **CASTOR MEAL** *or* **CASTER POMACE** *or* **CASTOR FLAKE**	9	UN2969	II		P5	A13.13
*	**CAUSTIC ALKALI LIQUIDS, N.O.S.**	8	UN1719	II		P4	A12.3
				III		P5	A12.3
	Caustic potash; see **POTASSIUM HYDROXIDE SOLUTION**						
	Caustic soda liquor; see **SODIUM HYDROXIDE SOLUTION**						
	CELLS, CONTAINING SODIUM	4.3	UN3292	II		P4	A8.19
	CELLULOID, *in blocks, rods, rolls, sheets, tubes, etc. (except scrap)*	4.1	UN2000	III		P5	A8.4
	CELLULOID, SCRAP	4.2	UN2002	III		P5	A8.4
	Cement, flammable; see **ADHESIVES** *containing flammable liquid*						
	CERIUM, *slabs, ingots, or rods*	4.1	UN1333	II		P5, N34	A8.4
	CERIUM, *turnings or gritty powder*	4.3	UN3078	II		P5, A1	A8.4
	CESIUM*; see* **CAESIUM**						
	CESIUM NITRATE *or* **CAESIUM NITRATE**	5.1	UN1451	III		P5, A1, A29	A9.8

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	Charcoal, activated; see **CARBON, ACTIVATED**						
	Charcoal briquettes commercial; see A3.3.4						
D	**CHARCOAL** *briquettes, shell, screenings, wood, etc.*	4.2	NA1361	III		P5	A8.4
	Charcoal, nonactivated; see **CARBON**						
	Charcoal screenings, wet	FORBIDDEN					FORBIDDEN
	Charcoal, wet	FORBIDDEN					FORBIDDEN
	CHARGES, BURSTING, PLASTICS BONDED	1.1D	UN0457	II		P4	A5.24
	CHARGES, BURSTING, PLASTICS BONDED	1.2D	UN0458	II		P4	A5.24
	CHARGES, BURSTING, PLASTICS BONDED	1.4D	UN0459	II		P5	A5.24
	CHARGES, BURSTING, PLASTICS BONDED	1.4S	UN0460	II		P5	A5.24
	CHARGES, DEMOLITION	1.1D	UN0048	II		P4	A5.25
	Charges, expelling, explosive, for fire extinguishers; see **CARTRIDGES, POWER DEVICE**						
	CHARGES, EXPLOSIVE, COMMERCIAL *without detonator*	1.1D	UN0442	II		P4	A5.26
	CHARGES, EXPLOSIVE, COMMERCIAL *without detonator*	1.2D	UN0443	II		P4	A5.26
	CHARGES, EXPLOSIVE, COMMERCIAL *without detonator*	1.4D	UN0444	II		P5	A5.26
	CHARGES, EXPLOSIVE, COMMERCIAL *without detonator*	1.4S	UN0445	II		P5	A5.26
*	**CHARGES, PROPELLING**	1.1C	UN0271	II		P4	A5.27
*	**CHARGES, PROPELLING**	1.3C	UN0272	II		P4	A5.27
*	**CHARGES, PROPELLING**	1.2C	UN0415	II		P4	A5.27
*	**CHARGES, PROPELLING**	1.4C	UN0491	II		P5	A5.27
	CHARGES, PROPELLING, FOR CANNON	1.2C	UN0414	II		P4	A5.27
	CHARGES, PROPELLING, FOR CANNON	1.3C	UN0242	II		P4	A5.28
	CHARGES, PROPELLING, FOR CANNON	1.1C	UN0279	II		P4	A5.28
	CHARGES, SHAPED, COMMERCIAL *without detonator*	1.1D	UN0059	II		P4	A5.29
	CHARGES, SHAPED, COMMERCIAL *without detonator*	1.2D	UN0439	II		P4	A5.29
	CHARGES, SHAPED, COMMERCIAL *without detonator*	1.4D	UN0440	II		P5	A5.29
	CHARGES, SHAPED, COMMERCIAL *without detonator*	1.4S	UN0441	II		P5	A5.29
	CHARGES, SHAPED, FLEXIBLE, LINEAR	1.4D	UN0237	II		P5	A5.30

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	CHARGES, SHAPED, FLEXIBLE, LINEAR	1.1D	UN0288	II		P4, 101	A5.30
	CHARGES, SUPPLEMENTARY, EXPLOSIVE	1.1D	UN0060	II		P4	A5.31
D	**CHEMICAL KITS**	8	NA1760	II		P5	A12.7
	CHEMICAL KITS *(must be classified and labeled according to the hazard class of the individual constituent(s)*		ID8004			P5	A12.7
	CHLORAL, ANHYDROUS, INHIBITED	6.1	UN2075	II		P5	A10.6
	CHLORATE AND BORATE MIXTURES	5.1	UN1458	II		P5, A9, N34	A9.8
				III		P5, A9, N34	A9.8
	CHLORATE AND MAGNESIUM CHLORIDE MIXTURES	5.1	UN1459	II		P5, A9, N34	A9.8
				III		P5, A9, N34	A9.8
	CHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	UN3210	II		P5	A9.7
	CHLORATES, INORGANIC, N.O.S.	5.1	UN1461	II		P5, A9, N34	A9.8
	CHLORIC ACID AQUEOUS SOLUTION, *with not more than 10% chloric acid*	FORBIDDEN					FORBIDDEN
	Chloride of phosphorus; see **PHOSPHORUS TRICHLORIDE**						
	Chloride of sulphur; see **SULPHUR CHLORIDES**						
	Chlorinated lime; see **CALCIUM HYPOCHLORITE MIXTURES,** *etc.*						
	CHLORINE	2.3	UN1017			P2, 2	A6.5
	Chlorine azide	FORBIDDEN					FORBIDDEN
D	**CHLORINE DIOXIDE, HYDRATE, FROZEN**	FORBIDDEN					FORBIDDEN
	Chlorine dioxide (not hydrate)	FORBIDDEN					FORBIDDEN
	CHLORINE PENTAFLUORIDE	2.3	UN2548		5.1, 8	P1, 1	A6.5
	CHLORINE TRIFLUORIDE	2.3	UN1749		5.1, 8	P2, 2	A6.5
	CHLORITE SOLUTION *with not less than 16% available chlorine*	8	UN1908	II		P5, A3, A6, A7, N34	A12.3
	CHLORITE SOLUTION *with more than 5% but less thsn 16% available chloride*	8	UN1908	III		P5, A3, A6, A7, N34	A12.3
	CHLORITES, INORGANIC, N.O.S.	5.1	UN1462	II		P5, A7, N34	A9.8
	CHLOROACETIC ACID, SOLID	6.1	UN1751	II	8	P5, A3, A7, N34	A10.6
	CHLOROACETIC ACID, SOLUTION	6.1	UN1750	II	8	P4, A7, N34	A10.5
+	**CHLOROACETONE, STABILIZED**	6.1	UN1695	II		P5, 2, N12, N32, N34	A10.7
	Chloroacetone (unstabilized)	FORBIDDEN					FORBIDDEN
+	**CHLOROACETONITRILE**	6.1	UN2668	II	3	P2, 2	A10.7

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	CHLOROACETOPHENONE, *liquid*	6.1	UN1697	II		P5, A3, N12, N32, N33	A10.5
	CHLOROACETOPHENONE, *solid*	6.1	UN1697	II		P5, A3, N12, N32, N33, N34	A10.6
	CHLOROACETYL CHLORIDE	6.1	UN1752	I	8	P3, 2, A3, A6, A7, N34, N43	A12.12
	CHLOROANILINES, LIQUID	6.1	UN2019	II		P5	A10.5
	CHLOROANILINES, SOLID	6.1	UN2018	II		P5	A10.6
	CHLOROANISIDINES	6.1	UN2233	III		P5	A10.6
	CHLOROBENZENE	3	UN1134	III		P5	A7.3
	Chlorobenzol; see **CHLOROBENZENE**						
	CHLOROBENZOTRIFLUORIDES	3	UN2234	III		P5	A7.3
	CHLOROBENZYL CHLORIDES	6.1	UN2235	III		P5	A10.5
	1-CHLORO-3-BROMOPROPANE	6.1	UN2688	III		P5	A10.5
	CHLOROBUTANES	3	UN1127	II		P5	A7.3
	CHLOROCRESOLS, *liquid*	6.1	UN2669	II		P5	A10.5
	CHLOROCRESOLS, *solid*	6.1	UN2669	II		P5	A10.6
	3-Chloro-4-diethylaminobenzenediazonium zinc chloride; see **SELF-REACTIVE SOLID TYPE D**						
	CHLORODIFLUOROBROMOMETHANE	2.2	UN1974			P5	A6.3, A6.5
	1-CHLORO-1, 1-DIFLUOROETHANE	2.1	UN2517			P4	A6.3, A6.5
	CHLORODIFLUOROMETHANE	2.2	UN1018			P5	A6.3, A6.5
	CHLORODIFLUOROMETHANE AND CHLOROPENTAFLUOROETHANE MIXTURE *with fixed boiling point, with approximately 49% chlorodifluoromethane*	2.2	UN1973			P5	A6.3, A6.5
	CHLORODINITROBENZENES	6.1	UN1577	II		P5	A10.6
	2-Chloroethanol; see **ETHYLENE CHLOROHYDRIN**						
	Chloroethane; see **ETHYL CHLORIDE**						
	2-CHLOROETHANAL	6.1	UN2232	I		P2, 2	A10.7
	CHLOROFORM	6.1	UN1888	III		P5, N36	A10.5
	CHLOROFORMATES, **TOXIC, CORROSIVE, FLAMMABLE, N.O.S.**	6.1	UN2742	II	8, 3	P2, 5	A10.5
*	**CHLOROFORMATES, TOXIC, CORROSIVE, N.O.S**.	6.1	UN3277	II	8	P3	A10.5
	Chloromethane; see **METHYL CHLORIDE**						
	1-Chloro-3-methylbutane; see **AMYL CHLORIDE**						
	2-Chloro-2-methylbutane; see **AMYL CHLORIDE**						

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	CHLOROMETHYL CHLOROFORMATE	6.1	UN2745	II	8	P4	A10.5
	CHLOROMETHYL ETHYL ETHER	3	UN2354	II	6.1	P4	A7.3
	3-CHLORO-4-METHYLPHENYL ISOCYANATE	6.1	UN2236	II		P5	A10.5
	1-Chloro-2-methylpropane; see **CHLOROBUTANES**						
	2 Chloro-2-methylopropane; see **CHLOROBUTANES**						
	CHLORONITROANILINES	6.1	UN2237	III		P5	A10.6
+	**CHLORONITROBENZENES,** *liquid*	6.1	UN1578	II		P4	A10.5
+	**CHLORONITROBENZENES,** *solid*	6.1	UN1578	II		P5	A10.6
	CHLORONITROTOLUENES, *liquid*	6.1	UN2433	III		P5	A10.5
	CHLORONITROTOLUENES, *solid*	6.1	UN2433	III		P5	A10.6
	CHLOROPENTAFLUOROETHANE *(R-115)*	2.2	UN1020			P5	A6.3, A6.5
	CHLOROPHENOLATES, LIQUID, *or* **PHENOLATES, LIQUID**	8	UN2904	III		P5	A12.3
	CHLOROPHENOLATES, SOLID *or* **PHENOLATES SOLID**	8	UN2905	III		P5	A12.4
	CHLOROPHENOLS, LIQUID	6.1	UN2021	III		P5	A10.5
	CHLOROPHENOLS, SOLID	6.1	UN2020	III		P5	A10.6
	CHLOROPHENYLTRICHLOROSILANE	8	UN1753	II		P4, A7, N34	A12.3
+	**CHLOROPICRIN**	6.1	UN1580	I		P2, 2	A10.7
	CHLOROPICRIN AND METHYL BROMIDE MIXTURES	2.3	UN1581			P2, 2	A6.16
	CHLOROPICRIN AND METHYL CHLORIDE MIXTURES	2.3	UN1582			P2, 2	A6.16
	Chloropicrun mixture, flammable (pressure not exceeding 14.7 psia at 115 degrees F flashpoint below 100 degrees F); see **TOXIC LIQUIDS, FLAMMABLE, N.O.S.**						
	CHLOROPICRIN MIXTURES, N.O.S.	6.1	UN1583	I		P2, 5	A10.5
				II		P3	A10.5
				III		P5	A10.5
D	**CHLOROPIVALOYL CHLORIDE**	6.1	NA9263	I	8	P3, 2	A10.7
	CHLOROPLATINIC ACID, SOLID	8	UN2507	III		P5	A12.4
	CHLOROPRENE, INHIBITED	3	UN1991	I	6.1	P3	A7.3
	Chloroprene, uninhibited	FORBIDDEN					FORBIDDEN
	2-CHLOROPROPANE	3	UN2356	I		P3, N36	A7.3
	3-CHLOROPROPANOL-1	6.1	UN2849	III		P5	A10.5
	2-CHLOROPROPENE	3	UN2456	I		P3, A3, N36	A7.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	2-CHLOROPROPIONIC ACID	8	UN2511	III		P5	A12.3
	2-CHLOROPYRIDINE	6.1	UN2822	II		P5	A10.5
	CHLOROSILANES, CORROSIVE N.O.S.	8	UN2987	II		P4	A12.3
	CHLOROSILANES, FLAMMABLE, CORROSIVE, N.O.S.	3	UN2985	II	8	P4	A7.3
	CHLOROSILANES, FLAMMABLE, CORROSIVE, N.O.S.,	8	UN2986	II	3	P4	A12.3
	CHLOROSILANES, WATER-REACTIVE, FLAMMABLE, CORROSIVE, **N.O.S.**	4.3	UN2988	I	3, 8	P3, A2	A8.3
+	**CHLOROSULPHONIC ACID** *(with or without sulphur trioxide)*	8	UN1754	I	6.1	P5, 2, A3, A10, A6	A12.12
	1-CHLORO-2,2,2-TETRAFLUOROETHANE *(R-124)*	2.2	UN1021			P5	A6.3,A6.5
	CHLOROTOLUENES	3	UN2238	III		P5	A7.3
	4-CHLORO-O-TOLUIDINE HYDROCHLORIDE	6.1	UN1579	III		P5	A10.6
	CHLOROTOLUIDINES, *liquid or solid*	6.1	UN2239	III		P5	A10.5, A10.6
	1-CHLORO-2,2,2-TRIFLUOROETHANE *(R133a)*	2.2	UN1983			P5	A6.3, A6.5
	Chlorotrifluoroethylene; see **TRIFLUOROCHLOROETHYLENE**, **INHIBITED**						
	CHLOROTRIFLUOROMETHANE *(R-13)*	2.2	UN1022			P5	A6.3, A6.5
	CHLOROTRIFLUOROMETHANE AND TRIFLUOROMETHANE AZEOTROPIC MIXTURE *(R503) with approximately 60% chlorotrifluoromethane*	2.2	UN2599			P5	A6.3, A6.5
D	**CHROMIC ACID, SOLID**	5.1	NA1463	II	8	P5	A9.8
	CHROMIC ACID, SOLUTION	8	UN1755	II		P5	A12.3
				III		P5	A12.3
	Chromic anhydride; see **CHROMIUM TRIOXIDE ANHYDROUS**						
	CHROMIC FLUORIDE, SOLID	8	UN1756	II		P5	A12.4
	CHROMIC FLUORIDE, SOLUTION	8	UN1757	II		P5	A12.3
				III		P5	A12.3
	CHROMIUM NITRATE	5.1	UN2720	III		P5, A1, A29	A9.8
	CHROMIUM OXYCHLORIDE	8	UN1758	I		P3, A3, A6, A7, N34	A12.3
	CHROMIUM TRIOXIDE, ANHYDROUS	5.1	UN1463	II	8	P5	A9.8
	CHROMOSULFURIC ACID	8	UN2240	I		P3, A3, A6, A7, N34	A12.3
	Chromyl chloride; see **CHROMIUM OXYCHLORIDE**						

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	Cigar and cigarette lighters, charged with fuel; see **LIGHTERS FOR CIGARS, CIGARETTES**, *etc.*						
	Cleaning fluid or liquid; see **FLAMMABLE LIQUIDS**, *etc.*						
	Coal briquettes, hot	FORBIDDEN					FORBIDDEN
	COAL GAS	2.3	UN1023		2.1	P2, 3	A6.6
	COAL TAR DISTILLATES, FLAMMABLE	3	UN1136	II		P5	A7.3
				III		P5	A7.3
	Coal tar dye, corrosive liquid, n.o.s.; see **DYES, LIQUID N.O.S**. *or* **DYE INTERMEDIATES, LIQUID N.O.S.**						
	COATING SOLUTION	3	UN1139	II		P5	A7.3
				III		P5	A7.3
	COBALT NAPHTHENATES, POWDER	4.1	UN2001	III		P5, A19	A8.4
	COBALT RESINATE, PRECIPITATED	4.1	UN1318	III		P5, A1, A19	A8.4
	Coke, hot	FORBIDDEN					FORBIDDEN
*	**COMPONENTS, EXPLOSIVE TRAIN, N.O.S.**	1.1B	UN0461	II		P4, 101	A5.11
*	**COMPONENTS, EXPLOSIVE TRAIN, N.O.S**.	1.2B	UN0382	II		P4, 101	A5.11
*	**COMPONENTS, EXPLOSIVE TRAIN, N.O.S.**	1.4B	UN0383	II		P5, 101	A5.11
*	**COMPONENTS, EXPLOSIVE TRAIN, N.O.S.**	1.4S	UN0384	II		P5, 101	A5.11
	Composition B; see **HEXOLITE**, *etc.*						
	Compounds, cleaning liquid, corrosive; see **CORROSIVE LIQUIDS, N.O.S.**						
	Compounds, cleaning liquid, flammable; see **FLAMMABLE LIQUIDS, N.O.S.**						
D	**COMPOUNDS, CLEANING LIQUID** see also	8	NA1760	I		P3, A7	A12.3
	CORROSIVE LIQUID N.O.S.			II		P5, N37	A12.3
				III		P5, N37	A12.3
D	**COMPOUNDS, CLEANING LIQUID** see also	3	NA1993	I		P3	A7.3
	FLAMMABLE LIQUID N.O.S.			II		P5	A7.3
				III		P5	A7.3
	Compounds, enamel; see **PAINT**, *etc.*						
D	**COMPOUNDS, TREE KILLING, LIQUID** *or*	8	NA1760	I		P3, A7	A12.3
	COMPOUNDS WEED KILLING, LIQUID			II		P5, N37	A12.3
				III		P5, N37	A12.3

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D	**COMPOUNDS, TREE KILLING** *or* **COMPOUNDS, WEED KILLING, LIQUID**	3	NA1993	I		P3	A7.3
				II		P5	A7.3
				III		P5	A7.3
D	**COMPOUNDS, TREE KILLING** *or* **COMPOUNDS, WEED KILLING, LIQUID**	6.1	NA2810	I		P3	A10.5
				II		P5	A10.5
				III		P5	A10.5
*	**COMPRESSED GAS, N.O.S.**	2.2	UN1956			P5	A6.3, A6.5,A6.6
*	**COMPRESSED GAS, FLAMMABLE, N.O.S**.	2.1	UN1954			P4	A6.3, A6.5
	COMPRESSED GAS, OXIDIZING, N.O.S.	2.2	UN3156		5.1	P5	A6.3, A6.6
*	**COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S.,** *Inhalation Hazard Zone A*	2.3	UN1953		2.1	P1, 1	A6.15
*	**COMPRESSED GAS, TOXIC, FLAMMABLE**, **N.O.S**., *Inhalation Hazard Zone B*	2.3	UN1953		2.1	P2, 2	A6.5, A6.6
*	**COMPRESSED GAS, TOXIC, FLAMMABLE**, **N.O.S.**, *Inhalation Hazard Zone C*	2.3	UN1953		2.1	P2, 3	A6.5, A6.6
*	**COMPRESSED GAS, TOXIC, FLAMMABLE N.O.S.,** *Inhalation Hazard Zone D*	2.3	UN1953		2.1	P2, 4	A6.5, A6.6
*	**COMPRESSED GAS, TOXIC, N.O.S.,** *Inhalation Hazard Zone A*	2.3	UN1955			P1, 1	A6.15
*	**COMPRESSED GAS, TOXIC, N.O.S**., *Inhalation Hazard Zone B*	2.3	UN1955			P2, 2	A6.5, A6.6
*	**COMPRESSED GAS, TOXIC, N.O.S.,** *Inhalation Hazard Zone C*	2.3	UN1955			P2, 3	A6.5, A6.6
*	**COMPRESSED, GAS TOXIC, N.O.S.,** *Inhalation Hazard Zone D*	2.3	UN1955			P2, 4	A6.5, A6.6
	CONSUMER COMMODITY	9	UN8000			P5	A13.13
*	**CONTRIVANCES, WATER-ACTIVATED**, *with burster, expelling charge or propelling charge*	1.2L	UN0248	II		P3, 101	A5.32
*	**CONTRIVANCES, WATER-ACTIVATED**, *with burster, expelling charge or propelling charge*	1.3L	UN0249	II		P3, 101	A5.32
	COPPER ACETOARSENITE	6.1	UN1585	II		P5	A10.6
	Copper acetylide	FORBIDDEN					FORBIDDEN
	Copper amine azide	FORBIDDEN					FORBIDDEN
	COPPER ARSENITE	6.1	UN1586	II		P5	A10.6
*	**COPPER BASED PESTICIDES, LIQUID**, **FLAMMABLE, TOXIC,** *flashpoint less than 23 degrees C*	3	UN2776	I	6.1	P3	A7.3
				II	6.1	P4	A7.3

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*	**COPPER BASED PESTICIDES, LIQUID,**	6.1	UN3009	I	3	P3	A10.5
	TOXIC, FLAMMABLE, *flashpoint not*			II	3	P4	A10.5
	less than 23 degrees C			III	3	P5	A10.5
*	**COPPER BASED PESTICIDES, LIQUID**,	6.1	UN3010	I		P3	A10.5
	TOXIC			II		P5	A10.5
				III		P5	A10.5
*	**COPPER BASED PESTICIDES, SOLID**,	6.1	UN2775	I		P5	A10.6
	TOXIC			II		P5	A10.6
				III		P5	A10.6
	COPPER CHLORATE	5.1	UN2721	II		P5, A1	A9.8
	COPPER CHLORIDE	8	UN2802	III		P5	A12.4
	COPPER CYANIDE	6.1	UN1587	II		P5	A10.6
	COPPER SELENATE; *see* **SELENATES**						
	COPPER SELENITE*; see* **SELENITES**						
	Copper tetramine nitrate	FORBIDDEN					FORBIDDEN
	Copra	FORBIDDEN					FORBIDDEN
	CORD, DETONATING, *flexible*	1.1D	UN0065	II		P4, 102	A5.33
	CORD, DETONATING, *flexible*	1.4D	UN0289	II		P5	A5.33
	CORD, **DETONATING** *or* **FUSE, DETONATING**, *metal clad*	1.2D	UN0102	II		P4	A5.34
	CORD, DETONATING *or* **FUSE, DETONATING,** *metal clad*	1.1D	UN0290	II		P4	A5.34
	CORD, **DETONATING, MILD EFFECT**	1.4D	UN0104	II		P5	A5.34
	or **FUSE, DETONATING, MILD EFFECT**,						
	metal clad						
	CORD, IGNITER	1.4G	UN0066	II		P5	A5.35
	Cordite, see **POWDER, SMOKELESS**						
	Corrosive battery fluid; see **BATTERY FLUID**,						
	ACID *or* **BATTERY FLUID, ALKALI**						
*	**CORROSIVE LIQUID, ACIDIC, INORGANIC,**	8	UN3264	I		P3	A12.3
	N.O.S.			II		P4	A12.3
				III		P5	A12.3
*	**CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.**	8	UN3265	I		P3	A12.3
				II		P4	A12.3
				III		P5	A12.3
*	**CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.**	8	UN3266	I		P3	A12.3
				II		P4	A12.3
				III		P5	A12.3

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*	**CORROSIVE LIQUID, BASIC, ORGANIC, N.O.S.**	8	UN3267	I		P3	A12.3
				II		P4	A12.3
				III		P5	A12.3
*	**CORROSIVE LIQUID, FLAMMABLE, N.O.S.**	8	UN2920	I	3	P3	A12.3
				II	3	P4	A12.3
*	**CORROSIVE LIQUID, SELF-HEATING, N.O.S.**	8	UN3301	I	4.2	P3	A12.3
				II	4.2	P4	A12.3
*	**CORROSIVE LIQUID, N.O.S.**	8	UN1760	I		P3, A7	A12.3
				II		P4	A12.3
				III		P5	A12.3
*	**CORROSIVE LIQUID, OXIDIZING, N.O.S.**	8	UN3093	I	5.1	P3	A12.3
				II	5.1	P4	A12.3
*	**CORROSIVE LIQUID, TOXIC N.O.S.**	8	UN2922	I	6.1	P3, A7	A12.3
				II	6.1	P4	A12.3
				III	6.1	P5	A12.3
*	**CORROSIVE LIQUID, WATER-REACTIVE, N.O.S.**	8	UN3094	I	4.3	P3	A12.3
				II	4.3	P4	A12.3
*	**CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S.**	8	UN3260	I		P5	A12.4
				II		P5	A12.4
				III		P5	A12.4
*	**CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.**	8	UN3261	I		P5	A12.4
				II		P5	A12.4
				III		P5	A12.4
*	**CORROSIVE SOLID, BASIC, INORGANIC, N.O.S**	8	UN3262	I		P5	A12.4
				II		P5	A12.4
				III		P5	A12.4
*	**CORROSIVE SOLID, BASIC, ORGANIC, N.O.S**	8	UN3263	I		P5	A12.4
				II		P5	A12.4
				III		P5	A12.4
*	**CORROSIVE SOLID, FLAMMABLE, N.O.S.**	8	UN2921	I	4.1	P3	A12.4
				II	4.1	P4	A12.4
*	**CORROSIVE SOLID, N.O.S.**	8	UN1759	I		P5	A12.4
				II		P5	A12.4
				III		P5	A12.4
*	**CORROSIVE SOLID, OXIDIZING, N.O.S.**	8	UN3084	I	5.1	P5	A12.4
				II	5.1	P5	A12.4

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
*	**CORROSIVE SOLID, TOXIC N.O.S.**	8	UN2923	I	6.1	P5	A12.4
				II	6.1	P5	A12.4
				III	6.1	P5	A12.4
*	**CORROSIVE SOLID, SELF-HEATING, N.O.S.**	8	UN3095	I	4.2	P5	A12.4
				II	4.2	P5	A12.4
*	**CORROSIVE SOLIDS, WATER-REACTIVE, N.O.S.**	8	UN3096	I	4.3	P3	A12.4
				II	4.3	P4	A12.4
	COTTON WASTE, OILY	4.2	UN1364	III		P5	A8.4
	Cotton Wet	FORBIDDEN					FORBIDDEN
*	**COUMARIN DERIVATIVE PESTICIDES, LIQUID**,	3	UN3024	I	6.1	P3	A7.3
	FLAMMABLE, TOXIC, *flashpoint*			II	6.1	P4	A7.3
	less than 23 degrees C						
*	**COUMARIN DERIVATIVE PESTICIDES, LIQUID,**	6.1	UN3025	I	3	P3	A10.5
	TOXIC, FLAMMABLE, *flashpoint*			II	3	P5	A10.5
	not less than 23 degrees C			III	3	P5	A10.5
*	**COUMARIN DERIVATIVE PESTICIDES, LIQUID**,	6.1	UN3026	I		P3	A10.5
	TOXIC			II		P5	A10.5
				III		P5	A10.5
	COUMARIN DERIVATIVE PESTICIDES, SOLID,	6.1	UN3027	I		P5	A10.6
	TOXIC			II		P5	A10.6
				III		P5	A10.6
	CRESOLS	6.1	UN2076	II	8	P5	A10.5
	CRESYLIC ACID	6.1	UN2022		8	P5	A10.5
	CROTONALDEHYDE, STABILIZED	6.1	UN1143	II	3	P2, 2	A10.7
	CROTONIC ACID, *liquid or solid*	8	UN2823	III		P5	A12.4
	CROTONYLENE	3	UN1144	I		P3	A7.3
	CUPRIETHYLENEDIAMINE SOLUTION	8	UN1761	II	6.1	P4	A12.3
				III	6.1	P5	A12.3
	CUTTERS, CABLE, EXPLOSIVE	1.4S	UN0070	II		P5	A5.36
	Cyanide or cyanide mixtures, dry; see						
	CYANIDES, INORGANIC, **N.O.S.**						
*	**CYANIDES, INORGANIC, SOLID N.O.S.**	6.1	UN1588	I		P5, N74, N75	A10.6
				II		P5, N74, N75	A10.6
				III		P5, N74, N75	A10.6

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	CYANIDE SOLUTIONS, N.O.S.	6.1	UN1935	I		P3	A10.5
				II		P4	A10.5
				III		P5	A10.5
	CYANOGEN BROMIDE	6.1	UN1889	I	8	P3, A6, A8	A10.6
	CYANOGEN CHLORIDE, INHIBITED	2.3	UN1589		8	P1, 1	A6.15
	Cyanogen Chloride, uninhibited	FORBIDDEN					FORBIDDEN
	CYANOGEN, LIQUEFIED	2.3	UN1026		2.1	P2, 2	A6.15
	CYANURIC CHLORIDE	8	UN2670	II		P5	A12.4
	Cyanuric triazide	FORBIDDEN					FORBIDDEN
	CYCLOBUTANE	2.1	UN2601			P4	A6.3, A6.5
	CYCLOBUTYL CHLOROFORMATE	6.1	UN2744	II	8	P4	A10.5
	1,5,9-CYCLODODECATRIENE	6.1	UN2518	III		P5	A10.5
	CYCLOHEPTANE	3	UN2241	II		P5	A7.3
	CYCLOHEPTATRIENE	3	UN2603	II	6.1	P5	A7.3
	CYCLOHEPTENE	3	UN2242	II		P5	A7.3
	CYCLOHEXANE	3	UN1145	II		P5	A7.3
	CYCLOHEXANONE	3	UN1915	III		P5	A7.3
	CYCLOHEXENE	3	UN2256	II		P5	A7.3
	CYCLOHEXENYLTRICHLOROSILANE	8	UN1762	II		P4, A7, N34	A12.3
	CYCLOHEXYL ACETATE	3	UN2243	III		P5	A7.3
	CYCLOHEXYLAMINE	8	UN2357	II	3	P5	A12.3
+	**CYCLOHEXYL ISOCYANATE**	6.1	UN2488	II		P2, 2	A10.7
	CYCLOHEXYL MERCAPTAN	3	UN3054	III		P5	A7.3
	CYCLOHEXYLTRICHLOROSILANE	8	UN1763	II		P4, A7, N34	A12.3
	CYCLONITE, *see* **CYCLOTRIMETHYLENE-TRINITRAMINE,** *etc.*						
	CYCLOOCTADIENE PHOSPHINES*; see* **9-PHOSPHABICYCLONONANES**						
	CYCLOOCTADIENES	3	UN2520	III		P5	A7.3
	CYCLOOCTATETRAENE	3	UN2358	II		P5	A7.3
	CYCLOPENTANE	3	UN1146	II		P5	A7.3
	Cyclopentane, methyl; see **METHYLCYCLOPENTANE**						
	CYCLOPENTANOL	3	UN2244	III		P5	A7.3
	CYCLOPENTANONE	3	UN2245	III		P5	A7.3
	CYCLOPENTENE	3	UN2246	II		P5	A7.3
	CYCLOPROPANE, LIQUEFIED	2.1	UN1027			P4	A6.3, A6.5

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	CYCLOTETRAMETHYLENETETRANITRAMINE, HMX, *or* **OCTOGEN, DESENSITIZED**	1.1D	UN0484	II		P4	A5.37
	Cyclotetramethylenetetranitramine (dry or unphlegmatized) (HMX)	FORBIDDEN					FORBIDDEN
	CYCLOTETRAMETHYLENETETRANITRAMINE, HMX, *or* **OCTOGEN, WETTED** *with not less than 15% water, by mass*	1.1D	UN0226	II		P4	A5.37
	CYCLOTETRAMETHYLENE-TETRANITRAMINE, **HMX**, *or* **OCTOGEN, WETTED** *with less than 15% water, by mass*	FORBIDDEN					FORBIDDEN
	CYCLOTRIMETHYLENETRINITRAMINE, CYCLONITE, HEXOGEN, *or* **RDX, AND CYCLOTETRAMETHYLENETETRANITRAMINE, NMX,** *or* **OCTOGEN MIXTURES, WETTED** *with not less than 15% water by mass, or* **CYCLOTRIMETHYLENETRINITRAMINE, CYCLONITE, HEXOGEN**, *or* **RDX, AND CYCLOTETRAMETHYLENETETRANITRAMINE, NMX,** *or* **OCTOGEN MIXTURES, DESENSITIZED** *with not less than 10% phlegmatizer by mass*	1.1D	UN0391	II		P4	A5.37
	CYCLOTRIMETHYLENETRINITRAMINE, CYCLONITE, HEXOGEN, *or* **RDX, DESENSITIZED**	1.1D	UN0483	II		P4	A5.37
	CYCLOTRIMETHYLENETRINITRAMINE, CYCLONITE, HEXOGEN, RDX, **WETTED** *with not less than 15% water by mass*	1.1D	UN0072	II		P4	A5.37
	CYMENES	3	UN2046	III		P5	A7.3
	DANGEROUS GOODS IN APPARATUS *or* **MACHINERY**		ID8001			P5, A68	A13.12
	DECABORANE	4.1	UN1868	II	6.1	P5, A19, A20	A8.4
	DECAHYDRONAPHTHALENE	3	UN1147	III		P5	A7.3
	N-DECANE	3	UN2247	III		P5	A7.3
	DEFLAGRATING METAL SALTS OF AROMATIC NITRODERIVATIVES, N.O.S.	1.3C	UN0132	II		P4	A5.8
	De-icing fluid; see **FLAMMABLE LIQUIDS, N.O.S.**						
	Delay electric igniter; see **IGNITERS**						

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
D	**DENATURED ALCOHOL**	3	NA1986	I	6.1	P3	A7.3
				II	6.1	P5	A7.3
				III	6.1	P5	A7.3
D	**DENATURED ALCOHOL**	3	NA1987	II		P5	A7.3
				III		P5	A7.3
	Depth charges; see **CHARGES, DEPTH**						
	Detonating relays; see **DETONATORS, NON-ELECTRIC** *or* **DETONATOR ASSEMBLIES, NON-ELECTRIC**						
	DETONATOR ASSEMBLIES, NON-ELECTRIC *for blasting*	1.1B	UN0360	II		P4	A5.38
	DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting	1.4B	UN0361	II		P5	A5.38
	DETONATORS, ELECTRIC, *for blasting*	1.1B	UN0030	II		P4	A5.38
	DETONATORS, ELECTRIC, *for blasting*	1.4B	UN0255	II		P5	A5.39
	DETONATORS, ELECTRIC, *for blasting*	1.4S	UN0456	II		P5	A5.39
	DETONATORS FOR AMMUNITION	1.1B	UN0073	II		P4	A5.40
	DETONATORS FOR AMMUNTION	1.2B	UN0364	II		P4	A5.40
	DETONATORS FOR AMMUNITION	1.4B	UN0365	II		P5	A5.40
	DETONATORS FOR AMMUNITION	1.4S	UN0366	II		P5	A5.40
	DETONATORS, NON-ELECTRIC, *for blasting*	1.1B	UN0029	II		P4	A5.41
	DETONATORS, NON-ELECTRIC, *for blasting*	1.4B	UN0267	II		P5	A5.41
	DETONATORS, NON-ELECTRIC, *for blasting*	1.4S	UN0455	II		P5	A5.41
	DEUTERIUM	2.1	UN1957			P4	A6.3, A6.6
	DEVICES, SMALL, HYDROCARBON GAS POWERED *or* **HYDROCARBON GAS REFILLS FOR SMALL DEVICES** *with release device*	2.1	UN3150			P5	A6.3, A6.5
	DIACETONE ALCOHOL	3	UN1148	II		P5	A7.3
				III		P5	A7.3
	Diacetyl, see **BUTANEDIONE**						
	DIALLYLAMINE	3	UN2359	II	6.1, 8	P4	A7.3
	DIALLYLETHER	3	UN2360	II	6.1	P4, N12	A7.3
	4,4'-DIAMINODIPHENYL METHANE	6.1	UN2651	III		P5	A10.6
	DI-N-AMYLAMINE	3	UN2841	III	6.1	P5	A7.3
	p-Diazidobenzene	FORBIDDEN					FORBIDDEN
	1,1'-Diazoaminonaphthalene	FORBIDDEN					FORBIDDEN
	DIAZODINITROPHENOL, WETTED *with not less than 40% water, or mixture of*	1.1A	UN0074	II		P4, 111, 117	A5.13

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	alcohol and water, by mass						
	Diazodiphenylmethane	FORBIDDEN					FORBIDDEN
	2-diazo-1-naphthol-4-sulphochloride; see **SELF-REACTIVE SOLID TYPE B**						
	Diazonium nitrates (dry)	FORBIDDEN					FORBIDDEN
	Diazonium perchlorates (dry)	FORBIDDEN					FORBIDDEN
	DIBENZYLDICHLOROSILANE	8	UN2434	II		P5	A12.3
	Diborane	FORBIDDEN					FORBIDDEN
D	*Diborane mixtures*	FORBIDDEN					FORBIDDEN
	Dibromoacetylene	FORBIDDEN					FORBIDDEN
	DIBROMOBENZENE	3	UN2711	III		P5	A7.3
	1,2-DIBROMOBUTAN-3-ONE	6.1	UN2648	II		P5	A10.5
	DIBROMOCHLOROPROPANES	6.1	UN2872	III		P5	A10.5
	DIBROMODIFLUOROMETHANE	9	UN1941	III		P5	A13.3
	1,2-Dibromoethane; see **ETHYLENE DIBROMIDE**						
	DIBROMOMETHANE	6.1	UN2664	III		P5	A10.5
	DI-N-BUTYLAMINE	8	UN2248	II	3	P5	A12.3
	DIBUTYLAMINOETHANOL	6.1	UN2873	III		P5	A10.5
	DIBUTYL ETHERS	3	UN1149	III		P5	A7.3
	DICHLOROACETIC ACID	8	UN1764	II		P5, A3, A6, A7, N34	A12.3
	1,3-DICHLOROACETONE	6.1	UN2649	II		P5	A10.6
	DICHLOROACETYL CHLORIDE	8	UN1765	II		P5, A3, A6, A7, N34	A12.3
	Dichloroacetylene	FORBIDDEN					FORBIDDEN
	DICHLOROANILINES, SOLID *or* **LIQUID**	6.1	UN1590	II		P5	A10.5, A10.6
	O-DICHLOROBENZENE	6.1	UN1591	III		P5	A10.5
D	**DICHLOROBUTENE**	8	NA2920	I	3	P3	A12.3
	2,2'-DICHLORODIETHYL ETHER	6.1	UN1916	II	3	P5, N33,N34	A10.5
	DICHLORODIFLUOROMETHANE	2.2	UN1028			P5	A6.3, A6.5
	DICHLORODIFLUOROMETHANE AND DIFLUOROETHANE AZEOTROPIC MIXTURE *with approximately 74% dichlorodifluoromethane*	2.2	UN2602			P5	A6.3, A6.5
	DICHLORODIMETHYL ETHER, SYMMETRICAL	6.l	UN2249	I		P3	A10.5

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	1,1-DICHLOROETHANE	3	UN2362	II		P5	A7.3
	1,2-Dichloroethane; see **ETHYLENE DICHLORIDE**						
	DICHLOROETHYLENE	3	UN1150	II		P5	A7.3
	Dichloroethyl sulphide	FORBIDDEN					FORBIDDEN
	DICHLOROISOCYANURIC ACID, DRY *or* **DICHLOROISOCYANURIC ACID SALTS**	5.1	UN2465	II		P5	A9.8
	DICHLOROISOPROPYL ETHER	6.1	UN2490	II		P5	A10.5
	DICHLOROMETHANE	6.1	UN1593	III		P5, N36	A10.5
	DICHLOROFLUOROMETHANE	2.2	UN1029			P5	A6.3, A6.5
	1,1-DICHLORO-1-NITROETHANE	6.1	UN2650	II		P5	A10.5
	DICHLOROPENTANES	3	UN1152	III		P5	A7.3
	DICHLOROPHENYL ISOCYANATES	6.1	UN2250	II		P5	A10.6
	DICHLOROPHENYLTRICHLOROSILANE	8	UN1766	II		P4, A7, N34	A12.3
	1,3-DICHLOROPROPANOL-2	6.1	UN2750	II		P5	A10.5
	DICHLOROPROPENE	3	UN2047	II		P5	A7.3
				III		P5	A7.3
	Dichloropropene and propylene dichloride mixture; see **PROPYLENE DICHLORIDE**						
	DICHLOROSILANE	2.3	UN2189		2.1, 8	P2, 2	A6.5
	DICHLOROTETRAFLUOROETHANE	2.2	UN1958			P5	A6.3, A6.5
D	**3,5 DICHLORO-2,4,6 TRIFLUOROPYRIDINE**	6.1	NA9264	I		P2, 2	A10.7
	Dichlorovinylchloroarsine	FORBIDDEN					FORBIDDEN
	1,4-Dicyanobutane; see **ADIPONITRILE**						
	DICYCLOHEPTADIENE*; see* **2,5-NORBORNADIENE**						
	DICYCLOHEXYLAMINE	8	UN2565	III		P5	A12.3
	DICYCLOHEXLAMMONIUM NITRITE	4.1	UN2687	III		P5	A8.4
	DICYCLOPENTADIENE	3	UN2048	III		P5	A7.3
	1,2-DI-(DIMETHYLAMINO) ETHANE	3	UN2372	II		P5	A7.3
	DIDYMIUM NITRATE	5.1	UN1465	III		P5, A1	A9.8
D	**DIELDRIN**	6.1	NA2761	II		P5	A10.6
	DIESEL FUEL*; also see* **GAS OIL**	3	UN1202	III		P5	A7.3
	DIETHOXYMETHANE	3	UN2373	II		P5	A7.3
	2,5-diethoxy-4-morpholinobenzene-diazonium zinc chloride; see **SELF-REACTIVE SOLID TYPE D, TEMPERATURE CONTROLLED**						
	3,3-DIETHOXYPROPENE	3	UN2374	II	8	P5	A7.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	DIETHYLAMINE	3	UN1154	II	8	P4, N34	A7.3
	DIETHYLAMINOETHANOL	3	UN2686	III		P5	A7.3
	DIETHYLAMINOPROPYLAMINE	3	UN2684	III	8	P5	A7.3
	N,N-DIETHYLANILINE	6.1	UN2432	III		P5	A10.5
	DIETHYLBENZENE	3	UN2049	III		P5	A7.3
	DIETHYL CARBONATE	3	UN2366	III		P5	A7.3
	DIETHYLDICHLOROSILANE	8	UN1767	II	3	P4, A7, N34	A12.3
	Diethyleneglycol dinitrate, *desensitized with not less than 25% nonvolatile water-insoluble phlegmatizer, by mass*	FORBIDDEN					FORBIDDEN
	Diethylene glycol dinitrate	FORBIDDEN					FORBIDDEN
	DIETHYLENETRIAMINE	8	UN2079	II		P5	A12.3
	N,N-Diethylethanolamine; see **DIETHYLAMINOETHANOL**						
	DIETHYL ETHER *or* **ETHYL ETHER**	3	UN1155	I		P3	A7.3
	N,N-DIETHYLETHYLENEDIAMINE	8	UN2685	II	3	P5	A12.3
	DIETHYL KETONE	3	UN1156	II		P5	A7.3
	DIETHYL SULPHATE	6.1	UN1594	II		P5	A10.5
	DIETHYL SULPHIDE	3	UN2375	II		P5	A7.3
	DIETHYLTHIOPHOSPHORYL CHLORIDE	8	UN2751	II		P5	A12.3
	DIETHYLZINC	4.2	UN1366	I		P3	A8.6
	1,1-DIFLUOROETHANE *(R152a)*	2.1	UN1030			P4	A6.3, A6.5
	1,1-DIFLUOROETHYLENE *(R1132a)*	2.1	UN1959			P4	A6.3, A6.5
	DIFLUOROMETHANE	2.1	UN3252			P4	A6.3, A6.6
	DIFLUOROPHOSPHORIC ACID, ANHYDROUS	8	UN1768	II		P5, A6, A7, N5, N34	A12.3
	2,3-DIHYDROPYRAN	3	UN2376	II		P5	A7.3
	DIISOBUTYLAMINE	3	UN2361	III	8	P5	A7.3
	DIISOBUTYLENE, ISOMETRIC COMPOUNDS	3	UN2050	II		P5	A7.3
	DIISOBUTYL KETONE	3	UN1157	III		P5	A 7.3
	DIISOOCTYL ACID PHOSPHATE	8	UN1902	III		P5	A12.3
	DIISOPROPYLAMINE	3	UN1158	II	8	P4	A7.3
	DIISOPROPYL ETHER	3	UN1159	II		P5	A7.3
	DIKETENE, INHIBITED	6.1	UN2521	I	3	P2, 2	A10.7
	1,1-DIMETHOXYETHANE	3	UN2377	II		P3	A7.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	1,2-DIMETHOXYETHANE	3	UN2252	II		P3	A7.3
	DIMETHYLAMINE, ANHYDROUS	2.1	UN1032			P4	A6.5
	DIMETHYLAMINE SOLUTION	3	UN1160	II	8	P4	A7.3
	2-DIMETHYLAMINOACETONITRILE	3	UN2378	II	6.1	P4	A7.3
	4-dimethylamino-6-(2-dimethylaminoethoxy) toluene-2-diazonium zinc chloride; see **SELF-RELATIVE SOLID TYPE D, TEMPERATURE CONTROLLED**						
	2-DIMETHYLAMINOETHANOL	8	UN2051	II	3	P5	A12.3
	DIMETHYLAMINOETHYL METHACRYLATE	6.1	UN2522	II		P5	A10.5
	N,N-DIMETHYLANILINE	6.1	UN2253	II		P5	A10.5
	2,3-DIMETHYLBUTANE	3	UN2457	II		P5	A7.3
	1,3-DIMETHYLBUTYLAMINE	3	UN2379	II	8	P5	A7.3
	DIMETHYLCARBAMOYL CHLORIDE	8	UN2262	II		P5	A12.3
	DIMETHYL CARBONATE	3	UN1161	II		P5	A7.3
	DIMETHYLCYCLOHEXANES	3	UN2263	II		P5	A7.3
	DIMETHYLCYCLOHEXYLAMINE	8	UN2264	II	3	P5	A12.3
	DIMETHYLDICHLOROSILANE	3	UN1162	II	8	P5	A7.3
	DIMETHYLDIETHOXYSILANE	3	UN2380	II		P5	A7.3
	DIMETHYLDIOXANES	3	UN2707	II		P5	A7.3
				III		P5	A7.3
	DIMETHYL DISULPHIDE	3	UN2381	II		P5	A7.3
	DIMETHYL ETHER	2.1	UN1033			P4	A6.3, A6.5
	N,N-DIMETHYFORMAMIDE	3	UN2265	III		P5	A7.3
	DIMETHYLHYDRAZINE, SYMMETRICAL	6.1	UN2382	I	3	P2, 2, A7	A10.7
	DIMETHYLHYDRAZINE, UNSYMMETRICAL	6.1	UN1163	I	3, 8	P2, 2	A10.7
	2,2-DIMETHYLPROPANE	2.1	UN2044			P4	A6.3, A6.5
	DIMETHYL-N-PROPYLAMINE	3	UN2266	II	8	P5	A7.3
	DIMETHYL SULPHATE	6.1	UN1595	I	8	P2, 2	A10.7
	DIMETHYL SULPHIDE	3	UN1164	I		P5	A7.3
	DIMETHYL THIOPHOSPHORYL CHLORIDE	6.1	UN2267	II	8	P5	A10.5
	DIMETHYLZINC	4.2	UN1370	I		P3	A8.6
	DINGU; *see* **DINITROGLYCOLURIL**						
	DINITROANILINES	6.1	UN1596	II		P5	A10.6
	DINITROBENZENES, *liquid or solid*	6.1	UN1597	II		P5	A10.5, A10.6
	DINITRO-O-CRESOL, *solid or solution*	6.1	UN1598	II		P5, 11	A10.5, A10.6
	1,3-Dinitro-4,5-dinitrosobenzene	FORBIDDEN					FORBIDDEN

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	1,2-Dinitroethane	FORBIDDEN					FORBIDDEN
	DINITROGEN TETROXIDE, **LIQUEFIED**	FORBIDDEN					FORBIDDEN
	DINITROGLYCOLURIL	1.1D	UN0489	II		P4	A5.8
	Dinitromethane	FORBIDDEN					FORBIDDEN
	DINITROPHENOLATES, *alkali metals, dry or wetted with less than 15% water, by mass*	1.3C	UN0077	II	6.1	P4	A5.8
	DINITROPHENOLATES, WETTED *with not less than 15% water, by mass*	4.1	UN1321	I	6.1	P4, 23, A8, A19, A20, N41	A8.4
	Dinitropropylene glycol	FORBIDDEN					FORBIDDEN
	DINITROPHENOL, *dry or wetted with less than 15% water, by mass*	1.1D	UN0076	II	6.1	P4	A5.8
	DINITROPHENOL SOLUTIONS	6.1	UN1599	II		P5	A10.5
				III		P5	A10.5
	DINITROPHENOL, WETTED *with not less than 15% water, by mass*	4.1	UN1320	I	6.1	P4, 23, A8, A19, A20, N41	A8.4
	Dinitropropylene glycol	FORBIDDEN					FORBIDDEN
	DINITRORESORCINOL, *dry or wetted with less than 15% water, by mass*	1.1D	UN0078	II		P4	A5.8
	DINITRORESORCINOL, WETTED *with not less than 15% water, by mass*	4.1	UN1322	I		P4, 23, A8, A19, A20, N41	A8.4
	DINITROSOBENZENE	1.3C	UN0406	II		P4	A5.43
	n,n'-dinitroso-n,n'-dimethyl terephthalamide, not more than 72% as a paste; see **SELF-REACTIVE SOLID TYPE C**						
	n,n'-dinitrosopentamethylenetetramine, not more than 82% with phlegmatizer; see **SELF-REACTIVE SOLID TYPE C**						
	2,2-Dinitrostilbene	FORBIDDEN					FORBIDDEN
	DINITROTOLUENES, *liquid or solid*	6.1	UN2038	II		P5	A10.5, A10.6
	2,4-Dinitro-1,3,5-trimethylbenzene	FORBIDDEN					FORBIDDEN
	DIOXANE	3	UN1165	II		P5	A7.3
	DIOXOLANE	3	UN1166	II		P5	A7.3
	DIPENTENE	3	UN2052	III		P5	A7.3
	DIPHENYLAMINE CHLOROARSINE	6.1	UN1698	I		P3	A10.5
	DIPHENYLCHLOROARSINE, LIQUID *or* **SOLID**	6.1	UN1699	I		P3, A8, N33, N34	A10.5, A10.6

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	DIPHENYLDICHLOROSILANE	8	UN1769	II		P4, A7, N34	A12.3
	DIPHENYLMETHANE-4,4'-DIISOCYANATE	6.1	UN2489	III		P5	A10.5
	DIPHENYLMETHYL BROMIDE	8	UN1770	II		P5	A12.4
	diphenyloxide-4,4' Disulphohydrazide; see **SELF-REACTIVE SOLID TYPE D**						
	DIPICRYLAMINE; *see* **HEXANITRODIPHENYLAMINE**						
	DIPICRYL SULPHIDE, *dry or wetted with less than 10% water, by mass*	1.1D	UN0401	II		P4	A5.8
	DIPICRYL SULPHIDE, WETTED *with not less than 10% water, by mass*	4.1	UN2852	I		P4, A2, N41	A8.4
	DIPROPYLAMINE	3	UN2383	II	8	P4	A7.3
	4-dipropylaminobenzene-diazonium zinc chloride; see **SELF-REACTIVE SOLID TYPE D**						
	DIPROPYL ETHER	3	UN2384	II		P5	A7.3
	DIPROPYL KETONE	3	UN2710	III		P5	A7.3
*	**DISINFECTANTS, LIQUID, CORROSIVE, N.O.S**	8	UN1903	II		P5	A12.3
				III		P5	A12.3
*	**DISINFECTANTS, LIQUID, TOXIC, N.O.S.**	6.1	UN3142	I		P3, A4	A10.5
				II		P5	A10.5
				III		P5	A10.5
*	**DISINFECTANTS, SOLID, TOXIC, N.O.S.**	6.1	UN1601	II		P5	A10.6
				III		P5	A10.6
	DISODIUM TRIOXOSILICATE, PENTAHYDRATE	8	UN3253	III		P5	A12.4
*	**DISPERSANT GAS; N.O.S.** *see* **REFRIGERANT GASES, N.O.S.**						
*	**DITHIOCARBAMATE PESTICIDES, LIQUID, FLAMMABLE, TOXIC,** *flashpoint less than 23 degrees C*	3	UN2772	I	6.1	P3	A7.3
				II	6.1	P4	A7.3
*	**DITHIOCARBAMATE PESTICIDES, LIQUID**, **TOXIC, FLAMMABLE,** *flashpoint not less than 23 degrees C*	6.1	UN3005	I	3	P3	A10.5
				II	3	P4	A10.5
				III	3	P5	A10.5
*	**DITHIOCARBAMATE PESTICIDES**, **LIQUID, TOXIC**	6.1	UN3006	I		P3	A10.5
				II		P4	A10.5
				III		P5	A10.5

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
*	**DITHIOCARBAMATE PESTICIDES, SOLID, TOXIC**	6.1	UN2771	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6
	DIVINYL ETHER, INHIBITED	3	UN1167	I		P3	A7.3
D	**DODECYLBENZENESULPHONIC ACID**	8	NA2584	II		P5	A12.3
	DODECYLTRICHLOROSILANE	8	UN1771	II		P4, A7, N34	A12.3
	DRY ICE; *see* **CARBON DIOXIDE, SOLID**						
*	**DYES**, **LIQUID, CORROSIVE, N.O.S.,** *or* **DYE INTERMEDIATES**, **LIQUID, CORROSIVE, N.O.S**	8	UN2801	II		P5, 11	A12.3
				III		P5, 11	A12.3
*	**DYES, LIQUID, TOXIC, N.O.S.,** *or* **DYE INTERMEDIATES, LIQUID, TOXIC, N.O.S**	6.1	UN1602	II		P4	A10.5
				III		P5	A10.5
*	**DYES, SOLID, CORROSIVE, N.O.S.,** *or* **DYE INTERMEDIATES, SOLID, CORROSIVE N.O.S.**	8	UN3147	II		P5	A12.4
				III		P5	A12.4
*	**DYES, SOLID, TOXIC, N.O.S.,** *or* **DYE INTERMEDIATES**, **SOLID, TOXIC, N.O.S.**	6.1	UN3143	I		P5, A5	A10.6
				II		P5	A10.6
				III		P5	A10.6
	Dynamite; see **EXPLOSIVE, BLASTING, TYPE A**						
	Electric squibs; see **IGNITERS**						
	Electric storage batteries; see **BATTERIES**, *etc.*						
	Electrolyte (acid or alkali) for batteries; see **BATTERY FLUID, ACID** *or* **BATTERY FLUID, ALKALI**						
	Electron tubes containing mercury; see **MERCURY CONTAINED IN MANUFACTURED ARTICLES**						
	Elevated temperature liquid, N.O.S.	FORBIDDEN					FORBIDDEN
	Elevated temperature solid, N.O.S.	FORBIDDEN					FORBIDDEN
	Empty packaging; see 1.10						
	ENGINES, INTERNAL COMBUSTION *(including motor vehicles, wheeled support equipment helicopters, boats, etc.)*	9	UN3166			P5	A13.5, A13.6
	Engines, rocket; see **ROCKET MOTORS**, *etc.*						
	ENGINE STARTING FLUID, *with flammable gas*	2.1	UN1960			P4	A6.5
*	**ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S.**	9	UN3082	III		P5, 8	A13.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
*	**ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S.**	9	UN3077	III		P5, 8	A13.3
	EPIBROMOHYDRIN	6.1	UN2558	I		P3	A10.5
	EPICHLOROHYDRIN	6.1	UN2023	II		P5	A10.5
	1,2-EPOXY-3-ETHOXYPROPANE	3	UN2752	III		P5	A7.3
*	**ESTERS, N.O.S.**	3	UN3272	II		P5	A7.3
				III		P5	A7.3
	ETHANE,COMPRESSED	2.1	UN1035			P4	A6.3, A6.5
D	**ETHANE-PROPANE MIXTURES, REFRIGERATED LIQUID** *(cryogenic liquid)*	FORBIDDEN					FORBIDDEN
	ETHANE,REFRIGERATED LIQUID	FORBIDDEN					FORBIDDEN
	Ethanol amine dinitrate	FORBIDDEN					FORBIDDEN
	ETHANOLAMINE *or* **ETHANOLAMINE SOLUTIONS**	8	UN2491	III		P5	A12.3
	ETHANOL *or* **ETHANOL SOLUTIONS** or	3	UN1170	II		P5	A7.3
	ETHYL ALCOHOL *or* **ETHYL ALCOHOL SOLUTIONS**			III		P5	A7.3
	Ether; see **DIETHYL ETHER**						
*	**ETHERS, N.O.S.**	3	UN3271	II		P5	A7.3
				III		P5	A7.3
	ETHYL ACETATE	3	UN1173	II		P5	A7.3
	ETHYLACETYLENE, INHIBITED	2.1	UN2452	II		P4	A6.5
	ETHYL ACRYLATE, INHIBITED	3	UN1917	II		P5	A7.3
	ETHYL ALCOHOL *or* **ETHYL ALCOHOL SOLUTIONS**; *see* **ETHANOL**						
	Ethyl aldehyde; see **ACETALDEHYDE**						
	ETHYLAMINE	2.1	UN1036			P4	A6.14
	ETHYLAMINE, AQUEOUS SOLUTIONS *with not less than 50%, but not more than 70% ethylamine*	3	UN2270	II	8	P5	A7.3
	ETHYL AMYL KETONE	3	UN2271	III		P5	A7.3
	N-ETHYLANILINE	6.1	UN2272	III		P5	A10.5
	2-ETHYLANILINE	6.1	UN2273	III		P5	A10.5
	ETHYLBENZENE	3	UN1175	II		P5	A7.3
	N-ETHYL-N-BENZYLANILINE	6.1	UN2274	III		P5	A10.5
	N-ETHYLBENZYLTOLUIDINES SOLID, *or* **LIQUID**	6.1	UN2753	III		P5	A10.5, A10.6
	ETHYL BORATE	3	UN1176	II		P5	A7.3

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	ETHYL BROMIDE	6.1	UN1891	II		P5	A10.5
	ETHYL BROMOACETATE	6.1	UN1603	II		P4	A10.5
	2-ETHYLBUTANOL	3	UN2275	III		P5	A7.3
	2-ETHYLBUTYL ACETATE	3	UN1177	III		P5	A7.3
	ETHYL BUTYL ETHER	3	UN1179	II		P5	A7.3
	2-ETHYLBUTYRALDEHYDE	3	UN1178	II		P5	A7.3
	ETHYL BUTYRATE	3	UN1180	III		P5	A7.3
	ETHYL CHLORIDE	2.1	UN1037			P4	A6.12
	ETHYL CHLOROACETATE	6.1	UN1181	II		P5	A10.5
	ETHYL CHLOROFORMATE	6.1	UN1182	I	3, 8	P3, 2, A3, A6, A7, N34	A10.7
	ETHYL 2-CHLOROPROPIONATE	3	UN2935	III		P5	A7.3
+	**ETHYL CHLOROTHIOFORMATE**	8	UN2826	II	6.1, 3	P2, 2	A12.12
	ETHYL CROTONATE	3	UN1862	II		P5	A7.3
	ETHYL CYANOACETATE	6.1	UN2666	III		P5	A10.5
	ETHYLDICHLOROARSINE	6.1	UN1892	I		P2, 2	A10.7
	ETHYLDICHLOROSILANE	4.3	UN1183	I	8, 3	P3, A2, A3, A7, N34	A8.3
	Ethylene, acetylene and propylene in mixtures, refrigerated liquid (cryogenic liquids) containing at least 71.5% ethylene with not more than 22.5% acetylene and not more than 6% propylene	FORBIDDEN					FORBIDDEN
	ETHYLENE CHLOROHYDRIN	6.1	UN1135	I	3	P2, 2	A10.7
	ETHYLENE, COMPRESSED	2.1	UN1962			P4	A6.3, A6.5
	ETHYLENEDIAMINE	8	UN1604	II	3	P5	A12.3
	Ethylene diamine diperchlorate	FORBIDDEN					FORBIDDEN
	ETHYLENE DIBROMIDE	6.1	UN1605	I		P2, 2	A10.7
	ETHYLENE DICHLORIDE	3	UN1184	II	6.1	P4	A7.3
	ETHYLENE GLYCOL DIETHYL ETHER	3	UN1153	III		P5	A7.3
	Ethylene glycol dinitrate	FORBIDDEN					FORBIDDEN
	ETHYLENE GLYCOL MONOBUTYL ETHER	6.1	UN2369	III		P5	A10.5
	ETHYLENE GLYCOL MONOETHYL ETHER	3	UN1171	III		P5	A7.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	ETHYLENE GLYCOL MONOETHYL ETHER ACETATE	3	UN1172	III		P5	A7.3
	ETHYLENE GLYCOL MONOMETHYL ETHER	3	UN1188	III		P5	A7.3
	ETHYLENE GLYCOL MONOMETHYL ETHER ACETATE	3	UN1189	III		P5	A7.3
	ETHYLENEIMINE, INHIBITED	6.1	UN1185	I	3	P1, 1, N25, N32	A10.7
	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE *with more than 87% ethylene oxide*	2.3	UN3300		2,1	P2, 4	A6.5
	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE *with more than 9% but not more than 87% ethylene oxide*	2.1	UN1041			P4	A6.3, A6.5
	ETHYLENE OXIDE AND CARBON DIOXIDE MIXTURE *with not more than 9% ethylene oxide*	2.2	UN1952			P5	A6.3, A6.5
	ETHYLENE OXIDE AND CHLOROTETRAFLUORO-ETHANE MIXTURE *with not more than 8.8% ethylene oxide*	2.2	UN3297			P5	A6.3, A6.5
	ETHYLENE OXIDE AND DICHLORODIFLUORO-METHANE MIXTURE *with not more than 12.5% ethylene oxide*	2.2	UN3070			P5	A6.3, A6.5
	ETHYLENE OXIDE AND PENTAFLUOROETHANE MIXTURE *with not more than 7.9% ethylene oxide*	2.2	UN3298			P5	A6.3, A6.5
	ETHYLENE OXIDE AND PROPYLENE OXIDE MIXTURES, *not more than 30% ethylene oxide*	3	UN2983	I	6.1	P2, 5, A11, N4, N34	A7.3
	ETHYLENE OXIDE AND TETRAFLUOROETHANE MIXTURE *with not more than 5.6% ethylene oxide*	2.2	UN3299			P5	A6.3, A6.5
	ETHYLENE OXIDE, *or* **ETHYLENE OXIDE WITH NITROGEN** up to a total pressure of 1 MPA (10 bar) at 50 degrees C	2.3	UN1040		2.1	P2, 4	A6.13
	ETHYLENE, REFRIGERATED LIQUID *(cryogenic liquid)*	2.1	UN1038			P3	A6.11
	ETHYL ETHER*; see* **DIETHYL ETHER**						
	ETHYL FLUORIDE	2.1	UN2453			P4	A6.3, A6.5
	ETHYL FORMATE	3	UN1190	II		P5	A7.3
	2-ETHYLHEXYLAMINE	3	UN2276	III	8	P5	A7.3
	2-ETHYLHEXYL CHLOROFORMATE	6.1	UN2748	II	8	P5	A10.5
	ETHYL ISOBUTYRATE	3	UN2385	II		P5	A7.3
+	**ETHYL ISOCYANATE**	3	UN2481	I	6.1	P1, 1, A7	A7.6

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	ETHYL LACTATE	3	UN1192	III		P5	A7.3
	ETHYL MERCAPTAN	3	UN2363	I		P3	A7.3
	ETHYL METHACRYLATE	3	UN2277	II		P5	A7.3
	ETHYL METHYL ETHER	2.1	UN1039			P4	A6.21
	ETHYL METHYL KETONE *or* **METHYL ETHYL KETONE**	3	UN1193	II		P5	A7.3
	Ethyl nitrate	FORBIDDEN					FORBIDDEN
	Ethyl nitrite	FORBIDDEN					FORBIDDEN
	ETHYL NITRITE SOLUTIONS	FORBIDDEN					FORBIDDEN
	ETHYL ORTHOFORMATE	3	UN2524	III		P5	A7.3
	ETHYL OXALATE	6.1	UN2525	III		P5	A10.5
	Ethyl perchlorate	FORBIDDEN					FORBIDDEN
	ETHYLPHENYLDICHLOROSILANE	8	UN2435	II		P5, A7, N34	A12.3
D	**ETHYL PHOSPHONOTHIOIC DICHLORIDE, ANHYDROUS**	6.1	NA2927	I	8	P2, 2	A10.7
D	**ETHYL PHOSPHONOUS DICHLORIDE, ANHYDROUS**	6.1	NA2845	I	4.2	P2, 2	A10.7
D	**ETHYL PHOSPHORODICHLORIDATE**	6.1	NA2927	I	8	P2, 2	A10.7
	1-ETHYLPIPERIDINE	3	UN2386	II	8	P5	A7.3
	ETHYL PROPIONATE	3	UN1195	II		P5	A7.3
	ETHYL PROPYL ETHER	3	UN2615	II		P5	A7.3
	Ethyl sulphate; see **DIETHYL SULPHATE**						
	N-ETHYLTOLUIDINES	6.1	UN2754	II		P5	A10.5
	ETHYLTRICHLOROSILANE	3	UN1196	II	8	P4, A7, N34	A7.3
	Etiologic agent; see **INFECTIOUS SUBSTANCES,** *etc.*						
	EXPLOSIVE, BLASTING,TYPE A	1.1D	UN0081	II		P4	A5.44
	EXPLOSIVE, BLASTING,TYPE B	1.1D	UN0082	II		P4	A5.44
	EXPLOSIVE, BLASTING,TYPE B	1.5D	UN0331	II		P4, 105, 106	A5.45
	EXPLOSIVE, BLASTING,TYPE C	1.1D	UN0083	II		P4	A5.46
	EXPLOSIVE, BLASTING,TYPE E	1.1D	UN0241	II		P4	A5.44
	EXPLOSIVE, BLASTING,TYPE E	1.5D	UN0332	II		P4, 105, 106	A5.48
	EXPLOSIVE, BLASTING,TYPE D	1.1D	UN0084	II		P4	A5.47
D	**EXPLOSIVE PEST CONTROL DEVICES**	1.1E	NA0006	II		P4	A5.20
D	**EXPLOSIVE PEST CONTROL DEVICES**	1.4E	NA0412	II		P5	A5.20

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	Explosives, slurry; see **EXPLOSIVE, BLASTING, TYPE E**						
	Explosives substances; see **SUBSTANCES, EXPLOSIVE, N.O.S.**						
	Explosives, emulsion; see **EXPLOSIVES; BLASTING, TYPE E**						
	Explosives, water gels; see **EXPLOSIVE, BLASTING, TYPE E**						
	EXTRACTS, AROMATIC, LIQUID	3	UN1169	II		P5	A7.3
				III		P5	A7.3
	EXTRACTS, FLAVORING, LIQUID	3	UN1197	II		P5	A7.3
				III		P5	A7.3
	FERRIC ARSENATE	6.1	UN1606	II		P5	A10.6
	FERRIC ARSENITE	6.1	UN1607	II		P5	A10.6
	FERRIC CHLORIDE, ANHYDROUS	8	UN1773	III		P5	A12.4
	FERRIC CHLORIDE, SOLUTION	8	UN2582	III		P5	A12.3
	FERRIC NITRATE	5.1	UN1466	III		P5, A1, A29	A9.8
	FERROCERIUM	4.1	UN1323	II		P5, A19	A8.4
	FERROSILICON, *with 30% or more, but less than 90% silicon*	4.3	UN1408	III	6.1	P5, A1, A19	A8.4
	FERROUS ARSENATE	6.1	UN1608	II		P5	A10.6
D	**FERROUS CHLORIDE, SOLID**	8	NA1759	II		P5	A12.4
D	**FERROUS CHLORIDE, SOLUTION**	8	NA1760	II		P5	A12.3
	FERROUS METAL BORINGS; *or* **FERROUS METAL SHAVINGS;** *or* **METAL TURNINGS,** *or* **FERROUS METAL CUTTINGS** *in a form liable to self-heating*	4.2	UN2793	III		P5, A1, A19	A8.4
	FERTILIZER AMMONIATING SOLUTION *with free ammonia*	2.2	UN1043			P5	A6.3, A6.5
	FIBRES *or* **FABRICS, ANIMAL** *or* **VEGETABLE,** *or* **SYNTHETIC N.O.S.** *with oil*	4.2	UN1373	III		P5	A8.4
	FIBERS *or* **FIBER IMPREGNATED WITH WEAKLY NITRATED NITROCELLULOSE, N.O.S**	4.1	UN1353	III		P5, A1	A8.4
	Films, nitrocellulose base, from which gelatine has been removed; film scrap; see **CELLULOID SCRAP**						
	FILMS, NITROCELLULOSE BASE, *gelatine coated (except scrap)*	4.1	UN1324	III		P5	A8.13
	FIRE EXTINGUISHER CHARGES, *corrosive liquid*	8	UN1774	II		P5, N41	A12.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	Fire extinguisher charges, expelling,explosive; see **CARTRIDGES, POWER DEVICE**						
	FIRE EXTINGUISHERS *containing compressed or liquified gas*	2.2	UN1044			P5	A6.8
	FIRELIGHTERS, SOLID *with flammable liquid*	4.1	UN2623	II		P5, A19	A8.4
				III		P5, A1, A19	A8.4
	FIREWORKS	1.1G	UN0333	II		P4, 108	A5.49
	FIREWORKS	1.2G	UN0334	II		P4, 108	A5.50
	FIREWORKS	1.3G	UN0335	II		P4, 108	A5.50
	FIREWORKS	1.4G	UN0336	II		P5, 108	A5.50
	FIREWORKS	1.4S	UN0337	II		P5, 108	A5.51
	FIRST AID KITS *(must be classified and labelled according to the hazard class of the individual constituent(s))*		ID8004			P5	A12.7
	FISH MEAL, **UNSTABILZED,** *or* **FISH SCRAP, UNSTABILIZED**	4.2	UN1374	II		P5, A1, A19	A8.4
	Flammable gas (small receptacles not fitted with a dispersion device, not refillable); see **RECEPTACLES, SMALL, CONTAINING GAS**						
	Flammable gas lighters; see **LIGHTERS** *(cigarettes), containing flammable gas*						
*	**FLAMMABLE LIQUIDS, CORROSIVE, N.O.S.**	3	UN2924	I	8	P3	A7.3
				II	8	P5	A7.3
				III	8	P5	A7.3
*	**FLAMMABLE LIQUIDS, N.O.S.**	3	UN1993	I		P3	A7.3
				II		P5	A7.3
				III		P5	A7.3
*	**FLAMMABLE LIQUIDS, TOXIC, N.O.S.**	3	UN1992	I	6.1	P3	A7.3
				II	6.1	P4	A7.3
				III	6.1	P5	A7.3
*	**FLAMMABLE LIQUIDS, TOXIC, CORROSIVE, N.O.S.**	3	UN3286	I	6.1, 8	P3	A7.3
				II	6.1, 8	P4	A7.3
*	**FLAMMABLE SOLID, CORROSIVE, INORGANIC, N.O.S.**	4.1	UN3180	II	8	P5, A1	A8.4
				III	8	P5, A1	A8.4
*	**FLAMMABLE SOLIDS, CORROSIVE, ORGANIC, N.O.S.**	4.1	UN2925	II	8	P5, A1	A8.4
				III	8	P5, A1	A8.4

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
*	**FLAMMABLE SOLIDS, INORGANIC, N.O.S.**	4.1	UN3178	II		P5	A8.4
				III		P5	A8.4
*	**FLAMMABLE SOLIDS, ORGANIC, N.O.S.**	4.1	UN1325	II		P5, A1	A8.4
				III		P5, A1	A8.4
*	**FLAMMABLE SOLID, ORGANIC, MOLTON, N.O.S.**	FORBIDDEN					FORBIDDEN
*	**FLAMMABLE SOLIDS, TOXIC, INORGANIC, N.O.S.**	4.1	UN3179	II	6.1	P5, A1	A8.4
				III	6.1	P5, A1	A8.4
*	**FLAMMABLE SOLIDS, TOXIC, ORGANIC, N.O.S.**	4.1	UN2926	II	6.1	P5, A1	A8.4
				III	6.1	P5, A1	A8.4
	FLARES, AERIAL	1.3G	UN0093	II		P4	A5.52
	FLARES, AERIAL	1.4G	UN0403	II		P5	A5.52
	FLARES, AERIAL	1.4S	UN0404	II		P5	A5.52
	FLARES, AERIAL	1.1G	UN0420	II		P4	A5.52
	FLARES, AERIAL	1.2G	UN0421	II		P4	A5.52
	Flares, aeroplane; see **FLARES, AERIAL**						
	Flares, distress, small; see **SIGNAL DEVICES, HAND**						
	Flares, highway; see **SIGNAL DEVICES, HAND**						
	Flares, signal; see **CARTRIDGES, SIGNAL**						
	FLARES, SURFACE	1.1G	UN0418	II		P4	A5.52
	FLARES, SURFACE	1.2G	UN0419	II		P4	A5.52
	FLARES, SURFACE	1.3G	UN0092	II		P4	A5.52
	Flares, water-activated; see **CONTRIVANCES, WATER-ACTIVATED,** *etc.*						
	FLASH POWDER	1.1G	UN0094	II		P4	A5.53
	FLASH POWDER	1.3G	UN0305	II		P4	A5.53
	FLUORINE, COMPRESSED	2.3	UN1045		5.1, 8	P1, 1	A6.6
	FLUOROACETIC ACID	6.1	UN2642	I		P5	A10.6
	FLUOROANILINES	6.1	UN2941	III		P5	A10.5
	FLUOROBENZENE	3	UN2387	II		P5	A7.3
	FLUOROBORIC ACID	8	UN1775	II		P5, A6, A7, N34, N3	A12.3
	FLUOROPHOSPHORIC ACID, ANHYDROUS	8	UN1776	II		P5, A6, A7, N3, N34	A12.3
	FLUOROSILICATES, N.O.S.	6.1	UN2856	III		P5	A10.6
	FLUOROSILICIC ACID	8	UN1778	II		P5, A6, A7, N34, N3	A12.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	FLUOROSULPHONIC ACID	8	UN1777	I		P3, A3, A6, A7, A10, N3	A12.3
	FLUOROTOLUENES	3	UN2388	II		P5	A7.3
	FORMALDEHYDE SOLUTIONS *with not less than 25% formaldehyde*	8	UN2209	III		P5	A12.3
	FORMALDEHYDE SOLUTIONS, FLAMMABLE	3	UN1198	III	8	P5	A7.3
	Formalin; see **FORMALDEHYDE, SOLUTIONS**						
	FORMIC ACID	8	UN1779	II		P5	A12.3
	FRACTURING DEVICES, EXPLOSIVE, *without detonators for oil wells*	1.1D	UN0099	II		P4	A5.54
	FUEL, AVIATION, TURBINE ENGINE	3	UN1863	I		P3	A7.3
				II		P5	A7.3
				III		P5	A7.3
	Fuel devices, lanterns, heaters, etc., see **DANGEROUS GOODS IN APPARATUS** *or* **MACHINERY**						
D	**FUEL OIL** *also see* **GAS OIL**	3	NA1993	III		P5	A7.3
	Fulminate of mercury (dry)	FORBIDDEN					FORBIDDEN
	Fulminate of mercury, wet; see **MERCURY FULMINATE**, *etc.*						
	Fulminating mercury	FORBIDDEN					FORBIDDEN
	Fulminating platinum	FORBIDDEN					FORBIDDEN
	Fulminating silver	FORBIDDEN					FORBIDDEN
	Fulminic acid	FORBIDDEN					FORBIDDEN
	FUMARYL CHLORIDE	8	UN1780	II		P5	A12.3
	Fumigant; see appropriate pesticide						
	Fungicide; see appropriate pesticide						
	FURAN	3	UN2389	I		P3	A7.3
	FURFURAL	3	UN1199	III		P5	A7.3
	FURFURYL ALCOHOL	6.1	UN2874	III		P5	A10.5
	FURFURYLAMINE	3	UN2526	III	8	P5	A7.3
	FUSE, DETONATING, *metal clad; see* **CORD, DETONATING**, *metal clad*						
	FUSE DETONATING, MILD EFFECT, *metal clad, see* **CORD, DETONATING, MILD EFFECT,** *metal clad*						
	FUSE, IGNITER, *tubular metal clad*	1.4G	UN0103	II		P5	A5.55

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	FUSE, INSTANTANEOUS, NONDETONATING *or* **QUICKMATCH**	1.3G	UN0101	II		P4	A5.55
	Fusee, matches; see **MATCHES, FUSEE**						
	Fusees, railway or highway, explosive; see **SIGNAL DEVICES, HAND**						
D	**FUSEE** *(railway or highway)*	4.1	NA1325	II		P5	A8.14
	FUSEL OIL	3	UN1201	II		P5	A7.3
				III		P5	A7.3
	FUSE, SAFETY	1.4S	UN0105	II		P5	A5.56
	Fuses, tracer; see **TRACERS FOR AMMUNITION**						
	Fuzes, combination, percussion and time; see **FUZES,DETONATING** *(UN0257, UN0367); or* **FUZES, IGNITING** *(UN0317, UN0368)*						
	FUZES, DETONATING	1.1B	UN0106	II		P4	A5.57
	FUZES, DETONATING	1.2B	UN0107	II		P4	A5.57
	FUZES, DETONATING	1.4B	UN0257	II		P5, 116	A5.57
	FUZES, DETONATING	1.4S	UN0367	II		P5, 116	A5.57
	FUZES, DETONATING, *with protective features*	1.1D	UN0408	II		P4	A5.57
	FUZES, DETONATING, *with protective features*	1.2D	UN0409	II		P4	A5.57
	FUZES, DETONATING, *with protective features*	1.4D	UN0410	II		P5, 116	A5.57
	FUZES, IGNITING	1.3G	UN0316	II		P4	A5.57
	FUZES, IGNITING	1.4G	UN0317	II		P4	A5.57
	FUZES, IGNITING	1.4S	UN0368	II		P5	A5.57
	GALLIUM	8	UN2803	I		P3	A12.8
	Gas, compressed; see **COMPRESSED GASES,** *etc.*						
	GAS GENERATOR ASSEMBLIES (AIRCRAFT), *containing a nonflammable, nontoxic gas and a propellant cartridge*	2.2	ID8013			P5	A6.22
D	**GAS IDENTIFICATION SET,** *must be classified and labelled according to the hazard class of the constituent(s)*	2.3	NA9035			P2, 6	A6.17
D	**GASOHOL** *(gasoline mixed with ethyl alcohol, max. 20% alcohol)*	3	NA1203	II		P5	A7.3
	GAS OIL *or* **DIESEL FUEL** *or* **HEATING OIL, LIGHT**	3	UN1202	III		P5	A7.3
	GASOLINE	3	UN1203	II		P5	A7.3
*	**GAS, REFRIGERATED LIQUID, N.O.S.**	2.2	UN3158			P5	A6.3, A6.5

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	GAS SAMPLE, NONPRESSURIZED, FLAMMABLE, N.O.S., *not refrigerated liquid*	2.1	UN3167			P4	A6.3, A6.5, A6.6
	GAS SAMPLE, NONPRESSURIZED, TOXIC, FLAMMABLE, N.O.S., *not refrigerated liquid*	2.3	UN3168		2.1	P3	A6.3, A6.6
	GAS SAMPLE, NONPRESSURIZED, TOXIC, N.O.S., *not refrigerated liquid*	2.3	UN3169			P4	A6.3, A6.6
	Gelatine, blasting; see **EXPLOSIVE, BLASTING, TYPE A**						
	Gelatine dynamites; see **EXPLOSIVE, BLASTING, TYPE A**						
	GERMANE	2.3	UN2192		2.1	P2, 2	A6.15
	Glycerol-1,3-dinitrate	FORBIDDEN					FORBIDDEN
	Glycerol gluconate trinitrate	FORBIDDEN					FORBIDDEN
	Glycerol lactate trinitrate	FORBIDDEN					FORBIDDEN
	GLYCEROL ALPHA-MONOCHLOROHYDRIN	6.1	UN2689	III		P5	A10.5
	Glyceryl trinitrate; see **NITROGLYCERIN,** *etc.*						
	GLYCIDALDEHYDE	3	UN2622	II	6.1	P5	A7.3
D	**GRENADES, EMPTY PRIMED**	1.4S	NA0349	II		P5	A5.58
	GRENADES, *hand or rifle, with bursting charge*	1.1D	UN0284	II		P4	A5.59
	GRENADES, *hand or rifle, with bursting charge*	1.2D	UN0285	II		P4	A5.59
	GRENADES, *hand or rifle, with bursting charge*	1.1F	UN0292	II		P4	A5.59
	GRENADES, *hand or rifle, with bursting charge*	1.2F	UN0293	II		P4	A5.59
	Grenades, illuminating; see **AMMUNITION, ILLUMINATING,** *etc.*						
	GRENADES, PRACTICE, *hand or rifle*	1.4G	UN0452	II		P5	A5.59
	GRENADES, PRACTICE, *hand or rifle*	1.4S	UN0110	II		P5	A5.59
	GRENADES, PRACTICE, *hand or rifle*	1.3G	UN0318	II		P4	A5.59
	GRENADES, PRACTICE, *hand or rifle*	1.2G	UN0372	II		P4	A5.59
	Grenades, smoke; see **AMMUNITION, SMOKE**, *etc.*						
	GUANIDINE NITRATE	5.1	UN1467	III		P5, A1	A9.8
	Guanyl nitrosaminoguanylidene hydrazine(dry)	FORBIDDEN					FORBIDDEN
	GUANYL NITROSAMINOGUANYLIDENE HYDRAZINE, WETTED *with not less than 30% water, by mass*	1.1A	UN0113	II		P4, 111, 117	A5.13
	Guanyl nitrosaminoguanyltetrazene (dry)	FORBIDDEN					FORBIDDEN

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	GUANYL NITROSAMINOGUANYLTETRAZENE, **WETTED;** *or* **TETRAZENE, WETTED** *with not less than 30% water, or mixture of alcohol and water, by mass*	1.1A	UN0114	II		P4, 111, 117	A5.13
	GUNPOWDER, COMPRESSED *or* **GUNPOWDER IN PELLETS**; *see* **BLACK POWDER** *(UN0028)*						
	GUNPOWDER, *granular or as a meal; see* **BLACK POWDER** *(UN0027)*						
	HAFNIUM POWDER, DRY	4.2	UN2545	I		P3	A8.4
				II		P5, A19, A20, N34	A8.4
				III		P5	A8.4
	HAFNIUM POWDER, WETTED *with not less than 25% water (a visible excess of water must be present) (a) mechanically produced, particle size less than 53 microns; (b) chemically produced, particle size less than 840 microns*	4.1	UN1326	II		P5, A6, A19, A20, N34	A8.4
*	**HALOGENATED IRRITATING LIQUID, N.O.S.**	6.1	UN1610	I		P3	A10.5
				II		P5	A10.5
				III		P5	A10.5
	Hand signal device; see **SIGNAL DEVICES, HAND**						
D	**HAZARDOUS SUBSTANCES, LIQUID** *or* **SOLID, N.O.S.** *see* **ENVIRONMENTALLY HAZARDOUS SUBSTANCES**, *etc.*						
D*	**HAZARDOUS WASTE, LIQUID, N.O.S.**	9	NA3082	III		P5	A13.3
D*	**HAZARDOUS WASTE, SOLID, N.O.S**.	9	NA3077	III		P5	A13.3
	HELIUM, COMPRESSED	2.2	UN1046			P5	A6.3, A6.6
	Helium-oxygen mixture; see **RARE GASES AND OXYGEN MIXTURES**						
	HELIUM, REFRIGERATED LIQUID *(cryogenic liquid)*	2.2	UN1963			P5	A6.11
	HEPTAFLUOROPROPANE	2.2	UN3296			P5	A6.3, A6.5
	N-HEPTALDEHYDE	3	UN3056	III		P5	A7.3
	n-Heptanal; *see* **N-HEPTALDEHYDE**						
	HEPTANES	3	UN1206	II		P5	A7.3
	N-HEPTENE	3	UN2278	II		P5	A7.3
	HEXACHLOROACETONE	6.1	UN2661	III		P5	A10.5
	HEXACHLOROBENZENE	6.1	UN2729	III		P5	A10.5
	HEXACHLOROBUTADIENE	6.1	UN2279	III		P5	A10.5

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	HEXACHLOROCYCLOPENTADIENE	6.1	UN2646	I		P2, 2	A10.7
	HEXACHLOROPHENE	6.1	UN2875	III		P5	A10.6
	HEXADECYLTRICHLOROSILANE	8	UN1781	II		P4, A7, N34	A12.3
	HEXADIENE	3	UN2458	II		P5	A7.3
	HEXAETHYL TETRAPHOSPHATE AND COMPRESSED GAS MIXTURES	2.3	UN1612			P2, 3	A6.18
	HEXAETHYL TETRAPHOSPHATE, *liquid or solid*	6.1	UN1611	I		P3, A4	A10.5, A10.6
				II		P5, N76	A10.5, A10.6
				III		P5, N77	A10.5, A10.6
	HEXAFLUOROACETONE	2.3	UN2420		8	P2, 2	A6.5
	HEXAFLUOROACETONE HYDRATE	6.1	UN2552	II		P5	A10.5
	HEXAFLUOROETHANE *(R116)*	2.2	UN2193				A6.3, A6.5
	HEXAFLUOROPHOSPHORIC ACID	8	UN1782	II		P5, A6, A7, N3, N34	A12.3
	HEXAFLUOROPROPYLENE	2.2	UN1858			P5	A6.3, A6.5
D	**HEXAFLUOROPROPYLENE OXIDE**	2.2	NA1956			P5	A6.3, A6.5
	HEXALDEHYDE	3	UN1207	III		P5	A7.3
	HEXAMETHYLENEDIAMINE, SOLID	8	UN2280	III		P5	A12.4
	HEXAMETHYLENEDIAMINE SOLUTION	8	UN1783	II		P5	A12.3
				III		P5	A12.3
	HEXAMETHYLENE DIISOCYANATE	6.1	UN2281	II		P5	A10.5
	HEXAMETHYLENEIMINE	3	UN2493	II	8	P5	A7.3
	HEXAMETHYLENETETRAMINE	4.1	UN1328	III		P5, A1	A8.4
	HEXANES	3	UN1208	II		P5	A7.3
	HEXANITRODIPHENYLAMINE *or* **DIPICRYLAMINE** *or* **HEXYL**	1.1D	UN0079	II		P4	A5.47
	Hexanitroethane	FORBIDDEN					FORBIDDEN
	Hexanitrooxanilide	FORBIDDEN					FORBIDDEN
	HEXANITROSTILBENE	1.1D	UN0392	II		P4	A5.47
	HEXANOLS	3	UN2282	III		P5	A7.3
	1-HEXENE	3	UN2370	II		P5	A7.3
	HEXOGEN; *see* **CYCLOTRIMETHYLENETRI-NITRAMINE** *etc.*						
	HEXOLITE, *or* **HEXOTOL** *dry or wetted with less than 15% water, by mass*	1.1D	UN0118	II		P4	A5.60
	HEXOTONAL	1.1D	UN0393	II		P4	A5.60

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	HEXYL; *see* **HEXANITRODIPHENYLAMINE**						
	HEXYLTRICHLOROSILANE	8	UN1784	II		P4, A7, N34	A12.3
	High explosives; see individual explosives' entries						
	HMX; *see* **CYCLOTETRAMETHYLENE-TETRANITRAMINE**, *etc.*						
	HYDRAZINE, ANHYDROUS *or* **HYDRAZINE AQUEOUS SOLUTIONS** *with more than 64% hydrazine, by mass*	8	UN2029	I	3, 6.1	P3, A3, A6, A7, A10	A12.3
	Hydrazine azide	FORBIDDEN					FORBIDDEN
	Hydrazine chlorate	FORBIDDEN					FORBIDDEN
	Hydrazine dicarbonic acid diazide	FORBIDDEN					FORBIDDEN
	HYDRAZINE, AQUEOUS SOLUTION *with not more than 37% hydrazine, by mass*	6.1	UN3293	III		P5	A10.5
	HYDRAZINE HYDRATE *or* **HYDRAZINE AQUEOUS SOLUTIONS**, *with not less than 37% but not more not more than 64% hydrazine, by mass*	8	UN2030	II	6.1	P4	A12.3
	Hydrazine perchlorate	FORBIDDEN					FORBIDDEN
	Hydrazine selenate	FORBIDDEN					FORBIDDEN
	Hydriodic acid, anhydrous; see **HYDROGEN IODIDE, ANHYDROUS**						
	HYDRIODIC ACID, SOLUTION	8	UN1787	II		P5, A3, A6, N41	A12.3
				III		P5	A12.3
	Hydrobromic acid, anhydrous; see **HYDROGEN BROMIDE, ANHYDROUS**						
	HYDROBROMIC ACID, SOLUTION, *more than 49% strength*	8	UN1788	II		P4, N41	A12.3
				III		P5, A3, A6, N41	A12.3
	HYDROBROMIC ACID, SOLUTION, *not more than 49% strength*	8	UN1788	II		P5, A3, A6, N41	A12.3
				III		P5	A12.3
*	**HYDROCARBON GAS, COMPRESSED, N.O.S.** *or* **HYDROCARBON GAS MIXTURES, COMPRESSED, N.O.S.**	2.1	UN1964			P4	A6.3, A6.6
*	**HYDROCARBON GAS, LIQUEFIED**, **N.O.S.** *or* **HYDROCARBON GAS MIXTURES, LIQUEFIED, N.O.S**	2.1	UN1965			P4	A6.3, A6.5

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	HYDROCARBON GAS REFILLS FOR SMALL DEVICES, *with release device; see* **DEVICES, SMALL**,						
	HYDROCARBON GAS POWERED, *with release device*						
	Hydrochloric acid, anhydrous; see **HYDROGEN CHLORIDE, ANHYDROUS**						
	HYDROCARBONS, LIQUID, N.O.S.	3	UN3295	I		P3	A7.3
				II		P5	A7.3
				III		P5	A7.3
	HYDROCHLORIC ACID, SOLUTION	8	UN1789	II		P4, A3, A6, N41	A12.3
				III		P5	A12.3
	Hydrocyanic acid, anhydrous; see **HYDROGEN CYANIDE**						
	HYDROCYANIC ACID, AQUEOUS SOLUTIONS *less than 5% hydrogen cyanide*	FORBIDDEN					FORBIDDEN
	HYDROCYANIC ACID, AQUEOUS SOLUTIONS *not more than 20% hydrocyanic acid*	FORBIDDEN					FORBIDDEN
	HYDROFLUORIC ACID AND SULPHURIC ACID MIXTURES	8	UN1786	I	6.1	P3, A6, A7, N5, N34	A12.3
	Hydrofluoric acid, anhydrous; see **HYDROGEN FLUORIDE, ANHYDROUS**						
	HYDROFLUORIC ACID, SOLUTION, *more than 60% strength*	8	UN1790	I	6.1	P3, A6, A7, N5, N34	A12.3
	HYDROFLUORIC ACID, SOLUTION, *not more than 60% strength*	8	UN1790	II	6.1	P4, A6, A7, N5, N34	A12.3
	Hydrofluosilicic acid; see **FLUOROSILICIC ACID**						
	HYDROGEN AND METHANE MIXTURES, COMPRESSED	2.1	UN2034			P4	A6.3, A6.6
	HYDROGEN BROMIDE, ANHYDROUS	2.3	UN1048		8	P2, 3	A6.5
	HYDROGEN CHLORIDE, ANHYDROUS	2.3	UN1050		8	P2, 3	A6.5
	HYDROGEN CHLORIDE, REFRIGERATED LIQUID *(cryogenic liquid)*	FORBIDDEN					FORBIDDEN
	HYDROGEN, COMPRESSED	2.1	UN1049			P4	A6.3, A6.6
	HYDROGEN CYANIDE, ANHYDROUS, STABILIZED *absorbed in a porous inert material*	FORBIDDEN					FORBIDDEN
	HYDROGEN CYANIDE, SOLUTION IN ALCOHOL	FORBIDDEN					FORBIDDEN

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	HYDROGEN FLUORIDE, ANHYDROUS	8	UN1052	I	6.1	P2, 3	A12.9
	HYDROGEN IODIDE, ANHYDROUS	2.3	UN2197			P2, 3	A6.5
	Hydrogen iodide solution; see **HYDRIODIC ACID, SOLUTION**						
	HYDROGEN PEROXIDE AND PEROXYACETIC ACID MIXTURES, *with acids, water and not more than 5% peroxyacetic acid,*	5.1	UN3149	II	8	P5, A2, A3, A6	A9.7
	HYDROGEN PEROXIDE, AQUEOUS SOLUTIONS *with more than 40%, but not more than 60% hydrogen peroxide*	FORBIDDEN					FORBIDDEN
	HYDROGEN PEROXIDE, AQUEOUS SOLUTIONS *with not less than 8%, but less than 20% hydrogen peroxide (stabilized as necessary)*	5.1	UN2984	III		P5, A1, 17	A9.7
	HYDROGEN PEROXIDE, AQUEOUS SOLUTIONS *with not less than 20%, but not more than 40% hydrogen peroxide (stabilized as necessary)*	5.1	UN2014	II	8	P5, A2, A3, A6	A9.7
	HYDROGEN PEROXIDE, STABILIZED *or* **HYDROGEN PEROXIDE AQUEOUS SOLUTIONS, STABILIZED** *with more than 60% hydrogen peroxide*	FORBIDDEN					FORBIDDEN
	HYDROGEN, REFRIGERATED LIQUID *(cryogenic liquid)*	2.1	UN1966			P3	A6.11
	HYDROGEN SELENIDE, ANHYDROUS	FORBIDDEN					FORBIDDEN
	Hydrogen sulphate; see **SULPHURIC ACID**						
	HYDROGEN SULPHIDE, LIQUEFIED	2.3	UN1053		2.1	P2, 2	A6.5
	HYDROGENDIFLORIDES, N.O.S. SOLID *or* **SOLUTION**	8	UN1740	II		P5, N3, N34	A12.3, A12.4
				III		P5, N3, N34	A12.3, A12.4
	HYDROQUINONE	6.1	UN2662	III		P5	A10.6
	Hydrosilicofluoric acid; see **FLUOSILICIC ACID**						
	3-(2-Hydroxyethoxy)-4-Pyrrolidin-1-Ylbenzenediazonium Zinc Chloride; see **SELF-REACTIVE SOLID TYPE D, TEMPERATURE CONTROLLED**						
	HYDROXYLAMINE SULPHATE	8	UN2865	III		P5	A12.4

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	Hydroxyl amine iodide	FORBIDDEN					FORBIDDEN
	HYPOCHLORITE SOLUTIONS *with more than 5% but less than 16% available chlorine*	8	UN1791	III		P5, N34	A12.3
	HYPOCHLORITE SOLUTIONS *with 16% or more available chlorine*	8	UN1791	II		P5, A7, N34	A12.3
	Hyponitrous acid	FORBIDDEN					FORBIDDEN
	HYPOCHLORITES, INORGANIC, N.O.S.	5.1	UN3212	II		P5	A9.8
	Igniter fuse, metal clad; see **FUSE, IGNITER**, *tubular, metal clad*						
	IGNITERS	1.1G	UN0121	II		P4	A5.61
	IGNITERS	1.2G	UN0314	II		P4	A5.61
	IGNITERS	1.3G	UN0315	II		P5	A5.61
	IGNITERS	1.4G	UN0325	II		P5	A5.62
	IGNITERS	1.4S	UN0454	II		P5	A5.62
	3,3'-IMINODIPROPYLAMINE	8	UN2269	III		P5	A12.3
*	**INFECTIOUS SUBSTANCES, AFFECTING ANIMALS** *only*	6.2	UN2900			P1, P5	A10.9
*	**INFECTIOUS SUBSTANCES, AFFECTING HUMANS**	6.2	UN2814			P1, P5	A10.9
	Inflammable; see Flammable						
	Initiating explosives (dry)	FORBIDDEN					FORBIDDEN
*	**INSECTICIDE GAS**, **N.O.S.**	2.2	UN1954			P5	A6.3, A6.5
D	**INSECTICIDE GAS, N.O.S.** *flammable*	2.1	NA1968			P4	A6.3, A6.5
*	**INSECTICIDE GAS, TOXIC, N.O.S**.	FORBIDDEN					FORBIDDEN
	Iodine azide (dry)	FORBIDDEN					FORBIDDEN
	IODINE MONOCHLORIDE	8	UN1792	II		P4, N41	A12.3
	IODINE PENTAFLUORIDE	5.1	UN2495	I	6.1, 8	P3	A9.9
	2-IODOBUTANE	3	UN2390	II		P5	A7.3
	IODOMETHYLPROPANES	3	UN2391	II		P5	A7.3
	IODOPROPANES	3	UN2392	III		P5	A7.3
	Iron chloride; see **FERRIC CHLORIDE**						
	IRON OXIDE, SPENT, *or* **IRON SPONGE, SPENT** *obtained from coal gas purification*	FORBIDDEN					FORBIDDEN
	IRON PENTACARBONYL	6.1	UN1994	I	3	P1, 1	A10.3
	Irritating material; see **TEAR GAS SUBSTANCE,** *etc.*						

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	ISOBUTANE *or* **ISOBUTANE MIXTURES**, *see also* **PETROLEUM GASES, LIQUEFIED**	2.1	UN1969			P4	A6.3, A6.5
	ISOBUTANOL *or* **ISOBUTYL ALCOHOL**	3	UN1212	III		P5	A7.3
	ISOBUTYL ACETATE	3	UN1213	II		P5	A7.3
	ISOBUTYL ACRYLATE	3	UN2527	III		P5	A7.3
	ISOBUTYL ALCOHOL*; see* **ISOBUTANOL**						
	ISOBUTYL ALDEHYDE*; see* **ISOBUTYRALDEHYDE**						
	ISOBUTYLAMINE	3	UN1214	II	8	P5	A7.3
D	**ISOBUTYL CHLOROFORMATE**	6.1	NA2742	I	3, 8	P2, 2	A10.7
	ISOBUTYLENE	2.1	UN1055			P4	A6.3, A6.5
	ISOBUTYL FORMATE	3	UN2393	II		P5	A7.3
	ISOBUTYL ISOBUTYRATE	3	UN2528	III		P5	A7.3
+	**ISOBUTYL ISOCYANATE**	3	UN2486	II	6.1	P1, 1	A7.6
	ISOBUTYL METHACRYLATE	3	UN2283	III		P5	A7.3
	ISOBUTYL PROPIONATE	3	UN2394	III		P5	A7.3
	ISOBUTYRALDEHYDE *or* **ISOBUTYL ALDEHYDE**	3	UN2045	II		P5	A7.3
	ISOBUTYRIC ACID	3	UN2529	III	8	P5	A7.3
	ISOBUTYRIC ANHYDRIDE	3	UN2530	III	8	P5	A7.3
	ISOBUTYRONITRILE	3	UN2284	II	6.1	P5	A7.3
	ISOBUTYRYL CHLORIDE	3	UN2395	II	8	P5	A7.3
*	**ISOCYANATES, TOXIC N.O.S**. *or* **ISOCYANATE SOLUTIONS, TOXIC N.O.S.,** *flashpoint more than 61 degrees C and boiling point less than than 300 degrees C*	6.1	UN2206	II III		P4 P4	A10.5 A10.5
*	**ISOCYANATES, TOXIC, FLAMMABLE N.O.S.** *or* **ISOCYANATE SOLUTIONS, TOXIC, FLAMMABLE, N.O.S.,** *flashpoint not less than 23 degrees C and not more than 61 degrees C and boiling point less than 300 degrees C*	6.1	UN3080	II	3	P4	A10.5
*	**ISOCYANATES, FLAMMABLE, TOXIC, N.O.S**. *or* **ISOCYANATE SOLUTIONS, FLAMMABLE, TOXIC, N.O.S.,** *flashpoint less than 23 degrees C*	3	UN2478	II	6.1	P2, 5, A3, A7	A7.3
	ISOCYANATOBENZOTRIFLUORIDES	6.1	UN2285	II		P2, 5	A10.5
	Isododecane, see **PENTAMETHYLHEPTANE**						
	ISOHEPTENE	3	UN2287	II		P5	A7.3
	ISOHEXENE	3	UN2288	II		P5	A7.3
	Isooctane, see **OCTANES**						

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	ISOOCTENE	3	UN1216	II		P5	A7.3
	ISOPENTANE, *see* **PENTANE**						
	ISOPENTENES	3	UN2371	I		P3	A7.3
	Isopentylamine, see **AMYLAMINE**						
	Isopentyl nitrite, see **AMYL NITRITE**						
	ISOPHORONEDIAMINE	8	UN2289	III		P5	A12.3
	ISOPHORONE DIISOCYANATE	6.1	UN2290	III		P5	A10.5
	ISOPRENE, INHIBITED	3	UN1218	I		P3	A7.3
	ISOPROPANOL *or* **ISOPROPYL ALCOHOL**	3	UN1219	II		P5	A7.3
	ISOPROPENYL ACETATE	3	UN2403	II		P5	A7.3
	ISOPROPENYLBENZENE	3	UN2303	III		P5	A7.3
	ISOPROPYL ACETATE	3	UN1220	II		P5	A7.3
	ISOPROPYL ACID PHOSPHATE	8	UN1793	III		P5	A12.4
	ISOPROPYL ALCOHOL, *see* **ISOPROPANOL**						
	ISOPROPYLAMINE	3	UN1221	I	8	P3	A7.3
	ISOPROPYLBENZENE	3	UN1918	III		P5	A7.3
	ISOPROPYL BUTYRATE	3	UN2405	III		P5	A7.3
	ISOPROPYL CHLOROACETATE	3	UN2947	III		P5	A7.3
	ISOPROPYL CHLOROFORMATE	6.1	UN2407	I	3, 8	P2, 2	A10.7
	ISOPROPYL 2-CHLOROPROPIONATE	3	UN2934	III		P5	A7.3
	Isopropyl-alpha-chloropropionate, see **ISOPROPYL 2- CHLOROPROPIONATE**						
	ISOPROPYL ISOBUTYRATE	3	UN2406	II		P5	A7.3
+	**ISOPROPYL ISOCYANATE**	3	UN2483	I	6.1	P1, 1	A7.6
	Isopropyl mercaptan, see **PROPANETHIOLS**						
	ISOPROPYL NITRATE	3	UN1222	II		P5	A7.3
	Isopropyl phosphoric acid, see **ISOPROPYL ACID PHOSPHATE**						
	ISOPROPYL PROPIONATE	3	UN2409	II		P5	A7.3
	ISOSORBIDE DINITRATE MIXTURE *with not less than 60% lactose, mannose, starch or calcium hydrogen phosphate*	4.1	UN2907	II		P5	A8.4
	ISOSORBIDE-5-MONONITRATE	4.1	UN3251	III		P5	A8.4
	Isothiocyanic acid	FORBIDDEN					FORBIDDEN
	Jet fuel, see **FUEL, AVIATION, TURBINE ENGINE**						

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	JET PERFORATING GUNS, CHARGED *oil well, with detonator*	FORBIDDEN					FORBIDDEN
D	**JET PERFORATING GUNS, CHARGED** *oil well, with detonator*	1.4D	NA0494	II		P5, 56	A5.63
	JET PERFORATING GUNS, CHARGED *oil well, without detonator*	FORBIDDEN					FORBIDDEN
	JET PERFORATING GUNS, CHARGED *oil well, without detonator*	1.4D	UN0494	II		P5, 56	A5.63
	Jet perforators, see **CHARGES, SHAPED, COMMERCIAL**						
	Jet tappers, without detonator, see **CHARGES, SHAPED, COMMERCIAL**						
	Jet thrust igniters, for rocket motors or Jato, see **IGNITERS**						
	Jet thrust unit (Jato) see **ROCKET MOTORS**						
	KEROSENE	3	UN1223	III		P5	A7.3
*	**KETONES, LIQUID, N.O.S.**	3	UN1224	I		P3	A7.3
				II		P5	A7.3
				III		P5	A7.3
	KRYPTON, COMPRESSED	2.2	UN1056			P5	A6.3, A6.6
	KRYPTON, REFRIGERATED LIQUID *(cryogenic liquid)*	2.2	UN1970			P5	A6.11
	Lacquer base or lacquer chips, nitrocellulose, dry, see **NITROCELLULOSE**, *etc.*						
	Lacquer base or lacquer chips, plastic, wet with alcohol or solvent, see **NITROCELLULOSE**, *etc., or* **PAINT**, *etc.*						
	LEAD ACETATE	6.1	UN1616	III		P5	A10.6
	LEAD ARSENATES	6.1	UN1617	II		P5	A10.6
	LEAD ARSENITES	6.1	UN1618	II		P5	A10.6
	Lead azide (dry)	FORBIDDEN					FORBIDDEN
	LEAD AZIDE, WETTED *with not less than 20% water or mixture of alcohol and water, by mass*	1.1A	UN0129	II		P3, 111, 117	A5.13
	LEAD COMPOUNDS, SOLUBLE, N.O.S.	6.1	UN2291	III		P5	A10.6
	LEAD CYANIDE	6.1	UN1620	II		P5	A10.6
	LEAD DIOXIDE	5.1	UN1872	III		P5, A1	A9.8

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D	**LEAD MONONITRORESORCINATE**	1.1A	NA0473	II		P3, 111, 117	A5.13
	LEAD NITRATE	5.1	UN1469	II	6.1	P5	A9.8
	Lead nitroresorcinate (dry)	FORBIDDEN					FORBIDDEN
	LEAD PERCHLORATE SOLID *or* **SOLUTION**	5.1	UN1470	II	6.1	P5	A9.7, A9.8
	Lead peroxide; see **LEAD DIOXIDE**						
	LEAD PHOSPHITE, DIBASIC	4.1	UN2989	II		P5	A8.4
				III		P5	A8.4
	Lead picrate (dry)	FORBIDDEN					FORBIDDEN
	Lead styphnate (dry)	FORBIDDEN					FORBIDDEN
	LEAD STYPHNATE, WETTED *or* **LEAD TRINITRORESORCINATE, WETTED** *with not less than 20% water or mixture of alcohol and water, by mass*	1.1A	UN0130	II		P3, 111, 117	A5.13
	Lead styphnate or lead trinitroresorcinate, wetted with less than 20% water or mixture of alcohol water	FORBIDDEN					FORBIDDEN
	LEAD SULPHATE *with more than 3% free acid*	8	UN1794	II		P5	A12.4
	LEAD TRINITRORESORCINATE; *see* **LEAD STYPHNATE**, *etc.*						
	Life rafts, see **LIFE-SAVING APPLIANCES**						
	LIFE-SAVING APPLIANCES, NOT SELF INFLATING *containing dangerous goods as equipment*	9	UN3072			P5	A13.11
	LIFE-SAVING APPLIANCES, SELF INFLATING	9	UN2990			P5	A13.11
D	**LIGHTERS FOR CIGARS, CIGARETTES**, *etc. with lighter fluids*	FORBIDDEN					FORBIDDEN
	LIGHTERS, FUSE	1.4S	UN0131	II		P5	A5.62
	LIGHTERS OR LIGHTER REFILLS *(cigarettes) containing flammable gas*	2.1	UN1057			P5	A6.10
	LIQUEFIED GASES, *nonflammable charged with nitrogen, carbon dioxide or air*	2.2	UN1058			P5	A6.3, A6.5
*	**LIQUEFIED GAS, N.O.S**	2.2	UN3163			P5	A6.3, A6.5
*	**LIQUEFIED GAS OXIDIZING, N.O.S**	2.2	UN3157		5.1	P5	A6.3, A6.5
*	**LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S,** *Inhalation Hazard Zone A*	2.3	UN3160		2.1	P1, 1	A6.15
*	**LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S,** *Inhalation Hazard Zone B*	2.3	UN3160		2.1	P2, 2	A6.5

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*	**LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S,** *Inhalation Hazard Zone C*	2.3	UN3160		2.1	P2, 3	A6.5
*	**LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S,** *Inhalation Hazard Zone D*	2.3	UN3160		2.1	P2, 4	A6.5
*	**LIQUEFIED GAS, TOXIC, N.O.S,** *Inhalation Hazard Zone A*	2.3	UN3162			P1, 1	A6.15
*	**LIQUEFIED GAS, TOXIC, N.O.S,** *Inhalation Hazard Zone B*	2.3	UN3162			P2, 2	A6.5
*	**LIQUEFIED GAS, TOXIC, N.O.S,** *Inhalation Hazard Zone C*	2.3	UN3162			P2, 3	A6.5
*	**LIQUEFIED GAS, TOXIC, N.O.S,** *Inhalation Hazard Zone D*	2.3	UN3162			P2, 4	A6.5
*	**LIQUEFIED GASES, FLAMMABLE, N.O.S.**	2.1	UN3161			P4	A6.3, A6.5
	Liquefied hydrocarbon gas; see **HYDROCARBON GASES, LIQUEFIED, N.O.S.,** *etc.*						
	Liquefied natural gas; see **METHANE**						
	Liquefied petroleum gas; see **PETROLEUM GASES,LIQUEFIED**						
	LITHIUM	4.3	UN1415	I		P3, A7, A19, N45	A8.4
	LITHIUM ALKYLS	4.2	UN2445	I	4.3	P3	A8.6
	LITHIUM ALUMINIUM HYDRIDE	4.3	UN1410	I		P3, A19	A8.4
	LITHIUM ALUMINIUM HYDRIDE, ETHEREAL	4.3	UN1411	I	3	P3, A2, A3, A11, N34	A8.3
	LITHIUM BATTERIES CONTAINED IN EQUIPMENT *or* **LITHIUM BATTERIES PACKED WITH EQUIPMENT**	9	UN3091	II		P5	A13.8
	LITHIUM BATTERIES, *liquid or solid cathode*	9	UN3090	II		P5	A13.8
	LITHIUM BOROHYDRIDE	4.3	UN1413	I		P3, A19, N40	A8.4
	LITHIUM FERROSILICON	4.3	UN2830	II		P5, A19	A8.4
	LITHIUM HYDRIDE	4.3	UN1414	I		P3, A19, N40	A8.4
	LITHIUM HYDRIDE, FUSED SOLID	4.3	UN2805	II		P5, A8, A19, A20	A8.4
	LITHIUM HYDROXIDE, MONOHYDRATE	8	UN2680	II		P5	A12.4
	LITHIUM HYDROXIDE, SOLUTION	8	UN2679	II		P5	A12.3
				III		P5	A12.3
	LITHIUM HYPOCHLORITE, DRY *or* **LITHIUM HYPOCHLORITE MIXTURES, DRY**	5.1	UN1471	II		P5, A9, N34	A9.8

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	LITHIUM NITRATE	5.1	UN2722	III		P5, A1	A9.8
	LITHIUM NITRIDE	4.3	UN2806	I		P3, A19, N40	A8.4
	LITHIUM PEROXIDE	5.1	UN1472	II		P5, A9, N34	A9.8
	LITHIUM SILICON	4.3	UN1417	II		P5, A19, A20	A8.4
	LONDON PURPLE	6.1	UN1621	II		P5	A10.6
	LPG, see **PETROLEUM GASES, LIQUEFIED**						
	Lye solid, see **SODIUM HYDROXIDE, SOLID**						
	Lye solution, see **SODIUM HYDROXIDE, SOLUTIONS**						
	MAGNESIUM ALKYLS	4.2	UN3053	I		P3	A8.6
	MAGNESIUM ALUMINIUM PHOSPHIDE	4.3	UN1419	I	6.1	P3, A19, N34, N40	A8.4
+	**MAGNESIUM ARSENATE**	6.1	UN1622	II		P5	A10.6
	Magnesium bisulfite solution, see **BISULFITES AQUEOUS SOLUTIONS, N.O.S.**						
	MAGNESIUM BROMATE	5.1	UN1473	II		P5, A1	A9.8
	MAGNESIUM CHLORATE	5.1	UN2723	II		P5	A9.8
	MAGNESIUM DIAMIDE	4.2	UN2004	II		P5, A8, A19, A20	A8.4
	MAGNESIUM DIPHENYL	4.2	UN2005	I		P3	A8.12
	Magnesium dross, wet or hot	FORBIDDEN					FORBIDDEN
	MAGNESIUM FLUOROSILICATE	6.1	UN2853	III		P5	A10.6
	MAGNESIUM GRANULES, COATED, *particle size not less than 149 Microns*	4.3	UN2950	III		P5, A1, A19	A8.4
	MAGNESIUM HYDRIDE	4.3	UN2010	I		P3, A19, N40	A8.4
	MAGNESIUM *or* **MAGNESIUM ALLOYS** *with more than 50% magnesium in pellets, turnings or ribbons*	4.1	UN1869	III		P5, A1	A8.4
	MAGNESIUM NITRATE	5.1	UN1474	III		P5, A1	A9.8
	MAGNESIUM PERCHLORATE	5.1	UN1475	II		P5	A9.8
	MAGNESIUM PEROXIDE	5.1	UN1476	II		P5	A9.8
	MAGNESIUM PHOSPHIDE	4.3	UN2011	I	6.1	P3, A19, N40	A8.4
	MAGNESIUM, POWDER *or* **MAGNESIUM ALLOYS, POWDER**	4.3	UN1418	I	4.2	P3, A19	A8.4
				II	4.2	P5, A19	A8.4
				III	4.2	P5, A19	A8.4
	Magnesium scrap, see **MAGNESIUM,** *etc.*						
	MAGNESIUM SILICIDE	4.3	UN2624	II		P5, A19, A20	A8.4

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	MAGNETIZED MATERIAL	9	UN2807			P5	A13.10
D	**MALEIC ACID**	8	NA2215	III		P5	A12.4
	MALEIC ANHYDRIDE	8	UN2215	III		P5	A12.4
	MALONONITRILE	6.1	UN2647	II		P5	A10.6
	MANEB *or* **MANEB PREPARATIONS** *with not less than 60% maneb*	4.2	UN2210	III	4.3	P5, A1, A19	A8.4
	MANEB STABILIZED *or* **MANEB PREPARATIONS, STABILIZED** *against self-heating*	4.3	UN2968	III		P5, A1, A19	A8.4
	MANGANESE NITRATE	5.1	UN2724	III		P5, A1	A9.8
	MANGANESE RESINATE	4.1	UN1330	III		P5, A1	A8.4
	Mannitan tetranitrate	FORBIDDEN					FORBIDDEN
	Mannitol hexanitrate (dry)	FORBIDDEN					FORBIDDEN
D	**MANNITOL HEXANITRATE, WETTED** *or* **NITROMANNITE, WETTED** *with not less than 40% water, by mass or mixture of alcohol and water*	1.1A	NA0133	II		P3, 111	A5.13
	MANNITOL HEXANITRATE, WETTED *or* **NITROMANNITE, WETTED** *with not less than 40% water, or mixture of alcohol and water, by mass*	1.1D	UN0133	II		P4, 111, 117	A5.13
	Matches, block, see **MATCHES, STRIKE ANYWHERE**						
	MATCHES, FUSEE	4.1	UN2254	III		P4	A8.15
	MATCHES, SAFETY*(book, card or strike on box)*	4.1	UN1944	III		P5	A8.15
	MATCHES, STRIKE ANYWHERE	4.1	UN1331	III		P4	A8.15
	MATCHES, WAX, VESTA	4.1	UN1945	III		P5	A8.15
D	**MEDICINE, N.O.S.** *corrosive, liquid*	8	NA1760	II		P5	A12.3
				III		P5	A12.3
D	**MEDICINE, N.O.S.** *corrosive, solid*	8	NA1759	II		P5	A12.4
				III		P5	A12.4
D	**MEDICINE, N.O.S.** *flammable, liquid*	3	NA1993	I		P3	A7.3
				II		P5	A7.3
				III		P5	A7.3
D	**MEDICINE, N.O.S.** *flammable, solid*	4.1	NA1325	II		P5	A8.4
D	**MEDICINE, N.O.S.** *oxidizing substance, solid*	5.1	NA1479	II		P5	A9.8
*	**MEDICINE, LIQUID, FLAMMABLE, TOXIC, N.O.S.**	3	UN3248	II	6.1	P5, 36	A7.3
				III	6.1	P5, 36	A7.3
*	**MEDICINE, LIQUID TOXIC, N.O.S.**	6.1	UN1851	II		P5	A10.5
				III		P5	A10.5

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
*	**MEDICINE, SOLID, TOXIC, N.O.S.**	6.1	UN3249	II		P5, 36	A10.6
				III		P5, 36	A10.6
*	**MERCAPTANS, LIQUID, FLAMMABLE, TOXIC, N.O.S.** *or* **MERCAPTAN MIXTURES, LIQUID, FLAMMABLE, TOXIC, N.O.S.,** *flashpoint less than 23 degrees C*	3	UN1228	II	6.1	P4	A7.3
				III	6.1	P5	A7.3
*	**MERCAPTANS, LIQUID, TOXIC, FLAMMABLE, N.O.S**. *or* **MERCAPTAN MIXTURES, LIQUID, TOXIC, FLAMMABLE, N.O.S.,** *flashpoint not less than 23 degrees C*	6.1	UN3071	II	3	P5	A10.5
	5-MERCAPTOTETRAZOL-1-ACETIC ACID	1.4C	UN0448	II		P5	A5.43
	MERCURIC ARSENATE	6.1	UN1623	II		P5	A10.6
	MERCURIC CHLORIDE	6.1	UN1624	II		P5	A10.6
	MERCURIC NITRATE	6.1	UN1625	II		P5, N73	A10.6
+	**MERCURIC POTASSIUM CYANIDE**	6.1	UN1626	I		P5, N74, N75	A10.6
	Mercuric sulfocyanate, see **MERCURY THIOCYANATE**						
	Mercurol, see **MERCURY NUCLEATE**						
	Mercurous azide	FORBIDDEN					FORBIDDEN
	MERCUROUS NITRATE	6.1	UN1627	II		P5	A10.6
	MERCURY	8	UN2809	I		P5	A12.10
	MERCURY ACETATE	6.1	UN1629	II		P5	A10.6
	Mercury acetylide	FORBIDDEN					FORBIDDEN
	MERCURY AMMONIUM CHLORIDE	6.1	UN1630	II		P5	A10.6
*	**MERCURY BASED PESTICIDES, LIQUID, FLAMMABLE, TOXIC,** *flashpoint less than 23 degrees C*	3	UN2778	I	6.1	P3	A7.3
				II	6.1	P4	A7.2
*	**MERCURY BASED PESTICIDES, LIQUID, TOXIC, FLAMMABLE,** *flashpoint not less than 23 degrees C*	6.1	UN3011	I	3	P3	A10.5
				II	3	P4	A10.5
				III	3	P5	A10.5
*	**MERCURY BASED PESTICIDES, LIQUID, TOXIC**	6.1	UN3012	I		P3	A10.5
				II		P4	A10.5
				III		P5	A10.5
*	**MERCURY BASED PESTICIDES, SOLID, TOXIC**	6.1	UN2777	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6
	MERCURY BENZOATE	6.1	UN1631	II		P5	A10.6

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	MERCURY BROMIDES	6.1	UN1634	II		P5	A10.6
	MERCURY COMPOUNDS, LIQUID, N.O.S.	6.1	UN2024	I		P3	A10.5
				II		P4	A10.5
				III		P5	A10.5
	MERCURY COMPOUNDS, SOLID, N.O.S.	6.1	UN2025	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6
	MERCURY CONTAINED IN MANUFACTURED ARTICLES	8	UN2809	I		P5	A12.10
	MERCURY CYANIDE	6.1	UN1636	II		P5, N74, N75	A10.6
	MERCURY FULMINATE, WETTED *with not less than 20% water, or mixture of alcohol and water, by mass*	1.1A	UN0135	II		P3, 111, 117	A5.13
	MERCURY GLUCONATE	6.1	UN1637	II		P5	A10.6
	MERCURY IODIDE, *solid or solution*	6.1	UN1638	II		P5	A10.5, A10.6
	Mercury Nitride	FORBIDDEN					FORBIDDEN
	MERCURY NUCLEATE	6.1	UN1639	II		P5	A10.6
	MERCURY OLEATE	6.1	UN1640	II		P5	A10.6
	MERCURY OXIDE	6.1	UN1641	II		P5	A10.6
	Mercury oxycyanide, not desensitized	FORBIDDEN					FORBIDDEN
	MERCURY OXYCYANIDE, DESENSITIZED	6.1	UN1642	II		P5	A10.6
	MERCURY POTASSIUM IODIDE	6.1	UN1643	II		P5	A10.6
	MERCURY SALICYLATE	6.1	UN1644	II		P5	A10.6
+	**MERCURY SULPHATES**	6.1	UN1645	II		P5	A10.6
	MERCURY THIOCYANATE	6.1	UN1646	II		P5	A10.6
	MESITYL OXIDE	3	UN1229	III		P5	A7.3
*	**METAL ALKYL HALIDES, N.O.S.** *or* **METAL ARYL HALIDES, N.O.S**	4.2	UN3049	I		P3	A8.6
*	**METAL ALKYL HYDRIDES, N.O.S.** *or* **METAK ARYL HYDRIDES, N.O.S.**	4.2	UN3050	I		P3	A8.6
*	**METAL ALKYLS, N.O.S.** *or* **METAL ARYLS, N.O.S**	4.2	UN2003	I		P3	A8.6
D	**METAL ALKYL, SOLUTION, N.O.S.**	3	NA9195	II		P5	A7.3
	METAL CARBONYLS, N.O.S.	6.1	UN3281	I		P5	A10.5
				II		P5	A10.5
				III		P5	A10.5
	METAL CATALYST, DRY	4.2	UN2881	I		P3, N34	A8.12
				II		P5, N34	A8.12
				III		P5, N34	A8.12

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	METAL CATALYST, WETTED *with a visible excess of liquid*	4.2	UN1378	II		P5, A2, A8, N34	A8.4
	METALDEHYDE	4.1	UN1332	III		P5, A1	A8.4
*	**METAL HYDRIDES, FLAMMABLE, N.O.S**.	4.1	UN3182	II		P5, A1	A8.4
				III		P5, A1	A8.4
*	**METAL HYDRIDES, WATER-REACTIVE, N.O.S.**	4.3	UN1409	I		P3, A19, N34, N40	A8.4
				II		P5, A19, N34, N40	A8.4
	METAL POWDER, FLAMMABLE, N.O.S.	4.1	UN3089	II		P5	A8.4
				III		P5	A8.4
*	**METAL POWDER, SELF-HEATING, N.O.S.**	4.2	UN3189	II		P5	A8.4
				III		P5	A8.4
*	**METAL SALTS OF ORGANIC COMPOUNDS**,	4.1	UN3181	II		P4, A1	A8.4
	FLAMMABLE, N.O.S.			III		P4, A1	A8.4
*	**METAL SALTS OF ORGANIC COMPOUNDS**,	4.1	UN3181	II		P4, A1	A8.4
	FLAMMABLE, N.O.S.			III		P4, A1	A8.4
*	**METAL SALTS OF ORGANIC COMPOUNDS**,	4.1	UN3181	II		P4, A1	A8.4
	FLAMMABLE, N.O.S.			III		P4, A1	A8.4
*	**METALLIC SUBSTANCE,**	4.3	UN3208	I		P3	A8.4
	WATER-REACTIVE, N.O.S.			II		P5	A8.4
				III		P5	A8.4
*	**METALLIC SUBSTANCE, WATER-REACTIVE**,	4.3	UN3209	I	4.2	P3	A8.4
	SELF-HEATING, N.O.S.			II	4.2	P4	A8.4
				III	4.2	P5	A8.4
	METHACRYLALDEHYDE	3	UN2396	II	6.1	P5	A7.3
	METHACRYLIC ACID, INHIBITED	8	UN2531	III		P5	A12.3
+	**METHACRYLONITRILE, INHIBITED**	3	UN3079	I	6.1	P2, 2	A7.6
	METHALLYL ALCOHOL	3	UN2614	III		P5	A7.3
	METHANE, COMPRESSED *or* **NATURAL GAS, COMPRESSED** *(with high methane content)*	2.1	UN1971			P4	A6.3, A6.6
	METHANE, REFRIGERATED LIQUID *(cryogenic liquid) or* **NATURAL GAS, REFRIGERATED LIQUID** *(cryogenic liquid, with high methane content)*	2.1	UN1972			P3	A6.11
	METHANESULPHONYL CHLORIDE	6.1	UN3246	I	8	P3	A10.5
	METHANOL *or* **METHYL ALCOHOL**	3	UN1230	II	6.1	P4	A7.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
+	**METHOXYMETHYL ISOCYANATE**	3	UN2605	I	6.1	P1, 1	A7.6
	4-METHOXY-4-METHYLPENTAN-2-ONE	3	UN2293	III		P5	A7.3
	1-METHOXY-2-PROPANOL	3	UN3092	III		P5	A7.3
	METHYL ACETATE	3	UN1231	II		P5	A7.3
	METHYL ACETYLENE AND PROPADIENE MIXTURES, STABILIZED	2.1	UN1060			P4	A6.3, A6.5
	METHYL ACRYLATE, INHIBITED	3	UN1919	II		P5	A7.3
	METHYLAL	3	UN1234	II		P5	A7.3
	METHYL ALCOHOL, *see* **METHANOL**						
	METHYLALLYL CHLORIDE	3	UN2554	II		P5	A7.3
	METHYLAMINE, ANHYDROUS	2.1	UN1061			P4	A6.3, A6.5
	METHYLAMINE, AQUEOUS SOLUTION	3	UN1235	II	8	P4	A7.3
	Methylamine dinitramine and dry salts thereof	FORBIDDEN					FORBIDDEN
	Methylamine nitroform	FORBIDDEN					FORBIDDEN
	Methylamine perchlorate (dry)	FORBIDDEN					FORBIDDEN
	METHYLAMYL ACETATE	3	UN1233	III		P5	A7.3
	Methyl amyl ketone, see **AMYL METHYL KETONE**						
	N-METHYLANILINE	6.1	UN2294	III		P5	A10.5
	METHYL BENZOATE	6.1	UN2938	III		P5	A10.5
	ALPHA-METHYLBENZYL ALCOHOL	6.1	UN2937	III		P5	A10.5
	METHYL BROMIDE	2.3	UN1062			P2, 3	A6.16
	Methyl bromide and chloropicrin mixtures with more than 2% chloropicrin, see **CHLOROPICRIN AND METHYL BROMIDE MIXTURES**						
	Methyl bromide and chloropicrin mixtures with not more than 2% chloropicrin, see **METHYL BROMIDE**						
	METHYL BROMIDE AND ETHYLENE DIBROMIDE MIXTURES, LIQUID	6.1	UN1647	I		P2, 2, N65	A10.7
	METHYL BROMOACETATE	6.1	UN2643	II		P5	A10.5
	3-METHYLBUTAN-2-ONE	3	UN2397	II		P5	A7.3
	3-METHYL-1-BUTENE	3	UN2561	I		P3	A7.3
	2-METHYL-1-BUTENE	3	UN2459	I		P3	A7.3
	2-METHYL-2-BUTENE	3	UN2460	II		P5	A7.3
	N-METHYLBUTYLAMINE	3	UN2945	II	8	P4	A7.3
	METHYL-TERT-BUTYL ETHER	3	UN2398	II		P5	A7.3
	METHYL BUTYRATE	3	UN1237	II		P5	A7.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	METHYL CHLORIDE	2.1	UN1063			P4	A6.3, A6.5
	METHYL CHLORIDE AND METHYLENE CHLORIDE MIXTURE	2.1	UN1912			P4	A6.3, A6.5
	METHYL CHLOROACETATE	6.1	UN2295	II		P5	A10.5
	METHYL CHLOROFORMATE	6.1	UN1238	I	8, 3	P1, 1, N34	A10.7
	Methyl chloroform, see **1,1,1-TRICHLOROETHANE**						
	METHYL CHLOROMETHYL ETHER	6.1	UN1239	I	3	P1, 1	A10.7
	METHYL-2-CHLOROPROPIONATE	3	UN2933	III		P5	A7.3
	METHYLCHLOROSILANE	2.3	UN2534		2.1, 8	P2, 2, A2, A3, A7, N34	A6.19
	METHYLCYCLOHEXANE	3	UN2296	II		P5	A7.3
	METHYLCYCLOHEXANOLS, *flammable*	3	UN2617	III		P5	A7.3
	METHYLCYCLOHEXANONE	3	UN2297	III		P5	A7.3
	METHYLCYCLOPENTANE	3	UN2298	II		P5	A7.3
	METHYL DICHLOROACETATE	6.1	UN2299	III		P5	A10.5
D	**METHYLDICHLOROARSINE**	6.1	NA1556	I		P2, 2	A10.3
	METHYLDICHLOROSILANE	4.3	UN1242	I	8, 3	P3, A2, A3, A7, N34	A8.3
	Methylene chloride, see **DICHLOROMETHANE**						
	Methylene glycol dinitrate	FORBIDDEN					FORBIDDEN
	Methyl ethyl ether, see **ETHYL METHYL ETHER**						
	METHYL ETHYL KETONE, *see* **ETHYL METHYL KETONE**						
	Methyl ethyl ketone peroxide, in solution with more than 9% by mass active oxygen	FORBIDDEN					FORBIDDEN
	2-METHYL-5-ETHYLPYRIDINE	6.1	UN2300	III		P5	A10.5
	METHYL FLUORIDE	2.1	UN2454			P4	A6.3, A6.5
	METHYL FORMATE	3	UN1243	I		P3	A7.3
	2-METHYLFURAN	3	UN2301	II		P5	A7.3
	a-methylglucoside tetranitrate	FORBIDDEN					FORBIDDEN
	a-methylglycerol trinitrate	FORBIDDEN					FORBIDDEN
	5-METHYLHEXAN-2-ONE	3	UN2302	III		P5	A7.3
	METHYLHYDRAZINE	6.1	UN1244	I	3, 8	P1, 1, N34	A10.7
	METHYL IODIDE	6.1	UN2644	I		P2, 2	A10.7
	METHYL ISOBUTYL CARBINOL	3	UN2053	III		P5	A7.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	METHYL ISOBUTYL KETONE	3	UN1245	II		P5	A7.3
	Methyl isobutyl ketone peroxide, in solution with more than 9% by mass active oxygen	FORBIDDEN					FORBIDDEN
	METHYL ISOCYANATE	6.1	UN2480	I	3	P1, 1, A7	A10.7
	METHYL ISOPROPENYL KETONE, INHIBITED	3	UN1246	II		P5	A7.3
	METHYL ISOTHIOCYANATE	3	UN2477	II	6.1	P2, 2	A7.6
	METHYL ISOVALERATE	3	UN2400	II		P5	A7.3
	METHYL MAGNESIUM BROMIDE IN ETHYL ETHER	4.3	UN1928	I	3	P3	A8.3
	METHYL MERCAPTAN	2.3	UN1064		2.1	P2, 3	A6.5
	METHYL METHACRYLATE MONOMER, INHIBITED	3	UN1247	II		P5	A7.3
	METHYLMORPHOLINE	3	UN2535	II	8	P5	A7.3
	Methyl nitramine (dry),	FORBIDDEN					FORBIDDEN
	Metal salts of methyl nitrate	FORBIDDEN					FORBIDDEN
	Methyl nitrite	FORBIDDEN					FORBIDDEN
	METHYL ORTHOSILICATE	6.1	UN2606	I	3	P3, 2	A10.7
D	**METHYL PARATHION** *liquid*	6.1	NA3018	II		P5, N76	A10.5
D	**METHYL PARATHION** *solid*	6.1	NA2783	II		P5, N77	A10.6
	METHYLPENTADIENE	3	UN2461	II		P5	A7.3
	Methylpentanes, see **HEXANES**						
	2-METHYLPENTAN-2-OL	3	UN2560	III		P5	A7.3
	METHYLPHENYLDICHLOROSILANE	8	UN2437	II		P5	A12.3
D	**METHYL PHOSPHONIC DICHLORIDE**	6.1	NA9206	I	8	P2, 2, A3 N34, N43	A10.7
	Methyl phosphonothioic dichloride, anhydrous, see **CORROSIVE LIQUID, N.O.S**						
D	**METHYL PHOSPHONOUS DICHLORIDE,** *pyrophoric liquid*	6.1	NA2845	I	4.2	P2, 2	A10.7
	1-METHYLPIPERIDINE	3	UN2399	II	8	P4	A7.3
	METHYL PROPIONATE	3	UN1248	II		P5	A7.3
	METHYL PROPYL ETHER	3	UN2612	II		P5	A7.3
	METHYL PROPYL KETONE	3	UN1249	II		P5	A7.3
	Methyl sulfate, see **DIMETHYL SULFATE**						
	Methyl sulphide, see **DIMETHYL SULPHIDE**						
	METHYLTETRAHYDROFURAN	3	UN2536	II		P5	A7.3
	METHYL TRICHLOROACETATE	6.1	UN2533	III		P5	A10.5

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	METHYLTRICHLOROSILANE	3	UN1250	I	8	P3, A7, N34	A7.3
	Methyl trimethylol methane trinitrate	FORBIDDEN					FORBIDDEN
	ALPHA-METHYLVALERALDEHYDE	3	UN2367	II		P5	A7.3
	METHYL VINYL KETONE	3	UN1251	II		P5	A7.3
	MINES *with bursting charge*	1.1F	UN0136	II		P4	A5.10
	MINES *with bursting charge*	1.1D	UN0137	II		P4	A5.10
	MINES *with bursting charge*	1.2D	UN0138	II		P4	A5.10
	MINES *with bursting charge*	1.2F	UN0294	II		P4	A5.10
	MOLYBDENUM PENTACHLORIDE	8	UN2508	III		P5	A12.4
	Monochloroacetone (unstabilized)	FORBIDDEN					FORBIDDEN
	Monochloroethylene, see **VINYL CHLORIDE, INHIBITED**						
	Monoethylamine, see **ETHYLAMINE**						
	MORPHOLINE	3	UN2054	III		P5	A7.3
	Morpholine, aqueous, mixture, see **CORROSIVE LIQUID, N.O.S.**						
	Motorcycles, see **ENGINES, INTERNAL COMBUSTION**						
+	**MOTOR FUEL ANTI-KNOCK MIXTURES**	6.1	UN1649	I	3	P3	A10.5
	MOTOR SPIRIT, *see* **GASOLINE**						
	Motor vehicle, see **ENGINES, INTERNAL COMBUSTION**						
	Muriatic acid, see **HYDROCHLORIC ACID SOLUTION**						
	MUSK XYLENE, *see* 5-**TERT-BUTYL-2,4,6-TRINITO-M-XYLENE**						
	Naphtha, see **PETROLEUM DISTALLATE N.O.S**						
	NAPHTHALENE, CRUDE *or* **REFINED**	4.1	UN1334	III		P5, A1	A8.4
	Naphthalene diozonide	FORBIDDEN					FORBIDDEN
	NAPHTHALENE, MOLTEN	4.1	UN2304	III		P5, A1	A8.4
	ALPHA-NAPHTHYLAMINE	6.1	UN2077	III		P5	A10.6
	BETA-NAPHTHYLAMINE	6.1	UN1650	II		P5	A10.6
	Naphthylamineperchlorate	FORBIDDEN					FORBIDDEN
	NAPHTHYLTHIOUREA	6.1	UN1651	II		P5	A10.6
	NAPHTHYLUREA	6.1	UN1652	II		P5	A10.6

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	NATURAL GAS, COMPRESSED *with high methane content; see* **METHANE, COMPRESSED** *etc.*						
	NATURAL GAS, REFRIGERATED LIQUID, *with high methane content (cryogenic liquid)*	2.1	UN1972			P3	A6.11
	Neohexane, see **HEXANES**						
	NEON, COMPRESSED	2.2	UN1065			P5	A6.3, A6.6
	NEON, REFRIGERATED LIQUID *(cryogenic liquid)*	2.2	UN1913			P5	A6.11
	NICKEL CARBONYL	FORBIDDEN					FORBIDDEN
	NICKEL CYANIDE	6.1	UN1653	II		P5, N74, N75	A10.6
	NICKEL NITRATE	5.1	UN2725	III		P5, A1	A9.8
	NICKEL NITRITE	5.1	UN2726	III		P5, A1	A9.8
	Nickel Picrate	FORBIDDEN					FORBIDDEN
	NICOTINE	6.1	UN1654	II		P5	A10.5
	NICOTINE COMPOUNDS, LIQUID, N.O.S. *or*	6.1	UN3144	I		P3, A4	A10.5
	NICOTINE PREPARATIONS, LIQUID, N.O.S.			II		P5	A10.5
				III		P5	A10.5
	NICOTINE COMPOUNDS, SOLID, N.O. S. *or*	6.1	UN1655	I		P5	A10.6
	NICOTINE PREPARATIONS, SOLID, N.O.S.			II		P5	A10.6
				III		P5	A10.6
	NICOTINE HYDROCHLORIDE *or* **NICOTINE HYDROCHLORIDE SOLUTION**	6.1	UN1656	II		P5	A10.5
	NICOTINE SALICYLATE	6.1	UN1657	II		P5	A10.6
	NICOTINE SULPHATE, *solid or solution*	6.1	UN1658	II		P5	A10.5, A10.6
	NICOTINE TARTRATE	6.1	UN1659	II		P5	A10.6
	NITRATES, INORGANIC, **N.O.S**.	5.1	UN1477	II		P5	A9.8
				III		P5	A9.8
	NITRATES, INORGANIC, AQUEOUS	5.1	UN3218	II		P5	A9.7
	SOLUTIONS, N.O.S.			III		P5	A9.7
	Nitrates of diazonium compounds	FORBIDDEN					FORBIDDEN
	NITRATING ACID MIXTURES, SPENT *with not more than 50% nitric acid*	8	UN1826	II		P4	A12.11
	NITRATING ACID MIXTURES, SPENT *with 50% or more nitric acid*	8	UN1826	I	5.1	P4	A12.11
	NITRATING ACID MIXTURES *with not more than 50% nitric acid*	8	UN1796	II		P4	A12.11
	NITRATING ACID MIXTURES with *50% or more nitric acid*	8	UN1796	I	5.1	P4	A12.11

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	NITRIC ACID *other than red fuming, with more than 70% nitric acid*	8	UN2031	I		P3	A12.11
	NITRIC ACID, *other than red fuming, with not more than 70% nitric acid*	8	UN2031	II		P4	A12.11
+	**NITRIC ACID, RED FUMING**	8	UN2032	I	5.1, 6.1	P2, 2	A12.12
	NITRIC OXIDE	2.3	UN1660		5.1, 8	P1, 1	A6.20
	NITRIC OXIDE AND DINITROGEN TETROXIDE MIXTURES *or* **NITRIC OXIDE AND NITROGEN DIOXIDE MIXTURES**	FORBIDDEN					FORBIDDEN
*	**NITRILES, FLAMMABLE, TOXIC, N.O.S.**	3	UN3273	I	6.1	P3	A7.3
				II	6.1	P4	A7.3
*	**NITRILES, TOXIC, FLAMMABLE, N.O.S**	6.1	UN3275	I	3	P3	A10.5
				II	3	P5	A10.5
*	**NITRILES, TOXIC, N.O.S.**	6.1	UN3276	I		P3	A10.5
				II		P4	A10.5
				III		P5	A10.5
	NITRITES, INORGANIC, N.O.S.	5.1	UN2627	II		P5, 33	A9.8
	NITRITES, INORGANIC, AQUEOUS SOLUTION, N.O.S.	5.1	UN3219	II		P5	A9.7
				III		P5	A9.7
	N-Nitroaniline	FORBIDDEN					FORBIDDEN
	NITROANILINES *(o-m-p-,)*	6.1	UN1661	II		P5	A10.6
	NITROANISOLE, LIQUID *or* **SOLID**	6.1	UN2730	III		P5	A10.5, A10.6
	NITROBENZENE	6.1	UN1662	II		P5	A10.5
	m-Nitrobenzene diazonium perchlorate	FORBIDDEN					FORBIDDEN
	NITROBENZENESULPHONIC ACID	8	UN2305	II		P5	A12.3
	Nitrobenzol, see **NITROBENZENE**						
	5-NITROBENZOTRIAZOL	1.1D	UN0385	II		P4	A5.8
	NITROBENZOTRIFLUORIDES	6.1	UN2306	II		P5	A10.5
	NITROBROMOBENZENE, LIQUID *or* **SOLID**	6.1	UN2732	III		P5	A10.5, A10.6
	NITROCELLULOSE, *dry or wetted with less than 25% water (or alcohol), by mass*	1.1D	UN0340	II		P4	A5.11
	NITROCELLULOSE MEMBRANE FILTERS	4.1	UN3270	II		P5, 43, A1	A8.4
	NITROCELLULOSE, PLASTICIZED *with not less than 18% plasticizing substance, by mass*	1.3C	UN0343	II		P4	A5.64

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	NITROCELLULOSE SOLUTION, FLAMMABLE	3	UN2059	II		P5	A7.3
	with not more than 12.6% nitrogen, by mass, and not more than 55% nitrocellulose			III		P5	A7.3
	NITROCELLULOSE, *unmodified or plasticized with less than 18% plasticizing substance, by mass*	1.1D	UN0341	II		P4	A5.11
	NITROCELLULOSE, WETTED *with not less than 25% alcohol, by mass*	1.3C	UN0342	II		P4	A5.64
	NITROCELLULOSE WITH ALCOHOL *not less than 25% alcohol by mass, and not more than 12.6% nitrogen, by dry mass*	4.1	UN2556	II		P5	A8.4
	NITROCELLULOSE WITH WATER *with not less than 25% water by mass*	4.1	UN2555	II		P5	A8.4
	NITROCELLULOSE, *with not more than 12.6% nitrogen, by dry mass, or* **NITROCELLULOSE, MIXTURE WITHOUT PIGMENT** *or* **NITROCELLULOSE, MIXTURE WITHOUT PLASTICIZER,** *or* **NITROCELLULOSE, MIXTURE WITH PIGMENT** *or* **NITROCELLULOSE, MIXTURE WITH PLASTICIZER**	4.1	UN2557	II		P5	A8.4
	3-NITRO-4-CHLOROBENZOTRIFLUORIDE	6.1	UN2307	II		P5	A10.5
	NITROCRESOLS	6.1	UN2446	III		P5	A10.6
	6-Nitro-4-diazotoluene-3-sulphonic acid (dry)	FORBIDDEN					FORBIDDEN
	NITROETHANE	3	UN2842	III		P5	A7.3
	Nitroethylene polymer	FORBIDDEN					FORBIDDEN
	Nitroethyl nitrate	FORBIDDEN					FORBIDDEN
	NITROGEN, COMPRESSED	2.2	UN1066			P5	A6.3, A6.6
	NITROGEN DIOXIDE, LIQUEFIED *see also* **DINITROGEN TETROXIDE, LIQUEFIED**	FORBIDDEN					FORBIDDEN
	Nitrogen fertilizer solution; see **FERTILIZER AMMONIATING SOLUTION,** *etc.*						
	Nitrogen peroxide, see **DINITROGEN TETROXIDE, LIQUEFIED**						
	NITROGEN, REFRIGERATED LIQUID *(cryogenic liquid)*	2.2	UN1977			P4	A6.11
	Nitrogen tetroxide and nitric oxide mixtures, see **NITRIC OXIDE AND DINITROGEN TETROXIDE MIXTURES**						

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	Nitrogen tetroxide, see **DINITROGENTETROXIDE, LIQUEFIED**						
	Nitrogen trichloride	FORBIDDEN					FORBIDDEN
	NITROGEN TRIFLUORIDE	2.3	UN2451		5.1	P2	A6.6
	Nitrogen triiodide	FORBIDDEN					FORBIDDEN
	Nitrogen triiodide monoamine	FORBIDDEN					FORBIDDEN
	NITROGEN TRIOXIDE	FORBIDDEN					FORBIDDEN
	NITROGLYCERIN, DESENSITIZED *with not less than 40% nonvolatile water insoluble phlegmatizer, by mass*	1.1D	UN0143	II	6.1	P4	A5.42
	Nitroglycerin, liquid, not desensitized	FORBIDDEN					FORBIDDEN
	NITROGLYCERIN, SOLUTION IN ALCOHOL, *with more than 1%, but not more than 5% nitroglycerin*	3	UN3064	II		P3, N8	A7.3
	NITROGLYCERIN, SOLUTION IN ALCOHOL *with more than 1%, but not more than 10% nitroglycerin*	1.1D	UN0144	II		P4	A5.65
	NITROGLYCERIN SOLUTION IN ALCOHOL, *with not more than 1% nitroglycerin*	3	UN1204	II		P3, N34	A7.3
	Nitroguanidine nitrate	FORBIDDEN					FORBIDDEN
	NITROGUANIDINE *or* **PICRITE**, *dry or wetted with less than 20% water, by mass*	1.1D	UN0282	II		P4	A5.66
	NITROGUANIDINE WETTED, *or* **PICRITE WETTED** *with not less than 20% water, by mass*	4.1	UN1336	I		P5, 23, A8, A19, A20, N41	A8.4
	1-Nitrohydantoin	FORBIDDEN					FORBIDDEN
	NITROHYDROCHLORIC ACID	8	UN1798	I		P3, A3, N41	A12.3
	Nitro isobutane triol trinitrate	FORBIDDEN					FORBIDDEN
	Nitromannite (dry)	FORBIDDEN					FORBIDDEN
	NITROMANNITE, WETTED; *see* **MANNITOL HEXANITRATE, WETTED** *etc.*						
	NITROMETHANE	3	UN1261	II		P5	A7.3
	N-Nitro-N-methylglycolamide nitrate	FORBIDDEN					FORBIDDEN
	2-Nitro-2-methylpropanol nitrate	FORBIDDEN					FORBIDDEN
	Nitromuriatic acid; see **NITROHYDROCHLORIC ACID**						
	NITRONAPHTHALENE	4.1	UN2538	III		P5, A1	A8.4
	NITROPHENOLS *(o-,m-,p-,)*	6.1	UN1663	III		P5	A10.6

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	m-Nitrophenyldinitro methane	FORBIDDEN					FORBIDDEN
	NITROPROPANES	3	UN2608	III		P5	A7.3
	P-NITROSODIMETHYLANILINE	4.2	UN1369	II		P5, A19, A20, N34	A8.4
D	**NITROSOGUANIDINE**	1.1A	NA0473	II		P3, 111, 117	A5.13
	NITROSTARCH, *dry or wetted with less than 20% water, by mass*	1.1D	UN0146	II		P4	A5.67
	NITROSTARCH, WETTED *with not less than 20% water by mass*	4.1	UN1337	I		P4, 23, A8, A19, A20, N41	A8.4
	Nitrosugars (dry)	FORBIDDEN					FORBIDDEN
	NITROSYL CHLORIDE	2.3	UN1069		8	P2, 3	A6.5
	NITROSYLSULPHURIC ACID	8	UN2308	II		P5, A3, A6, A7, N34	A12.3
	NITROTOLUENES, *liquid or solid (o-,m-,p-)*	6.1	UN1664	II		P5	A10.5, A10.6
	NITROTOLUIDINES (MONO)	6.1	UN2660	III		P5	A10.6
	NITROTRIAZOLONE *or* **NTO**	1.1D	UN0490	II		P4	A5.8
	NITRO UREA	1.1D	UN0147	II		P4	A5.8
	Nitrous oxide and carbon dioxide mixtures; see **CARBON DIOXIDE AND NITROUS OXIDE MIXTURES**						
	NITROUS OXIDE, COMPRESSED	2.2	UN1070		5.1	P5	A6.3, A6.5
	NITROUS OXIDE, REFRIGERATED LIQUID *(cryogenic liquid)*	2.2	UN2201		5.1	P4	A6.5
	NITROXYLENES *(o-,m-,p-)*	6.1	UN1665	II		P5	A10.5
	Nitroxylol; see **NITROXYLENES**						
	NONANES	3	UN1920	III		P5	A7.3
	Nonflammable gas, n.o.s.; see **COMPRESSED** *or* **LIQUEFIED GASES,** *etc.*						
	Nonliquefied gases; see **COMPRESSED GASES**, *etc.*						
	Nonliquefied hydrocarbon gas; see **HYDROCARBON GAS COMPRESSED**, **N.O.S.**						
	NONYLTRICHLOROSILANE	8	UN1799	II		P4, A7, N34	A12.3
	2,5-NORBORNADIENE *or* **DICYCLOHEPTADIENE**	3	UN2251	II		P5	A7.3
	OCTADECYLTRICHLOROSILANE	8	UN1800	II		P4, A7, N34	A12.3
	OCTADIENE	3	UN2309	II		P5	A7.3
	1,7-Octadiene-3,5-diyne-1,8-dimethoxy-9-octadecynoic acid	FORBIDDEN					FORBIDDEN

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	OCTAFLUOROBUT-2-ENE	2.2	UN2422			P5	A6.5
	OCTAFLUOROCYCLOBUTANE	2.2	UN1976			P5	A6.5
	OCTAFLUOROPROPANE	2.2	UN2424			P5	A6.5
	OCTANES	3	UN1262	II		P5	A7.3
	OCTOGEN; *see* **CYLCOTETRAMETHYLENE TETRANITRAMINE,** *etc.*						
	OCTOLITE *or* **OCTOL** *dry or wetted with less than 15% water by mass*	1.1D	UN0266	II		P4	A5.60
	OCTONAL	1.1D	UN0496	II		P4	A5.60
	OCTYL ALDEHYDES, *flammable*	3	UN1191	III		P5	A7.3
+	**TERT-OCTYL MERCAPTAN**	6.1	UN3023	II	3	P2, 2	A10.7
	OCTYLTRICHLOROSILANE	8	UN1801	II		P4, A7, N34	A12.3
	OIL GAS	2.3	UN1071		2.1	P2, 6	A6.5
	Oleum; see **SULPHURIC ACID, FUMING**						
	ORGANIC PEROXIDE TYPE A, LIQUID *or* **SOLID**	FORBIDDEN					FORBIDDEN
*	**ORGANIC PEROXIDE TYPE B, LIQUID**	5.2	UN3101	II	EXPLOSIVE	P3, 53	TABLE A9.2.5
*	**ORGANIC PEROXIDE TYPE B, LIQUID, TEMPERATURE CONTROLLED**	5.2	UN3111	II	EXPLOSIVE	P3, 53	TABLE A9.2.5
*	**ORGANIC PEROXIDE TYPE B, SOLID**	5.2	UN3102	II	EXPLOSIVE	P3, 53	SEE BELOW BY TECHNICAL NAME
	tert-Butyl Monoperoxymaneate						TABLE A9.3.5
	3-Choloroperoxybenzoic Acid						TABLE A9.3.1
	Dibenzoyl Peroxide > 52 < 100						TABLE A9.3.2
	Dibenzoyl Peroxide > 78, < 94						TABLE A9.3.6
	Di-4-Chlorobenzoyl Peroxide						TABLE A9.3.5
	Di-2,4-Dichlorobenzoyl Peroxide						TABLE A9.3.5
	2,2-Dihydroperoxypropane						TABLE A9.3.5
	2,5-Dimethyl-2,5-di-(Benzoyl-Peroxy) Hexane						TABLE A9.3.5
	Di-(2 Phenoxyethyl) Peroxydicarbonate						TABLE A9.3.5
	Disuccinic Acid Peroxide						TABLE A9.3.4
	3,3,6,6,9,9,-Hexamethyl-1,2,4,5-Tetraoxa-cylcononane						TABLE A9.3.4
*	**ORGANIC PEROXIDE TYPE B, SOLID, TEMPERATURE CONTROLLED**	5.2	UN3112	II	EXPLOSIVE	P3, 53	SEE BELOW BY TECHNICAL NAME
	Acetyl Cylcohexanesulphonyl Peroxide						TABLE A9.3.4

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	Dibenzyl Peroxydicarbonate						TABLE A9.3.5
	Dicyclohexyl Peroxydicarbonate						TABLE A9.3.5
	Diisopropyl Peroxydicarbonate						TABLE A9.3.2
	Di-(2-Methylbenzoyl) Peroxide						TABLE A9.3.5
*	**ORGANIC PEROXIDE TYPE C, LIQUID**	5.2	UN3103	II		P5	SEE BELOW BY TECHNICAL NAME
	n-Butyl-4,4-di-(Tertcutylperoxy)-Valerate						TABLE A9.2.5
	tert-Butyl Hydroperoxide						TABLE A9.2.5
	tert-Butyl Hydroperoxide and di-tert-Butyl Peroxide						TABLE A9.2.5
	tert-Butyl Monoperoxymaneate						TABLE A9.2.6
	tert-Butyl Peroxyacetate						TABLE A9.2.6
	tert-Butyl Peroxybenzoate						TABLE A9.2.5
	tert-Butylperoxy Isopropyl Carbonate						TABLE A9.2.5
	2,2-Di-(tert-Butylperoxy) Butane						TABLE A9.2.6
	1,1-Di-(tert-Butylperoxy) Cyclohexane						TABLE A9.2.5
	2,5-Dimethyl-2,5-Di-(tert-Butyl-Peroxy)Hexane -3						TABLE A9.2.5
	Ethyl-3,3-Di-(tert-Butylperoxy)-Butyrate						TABLE A9.2.5
	Organic Peroxide, Liquid, Sample						TABLE A9.2.2
*	**ORGANIC PEROXIDE TYPE C, LIQUID, TEMPERATURE CONTROLLED**	5.2	UN3113	II		P3	SEE BELOW BY TECHNICAL NAME
	tert-Amyl Peroxypivalate						TABLE A9.2.5
	tert-Butyl Peroxydiethylacetate						TABLE A9.2.5
	tert-Butyl Peroxy-2-Ethylhexanoate						TABLE A9.2.6
	tert-Butyl Peroxypivalate						TABLE A9.2.5
	Di-sec-Butyl-Peroxydicarbonate						TABLE A9.2.4
	Di-(2-Ethylhexyl) Peroxydicarbonate						TABLE A9.2.5
	Di-n-Propyl Peroxydicarbonate						TABLE A9.2.4
	Organic Peroxide, Liquid, Temperature Controlled						TABLE A9.2.2
*	**ORGANIC PEROXIDE TYPE C, SOLID**	5.2	UN3104	II		P5	SEE BELOW BY TECHNICAL NAME
	Cyclohexanone Peroxide(s)						TABLE A9.3.6
	Dibenzoyl Peroxide						TABLE A9.3.6
	2,5-Dimethyl-2-5-di-(Benzoyl Peroxy) Hexane						TABLE A9.3.5
	2,5-Dimethyl-2,5-Dihydroperoxyhexane						TABLE A9.3.6
	Organic Peroxide, Solid, Sample						TABLE A9.3.2

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
*	**ORGANIC PEROXIDE TYPE C, SOLID, TEMPERATURE CONTROLLED**	5.2	UN3114	II		P3	SEE BELOW BY TECHNICAL NAME
	Di-(4-tert-Butylcyclohexyl) Peroxydicarbonate						TABLE A9.3.6
	Dicyclohexyl Peroxydicarbonate						TABLE A9.3.3
	Dideconoyl Peroxide						TABLE A9.3.6
	Di-n-Octanoyl Peroxide						TABLE A9.3.5
	Organic Peroxide, Solid, Temperature Controlled						TABLE A9.3.2
*	**ORGANIC PEROXIDE TYPE D, LIQUID**	5.2	UN3105	II		P5	TABLE A9.2.7
	Acetyl acetone peroxide						
	Acetyl benzoyl peroxide						
	tert-Amyl peroxybenzoate						
	tert-Butyl cumyl peroxide						
	tert-Butyl hydroperoxide						
	tert-Butyl peroxybenzoate						
	tert-Butyl peroxycrotonate						
	tert-Butyl peroxydiethylacetate and tert-Butyl eroxybenzoate						
	tert-Buyl peroxy-3,5,5-trimethylhexanoate						
	Cyclohexanone peroxide(s)						
	1,1 Di-(tert-butylperoxy) cyclohexane						
	Di-(tert-butylperoxy) phthalate						
	2,2-Di-(tert-butylperoxy)-propane						
	2,5-Dimethyl-2,5-di-(tert-butyl-peroxy)hexane						
	2,5-Dimethyl-2,5-di-(3,5,5-trimethylhexanoylperoxy) hexane						
	Ethyl-3,3-di-(tert-amylperoxy)-butryrate						
	Ethyl-3,3-di-(tert-butylperoxy)-butyrate						
	3,3,6,6,9,9-Hexamethyl-1,2,4,5-tetraoxacyclononane						
	p-Menthyl hydroperoxide						
	Methyl ethyl ketone peroxide(s)						
	Methyl isobutyl ketone peroxide(s)						
	Peroxyacetic acid, type D, stablized						
	Pinanyl hydroperoxide						
	1,1,3,3-Tertamethylbutyl hydroperoxide						
*	**ORGANIC PEROXIDE TYPE D, LIQUID, TEMPERATURE CONTROLLED**	5.2	UN3115	II		P3	TABLE A9.2.7
	Acetyl cyclohexanesulphonyl peroxide						

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	tert-Amyl peroxy-2-ethlyhexanoate						
	tert-Amyl peroxyneodecanoate						
	tert-Butyl peroxy-2-ethylhexanoate and 2,2-Di-(tert-butylperoxy)butane						
	tert-Butyl peroxyisobutyrate						
	tert-Butyl peroxyneodecanoate						
	tert-Butyl peroxypivalate						
	Cumyl peroxyneodecanoate						
	Cumyl peroxypivalate						
	Diacetone alcohol peroxides						
	Diacetyl peroxide						
	Di-n-butyl-peroxydicarbonate						
	Di-sec-butyl peroxydicarbonate						
	Di-(2-ethylhexyl) peroxydicarbonate						
	Diethyl peroxydicarbonate						
	Diisobutyryl peroxide						
	Diisopropyl peroxydicarbonate						
	Diisotridecyl peroxydicarbonate						
	2,5-Dimethyl-2,5-di-(2-ethylhexanoylperoxy)hexane						
	Di-(3,5,5-trimethylhexanoyl) peroxide						
	Methylcyclohexanone peroxide(s)						
	1,1,3,3-Tetramethylbutylperoxy-2-ethylhexanoate						
	2,4,4-Trimethylpentyl-2-peroxy phenoxyacetate						
*	**ORGANIC PEROXIDE TYPE D, SOLID**	5.2	UN3106	II		P5	TABLE A9.3.7
	Acetyl acetone peroxide, as a paste						
	n-Butyl-4-4-di-(tertbutyl-peroxy)-valerate						
	tert-Butyl peroxybenzoate						
	tert-Butyl-peroxy-2-ethylhexanoate and 2,2-Di-(tert-butylperoxy)butane						
	3-tert-Butylperoxy-3-phenylphthalide						
	tert-Butylperoxy stearylcarbonate						
	3-Chloroperoxybenzoic acid						
	Cyclohexanone peroxide(s) as a paste						
	Dibenzoy peroxide						
	Dibenzoyl peroxide, as a paste						
	1,1-Di-(tert-butylperoxy) cyclohexane						
	2,2-Di(1,4-tert-butylperoxycyclohexyl)propane						

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	Di-(2-tert-butylperoxyisopropyl)-benzene(s)						
	Di-(tert-butylperoxy) phthalate, as a paste						
	2,2-Di-(tert-butylperoxy)propane						
	1,1-Di-(tert-butylperoxy)-3,3,5-trimethyl cyclohexane						
	Di-4-chlorobenzoyl peroxide, as a paste						
	Di-2,4-dichlorobenzoyl proxide, as a paste with silicon oil						
	Di-(1-hydroxycyclohexyl) peroxide						
	Dilauroyl peroxide						
	2,5-Dimethyl-2,5-di-(benzoyl-peroxy) hexane						
	2,5-Dimethyl-2,5-di-(tert-butyl-peroxy)hexyne-3						
	2,5-Dimethyl-2,5-di-(tert-butyl-peroxy) hexane						
	Di-(2 phenoxyethyl) peroxydicarbonate						
	Distearyl peroxydicarbonate						
	Ethyl-3,3-di-(tert-butylperoxy)-butyrate						
	3,3,6,6,9,9-Hexamethyl-1,2,4,5-tetraoxacyclononae						
	Tetrahydronaphthyl hydroperoxide						
*	**ORGANIC PEROXIDE TYPE D, SOLID, TEMPERATURE CONTROLLED**	5.2	UN3116	II		P3	TABLE A9.3.7
	Dicetyl peroxydicarbonate						
	Dimyristyl peroxydicarbonate						
	Di-n-nonanoyl peroxide						
	Diperoxy azelaic acid						
	Diperoxy dodecane diacid						
	Disuccinic acid peroxide						
	Di-(3,5,5-trimethyl-1,2-dioxo-lanyl-3) peroxide, as a paste						
*	**ORGANIC PEROXIDE TYPE E, LIQUID**	5.2	UN3107	II		P5	TABLE A9.2.8
	tert-Amyl hydroperoxide						
	Di-tert-amyl peroxide						
	Di-tert-butyl peroxide						
	1,1-Di-(tert-butylperoxy)cyclohexane						
	Di-(tert-butylperoxy)phthalate						
	1,1-Di-(tert-butylperoxy)-3,3,5-trimethyl cyclohexane						
	Methyl ethyl ketone peroxide(s)						
	Peroxyacetic acid, type E, stabilized						
*	**ORGANIC PEROXIDE TYPE E, LIQUID, TEMPERATURE CONTROLLED**	5.2	UN3117	II		P3	SEE BELOW BY TECHNICAL NAME

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	tert-Butyl peroxy-2-ethylhexanonate						TABLE A9.2.8
	Di-n-butyl peroxydicarbonate						TABLE A9.2.8
	Di-(2-ethylhexyl) peroxydicarbonate as a stable dispersion in water						TABLE A9.2.8
	Di-(2-Ethylhexyl) Peroxydicarbonate as a stable dipersion in water (frozen)						TABLE A9.3.8
	Dipropionyl peroxide						TABLE A9.2.8
*	**ORGANIC PEROXIDE TYPE E, SOLID**	5.2	UN3108	II		P5	TABLE A9.3.8
	tert-Butyl monoperoxymaleate, as a paste						
	Dibenzoyl peroxide, as a paste						
*	**ORGANIC PEROXIDE TYPE E, SOLID, TEMPERATURE CONTROLLED**	5.2	UN3118	II		P3	TABLE A9.3.8
*	**ORGANIC PEROXIDE TYPE F, LIQUID**	5.2	UN3109	II		P5	TABLE A9.2.8
	tert-Butylhydroperoxide						
	Cumyl hydroperoxide						
	Dilauroyl peroxide, as a stable dispersion in water						
	Isopropylcumyl hydroperoxide						
	p-Menthyl hydroperoxide						
	Peroxyacetic acid, Type F, stablized						
	Pinanyl hydroperoxide						
*	**ORGANIC PEROXIDE TYPE F, LIQUID TEMPERATURE CONTROLLED**	5.2	UN3119	II		P3	TABLE A9.2.8
	Di-(4-tert-butylcyclohexyl) peroxydicarbonate, as a stable dispersion in water						
	Dicetyl peroxydicarbonate, as a stable dispersion in water						
	Dimyristyl peroxydicarbonate, as a stable dispersion in water						
*	**ORGANIC PEROXIDE TYPE F, SOLID**	5.2	UN3110	II		P5	TABLE A9.3.8
	Dicumyl peroxide						
*	**ORGANIC PEROXIDE TYPE F, SOLID, TEMPERATURE CONTROLLED**	5.2	UN3120	II		P3	TABLE A9.3.8
	ORGANIC PHOSPHATE, ORGANIC PHOSPHATE COMPOUND *or* **ORGANIC PHOSPHORUS COMPOUND; MIXED WITH COMPRESSED GAS**	FORBIDDEN					FORBIDDEN

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
*	**ORGANOARSENIC COMPOUND, N.O.S.**	6.1	UN3280	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6
*	**ORGANOCHLORINE PESTICIDES LIQUID, FLAMMABLE, TOXIC,** *flashpoint less than 23 degrees C*	3	UN2762	I	6.1	P3	A7.3
				II	6.1	P4	A7.3
*	**ORGANOCHLORINE PESTICIDES, LIQUID, TOXIC, FLAMMABLE,** *flashpoint not less than 23 degrees C*	6.1	UN2995	I	3	P3	A10.5
				II	3	P4	A10.5
				III	3	P5	A10.5
*	**ORGANOCHLORINE PESTICIDES, LIQUID, TOXIC**	6.1	UN2996	I		P3	A10.5
				II		P4	A10.5
				III		P5	A10.5
*	**ORGANOCHLORINE PESTICIDES, SOLID, TOXIC**	6.1	UN2761	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6
*	**ORGANOMETALLIC COMPOUNDS, WATER-REACTIVE, FLAMMABLE, N.O.S.**	4.3	UN3207	I	3	P3	A8.3
				II	3	P4	A8.3
				III	3	P5	A8.3
*	**ORGANOMETALLIC COMPOUND DISPERSION, WATER-REACTIVE, FLAMMABLE, N.O.S.**	4.3	UN3207	I	3	P3	A8.3
				II	3	P4	A8.3
				III	3	P5	A8.3
*	**ORGANOMETALLIC COMPOUND SOLUTION, WATER-REACTIVE, FLAMMABLE, N.O.S.**	4.3	UN3207	I	3	P3	A8.3
				II	3	P4	A8.3
				III	3	P5	A8.3
	ORGANOMETALLIC COMPOUND, TOXIC, N.O.S.	6.1	UN3282	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6
	ORGANOPHOSPHORUS COMPOUND, TOXIC, FLAMMABLE	6.1	UN3279	I	3	P3	A10.5
				II	3	P3	A10.5
	ORGANOPHOSPHORUS COMPOUND, TOXIC, N.O.S.	6.1	UN3278	I		P3	A10.5
				II		P4	A10.5
				III		P5	A10.5
*	**ORGANOPHOSPHOROUS PESTICIDES, LIQUID, FLAMMABLE, TOXIC,** *flashpoint less than 23 degrees C*	3	UN2784	I	6.1	P3	A7.3
				II	6.1	P4	A7.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
*	**ORGANOPHOSPHORUS PESTICIDES, LIQUID, TOXIC, FLAMMABLE,** *flashpoint not less than 23 degrees C*	6.1	UN3017	I	3	P3, N76	A10.5
				II	3	P4, N76	A10.5
				III	3	P5, N76	A10.5
*	**ORGANOPHOSPHORUS PESTICIDES, LIQUID, TOXIC**	6.1	UN3018	I		P3, N76	A10.5
				II		P4, N76	A10.5
				III		P5, N76	A10.5
*	**ORGANOPHOSPHORUS PESTICIDES, SOLID, TOXIC**	6.1	UN2783	I		P5, N77	A10.6
				II		P5, N77	A10.6
				III		P5, N77	A10.6
	ORGANOTIN COMPOUNDS, LIQUID, N.O.S.	6.1	UN2788	I		P3, A3, N33, N34	A10.5
				II		P4, A3, N33, N34	A10.5
				III		P5	A10.5
	ORGANOTIN COMPOUNDS, SOLID, N.O.S.	6.1	UN3146	I		P5, A5	A10.6
				II		P5	A10.6
				III		P5	A10.6
*	**ORGANOTIN PESTICIDES, LIQUID, FLAMMABLE, TOXIC,** *flashpoint less than 23 degrees C*	3	UN2787	I	6.1	P3	A7.3
				II	6.1	P4	A7.3
*	**ORGANOTIN PESTICIDES, LIQUID, TOXIC, FLAMMABLE,** *flashpoint more than 23 degrees C*	6.1	UN3019	I	3	P3	A10.5
				II	3	P4	A10.5
				III	3	P5	A10.5
*	**ORGANOTIN PESTICIDES, LIQUID, TOXIC**	6.1	UN3020	I		P3	A10.5
				II		P4	A10.5
				III		P5	A10.5
*	**ORGANOTIN PESTICIDES, SOLID, TOXIC**	6.1	UN2786	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6
	OSMIUM TETROXIDE	6.1	UN2471	I		P5, A8, N33, N34	A10.6
	OTHER REGULATED SUBSTANCES, *liquid not falling under the definitions of classes 1-8*	9	ID8035	III		P5	A13.3
	OTHER REGULATED SUBSTANCES, *solid not falling under the definitions of classes 1-8*	9	ID8036	III		P5	A13.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	Otto *fuel II, see* **ENVIRONMENTALLY HAZARDOUS SUBSTANCE LIQUID, N.O.S.**						
*	**OXIDIZING LIQUID, CORROSIVE, N.O.S.**	5.1	UN3098	I	8	P3	A9.7
				II	8	P4	A9.7
				III	8	P5	A9.7
*	**OXIDIZING LIQUID, N.O.S.**	5.1	UN3139	II		P5, A2	A9.7
				III		P5, A2	A9.7
*	**OXIDIZING LIQUID, TOXIC, N.O.S.**	5.1	UN3099	I	6.1	P3	A9.7
				II	6.1	P4	A9.7
				III	6.1	P5	A9.7
	OXIDIZING SOLID, CORROSIVE, N.O.S.	5.1	UN3085	I	8	P5	A9.8
				II	8	P5	A9.8
				III	8	P5	A9.8
*	**OXIDIZING SOLID, FLAMMABLE, N.O.S.**	5.1	UN3137	I	4.1	P4	A9.10
*	**OXIDIZING SOLID, N.O.S.**	5.1	UN1479	I		P5	A9.8
				II		P5	A9.8
				III		P5	A9.8
*	**OXIDIZING SOLID, SELF-HEATING, N.O.S.**	5.1	UN3100	II	4.2	P4	A9.10
*	**OXIDIZING SOLID, TOXIC, N.O.S.**	5.1	UN3087	I	6.1	P5	A9.8
				II	6.1	P5	A9.8
				III	6.1	P5	A9.8
*	**OXIDIZING SOLID, WATER-REACTIVE, N.O.S.**	5.1	UN3121		4.3	P4	A9.10
	OXYGEN, COMPRESSED	2.2	UN1072		5.1	P5	A6.3, A6.6
	OXYGEN DIFLUORIDE	2.3	UN2190		5.1, 8	P1, 1	A6.5
	OXYGEN, REFRIGERATED LIQUID *(cryogenic liquid)*	2.2	UN1073		5.1	P4	A6.11
	PAINT *(including paint, lacquer, enamel, stain shellac solutions, varnish, polish, liquid, filler, and liquid lacquer base) or* **PAINT RELATED MATERIAL** *(including paint thinning or reducing compounds)*	3	UN1263	II		P5	A7.3
				III		P5	A7.3
	PAINT *or* **PAINT RELATED MATERIAL**	8	UN3066	II		P5	A12.3
				III		P5	A12.3
	PAPER, UNSATURATED OIL TREATED *incompletely dried (including carbon paper)*	4.2	UN1379	III		P5	A8.4
	PARAFORMALDEHYDE	4.1	UN2213	III		P5, A1	A8.4
	PARALDEHYDE	3	UN1264	III		P5	A7.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	Paranitroaniline, solid; see **NITROANILINES**						
D	**PARATHION**	6.1	NA2783	I		P3	A10.5
				II		P4	A10.5
D	**PARATHION AND COMPRESSED GAS MIXTURE**	2.3	NA1967			P2, 3	A6.18
	PCB, *see* **POLYCHLORINATED BIPHENYLS**						
+	**PETABORANE**	FORBIDDEN					FORBIDDEN
	PENTACHLOROETHANE	6.1	UN1669	II		P5	A10.5
	PENTACHLOROPHENOL	6.1	UN3155	II		P5	A10.6
	Pentaerythrite Tetranitrate (dry)	FORBIDDEN					FORBIDDEN
D	**PENTAERYTHRITE TETRANITRATE, WETTED** *or* **PENTAERYTHRITOL TETRANITRATE, WETTED** *or* **PETN, WETTED** *with not less than 25% water by mass, or* **PENTAERYTHRITE TETRANITRATE** *or* **PENTAERYTHRITOL TETRANITRATE** *or* **PETN; DESENSITIZED** *with not less than 15% phlegmatizer by mass*	1.1D	UN0150	II		P4	A5.37
	PENTAERYTHRITE TETRANITRATE *or* **PENTAERYTHRITOL TETRANITRATE** *or* **PETN,** *with not less than 7% wax by mass*	1.1D	UN0411	II		P4	A5.68
	PENTAERYTHRITOL TETRANITRATE; *see* **PENTAERYTHRITE TETRANITRATE,** *etc.*						
	PENTAFLUOROETHANE	2.2	UN3220			P5	A6.3, A6.5
	PENTAMETHYLHEPTANE	3	UN2286	III		P5	A7.3
	PENTAN-2,4-DIONE	3	UN2310	III		P5	A7.3
	PENTANES	3	UN1265	I		P3	A7.3
				II		P5	A7.3
	Pentanitroaniline (dry)	FORBIDDEN					FORBIDDEN
	1-PENTOL	8	UN2705	II		P5	A12.3
	PENTOLITE, *dry or wetted with less than 15% water by mass*	1.1D	UN0151	II		P4	A5.60
	PERCARBONATES, INORGANIC, N.O.S.	5.1	UN3217	III		P5	A9.8
	PERCHLORATES, INORGANIC, N.O.S.	5.1	UN1481	II		P5	A9.8
				III		P5	A9.8
	PERCHLORATES, INORGANIC, AQUEOUS SOLUTIONS, N.O.S.	5.1	UN3211	II		P5	A9.7
	Perchloric Acid, more than 72% acid by mass	FORBIDDEN					FORBIDDEN

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	PERCHLORIC ACID *more than 50% but not more than 72% acid, by mass*	5.1	UN1873	I	8	P3, A2, A3, N41	A9.7
	PERCHLORIC ACID *not more than 50% acid by mass*	8	UN1802	II	5.1	P5, N41	A12.3
	Perchloroethylene; see **TETRACHLOROETHYLENE**						
	PERCHLOROMETHYL MERCAPTAN	6.1	UN1670	I		P2, 2, A3, A7, N34	A10.7
	PERCHLORYL FLUORIDE	2.3	UN3083		5.1	P2, 2	A6.6
	Percussion Caps; *see* **PRIMERS, CAP TYPE**						
	PERFLUOROETHYL VINYL ETHER	2.1	UN3154			P4	A6.3, A6.5, A6.6
	PERFLUOROMETHYL VINYL ETHER	2.1	UN3153			P4	A6.3, A6.5, A6.6
	Perfluoro-2-butene; see **OCTAFLUOROBUT-2-ENE**						
	PERFUMERY PRODUCTS *with flammable solvents*	3	UN1266	II		P5	A7.3
				III		P5	A7.3
	PERMANGANATES, INORGANIC, N.O.S.	5.1	UN1482	II		P5, A30	A9.8
				III		P5, A30	A9.8
	PERMANGANATES, INORGANIC AQUEOUS SOLUTIONS, N.O.S.	5.1	UN3214	II		P5	A9.7
	PEROXIDES, INORGANIC, N.O.S.	5.1	UN1483	II		P5, A7, A20, N34	A9.8
				III		P5, A7, A20, N34	A9.8
	Peroxyacetic acid, more than 43% and with more than 6% hydrogen peroxide	FORBIDDEN					FORBIDDEN
	PERSULFATES, INORGANIC, N.O.S.	5.1	UN3215	III		P5	A9.8
	PERSULFATES, INORGANIC, AQUEOUS SOLUTIONS, N.O.S.	5.1	UN3216	III		P5	A9.7
*	**PESTICIDES, LIQUID, FLAMMABLE, TOXIC,** *flashpoint less than 23 degrees C*	3	UN3021	I	6.1	P3	A7.3
				II	6.1	P4	A7.3
*	**PESTICIDES, LIQUID, TOXIC, FLAMMABLE, N.O.S.** *flashpoint not less than 23 degrees C*	6.1	UN2903	I	3	P3	A10.5
				II	3	P4	A10.5
				III	3	P5	A10.5
*	**PESTICIDES, LIQUID, TOXIC, N.O.S.**	6.1	UN2902	I		P3	A10.5
				II		P4	A10.5
				III		P5	A10.5
*	**PESTICIDES, SOLID, TOXIC, N.O.S.**	6.1	UN2588	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	PETN; *see* **PENTAERYTHRITE TETRANITRATE**						
	PETN/TNT; *see* **PENTOLITE,** *etc*						
	PETROL; *see* **GASOLINE**						
	PETROLEUM CRUDE OIL	3	UN1267	I		P3	A7.3
				II		P5	A7.3
				III		P5	A7.3
	PETROLEUM DISTILLATES, N.O.S. *or*	3	UN1268	I		P3	A7.3
	PETROLEUM PRODUCTS, N.O.S.			II		P5	A7.3
				III		P5	A7.3
	PETROLEUM GASES, LIQUEFIED *or*	2.1	UN1075			P4	A6.3, A6.7
	LIQUEFIED PETROLEUM GAS						
D	**PETROLEUM OIL**	3	NA1270	I		P3	A7.3
				II		P5	A7.3
				III		P5	A7.3
	PHENACYL BROMIDE	6.1	UN2645	II		P5	A10.6
	PHENETIDINES	6.1	UN2311	III		P5	A10.5
	PHENOL, MOLTEN	FORBIDDEN					FORBIDDEN
+	**PHENOL, SOLID**	6.1	UN1671	II		P5, N78	A10.6
	PHENOL SOLUTIONS	6.1	UN2821	II		P5	A10.5
				III		P5	A10.5
	PHENOLSULFONIC ACID, LIQUID	8	UN1803	II		P5, N41	A12.3
*	**PHENOXY PESTICIDES, LIQUID, FLAMMABLE**,	3	UN2766	I	6.1	P3	A7.3
	TOXIC, *flashpoint less than 23 degrees C*			II	6.1	P4	A7.3
*	**PHENOXY PESTICIDES, LIQUID, TOXIC**,	6.1	UN2999	I	3	P3	A10.5
	FLAMMABLE, *flashpoint not*			II	3	P4	A10.5
	less than 23 degrees C			III	3	P5	A10.5
*	**PHENOXY PESTICIDES, LIQUID, TOXIC**	6.1	UN3000	I		P3	A10.5
				II		P4	A10.5
				III		P5	A10.5
*	**PHENOXY PESTICIDES, SOLID, TOXIC**	6.1	UN2765	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6
	PHENYLACETONITRILE, LIQUID	6.1	UN2470	III		P5	A10.5
	PHENYLACETYL CHLORIDE	8	UN2577	II		P5	A12.3
	PHENYLCARBYLAMINE CHLORIDE	6.1	UN1672	I		P2, 2	A10.7
	PHENYL CHLOROFORMATE	6.1	UN2746	II	8	P4	A10.5
	m-Phenylene diaminediperchlorate (dry)	FORBIDDEN					FORBIDDEN

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	PHENYLENEDIAMINES *(o-,m-,p-)*	6.1	UN1673	III		P5	A10.6
	PHENYLHYDRAZINE	6.1	UN2572	II		P5	A10.5
+	**PHENYL ISOCYANATE**	6.1	UN2487	II		P2, 2, A3, N33, N34	A10.7
	PHENYL MERCAPTAN	6.1	UN2337	I	3	P2, 2	A10.7
	PHENYLMERCURIC ACETATE	6.1	UN1674	II		P5	A10.6
	PHENYLMERCURIC COMPOUNDS, N.O.S.	6.1	UN2026	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6
	PHENYLMERCURIC HYDROXIDE	6.1	UN1894	II		P5	A10.6
	PHENYLMERCURIC NITRATE	6.1	UN1895	II		P5	A10.6
	PHENYL PHOSPHORUS DICHLORIDE	8	UN2798	II		P4	A12.3
	PHENYL PHOSPHOROUS THIODICHLORIDE	8	UN2799	II		P4	A12.3
	PHENYLTRICHLOROSILANE	8	UN1804	II		P4, A7, N34	A12.3
*	**PHENYL UREA PESTICIDES, LIQUID, FLAMMABLE, TOXIC** *flashpoint less than 23 degrees C*	3	UN2768	I	6.1	P3	A7.3
				II	6.1	P4	A7.3
*	**PHENYL UREA PESTICIDES, LIQUID, TOXIC, FLAMMABLE** *flash point more than 23 degrees C*	6.1	UN3001	I	3	P3	A10.5
				II	3	P4	A10.5
				III	3	P5	A10.5
*	**PHENYL UREA PESTICIDES, LIQUID, TOXIC**	6.1	UN3002	I		P3	A10.5
				II		P4	A10.5
				III		P5	A10.5
*	**PHENYL UREA PESTICIDES, SOLID, TOXIC**	6.1	UN2767	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6
	PHOSGENE	2.3	UN1076		8	P1, 1	A6.15
	9-PHOSPHABICYCLONONANES *or* **CYCLOOCTADIENE PHOSPHINES**	4.2	UN2940	II		P5, A19	A8.4
	PHOSPHINE	2.3	UN2199		2.1	P1, 1	A6.15
	Phosphoric acid triethyleneimine; *see* **TRI-(1-AZIRIDIYL) PHOSPHINE OXIDE, SOLUTION**						
	Phosphoric Anhydride; see **PHOSPHORUS PENTOXIDE**						
	PHOSPHORIC ACID	8	UN1805	III		P5, A7, N34	A12.3
	PHOSPHOROUS ACID	8	UN2834	III		P5	A12.4

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	PHOSPHORUS, AMORPHOUS	4.1	UN1338	III		P5, A1, A19	A8.4
	Phosphorus Bromide; see **PHOSPHORUS TRIBROMIDE**						
	Phosphorus Chloride; see **PHOSPHORUS TRICHLORIDE**						
	PHOSPHORUS HEPTASULPHIDE, *free from yellow or white phosphorus*	4.1	UN1339	II		P5, A20, N34	A8.4
	PHOSPHORUS OXYBROMIDE	8	UN1939	II		P5, N41, N43	A12.4
	PHOSPHORUS OXYBROMIDE, MOLTEN	FORBIDDEN					FORBIDDEN
+	**PHOSPHORUS OXYCHLORIDE**	8	UN1810	II	6.1	P2, 2, A7, N34	A12.12
	PHOSPHORUS PENTABROMIDE	8	UN2691	II		P4, A7, N34	A12.3
	PHOSPHORUS PENTACHLORIDE	8	UN1806	II		P4, A7, N34	A12.3
	PHOSPHORUS PENTAFLUORIDE	2.3	UN2198		8	P1, 1	A6.6
	PHOSPHORUS PENTASULPHIDE, *free from yellow or white phosphorus*	4.3	UN1340	II	4.1	P5, A20	A8.4
	PHOSPHORUS PENTOXIDE	8	UN1807	II		P4, A7, N34	A12.4
	PHOSPHORUS SESQUISULPHIDE, *free from yellow or white phosphorus*	4.1	UN1341	II		P5, A20, N34	A8.4
	PHOSPHORUS TRIBROMIDE	8	UN1808	II		P4, A3, A6, A7, N34, N43	A12.3
+	**PHOSPHORUS TRICHLORIDE**	8	UN1809	II	6.1	P4, 2, A3, A7, N34	A12.12
	PHOSPHORUS TRIOXIDE	8	UN2578	III		P5	A12.4
	PHOSPHORUS TRISULPHIDE, *free from yellow or white phosphorus*	4.1	UN1343	II		P5, A20, N34	A8.4
	PHOSPHORUS WHITE, MOLTEN	FORBIDDEN					FORBIDDEN
	Phosphorus (white or red) and a chlorate, mixtures of	FORBIDDEN					FORBIDDEN
	PHOSPHORUS, WHITE *or* **YELLOW DRY** *or* **UNDER WATER** *or* **IN SOLUTION**	4.2	UN1381	I	6.1	P3, N34	A8.17
	Phosphoryl Chloride; see **PHOSPHORUS OXYCHLORIDE**						
	PHTHALIC ANHYDRIDE *with more than .05% maleic anhydride*	8	UN2214	III		P5	A12.4
*	**PHTHALIMIDE DERIVATIVE PESTICIDES, LIQUID, FLAMMABLE, TOXIC,** *flash point less than 23 degrees C*	3	UN2774	I	6.1	P3	A7.3
				II	6.1	P4	A7.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
*	**PHTHALIMIDE DERIVATIVE PESTICIDES, LIQUID, TOXIC, FLAMMABLE,** *flashpoint not less than 23 degrees C*	6.1	UN3007	I II III	3 3 3	P3 P4 P5	A10.5 A10.5 A10.5
*	**PHTHALIMIDE DERIVATIVE PESTICIDES**, **LIQUID, TOXIC**	6.1	UN3008	I II III		P3 P4 P5	A10.5 A10.5 A10.5
*	**PHTHALIMIDE DERVATIVE PESTICIDES**, **SOLID, TOXIC**	6.1	UN2773	I II III		P5 P5 P5	A10.6 A10.6 A10.6
	PICOLINES	3	UN2313	III		P5	A7.3
	PICRAMIDE *see* **TRINITROANILINE**						
	PICRIC ACID; *see* **TRINITROPHENOL**, *etc*						
D	**PICRIC ACID, WET,** *with not less than 10% water*	4.1	NA1344	I		P3, A19, A20, N41	A8.4
	PICRITE; *see* **NITROGUANIDINE,** *etc*						
	PICRYL CHLORIDE; *see* **TRINITROCHLOROBENZENE**						
	ALPHA-PINENE	3	UN2368	III		P5	A7.3
	PINE OIL	3	UN1272	III		P5	A7.3
	PIPERAZINE	8	UN2579	III		P5	A12.4
	PIPERIDINE	3	UN2401	II	8	P4	A7.3
	Pivaloyl Chloride; *see* **TRIMETHYLACETYL CHLORIDE**						
	PLASTIC MOULDING MATERIAL *in dough, sheet, or extruded* rope form	9	ID8016	III		P5	A13.13
*	**PLASTICS, NITROCELLULOSE BASED, SELF-HEATING, N.O.S.**	4.2	UN2006	III		P2	A8.4
	Plastic solvent, n.o.s.; see **FLAMMABLE LIQUIDS, N.O.S**.						
	Poisonous gases, n.o.s.; see **COMPRESSED** *or* **LIQUEFIED GASES, FLAMMABLE** *or* **TOXIC, N.O.S.**						
	POLYAMINES,*ect, see* **AMINES,** *ect*						
	POLYCHLORINATED BIPHENYLS	9	UN2315	II		P5, 9	A13.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	POLYESTER RESIN KIT	3	UN3269	II		P5	A7.7
				III		P5	A7.7
	POLYHALOGENATED BIPHENYLS, LIQUID *or* **POLYHALOGENATED TERPHENYLS, LIQUID**	9	UN3151	II		P5	A13.3
	POLYHALOGENATED BIPHENYLS, SOLID, *or* **POLYHALOGENATED TERPHENYLS, SOLIDS**	9	UN3152	II		P5	A13.3
	POLYMERIC BEADS, EXPANDABLE, *evolving flammable vapor*	9	UN2211	III		P5	A13.17
	Polystyrene beads, expandable, see **POLYMERIC BEADS, EXPANDABLE**						
	POTASSIUM	4.3	UN2257	I		P3, A19, A20, N6, N34	A8.4
	POTASSIUM ARSENATE	6.1	UN1677	II		P5	A10.6
	POTASSIUM ARSENITE	6.1	UN1678	II		P5	A10.6
	Potassium bisulfite solution, see **BISULFITES, INORGANIC, AQUEOUS SOLUTIONS, N.O.S.**						
	POTASSIUM BOROHYDRIDE	4.3	UN1870	I		P3, A19, N40	A8.4
	POTASSIUM BROMATE	5.1	UN1484	II		P5	A9.8
	Potassium Carbonyl	FORBIDDEN					FORBIDDEN
	POTASSIUM CHLORATE	5.1	UN1485	II		P5, A9, N34	A9.8
	POTASSIUM CHLORATE, AQUEOUS SOLUTION	5.1	UN2427	II		P5, A2	A9.7
	POTASSIUM CUPROCYANIDE	6.1	UN1679	II		P5	A10.6
	POTASSIUM CYANIDE	6.1	UN1680	I		P5, N74, N75	A10.6
	POTASSIUM DITHIONITE *or* **POTASSIUM HYDROSULFITE**	4.2	UN1929	II		P5, A8, A19, A20	A8.4
	POTASSIUM FLUORIDE	6.1	UN1812	III		P5	A10.6
	POTASSIUM FLUOROACETATE	6.1	UN2628	I		P5	A10.6
	POTASSIUM FLUOROSILICATE	6.1	UN2655	III		P5	A10.6
	Potassium hydrate; see **POTASSIUM HYDROXIDE, SOLID**						
	Potassium hydrogen fluoride; see **POTASSIUM HYDROGEN DIFLUORIDE**						
	POTASSIUM HYDROGENDIFLUORIDE, *solid or solution*	8	UN1811	II	6.1	P5, N3, N34	A12.3, A12.4
	Potassium hydrogen fluoride solution; see **CORROSIVE LIQUID, N.O.S.**						
	POTASSIUM HYDROGEN SULPHATE	8	UN2509	II		P5, A7,N34	A12.4

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	POTASSIUM HYDROSULFITE, *see* **POTASSIUM DITHIONITE**						
	POTASSIUM, HYDROXIDE, SOLID	8	UN1813	II		P5	A12.4
	POTASSIUM HYDROXIDE, SOLUTION	8	UN1814	II		P5	A12.3
				III		P5	A12.3
	Potassium hypochlorite solution; see **HYPOCHLORITE SOLUTIONS,** *etc*						
	POTASSIUM, METAL ALLOYS	4.3	UN1420	I		P3, A19, A20	A8.4
	Potassium metal, liquid alloy; see **ALKALI METAL ALLOYS, LIQUID**						
	POTASSIUM METAVANADATE	6.1	UN2864	II		P5	A10.6
	POTASSIUM MONOXIDE	8	UN2033	II		P5	A12.4
	POTASSIUM NITRATE	5.1	UN1486	III		P5, A1, A29	A9.8
	POTASSIUM NITRATE AND SODIUM NITRITE MIXTURES	5.1	UN1487	II		P5	A9.8
	POTASSIUM NITRITE	5.1	UN1488	II		P5	A9.8
	POTASSIUM PERCHLORATE, *solid or solution*	5.1	UN1489	II		P5	A9.7, A9.8
	POTASSIUM PERMANGANATE	5.1	UN1490	II		P5	A9.8
	POTASSIUM PEROXIDE	5.1	UN1491	I		P5, A20, N34	A9.8
	POTASSIUM PERSULFATE	5.1	UN1492	III		P5, A1, A29	A9.8
	POTASSIUM PHOSPHIDE	4.3	UN2012	I	6.1	P3, A19, N40	A8.4
	POTASSIUM SALTS OF AROMATIC NITRO-DERIVATIVES, *explosive*	1.3C	UN0158	II		P4	A5.69
	Potassium selenate; *see* **SELENATES**						
	Potassium selenite; see **SELENITES**						
	POTASSIUM SODIUM ALLOYS	4.3	UN1422	I		P3, A19 N34, N40	A8.3
	POTASSIUM SULPHIDE, **ANHYDROUS** *or* **POTASSIUM SULPHIDE** *with less than 30% water of crystallization*	4.2	UN1382	II		P5, A19, A20, N34	A8.4
	POTASSIUM SULPHIDE, HYDRATED *with not less than 30% water of crystallization*	8	UN1847	II		P5	A12.4
	POTASSIUM SUPEROXIDE	5.1	UN2466	I		P5, A20	A9.8
	POWDER CAKE, WETTED, *or* **POWDER PASTE, WETTED** *with not less than 17% alcohol by mass*	1.1C	UN0433	II		P4	A5.8

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	POWDER CAKE, WETTED, *or* **POWDER PASTE, WETTED** *with not less than 25% water, by mass*	1.3C	UN0159	II		P4	A5.67
	POWDER, SMOKELESS	1.1C	UN0160	II		P4	A5.70
	POWDER, SMOKELESS	1.3C	UN0161	II		P4	A5.70
	Power device,explosive;see **CARTRIDGES, POWER DEVICE**						
	PRIMERS, CAP TYPE	1.4S	UN0044	II		P5	A5.58
	PRIMERS, CAP TYPE	1.1B	UN0377	II		P4	A5.58
	PRIMERS, CAP TYPE	1.4B	UN0378	II		P5	A5.58
	PRIMERS, TUBULAR	1.3G	UN0319	II		P4	A5.71
	PRIMERS, TUBULAR	1.4G	UN0320	II		P5	A5.71
	PRIMERS, TUBULAR	1.4S	UN0376	II		P5	A5.71
	PRINTING INK, *flammable*	3	UN1210	I		P3	A7.3
				II		P5	A7.3
				III		P5	A7.3
	Projectiles illuminating;see **AMMUNITION, ILLUMINATING,** *etc*						
	PROJECTILES, *inert with tracer*	1.4S	UN0345	II		P5	A5.10
	PROJECTILES, *inert, with tracer*	1.3G	UN0424	II		P4	A5.10
	PROJECTILES, *inert, with tracer*	1.4G	UN0425	II		P5	A5.10
	PROJECTILES, *with burster or expelling charge*	1.2D	UN0346	II		P4	A5.10
	PROJECTILES, *with burster or expelling charge*	1.4D	UN0347	II		P5	A5.10
	PROJECTILES, *with burster or expelling charge*	1.2F	UN0426	II		P4	A5.10
	PROJECTILES, *with burster or expelling charge*	1.2G	UN0434	II		P4	A5.10
	PROJECTILES, *with burster or expelling charge*	1.4F	UN0427	II		P5	A5.10
	PROJECTILES, *with burster or expelling charge*	1.4G	UN0435	II		P5	A5.10
	PROJECTILES, *with bursting charge*	1.4D	UN0344	II		P5	A5.10
	PROJECTILES, *with bursting charge*	1.1D	UN0168	II		P4	A5.10
	PROJECTILES, *with bursting charge*	1.1F	UN0167	II		P4	A5.10
	PROJECTILES, *with bursting charge*	1.2D	UN0169	II		P4	A5.10
	PROJECTILES, *with bursting charge*	1.2F	UN0324	II		P4	A5.10
	PROPADIENE, INHIBITED	2.1	UN2200			P4	A6.5
	PROPANE *or* **PROPANE MIXTURES,** *see also* **PETROLEUM GASES, LIQUEFIED**	2.1	UN1978			P4	A6.3, A6.7
	PROPANETHIOLS	3	UN2402	II		P5	A7.3
	N-PROPANOL *or* **PROPYL ALCOHOL, NORMAL**	3	UN1274	II		P5	A7.3
				III		P5	A7.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
D	**PROPARGYL ALCOHOL**	3	NA1986	II	6.1	P4	A7.3
D	**PROPELLANT EXPLOSIVE, LIQUID**	1.1C	NA0474	II		P4	A5.11
D	**PROPELLANT EXPLOSIVE, LIQUID**	1.3C	NA0477	II		P4	A5.11
*	**PROPELLANT, LIQUID**	1.3C	UN0495	II		P4	A5.42
*	**PROPELLANT, LIQUID**	1.1C	UN0497	II		P4	A5.42
*	**PROPELLANT, SOLID**	1.1C	UN0498	II		P4	A5.70
*	**PROPELLANT, SOLID**	1.3C	UN0499	II		P4	A5.70
	PROPIONALDEHYDE	3	UN1275	II		P5	A7.3
	PROPIONIC ACID	8	UN1848	III		P5	A12.3
	PROPIONIC ANHYDRIDE	8	UN2496	III		P5	A12.3
	PROPIONITRILE	3	UN2404	II	6.1	P4	A7.3
	PROPIONYL CHLORIDE	3	UN1815	II	8	P5	A7.3
	N-PROPYL ACETATE	3	UN1276	II		P5	A7.3
	PROPYL ALCOHOL, NORMAL; *see* **N-PROPANOL**						
	PROPYLAMINE	3	UN1277	II	8	P5, N34	A7.3
	N-PROPYL BENZENE	3	UN2364	III		P5	A7.3
	PROPYL CHLORIDE	3	UN1278	II		P5, N34	A7.3
	N-PROPYL CHLOROFORMATE	6.1	UN2740	I	3, 8	P2, 2, A3, A6, A7, N34	A10.7
	PROPYLENE	2.1	UN1077			P4	A6.3, A6.5
	PROPYLENE CHLOROHYDRIN	6.1	UN2611	II		P5	A10.5
	1,2-PROPYLENEDIAMINE	8	UN2258	II	3	P5, A3, A6, N34	A12.4
	PROPYLENE DICHLORIDE	3	UN1279	II		P5, N36	A7.3
	PROPYLENEIMINE, INHIBITED	3	UN1921	I		P3, A3, N34	A7.3
	PROPYLENE OXIDE	3	UN1280	I		P3, A3, N34	A7.3
	PROPYLENE TETRAMER	3	UN2850	III		P5	A7.3
	PROPYL FORMATES	3	UN1281	II		P5	A7.3
	N-PROPYL ISOCYANATE	6.1	UN2482	I	3	P1, 1, A7	A10.7
	Propyl mercaptan; see **PROPANETHIOLS**						
	N-PROPYL NITRATE	3	UN1865	II		P5	A7.3
	PROPYLTRICHLOROSILANE	8	UN1816	II	3	P5, A7, N34	A12.3
	Prussic acid; *see* **HYDROGEN CYANIDE** *etc.*						
	PYRIDINE	3	UN1282	II		P4	A7.3
	Pyridine perchlorate	FORBIDDEN					FORBIDDEN
*	**PYROPHORIC LIQUIDS, ORGANIC, N.O.S.**	4.2	UN2845	I		P3	A8.6

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
*	**PYROPHORIC LIQUIDS, INORGANIC, N.O.S.**	4.2	UN3194	I		P3	A8.6
*	**PYROPHORIC METALS, N.O.S.,** *or* **PYROPHORIC ALLOYS, N.O.S.**	4.2	UN1383	I		P3	A8.12
*	**PYROPHORIC SOLIDS, ORGANIC, N.O.S.**	4.2	UN2846	I		P3	A8.12
*	**PYROPHORIC SOLIDS, INORGANIC, N.O.S**.	4.2	UN3200	I		P3	A8.12
*	**PYROPHORIC ORGANOMETALLIC COMPOUNDS, N.O.S.**	4.2	UN3203	I		P3	A8.12
	PYROSULFURYL CHLORIDE	8	UN1817	II		P5	A12.3
	PYRROLIDINE	3	UN1922	II	8	P5	A7.3
	Quebrachitol pentanitrate	FORBIDDEN					FORBIDDEN
	Quicklime; see **CALCIUM OXIDE**						
	QUINOLINE	6.1	UN2656	III		P5	A10.5
	(R12B1), see **CHLORODIFLUOROBROMOMETHANE**						
	(R12), see **DICHLORODIFLUOROMETHANE**						
	(R12B2), see **DIBROMODIFLUOROMETHANE**						
	(R13B1), see **BROMOTRIFLUOROMETHANE**						
	(R13), see **CHLOROTRIFLUOROMETHANE**						
	(R14), see **TETRAFLUOROMETHANE**						
	(R21), see **DICHLOROFLUOROMETHANE**						
	(R22), see **CHLORODIFLUOROMETHANE**						
	(R23), see **TRIFLUOROMETHANE**						
	(R115), see **CHLOROPENTAFLUOROETHANE**						
	(R116), see **HEXAFLUOROETHANE**						
	(R124), see **CHLOROTETRAFLUOROETHANE**						
	(R133a), see **CHLOROTRIFLUOROETHANE**						
	(R142B) see **1-CHLORO-1,1-DIFLUOROETHANE**						
	(R143), see **TRIFLUOROETHANE**, **COMPRESSED**						
	(R152a) see **DIFLUOROETHANE**						
	(R218), see **OCTAFLUOROPROPANE**						
	(R500), see **DICHLORODIFLUOROMETHANE AND DIFLUOROETHANE AZEOTROPIC MIXTURE,** *etc.*						
	(R502), see **CHLORODIFLUOROMETHANE AND CHLOROPENTAFLUOROETHANE MIXTURE,** *etc.*						
	(R503), see **CHLOROTRIFLUOROMETHANE AND TRIFLUOROMETHANE AZEOTROPIC MIXTURE,** *etc.*						
	(R1113), see **TRIFLUOROCHLOROETHYLENE, INHIBITED**						
	*(R1132a),***1,1-DIFLUOROETHYLENE**						

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	(RC318), see **OCTAFLUOROCYCLOBUTANE**						
	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE, ARTICLES MANUFACTURED FROM NATURAL *or* **DEPLETED URANIUM** *or* **NATURAL THORIUM**	7	UN2910			P5	A11.12, A11.16
	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE, EMPTY PACKAGING	7	UN2910			P5	1.10.2
	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE, INSTRUMENTS *or* **ARTICLES**	7	UN2910			P5	A11.12, A11.14
	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE, LIMITED QUANTITY OF MATERIAL	7	UN2910			P5	A11.11, A11.12
	RADIOACTIVE MATERIAL, FISSILE, N.O.S.	7	UN2918			P1, P4, P5	A11.8
	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA), N.O.S.	7	UN2912			P4, P5	1.10.2, A11.11, A11.17
	RADIOACTIVE MATERIAL, N.O.S.	7	UN2982			P3, P4, P5	A11.6, A11.7, A11.11, 1.10.2
	RADIOACTIVE MATERIAL, SPECIAL FORM, N.O.S.	7	UN2974			P3, P4, P5	A11.6, A11.7, A11.11, A11.14
	RADIOACTIVE MATERIAL SURFACE CONTAMINATED OBJECT *or* **RADIOACTIVE MATERIAL SCO**	7	UN2913			P4, P5	A11.11, A11.14, A11.16
	Railway torpedo, see **SIGNALS, RAILWAY TRACK, EXPLOSIVE**						
	RARE GASES AND NITROGEN MIXTURES	2.2	UN1981			P5	A6.3, A6.6
	RARE GASES AND OXYGEN MIXTURES	2.2	UN1980			P5	A6.3, A6.6
	RARE GASES MIXTURES	2.2	UN1979			P5	A6.3, A6.6
	RDX, *see* **CYCLOTETRAMETHYLENETETRANITRAMINE,** *etc.*						
	RECEPTACLES, SMALL, CONTAINING GAS *non-flammable, without release device, not refillable and not exceeding 1L capacity*	2.2	UN2037			P5	A6.3, A6.5
	RECEPTACLES, SMALL, CONTAINING GAS *(flammable) without release device, not refillable and not exceeding 1L capacity*	2.1	UN2037			P5	A6.3, A6.5
*	**REFRIGERANT GASES, N.O.S.**	2.2	UN1078			P5	A6.3, A6.5
D	**REFRIGERANT GAS, N.O.S.** *or* **DISPERSANT GAS, N.O.S.**	2.1	NA1954			P4	A6.3, A6.5
D	**REFRIGERATING MACHINE**	3	NA1993	III		P5	A7.4

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
D	**REFRIGERATING MACHINES,** *containing flammable nonpoisonous, liquefied gas*	2.1	NA1954			P4	A6.3, A6.9
	REFRIGERATING MACHINES, *containing nonflammable non-poisonous, liquefied gas or ammonia solutions*	2.2	UN2857			P5	A6.3, A6.9
D	**REGULATED MEDICAL WASTE**	6.2	UN3291	II		P5	A10.10
	RELEASE DEVICES, EXPLOSIVE	1.4S	UN0173	II		P5	A5.72
	RESIN SOLUTION, *flammable*	3	UN1866	II		P5	A7.3
				III		P5	A7.3
	RESORCINOL	6.1	UN2876	III		P5	A10.6
	Rifle grenade, see **GRENADES,**						
	Rifle powder, see **POWDER, SMOKELESS**						
	RIVETS, EXPLOSIVE	1.4S	UN0174	II		P5	A5.72
	ROCKET MOTORS	1.3C	UN0186	II		P4, 109	A5.73
	ROCKET MOTORS	1.1C	UN0280	II		P4, 109	A5.73
	ROCKET MOTORS	1.2C	UN0281	II		P4, 109	A5.73
	ROCKET MOTORS, LIQUID FUELED	1.2J	UN0395	II		P3, 109	A5.11
	ROCKET MOTORS, LIQUID FUELED	1.3J	UN0396	II		P3, 109	A5.11
	ROCKET MOTORS WITH HYPERGOLIC LIQUIDS *with or without an expelling charge*	1.3L	UN0250	II		P3, 109	A5.74
	ROCKET MOTORS WITH HYPERGOLIC LIQUIDS *with or without an expelling charge*	1.2L	UN0322	II		P3, 109	A5.74
	ROCKETS, LINE-THROWING	1.4G	UN0453	II		P5	A5.75
	ROCKETS, LINE-THROWING	1.2G	UN0238	II		P4	A5.75
	ROCKETS, LINE-THROWING	1.3G	UN0240	II		P4	A5.75
	ROCKETS, LIQUID FUELED *with bursting charge*	1.2J	UN0398	II		P3	A5.11
	ROCKETS, LIQUID FUELED *with bursting charge*	1.1J	UN0397	II		P3	A5.11
	ROCKETS, *with bursting charge*	1.1F	UN0180	II		P4	A5.51
	ROCKETS, *with bursting charge*	1.1E	UN0181	II		P4	A5.51
	ROCKETS, *with bursting charge*	1.2E	UN0182	II		P4	A5.51
	ROCKETS, *with bursting charge*	1.2F	UN0295	II		P4	A5.51
	ROCKETS, *with expelling charge*	1.2C	UN0436	II		P4	A5.51
	ROCKETS, *with expelling charge*	1.3C	UN0437	II		P4	A5.51
	ROCKETS, *with expelling charge*	1.4C	UN0438	II		P5	A5.51
	ROCKETS, *with inert head*	1.3C	UN0183	II		P4	A5.51
	ROSIN OIL	3	UN1286	II		P5	A7.3
				III		P5	A7.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	RUBBER SOLUTION	3	UN1287	II		P5	A7.3
				III		P5	A7.3
	RUBIDIUM	4.3	UN1423	I		P3, 22, A7, A19, N34, N40, N45	A8.4
	RUBIDIUM HYDROXIDE	8	UN2678	II		P5	A12.4
	RUBIDIUM HYDROXIDE SOLUTION	8	UN2677	II		P5	A12.3
				III		P5	A12.3
	Safety fuse, see **FUSE, SAFETY**						
*	**SAMPLES, EXPLOSIVE**, *other than initiating explosives*	use class/ division of sample	UN0190	II		P4, 113	A5.76
	SEED CAKE, *containing vegetable oil solvent extractions and expelled seeds, containing not more than 10% of oil and when the amount of moisture is higher than 11%, not more than 20% of oil and moisture combined*	4.2	UN1386	III		P5, N7	A8.4
	SEED CAKE *with more than 1.5% oil and not more than 11% moisture*	4.2	UN1386	III		P5, N7	A8.4
	SEED CAKE *with not more than 1.5% oil and not more than 11% moisture*	4.2	UN2217	III		P5, N7	A8.4
	SELENATES *or* **SELENITES**	6.1	UN2630	I		P5	A10.6
	SELENIC ACID	8	UN1905	I		P3, N34	A12.4
	SELENIUM COMPOUND, N.O.S.	6.1	UN3283	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6
	SELENIUM DISULPHIDE	6.1	UN2657	II		P5	A10.6
	SELENIUM HEXAFLUORIDE	2.3	UN2194		8	P2, 1	A6.6
	Selenium nitride	FORBIDDEN					FORBIDDEN
D	**SELENIUM OXIDE**	6.1	NA2811	I		P5	A10.6
	SELENIUM OXYCHLORIDE	8	UN2879	I	6.1	P3, A3, A6, A7, N34	A12.3
	SELENIUM POWDER	6.1	UN2658	III		P5	A10.6
*	**SELF-HEATING LIQUID, CORROSIVE, INORGANIC, N.O.S.**	4.2	UN3188	II	8	P4	A8.3
				III	8	P5	A8.3
*	**SELF-HEATING LIQUID, CORROSIVE, ORGANIC, N.O.S.**	4.2	UN3185	II	8	P4	A8.3
				III	8	P5	A8.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
*	**SELF-HEATING LIQUID, INORGANIC, N.O.S.**	4.2	UN3186	II		P4	A8.3
				III		P5	A8.3
*	**SELF-HEATING LIQUID, ORGANIC, N.O.S**.	4.2	UN3183	II		P4	A8.3
				III		P4	A8.3
*	**SELF-HEATING LIQUID, TOXIC, INORGANIC**,	4.2	UN3187	II	6.1	P4	A8.3
	N.O.S.			III	6.1	P5	A8.3
*	**SELF-HEATING LIQUID, TOXIC, ORGANIC,**	4.2	UN3184	II	6.1	P4	A8.3
	N.O.S.			III	6.1	P5	A8.3
*	**SELF-HEATING SOLID, CORROSIVE, INORGANIC**,	4.2	UN3192	II	8	P5	A8.4
	N.O.S.			III	8	P5	A8.4
*	**SELF-HEATING SOLID, CORROSIVE, ORGANIC**,	4.2	UN3126	II	8	P5	A8.4
	N.O.S.			III	8	P5	A8.4
*	**SELF-HEATING SOLID, INORGANIC, N.O.S.**	4.2	UN3190	II		P5	A8.4
				III		P5	A8.4
*	**SELF-HEATING SOLID, ORGANIC, N.O.S.**	4.2	UN3088	II		P5	A8.4
				III		P5	A8.4
*	**SELF-HEATING SOLID, OXIDIZING, N.O.S.**	4.2	UN3127		5.1	P3	A8.6
*	**SELF-HEATING SOLID, TOXIC, INORGANIC,**	4.2	UN3191	II	6.1	P5	A8.4
	N.O.S.			III	6.1	P5	A8.4
*	**SELF-HEATING SOLID, TOXIC, ORGANIC,**	4.2	UN3128	II	6.1	P5	A8.4
	N.O.S.			III	6.1	P5	A8.4
	Self-propelled vehicle, see **BATTERY-POWERED VEHICLE**, *etc. or* **BATTERY-POWERED EQUIPMENT**, *etc. or* **ENGINES, INTERNAL COMBUSTION,** *etc. or* **WHEELCHAIR, ELECTRIC**, *etc.*						
*	**SELF-REACTIVE LIQUID TYPE B**	FORBIDDEN					FORBIDDEN
*	**SELF-REACTIVE LIQUID TYPE C** *(specific technical name required)*	4.1	UN3223	II		P5	A8.8
*	**SELF-REACTIVE LIQUID TYPE D** *(specific technical name required)*	4.1	UN3225	II		P5	A8.8
*	**SELF-REACTIVE LIQUID TYPE E** *(specific technical name required)*	4.1	UN3227	II		P5	A8.8
*	**SELF-REACTIVE LIQUID TYPE F** *(specific technical name required)*	4.1	UN3229	II		P5	A8.8
*	**SELF-REACTIVE LIQUID TYPE B, TEMPERATURE CONTROLLED** *(specific technical name required)*	FORBIDDEN					FORBIDDEN

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
*	**SELF-REACTIVE LIQUID TYPE C TEMPERATURE CONTROLLED** *(specific technical name required)*	FORBIDDEN					FORBIDDEN
*	**SELF-REACTIVE LIQUID TYPE D, TEMPERATURE CONTROLLED** *(specific technical name required)*	FORBIDDEN					FORBIDDEN
*	**SELF-REACTIVE LIQUID TYPE E, TEMPERATURE CONTROLLED** *(specific technical name required)*	FORBIDDEN					FORBIDDEN
*	**SELF-REACTIVE LIQUID TYPE F, TEMPERATURE CONTROLLED** *(specific technical name required)*	FORBIDDEN					FORBIDDEN
*	**SELF-REACTIVE SOLID TYPE B** *(see below for specific technical name)*	4.1	UN3222	II		P5, 53	(see technical name below for packaging paragraph reference)
	2-diazo-1-naphthol-4-sulphochloride						A8.10
	2-diazo-1-naphthol-5-sulphochloride						A8.10
*	**SELF-REACTIVE SOLID TYPE C** *(see below for specific technical name)*	4.1	UN3224	II		P5	(see technical name below for packaging paragraph reference)
	n,n'-dinitroso-n,n'-dimethylterephthalamide, 72% or less as a paste						A8.7
	n,n'-dinitrosopentamethylenetetramine, 82% or less with phlegmatizer						A8.8
*	**SELF-REACTIVE SOLID TYPE D** *(see below for specific technical name)*	4.1	UN3226	II		P5	(see technical name below for packaging paragraph reference)
	1,1'-azodi-(hexahydrobenzonitrile)						A8.8
	benzene-1,3-disulphohydrazide, not more than 52% as a paste						A8.8
	benzene sulphohydrazide						A8.8
	4-(benzyl(ethyl)amino)-	FORBIDDEN					FORBIDDEN

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	3-ethoxybenzenediazonium zinc chloride						
	3-chloro-4-diethylamino-benzenediazonium zinc chloride						A8.9
	diphenyloxide-4,4'-disulphohydrazide						A8.7
	4-dipropylaminobenzenediazonium zinc chloride						A8.9
	sodium 2-diazo-1-naphthol-4-sulphonate						A8.9
	sodium 2-diazo-1-naphthol-5-sulphonate						A8.9
*	**SELF-REACTIVE SOLID TYPE E,** *(specific technical name required)*	4.1	UN3228	II		P5	A8.9
*	**SELF-REACTIVE SOLID TYPE F** *(specific technical name required)*	4.1	UN3230	II		P5	A8.9
*	**SELF-REACTIVE SOLID TYPE B, TEMPERATURE CONTROLLED** *(specific technical name required)*	FORBIDDEN					FORBIDDEN
*	**SELF-REACTIVE SOLID TYPE C, TEMPERATURE CONTROLLED** *(specific technical name required)*	FORBIDDEN					FORBIDDEN
*	**SELF-REACTIVE SOLID TYPE D, TEMPERATURE CONTROLLED** *(specific technical name required)*	FORBIDDEN					FORBIDDEN
*	**SELF-REACTIVE SOLID TYPE E, TEMPERATURE CONTROLLED** *(specific technical name required)*	FORBIDDEN					FORBIDDEN
*	**SELF-REACTIVE SOLID TYPE F, TEMPERATURE CONTROLLED** *(specific technical name required)*	FORBIDDEN					FORBIDDEN
	SHALE OIL	3	UN1288	I		P3	A7.3
				II		P5	A7.3
				III		P5	A7.3
	SIGNAL DEVICES, HAND	1.4G	UN0191	II		P5	A5.77
	SIGNAL DEVICES, HAND	1.4S	UN0373	II		P5	A5.77
	SIGNALS, DISTRESS, *ship*	1.1G	UN0194	II		P4	A5.77
	SIGNALS, DISTRESS, *ship*	1.3G	UN0195	II		P4	A5.77
	Signals, highway, see **SIGNAL DEVICES, HAND;** *or* **FIREWORKS**						
	SIGNALS, RAILWAY TRACK, EXPLOSIVE	1.1G	UN0192	II		P4	A5.78
	SIGNALS, RAILWAY TRACK, EXPLOSIVE	1.3G	UN0492	II		P4	A5.78

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	SIGNALS, RAILWAY TRACK, EXPLOSIVE	1.4G	UN0493	II		P5	A5.78
	SIGNALS, RAILWAY TRACK, EXPLOSIVE	1.4S	UN0193	II		P5	A5.78
	Signals, ship distress, water-activated; see **CONTRIVANCES, WATER-ACTIVATED**, *etc*						
	SIGNALS, SMOKE	1.1G	UN0196	II		P4	A5.77
	SIGNALS, SMOKE	1.2G	UN0313	II		P4	A5.77
	SIGNALS, SMOKE	1.4G	UN0197	II		P5	A5.77
	SIGNALS, SMOKE	1.3G	UN0487	II		P4	A5.77
	SILANE	2.1	UN2203			P4	A6.6
	SILICON POWDER, AMORPHOUS	4.1	UN1346	III		P5, A1	A8.4
	SILICON TETRACHLORIDE	8	UN1818	II		P5, A3, A6	A12.3
	SILICON TETRAFLUORIDE	2.3	UN1859		8	P2, 2	A6.6
	SILVER ARSENITE	6.1	UN1683	II		P5	A10.6
	Silver azide (dry)	FORBIDDEN					FORBIDDEN
	Silver chlorite (dry)	FORBIDDEN					FORBIDDEN
	SILVER CYANIDE	6.1	UN1684	II		P5	A10.6
	Silver fulminate (dry)	FORBIDDEN					FORBIDDEN
	SILVER NITRATE	5.1	UN1493	II		P5	A9.8
	Silver picrate (dry)	FORBIDDEN					FORBIDDEN
	SILVER PICRATE, WETTED, *with not less than 30% water, by mass*	4.1	UN1347	I		P3	A8.4
	SLUDGE, ACID	8	UN1906	II		P5, A3, A7, N34	A12.3
D	**SMOKELESS POWDER FOR SMALL ARMS** *(100 pounds or less)*	4.1	NA3178	I		P4	A8.18
	SODA LIME *with more than 4% sodium hydroxide*	8	UN1907	III		P5	A12.4
	SODIUM	4.3	UN1428	I		P3, A7, A8, A19, A20, N34	A8.4
	SODIUM ALUMINATE, SOLID	8	UN2812	III		P5	A12.4
	SODIUM ALUMINATE, SOLUTION	8	UN1819	II		P5	A12.3
				III		P5	A12.3
	SODIUM ALUMINUM HYDRIDE	4.3	UN2835	II		P5, A8, A19, A20	A8.4
	SODIUM AMMONIUM VANADATE	6.1	UN2863	II		P5	A10.6
	SODIUM ARSANILATE	6.1	UN2473	III		P5	A10.6
	SODIUM ARSENATE	6.1	UN1685	II		P5	A10.6

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	SODIUM ARSENITE, AQUEOUS SOLUTIONS	6.1	UN1686	II		P5	A10.5
				III		P5	A10.5
	SODIUM ARSENITE, SOLID	6.1	UN2027	II		P5	A10.6
	SODIUM AZIDE	6.1	UN1687	II		P5	A10.6
	Sodium bifluoride, see **SODIUM HYDROGENFLUORIDE**						
	SODIUM BOROHYDRIDE	4.3	UN1426	I		P3, N40	A8.4
	SODIUM BROMATE	5.1	UN1494	II		P5	A9.8
	SODIUM CACODYLATE	6.1	UN1688	II		P5	A10.6
	SODIUM CHLORATE	5.1	UN1495	II		P5, A9, N34	A9.8
	SODIUM CHLORATE, AQUEOUS SOLUTION	5.1	UN2428	II		P5, A2	A9.7
	SODIUM CHLORITE	5.1	UN1496	II		P5, A9, N34	A9.8
	SODIUM CHLOROACETATE	6.1	UN2659	III		P5	A10.6
	SODIUM CUPROCYANIDE, SOLID	6.1	UN2316	I		P5	A10.6
	SODIUM CUPROCYANIDE, SOLUTION	6.1	UN2317	I		P3	A10.5
	SODIUM CYANIDE	6.1	UN1689	I		P5, N74, N75	A10.6
	sodium 2-diazo-1-naphthol-4-sulphonate, see **SELF-REACTIVE SOLID TYPE D**						
	sodium 2-diazo-1-naphthol-5-sulphonate, see **SELF-REACTIVE SOLID TYPE D**						
	Sodium dichloroisocyanurate or sodium dichloro-s-triazinetrione, *see* **DICHLOROISOCYANURIC ACID,** *etc.*						
	SODIUM DINITRO-O-CRESOLATE, *dry or wetted, with less than 15% water, by mass*	1.3C	UN0234	II		P4	A5.8
	SODIUM DINITRO-O-CRESOLATE, WETTED, *with not less than 15% water, by mass*	4.1	UN1348	I	6.1	P4, 23, A8, A19, A20,N41	A8.4
	SODIUM DITHIONITE *or* **SODIUM HYDROSULFITE**	4.2	UN1384	II		P5, A19, A20	A8.4
	SODIUM FLUORIDE	6.1	UN1690	III		P5	A10.6
	SODIUM FLUOROACETATE	6.1	UN2629	I		P5	A10.6
	SODIUM FLUOROSILICATE	6.1	UN2674	III		P5	A10.6
	Sodium hydrate solution; see **SODIUM HYDROXIDE SOLUTION**						
	SODIUM HYDRIDE	4.3	UN1427	I		P3, A19, N40	A8.4
	SODIUM HYDROGENDIFLUORIDE, *solid or solution*	8	UN2439	II		P5, N3, N34	A12.3, A12.4
D	**SODIUM HYDROSULPHIDE, SOLUTION**	8	NA2922	II	6.1	P5	A12.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	SODIUM HYDROSULPHIDE, *with less than 25% water of crystallization*	4.2	UN2318	II		P5, A7, A19, A20	A8.4
	SODIUM HYDROSULPHIDE, *with not less than 25% water of crystallization*	8	UN2949	II		P5, A7	A12.4
	SODIUM HYDROSULFITE; *see* **SODIUM DITHIONITE**						
	SODIUM HYDROXIDE, SOLID	8	UN1823	II		P5	A12.4
	SODIUM HYDROXIDE, SOLUTION	8	UN1824	II		P5, N34	A12.3
				III		P5, N34	A12.3
	Sodium hypochlorite, solution; see **HYPOCHLORITE SOLUTIONS**, *etc.*						
	Sodium metal, liquid alloy; *see* **ALKALI METAL ALLOYS, LIQUID, N.O.S.**						
	SODIUM METHYLATE	4.2	UN1431	II	8	P5, A19	A8.4
	SODIUM METHYLATE SOLUTIONS *in alcohol*	3	UN1289	II	8	P5	A7.3
				III	8	P5	A7.3
	SODIUM MONOXIDE	8	UN1825	II		P5	A12.4
	SODIUM NITRATE	5.1	UN1498	III		P5, A1, A29	A9.8
	SODIUM NITRATE AND POTASSIUM NITRATE MIXTURES	5.1	UN1499	III		P5, A1, A29	A9.8
	SODIUM NITRITE	5.1	UN1500	III		P5, A1, A29	A9.8
	SODIUM PENTACHLOROPHENATE	6.1	UN2567	II		P5	A10.6
	SODIUM PERCARBONATES	5.1	UN2467	III		P5, 27, A1, A29	A9.8
	SODIUM PERCHLORATE	5.1	UN1502	II		P5	A9.8
	SODIUM PERMANGANATE	5.1	UN1503	II		P5	A9.8
	SODIUM PEROXIDE	5.1	UN1504	I		P3, A20, N34	A9.8
	SODIUM PEROXOBORATE, ANHYDROUS	5.1	UN3247	II		P5	A9.8
	SODIUM PERSULPHATE	5.1	UN1505	III		P5, A1	A9.8
	SODIUM PHOSPHIDE	4.3	UN1432	I	6.1	P3, A19, N40	A8.4
	SODIUM PICRAMATE, *dry or wetted, with less than 20% water, by mass*	1.3C	UN0235	II		P3	A5.8
	SODIUM PICRAMATE, WETTED, *with not less than 20% water, by mass*	4.1	UN1349	I		P4, 23, A8, A19, N41	A8.4
	Sodium picryl peroxide	FORBIDDEN					FORBIDDEN
	SODIUM SALTS OF AROMATIC NITRO DERIVATIVES, N.O.S. *explosive*	1.3C	UN0203	II		P3	A5.69

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	Sodium selenate; see **SELENATES** *or* **SELENITES**						
D	**SODIUM SELENITE**	6.1	NA2630	II		P5	A10.6
	SODIUM SULPHIDE, ANHYDROUS *or* **SODIUM SULPHIDE** *with less than 30% water of crystallization*	4.2	UN1385	II		P5, A19, A20, N34	A8.4
	SODIUM SULPHIDE, HYDRATED *with at least 30% water*	8	UN1849	II		P5	A12.4
	SODIUM SUPEROXIDE	5.1	UN2547	I		P5, A20, N34	A9.8
	Sodium tetranitride	FORBIDDEN					FORBIDDEN
*	**SOLIDS CONTAINING CORROSIVE LIQUID, N.O.S.**	8	UN3244	II		P5	A12.4
*	**SOLIDS CONTAINING FLAMMABLE LIQUID, N.O.S.**	4.1	UN3175	II		P5	A8.4
*	**SOLIDS CONTAINING TOXIC LIQUID, N.O.S.**	6.1	UN3243	II		P5	A10.6
	SOUNDING DEVICES, EXPLOSIVE	1.2F	UN0204	II		P4	A5.79
	SOUNDING DEVICES, EXPLOSIVE	1.1F	UN0296	II		P4	A5.79
	SOUNDING DEVICES, EXPLOSIVE	1.1D	UN0374	II		P4	A5.79
	SOUNDING DEVICES, EXPLOSIVE	1.2D	UN0375	II		P4	A5.79
	STANNIC CHLORIDE, ANHYDROUS	8	UN1827	II		P5	A12.3
	STANNIC CHLORIDE, PENTAHYDRATE	8	UN2440	III		P5	A12.4
	STANNIC PHOSPHIDES	4.3	UN1433	I	6.1	P3, A19, N40	A8.4
	Steel swarf, see **FERROUS METAL**, *etc.*						
	STIBINE	2.3	UN2676		2.1	P1, 1	A6.5
	Storage batteries, wet, see **BATTERIES, WET,** *etc.*						
	STRONTIUM ARSENITE	6.1	UN1691	II		P5	A10.6
	STRONTIUM CHLORATE	5.1	UN1506	II		P5, A1, A9, N34	A9.8
	STRONTIUM NITRATE	5.1	UN1507	III		P5, A1, A29	A9.8
	STRONTIUM PERCHLORATE	5.1	UN1508	II		P5	A9.8
	STRONTIUM PEROXIDE	5.1	UN1509	II		P5	A9.8
	STRONTIUM PHOSPHIDE	4.3	UN2013	I	6.1	P3, A19, N40	A8.4
	STRYCHNINE *or* **STRYCHNINE SALTS**	6.1	UN1692	I		P5	A10.6
	STYPHNIC ACID, *see* **TRINITRORESORCINOL,** *etc.*						
	STYRENE MONOMER, INHIBITED	3	UN2055	III		P5	A7.3
*	**SUBSTANCES, EXPLOSIVE, N.O.S.**	1.1L	UN0357	II		P3, 101	A5.11
*	**SUBSTANCES, EXPLOSIVE, N.O.S.**	1.2L	UN0358	II		P3, 101	A5.11
*	**SUBSTANCES, EXPLOSIVE, N.O.S.**	1.3L	UN0359	II		P3, 101	A5.11
*	**SUBSTANCES, EXPLOSIVE, N.O.S.**	1.1A	UN0473	II		P3, 101, 111	A5.11

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
*	**SUBSTANCES, EXPLOSIVE, N.O.S.**	1.1C	UN0474	II		P4, 101	A5.11
*	**SUBSTANCES, EXPLOSIVE, N.O.S.**	1.1D	UN0475	II		P4, 101	A5.11
*	**SUBSTANCES, EXPLOSIVE, N.O.S**.	1.1G	UN0476	II		P4, 101	A5.11
*	**SUBSTANCES, EXPLOSIVE, N.O.S.**	1.3C	UN0477	II		P4, 101	A5.11
*	**SUBSTANCES, EXPLOSIVE, N.O.S.**	1.3G	UN0478	II		P4, 101	A5.11
*	**SUBSTANCES, EXPLOSIVE, N.O.S.**	1.4C	UN0479	II		P5, 101	A5.11
*	**SUBSTANCES, EXPLOSIVE, N.O.S.**	1.4D	UN0480	II		P5, 101	A5.11
*	**SUBSTANCES, EXPLOSIVE, N.O.S.**	1.4S	UN0481	II		P5, 101	A5.11
*	**SUBSTANCES, EXPLOSIVE, N.O.S.**	1.4G	UN0485	II		P5, 101	A5.11
*	**SUBSTANCES, EXPLOSIVE, VERY INSENSITIVE, N.O.S.** *or* **SUBSTANCES EVI, N.O.S.**	1.5D	UN0482	II		P5, 101	A5.11
	Substances which in contact with water emit flammable gases, see **WATER-REACTIVE**, *etc.*						
*	**SUBSTITUTED NITROPHENOL PESTICIDES, LIQUID, FLAMMABLE, TOXIC** *flashpoint less than 23 degrees C*	3	UN2780	I	6.1	P3	A7.3
				II	6.1	P4	A7.3
*	**SUBSTITUTED NITROPHENOL PESTICIDES, LIQUID, TOXIC**	6.1	UN3014	I		P3	A10.5
				II		P4	A10.5
				III		P5	A10.5
*	**SUBSTITUTED NITROPHENOL PESTICIDES, LIQUID, TOXIC, FLAMMABLE** *flashpoint not less than 23 degrees C*	6.1	UN3013	I	3	P3	A10.5
				II	3	P4	A10.5
				III	3	P5	A10.5
*	**SUBSTITUTED NITROPHENOL PESTICIDES, SOLID, TOXIC**	6.1	UN2779	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6
	Sucrose octanitrate (dry)	FORBIDDEN					FORBIDDEN
	SULPHAMIC ACID	8	UN2967	III		P5	A12.4
	SULPHUR	4.1	UN1350	III		P5, A1	A8.4
	Sulphur and chlorate, loose mixtures of	FORBIDDEN					FORBIDDEN
	SULPHUR CHLORIDES	8	UN1828	I		P2, 2, A3, N34	A12.3
	Sulphur dichloride, see **SULPHUR CHLORIDES**						
	SULPHUR DIOXIDE, LIQUEFIED	2.3	UN1079		8	P2, 3	A6.5

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	Sulphur dioxide solution, see **SULPHUROUS ACID**						
	Sulphuretted hydrogen, see **HYDROGEN SULPHIDE, LIQUEFIED**						
	SULPHUR HEXAFLUORIDE	2.2	UN1080			P5	A6.3, A6.5
	SULPHURIC ACID *with more than 51% acid*	8	UN1830	II		P4, A3, A7, N34	A12.3
	SULPHURIC ACID, *not more than 51% acid*	8	UN2796	II		P5, A3, A7 N6, N34	A12.3
+	**SULPHURIC ACID, FUMING** *with less than 30% free sulfur trioxide*	8	UN1831	I		P3, A3, A7, N34	A12.12
	SULPHURIC ACID, FUMING *with 30% or more free sulfur trioxide*	FORBIDDEN					FORBIDDEN
	SULPHURIC ACID, SPENT	8	UN1832	II		P4, A3, A7, N34	A12.3
	Sulphuric anhydride, see **SULFUR TRIOXIDE, INHIBITED**						
	SULPHUR, MOLTEN	FORBIDDEN					FORBIDDEN
	SULPHUROUS ACID	8	UN1833	II		P5	A12.3
	SULPHUR TETRAFLUORIDE	2.3	UN2418		8	P1, 1	A6.6
	SULPHUR TRIOXIDE, INHIBITED	8	UN1829	I	6.1	P2, 2, A7, N34	A12.12
+, D	**SULPHUR TRIOXIDE, UNINHIBITED**	8	NA1829	I	6.1	P2, 2, A7, N34	A10.7
+	**SULPHURYL CHLORIDE**	8	UN1834	I	6.1	P1, 1, A3, N34	A12.12
	SULPHURYL FLUORIDE	2.3	UN2191			P2, 4	A6.5
	TARS, LIQUID, *including road asphalt and*	3	UN1999	II		P5	A7.3
	oils, bitumen and cut backs			III		P5	A7.3
	TEAR GAS CANDLES	6.1	UN1700	II	4.1	P4	A10.8
	Tear gas cartridges, see **AMMUNITION, TEAR-PRODUCING,** *etc*						
D	**TEAR GAS DEVICES**, *with more than 2%*	6.1	NA1693	I		P4	A10.8
	tear gas substance, by mass			II		P4	A10.8
	Tear gas devices, containing tear gas substances, see **AEROSOLS,** *etc.*						
	Tear gas grenades, see **TEAR GAS CANDLES**						

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
*	**TEAR GAS SUBSTANCES LIQUID, N.O.S.**	6.1	UN1693	I		P3	A10.5
				II		P5	A10.5
*	**TEAR GAS SUBSTANCES, SOLID, N.O.S.**	6.1	UN1693	I		P5	A10.6
				II		P5	A10.6
	TELLURIUM COMPOUND, N.O.S.	6.1	UN3284	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6
	TELLURIUM HEXAFLUORIDE	2.3	UN2195		8	P1, 1	A6.6
	TERPENE HYDROCARBONS, N.O.S.	3	UN2319	III		P5	A7.3
	TERPINOLENE	3	UN2541	III		P5	A7.3
	Tetraazido benzene quinone	FORBIDDEN					FORBIDDEN
	TETRABROMOETHANE	6.1	UN2504	III		P5	A10.5
	TETRACHLOROETHANE	6.1	UN1702	II		P5, N36	A10.5
	TETRACHLOROETHYLENE	6.1	UN1897	III		P5, N36	A10.5
	Tetraethylammonium perchlorate (dry)	FORBIDDEN					FORBIDDEN
	TETRAETHYL DITHIOPYROPHOSPHATE	6.1	UN1704	II		P5	A10.6
	TETRAETYLENEPENTAMINE	8	UN2320	III		P5	A12.3
D	**TETRAETHYL LEAD, LIQUID**	6.1	NA1649	I	3	P3	A10.5
D	**TETRAETHYL PYROPHOSPHATE** *(liquid)*	6.1	NA3018	I		P3	A10.5
D	**TETRAETHYL PYROPHOSPHATE** *(solid)*	6.1	NA2783	I		P5, N77	A10.6
	TETRAETHYL SILICATE	3	UN1292	III		P5	A7.3
	1,1,1,2-TETRAFLUOROETHANE *(R134a)*	2.2	UN3159			P5	A6.3, A6.5
	TETRAFLUOROETHYLENE, INHIBITED	2.1	UN1081			P4	A6.3, A6.5
	TETRAFLUOROMETHANE *(R14)*	2.2	UN1982			P5	A6.6
	1,2,3,6-TETRAHYDROBENZALDEHYDE	3	UN2498	III		P5	A7.3
	TETRAHYDROFURAN	3	UN2056	II		P5	A7.3
	TETRAHYDROFURFURYLAMINE	3	UN2943	III		P5	A7.3
	TETRAHYDROPHTHALIC ANHYDRIDES *with more than 0.05% of maleic anhydride*	8	UN2698	III		P5	A12.4
	1,2,3,6-TETRAHYDROPYRIDINE	3	UN2410	II		P5	A7.3
	TETRAHYDROTHIOPHENE	3	UN2412	II		P5	A7.3
	TETRAMETHYLAMMONIUM HYDROXIDE	8	UN1835	II		P5	A12.3
	Tetramethylene diperoxide dicarbamide	FORBIDDEN					FORBIDDEN
	TETRAMETHYLSILANE	3	UN2749	I		P3	A7.3
	TETRANITROANILINE	1.1D	UN0207	II		P4	A5.8

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	Tetranitro diglycerin	FORBIDDEN					FORBIDDEN
+	**TETRANITROMETHANE**	FORBIDDEN					FORBIDDEN
	2,3,4,6-Tetranitrophenol	FORBIDDEN					FORBIDDEN
	2,3,4,6-Tetranitrophenyl methyl nitramine	FORBIDDEN					FORBIDDEN
	2,3,4,6-Tetranitrophenylnitramine	FORBIDDEN					FORBIDDEN
	Tetranitroresorcinol (dry)	FORBIDDEN					FORBIDDEN
	2,3,5,6-Tetranitroso-1,4-dinitrobenzene	FORBIDDEN					FORBIDDEN
	2,3,5,6-Tetranitroso nitrobenzene (dry)	FORBIDDEN					FORBIDDEN
	TETRAPROPYL ORTHOTITANATE	3	UN2413	III		P5	A7.3
	TETRAZENE, *see* **GUANYL NITROSAMINOGUANYLTETRAZENE,** *wetted, etc.*						
	Tetrazine	FORBIDDEN					FORBIDDEN
	Tetrazolyl azide (dry)	FORBIDDEN					FORBIDDEN
	TETRAZOL-1-ACETIC ACID	1.4C	UN0407	II		P5	A5.43
	TETRYL, *see* **TRINITROPHENYLMETHYLNITRAMINE**						
	THALLIUM CHLORATE	5.1	UN2573	II	6.1	P5	A9.8
	THALLIUM COMPOUNDS, N.O.S.	6.1	UN1707	II		P5	A10.6
	THALLIUM NITRATE	6.1	UN2727	II	5.1	P5	A10.6
D	**THALLIUM SULPHATE, SOLID**	6.1	NA1707	II		P5	A10.6
	4-THIAPENTANAL	6.1	UN2785	III		P5	A10.5
	THIOACETIC ACID	3	UN2436	II		P5	A7.3
	Thiocarbonylchloride, see **THIOPHOSGENE**						
	THIOGLYCOL	6.1	UN2966	II		P5	A10.5
	THIOGLYCOLIC ACID	8	UN1940	II		P5, A7, N34	A12.3
	THIOLACTIC ACID	6.1	UN2936	II		P5	A10.6
	THIONYL CHLORIDE	8	UN1836	I		P3, A7, N34	A12.3
	THIOPHENE	3	UN2414	II		P5	A7.3
+	**THIOPHOSGENE**	6.1	UN2474	II		P2, 2, A7, N33, N34	A10.7
	THIOPHOSPHORYL CHLORIDE	8	UN1837	II		P4, A3, A7, N34	A12.3
	THORIUM METAL, PYROPHORIC	7	UN2975		4.2	P3, P4, P5	A11.9
	THORIUM NITRATE, SOLID	7	UN2976		5.1	P3, P4, P5	A11.10
	Tin chloride, fuming, see **STANNIC CHLORIDE, ANHYDROUS**						
	TINCTURES, MEDICINAL	3	UN1293	II		P5	A7.3
				III		P5	A7.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	Tinning flux, see **ZINC CHLORIDE, ANHYDOUS**						
	Tin perchloride or Tin tetrachloride, see **STANNIC CHLORIDE, ANHYDROUS**						
	TITANIUM DISULPHIDE	4.2	UN3174	III		P5	A8.4
	TITANIUM HYDRIDE	4.1	UN1871	II		P5, A19, A20, N34	A8.4
+	**TITANIUM POWDER, DRY**	4.2	UN2546	I		P3, A19, A20, N5, N34	A8.4
				II		P5, A19, A20, N5, N34	A8.4
				III		P5	A8.4
	TITANIUM POWDER, WETTED, *with not less than 25% water (a visible excess of water must be present) (a) mechanically produced, particle size less than 53 microns; (b) chemically produced, particle size less than 840 microns)*	4.1	UN1352	II		P5, A19, A20, N34	A8.4
	TITANIUM SPONGE GRANULES *or* **TITANIUM SPONGE POWDERS**	4.1	UN2878	III		P5, A1	A8.4
D	**TITANIUM SULPHATE SOLUTION**	8	NA1760	II		P5	A12.3
	TITANIUM TETRACHLORIDE	8	UN1838	II	6.1	P2, 2, A3, A6	A12.12
	TITANIUM TRICHLORIDE MIXTURES	8	UN2869	II		P5, A7, N34	A12.4
				III		P5, A7, N34	A12.4
	TITANIUM TRICHLORIDE, PYROPHORIC, *or* **TITANIUM TRICHLORIDEMIXTURES, PYROPHORIC**	4.2	UN2441	I	8	P3, A7,A8, A19, A20, N34	A8.6
	(TNT mixed with aluminium), see **TRITONAL**						
	TNT, *see* **TRINITROTOLUENE**, *etc.*						
	TOLUENE	3	UN1294	II		P5	A7.3
	TOLUENE DIISOCYANATE	6.1	UN2078	II		P5	A10.5
	TOLUIDINES, LIQUID *or* **SOLID**	6.1	UN1708	II		P5	A10.5, A10.6
	2,4-TOLUYLENEDIAMINE	6.1	UN1709	III		P5	A10.6
	TORPEDOES, LIQUID FUELED, *with inert head*	1.3J	UN0450	II		P3	A5.80
	TORPEDOES, LIQUID FUELED, *with or without bursting charge*	1.1J	UN0449	II		P3	A5.80
	TORPEDOES, *with bursting charge*	1.1E	UN0329	II		P4	A5.80

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	TORPEDOES, *with bursting charge*	1.1F	UN0330	II		P4	A5.80
	TORPEDOES, *with bursting charge*	1.1D	UN0451	II		P4	A5.80
*	**TOXIC LIQUID, CORROSIVE, INORGANIC, N.O.S.**	6.1	UN3289	I	8	P3	A10.5
				II	8	P4	A10.5
*	**TOXIC LIQUID, CORROSIVE, INORGANIC, N.O.S.,** *Inhalation Hazard, Packing Group I, Zone A*	6.1	UN3289	I	8	P1, 1	A10.7
*	**TOXIC LIQUID, CORROSIVE, INORGANIC, N.O.S.,** *Inhalation Hazard, Packing Group I, Zone B*	6.1	UN3289	I	8	P2, 2	A10.7
*	**TOXIC LIQUIDS, CORROSIVE, ORGANIC, N.O.S.**	6.1	UN2927	I	8	P3	A10.5
				II	8	P4	A10.5
*	**TOXIC LIQUIDS, CORROSIVE, ORGANIC,N.O.S.,** *Inhalation Hazard Packing Group I, Zone A*	6.1	UN2927	I	8	P1, 1	A10.7
*	**TOXIC LIQUIDS, CORROSIVE, ORGANIC, N.O.S.,** *Inhalation Hazard Packing Group I, Zone B*	6.1	UN2927	I	8	P2, 2	A10.7
*	**TOXIC LIQUIDS, FLAMMABLE, ORGANIC, N.O.S.**	6.1	UN2929	I	3	P3	A10.5
				II	3	P4	A10.5
*	**TOXIC LIQUIDS, FLAMMABLE, ORGANIC, N.O.S.,** *Inhalation Hazard Packing Group I, Zone A*	6.1	UN2929	I	3	P1, 1	A10.7
*	**TOXIC LIQUIDS, FLAMMABLE, ORGANIC, N.O.S.,** *Inhalation Hazard, Packing Group I, Zone B*	6.1	UN2929	I	3	P2, 2	A10.7
*	**TOXIC LIQUID, INORGANIC, N.O.S.**	6.1	UN3287	I		P3	A10.5
				II		P4	A10.5
				III		P5	A10.5
*	**TOXIC LIQUID, INORGANIC, N.O.S.,** *Inhalation Hazard, Packing Group I, Zone A*	6.1	UN3287	I		P1, 1	A10.7
*	**TOXIC LIQUID, INORGANIC, N.O.S.,** *Inhalation Hazard, Packing Group I, Zone B*	6.1	UN3287	I		P2, 2	A10.7
*	**TOXIC LIQUIDS, ORGANIC, N.O.S.**	6.1	UN2810	I		P3	A10.5
				II		P4	A10.5
				III		P5	A10.5
*	**TOXIC LIQUIDS, ORGANIC, N.O.S.,** *Inhalation Hazard, Packing Group I, Zone A*	6.1	UN2810	I		P1, 1	A10.7
*	**TOXIC LIQUIDS, ORGANIC, N.O.S.,** *Inhalation Hazard, Packing Group I, Zone B*	6.1	UN2810	I		P2, 2	A10.7
*	**TOXIC LIQUIDS, OXIDIZING, N.O.S.**	6.1	UN3122	I	5.1	P3, A4	A10.5
				II	5.1	P4	A10.5
*	**TOXIC LIQUIDS, OXIDIZING, N.O.S.,** *Inhalation Hazard, Packing Group I, Zone A*	6.1	UN3122	I	5.1	P1, 1	A10.7

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
*	**TOXIC LIQUIDS, OXIDIZING, N.O.S.,** *Inhalation Hazard, Packing Group I, Zone B*	6.1	UN3122	I	5.1	P2, 2	A10.7
*	**TOXIC LIQUIDS, WATER-REACTIVE, N.O.S.**	6.1	UN3123	I	4.3	P3, A4	A10.5
				II	4.3	P4	A10.5
*	**TOXIC LIQUIDS, WATER-REACTIVE, N.O.S.,**, *Inhalation Hazard, Packing Group I, Zone A*	6.1	UN3123	I	4.3	P1, 1	A10.7
*	**TOXIC LIQUIDS, WATER-REACTIVE, N.O.S.,**, *Inhalation Hazard, Packing Group I, Zone B*	6.1	UN3123	I	4.3	P2, 2	A10.7
*	**TOXIC SOLID, CORROSIVE, INORGANIC, N.O.S.**	6.1	UN3290	I	8	P5	A10.6
				II	8	P5	A10.6
*	**TOXIC SOLID, INORGANIC, N.O.S.**	6.1	UN3288	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6
*	**TOXIC SOLIDS, CORROSIVE, ORGANIC, N.O.S.**	6.1	UN2928	I	8	P5	A10.6
				II	8	P5	A10.6
*	**TOXIC SOLIDS, FLAMMABLE, ORGANIC, N.O.S**.	6.1	UN2930	I	4.1	P5	A10.6
				II	4.1	P5	A10.6
*	**TOXIC SOLIDS, ORGANIC, N.O.S.**	6.1	UN2811	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6
*	**TOXIC SOLIDS, OXIDIZING, N.O.S.**	6.1	UN3086	I	5.1	P5	A10.6
				II	5.1	P5	A10.6
*	**TOXIC SOLIDS, SELF-HEATING, N.O.S.**	6.1	UN3124	I	4.2	P5, A5	A10.6
				II	4.2	P5	A10.6
*	**TOXIC SOLIDS, WATER-REACTIVE, N.O.S.**	6.1	UN3125	I	4.3	P5, A5	A10.6
				II	4.3	P5	A10.6
	TRACERS FOR AMMUNITION	1.3G	UN0212	II		P4	A5.26
	TRACERS FOR AMMUNITION	1.4G	UN0306	II		P5	A5.26
	TRIALLYLAMINE	3	UN2610	III	8	P5	A7.3
	TRIALLYL BORATE	6.1	UN2609	III		P5	A10.5
*	**TRIAZINE PESTICIDES, LIQUID, FLAMMABLE**, **TOXIC,** *flashpoint less than 23 degrees C*	3	UN2764	I	6.1	P3	A7.3
				II	6.1	P4	A7.3
*	**TRIAZINE PESTICIDES, LIQUID, TOXIC, FLAMMABLE,** *flashpoint not less than 23 degrees C*	6.1	UN2997	I	3	P3	A10.5
				II	3	P4	A10.5
				III	3	P5	A10.5

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
*	**TRIAZINE PESTICIDES, LIQUID, TOXIC**	6.1	UN2998	I		P3	A10.5
				II		P4	A10.5
				III		P5	A10.5
*	**TRIAZINE PESTICIDES, SOLID, TOXIC**	6.1	UN2763	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6
	TRIBUTYLAMINE	8	UN2542	III		P5	A12.3
	TRIBUTYLPHOSPHANE	4.2	UN3254	I		P3	A8.4
	TRICHLOROACETIC ACID	8	UN1839	II		P5, A7, N34	A12.4
	TRICHLOROACETIC ACID, SOLUTION	8	UN2564	II		P5, A3, A6, A7, N34	A12.3
				III		P5, A3, A6 A7, N34	A12.3
+	**TRICHLOROACETYL CHLORIDE**	8	UN2442	II	6.1	P2, 2, A3, A7, N34	A12.12
	TRICHLOROBENZENES, LIQUID	6.1	UN2321	III		P5	A10.5
	TRICHLOROBUTENE	6.1	UN2322	II		P5	A10.5
	1,1,1-TRICHLOROETHANE	6.1	UN2831	III		P5, N36	A10.5
	TRICHLOROETHYLENE	6.1	UN1710	III		P5, N36	A10.5
	TRICHLOROISOCYANURIC ACID, DRY	5.1	UN2468	II		P5	A9.8
	Trichloromethyl perchlorate	FORBIDDEN					FORBIDDEN
	TRICHLOROSILANE	4.3	UN1295	I	3, 8	P3, A7, N34	A8.3
D	**MONO-(TRICHLORO) TETRA-(MONOPOTASSIUM DICHLORO)-PENTA-S-TRIAZINETRIONE, DRY** *(containing over 39% available chlorine)*	5.1	NA2468	II		P5	A9.8
	Trichloro-s-triazinetrione dry, containing over 39% available chlorine, see **TRICHLOROISOCYANURIC ACID, DRY**						
	TRICRESYL PHOSPHATE *with more than 3% ortho isomer*	6.1	UN2574	II		P5, A3, N33, N34	A10.5
	TRIETHYLAMINE	3	UN1296	II	8	P4	A7.3
	TRIETHYLENETETRAMINE	8	UN2259	II		P5	A12.3
	TRIETHYL PHOSPHITE	3	UN2323	III		P5	A7.3
	TRIFLUOROACETIC ACID	8	UN2699	I		P3, A3, A6, A7, N3, N34	A12.3
	TRIFLUOROACETYL CHLORIDE	2.3	UN3057			P2, 2	A6.5
	TRIFLUOROCHLOROETHYLENE, INHIBITED *(R1113)*	2.3	UN1082			P2, 3	A6.3, A6.5

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	TRIFLUOROETHANE, COMPRESSED *(R143)*	2.1	UN2035			P4	A6.3, A6.5
	TRIFLUOROMETHANE *(R23)*	2.2	UN1984			P5	A6.3, A6.5
D	**TRIFLUOROMETHANE AND CHLOROTRIFLUORO-METHANE MIXTURE** *(constant boiling mixture) (R-503), see* **REFRIGERANT GAS, N.O.S.**						
	TRIFLUOROMETHANE, REFRIGERATED LIQUID *(cryogenic liquids)*	2.2	UN3136			P4	A6.3, A6.11
	3-TRIFLUOROMETHYLANILINE	6.1	UN2948	II		P5	A10.5
	2-TRIFLUOROMETHYLANILINE	6.1	UN2942	III		P5	A10.5
	Triformoxime trinitrate	FORBIDDEN					FORBIDDEN
	TRIISOBUTYLENE	3	UN2324	III		P5	A7.3
	TRIISOCYANATOISOCYANURATE OF ISOPHORONEDIISOCYANTE, SOLUTION, *70%, by mass*	3	UN2906	III		P5	A7.3
	TRIISOPROPYL BORATE	3	UN2616	II		P5	A7.3
				III		P5	A7.3
D	**TRIMETHOXYSILANE**	6.1	NA9269	I	3	P2, 2	A10.7
	TRIMETHYLACETYL CHLORIDE	6.1	UN2438	I	8, 3	P2, 2, A3, A6, A7, N34	A12.12
	TRIMETHYLAMINE, ANHYDROUS	2.1	UN1083			P4	A6.3, A6.5
	TRIMETHYLAMINE, AQUEOUS SOLUTIONS *not more than 50% trimethylamine, by mass*	3	UN1297	I	8	P3	A7.3
				II	8	P4	A7.3
				III	8	P5	A7.3
	1,3,5-TRIMETHYLBENZENE	3	UN2325	III		P5	A7.3
	TRIMETHYL BORATE	3	UN2416	II		P5	A7.3
	TRIMETHYLCHLOROSILANE	3	UN1298	II	8	P5, A3, A7, N34	A7.3
	TRIMETHYLCYCLOHEXYLAMINE	8	UN2326	III		P5	A12.3
	Trimethylene glycol diperchlorate	FORBIDDEN					FORBIDDEN
	TRIMETHYLHEXAMETHYLENEDIAMINES	8	UN2327	III		P5	A12.3
	TRIMETHYLHEXAMETHYLENE DIISOCYANATE	6.1	UN2328	III		P5	A10.5
	Trimethylol nitromethane trinitrate	FORBIDDEN					FORBIDDEN
	TRIMETHYL PHOSPHITE	3	UN2329	III		P5	A7.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	1,3,5-Trimethyl-2,4,6-trinitrobenzene	FORBIDDEN					FORBIDDEN
	Trinitroacetic acid	FORBIDDEN					FORBIDDEN
	Trinitroacetonitrile	FORBIDDEN					FORBIDDEN
	Trinitroamine cobalt	FORBIDDEN					FORBIDDEN
	TRINITROANILINE *or* **PICRAMIDE**	1.1D	UN0153	II		P4	A5.8
	TRINITROANISOLE	1.1D	UN0213	II		P4	A5.8
	TRINITROBENZENE, *dry or wetted, with less than 30% water, by mass*	1.1D	UN0214	II		P4	A5.8
	TRINITROBENZENESULPHONIC ACID	1.1D	UN0386	II		P4	A5.8
	TRINITROBENZENE, WETTED *with not less than 30% water, by mass*	4.1	UN1354	I		P4, 23, A2, A8, A19, N41	A8.4
	TRINITROBENZOIC ACID, *dry or wetted with less than 30% water, by mass*	1.1D	UN0215	II		P4	A5.47
	TRINITROBENZOIC ACID, WETTED *with not less than 30% water, by mass*	4.1	UN1355	I		P4, 23, A2, A8, A19, N41	A8.4
	TRINITROCHLOROBENZENE *or* **PICRYL CHLORIDE**	1.1D	UN0155	II		P4	A5.8
	TRINITRO-META-CRESOL	1.1D	UN0216	II		P4	A5.8
	2,4,6-Trinitro-1,3-diazobenzene	FORBIDDEN					FORBIDDEN
	Trinitroethanol	FORBIDDEN					FORBIDDEN
	Trinitroethylnitrate	FORBIDDEN					FORBIDDEN
	TRINITROFLUORENONE	1.1D	UN0387	II		P4	A5.8
	Trinitromethane	FORBIDDEN					FORBIDDEN
	1,3,5-Trinitronaphthalene	FORBIDDEN					FORBIDDEN
	TRINITRONAPHTHALENE	1.1D	UN0217	II		P4	A5.8
	TRINITROPHENETOLE	1.1D	UN0218	II		P4	A5.8
	TRINITROPHENOL *or* **PICRIC ACID,** *dry or wetted with less than 30% water, by mass*	1.1D	UN0154	II		P4	A5.8
	TRINITROPHENOL, WETTED *with not less than 30% water, by mass*	4.1	UN1344	I		P4, 23, A8, A19, N41	A8.4
	2,4,6-Trinitrophenyl guanidine (dry)	FORBIDDEN					FORBIDDEN
	TRINITROPHENYLMETHYLNITRAMINE *or* **TETRYL**	1.1D	UN0208	II		P4	A5.47
	2,4,6-Trinitrophenyl nitramine	FORBIDDEN					FORBIDDEN
	2,4,6-Trinitrophenyl trimethylol methyl nitramine trinitrate (dry)	FORBIDDEN					FORBIDDEN

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	TRINITRORESORCINOL *or* **STYPHNIC ACID,** *dry or wetted with less than 20% water, or mixture mixture of alcohol and water, by mass*	1.1D	UN0219	II		P4	A5.8
	TRINITRORESORCINOL WETTED *or* **STYPHNIC ACID, WETTED** *with not less than 20% water, or mixture of alcohol and water, by mass*	1.1D	UN0394	II		P4	A5.82
	2,4,6-Trinitroso-3-methyl nitraminoanisole	FORBIDDEN					FORBIDDEN
	Trinitrotetramine cobalt nitrate	FORBIDDEN					FORBIDDEN
	TRINITROTOLUENE *or* **TNT AND TRINITRO-BENZENE MIXTURES** *or* **TRINITROTOLUENE** *or* **TNT AND HEXANITROSTILBENE MIXTURES**	1.1D	UN0388	II		P4	A5.8
	TRINITROTOLUENE *or* **TNT,** *dry or wetted with less than 30% water, by mass*	1.1D	UN0209	II		P4	A5.82
	TNT MIXTURES, CONTAINING TRINITROBENZENE AND HEXANITROSTILBENE	1.1D	UN0389	II		P4	A5.8
	TRINITROTOLUENE WETTED, *with not less than 30% water, by mass*	4.1	UN1356	I		P4, 23, A2, A8, A19, N41	A8.4
	2,4,6-Trinitro-1,3,6-triazido benzene (dry)	FORBIDDEN					FORBIDDEN
	Tri-(b-nitroxyethyl) ammonium nitrate	FORBIDDEN					FORBIDDEN
	TRIPROPYLAMINE	3	UN2260	III	8	P5	A7.3
	TRIPROPYLENE	3	UN2057	II		P5	A7.3
				III		P5	A7.3
	TRIS-(1-AZIRIDINYL) PHOSPHINE OXIDE SOLUTION	6.1	UN2501	II		P5	A10.5
				III		P5	A10.5
	Tris, bis-bifluoroamino diethoxy propane	FORBIDDEN					FORBIDDEN
	TRITONAL	1.1D	UN0390	II		P4	A5.8
	TUNGSTEN HEXAFLUORIDE	FORBIDDEN					FORBIDDEN
	TURPENTINE	3	UN1299	III		P5	A7.3
	TURPENTINE SUBSTITUTE	3	UN1300	I		P3	A7.3
				II		P5	A7.3
				III		P5	A7.3
	UNDECANE	3	UN2330	III		P5	A7.3
	URANIUM HEXAFLUORIDE, FISSILE *(containing more than 1% U-235)*	7	UN2977		8	P3, P4	A11.8, A11.18
	URANIUM HEXAFLUORIDE, *fissile excepted or nonfissile*	7	UN2978		8	P3,P4, P5	A11.11, A11.18

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	URANIUM METAL, PYROPHORIC	7	UN2979		4.2	P3, P4, P5	A11.9
	URANYL NITRATE HEXAHYDRATE SOLUTION	7	UN2980		8	P3, P4, P5	A11.6, A11.7, A11.8
	URANYL NITRATE, SOLID	7	UN2981		5.1	P3, P4, P5	A11.10
	UREA HYDROGEN PEROXIDE	5.1	UN1511	III	8	P5, A1, A7, A29	A9.8
	UREA NITRATE, *dry or wetted with less than 20% water, by mass*	1.1D	UN0220	II		P4	A5.8
	UREA NITRATE, WETTED *with not less than 20% water, by mass*	4.1	UN1357	I		P4, A8, A19, N41	A8.4
	Urea peroxide, see **UREA HYDROGEN PEROXIDE**						
	VALERALDEHYDE	3	UN2058	II		P5	A7.3
	Valeric acid, see **CORROSIVE LIQUID, N.O.S**.						
	VALERYL CHLORIDE	8	UN2502	II	3	P5, A3, A6, A7, N34	A12.3
	VANADIUM COMPOUND, N.O.S.	6.1	UN3285	I		P5	A10.6
				II		P5	A10.6
				III		P5	A10.6
	VANADIUM OXYTRICHLORIDE	8	UN2443	II		P5, A3, A6, A7, N34	A12.3
	VANADIUM PENTOXIDE, *nonfused form*	6.1	UN2862	II		P5	A10.6
	VANADIUM TETRACHLORIDE	8	UN2444	I		P3, A3, A6, A7, N34	A12.3
	VANADIUM TRICHLORIDE	8	UN2475	III		P5	A12.4
	VANADYL SULPHATE	6.1	UN2931	II		P5	A10.6
	Vehicles, self-propelled see **ENGINES, INTERNAL COMBUSTION** *or* **BATTERY POWERED EQUIPMENT**, *etc or* **BATTERY POWERED VEHICLE,** *etc or* **WHEELCHAIR, ELECTRIC**						
	Very signal cartridge, see **CARTRIDGES, SIGNAL**						
	VINYL ACETATE, INHIBITED	3	UN1301	II		P5	A7.3
	VINYL BROMIDE, INHIBITED	2.1	UN1085			P4	A6.3, A6.5
	VINYL BUTYRATE, INHIBITED	3	UN2838	II		P5	A7.3
	VINYL CHLORIDE, INHIBITED *or* **VINYL CHLORIDE, STABILIZED**	2.1	UN1086			P4	A6.3, A6.5
	VINYL CHLOROACETATE	6.1	UN2589	II	3	P5	A10.5
	VINYL ETHYL ETHER, INHIBITED	3	UN1302	I		P3, A3	A7.3

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	VINYL FLUORIDE, INHIBITED	2.1	UN1860			P4	A6.3, A6.5
	VINYLIDENE CHLORIDE, INHIBITED	3	UN1303	I		P3	A7.3
	VINYL ISOBUTYL ETHER, INHIBITED	3	UN1304	II		P5	A7.3
	VINYL METHYL ETHER, INHIBITED	2.1	UN1087			P4	A6.3, A6.5
	Vinyl nitrate polymer	FORBIDDEN					FORBIDDEN
	VINYLPYRIDINES, INHIBITED	6.1	UN3073	II	3	P5	A10.5
	VINYL TOLUENE, INHIBITED *mixed isomers*	3	UN2618	III		P5	A7.3
	VINYLTRICHLOROSILANE	3	UN1305	I	8	P3, A3, A7, N34	A7.3
	WARHEADS,ROCKET *with burster or expelling charge*	1.4D	UN0370	II		P5	A5.10
	WARHEADS, ROCKET *with burster or expelling charge*	1.4F	UN0371	II		P5	A5.10
	WARHEADS, ROCKET *with bursting charge*	1.1D	UN0286	II		P4	A5.10
	WARHEADS, ROCKET *with bursting charge*	1.2D	UN0287	II		P4	A5.10
	WARHEADS, ROCKET *with bursting charge*	1.1F	UN0369	II		P4	A5.10
	WARHEADS, TORPEDO *with bursting charge*	1.1D	UN0221	II		P4	A5.10
*	**WATER-REACTIVE LIQUID, N.O.S**.	4.3	UN3148	I		P3	A8.3
				II		P5	A8.3
				III		P5	A8.3
*	**WATER-REACTIVE LIQUID**,	4.3	UN3129	I	8	P3	A8.3
	CORROSIVE, N.O.S.			II	8	P4	A8.3
				III	8	P5	A8.3
*	**WATER-REACTIVE LIQUID,**	4.3	UN3130	I	6.1	P3, A4	A8.3
	TOXIC, N.O.S.			II	6.1	P4	A8.3
				III	6.1	P5	A8.3
*	**WATER-REACTIVE SOLID, N.O.S.**	4.3	UN2813	I		P3, N40	A8.4
				II		P5	A8.4
				III		P5	A8.4
*	**WATER-REACTIVE SOLID**,	4.3	UN3131	I	8	P3, N40	A8.4
	CORROSIVE, N.O.S.			II	8	P5	A8.4
				III	8	P5	A8.4
*	**WATER-REACTIVE SOLID**,	4.3	UN3132	I	4.1	P3, N40	A8.4
	FLAMMABLE, N.O.S.			II	4.1	P5	A8.4
				III	4.1	P5	A8.4

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
*	**WATER-REACTIVE SOLID**, **OXIDIZING, N.O.S.**	4.3	UN3133		5.1	P3	A8.5
*	**WATER-REACTIVE SOLID**, **TOXIC, N.O.S.**	4.3	UN3134	I	6.1	P3, A8, N40	A8.4
				II	6.1	P5	A8.4
				III	6.1	P5	A8.4
*	**WATER-REACTIVE SOLID, SELF-HEATING, N.O.S**.	4.3	UN3135	I	4.2	P3, N40	A8.4
				II	4.2	P5	A8.4
				III	4.2	P5	A8.4
D	*Wheelchair, electric with batteries, see* **BATTERY-POWERED EQUIMENT** *or* **BATTERY-POWERED VEHICLE**						
	WHITE ASBESTOS *(Chrysotile, actinolite, anthophyllite, tremolite)*	9	UN2590	III		P5	A13.15
	WOOD PRESERVATIVES, LIQUID	3	UN1306	II		P5	A7.3
				III		P5	A7.3
	XENON	2.2	UN2036			P5	A6.3, A6.6
	XENON, REFRIGERATED LIQUID *(cryogenic liquid)*	2.2	UN2591			P4	A6.11
	XYLENES	3	UN1307	II		P5	A7.3
				III		P5	A7.3
	XYLENOLS	6.1	UN2261	II		P5	A10.6
	XYLIDINES, SOLID *or* **SOLUTION**	6.1	UN1711	II		P5	A10.5, A10.6
	XYLYL BROMIDE	6.1	UN1701	II		P4, A3, A6, A7, N33	A10.8
	p-Xylyl diazide	FORBIDDEN					FORBIDDEN
	ZINC AMMONIUM NITRITE	5.1	UN1512	II		P5	A9.8
	ZINC ARSENATE *or* **ZINC ARESINITE** *or* **ZINC ARSENATE AND ZINC ARSENITE MIXTURES**	6.1	UN1712	II		P5	A10.6
	ZINC ASHES	4.3	UN1435	III		P5, A1, A19	A8.4
	Zinc bisulfiite solution, see **BISULFITES, INORGANIC AQUEOUS SOLUTIONS, N.O.S.**						
	ZINC BROMATE	5.1	UN2469	III		P5, A1, A29	A9.8
	ZINC CHLORATE	5.1	UN1513	II		P5, A9, N34	A9.8
	ZINC CHLORIDE, ANHYDROUS	8	UN2331	III		P5	A12.4
	ZINC CHLORIDE, SOLUTION	8	UN1840	III		P5	A12.3
	ZINC CYANIDE	6.1	UN1713	I		P5	A10.6
	ZINC DITHIONITE *or* **ZINC HYDROSULPHITE**	9	UN1931	III		P5	A13.13

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	Zinc ethyl, see **DIETHYLZINC**						
	ZINC FLUOROSILICATE	6.1	UN2855	III		P5	A10.6
	ZINC HYDROSULPHITE, *see* **ZINC DITHIONITE**						
	Zinc muriate solution, see **ZINC CHLORIDE, SOLUTION**						
	ZINC NITRATE	5.1	UN1514	II		P5	A9.8
	ZINC PERMANGANATE	5.1	UN1515	II		P5	A9.8
	ZINC PEROXIDE	5.1	UN1516	II		P5	A9.8
	ZINC PHOSPHIDE	4.3	UN1714	I	6.1	P3, A19, N40	A8.4
	ZINC POWDER *or* **ZINC DUST**	4.3	UN1436	I	4.2	P3, A19, N40	A8.4
				II	4.2	P4, A19	A8.4
				III	4.2	P5	A8.4
	ZINC RESINATE	4.1	UN2714	III		P5, A1	A8.4
	ZINC SELENATE, *see* **SELENATES**						
	ZINC SELENITE, *see* **SELENITES**						
	Zinc silicofluoride, see **ZINC FLUOROSILICATE**						
	ZIRCONIUM, DRY, *coiled wire, finished metal sheets, strip (thinner than 254 microns but not thinner than 18 microns)*	4.1	UN2858	III		P5, A1	A8.4
	ZIRCONIUM, DRY, *finished sheets, strip, or coiled wire (thinner than 18 microns)*	4.2	UN2009	III		P5, A1, A19	A8.4
	ZIRCONIUM HYDRIDE	4.1	UN1437	II		P5, A19, A20, N34	A8.4
	ZIRCONIUM NITRATE	5.1	UN2728	III		P5, A1, A29	A9.8
	ZIRCONIUM PICRAMATE, *dry or wetted with less than 20% water, by mass*	1.3C	UN0236	II		P4	A5.8
	ZIRCONIUM PICRAMATE, WETTED *with not less than 20% water, by mass*	4.1	UN1517	I		P4, 23, N41	A8.4
	ZIRCONIUM POWDER, DRY	4.2	UN2008	I		P3	A8.4
				II		P5, A19, A20, N5, N34	A8.4
				III		P5	A8.4

SYM-BOL (1)	PROPER SHIPPING NAME/DESCRIPTION (2)	HAZARD CLASS/DIV (3)	UN/ID NUMBER (4)	PG (5)	SUBSIDIARY RISK (6)	SPECIAL PROVISION (7)	PACKAGING PARAGRAPH (8)
	ZIRCONIUM POWDER, WETTED, *with not less than 25% water (a visible excess of water must be present (a) mechanically produced, particle size less than 53 microns; (b) chemically produced, particle size less than 840 microns)*	4.1	UN1358	II		P5, A19, A20, N34	A8.4
	ZIRCONIUM SCRAP	4.2	UN1932	III		P5, N34	A8.4
D	**ZIRCONIUM SULFATE**	8	NA9163	III		P5, N34	A12.4
	ZIRCONIUM SUSPENDED IN A LIQUID	3	UN1308	I		P3	A7.3
				II		P5	A7.3
				III		P5	A7.3
	ZIRCONIUM TETRACHLORIDE	8	UN2503	III		P5	A12.4

★Table A4.2. Special Provisions

When column 7 of table A4.1 refers to a special provision for a hazardous material, the meaning and requirements of that provision are defined in this table. The following list identifies the requirements of the special provisions referred to in column 7 of table A4.1:

1. **Passenger Eligibility "P" Codes.** These provisions apply to passenger movement with hazardous materials (see also attachment 22).

P1 Transport this material on Special Assignment Airlift Mission aircraft as identified in attachment 24. Material authorized on cargo aircraft only. Passenger deviations are not authorized.

P2 Transport this material on cargo aircraft only. Passenger deviations are not authorized.

P3 Transport this material on cargo aircraft only. Deviations are authorized according to paragraph 2.2 and attachment 22. Apply to radioactive material requiring a Yellow III label.

P4 Transport this material on cargo aircraft only. Deviations are authorized according to paragraph 2.2 and attachment 22. DoD duty passengers do not require a deviation. Apply to radioactive material requiring a Yellow II label.

P5 Transport this material on passenger or cargo aircraft without passenger restriction. Apply to radioactive material requiring a White I or no label.

2. **Additional Codes.** The Special Provision column may provide material and/or packaging requirements. This information is in addition to the standard requirements already prescribed in this manual. The following numeric (1-117), airlift (A codes), and nonbulk packaging (N Codes) special provisions apply (some numbers are intentionally not included):

- Numeric Provisions.

1 This material is poisonous by inhalation in Hazard Zone A, describe as an inhalation hazard.

2 This material is poisonous by inhalation in Hazard Zone B, describe as an inhalation hazard.

3 This material is poisonous by inhalation in Hazard Zone C, describe as an inhalation hazard.

4 This material is poisonous by inhalation in Hazard Zone D, describe as an inhalation hazard.

5 If this material meets the defining criteria for a material poisonous by inhalation (49 CFR 173.116(a) or 173.133(a)) use an appropriate Class 2.3 or Class 6.1 generic PSN which identifies the inhalation hazard.

6 This material is poisonous by inhalation and must be described as an inhalation hazard.

8 A hazardous substance that is not a hazardous waste may be shipped under the shipping description "Other regulated substance, liquid or solid", as appropriate.

9 Packaging for certain PCBs for disposal and storage is prescribed by EPA in 40 CFR 761.60 and 761.65.

11 Package material either as a liquid or solid, as appropriate, depending on its physical form at 55 degrees C (131 degrees F) at atmospheric pressure.

12 In concentrations greater than 40 percent, this material has strong oxidizing properties and is capable of starting fires in contact with combustible materials. If applicable, a package containing this material must comply with the subsidiary risk labeling requirements of attachment 15.

17 Aqueous solutions of hydrogen peroxide containing less than 8 percent hydrogen peroxide are not subject to the requirements of this manual.

22 If the hazardous material is in dispersion in organic liquid, the organic liquid must have a flash point above 50 degrees C (122 degrees F).

23 Classify this material as Class 4.1 only if it is packed so that the percentage of diluent will not fall below that stated in the shipping description at any time during transport.

27 Sodium carbonate peroxyhydrate is considered nonhazardous.

31 Materials which have undergone sufficient heat treatment to render them nonhazardous are not subject to the requirements of this manual.

33 Ammonium nitrites and mixtures of an inorganic nitrite with an ammonium salt are prohibited.

36 The maximum net quantity per package is 5 L (1 gallon) or 5 kg (11 lbs).

Table A4.2. Continued.

43 The nitrogen content of the nitrocellulose must not exceed 11.5 percent. Pack each single filter sheet between sheets of glazed paper. Ensure the portion of glazed paper between the filter sheets is not less than 65 percent, by mass. The membrane filters/paper arrangement must not be liable to propagate a detonation.

53 Packages of these materials must bear a subsidiary risk label, "EXPLOSIVE", unless exempted by the DOT. A copy of the exemption must accompany the shipment.

56 Ensure a means to interrupt and prevent detonation of the detonator from initiating the detonating cord is installed between each electric detonator and the detonating cord ends of the jet perforating guns.

101 Specify the name of the particular substance or article.

102 This article may be transported as Class 1.4D if all of the conditions specified in 49 CFR 173.63(a) are met.

103 Detonators which will not mass detonate and undergo only limited propagation in the shipping package may be assigned to Class 1.4B. Mass detonate means that more than 90 percent of the devices tested in a package explode practically simultaneously. Limited propagation means that if one detonator near the center of a shipping package is exploded, the aggregate weight of explosives, excluding ignition and delay charges, in this and all additional detonators in the outside packaging that explode, may not exceed 25 g.

104 Detonators which meet the following conditions may be assigned to Class 1.4S: Each detonator may contain no more than 1 g of explosive, excluding ignition and delay charges, and if one detonator near the center of the package detonates it will not cause functioning of any other device in the same or adjacent packages.

105 The word "Agents" may be used instead of "Explosives" when approved by the DOT.

106 The recognized name of the particular explosive may be specified in addition to the type.

107 The classification of the substance is expected to vary especially with the particle size and packaging, but the border lines have not been experimentally determined; appropriate classifications should be verified following the test procedures in 49 CFR 173.57 and 173.58.

108 Fireworks must be constructed and packaged so that loose pyrotechnic composition is not present in packages during transportation.

109 Rocket motors must be nonpropulsive in transportation unless approved according to A3.3.1.2. To be considered "nonpropulsive", a rocket motor must be capable of unrestrained burning and must not appreciably move in any direction when ignited by any means.

110 Fire extinguisher charges containing 3.2 g or less of propellant explosives per unit are not subject to the requirements of this manual.

111 Explosive substances of Class 1.1A are forbidden for transportation if dry or not desensitized, unless incorporated in a device.

112 Cartridges, small arms, Class 1.4S, may be reclassed and offered for domestic transportation as ORM-D material if they are offered for transportation and transported according to the limitations and packaging requirements of 49 CFR 173.230.

113 The sample must be given a tentative approval by an agency or laboratory according to the provisions of 49 CFR 173.56.

115 Boosters with detonator (detonating primers) in which the total explosive charge per unit does not exceed 25 g, and which will not mass detonate and undergo only limited propagation in the shipping package may be assigned to Class 1.4B. Mass detonate means more than 90 percent of the devices tested in a package explode practically simultaneously. Limited propagation means that if one booster near the center of the package is exploded, the aggregate weight of explosives, excluding ignition and delay charges, in this and all additional boosters in the outside packaging that explode may not exceed 25 g.

Table A4.2. Continued.

116 Fuzes, detonating, may be classed in Class 1.4 if the fuzes do not contain more than 25 g of explosive per fuze and are made and packaged so that they will not cause functioning of other fuzes, explosives, or other explosive devices if one of the fuzes detonates in a shipping packaging or in adjacent packages.

117 If a shipment of the explosive substance is to take place at a time that freezing weather is anticipated, the water contained in the explosive substance must be mixed with denatured alcohol so that freezing will not occur.

- "A" Codes. These special provisions are in addition to other requirements for military air shipment.

A1 Single packaging is not permitted on passenger aircraft. P4 restrictions apply.

A2 Single packagings are not permitted.

A3 For combination packagings, if glass inner packagings (including ampoules) are used, they must be packed with absorbent material in tightly closed metal receptacles before packing in outer packagings.

A4 Liquids having an inhalation toxicity of PG I and are identified as P1, P2, or P3 are not permitted on passenger aircraft. Deviations are not allowed.

A5 Solids having an inhalation toxicity of PG I and are identified as P1, P2, or P3, are not permitted on passenger aircraft and may not exceed a maximum net quantity per package of 15 kg (33 pounds) on cargo aircraft. See paragraph 2.2 for deviation authority.

A6 For combination packagings, if plastic inner packagings are used, pack in tightly closed metal receptacles before packing into outer packagings.

A7 Steel packagings must be corrosion-resistant or have protection against corrosion.

A8 For combination packagings, if glass inner packagings (including ampoules) are used, they must be packed with cushioning material in tightly closed metal receptacles before packing in outer packagings

A9 For combination packages, if plastic bags are used, they must be packed in tightly closed metal receptacles before packing in outer packagings.

A10 When aluminum or aluminum alloy construction materials are used, they must be resistant to corrosion.

A11 For combination packagings, when metal inner packagings are permitted, only specification cylinders constructed of metals which are compatible with the hazardous material may be used.

A19 Combination packagings consisting of outer fiber drums or plywood drums, with inner plastic packagings, are not authorized.

A20 Plastic bags as inner receptacles of combination packagings are not authorized.

A29 Combination packagings consisting of outer expanded plastic boxes with inner plastic bags are not authorized.

A30 Ammonium permanganate is not authorized.

A33 Ammonium nitrates and mixtures of an inorganic nitrite with an ammonium salt are prohibited.

A67 Nonspillable batteries are considered dry batteries and not subjest to any other requirements of this manual if:

- At a temperature of 55 degrees C (130 degrees F), the electrolyte will not flow from a ruptured or cracked case and there is no free liquid to flow .
- Packaged for transport in inner packagings that effectively prevent short circuit and prevent movement which could lead to short circuit.

A68 Articles drained to the maximum extent possible, not to exceed 500 ml (17 ounces) of flammable liquid residue remaining, and containing no other hazard may be shipped under this PSN and assigned to hazard class 9 for military airlift. This applies to fuel devices, mechanical components, tent heaters, ect. See A14.3.10 for marking and A15.2 for labeling requirements.

- "N" Codes. These provisions apply only to nonbulk packagings:

N3 Glass inner packagings are permitted in combination or composite packagings only if the hazardous material is free from hydrofluoric acid.

Table A4.2. Continued.

N4 For combination or composite packagings, glass inner packagings, other than ampoules, are not permitted.

N5 Glass materials of construction are not authorized for any part of the packaging which is normally in contact with the hazardous material.

N6 Battery fluid packaged with electric storage batteries, wet or dry, must conform to the packaging provisions of A12.5.3.

N7 The hazard class or division number of the material must be marked on the package according to 49 CFR 172.302. However, the hazard label corresponding to the hazard class or division may be substituted for the marking.

N8 Nitroglycerin solution in alcohol may be transported under this entry only when the solution is packed in metal cans of not more than 1 L capacity each, overpacked in a wooden box containing not more than 5 L. Completely surround metal cans with absorbent cushioning material. Completely line wooden boxes with a suitable material impervious to water and nitroglycerin.

N12 Plastic packagings are not authorized.

N25 Steel single packagings are not authorized.

N32 Aluminum materials of construction are not authorized for single packagings.

N33 Aluminum drums are not authorized.

N34 Aluminum construction materials are not authorized for any part of a packaging which is normally in contact with the hazardous materials.

N36 Aluminum or aluminum alloy construction materials are permitted only for halogenated hydrocarbons that will not react with aluminum.

N37 This material may be shipped in an integrally-lined fiber drum (1G) which meets the general packaging requirements of attachment 3, the POP tests required based on the PG assigned to the material and to any other special provisions of column 7 of table A4.1.

N40 This material is not authorized in the following packagings:

- A combination packaging consisting of a 4G fiberboard box with inner receptacles of glass or earthenware.
- A single packaging of a 4C2 sift-proof, natural wood box.
- A composite packaging 6PG2 (glass, porcelain, or stoneware receptacles within a fiberboard box).

N41 Metal construction materials are not authorized for any part of a packaging which is normally in contact with the hazardous material.

N43 Metal drums are permitted as single packagings only if constructed of nickel or Monel.

N45 For combination packagings, copper cartridges are permitted as inner packagings when the hazardous material is not in dispersion.

N65 Outage must be sufficient to prevent cylinders or spheres from becoming liquid full at 55 degrees C (130 degrees F). The vacant space (outage) may be charged with a nonflammable, nonliquefied compressed gas if the pressure in the cylinder or sphere at 55 degrees C (130 degrees F) does not exceed 125 percent of the marked service pressure.

N73 Packagings consisting of outer wooden or fiberboard boxes with inner glass, metal, or other strong containers; metal or fiber drums; kegs or barrels; or strong metal cans are authorized and need not conform to the POP test requirements for domestic shipment.

N74 Packages consisting of tightly closed inner containers of glass, earthenware, metal or polyethylene, capacity not over 0.5 kg (1.1 pounds) securely cushioned and packed in outer wooden barrels or wooden or fiberboard boxes, not over 15 kg (33 pounds) net weight, are authorized and need not conform to the POP test requirements for domestic shipment.

N75 Packages consisting of tightly closed inner packagings of glass, earthenware, or metal, securely cushioned and packed in outer wooden barrels, or wooden or fiberboard boxes, capacity not over 2.5 kg (5.5 pounds) net weight, are authorized and need not conform to the POP test requirements for domestic shipment.

Table A4.2. Continued.

N76 For materials of not more than 25 percent active ingredient by weight, packages consisting of inner metal packagings not greater than 250 ml (8 ounces) capacity each, packed in strong outer packagings together with sufficient absorbent material to completely absorb the liquid contents are authorized and need not conform to the POP test requirements for domestic shipment.

N77 For materials of not more than two percent active ingredients by weight and the liquid contents are absorbed in an inert material, the packagings need not conform to the POP test requirements for domestic shipment.

N78 Packages consisting of inner glass, earthenware, polyethylene, or other nonfragile plastic bottles or jars not over 0.5 kg (1.1 pounds) capacity each, or metal cans not over 5 pounds capacity each, packed in outer wooden boxes, barrels, kegs, or fiberboard boxes, are authorized and need not conform to the POP test requirements for domestic shipments. Net weight of contents in fiberboard boxes may not exceed 29 kg (64 pounds). Net weight of contents in wooden boxes, barrels, or kegs may not exceed 45 kg (99 pounds).

N79 Packages consisting of tightly closed metal inner packagings not over 0.5 kg (1.1 pounds) capacity each, packed in outer wooden or fiberboard boxes, or wooden barrels, are authorized and need not conform to POP test requirements for domestic shipment. Net weight of contents may not exceed 15 kg (33 pounds).

★**Table A4.3. Hazardous Substances and Reportable Quantities**

Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)	Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)
Acenaphthene	100 (45.4)	Ammonium acetate	5000 (2270)
Acenaphthylene	5000 (2270)	Ammonium benzoate	5000 (2270)
Acetaldehyde	1000 (454)	Ammonium bicarbonate	5000 (2270)
Acetaldehyde, chloro-	1000 (454)	Ammonium bichromate	10 (4.54)
Acetaldehyde, trichloro-	5000 (2270)	Ammonium bifluoride	100 (45.4)
Acetamide	100 (45.4)	Ammonium bisulfite	5000 (2270)
Acetamide, N-(aminothioxomethyl)-	1000 (454)	Ammonium carbamate	5000 (2270)
Acetamide, N-(4-ethoxyphenyl)-	100 (45.4)	Ammonium carbonate	5000 (2270)
Acetamide, N-fluoren-2-yl-	1 (0.454)	Ammonium chloride	5000 (2270)
Acetamide, 2-fluoro-	100 (45.4)	Ammonium chromate	10 (4.54)
Acetic acid	5000 (2270)	Ammonium citrate, dibasic	5000 (2270)
Acetic acid (2,4-dichlorophenoxy)-	100 (45.4)	Ammonium dichromate *	10 (4.54)
Acetic acid, ethyl ester	5000 (2270)	Ammonium fluoborate	5000 (2270)
Acetic acid, fluoro-, sodium salt	10 (4.54)	Ammonium fluoride	100 (45.4)
Acetic acid, lead (2+) salt	10 (4.54)	Ammonium hydroxide	1000 (454)
Acetic acid, thallium (I+) salt	100 (45.4)	Ammonium oxalate	5000 (2270)
Acetic acid, (2,4,5-trichlorophenoxy)	1000 (454)	Ammonium picrate	10 (4.54)
Acetic anhydride	5000 (2270)	Ammonium silicofluoride	1000 (454)
Acetone	5000 (2270)	Ammonium sulfamate	5000 (2270)
Acetone cyanohydrin	10 (4.54)	Ammonium sulfide	100 (45.4)
Acetonitrile	5000 (2270)	Ammonium sulfite	5000 (2270)
Acetophenone	5000 (2270)	Ammonium tartrate	5000 (2270)
2-Acetylaminofluorene	1 (0.454)	Ammonium thiocyanate	5000 (2270)
Acetyl bromide	5000 (2270)	Ammonium vanadate	1000 (454)
Acetyl chloride	5000 (2270)	Amyl acetate	5000 (2270)
1-Acetyl-2-thiourea	1000 (454)	iso-Amyl acetate	
Acrolein	1 (0.454)	sec-Amyl acetate	
Acrylamide	5000 (2270)	tert-Amyl acetate	
Acrylic acid	5000 (2270)	Aniline	5000 (2270)
Acrylonitrile	100 (45.4)	o-Anisidine	100 (45.4)
Adipic acid	5000 (2270)	Anthracene	5000 (2270)
Aldicarb	1 (0.454)	Antimony +	5000 (2270)
Aldrin	1 (0.454)	Antimony pentachloride	1000 (454)
Allyl alcohol	100 (45.4)	Antimony potassium tartrate	100 (45.4)
Allyl chloride	1000 (454)	Antimony tribromide	1000 (454)
Aluminum phosphide	100 (45.4)	Antimony trichloride	1000 (454)
Aluminum sulfate	5000 (2270)	Antimony trifluoride	1000 (454)
4-Aminobiphenyl	1 (0.454)	Antimony trioxide	1000 (454)
5-(Aminomethyl)-3-isoxazolol	1000 (454)	Argentate(1-), bis(cyano-C)-, potassium	1 (0.454)
4-Aminopyridine	1000 (454)	Aroclor 1016	1 (0.454)

Amitrole	10 (4.54)	Aroclor 1221	1 (0.454)
Ammonia	100 (45.4)		

Table A4.3. Continued

Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)	Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)
Aroclor 1232	1 (0.454)	Benzal chloride	5000 (2270)
Aroclor 1242	1 (0.454)	Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)	5000 (2270)
Aroclor 1248	1 (0.454)	Benz[a]anthracene	10 (4.54)
Aroclor 1254	1 (0.454)	1,2-Benzanthracene	10 (4.54)
Aroclor 1260	1 (0.454)	Benz[a]anthracene 7,12-dimethyl-	1 (0.454)
Arsenic +	1 (0.454)	Benzenamine	5000 (2270)
Arsenic acid	1 (0.454)	Benzenamine, 4,4'-carbonimidoylbis (N,N-dimethyl-	100 (45.4)
Arsenic acid H3AsO4	1 (0.454)	Benzenamine, 4-chloro-	1000 (454)
Arsenic disulfide	1 (0.454)	Benzenamine, 4-chloro-2-methyl-, hydrochloride	100 (45.4)
Arsenic oxide As203	1 (0.454)	Benzenamine, N,N-dimethyl-4-(phenylazo)-	10 (4.54)
Arsenic oxide As205	1 (0.454)	Benzenamine, 2-methyl-	100 (45.4)
Arsenic pentoxide	1 (0.454)	Benzenamine, 4-methyl-	100 (45.4)
Arsenic trichloride	1 (0.454)	Benzenamine, 4,4'-methylenebis(2-chloro-	10 (4.54)
Arsenic trioxide	1 (0.454)	Benzenamine, 2-methyl-,hydrochloride	100 (45.4)
Arsenic trisulfide	1 (0.454)	Benzenamine, 2-methyl-5-nitro-	100 (45.4)
Arsine, diethyl-	1 (0.454)	Benzenamine, 4-nitro-	5000 (2270)
Arsinic acid, dimethyl-	1 (0.454)	Benzene	10 (4.54)
Arsonous dichloride, phenyl-	1 (0.454)	Benzene, 1-bromo-4-phenoxy-	100 (45.4)
Asbestos ++	1 (0.454)	Benzene, chloro-	100 (45.4)
Auramine	100 (45.4)	Benzene, chloromethyl-	100 (45.4)
Azaserine	1 (0.454)	Benzene, 1,2-dichloro-	100 (45.4)
Aziridine	1 (0.454)	Benzene, 1,3-dichloro-	100 (45.4)
Aziridine, 2-methyl-	1 (0.454)	Benzene, 1,4-dichloro-	100 (45.4)
Azirino[2',3':3,4]pyrrolo(1,2-a)indole-4,7-dione,6-amino-8-[[aminocarbonyl)oxy]methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-,[1aS-(aalpha,8beta,8aalpha,8balpha)]	10 (4.54)	Benzene, 1,1'-(2,2-dichloroethylidene)bis[4-chloro	1 (0.454)
Barium cyanide	10 (4.54)	Benezene, dichloromethyl-	5000 (2270)
Benz[j]aceanthrylene,1,2-dihydro-3-methyl-	10 (4.54)	Benzene, 1,3-diisocyanatomethyl	100 (45.4)
Benz[c]acridine	100 (45.4)	Benzene, dimethyl-	100 (45.4)

3,4-Benzacridine	100 (45.4)	Benzene, m-dimethyl-	1000 (454)
		Benzene, o-dimethyl-	1000 (454)

Table A4.3. Continued

Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)	Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)
Benzene, p-dimethyl-	100 (45.4)	1,3-Benzenediol	5000 (2270)
Benzene, hexachloro-	10 (4.54)	1,2-Benzenediol,4-[1-hydroxy-2-(methylamino) ethyl]-	1000 (454)
Benzene, hexahydro-	1000 (454)	Benzeneethanamine, alpha,alpha-dimethyl-	5000 (2270)
Benzene, hydroxy-	1000 (454)	Benzenesulfonic acid chloride	100 (45.4)
Benzene, methyl-	1000 (454)	Benzenesulfonyl chloride	100 (4.54)
Benzene, 1-methyl-2,4-dinitro-	10 (4.54)	Benzenethiol	100 (45.4)
Benzene, 2-methyl-1,3-dinitro-	100 (45.4)	Benzidine	1 (0.454)
Benzene, 1-methylethyl-	5000 (2270)	1,2-Benzisothiazol-3(2H)-one,1,1-dioxide	100 (45.4)
Benzene, nitro-	1000 (454)	Benz[o]aanthracene	10 (4.54)
Benzene, pentachloro-	10 (4.54)	1,3-Benzodioxole, 5-(2-propenyl)-	100 (45.4)
Benzene, pentachloronitro-	100 (45.4)	1,3-Benzodioxole, 5-(1-propenyl)-	100 (45.4)
Benzene, 1,2,4,5-tetrachloro-	5000 (2270)	1,3-Benzodioxole, 5-propyl-	10 (4.54)
Benzene, 1,1'-(2,2,2-trichloroethylidene) bis[4-chloro-	1 (0.454)	Benzo[b]fluoranthene	1 (0.454)
Benzene, 1,1'-(2,2,2-trichloroethylidene) bis[4-methoxy]-	1 (0.454)	Benzo[k]fluoranthene	5000 (2270)
Benzene, (trichloromethyl)	10 (4.54)	Benzo[j,k]fluorene	100 (45.4)
Benzene, 1,3,5-trinitro-	10 (4.54)	Benzoic acid	5000 (2270)
Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha- hydroxy, ethyl ester	10 (4.54)	Benzonitrile	5000 (2270)
Benzenebutanoic acid, 4-[bis(2-chloroethyl)amino]-	10 (4.54)	Benzo[g,h,i]perylene	5000 (2270)
Benzenediamine, ar-methyl-	10 (4.54)	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenyl-buthyl)-, & salts, when present at concentrations greater than 0.3%	100 (45.4)
1,2-Benzenedicarboxylic acid, [bis(2-ethylhexyl)] ester	100 (45.4)	Benzo[a]pyrene	1 (0.454)
1,2-Benzenedicarboxylic acid, dibutyl ester	10 (4.54)	3,4-Benzopyrene	1 (0.454)
1,2-Benzenedicarboxylic acid, diethyl ester	1000 (454)	p-Benzoquinone	10 (4.54)
1,2-Benzenedicarboxylic acid, dimethyl ester	5000 (2270)	Benzo [rst]pentaphene	10 (4.54)
1,2-Benzenedicarboxylic acid, dioctyl ester	5000 (2270)	Benzotrichloride	10 (4.54)

Table A4.3. Continued

Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)	Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)
Benzoyl chloride	1000 (454)	2-Butenal	100 (45.4)
1,2-Benzphenanthrene	100 (45.4)	2-Butene, 1,4-dichloro-	1 (0.454)
Benzyl chloride	100 (45.4)	2-Butenoic acid,2-methyl-,7 [[2,3-dihydroxy-2-(1-methoxyethyl)-3-methyl-1-oxobutoxy]methyl]-2,3,5,7a-tetrahydro-1H-pyrrolizin-1-yl ester, [1S-[1alpha(Z), 7 (2S*,3R*),7aalpha]]-	10 (4.54)
Beryllium +	10 (4.54)	Butyl acetate	5000 (2270)
Beryllium chloride	1 (0.454)	iso-Butyl acetate	
Beryllium dust +	10 (4.54)	sec-Butyl acetate	
Beryllium fluoride	1 (0.454)	tert-Butyl acetate	
Beryllium nitrate	1 (0.454)	n-Butyl alcohol	5000 (2270)
alpha - BHC	10 (4.54)	Butylamine	1000 (454)
beta - BHC	1 (0.454)	iso-Butylamine	
delta - BHC	1 (0.454)	sec-Butylamine	
gamma - BHC	1 (0.454)	tert-Butylamine	
2,2'-Bioxirane	10 (4.54)	Butyl benzyl phthalate	100 (45.4)
Biphenyl	100 (45.4)	n-Butyl phthalate	10 (4.54)
(1,1'-Biphenyl)-4,4'-diamine	1 (0.454)	Butyric acid	5000 (2270)
(1,1'-Biphenyl)-4,4'-diamine,3,3'-dichloro-	1 (0.454)	iso-Butyric acid	
(1,1'-Biphenyl)-4,4'-diamine,3,3'-dimethoxy-	10 (4.54)	Cacodylic acid	1 (0.454)
(1,1'-Biphenyl)-4,4'-diamine,3,3'-dimethyl-	10 (4.54)	Cadmium +	10 (4.54)
Bis(2-chloroethoxy) methane	1000 (454)	Cadmium acetate	10 (4.54)
Bis(2-chloroethyl) ether	10 (4.54)	Cadmium bromide	10 (4.54)
Bis(2-ethylhexyl)phthalate	100 (45.4)	Cadmium chloride	10 (4.54)
Bromoacetone	1000 (454)	Calcium arsenate	1 (0.454)
Bromoform	100 (45.4)	Calcium arsenite	1 (0.454)
4-Bromophenyl phenyl ether	100 (45.4)	Calcium carbide	10 (4.54)
Brucine	100 (45.4)	Calcium chromate	10 (4.54)
1,3-Butadiene	10 (4.54)	Calcium cyanamide	1000 (454)
1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	1 (0.454)	Calcium cyanide	10 (4.54)
1-Butanamine, N-butyl-N-nitroso-	10 (4.54)	Calcium cyanide Ca(CN)2	10 (4.54)
1-Butanol	5000 (2270)	Calcium dodecylbenzene sulfonate	1000 (454)
2-Butanone	5000 (2270)	Calcium hypochlorite	10 (4.54)
2-Butanone, 3,3-dimethyl-1-(methylthio)-,O-[(methylamino) carbonyl] oxime	100 (45.4)	Camphene, octachloro-	1 (0.454)
2-Butanone peroxide	10 (4.54)	Caprolactam	5000 (2270)

Table A4.3. Continued

Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)	Hazardous Substance	Reportable Reportable Quantity (RQ) Pounds (Kilograms)
Captan	10 (4.54)		
Carbamic acid, ethyl ester	100 (45.4)	Chloroform	10 (4.54)
Carbamic acid, methylnitroso-, ethyl ester	1 (0.454)	Chloromethane	100 (45.4)
Carbamic chloride, dimethyl-	1 (0.454)	Chloromethyl methyl ether	1 (0.454)
Carbamide, thio-	10 (4.54)	beta-Chloronaphthalene	5000 (2270)
Carbamimidoselenoic acid	1000 (454)	2-Chloronaphthalene	5000 (2270)
Carbamothioic acid, bis (1-methylethyl)-,S-(2,3-dichloro-2-propenyl) ester	100 (45.4)	2-Chlorophenol	100 (45.4)
Carbaryl	100 (45.4)	o-Chlorophenol	100 (45.4)
Carbofuran	10 (4.54)	4-Chlorophenyl phenyl ether	5000 (2270)
Carbon bisulfide	100 (45.4)	1-(o-Chlorophenyl)thiourea	100 (45.4)
Carbon disulfide	100 (45.4)	Chloroprene	100 (45.4)
Carbonic acid, dithallium (1+)	100 (45.4)	3-Chloropropionitrile	1000 (454)
Carbonic dichloride	10 (4.54)	Chlorosulfonic acid	1000 (454)
Carbonic difluoride	1000 (454)	4-Chloro-o-toluidine, hydrochloride	100 (45.4)
Carbonochloridic acid, methyl ester	1000 (454)	Chlorpyrifos	1 (0.454)
Carbon oxyfluoride	1000 (454)	Chromic acetate	1000 (454)
Carbon tetrachloride	10 (4.54)	Chromic acid	10 (4.54)
Carbonyl sulfide	100 (45.4)	Chromic acid H2CrO4, calcium salt	10 (4.54)
Catechol	100 (45.4)	Chromic sulfate	1000 (454)
Chloral	5000 (2270)	Chromium +	5000 (2270)
Chloramben	100 (45.4)	Chromous chloride	1000 (454)
Chlorambucil	10 (4.54)	Chrysene	100 (45.4)
Chlordane	1 (0.454)	Cobaltous bromide	1000 (454)
Chlordane, alpha & gamma isomers	1 (0.454)	Cobaltous formate	1000 (454)
Chlordane, technical	1 (0.454)	Cobaltous sulfamate	1000 (454)
Chlorine	10 (4.54)	Coke Oven Emissions	1 (0.454)
Chlornaphazine	100 (45.4)	Copper +	5000 (2270)
Chloroacetaldehyde	1000 (454)	Copper chloride *	10 (4.54)
Chloroacetic acid	100 (45.4)	Copper cyanide	10 (4.54)
2-Chloroacetophenone	100 (45.4)	Copper cyanide CuCN	10 (4.54)
p-Chloroaniline	1000 (454)	Coumaphos	10 (4.54)
Chlorobenzene	100 (45.4)	Creosote	1 (0.454)
Chlorobenzilate	10 (4.54)	Cresols (isomers and mixture)	100 (45.4)
4-Chloro-m-cresol	5000 (2270)	m-Cresol	100 (45.4)
p-Chloro-m-cresol	5000 (2270)	o-Cresol	100 (45.4)
Chlorodibromomethane	100 (45.4)	p-Cresol	100 (45.4)
Chloroethane	100 (45.4)	Cresylic acid (isomers and mixture)	100 (45.4)
2-Chloroethyl vinyl ether	1000 (454)	m-Cresylic acid	100 (45.4)

Table A4.3. Continued

Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)	Hazardous Substance	Reportable Reportable Quantity (RQ) Pounds (Kilograms)
o-Cresylic acid	100 (45.4)		
p-Cresylic acid	100 (45.4)	Diazomethane	100 (45.4)
Crotonaldehyde	100 (45.4)	Dibenz[a,h]anthracene	1 (0.454)
Cumene	5000 (2270)	1,2:5,6-Dibenzanthracene	1 (0.454)
Cupric acetate	100 (45.4)	Dibenzo[a,h]anthracene	1 (0.454)
Cupric acetoarsenite	1 (0.454)	Dibenz[a,i]pyrene	10 (4.54)
Cupric chloride	10 (4.54)	Dibenzofuran	100 (45.4)
Cupric nitrate	100 (45.4)	1,2-Dibromo-3-chloropropane	1 (0.454)
Cupric oxalate	100 (45.4)	Dibutyl phthalate	10 (4.54)
Cupric sulfate	10 (4.54)	Di-n-butyl phthalate	10 (4.54)
Cupric sulfate ammoniated	100 (45.4)	Dicamba	1000 (454)
Cupric tartrate	100 (45.4)	Dichlobenil	100 (45.4)
Cyanides (soluble salts and complexes) not otherwise specified	10 (4.54)	Dichlone	1 (0.454)
Cyanogen	100 (45.4)	Dichlorobenzene	100 (45.4)
Cyanogen bromide	1000 (454)	1,2-Dichlorobenzene	100 (45.4)
Cyanogen bromide (CN)Br	1000 (454)	1,3-Dichlorobenzene	100 (45.4)
Cyanogen chloride	10 (4.54)	1,4 Dichlorobenzene	100 (45.4)
Cyanogen chloride (CN)Cl	10 (4.54)	m-Dichlorobenzene	100 (45.4)
2,5-Cyclohexadiene-1,4-dione	10 (4.54)	o-Dichlorobenzene	100 (45.4)
Cyclohexane	1000 (454)	p-Dichlorobenzene	100 (45.4)
Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1alpha,2alpha, 3beta, 4alpha,5alpha,6beta)-	1 (0.454)	3,3'-Dichlorobenzidine	1 (0.454)
Cyclohexanone	5000 (2270)	Dichlorobromomethane	5000 (2270)
2-Cyclohexyl-4,6-dinitrophenol	100 (45.4)	1,4 Dichloro-2-butene	1 (0.454)
1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	10 (4.54)	Dichlorodifluoromethane	5000 (2270)
Cyclophosphamide	10 (4.54)	1,1 Dichloroethane	1000 (454)
2,4-D Acid	100 (45.4)	1,2 Dichloroethane	100 (45.4)
2,4-D Ester	100 (45.4)	1,1-Dichloroethylene	100 (45.4)
Daunomycin	10 (4.54)	1,2 Dichloroethylene	1000 (454)
DDD	1 (0.454)	Dichloroethyl ether	10 (4.54)
4,4'-DDD	1 (0.454)	Dichloroisopropyl--ether	1000 (454)
DDE	5000 (2270)	Dichloromethane *	1000 (454)
4,4'-DDE	5000 (2270)	Dichloromethoxy ethane	1000 (454)
DDT	1 (0.454)	Dichloromethyl ether	1 (0.454)
4,4'-DDT	1 (0.454)	2,4 Dichlorophenol	100 (45.4)
Diallate	100 (45.4)	2,6-Dichlorophenol	100 (45.4)
Diamine	1 (0.454)	Dichlorophenylarsine	1 (0.454)
Diazinon	1 (0.454)	Dichloropropane	1000 (454)

Table A4.3. Continued

Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)	Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)
1,1-Dichloropropane		Diethylstilbestrol	1 (0.454)
1,3-Dichloropropane		Diethyl sulfate	10 (4.54)
1,2-Dichloropropane	1000 (454)	Dihydrosafrole	10 (4.54)
Dichloropropane - Dichloropropene (mixture)	100 (45.4)	Diisopropyl fluorophosphate	100 (45.4)
Dichloropropene	100 (45.4)	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10, 10-hexachloro-1,4, 4a,5, 8,8a-hexahydro, (1alpha, 4alpha, 4abeta, 5abeta,8beta, 8abeta)-	1 (0.454)
2,3-Dichloropropene		1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10, 10-10-hexachloro-1,4, 4a,5,8,8a-hexahydro-,(1alpha, 4alpha, 4abeta,5alpha,8alpha, 8abeta)-	1 (0.454)
1,3-Dichloropropene	100 (45.4)	2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7, 7a-octahydro-, (1aalpha,2beta, 2abeta, 3alpha,6alpha,6abeta, 7beta, 7aalpha)-	1 (0.454)
2,2-Dichloropropionic acid	5000 (2270)	2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro -1a,2,2a,3,6,6a,7, 7a-octahydro-, (1aalpha,2beta,2aalpha, 3beta, 6beta,6aalpha,7beta, 7aalpha)-	1 (0.454)
Dichlorvos	10 (4.54)	Dimethoate	10 (4.54)
Dicofol	10 (4.54)	3,3'-Dimethoxybenzidine	10 (4.54)
Dieldrin	1 (0.454)	Dimethylamine	1000 (454)
1,2:3,4-Diepoxybutane	10 (4.54)	p-Dimethylaminoazobenzene	10 (4.54)
Diethanolamine	100 (45.4)	N,N-dimethylaniline	100 (45.4)
Diethylamine	1000 (454)	7,12-Dimethylbenz[a]anthracene	1 (0.454)
N,N-diethylaniline	1000 (454)	3,3'-Dimethylbenzidine	10 (4.54)
Diethylarsine	1 (0.454)	alpha,alpha-Dimethylbenzylhydroperoxide	10 (4.54)
1,4-Diethylenedioxide	100 (45.4)	Dimethylcarbamoyl chloride	1 (0.454)
Diethylhexyl phthalate	100 (45.4)	Dimethylformamide	100 (45.4)
N,N'-Diethylhydrazine	10 (4.54)	1,1-Dimethylhydrazine	10 (4.54)
O,O-Diethyl S-methyl dithiophosphate	5000 (2270)	1,2-Dimethylhydrazine	1 (0.454)
Diethyl-p-nitrophenyl phosphate	100 (45.4)	Dimethylhydrazine, unsymmetrical *	10 (4.54)
Diethyl phthalate	1000 (454)		
O,O-Diethyl O-pyrazinyl phosphorothioate	100 (45.4)		

Table A4.3. Continued

Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)	Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)
alpha,alpha-Dimethylphenethylamine	5000 (2270)	Endosulfan sulfate	1 (0.454)
2,4-Dimethylphenol	100 (45.4)	Endothall	1000 (454)
Dimethyl phthalate	5000 (2270)	Endrin	1 (0.454)
Dimethyl sulfate	100 (45.4)	Endrin, & metabolites	1 (0.454)
Dinitrobenzene (mixed)	100 (45.4)	Endrin aldehyde	1 (0.454)
m-Dinitrobenzene		Epichlorohydrin	100 (45.4)
o-Dinitrobenzene		Epinephrine	1000 (454)
p-Dinitrobenzene		1,2-Epoxybutane	100 (45.4)
4,6-Dinitro-o-cresol and salts	10 (4.54)	Ethanal	1000 (454)
Dinitrogen tetroxide *	10 (4.54)	Ethanamine, N-ethyl-N-nitroso-	1 (0.454)
Dinitrophenol	10 (4.54)	Ethane, 1,2-dibromo-	1 (0.454)
2,5-Dinitrophenol		Ethane, 1,1-dichloro-	1000 (454)
2,6-Dinitrophenol		Ethane, 1,2-dichloro-	100 (45.4)
2,4-Dinitrophenol	10 (4.54)	Ethane, hexachloro-	100 (45.4)
Dinitrotoluene	10 (4.54)	Ethane, 1,1'-[methylenebis (oxy)]bis(2-chloro-	1000 (454)
3,4-Dinitrotoluene		Ethane, 1,1'-oxybis-	100 (45.4)
2,4-Dinitrotoluene	10 (4.54)	Ethane, 1,1'-oxybis(2-chloro-	10 (4.54)
2,6-Dinitrotoluene	100 (45.4)	Ethane, pentachloro-	10 (4.54)
Dinoseb	1000 (454)	Ethane, 1,1,1,2-tetrachloro-	100 (45.4)
Di-n-octyl phthalate	5000 (2270)	Ethane, 1,1,2,2 tetrachloro-	100 (45.4)
1,4-Dioxane	100 (45.4)	Ethane, 1,1,2-trichloro-	100 (45.4)
1,2-Diphenylhydrazine	10 (4.54)	Ethane, 1,1,1-trichloro-	1000 (454)
Diphosphoramide, octamethyl-	100 (45.4)	1,2-Ethanediamine, N, N-dimethyl-N'-2-pyridinyl-N'-(2-thienyl-methyl)-	5000 (2270)
Diphosphoric acid, tetraethyl ester	10 (4.54)	Ethanedinitrile	100 (45.4)
Dipropylamine	5000 (2270)	Ethanenitrile	5000 (2270)
Di-n-propylnitrosamine	10 (4.54)	Ethanethioamide	10 (4.54)
Diquat	1000 (454)	Ethanimidothioic acid, N-[[(methylamino) carbonyl] oxy]-, methyl ester	100 (45.4)
Disulfoton	1 (0.454)	Ethanol, 2-ethoxy-	1000 (454)
Dithiobiuret	100 (45.4)	Ethanol, 2,2'-(nitrosoimino)bis-	1 (0.454)
Diuron	100 (45.4)	Ethanone, 1-phenyl-	5000 (2270)
Dodecylbenzenesulfonic acid	1000 (454)	Ethanoyl chloride	5000 (2270)
2,4-D,salts and esters	100 (45.4)	Ethene, chloro-	1 (0.454)
Endosulfan	1 (0.454)	Ethene, 2-chloroethoxy-	1000 (454)
alpha - Endosulfan	1 (0.454)		
beta - Endosulfan	1 (0.454)		

Table A4.3. Continued

Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)	Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)
Ethene, 1,1-dichloro-	100 (45.4)	Ferric sulfate	1000 (454)
Ethene, 1,2-dichloro- (E)	1000 (454)	Ferrous ammonium sulfate	1000 (454)
Ethene, tetrachloro-	100 (45.4)	Ferrous chloride	100 (45.4)
Ethene, trichloro-	100 (45.4)	Ferrous sulfate	1000 (454)
Ethion	10 (4.54)	Fluoranthene	100 (45.4)
Ethyl acetate	5000 (2270)	Fluorene	5000 (2270)
Ethyl acrylate	1000 (454)	Fluorine	10 (4.54)
Ethylbenzene	1000 (454)	Fluoroacetamide	100 (45.4)
Ethyl carbamate (Urethan)	100 (45.4)	Fluoroacetic acid, sodium salt	10 (4.54)
Ethyl chloride *	100 (45.4)	Formaldehyde	100 (45.4)
Ethyl cyanide	10 (4.54)	Formic acid	5000 (2270)
Ethylene dibromide	1 (0.454)	Fulminic acid, mercury(2+)salt	10 (4.54)
Ethylene dichloride	100 (45.4)	Fumaric acid	5000 (2270)
Ethylene glycol	5000 (2270)	Furan	100 (45.4)
Ethylene glycol monoethyl ether	1000 (454)	Furan, tetrahydro-	1000 (454)
Ethylene oxide	10 (4.54)	2-Furancarboxaldehyde	5000 (2270)
Ethylenebisdithiocarbamic acid	5000 (2270)	2,5-Furandione	5000 (2270)
Ethylenebisdithiocarbamic acid, salts and esters	5000 (2270)	Furfural	5000 (2270)
Ethylenediamine	5000 (2270)	Furfuran	100 (45.4)
Ethylenediamine tetraacetic acid (EDTA)	5000 (2270)	Glucopyranose, 2-deoxy-2-(3-methyl-3- nitrosoureido)-	1 (0.454)
Ethylenethiourea	10 (4.54)	D-Glucose, 2-deoxy-2-[[methylnitrosoamino)-carbonyl]amino]-	1 (0.454)
Ethylenimine	1 (0.454)	Glycidylaldehyde	10 (4.54)
Ethyl ether	100 (45.4)	Guanidine, N-methyl-N'nitro-N-nitroso	10 (4.54)
Ethylidene dichloride	1000 (454)	Guthion	1 (0.454)
Ethyl methacrylate	1000 (454)	Heptachlor	1 (0.454)
Ethyl methanesulfonate	1 (0.454)	Heptachlor epoxide	1 (0.454)
Ethyl methyl ketone *	5000 (2270)	Hexachlorobenzene	10 (4.54)
Famphur	1000 (454)	Hexachlorobutadiene	1 (0.454)
Ferric ammonium citrate	1000 (454)	Hexachlorocyclohexane (gamma isomer)	1 (0.454)
Ferric ammonium oxalate	1000 (454)	Hexachlorocyclopentadiene	10 (4.54)
Ferric chloride	1000 (454)	Hexachloroethane	100 (45.4)
Ferric fluoride	100 (45.4)	1,2,3,4,10-10-Hexachloro-1,4,4a,5,8, 8a-hexahydro-1,4:5,8-endo,exo- dimethanonaphthalene	1 (0.454)
Ferric nitrate	1000 (454)		

Table A4.3. Continued

Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)	Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)
Hexachlorophene	100 (45.4)	Lead arsenate	1 (0.454)
Hexachloropropene	1000 (454)	Lead, bis(acetato-O) tetrahydroxytri	10 (4.54)
Hexaethyl tetraphosphate	100 (45.4)	Lead chloride	10 (4.54)
Hexamethylene-1,6-diisocyanate	100 (45.4)	Lead fluoborate	10 (4.54)
Hexamethylphosphoramide	1 (0.454)	Lead fluoride	10 (4.54)
Hexane	5000 (2270)	Lead iodide	10 (4.54)
Hydrazine	1 (0.454)	Lead nitrate	10 (4.54)
Hydrazine, 1,2-diethyl-	10 (4.54)	Lead phosphate	10 (4.54)
Hydrazine, 1,1-dimethyl-	10 (4.54)	Lead stearate	10 (4.54)
Hydrazine, 1,2-dimethyl-	1 (0.454)	Lead subacetate	10 (4.54)
Hydrazine, 1,2-diphenyl-	10 (4.54)	Lead sulfate	10 (4.54)
Hydrazine, methyl-	10 (4.54)	Lead sulfide	10 (4.54)
Hydrazinecarbothioamide	100 (45.4)	Lead thiocyanate	10 (4.54)
Hydrochloric acid	5000 (2270)	Lindane	1 (0.454)
Hydrocyanic acid	10 (4.54)	Lithium chromate	10 (4.54)
Hydrofluoric acid	100 (45.4)	Malathion	100 (45.4)
Hydrogen chloride	5000 (2270)	Maleic acid	5000 (2270)
Hydrogen cyanide	10 (4.54)	Maleic anhydride	5000 (2270)
Hydrogen fluoride	100 (45.4)	Maleic hydrazide	5000 (2270)
Hydrogen phosphide	100 (45.4)	Malononitrile	1000 (454)
Hydrogen sulfide	100 (45.4)	MDI	5000 (2270)
Hydrogen sulfide H2S	100 (45.4)	Melphalan	1 (0.454)
Hydroperoxide, 1-methyl-1-phenylethyl-	10 (4.54)	Mercaptodimethur	10 (4.54)
Hydroquinone	100 (45.4)	Mercuric cyanide	1 (0.454)
2-Imidazolidinethione	10 (4.54)	Mercuric nitrate	10 (4.54)
Indeno(1,2,3-cd)pyrene	100 (45.4)	Mercuric sulfate	10 (4.54)
1,3-Isobenzofurandione	5000 (2270)	Mercuric thiocyanate	10 (4.54)
Isobutyl alcohol	5000 (2270)	Mercurous nitrate	10 (4.54)
Isodrin	1 (0.454)	Mercury	1 (0.454)
Isophorone	5000 (2270)	Mercury, (acetato-O)phenyl-	100 (45.4)
Isoprene	100 (45.4)	Mercury fulminate	10 (4.54)
Isopropanolamine dodecylbenzene sulfonate	1000 (454)	Methacrylonitrile	1000 (454)
Isosafrole	100 (45.4)	Methanamine, N-methyl-	1000 (454)
3(2H)-Isoxazolone, 5-(aminomethyl)-	1000 (454)	Methanamine, N-methyl-N-nitroso	10 (4.54)
Kepone	1 (0.454)	Methane, bromo	1000 (454)
Lasiocarpine	10 (4.54)	Methane, chloro-	100 (45.4)
Lead +	10 (4.54)	Methane, chloromethoxy-	1 (0.454)
Lead acetate	10 (4.54)	Methane, dibromo-	1000 (454)

Table A4.3. Continued

Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)	Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)
Methane, dichloro-	1000 (454)	Methyl chloroformate	1000 (454)
Methane, dichlorodifluoro	5000 (2270)	Methylchloromethyl ether *	1 (0.454)
Methane, iodo-	100 (45.4)	3-Methylcholanthrene	10 (4.54)
Methane, isocyanato-	10 (4.54)	4,4'-Methylenebis(2-chloroaniline)	10 (4.54)
Methane, oxybis(chloro-	1 (0.454)	Methylene bromide	1000 (454)
Methane, tetrachloro-	10 (4.54)	Methylene chloride	1000 (454)
Methane, tetranitro-	10 (4.54)	4,4'-Methylenedianiline	10 (4.54)
Methane, tribromo-	100 (45.4)	Methylene diphenyl diisocyanate	5000 (2270)
Methane, trichloro-	10 (4.54)	Methylene oxide	100 (45.4)
Methane, trichlorofluoro-	5000 (2270)	Methyl ethyl ketone (MEK)	5000 (2270)
Methanesulfenyl chloride, trichloro-	100 (45.4)	Methyl ethyl ketone peroxide	10 (4.54)
Methanesulfonic acid, ethyl ester	1 (0.454)	Methyl hydrazine	10 (4.54)
Methanethiol	100 (45.4)	Methyl iodide	100 (45.4)
6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro -1,5,5a,6,9, 9a-hexahydro-, 3-oxide	1 (0.454)	Methyl isobutyl ketone	5000 (2270)
Methanoic acid	5000 (2270)	Methyl isocyanate	1 (0.454)
4,7-Methano-1H-indene, 1,4,5,6,7,8, 8-heptachloro-a,4,7,7a-tetrahydro-	1 (0.454)	2-Methyllactonitrile	10 (4.54)
4,7-Methano-1H-indene, 1,4,5,6,7,8, 8-octachloro-2,3,3a,4,7,7a-hexahydro-	1 (0.454)	Methyl mercaptan	100 (45.4)
Methanol	5000 (2270)	Methyl methacrylate	1000 (454)
Methapyrilene	5000 (2270)	Methyl parathion	100 (45.4)
1,3,4-Metheno-2H-cyclobutal[cd]-pentalen-2 -one, 1, 1a, 3, 3a, 4, 5, 5,5a,5b,6- decachloroctahydro-	1 (0.454)	4-Methyl-2-pentanone	5000 (2270)
Methomyl	100 (45.4)	Methyl tert-butyl ether	1000 (454)
Methoxychlor	1 (0.454)	Methylthiouracil	10 (4.54)
Methyl alcohol	5000 (2270)	Mevinphos	10 (4.54)
Methylamine *	100 (45.4)	Mexacarbate	1000 (454)
Methyl bromide	1000 (454)	Mitomycin C	10 (4.54)
1-Methylbutadiene	100 (45.4)	MNNG	10 (4.54)
Methyl chloride	100 (45.4)	Monoethylamine	100 (45.4)
Methyl chlorocarbonate	1000 (454)	Monomethylamine	100 (45.4)
Methyl chloroform	1000 (454)	Muscimol	1000 (454)
		Naled	10 (4.54)

Table A4.3. Continued

Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)	Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)
5,12-Naphthacenedione, 8-acetyl-10-[3-amino-2,3,6-trideoxy- alpha-L-lyxo-hexopyranosyl) oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-,(8S-cis)-	10 (4.54)	Nitrogen oxide NO2	10 (4.54)
Naphthalenamine, N,N-bis(2-chloroethyl)-	100 (45.4)	Nitroglycerine	10 (4.54)
Naphthalene	100 (45.4)	Nitrophenol (mixed)	100 (45.4)
Naphthalene, 2-chloro-	5000 (2270)	m-	
1,4-Naphthalenedione	5000 (2270)	o-	
2,7-Naphthalenedisulfonic acid, 3,3'-[(3,3'-dimethyl-(1,1'-biphenyl)-4, 4'-diyl)-bis(azo)]bis(5-amino-4-hydroxy)-tetrasodium salt	10 (4.54)	p-	
Naphthenic acid	100 (45.4)	o-Nitrophenol	100 (45.4)
1,4-Naphthoquinone	5000 (2270)	p-Nitrophenol	100 (45.4)
alpha-Naphthylamine	100 (45.4)	2-Nitrophenol	100 (45.4)
beta-Naphthylamine	1 (0.454)	4-Nitrophenol	100 (45.4)
1-Naphthylamine	100 (45.4)	2-Nitropropane	10 (4.54)
2-Naphthylamine	1 (0.454)	N-Nitrosodi-n-butylamine	10 (4.54)
alpha-Naphthylthiourea	100 (45.4)	N-Nitrosodiethanolamine	1 (0.454)
Nickel +	100 (45.4)	N-Nitrosodiethylamine	1 (0.454)
Nickel ammonium sulfate	100 (45.4)	N-Nitrosodimethylamine	10 (4.54)
Nickel carbonyl	10 (4.54)	N-Nitrosodiphenylamine	100 (45.4)
Nickel carbonyl Ni(CO)4,(T-4)-	10 (4.54)	N-Nitroso-N-ethylurea	1 (0.454)
Nickel chloride	100 (45.4)	N-Nitroso-N-methylurea	1 (0.454)
Nickel cyanide	10 (4.54)	N-Nitroso-N-methylurethane	1 (0.454)
Nickel cyanide Ni(CN)2	10 (4.54)	N-Nitrosomethylvinylamine	10 (4.54)
Nickel hydroxide	10 (4.54)	n-Nitrosomorpholine	1 (0.454)
Nickel nitrate	100 (45.4)	N-Nitrosopiperidine	10 (4.54)
Nickel sulfate	100 (45.4)	N-Nitrosopyrrolidine	1 (0.454)
Nicotine and salts	100 (45.4)	Nitrotoluene	1000 (454)
Nitric acid	1000 (454)	m-Nitrotoluene	
Nitric acid, thallium (1+) salt	100 (45.4)	o-Nitrotoluene	
Nitric oxide	10 (4.54)	p-Nitrotoluene	
p-Nitroaniline	5000 (2270)	5-Nitro-o-toluidine	100 (45.4)
Nitrobenzene	1000 (454)	Octamethylpyrophosphoramide	100 (45.4)
4-nitrobiphenyl	10 (4.54)	Osmium oxide OsO4 (T-4)-	1000 (454)
Nitrogen dioxide	10 (4.54)		
Nitrogen oxide NO	10 (4.54)		

Table A4.3. Continued

Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)	Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)
Osmium tetroxide	1000 (454)	Phenol, 2,4-dinitro-	10 (4.54)
7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid	1000 (454)	Phenol, methyl-	100 (45.4)
1,2-Oxathiolane, 2,2-dioxide	10 (4.54)	Phenol, 2-methyl-4,6-dinitro-	10 (4.54)
2H-1,3,2-Oxazaphosphorin-2-amine, N,N-bis(2-chloroethyl) tetrahydro-2-oxide	10 (4.54)	Phenol, 2,2'-methylenebis [3,4,6-trichloro-	100 (45.4)
Oxirane	10 (4.54)	Phenol, 2-(1-methylpropyl)-4,6-dinitro	1000 (454)
Oxiranecarboxyaldehyde	10 (4.54)	Phenol, 4-nitro-	100 (45.4)
Oxirane, (chloromethyl)-	100 (45.4)	Phenol, pentachloro-	10 (4.54)
Paraformaldehyde	1000 (454)	Phenol, 2,3,4,6-tetrachloro-	10 (4.54)
Paraldehyde	1000 (454)	Phenol, 2,4,5-trichloro-	10 (4.54)
Parathion	10 (4.54)	Phenol, 2,4,6-trichloro-	10 (4.54)
Pentachlorobenzene	10 (4.54)	Phenol, 2,4,6-trinitro-, ammonium salt	10 (4.54)
Pentachloroethane	10 (4.54)	L-Phenylalanine, 4-[bis(2-chloroethyl)aminol]	1 (0.454)
Pentachloronitrobenzene (PCNB)	100 (45.4)	p-Phenylenedimine	5000 (2270)
Pentachlorophenol	10 (4.54)	1,10-(1,2-Phenylene)pyrene	100 (45.4)
1,3-Pentadiene	100 (45.4)	Phenyl mercaptan *	100 (45.4)
Perchloroethylene	100 (45.4)	Phenylmercuric acetate	100 (45.4)
Perchloromethyl mercaptan *	100 (45.4)	Phenylthiourea	100 (45.4)
Phenacetin	100 (45.4)	Phorate	10 (4.54)
Phenanthrene	5000 (2270)	Phosgene	10 (4.54)
Phenol	1000 (454)	Phosphine	100 (45.4)
Phenol, 2-chloro-	100 (45.4)	Phosphoric acid	5000 (2270)
Phenol, 4-chloro-3-methyl-	5000 (2270)	Phosphoric acid, diethyl 4-nitrophenyl ester	100 (45.4)
Phenol, 2-cyclohexyl-4,6-dinitro-	100 (45.4)	Phosphoric acid, lead(2+) salt (2:3)	10 (4.54)
Phenol, 2,4-dichloro-	100 (45.4)	Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio) ethyl]ester	1 (0.454)
Phenol, 2,6-dichloro-	100 (45.4)	Phosphorodithioic acid, O,O-diethyl S-(ethylthio), methyl ester	10 (4.54)
Phenol, 4,4'-(1,2-diethyl-1,2-ethenediyl)bis-, (E)	1 (0.454)	Phosphorodithioic acid, O,O-diethyl S-methyl ester	5000 (2270)
Phenol, 2,4-dimethyl-	100 (45.4)	Phosphorodithioic acid, O,O-dimethyl S-[2 (methylamino)-2-oxoethyl] ester	10 (4.54)

Table A4.3. Continued

Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)	Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)
Phosphorofluoridic acid, bis(1-methylethyl) ester	100 (45.4)	Propane, 1,2-dibromo-3-chloro-	1 (0.454)
Phosphorothioic acid, O,O-diethyl O-(4-nitrophenyl) ester	10 (4.54)	Propane, 1,2-dichloro-	1000 (454)
Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester	100 (45.4)	Propane, 2-nitro-	10 (4.54)
Phosphorothioic acid, O,O-dimethyl O-(4-nitrophenyl) ester	100 (45.4)	Propane, 2,2'-oxybis [2-chloro-	1000 (454)
Phosphorothioic acid, O,[4-[(dimethylamino) sulfonyl phenyl]O,O-dimethyl ester	1000 (454)	1,3-Propane sultone	10 (4.54)
Phosphorus	1 (0.454)	Propanedinitrile	1000 (454)
Phosphorus oxychloride	1000 (454)	Propanenitrile	10 (4.54)
Phosphorus pentasulfide	100 (45.4)	Propanenitrile, 3-chloro-	1000 (454)
Phosphorus sulfide	100 (45.4)	Propanenitrile, 2-hydroxy-2-methyl-	10 (4.54)
Phosphorus trichloride	1000 (454)	1,2,3-Propanetriol, trinitrate-	10 (4.54)
Phthalic anhydride	5000 (2270)	1-Propanol, 2,3-dibromo-, phosphate (3:1)	10 (4.54)
2-Picoline	5000 (2270)	1-Propanol, 2-methyl-	5000 (2270)
Piperidine, 1-nitroso-	10 (4.54)	2-Propanone	5000 (2270)
Plumbane, tetraethyl-	10 (4.54)	2-Propanone, 1-bromo-	1000 (454)
POLYCHLORINATED BIPHENYLS (PCBs)	1 (0.454)	Propargite	10 (4.54)
Potassium arsenate	1 (0.454)	Propargyl alcohol	1000 (454)
Potassium arsenite	1 (0.454)	2-Propenal	1 (0.454)
Potassium bichromate	10 (4.54)	2-Propenamide	5000 (2270)
Potassium chromate	10 (4.54)	1-Propene, 1,3-dichloro-	100 (45.4)
Potassium cyanide	10 (4.54)	1-Propene, 1,1,2,3,3,3-hexachloro-	1000 (454)
Potassium cyanide K(CN)	10 (4.54)	2-Propenenitrile	100 (45.4)
Potassium hydroxide	1000 (454)	2-Propenenitrile, 2-methyl	1000 (454)
Potassium permanganate	100 (45.4)	2-Propenoic acid	5000 (2270)
Potassium silver cyanide	1 (0.454)	2-Propenoic acid, ethyl ester	1000 (454)
Pronamide	5000 (2270)	2-Propenoic acid, 2-methyl-, ethyl ester	1000 (454)
Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl] oxime	1 (0.454)	2-Propenoic acid, 2-methyl-, methyl ester	1000 (454)
1-Propanamine	5000 (2270)	2-Propen-1-ol	100 (45.4)
1-Propanamine, N-nitroso-N-propyl-	10 (4.54)	beta-Propioaldehyde	1000 (454)
1-Propanamine, N-propyl-	5000 (2270)	Propionic acid	5000 (2270)
		Propionic acid, 2-(2,4,5-trichlorophenoxy)-	100 (45.4)
		Propionic anhydride	5000 (2270)

Table A4.3. Continued

Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)	Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)
Propoxur (baygon)	100 (45.4)	Sodium azide	1000 (454)
n-Propylamine	5000 (2270)	Sodium bichromate	10 (4.54)
Propylene dichloride	1000 (454)	Sodium bifluoride	100 (45.4)
Propylene oxide	100 (45.4)	Sodium bisulfite	5000 (2270)
1,2-Propyleimine	1 (0.454)	Sodium chromate	10 (4.54)
2-Propyn-1-ol	1000 (454)	Sodium cyanide	10 (4.54)
Pyrene	5000 (2270)	Sodium cyanide Na(CN)	10 (4.54)
Pyrethrins	1 (0.454)	Sodium dodecylbenzene sulfonate	1000 (454)
3,6-Pyridazinedione, 1,2-dihydro-	5000 (2270)	Sodium fluoride	1000 (454)
4-Pyridinamine	1000 (454)	Sodium hydrosulfide	5000 (2270)
Pyridine	1000 (454)	Sodium hydroxide	1000 (454)
Pyridine, 2-methyl-	5000 (2270)	Sodium hypochlorite	100 (45.4)
Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)	100 (45.4)	Sodium methylate	1000 (454)
2,4-(1H,3H)-Pyrimidinedione, 5-[bis(2- chloroethyl)amino]-	10 (4.54)	Sodium nitrite	100 (45.4)
4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-	10 (4.54)	Sodium phosphate, dibasic	5000 (2270)
Pyrrolidine, 1-nitroso-	1 (0.454)	Sodium phosphate, tribasic	5000 (2270)
Quinoline	5000 (2270)	Sodium selenite	100 (45.4)
Reserpine	5000 (2270)	Streptozotocin	1 (0.454)
Resorcinol	5000 (2270)	Strontium chromate	10 (4.54)
Saccharin and salts	100 (45.4)	Strychnidin-10-one	10 (4.54)
Safrole	100 (45.4)	Strychnidin-10-one, 2,3-dimethoxy-	100 (45.4)
Selenious acid	10 (4.54)	Strychnine and salts	10 (4.54)
Selenious acid, dithallium(1+) salt	1000 (454)	Styrene	1000 (454)
Selenium +	100 (45.4)	Styrene oxide	100 (45.4)
Selenium dioxide	10 (4.54)	Sulfur chloride *	1000 (454)
Selenium oxide	10 (4.54)	Sulfur monochloride	1000 (454)
Selenium sulfide	10 (4.54)	Sulfur phosphide	100 (45.4)
Selenium sulfide SeS2	10 (4.54)	Sulfuric acid	1000 (454)
Selenourea	1000 (454)	Sulfuric acid, dimethyl ester	100 (45.4)
L-Serine, diazoacetate (ester)	1 (0.454)	Sulfuric acid, dithallium(I+) salt	100 (45.4)
Silver	1000 (454)	2,4,5-T	1000 (454)
Silver cyanide	1 (0.454)	2,4,5-T acid	1000 (454)
Silver cyanide Ag(CN)	1 (0.454)	2,4,5-T amines	5000 (2270)
Silver nitrate	1 (0.454)	2,4,5-T esters	1000 (454)
Silvex (2,4,5-TP)	100 (45.4)	2,4,5-T salts	1000 (454)
Sodium	10 (4.54)	TDE	1 (0.454)
Sodium arsenate	1 (0.454)	1,2,4,5-Tetrachlorobenzene	5000 (2270)
Sodium arsenite	1 (0.454)	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1 (0.454)

Table A4.3. Continued

Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)	Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)
1,1,1,2-Tetrachloroethane	100 (45.4)	Toluene diisocyanate	100 (45.4)
1,1,2,2-Tetrachloroethane	100 (45.4)	o-Toluidine	100 (45.4)
Tetrachloroethane *	100 (45.4)	p-Toluidine	100 (45.4)
Tetrachloroethene	100 (45.4)	o-Toluidine hydrochloride	100 (45.4)
Tetrachloroethylene	100 (45.4)	Toxaphene	1 (0.454)
2,3,4,6-Tetrachlorophenol	10 (4.54)	2,4,5-TP acid	100 (45.4)
Tetraethyl lead	10 (4.54)	2,4,5-TP acid esters	100 (45.4)
Tetraethyl pyrophosphate	10 (4.54)	1H-1,2,4-Triazol-3-amine	10 (4.54)
Tetraethyldithiopyrophosphate	100 (45.4)	Trichlorfon	100 (45.4)
Tetrahydrofuran	1000 (454)	1,2,4-Trichlorobenzene	100 (45.4)
Tetranitromethane	10 (4.54)	1,1,1-Trichloroethane	1000 (454)
Tetraphosphoric acid, hexaethyl ester	100 (45.4)	1,1,2-Trichloroethane	100 (45.4)
Thallic oxide	100 (45.4)	Trichloroethene	100 (45.4)
Thallium +	1000 (454)	Trichloroethylene	100 (45.4)
Thallium(I) acetate	100 (45.4)	Trichloromethanesulfenyl chloride	100 (45.4)
Thallium(I) carbonate	100 (45.4)	Trichloromonofluoromethane	5000 (2270)
Thallium(I) chloride	100 (45.4)	Trichlorophenol	10 (4.54)
Thallium chloride TICI	100 (45.4)	2,3,4-Trichlorophenol	
Thallium(I) nitrate	100 (45.4)	2,3,5-Trichlorophenol	
Thallium oxide T1203	100 (45.4)	2,3,6-Trichlorophenol	
Thallium selenite	1000 (454)	2,4,5-Trichlorophenol	
Thallium(I) sulfate	100 (45.4)	2,4,6-Trichlorophenol	
Thioacetamide	10 (4.54)	3,4,5-Trichlorophenol	
Thiodiphosphoric acid, tetraethyl ester	100 (45.4)	2,4,5-Trichlorophenol	10 (4.54)
Thiofanox	100 (45.4)	2,4,6-Trichlorophenol	10 (4.54)
Thioimidodicarbonic diamide [(H2N)C(S)]2NH	100 (45.4)	Triethanolamine dodecylbenzene sulfonate	1000 (45.4)
Thiomethanol	100 (45.4)	Triethylamine	5000 (2270)
Thioperoxydicarbonic diamide [(H2N)C(S)]2S2, tetramethyl-	10 (4.54)	Trifluralin	10 (4.54)
Thiophenol	100 (45.4)	Trimethylamine	100 (45.4)
Thiosemicarbazide	100 (45.4)	2,2,4-Trimethylpentane	1000 (454)
Thiourea	10 (4.54)	1,3,5-Trinitrobenzene	10 (4.54)
Thiourea, (2-chlorophenyl)-	100 (45.4)	1,3,5-Trioxane, 2,4,6-trimethyl-	1000 (45.4)
Thiourea, 1-naphthalenyl-	100 (45.4)	Tris(2,3-dibromopropyl) phosphate	10 (4.54)
Thiourea, phenyl-	100 (45.4)	Trypan blue	10 (4.54)
Thiram	10 (4.54)	Uracil mustard	10 (4.54)
Titanium tetrachloride	1000 (454)	Uranyl acetate	100 (45.4)
Toluene	1000 (454)	Uranyl nitrate	100 (45.4)
Toluenediamine	10 (4.54)	Urea, N-ethyl-N-nitroso-	1 (0.454)

Table A4.3. Continued

Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)	Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)
Urea, N-methyl-N-nitroso-	1 (0.454)	Zinc cyanide Zn(CN)2	10 (4.54)
Vanadic acid, ammonium salt	1000 (454)	Zinc fluoride	1000 (454)
Vanadium oxide V205	1000 (454)	Zinc formate	1000 (454)
Vanadium pentoxide	1000 (454)	Zinc hydrosulfite	1000 (454)
Vanadyl sulfate	1000 (454)	Zinc nitrate	1000 (454)
Vinyl acetate	5000 (2270)	Zinc phenolsulfonate	5000 (2270)
Vinyl acetate monomer	5000 (2270)	Zinc phosphide	100 (45.4)
Vinylamine, N-methyl-N-nitroso-	10 (4.54)	Zinc phosphide Zn3P2, when present at concentrations greater than 10%	100 (45.4)
Vinyl bromide	100 (45.4)	Zinc silicofluoride	5000 (2270)
Vinyl chloride	1 (0.454)	Zinc sulfate	1000 (454)
Vinylidene chloride	100 (45.4)	Zirconium nitrate	5000 (2270)
Warfarin, & salts, when present at concentrations greater than 0.3%	100 (45.4)	Zirconium potassium fluoride	1000 (454)
Xylene	100 (45.4)	Zirconium sulfate	5000 (2270)
m-Xylene	1000 (454)	Zirconium tetrachloride	5000 (2270)
o-Xylene	1000 (454)	D001 Unlisted Hazardous Wastes Characteristic of Ignitability	100 (45.4)
p-Xylene	100 (45.4)	D002 Unlisted Hazardous Wastes Characteristic of Corrosivity	100 (45.4)
Xylene (mixed)	100 (45.4)	D003 Unlisted Hazardous Wastes Characteristic of Reactivity	100 (45.4)
Xylenes (isomers and mixture)	100 (45.4)	D004 - D043 Specific Hazardous Wastes with Toxicity Characteristics	
Xylenol	1000 (454)	D004 Arsenic	1 (0.454)
Yohimban-16-carboxylic acid, 11, 17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl) oxy]-, methyl ester(3beta, 16beta, 17alpha, 18beta, 20alpha)-	5000 (2270)	D005 Barium	1000 (454)
Zinc +	1000 (454)	D006 Cadmium	10 (4.54)
Zinc acetate	1000 (454)	D007 Chromium	10 (4.54)
Zinc ammonium chloride	1000 (454)	D008 Lead	10 (4.54)
Zinc borate	1000 (454)	D009 Mercury	1 (0.454)
Zinc bromide	1000 (454)	D010 Selenium	10 (4.54)
Zinc carbonate	1000 (454)	D011 Silver	1 (0.454)
Zinc chloride	1000 (454)	D012 Endrin	1 (0.454)
Zinc cyanide	10 (4.54)	D013 Lindane	1 (0.454)
		D014 Methoxychlor	1 (0.454)

Table A4.3. Continued

Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)	Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)
D015 Toxaphene	1 (0.454)	D035 Methyl ethyl ketone	5000 (2270)
D016 2,4-D	100 (45.4)	D036 Nitrobenzene	1000 (454)
D017 2,4,5-TP (Silvex)	100 (45.4)	D037 Pentachlorophenol	10 (4.54)
D018 Benzene	10 (4.54)	D038 Pyridine	1000 (454)
D019 Carbon tetrachloride	10 (4.54)	D039 Tetrachloroethylene	100 (45.4)
D020 Chlordane	1 (0.454)	D040 Tricholorethylene	100 (45.4)
D021 Chlorobenzene	100 (45.4)	D041 2,4,5-Trichlorophenol	10 (4.54)
D022 Chloroform	10 (4.54)	D042 2,4,6-Trichlorophenol	10 (4.54)
D023 o-Cresol	100 (45.4)	D043 Vinyl chloride	1 (0.454)
D024 m-Cresol	100 (45.4)	F001	10 (4.54)
D025 p-Cresol	100 (45.4)	The following spent halogenated solvents used in degreasing; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more, (by volume) of one or more of the below listed halogenated solvents or those solvents listed in F002, F004 and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	
D026 Cresol	100 (45.4)	(a) Tetrachloroethylene	100 (45.4)
D027 1,4-Dichlorobenzene	100 (45.4)	(b) Trichloroethylene	100 (45.4)
D028 1,2-Dichloroethane	100 (45.4)	(c) Methylene chloride	1000 (454)
D029 1,1-Dichloroethylene	100 (45.4)	(d) 1,1,1-Trichloroethane	1000 (454)
D030 2,4-Dinitrotoluene	10 (4.54)	(e) Carbon tetrachloride	10 (45.4)
D031 Heptachlor (and hydroxide)	1 (0.454)	(f) Chlorinated fluorocarbons	5000 (2270)
D032 Hexachlorobenzene	10 (4.54)	F002	10 (45.4)
D033 Hexachlorobutadiene	1 (0.454)	The following spent halogenated solvents; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the below listed halogenated solvents or those listed in F001, F004, F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	
D034 Hexachloroethane	100 (45.4)	(a) Tetrachloroethylene	100 (45.4)

Table A4.3. Continued

Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)	Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)
(b) Methylene chloride	1000 (454)	F004	100 (45.4)
(c) Trichloroethylene	100 (45.4)	The following spent non-halogenated solvents and the stillbottoms from the recovery of these solvents	
(d) 1,1,1-Trichloroethane	1000 (454)	(a) Cresols/Cresylic acid	1000 (454)
(e) Chlorobenzene	100 (45.4)	(b) Nitrobenzene	100 (45.4)
(f) 1,1,2-Trichloro-1,2,2-trifluoroethane	5000 (2270)	F005	100 (45.4)
(g) o-Dichlorobenzene	100 (45.4)	The following spent non-halogenated solvents and the stillbottoms from the recovery of these solvents:	
(h) Trichlorofluoromethane	5000 (2270)	(a) Toluene	1000 (454)
(i) 1,1,2 Trichloroethane	100 (45.4)	(b) Methyl ethyl ketone	5000 (2270)
F003	100 (45.4)	(c) Carbon disulfide	100 (45.4)
The following spent non-halogenated solvents and solvents:		(d) Isobutanol	5000 (2270)
(a) Xylene	1000 (454)	(e) Pyridine	1000 (454)
(b) Acetone	5000 (2270)	F006	10 (4.54)
(c) Ethyl acetate	5000 (2270)	Wastewater treatment sludges from electroplating operations except from the following processes: (1) sulfuric acid anodizing of aluminum,(2) tin plating on carbon steel, (3) zinc plating (segregated basis) on carbonsteel, (4) aluminum or zinc-aluminum plating on carbon steel, (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel, and (6) chemical etching and milling of aluminum.	
(d) Ethylbenzene	1000 (454)	F007	10 (4.54)
(e) Ethyl ether	100 (45.4)	Spent cyanide plating bath solutions from electroplating operations.	
(f) Methyl isobutyl ketone	5000 (2270)	F008	10 (4.54)
(g) n-Butyl alcohol	5000 (2270)	Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.	
(h) Cyclohexanone	5000 (2270)		
(i) Methanol	5000 (2270)		

Table A4.3. Continued

Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)	Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)
F009	10 (4.54)	F019	10 (4.54)
Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.		Wastewater treatment sludges from the chemical conversion coating of aluminum-- except from zirconium phosphating in aluminum can washing when such phosphating is an exclusive conversion coating process.	
F010	10 (4.54)	F020	1 (0.454)
Quenching bath residues from oil baths from metal heat treating operations where cyanides are used in the process.		Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in formulating process) of tri- or tetrachlorophenol, or of intermediates used to produce their pesticide derivatives. (This listing does not include wastes from the production of hexachlorophene from higly purified 2,4,5,- trichlorophenol.	
F011	10 (4.54)	F021	1 (0.454)
Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations (except for precious metals heat treating spent cyanide solutions from salt bath pot cleaning).		Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol, or of intermediates used to produce its derivatives.	
F012	10 (4.54)	F022	1 (0.454)
Quenching wastewater treatment sludges from metal heat treating operations where cyanides are used in the process.		Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzenes under alkaline conditions	

Table A4.3. Continued

Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)	Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)
F023	1 (0.454)	F027	1 (0.454)
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- and tetrachlorophenols. (This listing does not include wastes from equipment used only for the production or use of hexachlorophene from highly purified 2,4,5-trichlorophenol.).		Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols. (This listing does not include formulations containing hexachlorophene synthesized from prepurified 2,4,5-trichlorophenol as the sole component.).	
F024	1 (0.454)	F028	1 (0.454)
Wastes, including but not limited to distillation residues, heavy ends, tars, and reactor cleanout wastes, from the production of chlorinated aliphatichydrocarbons, having carbon content from one to five, utilizing free radical catalyzed processes. (This listing does not include light ends, spent filters and filter aids, spent dessicants(sic), wastewater, wastewater treatment sludges, spent catalysts, and wastes listed in 40 CFR 261.32.).		Residues resulting from the incineration or thermal treatment of soil contaminated with EPA Hazardous Waste Nos. F020, F021, F022, F023, F026, and F027.	
F025	1 (0.454)	F032	1 (0.454)
Condensed light ends, spent filters and filter aids, and spent desiccant wastes from the production of certain chlorinated aliphatic with varying amounts and positions of with varying amounts and positions of chlorine substitution.		F034	1 (0.454)
F026	1 (0.454)	F035	1 (0.454)
Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzene under alkaline conditions.		F037	1 (0.454)
		F038	1 (0.454)
		F039	1 (0.454)

Table A4.3. Continued

Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)	Hazardous Substance	Reportable Quantity (RQ) Pounds (Kilograms)
Footnotes:			
+ The RQ for these hazardous substances is limited to those pieces of metal having a diameter smaller than 100 micrometer (0.004 inches)			
++ The RQ for asbestos is limited to			
friable forms only			
*** Indicates that the name was added by DOT because (1) the name is a synonym for a specific hazardous substance for a specific hazardous substance and (2) the name appears in the Hazardous Materials Table as a proper shipping name.**			

★CLASS 1--EXPLOSIVES AND AMMUNITION

A5.1. General Requirements. This attachment contains information concerning packaging and general handling instructions for Class 1 material.

A5.2. General Handling Instructions. Class 1 materials can function by detonation or combustion. Store away from fire hazards and handle carefully. Do not drop. Handle dropped Class 1 material according to A3.3.1.1. Comply with A3.3.1.3 explosive safety requirements.

A5.3. Removing Explosive Devices. Remove explosive devices from aircraft systems before shipment by military cargo aircraft when possible. However, where removal of such explosives is not feasible, ship aircraft systems with explosive devices installed provided that:

- The safety devices are in place and secured to the maximum extent possible (including blocking or banding when advantageous) to prevent arming.
- The aircraft system's packaging provides reasonable security against tampering with the installed explosive items or the arming systems.
- The aircraft system's packaging is properly marked with respect to the explosives involved in the shipment.
- The shipping documentation properly identifies the explosive nature of the shipment to include the proper hazard classification for each configured item. The Shipper's Declaration must identify all of the installed explosive components. Reference this paragraph on the Shipper's Declaration rather than the specific paragraphs for the individual installed devices.

A5.4. Chemical Ammunitions. Chemical ammunitions are dangerous materials that are found in a variety of forms such as artillery shells, mortar shells, spray tanks, aircraft bombs, grenades, candles, rockets, and containers of chemical agents that are not high explosives or shrapnel. Chemical munitions are filled with war gases, smoke, or incendiaries. They are divided into four groups, according to the nature of fillings. These groupings are described in the service regulations referenced in A3.3.1.3.

A5.4.1. **Handling Chemical Ammunitions.** Use maximum preferential handling. Use the same materials handling equipment for high explosive munitions that is used for chemical munitions.

A5.4.2. **Reporting and Disposing of Chemical Ammunitions.** Immediately report any leaking chemical munitions to the agency initiating the shipment. If the leak is due to causes other than faulty munitions construction, report according to 1.9. Dispose of leaking or damaged chemical munitions according to applicable service directives. The report should include the following:

- Type and amount of chemical munitions.
- Lot number.
- Date discovered.
- Detailed information concerning the nature and possible cause of leak.
- Disposition or recommendation for disposition.

A5.5. Captured Ammunition and Ammunition With Unknown Characteristics. Transport this ammunition on military aircraft only under the following provisions:

- Explosive ordinance disposal (EOD) personnel must inspect the items and complete necessary action to make them safe for air shipment, and sign a certificate to this effect.
- Qualified personnel assign a hazard classification. Pack and mark according to the perscribed packaging in table A4.1, including UN specification POP requirements.

A5.6. Ammonium Nitrate-Fuel Oil Mixture (containing only prilled ammonium nitrate and fuel oil). Package:

A5.6.1. In inner oil-resistant bags or plastic sheets, then pack in an outer paper, multiwall, water resistant (5M2), woven plastic, without inner lining or coating (5H1), woven plastic, sift-proof (5H2), woven plastic, water resistant (5H3), plastic film (5H4), textile, sift-proof (5L2), or textile, water resistant (5L3) bags.

A5.6.2. In inner oil-resistant bags or plastic sheets, then pack in an outer fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), aluminum (4B), or plastics, solid (4H2) box.

A5.6.3. In inner oil-resistant bags or plastic sheets, then pack in an outer fiber (1G), steel, removable head (1A2), aluminum, removable head (1B2) drum.

A5.6.4. In outer woven plastic, sift-proof (5H2) or woven plastic, water resistant (5H3). No inner packaging is required.

A5.7. Ammonium Nitrate. Package:
A5.7.1. In an outer paper, multiwall, water resistant (5M2), textile, sift-proof (5L2), textile, water resistant (5L3), woven plastic, sift-proof (5H2), woven plastic, water resistant (5H3), or plastic film (5H4) bag. No inner packaging is required.
A5.7.2. In inner kraft paper or plastic bags, or in plastic sheets, then pack in one of the following outer packagings:
A5.7.2.1. Removable head wood barrel (2C2).
A5.7.2.2. Ordinary wood (4C1), plywood (4D), reconstituted wood (4F) box.
A5.7.2.3. Removable head steel drum (1A2).

A5.8. Ammonium Perchlorate; Ammonium Picrate; Deflagrating Metal Salts of Aromatic Nitroderivatives, N.O.S.; Dinitroglycoluril or Dingu; Dinitrophenol; Dinitrophenolates; Dinitroresorcinol; Dipicryl Sulfide; 5-Nitrobenzotriazol; Nitrotriazolone or NTO; Nitro Urea; and Powder Cake, Wetted or Powder Paste, Wetted (UN 0433); Sodium Dinitro-O-Cresolate; Sodium Picramate; Tetranitroaniline; Trinitro-Meta-Cresol; Trinitroaniline or Picramide; Trinitroanisole; Trinitrobenzene; Trinitrobenzenesulfonic Acid; Trinitrochlorobenzene or Picryl Chloride; Trinitrofluorenone; Trinitronaphthalene; Trinitrophenetole; Trinitrophenol or Picric Acid; Trinitroresorcinol or Styphnic Acid; Trinitrotoluene and Trinitrobenzene Mixtures or TNT and Trinitrobenzene Mixtures or TNT and Hexannitrostilbene Mixtures or Trinitrotoluene and Hexanitrostilnene Mixtures; Trinitrotoluene Mixtures Containing Trinitrobenzene and Hexanitrostilbene or TNT Mixtures containing Trinitrobenzene and Hexanitrostilbene; Tritonal; Urea Nitrate; and Zirconium Picramate. Pack water-soluble substances in waterproof receptacles. Ensure all packages are lead-free (except UN 0402). Package:
A5.8.1. In inner metal, paper, or plastic receptacles. Pack inner receptacles in one of the following outer packagings:
A5.8.1.1. Removable head wood barrel (2C2).
A5.8.1.2. Fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F) box.
A5.8.1.3. Removable head steel (1A2), or fiber (1G) drum.
A5.8.2. In inner plastic sheets, then pack in one of the following outer packagings:
A5.8.2.1. Removable head wood barrel (2C2).
A5.8.2.2. Fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F) box.
A5.8.2.3. Removable head steel (1A2), or fiber (1G) drum.
A5.8.3. In inner paper, multiwall, water resistant, or woven plastic bags, then pack in one of the following outer packagings:
A5.8.3.1. Removable head wood barrel (2C2).
A5.8.3.2. Fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F) box.
A5.8.3.3. Removable head steel (1A2), or fiber drum.

A5.9. Ammunition Illuminating; Ammunition Incendiary; Ammunition Incendiary, White Phosphorus; Ammunition Practice; Ammunition Proof; Ammunition Smoke; Ammunition Smoke, White Phosphorus; Ammunition, Tear-Producing; and Ammunition, Toxic. Inner packagings are not necessary. However, fit open ends of inner packaging (when used) with padded end caps or provide padding in the outer packaging. Pack in one of the following outer packagings:
A5.9.1. Fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), aluminum (4B), expanded plastics (4H1), or plastics, solid (4H2) box.
A5.9.2. Removable head steel (1A2), fiber (1G), or aluminum, removable head (1B2) drum.
A5.9.3. Crates for large articles. Also, large articles without propelling charge and without means of ignition or initiation, or large articles without their means of initiation or with their means of initiation containing at least two effective protective features may be carried unpacked if secured to pallets or securely blocked and braced.

A5.10. Articles, Explosive, Extremely Insensitive or Articles, EEI; Bombs; Bombs, Photo-Flash; Charges, Depth; Mines; Projectiles; Warheads, Rocket; and Warheads, Torpedo: Inner packagings are not necessary. Pack in one of the following outer packagings:

A5.10.1. Ordinary wood (4C1), plywood (4D), reconstituted wood (4F), or steel (4A), aluminum (4B), or plastics, solid (4H2) box.
A5.10.2. Removable head steel (1A2) drum.
A5.10.3. Except for UN 0434 and 0435, large articles without their means of initiation, or with their means of initiation containing at least two effective protective features, may be carried unpacked if secured to pallets or securely blocked and braced.

A5.11. Articles, Explosive, N.O.S; Articles, Pyrophoric (1.2L); Components, Explosive Train, N.O.S.; Nitrocellulose; and Propellant Explosive, Liquid; Rocket Motors, Liquid Fueled; Rockets, Liquid Fueled; Substances, Explosive, NOS and Substances, Explosive, Very Insensitive, NOS or Substances, EVI, N.O.S. Ship these items according to a CAA. See 2.5 for more information on CAAs. Comply with handling instructions and shipping requirements of A5.74 when shipping "Rocket Motors, Liguid Fueled" or "Rockets, Liquid Fueled"".

A5.12. Articles, Pyrotechnic and Toy Caps. Package as follows:
A5.12.1. Package UN0428 and UN0429 in inner metal, plastic, wood, paper, or fiberboard receptacles. Pack inner receptacles in an outer ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box. Pad metal inner packagings with cushioning material.
A5.12.2. Package UN0430, UN0431, UN0432, and NA0337 in inner fiberboard, metal, plastic, or wood receptacles. Pack inner receptacles in one of the following outer packagings:
A5.12.2.1. Fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), aluminum (4B) box.
A5.12.2.2. Removable head steel (1A2), or aluminum (4B) drum.

A5.13. Barium Azide; Barium Styphnate; Diazodinitrophenol, Wetted; Guanyl Nitrosaminoguanylidene Hydrazine, Wetted; Guanyl Nitrosaminoguanyltetrazene, Wetted; Tetrazene, Wetted; Lead Azide, Wetted; Lead Mononitroresorcinate; Lead Styphnate, Wetted; Lead Trinitroresorcinate, Wetted; Mannitol Hexanitrate or Nitromannite, Wetted; Mercury Fulminate, Wetted; and Nitrosoguanidine. The barrels and drums must have a watertight seal. Fill the intermediate and outer packagings with water or an appropriate water-saturated material when the intermediate packaging is a rubber or rubberized textile bag. Sorround completely the intermediate packaging inside the outer packaging with wetted cushioning material. Package in inner plastic, rubber, textile, or rubberized textile bags. Pack inner packagings in an intermediate plastic, rubber, textile, or rubberized textile bag, wood barrel, or plastic receptacle. Pack this configuration in one of the following outer packagings:
A5.13.1. Removable head wood barrel (2C2).
A5.13.2. Removable head plastic (1H2) or removable head steel (1A2) drum.

A5.14. Black Powder or Gunpowder; Black Powder, Compressed or Gunpowder, Compressed; Black Powder, in Pellets or Gunpowder, in Pellets. Packaged as follows:
A5.14.1. Package UN0028 in inner plastic bags, kraft paper or wax paper sheets. Pack inner packagings in an outer fiberboard (4G), sift-proof wood (4C2), plywood (4D), or reconstituted wood (4F) box.
A5.14.2. Package UN0027 in inner fiberboard, metal, paper, plastic, or rubberized textile receptacles. Pack inner receptacles in one of the following outer packagings:
A5.14.2.1. Fiberboard (4G), ordinary wood (4C1), sift-proof wood (4C2), plywood (4D), reconstituted wood (4F), or steel (4A) box.
A5.14.2.2. Removable head wood barrel (2C2).
A5.14.3. Package UN0027 in an outer removable head steel (1A2), removable head aluminum (1B2), or fiber (1G) drum. Ensure removable head steel drum (1A2) is dust tight. Inner packagings are not necessary.

A5.15. Bombs With Flammable Liquid.
A5.15.1. **Handling Instructions.** Warning! This item contains ethylene oxide. If ethylene oxide odor or leakage is detected, the area must be kept well ventilated. Remove the item from transportation as soon as practical. Prolonged exposure to ethylene oxide fumes is hazardous to health.
A5.15.2. **Packaging Requirements.** Ship these items according to a CAA. See 2.5 for more information on CAAs.

A5.16. Boosters with Detonator. Package in inner metal, plastic, or wood receptacles. Pack inner receptacles in an outer ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box. Dividing

partitions in the outer packaging may be used in place of inner packagings. Detonators with radioactive components are also subject to attachment 11 requirements for radioactive material.

A5.17. Boosters. Use a liner or inner coating for metal outer packagings unless another means, such as the use of an inner packaging or cushioning material protects the explosive substance from contact with the metal outer packaging during normal conditions of tranport. Package as follows:
A5.17.1. Use this packaging for boosters which are finished articles consisting of closed metal, plastic, or fiberboard receptacles that contain a detonating explosive, or consist of a plastic-bonded detonating explosive. Pack in outer fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box. Inner packaging is not necessary.
A5.17.2. Use this packaging for cast or pressed boosters in tube or capsules without end closures. Package in inner fiberboard, metal, or plastic receptacles, or in plastic or paper sheets. Pack inner receptacles in an outer fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box.

A5.18. Bursters. Package in inner metal, plastic, wood, paper, or fiberboard receptacles. Pack inner receptacles in an outer ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box. Pad metal inner packagings with cushioning material.

A5.19. Cartridges, Flash and Cartridges, Signal. Package in inner fiberboard, metal, kraft paper (for cartridge of 1.4G and 1.4S only), plastic, or wood receptacles. Pack inner receptacles in an outer fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), aluminum (4B), expanded plastics (4H1), or plastics, solid (4H2) box.

A5.20. Cartridges for Weapons; Cartridges for Weapons, Inert Projectile or Cartridges, Small Arms; Cartridges for Weapons, Blank, or Cartridges, Small Arms, Blank; Explosive Pest Control Devices. Package in inner fiberboard, metal, plastic, or wood boxes. Metal clips or dividing partitions in the outer packaging may be used in place of inner packagings. Fit open ends of inner packagings with padded end caps or provide padding in the outer packaging. Pack inner packaging in one of the following outer packagings:
A5.20.1. Fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box.
A5.20.2. Removable head steel drum (1A2).

A5.21. Cartridges, Oil Well. Package in inner fiberboard, plastic, or metal receptacles. Pack inner receptacles in an outer fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), natural wood, with sift-proof walls (4C2), or steel (4A) box.

A5.22. Cartridges, Power Device and Model Rocket Motor. Package in inner fiberboard, plastic, metal, or wood receptacles. Plastic bags may be used as inner packagings for model rocket moters. Pack inner receptacles in one of the following outer packagings:
A5.22.1. Fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), aluminum (4B), or natural wood, with sift-proof walls (4C2) box.
A5.22.2. Steel, removable head drum (1A2).

A5.23. Cases, Cartridge, Empty With Primer and Cases, Combustible, Empty, Without Primer. Package in inner plastic or textile bags, or fiberboard, plastic or wood boxes. Bags are authorized as inner packagings for small cases only. Dividing partitions may be used in the outer packaging in place of inner packagings. Pack inner packagings in an outer fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box.

A5.24. Charges, Bursting, Plastics Bonded. Package in an outer ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box. Inner packagings are not necessary.

A5.25. Charges, Demolition. Use a liner or inner coating for metal outer packagings unless another means, such as the use of an inner packaging or cushioning material protects the explosive substance from contact with the metal

outer packaging during normal conditions of tranport. Inner packaging is not necessary. Pack in one of the following outer packagings:
A5.25.1. Ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), aluminum (4B), or fiberboard (4G) box.
A5.25.2. Steel, removable head (1A2) drum.

A5.26. Charges, Explosive, Commercial and Tracers for Ammunition. Package in inner plastic bags, fiberboard boxes, or fiberboard, plastic, or metal tubes. Dividing partitions may be used in the outer packaging in place of inner packagings. Pack inner packagings in an outer fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box.

A5.27. Charges, Propelling. Ensure the inside of drums and jerricans are galvanized, painted, or otherwise protected. Bare steel must not come into contact with smokeless powder. Ensure metal receptacles are so constructed that the risk of explosion, by reason of increase in internal pressure (from internal or external causes), is reduced. Plastic inner packagings must not be liable to generate sufficient static electricity that a discharge could cause the packaged articles to function. Package:
A5.27.1. In inner kraft paper, plastic, textile, or rubberized textile bags. Pack inner packagings in one of the following outer packagings:
A5.27.1.1. Fiberboard (4G), ordinary wood (4C1), sift-proof wood (4C2), plywood (4D), reconstituted wood (4F), or solid plastic (4H2) box.
A5.27.1.2. Removable head steel (1A2), fiber (1G), or plywood (1D) drum.
A5.27.3. In inner fiberboard, metal, or plastic receptacles. Pack inner receptacles in an outer fiberboard (4G), ordinary wood (4C1), sift-proof wood (4C2), plywood (4D), reconstituted wood (4F), or solid plastics (4H2) box.
A5.27.4. In a composite packaging constructed of a plastic receptacle with an outer solid plastic (6HH2) box. Inner packaging is not necessary.

A5.28. Charges, Propelling, for Cannon. Inner packagings are not necessary. Pack in one of the following outer packagings:
A5.28.1. Ordinary wood (4C1), sift-proof wood (4C2), plywood (4D), reconstituted wood (4F), steel (4A), aluminum (4B), fiberboard (4G), or plastic, solid (4H2) box. Ordinary wood (4C1) is authorized for cased charges only.
A5.28.2. Removable head steel (1A2) or a removable head aluminum (1B2) drum.

A5.29. Charges, Shaped, Commercial. Package shaped charges to prevent contact between charges. Conical cavities must face inward in pairs or groups to minimize the shaped charge (jetting) effect in the event of accidental initiation. Package shaped charges in inner fiberboard or other type material tubes. Pack inner packagings in an outer fiberboard (4G), ordinary wood (4C1), plywood (4D), or reconstituted wood (4F) box. Dividing partitions may be used in the outer packaging in place of inner packagings.

A5.30. Charges, Shaped, Flexible, Liner. Ensure the ends of charges are sealed, or use bags or plastic material as inner packagings. Use a liner or inner coating for metal outer packagings unless another means, such as the use of an inner packaging or cushioning material protects the explosive substance from contact with the metal outer packaging during normal conditions of tranport. Inner packagings are not necessary. Package in an outer:
A5.30.1. Fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box.
A5.30.2. Removable head steel (1A2), or removable head aluminum (1B2) drum.

A5.31. Charges, Supplementary Explosive. Package in inner metal, plastic, wood, or fiberboard boxes. Pack inner packagings in an outer fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box.

A5.32. Contrivances, Water-Activated. Package as follows:
A5.32.1. In inner fiberboard, plastic, or metal receptacles. Pack inner receptacles in an outer ordinary wood (4C1) with metal liner, plywood (4D), reconstituted wood (4F), steel (4A), aluminum (4B), or expanded plastic (4H1) box.

Dividing partitions may be used in outer packagings in place of inner packagings. Seal packagings against the ingress of water.
A5.32.2. Large articles without their means of initiation, or with their means of initiation containing at least two effective protective features, may be carried unpacked if secured to pallets or securely blocked and braced.

A5.33. Cord, Detonating. Seal and tie securely the ends of the detonating cord. Package on inner reels or in metal receptacles. Then pack in one of the following outer packagings:
A5.33.1. Fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box.
A5.33.2. Removable head steel (1A2), removable head aluminum (1B2), or fiber (1G) drum.

A5.34. Cord or Fuse, Detonating, Cord or Fuse, Detonating Mild Effect. Package in inner plastic bags, kraft paper or plastic sheets. Reels may be used in place of inner packagings. Seal the ends of the detonating cord. Fill void spaces with packing material. Pack inner packagings or reels in one of the following outer packagings:
A5.34.1. Fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box.
A5.34.2. Removable head steel (1A2), or removable head aluminum (1B2) drum.

A5.35. Cord, Igniter. Package in inner fiberboard receptacles or on reels. Pack inner packaging or reels in one of the following outer packagings:
A5.35.1. Fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box.
A5.35.2. Removable head steel (1A2), or removable head aluminum (1B2) drum.

A5.36. Cutters, Cable, Explosive. Package in inner fiberboard, metal, or plastic receptacles, then pack in an outer ordinary wood (4C1), plywood (4D), reconstituted wood (4F), fiberboard (4G), steel (4A), aluminum (4B), box.

A5.37. Cyclotetramethylenetetranitramine, Octogen, or HMX Desensitized; Cyclotetramethylenetetranitramine, HMX, or Octogen Wetted; Cyclotrimethylenetrinitramine, Cyclonite, Hexogen, or RDX Desensitized; Cyclotrimethylenetrinitramine, Cyclonite, Hexogen, or RDX Wetted; Cyclotrimethylenetrinitramine and Octogen, Mixtures, Wetted or Desensitized; Cyclotrimethylenetrinitramine and Cyclotetramethylenetetranitramine, Mixtures, Wetted or Desensitized; Cyclotrimethylenetrinitramine and HMX Mixtures, Wetted or Desensitized; Pentaerythrite Tetranitrate or Pentaerythritol Tetranitrate or PETN, Wetted; or Pentaerythrite Tetranitrate or Pentaerythritol Tetranitrate or PETN, Desensitized; RDX and Cyclotetramethylenetetranitramine, Wetted or Desensitized; RDX and HMX Mixtures, Wetted or Desensitized. Package wetted explosives according to A5.37.1 or A5.37.2. Package desensitized explosives according to A5.37.3 or A5.37.4.
A5.37.1. Inner plastic or rubberized textile bags, then pack in one of the following outer packagings:
A5.37.1.1. Removable head wood (2C2) barrel.
A5.37.1.2. Fiberboard (4G), ordinary wood (4C1), plywood (4D), or reconstituted wood (4F) box.
A5.37.1.3. Removable head steel (1A2), or fiber (1G) drum.
A5.37.2. Inner rubber, textile, or rubberized textile bag, then pack in an intermediate rubber, rubberized textile, or a plastic bag. Pack this configuration in one of the following outer packagings:
A5.37.2.1. Removable head wood (2C2) barrel.
A5.37.2.2. Removable head steel (1A2) or fiber (1G) drum.
A5.37.3. Inner fiberboard box, plastic or any textile bag, then pack in one of the following outer packagings:
A5.37.3.1. Removable head wood (2C2) barrel.
A5.37.3.2. Fiberboard (4G), ordinary wood (4C1), plywood (4D), or reconstituted wood (4F) box.
A5.37.3.3. Removable head steel (1A2), or fiber (1G) drum.
A5.37.4. Inner fiberboard box, rubber, or any textile bag, then pack in an intermediate textile bag. Pack this configuration in one of the following outer packagings:
A5.37.4.1. Removable head wood (2C2) barrel.
A5.37.4.2. Removable head steel (1A2), or fiber (1G) drum.

A5.38. Detonator Assemblies, Non electric:
A5.38.1. **General Requirements.** Detonators are not required to be attached to the safety fuse, metal-clad mild detonating cord, detonating cord, or shock tube. There is no quantity limitation for 1.4B or 1.4S, except for the ability of that packaging to pass certain tests (see 49 CFR, paragraph 173.57) that qualify the detonators to be classed as 1.4B or 1.4S; or the gross weight limitations of the container used. Do not pack detonator assemblies with detonating cord with more than 50 detonator assemblies in one inner packaging, and no more than 500 detonator assemblies in one outer packaging. Do not pack detonator assemblies with safety fuse or shock tube with more than 50 detonator assemblies in one inner packaging, and no more than 1,000 detonator assemblies in one outer packaging. For detonators not identified above, the following quantity limitations apply:

- For detonators containing no more than 10 g (.35 oz) of explosives (excluding ignition and delay charges), pack no more than 50 detonators in one inner packaging, and no more than 500 detonators in one outer packaging.
- For detonators containing no more than 3 g (.11 oz) of explosive (excluding ignition and delay charges), pack no more than 100 detonators in one inner packaging, and no more than 1,000 detonators in one outer packaging.

A5.38.2. **Packaging Requirements.** Inner packagings are not required if the packing configuration restricts free movement of the caps and protects them from impact forces. Package items in inner fiberboard, metal, or paper receptacles. Pack inner receptacles in an outer fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box.

A5.39. Detonators, Electric:
A5.39.1. **General Requirements.** For detonators containing no more than 10 g (0.35 oz) of explosive (excluding ignition and delay charges) pack no more than 50 detonators in one inner packaging, and no more than 500 detonators in one outer packaging. For detonators containing no more than 3 g (0.11 oz) of explosive (excluding ignition and delay charges) pack no more than 100 detonators in one inner packaging, and no more than 500 detonators in one outer packaging. There is no quantity limitation for 1.4B or 1.4S detonators, except for the ability of that packaging to pass certain tests (see 49 CFR, paragraph 173.57) that qualify the detonators to be classed as 1.4B or 1.4S; or the gross weight limitations of the container used. However, under no condition pack more than 500 electric blasting caps in one outer packaging.
A5.39.2. **Packaging Requirements.** Inner packaging is not required for electric detonators which are packed in pasteboard tubes, or when their leg wires are wound on spools with the caps either placed inside the spool or securely taped to the wire on the spool, so as to restrict free movement of the caps and to protect them from impact forces. Package items in inner fiberboard, metal, or paper receptacles. Pack inner receptacles in an outer fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box.

A5.40. Detonators for Ammunition. Cushion detonators to prevent movement and contact between them. Package in inner fiberboard, plastic, or wood boxes; fiberboard, plastic, or wood trays; or metal cans. Fit all inner packagings with dividing partitions. Pack inner packagings in an outer ordinary wood (4C1), plywood (4D), reconstituted wood (4F), fiberboard (4G), steel (4A), or aluminum (4B) box.

A5.41. Detonators, Non-electric. Do not use plastic inner packagings that are liable to generate sufficient static electricity that a discharge could cause the packaged articles to function. Package detonators, non-electric (including percussion activity) or detonating relays in metal tubes as follows:

- Detonators containing no more than 10 g (0.35 oz) of explosive (excluding ignition and delay charges) may have no more than 50 detonators in one inner packaging, and no more than 500 detonators in one outer packaging. Detonators containing no more than 3 g (0.11 oz) of explosive (excluding ignition and delay charges) may have no more than 110 detonators in one inner packaging and no more than 5,000 detonators in one outer packaging.
- Package detonators in inner fiberboard, metal, or plastic receptacles with the open end of any detonator covered with appropriate cushioning material.
- Tightly pack inner packagings in an intermediate package of fiberboard or wood boxes, kraft paper or plastic sheets. Separate intermediate packagings from the outside packaging by at least 25 mm (1 in) of cushioning material. Intermediate packagings are only required for non-electric detonators that are blasting caps or delay connectors in metal tubes.

- Pack the inner configuration in an outer fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box.

A5.42. Diethyleneglycol Dinitrate, Desensitized; Nitroglycerin, Desensitized; and Propellant, Liquid. Package as follows:
A5.42.1. Tape screwcap closures of plastic receptacles. Do not use plastic receptacles greater than 5 liters capacity each. Contain each receptacle within an intermediate packaging. Surround each plastic bag on all sides with at least 50mm of non-combustible absorbent cushioning material. Cushion metal cans from each other in all directions. Do not exceed 30 kg net mass of propellent for each package. Package in a inner plastic receptacle, then pack in an intermediate bag, or plastic, in metal can. Pack this configuration in an outer ordinary wood (4C1), plywood (4D), reconstituted wood (4F) box.
A5.42.2. Surround the intermediate drum on all sides with at least 50mm of non-combustible absorbent cushioning material. A composite packaging consisting of a plastic receptacle in a metal drum may be used instead of the inner and intermediate packagings. Do not exceed 120 liters net volume of propellent in each packaging. Package in an inner plastic receptacle, then pack in an intermediate drum or metal receptacle. Pack this configuration in an outer removable head steel (1A2), or removable head aluminum (1B2) drum.

A5.43. Dinitrosobenzene; 5-Mercaptotetrazol-1-Acetic Acid; and Tetrazol-1-Acetic Acid. Package in an inner plastic bag, then pack in an outer removable head steel (1A2), or fiber drum (1G).

A5.44. Explosive, Blasting, Type A (UN 0081); Explosive, Blasting, Type B (UN 0082); and Explosive, Blasting, Type E (UN 0241). If a waterproof sheet is used, it must be impervious to any liquid explosive ingredients of the item Package in an inner waterproof material receptacle or waterproof sheet, then package in one of the following outer packaging:
A5.44.1. Removable head wood barrel (2C2).
A5.44.2. Steel (4A), aluminum (4B), solid plastic (4H2), fiberboard (4G), ordinary wood (4C1), plywood (4D), or reconstituted wood (4F) box.
A5.44.3. Removable head steel (1A2), removable head aluminum (1A2), or fiber drum (1G). No inner packaging is required if a fiber drum (1G) is used.

A5.45. Explosive, Blasting, Type B (UN 0331) or Agent Blasting, Type B. If a waterproof sheet is used, it must be impervious to any liquid explosive ingredients of the item. No inner packaging is required if a fiber drum (1G) is used.
A5.45.1. Package in an inner waterproof material receptacle or waterproof sheet, then package in one of the following outer packagings:
A5.45.1.1. Removable head wood (2C2) barrel.
A5.45.1.2. Fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), aluminum (4B), or solid plastic (4H2) box.
A5.45.1.3. Removable head steel (4A), removable head aluminum (4B), or fiber (1G) drum.
A5.45.2. In inner oil-resistant bag, plastic sheet, or metal can, then package in one of the following outer packagings:
A5.45. 2.1. Multiwall water resistant paper (5M2), sift-proof textile (5L2), water resistant textile (5L3), woven plastic, without inner lining or coating (5H1), sift-proof woven plastic (5H2), water resistant woven plastic (5H3), or plastic film (5H4). If 5H2, 5H3, 5H4, or 5M2 are used, no inner packaging is necessary.
A5.45.2.2. Fiberboard (4G), ordinary wood (4C1), or plywood (4D) box.
A5.45.2.3. Removable head steel (1A2), or fiber (1G) drum.

A5.46. Explosive, Blasting, Type C (UN 0083). Package in an inner waxed paper, plastic, or rubberized textile bag or sheet, then pack in one of the following outer packagings:
A5.46.1. Removable head wood (2C2) barrel.
A5.46.2. Ordinary wood (4C1), plywood (4D), or reconstituted wood (4F) box.

A5.47. Explosive, Blasting, Type D (UN 0084); Hexanitrodiphenylamine or Dipicrylamine or Hexyl; Hexanitrostilbene; Trinitrobenzoic Acid; Trinitrophenylmethylnitramine or Tetryl . Package in an inner

waxed paper, plastic, or rubberized textile bag, or waxed paper, plastic, textile, or rubberized textile sheet, then pack in one of the following outer packagings:
A5.47.1. Removable head wood (2C2) barrel.
A5.47.2. Fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F) box.
A5.47.3. Fiber drum (1G).

A5.48. Explosive, Blasting, Type E (UN 0332) or Agent Blasting, Type E. Package in an inner oil-resistant bag or plastic sheet, then pack in one of the following outer packagings:
A5.48.1. Multiwall water resistant paper (5M2), sift-proof textile (5L2), water resistant textile (5L3), woven plastic, without inner lining or coating (5H1), sift-proof woven plastic (5H2), water resistant woven plastic (5H3), or plastic film (5H4). If 5H2, or 5H3 are used, no inner packaging is necessary.
A5.48.1. Fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), aluminum (4B), or solid plastic box. Inner packaging is not required when packed in an outer fiberboard (4G) box.
A5.48.2. Removable head steel (1A2), removable head aluminum (1B2), or fiber (1G) drum.

A5.49. Fireworks (UN 0333). Package in an inner fiberboard or plastic receptacle, or plastic sheet, then pack in one of the following outer packagings:
A5.49.1. Fiberboard (4G), ordinary wood (4C1), plywood (4D), or reconstituted wood (4F) box.
A5.49.2. Fiber drum (1G).

A5.50. Fireworks (UN 0334, 0335, or 0336). Package in an inner fiberboard, plastic, or metal receptacle, or paper sheet, then pack in one of the following outer packagings:
A5.50.1. Fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), aluminum (4B), or expanded plastic box.
A5.50.2. Removable head steel (1A2), removable head aluminum (1B2), removable head plastic (1H2), or fiber (1G) drum.

A5.51. Fireworks (UN 0337) and Rockets. Package in an outer fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box. Inner packagings are not necessary.

A5.52. Flares, Aerial or Surface. Dividing partitions in the outer package may be used in place of inner packagings. Package in an inner fiberboard, metal, or plastic receptacle, or a kraft paper sheet, then pack in one of the following outer packagings:
A5.52.1. Fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), aluminum (4B), expanded plastic (4H1), or solid plastic (4H2) box.
A5.52.2. Removable head steel (1A2), removable head aluminum (1B2), removable head plastic (1H2), or fiber (1G) drum.

A5.53. Flash Powder. Do not package more than 50 g (1.8 oz) of flash powder in each inner packaging. Package in an inner metal, plastic, wood, or fiberboard receptacle, then pack in one of the following outer packagings:
A5.53.1. Fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), aluminum (4B), or solid plastic(4H2) box.
A5.53.2. Fiber drum (1G).

A5.54. Fracturing Devices, Explosive. Package in an inner fiberboard, metal, plastic, or wood receptacle, then pack in one of the following outer packagings:
A5.54.1. Fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box.
A5.54.2. Removable head steel (1A2) or removable head aluminum (1B2) drum.

A5.55. Fuse, Igniter; Fuse, Instantaneous, Non-detonating or Quickmatch. Package in an inner plastic bag, reel, kraft paper, or plastic sheet, then pack in an outer fiberboard (4G), ordinary wood (4C1), plywood (4D), or reconstituted wood (4F) box.

A5.56. Fuse, Safety. Use a liner or inner coating for metal outer packagings unless another means, such as the use of an inner packaging or cushioning material protects the explosive substance from contact with the metal outer packaging during normal conditions of tranport. Inner packagings are not required if the ends of the articles are sealed. Package in inner plastic bags, then pack in one of the following outer packagings:
A5.56.1. Fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), aluminum (4B), or expanded plastic (4H2) box.
A5.56.2. Removable head steel (1A2), removable head aluminum (1B2), or fiber drum (1G).

A5.57. Fuzes, Detonating and Fuzes, Igniting. Separate detonating fuzes UN 0106, 0107, 0257, 0367, 0408, 0409, and 0410 from each other in the inner packaging. Dividing partitions in the outer packaging may be used in place of inner packagings. Package in an inner fiberboard, metal, plastic, or wood receptacle, plastic or wood tray, then pack in one of the following outer packagings:
A5.57.1. Fiberboard (4G, not authorized for UN 0106 or 0107), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), aluminum (4B), or solid plastic (4H2) box.
A5.57.2. Removable head steel (1A2) drum.

A5.58. Grenades, Empty Primed; and Primers, Cap Type. Pack primers fitted with anvil, composition not covered with a disk of metal foil or other material (varnished only), in fiberboard or plastic trays in single layer rows with not more than 500 primers in any inner packaging. Primers not fitted with an anvil, composition covered, may not have more than 5,000 primers in any inner packaging. Package:
A5.58.1. In an inner fiberboard, metal, plastic, or wood box, or metal can. Pack inner packagings in an outer fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box.
A5.58.2. In an inner sleeved fiberboard or plastic tray, then pack in an intermediate fiberboard, metal, plastic, or wood box, or metal can. Pack this configuration in an outer fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box.
A5.58.3. Large articles without their means of initiation, or with their means of initiation containing at least two effective protective features, may be carried unpacked if secured to pallets or securely blocked and braced.

A5.59. Grenades and Grenades, Practice. Pack in an outer ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), aluminum (4B), or solid plastic (4H2) box. Inner packagings are optional.

A5.60. Hexolite or Hexotol; Hexotonal; Octolite or Octol; Octonal and Pentolite. Package wetted explosives according to A5.60.1 or A5.60.2. Package dry explosives according to A5.60.3 or A5.60.4.
A5.60.1. Package in inner plastic, woven plastic, or paper, multiwall, water resistant bag, or plastic sheet, then pack in one of the following outer packagings:
A5.60.1.1. Removable head wood (2C2) barrel.
A5.60.1.2. Fiberboard (4G), ordinary wood (4C1), plywood (4D), or reconstituted wood (4F) box.
A5.60.1.3. Fiber drum (1G).
A5.60.2. Package in inner paper, plastic, woven plastic, or paper, multiwall, water resistant bag, fiberboard box, or plastic sheet, then pack in one of the following outer packagings:
A5.60.2.1. Removable head wood (2C2) barrel.
A5.60.2.2. Fiberboard (4G), ordinary wood (4C1), plywood (4D), or reconstituted wood (4F) box.
A5.60.2.3. Fiber drum (1G).

A5.61. Igniters (UN 0121, 0314, and 0315). Pad igniters (UN 0121) packed in inner metal packagings with cushioning material. Package in inner metal, plastic, wood, or fiberboard receptacles, then pack in one of the following outer packagings:
A5.61.1. Ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box.
A5.61.2. Removable head steel (1A2) drum.

A5.62. Igniters (UN 0325 and 0454) and Lighters, Fuse. Package in inner fiberboard, metal, or wood receptacles, paper sheets or plastic trays. Pack the inner packaging in an outer fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), aluminum (4B), or solid plastic (4H2) box.

A5.63. Jet Perforating Guns, Charged Oil Well, With Detonator, and Jet Perforating Guns, Charged. The total quantity of explosive substance contained in the shaped charges and the detonating cord must not exceed 10 kg per assembled perforating gun. Segregate initiation devices from each other, and from any gun, tool, or other supplies. Carry initiation devices in a container having individual pockets for each device or in a fully enclosed steel container lined with non-sparking material. Two initiation devices per gun may be carried on the same aircraft. Do not exceed 112 g (4 ounces) of explosive for each shaped charge affixed to the gun. Protect each shaped charge not completely enclosed in glass or metal by a metal cover after installation in the gun. Package in an inner water resistant bag, then pack in an outer fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box.

A5.64. Nitrocellulose, Plasticized and Nitrocellulose, Wetted. Package in an inner waterproof paper, plastic, or rubberized textile bag; or a plastic or rubberized textile sheet, the pack in one of the following outer packagings:
A5.64.1. Removable head wood (2C2) barrel.
A5.64.2. Fiberboard (4G), ordinary wood (4C1), plywood (4D), or reconstituted wood (4F) box.
A5.64.3. Fiber drum (1G).
A5.64.4. Removable head steel (1A2), or removable head aluminum (1B2) drum. Inner packagings are not necessary.

A5.65. Nitroglycerin, Solution in Alcohol. Package in an inner metal can, or glass or plastic receptacle. Pack the inner cans or receptacles in an outer ordinary wood (4C1), plywood (4D), or reconstituted wood (4F) box.

A5.66. Nitroguanidine or Picrite. Package in an inner paper or plastic bag, or a plastic sheet, then pack in one of the following outer packagings:
A5.66.1. Removable head wood barrel (2C2).
A5.66.2. Fiberboard (4G), ordinary wood (4C1), plywood (4D), or reconstituted wood (4F) box.
A5.66.3. Removable head steel (1A2), plywood (1D), or fiber (1G) drum.

A5.67. Nitrostarch; Powder Cake, Wetted or Powder Paste, Wetted (UN 0159). Package in an inner plastic bag or plastic sheet, then pack in one of the following outer packagings:
A5.67.1. Removable head wood (2C2) barrel.
A5.67.2. Ordinary wood (4C1), plywood (4D), or reconstituted wood (4F) box.
A5.67.3. Fiber (1G) drum.
A5.67.1. Removable head aluminum (1B2), removable head steel (1A2), or removable head plastic (1H2) drum. Construct metal drums used for powder paste, so an explosion is not possible from an increase in internal pressure from internal or external causes. Inner packagings are not necessary.

A5.68. Pentaerythrite Tetranitrate or Pentaerythritol Tetranitrate or PETN. Package in inner kraft paper, plastic, textile, or rubberized textile bags. Seal all inner packagings. Pack inner packagings in one of the following outer packagings:
A5.68.1. Removable head wood (2C2) barrel.
A5.68.2. Fiberboard (4G), ordinary wood (4C1), sift-proof wood (4C2), plywood (4D), reconstituted wood (4F), or steel (4A) box.
A5.68.3. Plywood (1D) or fiber (1G) drum.

A5.69. Potassium Salts of Aromatic Nitro-Derivatives and Sodium Salts of Aromatic Nitro-Derivatives NOS. Use lead-free packages. Ensure plastic used is not liable to generate static electricity by contained substances. Package in inner fiberboard boxes, metal cans, waterproof paper or plastic receptacles. Pack inner packagings in an outer sift-proof wood (4C2), plywood (4D), or reconstituted wood (4F) box.

A5.70. Powder, Smokeless; and Propellant, Solid. Package in an inner kraft paper, plastic, textile, or rubberized textile bag, then pack in one of the following outer packagings:
A5.70.1. Removable head wood (2C2) barrel.
A5.70.2. Fiberboard (4G), ordinary wood (4C1), sift-proof wood (4C2), plywood (4D), reconstituted wood (4F), or steel (4A) box.
A5.70.3. Plywood (1D), or fiber (1G) drum.

A5.70.4. In an inner fiberboard, metal, or plastic receptacle. Pack the inner packagings in an outer fiberboard (4G), ordinary wood (4C1), sift-proof wood (4C2), plywood (4D), or reconstituted wood (4F) box. Construct metal receptacles so that the risk of explosion caused by increased internal pressure (from internal or external causes) is reduced.
A5.70.5. Inner packagings are not necessary. Galvanize, paint, or otherwise protect the inside of drums and jerricans. Ensure bare steel does not come into contact with the smokeless powder. Construct packages without pockets or crevices that could trap or nip the smokeless powder. Construct metal receptacles so that the risk of explosion caused by increased internal pressure (from internal or external causes) is reduced. Pack in one of the following outer packagings:
A5.70.5.1. Removable head steel (1A2), fiber (1G), or plywood (1D) drum.
A5.70.5.2. Steel (3A1), or removable head steel (3A2) jerrican.

A5.71. Primers, Tubular. Package in an inner fiberboard, metal, or wood box, or a fiberboard tube, or a plastic tray. Pack the inner packagings in an outer ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box.

A5.72. Release Devices, Explosive and Rivets Explosive. Package in an inner fiberboard, metal (for rivets, explosive only), plastic, or wood receptacle. Pack the inner receptacles in an outer fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box.

A5.73. Rocket Motors (UN 0186, 0280, and 0281). Package in an outer fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box. Inner packagings are not necessary. Igniters or igniter components may be shipped in the same outside container with the rocket motor, if separately packaged according to A5.61 or A5.62.

A5.74. Rocket Motors with Hypergolic Liquids:
A5.74.1. **Packaging Requirements.** Reinforce outer plastic packaging with metal at the corners and edge. Inner packagings are not necessary. Package in one of the following outer packagings:
A5.74.1.1. In an ordinary wood (4C1), plywood (4D), reconstituted wood (4F), solid plastic (4H2), steel (4A), or aluminum (4B) box.
A5.74.1.2. Large articles without their means of ignition may be carried unpackaged if securely fastened to pallets or securely blocked and braced.
A5.74.2. **Handling Instructions.** Exercise extreme caution in handling this item. Keep well ventilated, away from sparks, fire hazards, and oxidizing materials. Vapors are toxic when inhaled. Liquid is corrosive. Fuel in presence of an oxidizer is self-igniting and highly reactive. Personnel exposed to this material must wear protective clothing, gloves, safety goggles, and must use a positive pressure breathing apparatus.
A5.74.3. **Shipping Requirements.** The following requirements apply:

- Load containers having an installed indicator in such a manner as to provide access to the indicator during flight. Inspect the indicator before aircraft loading, after aircraft loading, at cruise altitude, periodically during flight as cargo tiedown is inspected, and after landing. The normal color of the indicator is white or off-white. The color will change to yellow if inhibited red fuming nitric acid (IRFNA) leak occurs. The color will change to black if an amine fuel mixture (AFM) leak occurs. Changes will be obvious and will not require technical escort personnel to monitor.
- Containers that do not have an indicator installed must be preplanned under the same conditions as described in 2.9. The shipper must contact the carrier no less than 72 hours before movement. The shipper must also furnish the following:
- Protective clothing, gloves, and a positive pressure breathing apparatus for all personnel aboard the aircraft.
- Fume-detecting equipment.
- A qualified technical escort or courier with equipment to monitor the item for leaks and is prepared to take emergency inflight action.

A5.74.3.1. When a leak is detected, either by observation of the indicator or by monitoring equipment:

- Get personnel out of the cargo compartment.
- Alert pilot and crew.
- Depressurize cargo compartment and ventilate as soon as possible.
- All personnel should go on 100 percent oxygen.

- Declare an in-flight emergency.
- Be prepared to jettison cargo if possible.
- Descend and land as soon as possible.
- Aircraft must be parked in an isolated area.
- Aircraft must be unloaded by EOD personnel as soon as possible.

A5.75. Rockets, Line-Throwing. Package in inner fiberboard or metal receptacle. Pack the inner receptacles in one of the following outer packagings:
A5.75.1. Fiberboard (4G), ordinary wood (4C1), plywood (4D), or reconstituted wood (4F) box,
A5.75.2. Fiber drum (1G).

A5.76. Samples, Explosive. Give explosive samples a tentative classification for shipment according to the procedures established in TB 700-2/NAVSEAINST 8020.3/TO 11A-1-47/DLAR 8220.1, *DoD Explosive Hazard Classification Procedures*. Package according to the applicable paragraph specified in table A4.1 as identified by the tentative classification. Cite this paragraph and the applicable packaging paragraph on the Shipper's Declaration.

A5.77. Signal Devices, Hand; Signals, Distress; and Signals, Smoke. Package in an inner fiberboard or metal box, metal or plastic receptacle, or a kraft paper sheet. Then package the inner packagings in one of the following outer packagings:
A5.77.1. Fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), aluminum (4B), expanded plastic (4H1), or solid plastic (4H2) box. Outer boxes of natural wood may be provided with a tin-plate liner having a sealed lid.
A5.77.2. Removable head steel (1A2), removable head aluminum (1B2), removable head plastic (1H2), or fiber drum (1G).

A5.78. Signals, Railway Track, Explosive. Separate the signals to prevent contact with one another and kept away from the interior walls of the outer container using adequate cushioning material. When signals are housed in magazines for fitting into automatic units, the magazine may replace the inner packaging provided adequate cushioning material is used. If tin-plate inner packagings are used, they must be sealed. Package in an inner metal, plastic, wood, or fiberboard receptacle. Then pack the inner receptacless in one of the following outer packagings:
A5.78.1. Fiberboard (4G), ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box.
A5.78.2. Fiber drum (1G).

A5.79. Sounding Devices, Explosive. Individually wrap in inner corrugated fiberboard sheets or insert in fiberboard tubes, then pack in an intermediate fiberboard, metal, or plastic receptacle. Pack this configuration in an outer ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box.

A5.80. Torpedoes and Torpedoes, Liquid Fueled.
A5.80.1. **Handling Instructions.** Contains Otto Fuel II as a liquid propellant. In the event of a leak, avoid direct skin contact, ingestion, or inhalation of vapors. Vapors are toxic and may cause severe headache and nausea.
A5.80.2. **Packaging Requirements.** Inner packagings are not necessary. Package in an outer ordinary wood (4C1), plywood (4D), reconstituted wood (4F), steel (4A), or aluminum (4B) box.

A5.81. Trinitroresorcinol, Wetted or Styphnic Acid. Package in an inner rubber, rubberized textile, or plastic bag, then pack as follows:
A5.81.1. In an outer fiberboard (4G) box.
A5.81.2. In an intermediate rubber, rubberized textile, or plastic bag, then pack in an outer removable head steel (1A2) drum with coating other than lead.

A5.82. Trinitrotoluene or TNT. Package in an inner plastic, paper, or multiwall, water-resistant paper bag, plastic sheet, or a metal, paper, or plastic receptacle. Then pack in one of the following outer packagings:
A5.82.1. Removable head wood barrel (2C2).
A5.82.2. Fiberboard (4G), ordinary wood (4C1), plywood (4D), or reconstituted wood (4F) box.
A5.82.3. Fiber (1G) drum.

A5.82.4. Plastic sift-proof bag (5H2). Plastic sift-proof bags may only be used for flake or prilled TNT in the dry state. Do not exceed 30 kg (66 pounds) maximum net mass per bag.

CLASS 2--COMPRESSED GASES

A6.1. General Requirements. This attachment contains information concerning the packaging and general handling instructions for Class 2.1 (flammable gas), Class 2.2 (nonflammable, nontoxic compressed gas), and Class 2.3 (toxic gas).

★A6.2. General Handling Instructions for Compressed Gases.

- Store compressed gases in a cool, ventilated area away from fire hazards, sources of heat, ignition, or sparks.
- When stored in an upright position, secure cylinders to fixed supports. Compressed gas cylinders may be palletized for shipment provided the valves are protected and cylinders are adequately secured to the pallet.
- Exercise care when handling compressed gases. Do not drop, jar, or slide cylinders since the gas may be toxic or asphyxiating. Personnel must know the importance of handling compressed gases properly.
- Ensure valves are always tightly closed and protected before offering for transportation.

★A6.3. Small Receptacles Containing Compressed Gas.

A6.3.1. Package aerosol products:

A6.3.1.1. In inner nonrefillable non-metal receptacles not exceeding 120 mL (4 fluid-ounce) capacity each, or in inner nonrefillable metal or plastic receptacles containing a non-toxic substance not exceeding 1 L (34 fluid-ounces) provided all of the following conditions are met:

- Pressure in the aerosol container must not exceed 1245 kPa at 55 degrees C (180 psig at 130 degrees F) and each receptacle must be capable of withstanding without bursting a pressure of at least 1.5 times the equilibrium pressure of the contents at 55 degrees C (130 degrees F).
- If the pressure exceeds 970 kPa at 55 degrees C (140 psig at 130 degrees F) but does not exceed 1105 kPa at 55 degrees C (160 psig at 130 degrees F) use a DOT 2P, IP7, IP7A, or IP7B inner metal receptacle. If the pressure exceeds 1105 kPa at 55 degrees C (160 psig at 130 degrees F) but does not exceed 1245 kPa at 55 degrees C (180 psig at 130 degrees F) use a DOT 2Q, IP7A, or IP7B inner metal receptacle.
- Liquid content of the material and the gas must not completely fill the receptacle at 55 degrees C (130 degrees F).
- Each aerosol exceeding 120 mL (4 fluid ounce) capacity must have been heated until the pressure in the aerosol is equivalent to the equilibrium pressure of the content at 55 degrees C (130 degrees F) without evidence of leakage, distortion, or other defects.
- Protect the valves by a cap or other suitable means.
- Tightly pack aerosals in a strong outer packaging. The outer packaging must be capable of meeting the limited quantity performance standards outlined in A19.3.4. UN specification (POP marked) packaging is not required.
- The complete package must not exceed 30 kg (66 lbs) gross weight.

A6.3.1.2. In inner nonrefillable non-metal receptacles not exceeding 120 mL (4 fluid ounce) capacity each, or in inner nonrefillable metal receptacles not exceeding 1 L (34 fluid ounces) provided all of the following conditions are met:

- Pressure in the aerosol container must not exceed 1500 kPa at 55 degrees C (217 psig at 130 degrees F) and each receptacle must be capable of withstanding without bursting a pressure of at least 1.5 times the equilibrium pressure of the contents at 55 degrees C (130 degrees F).
- If the pressure exceeds 970 kPa at 55 degrees C (140 psig at 130 degrees F) but does not exceed 1105 kPa at 55 degrees C (160 psig at 130 degrees F) use a DOT 2P, IP7, IP7A, or IP7B inner metal receptacle. If the pressure exceeds 1105 kPa at 55 degrees C (160 psig at 130 degrees F) but does not exceed 1245 kPa at 55 degrees C (180 psig at 130 degrees F) use a DOT 2Q, IP7A, or IP7B inner metal receptacle. If the pressure exceeds 1245 kPa at 55 degrees C (180 psig at 130 degrees F) but does not exceed 1500 kPa at 55 degrees C (217 psig at 130 degrees F) use an IP7B inner metal receptacle.
- Liquid content of the material and the gas must not completely fill the receptacle at 55 degrees C (130 degrees F).
- Each aerosol exceeding 120 mL (4 fluid ounce) capacity must have been heated until the pressure in the aerosol is equivalent to the equilibrium pressure of the contents at 55 degrees C (130 degrees F) without evidence of leakage, distortion, or other defects.
- Protect the valves by a cap or other suitable means.
- Tightly pack aerosols in an outer fiberboard (4G), wooden (4C1, 4C2), plywood (4D), reconstituted (4F), or plastic (4H1, 4H2) box. The packaging must meet PG II requirements.

A6.3.1.3. In inner nonrefillable metal receptacles charged with non-toxic solution containing a biological product or medical preparation that could be deteriorated by heat and compressed gases that, except Class 6.1, PG III material, are poisonous or nonflammable provided all of the following conditions are met:

- The capacity of each inner receptacle must not exceed 575 mL (20 fluid ounces).
- Pressure in the receptacle must not exceed 970 kPa at 55 degrees C (140 psig at 130 degrees F).
- The liquid content of the product and gas must not completely fill the receptacle at 55 degrees C.
- One aerosol out of each lot of 500 or less, filled for shipment, must be heated until the pressure in the container is equivalent to the equilibrium pressure of the contents at 55 degrees C (130 degrees F) without evidence of leakage, distortion, or other defects.
- Protect the valves by a cap or other suitable means.
- Package inner receptacles in a strong outer packaging. The outer packaging must be capable of meeting the limited quantity performance standards outlined in A19.3.4. UN specification (POP marked) packaging is not required.
- The complete package must not exceed 30 kg (66 lbs) gross weight.

A6.3.1.4. In inner nonrefillable metal receptacles containing a biological product or medical preparation that could be deteriorated by heat and is nonflammable provided all of the following conditions are met:

- The first five bullet requirements of A6.3.1.3 related to the aerosal receptacles apply.
- Tightly pack aerosol containers in an outer fiberboard (4G), wooden (4C1, 4C2), plywood (4D), reconstituted (4F), or plastic (4H1, 4H2) box. The packaging must meet PG II requirements.

A6.3.2. Package small receptacles of compressed gases, **other than aerosols**, as identified in this paragraph. Unless otherwise specified, UN specification (POP marked) packaging is not required. Each package must not exceed 30 kg (66 lbs) gross weight.

A6.3.2.1. Use containers, except cigarette lighters, of not more than 120 mL (4 fluid ounces, 7.22 cubic inches or less) capacity each. Package inner receptacles in a strong outer packaging.

A6.3.2.2. Use metal containers filled with nonhazardous material not over 90 percent capacity at 21 degrees C (70 degrees F) then charged with a nonflammable, nonliquified gas. Each container must be tested to three times the gas pressure at 21 degrees C (70 degrees F). When refilled, the container must be retested to three times the gas pressure at 21 degrees C (70 degrees F) provided one of the following conditions are met:

- Container is not over 1 L (1 quart) capacity and charged to not more than 1172 kPa at 21 degrees C (170 psig at 70 degrees F).
- Container is not over 114L (30 gallon) capacity and charged to not more than 517 kPa at 21 degrees C (75 psig at 70 degrees F).

A6.3.2.3. Package electronic tubes of not more than 489 mL (30 cubic inch) volume charged with gas to a pressure of not more than 241 kPa (35 psig) in strong outside containers.

A6.3.2.4. Use inside metal containers of a capacity not over 570.7 mL (35 cubic inches, 19.3 fluid ounces), charged with nonflammable, nonpoisonous or noncorrosive liquefied compressed gas designed for audible fire alarm systems. Pressure in the container must not exceed 482.6 kPa at 21 degrees C (70 psig at 70 degrees F). The completely assembled nonrefillable container must be designed and fabricated with a burst pressure of not less than four times its charged pressure at 55 degrees C (130 degrees F.) Each refillable inside container must be designed and fabricated with a burst pressure of not less than five times its charged pressure at 55 degrees C (130 degrees F). The liquid portion of the gas must not completely fill the container at 55 degrees C (130 degrees F).

A6.3.2.5. A cylinder that is a component part of a passenger restraint system and is installed in a motor vehicle, charged with nonliquefied, nonflammable compressed gas and having no more than two actuating cartridges per valve, is exempt from the requirements of this manual except each:

- Cylinder must comply with one of the cylinder specifications in 49 CFR, Part 178, and be authorized for use in A6.7 for the gas it contains.
- Cylinder must comply with the filling requirements of A3.3.2.5.
- Actuating cartridge must be approved according to 49 CFR 173.86 and meet the definition of an actuating cartridge, explosive, fire extinguisher, or valve.

A6.3.2.6. A cylinder that is part of a tire inflate system in a motor vehicle, charged with a nonliquefied, nonflammable compressed gas, and is excepted from the requirements of this manual except:

- Cylinder must comply with one of the cylinder specifications in 49 CFR, Part 178, and be authorized for use in A6.7 for the gas it contains.
- Cylinder must comply with the filling requirements of A3.3.2.5.
- Each cylinder must be securely installed in the trunk of the motor vehicle, and the valve must be protected against accidental discharge.

A6.3.2.8. Compressed gasses in the following materials are not regulated:

- Inflated tires, when inflated to a pressure not greater than its rated inflation pressure.
- Inflated balls used for sports.

- Carbonated beverages.
- Refrigerating machines, including dehumidifiers, air conditioners, and components thereof such as precharged tubing containing 12 kg (25 pounds) or less of nonflammable liquefied gas.

A6.4. Acetylene Gas. Ship in DOT 8 or 8AL cylinders.

- Ensure cylinders are filled with a porous material charged with a suitable solvent as identified in 49 CFR, paragraph 178.59 or 178.60.
- The specific gravity of acetone solvent in acetylene cylinders must be 0.796 or over at 15.5 degrees C (60 degrees F). The amount of solvent added in the refilling operation must not cause the tare weight of the cylinder to be over its marked tare weight. The tare weight includes the weight of the cylinder shell, porous filling, safety relief devices, valve, and solvent, but without removable cap.
- The pressure in cylinders containing acetylene gas must not exceed 1724 kPa at 21 degrees C (250 psig at 70 degrees F); however, if the cylinders are marked for a lower allowable charging pressure at 21 degrees C (70 degrees F), then do not exceed that pressure.

★A6.5. Liquefied Compressed Gases.

A6.5.1. Ship liquefied compressed gases in accordance with the filling, pressure, and DOT cylinder specification requirements of table A6.1. If the compressed gas is not specifically identified in table A6.1, ship (except gas in solution) in DOT 3, 3A, 3AA, 3B, 3BN, 3D, 3E, 4, 4A, 4B, 4BA, 4B240ET, 4BW, 4E, 9, 25, 26, 38, 39, 40, or 41 cylinders. Ensure compliance with A3.2.2. Do not charge and ship DOT 4E, 9, 39, 40, or 41 cylinders with a mixture containing a pyroforic liquid, carbon bisulfide (disulfide), ethyl chloride, ethylene oxide, nickel carbonyl, spirits of nitroglycerin, or toxic material, (Class 6.1 or 2.3) unless authorized in a specific packaging paragraph. Use of existing cylinders, DOT 3, 3D, 4, 4A, 9, 25, 26, 38, 40, and 41 is authorized, but new construction of these cylinders is not authorized. Ship a nontoxic and nonflammable mixture (including insecticides) that contains a compressed gas according to this paragraph.

A6.5.2. Use DOT 3AL cylinders to ship carbonyl sulfide, cyclobutane, dimethyl ether, hydrogen selenide, propylene, silane, and vinyl bromide. Shipments are authorized on cargo aircraft only.

A6.5.3. Use DOT 3AL cylinders to ship nitrous oxide only under the following conditions:

- The cylinder must be equipped only with brass or stainless steel valve.
- Each cylinder must be cleaned and in compliance with the requirements of Federal Specification RR-C-901c, paragraphs 3.7.2, 3.8.2, and 4.4.2.3.

A6.5.4. Ship a mixture containing any Class 2.3 material or irritating material, in such proportion that the mixture would be classed as toxic, in containers authorized in attachment 10.

A6.5.5 Ship refrigerant gases that are nonpoisonous and nonflammable in cylinders prescribed in A6.5.1 or as follows: In DOT 2P and 2Q inside metal containers packed in a strong wooden or fiberboard box designed to protect valves from injury or accidental functioning under conditions incident to transportation. Pressure in the container must not exceed 586 kPa at 21 degrees C (85 psia at 70 degrees F). Each completed metal container filled for shipment must be heated until contents reach a minimum temperature of 55 degrees C (130 degrees F), without evidence of leakage, distortion, or other defects.

A6.5.6. Ship engine-starting fluids containing compressed gas (or gases) that are flammable in cylinders prescribed in A6.5.1 or as follows:

- Inside nonrefillable metal containers not over 522 mL (32 cubic inch) capacity. Pressure in the container must not exceed 966 kPa at 55 degrees C (140 psia at 130 degrees F).
- If the pressure exceeds 966 kPa at 55 degrees C (140 psia at 130 degrees F) use a DOT 2P container.
- Any metal container must be capable of withstanding a pressure of 1 1/2 times the pressure of the content at 55 degrees C (130 degrees F) without bursting.
- Each container filled for shipment must have been heated until the contents reach a minimum temperature of 55 degrees C (130 degrees F) without evidence of leakage, distortion, or other defects.
- Pack inside nonrefillable metal containers in a strong tight outside packaging.

★A6.6. Nonliquefied Compressed Gases.

A6.6.1. Ship nonliquefied, compressed gases in accordance with the filling, pressure, and DOT cylinder specification requirements of table A6.1. If the compressed gas is not specifically identified in table A6.1, ship in DOT 3, 3A, 3AA, 3B, 3C, 3D, 3E, 4, 4A, 4B, 4BA, 4BW, 4C, 25, 26, 33, or 38. Use of existing cylinders, DOT 3, 3C, 3D, 4, 4A, 4C, 25, 26, 33, and 38 is authorized, but new construction of these cylinders is not authorized.

A6.6.2. Cylinders DOT-3HT, for use in aircraft only, having a maximum service life of 24 years, are only authorized for nonflammable gases. They must be equipped with a frangible disc safety relief device, without fusible metal backing, with a

rated bursting pressure not over 90 percent of the minimum required test pressure of the cylinder with which the device is used. Package cylinders in strong outside containers.

A6.6.3. Use DOT 39 cylinder. For flammable gases, the internal volume must not exceed 1.2 L (75 cubic inches). Use aluminum cylinders for oxygen only under the following conditions:

- Cylinder threads must be straight threads.
- Valves must be made of brass or stainless steel.
- Each cylinder must be cleaned to comply with the requirements of Federal Specification RR-C-901c, paragraphs 3.7.2, 3.8.2, and 4.4.2.5.

A6.6.4. Use DOT 3AL cylinder only for the following nonliquefied gases: air, argon, carbon monoxide, diborane, ethylene, helium, mercury free hydrogen, krypton, methane, nitrogen, neon, oxygen, and xenon. Ship flammable gases in 3AL cylinders on cargo aircraft only. When used in oxygen service, the cylinders must comply with 49 CFR 173.302(a)(5).

A6.6.5. Ship carbon monoxide in a DOT-3A, 3AX, 3AA, 3AAX, 3AL, 3, 3E, or 3T cylinder having a minimum service pressure of 12,411 kPa (1800 psig). The pressure in the cylinder must not exceed 6895 kPa at 21 degrees C (1000 psig at 70 degrees F), except that if the gas is dry and sulfur free, the cylinder may be charged to five-sixths of the cylinder service pressure of 13,790 kPa (2000 psig), whichever is the least.

A6.6.6. Use cylinders, DOT 3AX, 3AAX, or 3T only for the following nonliquefied gases: air, argon, boron trifluoride, carbon monoxide, ethane, ethylene, helium, hydrogen, methane, neon, nitrogen, or oxygen, except that specification 3T is not authorized for hydrogen. As used in this paragraph, methane is a nonliquefied gas which has a minimum purity of 98.0 percent methane and which is commercially free of corroding components.

A6.6.7. For fluorine gas use only DOT 3A1000, 3AA1000, or 3BN400 cylinders without a safety relief device and equipped with valve protection caps. Do not charge cylinders over 2758 kPa at 21 degrees C (400 psig at 70 degrees F) and ensure contents do not exceed 2.7 kg (6 pounds) of gas.

A6.6.8. Pack recoil mechanisms or artillery gun mounts containing nitrogen charged to a maximum pressure of 15,858 kPa at 21 degrees C (2300 psig at 70 degrees F) in strong outer wooden containers (MIL-P-14232).

A6.6.9. Liquid argon, oxygen, or nitrogen samples under pressure, may be shipped in Cosmodyne Gas Samplers, Models CS 4.4 and CS 2.0 or in TTU-131/E Sampler (MIL-S-27626). See applicable technical directive for overpack instructions. Take samples in the liquid state but vaporize before shipment.

A6.6.10. Ship LAU-7/A launcher-receiver assemblies charged with nitrogen not over 1724 kPa (250 psig).

A6.6.11. Ship DSCS III Satellites charged with nitrogen. The system must consist of two DOT 3AU cylinders, each containing 5.664 cubic meters (200 cubic feet) of nitrogen. Nitrogen may vent into the DSCS III Satellite sensor at a rate not to exceed 0.05664 (2 cubic feet) per hour during transport. The nitrogen will flow through 6.35 mm (one quarter inch) inside diameter rubber tubing. The system must be equipped with a safety valve, enabling the nitrogen flow to be shut off in the event of a problem. Transport the DSCS III Satellite only on C-5 or C-141 aircraft. Transport no more than two satellites on any single aircraft.

★Table A6.1. Cylinder Requirements for Compressed Gases.

Name of Gas	Maximum Permitted Filling Density in Percent (See A3.3.2.5)	Cylinders Marked as Shown Below Must be Used
Anhydrous ammonia	54	DOT-3, DOT-3A480, DOT-3A480X, DOT-3AA480, DOT-3AL480, DOT-3E1800, DOT-4, DOT-4A480, DOT-4AA480
Bromotrifluoromethane (R-13B1 or H-1301)	124	DOT-3A400, DOT-3AA400, DOT-3AL400, DOT-3B400, DOT-3E1800, DOT-4A400, DOT-4AA480, DOT-4B400, DOT-4BA400, DOT-4BW400, DOT-39
Carbon dioxide (see notes 3 and 4)	68	DOT-3, DOT-3A1800, DOT-3AA1800, DOT-3AL1800, DOT-AX1800, DOT-3AAX1800, DOT-3E1800, DOT-3HT2000, DOT-3T1800, DOT-39
Chlorine (see note 1)	125	DOT-3, DOT-3A480, DOT-3AA480, DOT-3BN480, DOT-3E1800, DOT-25
Chlorodifluroethane (R142b) or Chloro-1,1-Difluoroethane (see note 4)	100	DOT-3A150, DOT-3AA150, DOT-3AL150, DOT-3B150, DOT-3E1800, DOT-4B150, DOT-4BA225, DOT-4BW225, DOT-39
Chlorodifluoromethane (R22) (see note 4)	105	DOT-3A240, DOT-3AA240, DOT-3ALA240, DOT-3B240, DOT-3E1800, DOT-4B240, DOT-4B240ET, DOT-4BA240, DOT-4BW240, DOT-4E240, DOT-39, DOT-41

Table A6.1. Continued.

Name of Gas	**Maximum Permitted Filling Density in Percent (See A3.3.2.5)**	**Cylinders Marked as Shown Below Must be Used**
Chloropentafluorethane (R-115)	110	DOT-3A225, DOT-3AA225, DOT-3AL225, DOT-3B225, DOT-3E1800, DOT-4A225, DOT-4B225, DOT-4BA225, DOT-4BW225, DOT-39
Chlorotrifluoromethane (R-13) (see note 4)	100	DOT-3, DOT-3A1800, DOT-3AA1800, DOT-3AL1800, DOT 3E1800, DOT-39
Cyclopropane (see notes 4 and 5)	55	DOT-3, DOT-3A225, DOT-3A480X, DOT-3AA225, DOT-3AL225, DOT-3B225, DOT-3E1800, DOT-4A225, DOT-4AA480, DOT-4B225, DOT-4B240ET, DOT-4BA225, DOT-4BW225, DOT-39
Dichlorodifluoromethane (see note 4)	119	DOT-3A225, DOT-3AA225, DOT-3AL225, DOT-3B225, DOT-3E1800, DOT-4A225, DOT-4B225, DOT-4BA225, DOT-4BW225, DOT-4B240ET, DOT-4E225, DOT-9, DOT-39, DOT-41
Dichlorodifluoromethane and difluoroethane mixture (constant boiling mixture) (R-500) (see note 4)	Not liquid full at 54 degrees C (130 degrees F)	DOT-3A240, DOT-3AA240, DOT-3B240, DOT-3E1800, DOT-4A240, DOT-4B240, DOT-4BA240, DOT-4BW240, DOT-4E240, DOT-9, DOT-39
Difluoroethane (R-152a) (see note 4)	79	DOT-3A150, DOT-3AA150, DOT-3B150, DOT-3AL150, DOT-3E1800, DOT-4B150, DOT-4BA225, DOT-4BW225

Table A6.1. Continued.

Name of Gas	Maximum Permitted Filling Density in Percent (See A3.3.2.5)	Cylinders Marked as Shown Below Must be Used
1,1-Difluoroethylene (R-1132A)	73	DOT-3A2200, DOT-3AA2200, DOT-3AX2200, DOT-3AAX2200, DOT-3T2200, DOT-39
Dimethylamine, anhydrous	59	DOT-3A150, DOT-3AA150, DOT-3B150, DOT-4B150, DOT-4BA225, DOT-4BW225, ICC-3E1800
Ethane (see notes 4 and 5)	35.8	DOT-3, DOT-3A1800, DOT-3AA1800, DOT-3AL1800, DOT-3AAX1800, DOT-3AX1800, DOT 3E1800, DOT-3T1800, DOT-39
Ethane (see notes 4 and 5)	36.8	DOT-3A2000, DOT-3AA2000, DOT-3AAX2000, DOT-3AL2000, DOT-3AX2000, DOT-3T2000, DOT-39
Ethylene (see notes 4 and 5)	31.0	DOT -3, DOT-3A1800, DOT -3AA1800, DOT-3AAX1800, DOT-3AL1800, DOT-3AX1800, DOT-3E1800, DOT-3T1800, DOT-39
Ethylene (see notes 4 and 5)	32.5	DOT-3A2000, DOT-3AA2000, DOT-3AAX2000, DOT-3AL2000, DOT-3AX2000, DOT-3T2000, DOT-39
Ethylene (see notes 4 and 5)	35.5	DOT-3A2400, DOT-3AA2400, DOT-3AAX2400, DOT-3AL2400, DOT-3AX2400, DOT-3T2400, DOT-39

Table A6.1. Continued.

Name of Gas	Maximum Permitted Filling Density in Percent (See A3.3.2.5)	Cylinders Marked as Shown Below Must be Used
Hydrogen chloride	65	DOT-3, DOT-3A1800, DOT-3AA1800, DOT-3AAX1800, DOT-3AX1800, DOT-3E1800, DOT-3T1800
Hydrogen sulfide (see note 6)	62.5	DOT-3A480, DOT -3AA480, DOT-3AL480, DOT-3B480, DOT-3E1800, DOT-4A480, DOT-4B480, DOT-4BA480, DOT-4BW480, DOT-26-480
Insecticide liquefied gas (see note 4 and 8)	Not liquid full at 54 degrees C (130 degrees F)	DOT-3A300, DOT-3AA300, DOT-3B300, DOT-3E1800, DOT-4B300, DOT-4BA300, DOT-4BW300, DOT-9, DOT-40, DOT-41
Liquefied nonflammable gases, liquids other than those classified as flammable, corrosive, or poisonous, and mixtures or solutions thereof, charged with nitrogen, carbon dioxide or air (see notes 3 and 4)	Not liquid full at 54 degrees C (130 degrees F)	DOT specification cylinders identified in A6.5.1 and DOT-3HT, DOT-4D, DOT-4DA, DOT-4DS
Methylacetylene-propadiene stabilized (see note 2)	Not liquid full at 54 degrees C (130 degrees F)	DOT-3A240, DOT-3AA240, DOT-3AL240, DOT-3B240, DOT-3E1800, DOT-4, DOT-4B240, without brazed seams; DOT-4B240ET, DOT-4BA240, without brazed seams; DOT-4BW240, DOT-4E240, DOT-41

Table A6.1. Continued.

Name of Gas	Maximum Permitted Filling Density in Percent (See A3.3.2.5)	Cylinders Marked as Shown Below Must be Used
Methyl chloride	84	DOT-3, DOT-3A225, DOT-3AA225, DOT-3B225, DOT-3E1800, DOT-4, DOT-4A225, DOT-4B225, DOT-4BA225, DOT-4BW225, DOT-4B240ET, DOT-25, DOT-26-300, DOT-38, Cylinders complying with DOT-3A150, 3B150, 4A150, and 4B150 manufactured before 7 December 1936 are also authorized.
Methyl mercaptan	80	DOT-3A240, DOT-3AA240, DOT-3B240, DOT-3E1800, DOT-4B240, DOT-4B240ET, DOT-4BA204, DOT-4BW240
Monomethylamine, anhydrous	60	DOT-3A150, DOT-3AA150, DOT-3B150, DOT-3E1800, DOT-4B150, DOT-4BA225, DOT-4BW225
Nitrosyl Chloride	110	DOT-3BN400 only
Nitrous Oxide (see notes 3, 4, and 7)	68	DOT-3, DOT-3A1800, DOT-3AA1800, DOT-3AAX1800, DOT-3AL1800, DOT-3AX1800, DOT-3E1800, DOT-3HT2000, DOT-3T1800, DOT-39
Refrigerant gas, NOS or Dispersant gas, NOS (see notes 4 and 9)	Not liquid full at 54 degrees C (130 degrees F)	DOT-3A240, DOT-3AA240, DOT-3AL240, DOT-3B240, DOT-3E1800, DOT-4A240, DOT-4B240, DOT-4BA240, DOT-4BW240, DOT-4E240, DOT-9, DOT-39

Table A6.1. Continued.

Name of Gas	Maximum Permitted Filling Density in Percent (See A3.3.2.5)	Cylinders Marked as Shown Below Must be Used
Sulfur dioxide (see note 4)	125	DOT-3, DOT-3A225, DOT-3AA225, DOT-3AL225, DOT-3B225, DOT-3E1800, DOT-4, DOT-4A225, DOT-4B225, DOT-4B240ET, DOT-4BA225, DOT-4BW225, DOT-25, DOT-26-150, DOT-38, DOT-39
Sulfur hexafluoride	120	DOT-3, DOT-3A1000, DOT- 3AA1000, DOT-3AAX2400, DOT-3AL1000, DOT-3E1800, DOT-3T1800
Sulfuryl fluoride	106	DOT-3A480, DOT-3AA480, DOT-3E1800, DOT-4B480, DOT-4BA480, DOT-4BW480
Tetrafluoroethylene, inhibited	90	DOT-3A1200, DOT-3AA1200, DOT-3E1800
Trifluorochloroethylene	115	DOT-3A300, DOT-3AA300, DOT-3B300, DOT-3E1800, DOT-4A300, DOT-4B300, DOT-4BA300, DOT-4BW300
Trimethylamine, anhydrous	57	DOT-3A150, DOT-3AA150, DOT-3B150, DOT-3E1800, DOT-4AB150, DOT-4BA225, DOT-4BW225
Vinyl chloride (see note 2)	84	DOT-3A150, DOT-3AA150, DOT-3AL150, DOT-3E1800, DOT-4B150, without brazed seams; DOT-4BA225, without brazed seams; DOT-4BW225, DOT-25

Table A6.1. Continued.

Name of Gas	Maximum Permitted Filling Density in Percent (See A3.3.2.5)	Cylinders Marked as Shown Below Must be Used
Vinyl fluoride, inhibited	62	DOT-3A1800, DOT-3AA1800, DOT-3AL1800, DOT-3E1800
Vinyl methyl ether (see note 2)	68	DOT-3A150, DOT-3AA150, DOT-3B150, DOT 3E1800, DOT-4B150, without brazed seams; DOT-4BA225, without brazed seams; DOT-4BW225, DOT-25

NOTES:

1. Cylinders purchased after 1 October 1944 for the transportation of chlorine must contain no aperture other than that provided in the neck of the cylinder for attachment of a valve equipped with an approved safety device. Cylinders purchased after November 1, 1935 and charged with chlorine must not contain over 150 pounds of gas.
2. All parts of valve and safety devices in contact with contents of cylinders must be of a metal or other material, suitably treated if necessary, which will not cause formation of any acetylides.
3. DOT-3HT cylinders are authorized for use in aircraft only for a maximum service life of 24 years. They must be equipped with a frangible disc safety relief device, without fusible metal backing, and with a rated bursting pressure not over 9 percent of the minimum required test pressure of the cylinder with which the device is used. Ship only nonflammable gases in these cylinders and pack in strong outside containers.
4. Ship DOT-2P, 2Q, 3E, 3HT, 4BA spherical type, 4D, 4DA, 9, 39, 40, 41, and 4DS spheres and cylinders in strong outside containers.
5. When used for shipment of flammable gases, the internal volume of the specification 39 cylinders must not be over 75 cubic inches.
6. Ensure each valve outlet is sealed by a threaded cap or a threaded solid plug.
7. Ensure DOT-3AL cylinders are equipped with brass or stainless steel valves and cleaned in compliance with Federal Specification RR-C-901c.
8. See A6.5.1 and A6.5.5 (except only DOT 2P is authorized).
9. See A6.5.5.

★**A6.7. Liquefied Petroleum Gas (**see A3.3.2 for additional cylinder and filling requirements).

A6.7.1. Use DOT 3, 3A, 3AA, 3AL, 3B, 3E, 4, 4A, 4B, 4BA, 4BW, 4B240FLW, 4B240ET, 4B240X, 4E, 9, 25, 26, 38, 39, or 41 cylinders. Ensure the internal volume of DOT 39 cylinders is not over 1.2 L (75 cubic inches). Use of existing DOT 3, 4, 4A, 4B240X, 9, 25, 26, 38, and 41 cylinders is authorized, but new construction of these cylinders is not authorized.

A6.7.2. Use cylinders marked as complying with DOT 4B240FLW, bearing manufacturers symbol WCO and serial numbers 47A-1 to 47A-59200 (inclusive), and varying from the specification requirements for the physical properties of steel.

A6.7.3. Use DOT 3C or 4C cylinders, when the capacity of cylinders is not over 60.5 L (3,881 cubic inches, 16 gallons) with 5 percent tolerance. Do not exceed a gas pressure over 1000 kPa (145 psig) at 55 degrees C (130 degrees F). Comply with the requirements of table A6.1 for the gases named.

A6.7.4. Use inside metal containers, DOT 2P or 2Q, packed in strong wooden or fiberboard boxes designed to protect valves from injury or accidental functioning under normal transportation conditions. These containers are authorized for liquefied petroleum gas with a gas pressure of 241 kPa (35 psig) at 21 degrees C (70 degrees F) and 689.5 kPa (100 psig) at 55 degrees C (130 degrees F) (or not over 310.3 kPa (45 psig) at 21 degrees C (70 degrees F) and 724 kPa (105 psig) at 55 degrees C (130 degrees F) when equipped with safety devices which will prevent rupture of the container when it is exposed to fire.)

Each completed container filled for shipment must have been heated until contents reached a minimum temperature of 55 degrees C (130 degrees F) without evidence of leakage, distortion, or other defects.

★**A6.8. Fire Extinguishers.** Fire extinguishers authorized below may be shipped secured in holders of equipment and protected from possible accidental damage. If these fire extinguishers are not fastened in a holder designed for them, pack in strong outer containers.

A6.8.1. Use DOT 3A, 3AA,3AL,4B, 4BA, 4B240ET, or 4BW cylinders provided:

- Cylinders contain only fire extinguishing agents such as ammonium phosphate, sodium bicarbonate, potassium bicarbonate, potassium imido dicarboxamide and bromochlorodiflurometh ane or bromotriflouromethane, which is commercially free from corroding components.
- Cylinders are charged with a nonflammable, nontoxic, noncorrosive, dry gas, having a dew point at or below minus 46.7 degrees C (minus 52 degrees F) at 101 kPa (1 atmosphere), to not more than the service pressure of the cylinder.
- Cylinders have an external corrosion-resistant coating.
- Cylinders are retested in accordance with Title 49 CFR 173.34(e)(18).
- Fire extinguisher, DOT 4BW240, on a cart does not require additional packaging.

A6.8.2. Use DOT 2P or 2Q inner nonrefillable metal containers provided:

- The liquid portion of the gas plus any additional liquid or solid does not completely fill the container at 55 degrees C (130 degrees F).
- The pressure in the container does not exceed 1250 kPa (181 psig) at 55 degrees C (130 degrees F). If the pressure exceeds 920 kPa (141 psig) at 55 degrees C (130 degrees F), but does not exceed 1100 kPa (160 psig) at 55 degrees C (130 degrees F) , use a DOT 2P inner metal container. If the pressure exceeds 1100 kPa (160 psig) at 55 degrees C (130 degrees F) use a DOT 2Q inner metal container. The metal container must be capable of withstanding, without bursting, a pressure of one and one-half times the equilibrium pressure of the contents at 55 degrees C (130 degrees F).
- Each completed inner container filled for shipment must have been heated until the pressure in the container is equivalent to the equilibrium pressure of the contents at 55 degrees C (130 degrees F) without evidence of leakage, distortion, or other defect.

A6.8.3. In fire extinguishers charged with a small amount of compressed gas of not more than 1660 kPa at 21 degrees C (241 psig at 70 degrees F). These fire extinguishers are excepted from DOT cylinder specification requirements provided:

- They are shipped as inside containers.
- The contents are not flammable, toxic, or corrosive.
- Internal volume is not over 18 L (1,100 cubic inches). For fire extinguishers not over a 900 mL (55 cubic inch) capacity, the liquid portion of the gas plus any additional liquid or solid must not completely fill the container at 55 degrees C (130 degrees F). Fire extinguishers over 900 mL (35 cubic inches) may not contain liquefied compressed gas.
- Fire extinguishers manufactured on and after 1 January 1976 must be designed and fabricated with a burst pressure not less than six times its charged pressure at 21 degrees C (70 degrees F).
- Fire extinguishers are tested to three times the charged pressure at 21 degrees C (70 degrees F), but not less than 825 kPa (120 psig) without failure before the initial shipment. For any subsequent shipments, they must meet retest requirements of 29 CFR 1910.157(e).

A6.8.4. Transport extinguisher (FEU-1/M) 10 gallon (37.8 L) capacity on military aircraft without special packing and crating. Use caution during handling and transportation to avoid damage to valves.

★**A6.9. Refrigerating Machines, Air Conditioners, and Accumulators.**

A6.9.1. **Refrigerating Machines, Air Conditioners, and Components.** Factory-tested refrigerating machines, air conditioners, and components are exempted from specification packaging, marking, and labeling except for the name of contents on the outside container, provided (see A6.3.2.8 for small quantities):

- Each pressure vessel is charged to not more than 2268 kg (5,000 pounds) of Group A1 refrigerant as classified in ANSI/ASHRAE Standard 15, or not more than 22.7 kg (50 pounds) of refrigerant other than Group A1.
- Machines containing two or more charged vessels may not contain more than 907 kg (2,000 pounds) of Group 1 refrigerant, or more than 45.4 kg (100 pounds) of refrigerant other than Group 1.
- Each pressure vessel is equipped with a safety relief device meeting the requirements of ANSI/ASHRAE Standard 15.

- Each pressure vessel is equipped with an individual shut-off valve at each opening except openings used for safety devices and with no other connection. Close shut-off valves during transportation.
- Pressure vessels are manufactured, inspected, and tested according to ANSI/ASHRAE Standard 15, or when over 152.4 mm (6 inches) internal diameter, according to American Society of Mechanical Engineers (ASME) Code.
- All parts subject to refrigerant pressure during shipment are tested under ANSI/ASHRAE Standard 15.
- The liquid portion of refrigerant, if any, does not completely fill any pressure vessel at 55 degrees C (130 degrees F).
- Filling densities prescribed in A3.3.2.5 are not exceeded.

A6.9.2. **Accumulators.** The following apply to hydraulic accumulators containing nonliquefied, nonflammable gas, and nonflammable liquids or pneumatic accumulators containing nonliquefied, nonflammable gas, fabricated from materials that do not fragment upon rupture:

A6.9.2.1. Accumulators installed in motor vehicles, construction equipment, and assembled machinery, designed and fabricated with a burst pressure of not less than five times their charged pressure at 21 degrees C (70 degrees F) are exempt from the requirements of this manual.

A6.9.2.2. When charged to not more than 1379 kPa (200 psig) at 21 degrees C (70 degrees F), the following conditions apply:

- Ship each accumulator as an inside package. There are no specification requirements.
- Each accumulator may not have a gas space over 40.7 L (2,500 cubic inches) under stored pressure.
- Each accumulator must be tested, without evidence of failure or damage, to at least three times its charged pressure at 21 degrees C (70 degrees F) but not less than 120 psig (827 kPa) before initial shipment and before each refilling and reshipment.

A6.9.2.3. When charged over 1379 kPa (200 psig) at 21 degrees C (70 degrees F) the following conditions apply:

- Each accumulator must be in compliance with the requirements stated in A6.9.2.2.
- Each accumulator must be designed and fabricated with a burst pressure of not less than five times its charged pressure when shipped.

A6.10. Cigarette Lighters or Other Similar Devices Charged With Fuel. Do not ship any package containing a cigarette lighter or other similar ignition device charged with fuel and equipped with an ignition element, or any self-lighting cigarette, unless the design of the device and its packaging has been approved according to 2.3 or by the DOT. Ship a cigarette lighter or other similar device charged with a flammable gas according to the following:

- No more than 70 mL (2.3 fluid ounces) of liquefied gas may be loaded into each device.
- The liquid portion of the gas may not be over 85 percent of the volumetric capacity of each chamber at 15 degrees C (59 degrees F).
- Each device including closures must be capable of withstanding, without leakage or rupture, an internal pressure of at least two times the vapor pressure of the fuel at 55 degrees C (130 degrees F).
- Overpack devices in packaging that is designed or arranged to prevent movement of the device itself.

A6.11. Cryogenic Liquids.

A6.11.1. **Handling Instructions.** Store in cool, well-ventilated area away from fire hazards, direct rays of the sun, and organic or easily oxidizable materials such as grease and oil. Handle containers with extreme care. Avoid direct contact.

A6.11.2. **Container Requirements:**

- Do not load a cylinder with a cryogenic liquid colder than the design service temperature of the packaging.
- Do not load a cylinder with any material which may combine chemically with any residue in the packaging to produce an unsafe condition.
- The jacket covering the insulation on a cylinder used to transport any flammable cryogenic liquid must be made of steel.
- Do not install a valve or fitting made of aluminum, with internal rubbing or abrading aluminum parts that may come in contact with oxygen in the cryogenic liquid form, on any cylinder used to transport oxygen, cryogenic liquid unless the parts are anodized according to ASTM Standard B 580.
- Do not install an aluminum valve, pipe, or fitting on any cylinder used to transport any flammable cryogenic liquid.
- Provide each cylinder with one or more pressure relief devices.
- Install each pressure relief device and locate so that the cooling effect of the contents during venting will not prevent effective operation of the device.
- The maximum weight of the contents in a cylinder with a design service temperature colder than -195.5 degrees C (-320 degrees F) may not be over the design weight marked on the cylinder.

- Each cylinder containing a cryogenic liquid must have a pressure control system that conforms to 49 CFR 173.34(d) and must be designed and installed so that it will prevent the cylinder from becoming liquid full.

A6.11.3. **Venting Requirements.** Protect all containers by vent openings or safety relief devices to prevent excessive pressure buildup within the containers. The shipper must provide specific venting instructions in the additional handling information block of the Shipper's Declaration for Dangerous Goods (unless venting procedures are provided in a separate instruction accompanying the shipment or attached to the cargo) and must provide required equipment (see A17.4.2). Crew members must monitor vent valves during flight. Containers charged with a nonflammable, nonpoisonous cryogenic liquid, with a net capacity of 25 liters (6.6 gallons) or less, are excepted from the overboard venting requirement. Tubing or hose for venting to the outside of the aircraft is required. Provide at least 4.6 m (15 feet) of 25.4 mm (one inch) inside diameter tubing or hose compatible with the product. Do not use rubber tubing for liquid oxygen. Make sure there are:

- Sufficient clamps to attach tubing to the unit, the aircraft vent adapter, and other hoses if more than one unit is transported. Do not use sealing compound on tubing or hose connections.
- T fittings and extra tubing or hose for the manifolding of two or more unit to one aircraft vent.
- Tubing or hose must be routed to ensure freedom from kinks, sharp bends, or restrictions that prevent free venting and cause pressure buildup in the tubing or hose.

A6.11.4. **Packaging Requirements.** Ensure all containers are designed to hold low temperature liquefied gases and are strong enough to withstand all shocks and loading normally incident to air shipment and associated handling. Ship cryogenic liquids of argon, helium, neon, nitrogen, and oxygen according to filling density requirements in figure A3.4. Ship hydrogen (minimum 95 percent parahydrogen) according to filling density requirements in figure A3.5. Protect container accessories against damage in handling. Ship in containers as follows:

A6.11.4.1. DOT 4L cylinders in a vertical position.

A6.11.4.2. Type TMU-27M, MIL-T-38170, or MA-1, trailer mounted, 189 L (50 gallon) capacity containers.

A6.11.4.3. C-1, 1892 L (500 gallons) capacity containers.

A6.11.4.4. Dewars, 25 L (6.6 gallon) capacity each. Not more than 6 per aircraft.

A6.11.4.5. Nonpressurized metal vacuum-type containers, dewars, 100 liter (26.42 gallon capacity) attached to nonskid base. Ship no more than one container per aircraft.

A6.11.4.6. NRU-5/E air-transportable 1514L (400 gallon tank) (MIL-T-38261).

A6.11.4.7. LS-160 container attached to shipping platform. Ship a maximum of one container per aircraft. Maximum 150 liters (39.63 gallons) nitrogen per container.

A6.11.4.8. TMU-70/M (MIL-A-85415) LOX servicing trailers. The trailers must be equipped with absolute pressure relief valve and vented to outside of aircraft.

A6.11.4.9. TMU-24E (MIL-T-27720), mounted on aircraft cargo pallet, 1514 L (400 gallons), liquid oxygen or liquid nitrogen storage and transfer tanks.

A6.11.4.10. LSHe-102, 109 L (28.79 gallon) capacity, attached to shipping skid. Container must be equipped with an absolute pressure relief valve for air shipment. Authorized for liquid helium.

A6.11.4.11. LSHe-30, 30 L (7.92 gallon) capacity, packed in a specially designed shipping container (P/N 0305-0002) equipped with plastic foam pads. Ship no more than five containers per aircraft. Authorized for liquid helium and neon.

A6.11.4.12. LSNe-75, liquid neon container, with a maximum quantity of 75 L (19.81 gallon) attached to a shipping skid. Ship not more than two containers per aircraft. Containers must be equipped with an absolute pressure relief valve.

A6.11.4.13. Liquid oxygen and liquid nitrogen in specification MIL-T-38170 containers vented to the outside of the aircraft. The container vent valve must be monitored by a crewmember to make sure the pressure buildup within the container is not over 40 psig. The container must be vented down to 5 psig whenever necessary during flight and the valve again shut off.

A6.12. Ethyl Chloride. Package ethyl chloride in any of the following single or combination nonbulk packagings which meet the PG I performance level. (Outage for all containers must be 7.5 percent or more at 21 degrees C (70 degrees F.)

A6.12.1. Wooden boxes (4C1, 4C2, 4D, or 4F) with glass, earthenware, or metal inner receptacles not over 500 g (17.6 ounces) capacity each.

A6.12.2. Metal drums, (1A1), not over 100 L (26 gallon) capacity each.

A6.12.3. Fiberboard box (4G) with inside glass, earthenware, or metal inner receptacles not over 500 g (17.6 ounces) capacity each. Gross weight must not exceed 30 kg (66 pounds).

A6.12.4. Any DOT specification cylinder prescribed for any compressed gas except acetylene.

A6.13. Ethylene Oxide. Silver mercury, or any of its alloys, or copper must not be used in any part of a packaging, valve, or other packaging appurtenance if that part, during normal conditions of transportation, may come in contact with ethylene oxide liquid or vapor. Copper alloys may be used only where gas mixtures do not contain free acetylene at any concentration

that will form copper acetylene. All packaging and gaskets must be constructed of materials which are compatible with ethylene oxide and do not lower the auto-ignition temperature of ethylene oxide. Each completed package must meet PG I performance requirements. Package ethylene oxide as follows:
A6.13.1. In inner glass ampoules or vials and placed in a fiberboard (4G) box. The total quantity of ethylene oxide must not exceed 100 g (3.5 ounces) per package.
A6.13.2. In inner aluminum receptacles and placed in a fiberboard (4G) box constructed with top and bottom pads and perimeter liner. The inner aluminum receptacles must not contain more than 135 g (4.8 ounces.) The inner aluminum receptacles must be cushioned with an incombustable material. No more than 12 inner receptacles may be packed in one fiberboard (4G) box, and no more than 10 fiberboard (4G) boxes may be overpacked.
A6.13.3. In inner metal receptacles and placed in a wooden (4C1, 4C2, 4D, or 4F), or fiberboard (4G) box. The capacity of the inner metal receptacles must not exceed 340 g (12 ounces). The metal receptacles must be capable of withstanding a 1124 kPa (180 psig) burst pressure. Each inner metal receptacle must be insulated and equipped with a relief device of the fusible plug type with a yield temperature of 69 to 77 degrees C (156 to 171 degrees F). The capacity of relief device and insulation must be such that the charged receptacle will not explode when tested by the method described in Compressed Gas Association Pamphlet C-14 or other equivalent method. No more than 12 receptacles may be packed in one outer box. Each receptacle must not be liquid full below 82 degrees C (180 degrees F).
A6.13.4. In 1A1 steel drums of no more than 231 L (61 gallons). The drum must be lagged, of all welded construction with the inner shell having a minimum thickness of 1.7 mm (0.068 inches) and the outer shell must have a minimum thickness of 2.4 mm (0.095 inches). Drums must be capable of withstanding a hydrostatic test pressure of 690 kPa (100 psig). Lagging must be of sufficient thickness so that the drum, when filled with ethylene oxide and equipped with the required pressure relief device, will not rupture when exposed to fire. The drum may not be liquid full below 85 degrees C (185 degrees F). Before each refilling, each drum must be pressure tested for leakage at no less than 103 kPa (15 psig). Each drum must be equipped with a fusible-type relief device with a yield temperature of 69 to 77 degrees C (157 to 170 degrees F). The capacity of the relief device and the effectiveness of the insulation must be such that the charged cylinder will not explode when tested by the method described in CGA Pamphlet C-14 or other equivalent method.
A6.13.5. In DOT specification cylinders, as authorized for any compressed gas except acetylene. Pressurizing valves and insulation are required for cylinders over 4 L (1 gallon) capacity. Eductor tubes must be provided for cylinders over 19 L (5 gallon) capacity. Cylinders must be seamless or welded steel (not brazed) with nominal capacity of no more than 115 L (30 gallons) and may not be liquid full below 82 degrees C (180 degrees F). Before each refilling, each cylinder must be pressure tested for leakage at no less than 103 kPa (15 psig). Each cylinder must be equipped with a fusible-type relief device with a yield temperature of 69 to 77 degrees C (157 to 170 degrees F). The capacity of the relief device and the effectiveness of the insulation must be such that the charged cylinder will not explode when tested by the method described in CGA Pamphlet C-14 or other equivalent method.

A6.14. Ethylamine (Monoethlamine, Aminoethane).
A6.14.1. Use metal drums (1A1) which meet PG I performance level requirements.
A6.14.2. Use any DOT specification cylinder prescribed for any compressed gas except acetylene.

A6.15. Arsine; Cyanogen Chloride, Inhibited; Cyanogen, Liquefied; Germane; Liquefied Gas, Toxic; Phosgene; Phosphine. See 2.9 for additional information.
A6.15.1. **Handling Instructions.** These items are extremely dangerous. Wear approved chemical safety mask and clothing when handling this material.
A6.15.2. **Packaging Requirements.** Package in DOT specification 3A1800, 3AA1800, 3AL1800, 3D, 3E1800, and 33 cylinders. Specification 3A, 3AA, 3AL, 3D, and 33 cylinders may not exceed 57 kg (125 pounds) water capacity (nominal). Shipments of "Arsine" or "Phosphine" will not be accepted for transportation if packaged in a specification 3AL cylinder. Cylinders containing "phosgene" may not exceed a filling density of 125 percent (see A3.3.2.5). The cylinder may not contain more than 68 kg (150 pounds) of phosgene. Also, each filled cylinder must be tested for leakage before it is offered for transportation and must show absolutely no leakage. This test must consist of immersing the cylinder and valve, without the protection cap attached, in a bath of water at a temperature of approximately 66 degrees C (150 degrees F) for at least 30 minutes. During which time, frequent examinations must be made to identify any escape of gas. After the test has been accomplished the valve of the cylinder must not be loosened before the cylinder is offered for transportation, and must not be loosened during transportation.

A6.16. Bromoacetone; Methyl Bromide; Chloropicrin and Methyl Bromide, or Methyl Chloride Mixtures; Insecticide Gases, Toxic, NOS. See 2.9 for additional requirements**.**

A6.16.1. **Handling Instructions.** These materials and mixtures are extremely dangerous poisons. Wear approved chemical safety mask and clothing when handling this material.
A6.16.2. **Packaging Requirements:**
A6.16.2.1. Pack bromoacetone in ordinary wood (4C1), ordinary wood, with sift-proof walls (4C2), plywood (4D), or reconstituted wood (4F), boxes with inner glass receptacles or tubes in hermetically sealed metal receptacles in corrugated fiberboard cartons. Bottles may not contain over 500 g (17.6 ounces) of liquid each and must be cushioned in cans with at least 12.7 mm (.5 inches) of absorbent cushioning material. The total amount of liquid in the outer box must not exceed 11 kg (24 pounds). Packagings must conform to the PG I performance level.
A6.16.2.2. Pack bromoacetone, methyl bromide, chloropicrin and methyl bromide mixtures, chloropicrin and methyl chloride mixtures, and chloropicrin mixtures charged with a nonflammable, nonliquefied compressed gas in DOT specification 3A, 3AA, 3B, 3C, 3E, 4A, 4B, 4BA, 4BW, or 4C cylinders having not over 113 kg (250 pounds) water capacity (nominal). However, this capacity does not apply to shipments of methyl bromide.
A6.16.2.3. Package methyl bromide mixtures containing up to 2 percent chloropicrin in a fiberboard (4G) box with inside metal cans containing not over 0.454 kg (1 pound) each, or inside metal cans with a minimum wall thickness of 0.178 mm (0.007 inch) containing not over 0.7945 kg (1 3/4 pounds) each. The 0.454 kg (1 pound) can must be capable of withstanding an internal pressure of 896.6 kPa (130 psig) without leakage or permanent distortion. Vapor pressure of the contents must not exceed 896.6 kPa (130 psig) at 55 degrees C (130 degrees F). The 0.7945 kg (1 3/4 pound) can must be capable of withstanding an internal pressure of 965.6 kPa (140 psig) without leakage or permanent distortion. Vapor pressure of the contents must not exceed 965.6 kPa (140 psig) at 55 degrees C (130 degrees F). Cans must not be liquid full at 55 degrees C (130 degrees F). Cans must be constructed of tinplate or lined with suitable material and must have concave or pressure ends.

★**A6.17. Gas Identification Sets.** Gas identification sets containing toxic material must meet the requirements of the PG I performance level.
A6.17.1. Pack in hermetically sealed glass inner receptacles not over 40 ml (1.4 fluid ounces). Each glass inner receptacle must be placed in a sealed fiberboard receptacle cushioned with absorbent material. Not more than 12 fiberboard receptacles may be placed in a 4G fiberboard box. No more than four fiberboard boxes, well-cushioned, may be placed in a steel cylinder. The cylinder must have a wall thickness of at least 3.7 mm (0.146 inches) and must have a hermetically sealed steel closure.
A6.17.2. When the toxic material is absorbed in a medium such as activated charcoal or silical gel, pack gas identification sets as follows:
A6.17.2.1. If the liquid toxic material does not exceed 5 ml (0.2 fluid ounces) or the solid toxic material does not exceed 5 g (0.2 ounces), they may be packed in glass inner receptacles of not over 120 ml (4.1 fluid ounces) each. Each glass receptacle, cushioned with absorbent material, must be packed in a hermetically sealed metal can. The metal can must have a wall thickness of not less than 0.30 mm (0.012 inch). Then the metal cans must be packed in wooden boxes (4C1, 4C2, 4D, or 4F) surrounded on all sides by at least 25 mm (1 inch) of dry sawdust. Not more than 100 ml (3.4 fluid ounces) or 100 g (3.5 ounces) of toxic materials may be packed in one outer wooden box.
A6.17.2.2. If the liquid toxic material does not exceed 5 ml (0.2 fluid ounces) or the solid toxic material does not exceed 20 g (0.7 ounces), they may be packed in glass inner receptacles with screw-top closures of not less than 60 ml (2 ounces) that are hermetically sealed. Twelve bottles containing toxic material not exceeding 100 ml (3.4 ounces) for liquids or 100 g (3.5 ounces) for solids may be placed in a plastic carrying case. Each glass receptacle must be surrounded by absorbent cushioning material and must also be separated from each other by sponge rubber partitions. The plastic carrying case must be placed in a tightly fitted fiberboard box and then placed in a tight fitting wooden box (4C1, 4C2, 4D, or 4F).

A6.18. Hexaethyl Tetraphosphate and Compressed Gas Mixtures; Insecticide Gases, Toxic, NOS; Parathion and Compressed Gas Mixture; Tetraethyl Dithiopyrophosphate and Gases, in Solution or Tetraethyl Dithiopyrophosphate and Gases, Mixtures (LC50 Less Than or Equal to 200 Parts Per Million (ppm)); Tetraethyl Dithiopyrophosphate and Gases, in Solution or Tetraethyl Dithiopyrophosphate and Gases, Mixtures (LC50 over 200 but not Greater Than 5000 ppm); Tetraethyl Pyrophosphate and Compressed Gas Mixture (LC50 Less Than or Equal to 200 ppm); Tetraethyl Pyrophosphate and Compressed Gas Mixture (LC50 Over 200 but not greater than 5000 ppm). See 2.9 for additional requirements.
A6.18.1. **Handling Instructions.** These materials and mixtures are extremely dangerous poisons. Wear approved chemical safety mask and clothing when handling this material.
A6.18.2. **Packaging Requirements.** Hexaethyl tetraphosphate, parathion, tetraethyl dithiopyrophosphate, and tetraethyl pyrophosphate may be mixed with a nonflammable compressed gas. This mixture must not contain more than 20 percent by

weight of an organic phosphate and must be packaged in DOT specification 3A240, 3AA240, 3B240, 4A240, 4B240, 4BA240, or 4BW240 cylinders meeting the following requirements:

- Each cylinder must not be charged with more than 5 kg (11.0 pounds) of the mixture. The maximum filling density of the cylinder must not exceed 80 percent of its water capacity.
- Each cylinder must be charged in compliance with A3.2.2.5.
- No cylinder may be equipped with an eduction tube or a fusible plug.
- No cylinder may be equipped with any valve unless the valve is a type approved by the DOT.

A6.18.2.1. Cylinders must be overpacked in a fiberboard box (4G) and packaged in a way to protect each valve or other closing device from damage. Except as provided in A6.18.2.2, no more than four cylinders may be packed in a box. Each box with its closing device protection must be sufficiently strong to protect all parts of each inside cylinder from deformation or breakage if the completed package is dropped 1.8 m (5.9 feet) onto solid concrete impacting at the package's weakest point.
A6.18.2.2. Cylinders may be packed in a strong wooden box (4C1, 4C2, 4D, or 4F) and packed in a way to protect each valve or other closing device from damage. No more than twelve cylinders may be packed in one outer wooden box. Each wooden box with its closing device protection must be sufficiently strong to protect all parts of each inside cylinder from deformation or breakage if the completed package is dropped 1.8 m (5.9 feet) onto solid concrete impacting at the package's weakest point.

★**A6.19. Packaging for Class 2.3 Materials, Poisonous by Inhalation (Hazard Zone A).** Package Class 2.3, PG I materials with an Inhalation Hazard Zone A as follows:
A6.19.1. In DOT cylinders as identified in 49 CFR, part 178, subpart C, except that specification 8, 8AL, and 39 cylinders are not authorized. Cylinders must also meet the requirements of A3.3.2.
A6.19.2. Pack in an inner drums (1A1, 1B1, 1H1, 1N1, or 6HA1), then place in an outer drum (1A2 or 1H2). Both the inner and outer drum must be tested to the PG I performance level. The outer 1A2 drum must have a minimum thickness of 1.35 mm (0.053 inches). The outer 1H2 drum must have a minimum thickness of 6.30 mm (0.248 inches). The outer 1A2 and 1H2 drums must withstand a hydrostatic test pressure of 100 kPa (15 psi). The capacity of the inner drum must not exceed 220 L (58 gallons). The inner drum must also meet the following requirements:

- Satisfactorily withstand a hydrostatic pressure test (as outlined in 49 CFR, paragraph 178.605) of 550 kPa (80 psig).
- Satisfactorily withstand a leak-proofness test (as outlined in 49 CFR, paragraph 178.604) using an internal air pressure at 55 degrees C (130 degrees F) of at least twice the vapor pressure of the material to be packaged.
- Have screw-type closures that are:
  - Closed and tightened to a torque as prescribed by the closure manufacturer, using a device that is capable of measuring torque.
  - Physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transportation.
  - Provided with a cap seal that is properly applied according to the cap seal manufacturer's recommendations. The cap seal must be capable of withstanding an internal pressure of at least 100 kPa (15 psi).
- Meet the following minimum thickness requirements:
  - If the capacity of the inner drum is less than or equal to 120 L (32 gallons) the minimum thickness of the inner drum is: 1.3 mm (0.051 inches) for 1A1 and 1N1 drums, 3.9 mm (0.154 inches) for 1B1 drums, 3.16 mm (0.124 inches) for 1H1 drums, 1.58 mm (0.0622 inches) for the plastic inner container and 0.96 mm (0.0378) for the outer steel drum of a 6HA1 drum.
  - If the capacity of the inner drum is greater than 120 L (32 gallons) the minimum thickness of the inner drum is: 1.7 mm (0.067 inches) for 1A1 and 1N1 drums, 4.7 mm (0.185 inches) for 1B1 drums, 3.16 mm (0.124 inches) for 1H1 drums, 1.58 mm (0.0622 inches) for the plastic inner container and 1.08 mm (0.0378) for the outer steel drum of a 6HA1 drum.

A6.19.2.1. Cushion the inner drum within the outer drum with a shock-mitigating, nonreactive material. There must be a minimum of 5.0 cm (2 inches) of cushioning material between the outer surface (side) of the inner drum and the inner surface (side) of the outer drum, and at least 7.6 cm (3 inches) of cushioning material between the outer surface (top and bottom) of the inner drum and the inner surface (top and bottom) of the outer drum.
A6.19.3. Pack in an inner packaging system that consists of an impact-resistant receptacle of glass, earthenware, plastic, or metal securely cushioned with a nonreactive absorbent material. The package must be packed within a leak-tight packaging of metal or plastic, then packed in a steel drum (1A2), aluminum drum (1B2), metal drum (other than steel or aluminum (1N2)), plywood drum (1D), fiber drum (1G), plastic drum (1H2), wooden barrel (2C2), steel jerrican (3A2), plastic jerrican (3H2), steel box (4A), aluminum box (4B), natural wood box (4C1 or 4C2), plywood box (4D), reconstituted wood box (4F), fiberboard box (4G), expanded plastic box (4H1), or solid plastic box (4H2.) The capacity of the inner receptacle must not

exceed 4 L (1 gallon). An inner receptacle that has a closure, must have the closure held in place by any means capable of preventing backoff or loosening of the closure by impact or vibration during transportation. Both the inner packaging system and the outer container must each meet the test requirements of the PG I performance level independently. The total amount of liquid that can be packed in the outer container must not exceed 16 L (4 gallons).

★**A6.20. Nitric Oxide.** See 2.9 for additional requirements.
A6.20.1. **Handling Instructions.** Nitric oxide is extremely dangerous and poisonous. Wear an approved safety mask and clothing when handling this material.
A6.20.2. **Packaging Requirements.** Pack nitric oxide in DOT 3A1800, 3AA1800, 3E1800, or 3AL1800 cylinders, charged to a pressure of not more than 5,170 kPa (750 psi) at 21 degrees C (70 degrees F). Cylinders must be equipped with a valve of stainless steel and a valve seat of material that is not deteriorated by contact with nitric oxide or nitrogen dioxide. Cylinders or valves must not be equipped with safety devices (pressure relief) of any type. Ensure valve outlets are sealed by a solid threaded cap or plug and an inert gasketing material. Each cylinder must be cleaned as identified in 49 CFR, 173.337(c). Additionally:
A6.20.2.1. Pack cylinders, DOT 3E1800, in strong wooden boxes designed to protect valves from injury or accidental functioning under conditions incident to transportation.
A6.20.2.2. Cylinders, DOT 3A, 3AA, and 3AL, must have their valves protected by metal caps, or other equally protective guards, securely attached to the cylinders and be of sufficient strength to protect the valves from injury during transit, or by packing in strong wooden boxes designed to protect valves from injury or accidental functioning under conditions incident to transportation.

★**A6.21. Ethyl Methyl Ether.** Each packaging must meet the requirements of the PG I performance level.
A6.21.1. Package items in combination packages consisting of glass, earthenware, plastic, metal receptacles, or glass ampoules, then packed in steel drums (1A1 or 1A2), aluminum drums (1B1 or 1B2), metal drums other than steel or aluminum (1N1 or 1N2), plywood drum (1D), fiber drum (1G), plastic drum (1H1 or 1H2), steel jerrican (3A1 or 3A2), plastic jerrican (3H1 or 3H2), steel box (4A1 or 4A2), aluminum box (4B1 or 4B2), natural wood box (4C1 or 4C2), plywood box (4D), reconstituted wood box (4F), fiberboard box (4G), expanded plastic box (4H1), solid plastic box (4H2).
A6.21.2. Package items in single packagings consisting of steel drums (1A1 or 1A2), aluminum drum (1B1 or 1B2), metal drum other than steel or aluminum (1N1 or 1N2), plastic drum (1H1 or 1H2), steel jerrican (3A1 or 3A2), plastic jerrican (3H1 or 3H2), plastic receptacle in steel, aluminum, fiber or plastic drum (6HA1, 6HB1, 6HG1, 6HH), plastic receptacle in steel, aluminum, wooden, plywood, or fiberboard box (6HA2, 6HB2, 6HC, 6HD2, 6HG2), glass, porcelain or stoneware in steel, aluminum or fiber drum (6PA1, 6PB1, 6PG1), glass, porcelain or stoneware in steel, aluminum, wooden, or fiberboard box (6PA2, 6PB2, 6PC, 6PG2), glass, porcelain or stoneware in solid or expanded plastic packaging (6PH1 or 6PH2).
A6.21.3. Any DOT specification cylinders as prescribed for any compressed gas, except for acetylene.

A6.22. Gas Generator Assemblies. Package gas generator assemblies (aircraft) containing liquefied non-flammable, non-toxic gas and a solid propellant cartridge as follows:

- Package the gas in specification steel cylinders authorized for any compressed gas except acetylene not exceeding 10.5L (2.8 gallons) internal volume and having a minimum design burst pressure of 19,000 kPa (2,857 psi).
- Protect fittings against damage under conditions normal to transport, any trigger must be fitted with a safety locking pin, and a non-propulsive plug must be installed on the discharge tube; and
- Individually and tightly pack each complete unit to prevent movement in wooden boxes (4C1 or 4C2), plywood boxes (4D), reconstituted wood boxes (4F), fiberboard boxes (4G), or plastic boxes (4H1 and 4H2) of PG II performance level, or in the original manufacturer's transit box.

CLASS 3--FLAMMABLE LIQUIDS

A7.1. General Requirements. This attachment contains information concerning the packaging and general handling instructions for Class 3 material (flammable liquids).

A7.2. General Handling Instructions. Store flammable liquids in cool, well-ventilated areas. Do not store near sources of heat, flames, sparks, combustible materials, or oxidizing agents. Keep containers tightly closed to prevent the evaporation of flammable liquids. Although classed as a flammable liquid, some materials in this attachment may also be described as corrosive or toxic. In the event of leakage or spillage, use rubber gloves, goggles, aprons, and respirators.

★**A7.3. Packaging for Class 3 Materials.** Package in (see A3.3.3.1 for inner container quantity requirements):
A7.3.1. Steel drum (1A1 or 1A2), aluminum drum (1B1 or 1B2), or metal drum, other than steel or aluminum (1N1 or 1N2) with inside glass, earthenware, plastic, or metal receptacles.
A7.3.2. Plywood drum (1D), fiber drum (1G), or plastic drum (1H1 or 1H2), with inside glass, earthenware, plastic, or metal receptacles.
A7.3.3. Wooden barrel (2C2), with inside glass, earthenware, plastic, or metal receptacles. Not authorized for PG I material.
A7.3.4. Steel jerrican (3A1 or 3A2) or plastic jerrican (3H1 or 3H2), with inside glass, earthenware, plastic, or metal receptacles.
A7.3.5. Steel box (4A1 or 4A2) or aluminum box (4B1 or 4B2) with inside glass, earthenware, plastic, or metal receptacles.
A7.3.6. Natural wood box (4C1 or 4C2), plywood box (4D), or reconstituted wood box (4F), with inside glass, earthenware, plastic, or metal receptacles.
A7.3.7. Fiberboard box (4G) with inside glass, earthenware, plastic, or metal receptacles.
A7.3.8. Expanded plastic box (4H1) or solid plastic box (4H2) with inside glass, earthenware, plastic, or metal receptacles.
A7.3.9. Steel drum (1A1 or 1A2), aluminum drum (1B1 or 1B2), or metal drum, other than steel or aluminum (1N1 or 1N2).
A7.3.10. Plastic drum (1H1 or 1H2).
A7.3.11. Wooden barrel (2C1). Not authorized for PG I material.
A7.3.12. Steel jerrican (3A1 or 3A2) or plastic jerrican (3H1 or 3H2).
A7.3.13. Single, composite package comprised of a plastic receptacle in steel, aluminum, fiber, or plastic drum (6HA1, 6HB1, 6HG1, or 6HH).
A7.3.14. Single, composite package comprised of a plastic receptacle in steel, aluminum, wooden, plywood, or fiberboard box (6HA2, 6HB2, 6HC, 6HD2, or 6HG2).
A7.3.15. Single, composite package comprised of glass, porcelain, or stoneware in steel, aluminum, or fiber drum (6PA1, 6PB1, or 6PG1).
A7.3.16. Single, composite package comprised of glass, porcelain, or stoneware, in steel, aluminum, wooden, or fiberboard box (6PA2, 6PB2, 6PC, or 6PG2).
A7.3.17. Single, composite package comprised of glass, porcelain, or stoneware in solid or expanded plastic packaging (6PH1 or 6PH2).
A7.3.18. Single, composite package comprised of a plastic receptacle in a plywood drum (6HD1.) Not authorized for PG I material.
A7.3.19. DOT specification cylinders as prescribed for any compressed gas, except DOT 8 (acetylene) and DOT 3HT.
A7.3.20. Pack BLU-27 fire bombs according to SPI 1325-912-3175. Pack BLU-32 fire bombs according to SPI 1325-912-3175 or SPI 1325-483-3035. Do not stack containers more than two high for air transportation. Ship fire bombs as flammable liquids, NOS.
A7.3.21. DOT 5L jerry cans authorized under 3.7. Completely drain cans for shipment.
A7.3.22. MIL-D-23119 500 gallon capacity collapsible fabric drums authorized under 3.7.
A7.3.23. Except as identified in paragraph 3.7, drain and purge bulk storage tanks according to service technical manuals.

A7.4. Refrigerating Machine. A refrigerating machine assembled for shipment and containing 7 kg (15 pounds) or less of flammable liquid for operation in a strong, tight receptacle is excepted from specification packaging, marking, and labeling except for the name of contents on the outside container.

★**A7.5. Aircraft Hydraulic Power Unit Fuel Tank.**
A7.5.1. **Handling Instructions.** In the event of a leak during transportation of hydrazine, crew members should use their aircraft oxygen masks in a positive pressure mode.

A7.5.2. **Packaging Requirements.** Aircraft hydraulic power unit fuel tanks containing a mixture of anhydrous hydrazine and monomethyl hydrazine (M86 fuel) and designed for installation as complete units in aircraft are excepted from specification packaging requirements if the units comply with one of the following:

- The unit must consist of an aluminum pressure vessel made from tubing and having welded heads. Primary containment of the fuel within this vessel must consist of a welded aluminum bladder having a maximum internal volume of 46 L (12 gallons). The outer vessel must have a minimum design gauge pressure of 1.275 kPa (185 psi) and a minimum burst gauge pressure of 2.755 kPa (400 psi). Each vessel must be leak-checked during manufacture and before shipment and must be found leak proof. The complete inner unit must be securely packed in noncombustible cushioning material, in a strong outer tightly closed metal packaging which will adequately protect all fittings. The maximum quantity of fuel per unit and package is 42 L (11 gallons).
- The unit must consist of an aluminum pressure vessel. Primary containment of the fuel within this vessel must consist of a welded hermetically sealed fuel compartment with an elastomeric bladder having a maximum internal volume of 46 L (12 gallons). The pressure vessel must have a minimum design gauge pressure of 5.17 kPa (750 psi). Each vessel must be leak-checked during manufacture and before shipment and must be found leak proof. The complete inner unit must be securely packed in noncombustible cushioning material, in a strong outer tightly closed metal packaging which will adequately protect all fittings. The maximum quantity of fuel per unit and package is 42 L (11 gallons).

★**A7.6. Packaging for Class 3 Materials, Poisonous by Inhalation (Hazard Zone A or B).** Package Class 3 materials with an Inhalation Hazard (Hazard Zone A and B) as follows:

A7.6.1. Package in DOT specification cylinders as identified in 49 CFR, part 178, subpart C, except that specification 8, 8AL, and 39 cylinders are not authorized. Cylinders must also meet the requirements of A3.3.2.

A7.6.2. Pack in an inner drum (1A1, 1B1, 1N1, 1H1, or 6HA1), then place in an outer drum (1A2 or 1H2). Both the inner and outer drum must be tested to the PG I performance level. The outer 1A2 drum must have a minimum thickness of 1.35 mm (0.053 inches). The outer 1H2 drum must have a minimum thickness of 6.30 mm (0.248 inches). The capacity of the inner drum (1A1, 1B1, or 1N1) must not exceed 220 L (58 gallons). The inner drum must also meet the following requirements:

- Satisfactorily withstand a hydrostatic pressure test (as outlined in 49 CFR, paragraph 178.605) of 550 kPa (80 psig).
- Satisfactorily withstand a leak proof test (as outlined in 49 CFR, 178.604) using an internal air pressure at 55 degrees C (131 degrees F) of at least twice the vapor pressure of the material to be packaged.
  - Have screw-type closures that meet all the following requirements:
  - Closed and tightened to a torque as prescribed by the closure manufacturer, using a device that is capable of measuring torque.
  - Physically held in place by any means capable of preventing backoff or loosening of the closure by impact or vibration during transportation.
- Provided with a cap seal that is properly applied according to the cap seal manufacturer's recommendations. The cap seal must be capable of withstanding an internal pressure of at least 100 kPa (15 psi).
- Meet the following minimum thickness requirements:
  - 1A1 and 1N1 drums with a capacity of less than or equal to 120 L (32 gallons) must have a minimum thickness of 1.3 mm (0.051 inches). 1B1 drums with a capacity of less than or equal to 120 L (32 gallons) must have a minimum thickness of 3.9 mm (0.154 inches).
  - 1A1 and 1N1 drums with a capacity greater than 120 L (32 gallons) must have a minimum thickness of 1.7 mm (0.067 inches). 1B1 drums with a capacity greater than 120 L (32 gallons) must have a minimum thickness of 4.7 mm (0.185 inches).

A7.6.2.1. Cushion the inner drum within the outer drum with a shock-mitigating, non reactive material. There must be a minimum of 5.0 cm (2 inches) of cushioning material between the outer surface (side) of the inner drum and the inner surface (side) of the outer drum, and at least 7.6 cm (3 inches) of cushioning material between the outer surface (top and bottom) of the inner drum and the inner surface (top and bottom) of the outer drum.

A7.6.3. Pack in an inner packaging system that consists of an impact-resistant receptacle of glass, earthenware, plastic, or metal securely cushioned with a non reactive absorbent material. The package must be packed within a leak-tight packaging of metal or plastic, then packed in a steel drum (1A2), aluminum drum (1B2), metal drum (other than steel or aluminum (1N2)), plywood drum (1D), fiber drum (1G), plastic drum (1H2), wooden barrel (2C2), steel jerrican (3A2), plastic jerrican (3H2), steel box (4A1 or 4A2), aluminum box (4B1 or 4B2), natural wood box (4C1 or 4C2), plywood box (4D), reconstituted wood box (4F), fiberboard box (4G), expanded plastic box (4H1), or solid plastic box (4H2). The capacity of the inner receptacle must not exceed 4 L (1 gallon). An inner receptacle that has a closure must have a screw-type closure,

which is held in place by any means capable of preventing backoff or loosening of the closure by impact or vibration during transportation. Both the inner packaging system and the outer container must each meet the test requirements of the PG I performance level independently. The total amount of liquid that can be packed in the outer container must not exceed 16 L (4 gallons).

A7.6.4. This paragraph is only authorized for Crotonaldehyde, stabilized; Diketene, Inhibited; Dimethylhydrazine, symmetrical; Isopropyl Cloroformate and Methyl Orthosilicate. Pack in metal drums (1A1, 1B1, or 1N1), or plastic drum (1H1), then place in metal drums (1A2 or 1H2), or a plastic receptacle with outer steel drum (6HA1). Both the inner and outer drum must be tested to the PG I performance level. The outer 1A2 drum must have a minimum thickness of 1.35 mm (0.053 inches). The outer 1H2 drum must have a minimum thickness of 6.30 mm (0.248 inches). The capacity of the inner drum (1A1, 1B1, 1N1, or 1H1) must not exceed 220 L (58 gallons). The inner drum must meet the following requirements:

- Satisfactorily withstand a leak-proof test (as outlined in 49 CFR, paragraph 178.604) using an internal air pressure at 55 degrees C (131 degrees F) of at least twice the vapor pressure of the material to be packaged.
  - Have screw-type closures that meet all the following requirements:
  - Closed and tightened to a torque as prescribed by the closure manufacturer, using a device that is capable of measuring torque.
- Physically held in place by any means capable of preventing backoff or loosening of the closure by impact or vibration during transportation.
- Provided with a cap seal that is properly applied according to the cap seal manufacturer's recommendations. The cap seal must be capable of withstanding an internal pressure of at least 100 kPa (15 psi).
- Meet the following minimum thickness requirements:
  - 1A1 drums with a capacity of less than or equal to 30 L (7.9 gallons) must have a minimum thickness of 0.69 mm (0.027 inches). 1B1 drums with a capacity of less than or equal to 30 L (7.9 gallons) must have a minimum thickness of 2.79 mm (0.110 inches). 1H1 drums with a capacity of less than or equal to 30 L (7.9 gallons) must have a minimum thickness of 1.14 mm (0.045 inches). 6HA1 drums with a capacity of less than or equal to 30 L (7.9 gallons) must have a minimum thickness of 1.58 mm (0.0625 inches) for the inner plastic drum and a minimum thickness of 0.96 mm (0.038 inches) for the outer steel drum.
  - 1A1 drums with a capacity greater than 30 L (7.9 gallons) but less than or equal to 120 L (32 gallons) must have a minimum thickness of 1.08 mm (0.043 inches). 1B1 drums with a capacity greater than 30 L (7.9 gallons) but less than or equal to 120 L (32 gallons) must have a minimum thickness of 3.9 mm (0.154 inches). 1H1 drums with a capacity greater than 30 L (7.9 gallons) but less than or equal to 120 L (32 gallons) must have a minimum thickness of 3.16 mm (0.125 inches). 6HA1 drums with a capacity greater than 30 L (7.9 gallons) but less than or equal to 120 L (32 gallons) must have a minimum thickness of 1.58 mm (0.0625 inches) for the inner plastic drum and a minimum thickness of 0.96 mm (0.038 inches) for the outer steel drum.
  - 1A1 or 1N1 drums with a capacity greater than 120 L (32 gallons) must have a minimum thickness of 1.35 mm (0.053 inches). 1B1 drums with a capacity greater than 120 L (32 gallons) must have a minimum thickness of 4.7 mm (0.185 inches). 1H1 drums with a capacity greater than 120 L (32 gallons) must have a minimum thickness of 3.16 mm (0.124 inches). 6HA1 drums with a capacity greater than 120 L (32 gallons) must have a minimum thickness of 1.58 mm (0.0625 inches) for the inner plastic drum and a minimum thickness of 1.08 mm (0.43 inches) for the outer steel drum.

A7.6.4.1. Cushion the inner drum within the outer drum with a shock-mitigating, non reactive material. There must be a minimum of 5.0 cm (2 inches) of cushioning material between the outer surface (side) of the inner drum and the inner surface (side) of the outer drum, and at least 7.6 cm (3 inches) of cushioning material between the outer surface (top and bottom) of the inner drum and the inner surface (top and bottom) of the outer drum.

★**A7.7. Polyester Resin Kits.** Polyestere resin and fiberglass repair kits consist of two components: a base material in Class 3, PG II or III, and an organic peroxide activator.

- Only organic peroxides of Type D, E, or F not requiring temperature controls are authorized.
- Assign PG II or III according to the criteria for Class 3, applied to the base material.
- Ensure each component is separately packed in an inner packaging. The components may be placed in the same outer packaging provided they will not react dangerous in the event of leakage.
- Pack organic peroxides in inner plastic or flexible tube packaging. Maximum quantity of organic peroxide per inner packaging is 125 ml (4.22 ounces) for liquids and 500 g (1 lb) for solids.
- Pack flammable liquids in inner glass or earthenware, plastic, metal, or aluminum packaging.
- Pack the inner packagings in one of the following outer packagings:

A7.7.1. Steel (1A2), aluminum (1B2), plyw ood (1D), fiber (1G), or plastic (1H2) drum.

A7.7.2. Steel (3A2) or plastic (3H2) jerrican.
A7.7.3. Fiberboard (4G), wooden (4C1 or 4C2), reconstituted wood (4F), plywood (4D), or plastic (4H2) box.

CLASS 4--FLAMMABLE SOLIDS, SPONTANEOUSLY COMBUSTIBLE MATERIAL, AND DANGEROUS WHEN WET MATERIAL

A8.1. General Requirements. This attachment contains information concerning the packaging and general handling instructions for Class 4.1 (flammable solids), Class 4.2 (spontaneously combustible material), and Class 4.3 (dangerous when wet material).

A8.2. General Handling Instructions. Store Class 4 material in a cool, well-ventilated area away from moisture. Do not store near corrosives (Class 8). Tightly and securely close all containers. These items may be water reactive and spontaneously combustible. Do not pack Class 4 material in the same outside container with corrosive liquids, unless the corrosive liquids are in bottles cushioned by incombustible absorbent material. Place the cushioned bottles in tightly closed metal containers. Material in quantities not over 118 ml (4 ounces) in securely closed metal cans can be packed for military air transport in the same compartment with other securely packed materials necessary for a complete fumigant.

A8.3. Packaging for Class 4 Liquids. Package in (see also A3.3.4.1):
A8.3.1. Steel drum (1A1 or 1A2), aluminum drum (1B1 or 1B2), or metal drum, other than steel or aluminum (1N1 or 1N2) with inside glass, earthenware, plastic, or metal receptacles.
A8.3.2. Plywood drum (1D), fiber drum (1G), or plastic drum (1H1 or 1H2), with inside glass, earthenware, plastic, or metal receptacles.
A8.3.3. Wooden barrel (2C2), with inside glass, earthenware, plastic, or metal receptacles. Not authorized for PG I material.
A8.3.4. Steel jerrican (3A1 or 3A2) or plastic jerrican (3H1 or 3H2), with inside glass, earthenware, plastic, or metal receptacles.
A8.3.5. Steel box (4A1 or 4A2) or aluminum box (4B1 or 4B2) with inside glass, earthenware, plastic, or metal receptacles.
A8.3.6. Natural wood box (4C1 or 4C2), plywood box (4D), or reconstituted wood box (4F), with inside glass, earthenware, plastic, or metal receptacles.
A8.3.7. Fiberboard box (4G) with inside glass, earthenware, plastic, or metal receptacles.
A8.3.8. Expanded plastic box (4H1) or solid plastic box (4H2) with inside glass, earthenware, plastic, or metal receptacles.
A8.3.9. Steel drum (1A1 or 1A2), aluminum drum (1B1 or 1B2), or metal drum, other than steel or aluminum (1N1 or 1N2).
A8.3.10. Plastic drum (1H1 or 1H2).
A8.3.11. Wooden barrel (2C1). Not authorized for PG I material.
A8.3.12. Steel jerrican (3A1 or 3A2) or plastic jerrican (3H1 or 3H2).
A8.3.13. Single composite package comprised of a plastic receptacle in steel, aluminum, fiber, or plastic drum (6HA1, 6HB1, 6HG1, or 6HH).
A8.3.14. Single, composite package comprised of a plastic receptacle in steel, aluminum, wooden, plywood, or fiberboard box (6HA2, 6HB2, 6HC, 6HD2, or 6HG2).
A8.3.15. Single, composite package comprised of glass, porcelain, or stoneware in steel, aluminum, or fiber drum (6PA1, 6PB1, or 6PG1).
A8.3.16. Single, composite package comprised of glass, porcelain, or stoneware, in steel, aluminum, wooden, or fiberboard box (6PA2, 6PB2, 6PC, or 6PG2).
A8.3.17. Single, composite package comprised of glass, porcelain, or stoneware in solid or expanded plastic packaging (6PH1 or 6PH2).
A8.3.18. Single, composite package comprised of a plastic receptacle in a plywood drum (6HD1).
A8.3.19. DOT specification cylinders as prescribed for any compressed gas, except DOT 8 (acetylene) and DOT 3HT.

A8.4. Packaging for Class 4 Solids. Package in (see also A3.3.4.1):
A8.4.1. Steel drum (1A1 or 1A2), aluminum drum (1B1 or 1B2), or metal drum, other than steel or aluminum (1N1 or 1N2) with inside glass, earthenware, plastic, or metal receptacles.
A8.4.2. Plywood drum (1D), fiber drum (1G), or plastic drum (1H1 or 1H2), with inside glass, earthenware, plastic, or metal receptacles.
A8.4.3. Wooden barrel (2C2), with inside glass, earthenware, plastic, or metal receptacles.
A8.4.4. Steel jerrican (3A1 or 3A2) or plastic jerrican (3H1 or 3H2), with inside glass, earthenware, plastic, or metal receptacles.
A8.4.5. Steel box (4A1 or 4A2) or aluminum box (4B1 or 4B2) with inside glass, earthenware, plastic, or metal receptacles.
A8.4.6. Natural wood box (4C1 or 4C2), plywood box (4D), or reconstituted wood box (4F), with inside glass, earthenware, plastic, or metal receptacles.

A8.4.7. Fiberboard box (4G) with inside glass, earthenware, plastic, or metal receptacles.
A8.4.8. Solid plastic box (4H2) with inside glass, earthenware, plastic, or metal receptacles.
A8.4.9. Steel drum (1A1 or 1A2), aluminum drum (1B1 or 1B2), or metal drum, other than steel or aluminum (1N1 or 1N2).
A8.4.10. Plywood drum (1D). Not authorized for PG I material.
A8.4.11. Plastic drum (1H1 or 1H2).
A8.4.12. Fiber drum (1G). Not authorized for PG I material.
A8.4.13. Wooden barrel (2C1 or 2C2). Not authorized for PG I material.
A8.4.14. Steel jerrican (3A1 or 3A2) or plastic jerrican (3H1 or 3H2).
A8.4.15. Steel box with liner (4A2), or aluminum box with liner (4B2).
A8.4.16. Steel box (4A1), aluminum box (4B1). Not authorized for PG I material.
A8.4.17. Natural wood box sift-proof (4C2).
A8.4.18. Natural wood box (4C1). Not authorized for PG I material.
A8.4.19. Plywood box (4D) or reconstituted wood box (4F). Not authorized for PG I material.
A8.4.20. Fiberboard box (4G). Not authorized for PG I material.
A8.4.21. Expanded plastic box (4H1) or solid plastic box (4H2). Not authorized for PG I material.
A8.4.22. Bag, woven plastic (5H1, 5H2, or 5H3); bag, plastic film (5H4); bag, textile (5L1, 5L2, or 5L3); bag, paper, multiwall, water-resistant (5M2). Not authorized for PG I material.
A8.4.23. Single, composite package comprised of a plastic receptacle in steel, aluminum, plywood, fiber, or plastic drum (6HA1, 6HB1, 6HD1, 6HG1, or 6HH1).
A8.4.24. Single, composite package comprised of a plastic receptacle in steel, aluminum, wood, plywood, or fiberboard box (6HA2, 6HB2, 6HC, 6HD2, or 6HG2).
A8.4.25. Single, composite package comprised of glass, porcelain, or stoneware in steel, aluminum, plywood, or fiber drum (6PA1, 6PB1, 6PD1, or 6PG1).
A8.4.26. Single, composite package comprised of glass, porcelain, or stoneware, in steel, aluminum, wooden, or fiberboard box (6PA2, 6PB2, 6PC, or 6PG2).
A8.4.27. Single, composite package comprised of glass, porcelain, or stoneware in expanded or solid plastic packaging (6PH1 or 6PH2).

★**A8.5. Class 4 Materials requiring CAA.** Ship Class 4 materials identified in table A4.1 to this paragraph according to a competent authority approval (CAA). See 2.5 for more information on CAAs.

★**A8.6. Pyrophoric Liquid Materials (Class 4.2).** Package in (see also A3.3.4.1):
A8.6.1. Specification steel or nickel cylinders prescribed for any compressed gas except acetylene having a minimum design pressure of 1206 kPa (175 psi).

- Cylinders with valves must be equipped with steel valve protection caps or collars, or
- Pack in wooden box (4C1, 4C2, 4D, or 4F), fiberboard box (4G), or plastic box (4H1 or 4H2). Secure cylinders to prevent movement in the box and when offered for transportation, load so that the pressure relief devices remain in the vapor space of the cylinder.

A8.6.2. Wooden boxes (4C1, 4C2, 4D, or 4F), or fiberboard boxes (4G) with not more than four strong, tight metal cans with inner receptacles of glass or metal. Inner receptacles must not be over 1 L (0.3 gallons) capacity each. Inner receptacles must have a positive screw cap closure with gasket. Cushion inner packagings on all sides with dry, incombustible absorbent cushioning material in a quantity sufficient to absorb the entire contents. The strong, tight metal cans must be closed by positive means, not by friction.
A8.6.3. Steel drums (1A2) or fiber drums (1G) not exceeding 220 L (58 gallons) capacity each with inner metal cans not over 4 L (1 gallon) capacity each, closed by positive means, not by friction. The following additional requirements must be met:

- Inner packaging must have no opening exceeding 25 mm (1 inch) in diameter and must be surrounded with non combustible absorbent cushioning material.
- Net quantity of pyrophoric liquids must not exceed two-thirds of the rated capacity of the outer drum. For example, a 220 L (58 gallon) outer drum must not contain more than 147 L (39 gallons) of pyrophoric liquids.
- Each layer of inner packagings must be separated by a metal plate separator in addition to the noncombustible absorbent cushioning material.

A8.7. Diphenyloxide-4, 4-Disulphohydrazide; N, N Dinitroso-N, N Dimethyl Teraphthlamide (not more than 72 percent as a paste). Temperature controls are not required.

A8.7.1. Package in a fiber drum (1G) with a plastic liner or internal coating. Maximum gross weight is 50 kg (110 pounds).
A8.7.2. Package in a sift-proof fiber drum (1G). Maximum gross weight must not exceed 110 pounds (50 kg).

A8.8. 1,1 Azodi-(Hexahydrobenzonitrile); Benzene Sulfohydrazide; Benzene-1,3-Disulfohydrazide (not more than 52 percent as a paste); N,N-Dinitrosopentamethylenetetramine (not more than 82 percent with phlegmatizer).
Temperature controls are not required.
A8.8.1. Package in a fiber drum (1G) with a plastic liner or internal coating. Maximum gross weight is 50 kg (110 pounds).
A8.8.2. Package in an inner container which must be a single plastic bag. Outer packaging must be a fiberboard box (4G). Maximum gross weight is 50 kg (110 pounds).
A8.8.3. Package in an inner packaging which must be either plastic boxes, plastic bottles or jars. Outer packaging must be a fiberboard box (4G). Maximum weight of inner packaging is 5 kg (11 pounds). Maximum gross weight: 40 kg (88 pounds).
A8.8.4. Outer package must be a sift-proof fiber drum (1G). Maximum gross weight is 55 kg (110 pounds).

A8.9. 3-Chloro-4-Diethylaminobenzenediazonium Zinc Chloride; 4-Dipropylaminobenzenediazonium Zinc Chloride; Sodium 2-Diazo-1Naphthol-4-Sulphonate; Sodium 2-Diazo-1-Naphthol-5-Sulphonate. Temperature controls are not required.
A8.9.1. Package in a fiber drum (1G) with a plastic liner or internal coating. Maximum gross weight is 50 kg (110 pounds).
A8.9.2. Package in an inner packaging which must be a plastic bag. Place in an outer packaging which must be either a steel removable head drum (1A2) or an aluminum removable head drum (1B2). Maximum gross weight is 55 kg (121 pounds).

A8.10. 2-Diazo-1-Naphthol-4-Sulphochloride and 2-Diazo-1-Naphhthol-5-Sulphochloride. Temperature controls are not required. Package in a fiber drum (1G) with plastic liner or internal coating. Maximum gross weight is 50 kg (110 pounds).

A8.11. Barium Azide, Wetted (with not less than 50 percent water by mass). Pack barium azide, wetted (with not less than 50 percent water by mass) in wooden boxes (4C1, 4C2, 4D, or 4F), or fiber drums (1G) with inner glass receptacles not over 0.5 kg (1.1 pounds) capacity each. Inner receptacles must have rubber stoppers wire-tied for securement. If transportation is to take place when freezing weather is possible, a suitable antifreeze solution must be used to prevent freezing.

A8.12. Calcium Pyrophoric; Magnesium Diphenyl; Metal Catalyst, Dry; Pyrophoric Metals, NOS and Pyrophoric Solids, NOS.
A8.12.1. Package in wooden boxes (4C1, 4C2, 4D, or 4F) with inner metal receptacles which have a positive (not friction) means of closure. Inner metal receptacles must not contain more than 15 kg (33 pounds) each.
A8.12.2. Package in fiberboard boxes (4G) with inner metal receptacles which have a positive (not friction) means of closure. Inner metal receptacles must not contain more than 7.5 kg (17 pounds) each.
A8.12.3. Package in steel drums (1A1 or 1A2) with a gross weight not exceeding 150 kg (331 pounds) each.
A8.12.4. Package in fiber (1G) or plywood (1D) drums with inner metal receptacles which have a positive (not friction) means of closure. Inner metal receptacles must not contain more than 15 kg (33 pounds) each.

A8.13. Films, Nitrocellulose Base (gelatin coated [except scrap]).
A8.13.1. Package in steel drums (1A2), aluminum drums (1B2), steel jerricans (3A2), wooden boxes (4C1, 4C2), plywood boxes (4D), reconstituted wood boxes (4F), or plywood drums (1D) with each reel in a tightly closed metal can or strong fiberboard inner packaging with its cover securely held in place with adhesive tape or adhesive paper.
A8.13.2. Package in a fiberboard box (4G) or fiber drum (1G) with a single tightly closed metal can or strong fiberboard inner packaging with cover securely held in place with adhesive tape or adhesive paper. This type packaging authorized only for film not exceeding 600 m (1969 feet).

A8.14. Fusee (railway or highway).
A8.14.1. **General Requirements.** Fusees that are equipped with spikes must have reinforced ends to prevent penetration of the spikes through the outer packaging. Also, the packages must be capable of passing at least one drop test with the spike in a downward position. The PSN "FUSEE" is only valid for domestic movement. For international shipment you must use the PSN "SIGNAL DEVICES, HAND" and package the material as required by the packaging paragraph for signal devices, hand.

A8.14.2. **Packaging Requirements.** Package fusees (railway or highway) in steel drums (1A2), steel jerricans (3A2), wooden box (4C1, 4C2), plywood box (4D), reconstituted wood box (4F), fiberboard box (4G), plywood drum (1D), or fiber drum (1G).

A8.15. Matches, Fusee; Matches, Safety (book, card, or strike-on-box); Matches Strike-Anywhere, and Matches, Wax Vesta. Matches must be of a type that will not ignite spontaneously when subjected to a temperature of 93.3 degrees C (200 degrees F) for 8 consecutive hours in a properly conducted laboratory test.
A8.15.1. Do not pack matches, strike-anywhere, in the same outside container with any other article except safety matches or wax vesta matches. The safety matches or wax vesta matches must be packaged in separate inside containers. Package matches, strike-anywhere in a steel drum (1A2), aluminum drum (1B2), steel jerrican (3A2), wooden box (4C1, 4C2), plywood box (4D), reconstituted wood box (4F), fiberboard box (4G), plywood drum (1D), or fiber drum (1G) with inside securely closed chipboard, fiberboard, wooden, or metal inner containers. Each inside packaging must not contain over 700 matches. Gross weight must not be over 27.2 kg (60 pounds) for fiberboard boxes or 45.4 kg (100 pounds) for all other outer packagings.
A8.15.2. Do not pack fusee matches, in the same outside container with any other article except safety matches or wax vesta matches. The safety matches or wax vesta matches must be packaged in separate inside containers. Package fusee matches in a steel drum (1A2), aluminum drum (1B2), steel jerrican (3A2), wooden box (4C1, 4C2), plywood box (4D), reconstituted wood box (4F), fiberboard box (4G), plywood drum (1D), or fiber drum (1G) with inside securely closed chipboard, fiberboard, wooden, or metal inner containers. Each inside packaging must not contain over 700 matches. Gross weight must not be over 27.2 kg (60 pounds) for fiberboard boxes or 45.4 kg (100 pounds) for all other outer packagings.
A8.15.3. Tightly pack safety matches (strike-on-box, book, and card) or wax vesta matches in securely closed inside containers then packed in a steel drum (1A2), aluminum drum (1B2), steel jerrican (3A2), wooden box (4C1, 4C2), plywood box (4D), reconstituted wood box (4F), fiberboard box (4G), plywood drum (1D), or fiber drum (1G). Safety matches may be packed in the same outside container with non hazardous materials.

A8.16. Pentaborane. Package in any DOT specification cylinder, except those specified for acetylene.

A8.17. Phosphorus, White or Yellow, Dry, or Under Water, or in Solution. The packaging requirements are:
A8.17.1. Phosphorus white or yellow, when dry, must be cast solid and shipped in containers as follows:
A8.17.1.1. Steel drums (1A2) not over a 114 L (30 gallons) capacity each.
A8.17.1.2. In projectiles or bombs without bursting elements.
A8.17.2. Pack phosphorus, white or yellow, when in water or solution, in:
A8.17.2.1. Wooden boxes (4C1, 4C2, 4D, or 4F) with inside soldered or hermetically-sealed metal cans placed inside another soldered or hermetically-sealed metal can.
A8.17.2.2. Wooden boxes (4C1, 4C2, 4D, or 4F) with inside water-tight metal cans containing not over .45 kg (1 pound) of phosphorus with screw-top closures.
A8.17.2.3. Steel drums (1A1 or 1A2). 1A1 drums must not exceed 250 L (66 gallons), and 1A2 drums must not exceed 114 L (30 gallon) capacity each.
A8.17.3. Pack white phosphorus igniters one each in a hermetically-sealed (soldered) or watertight metal can, sealed airtight and positively fastened. Pack no more than 25 metal cans in a wooden box (4C1, 4C2, 4D, or 4F).

A8.18. Smokeless Powder for Small Arms (100 pounds or less). The PSN "SMOKELESS POWDER FOR SMALL ARMS" is only valid for domestic movement. For international shipment you must use the PSN "POWDER, SMOKELESS" and package the material as required by the packaging paragraph for powder, smokeless. The complete package must be a type examined by the Bureau of Explosives, approved by the DOT, and meet A3.3.1. Not more than 45.4 kg (100 pounds) is allowed on the aircraft. Only combination packaging with inner packagings not exceeding 3.6 kg (8 pounds) net mass are authorized. Arrange and protect inner packagings to prevent simultaneous ignition of the contents.

★A8.19. Batteries and Cells Containing Sodium.

- Ensure batteries and cells do not contain any hazardous material other than sodium, sulfur, or polysulfides.
- Do not offer batteries or cells for transportation at a temperature at which there is any liquid elemental sodium present in the battery or cell. Ensure the external battery temperature does not exceed 55 degrees C (130 degrees F).
- Ensure batteries are protected from external short circuit.

A8.19.1. Batteries must consist of cells secured within and fully enclosed by a metal casing. Ship unpackaged or in nonspecification protective packagings. UN specification POP containers are not required.

A8.19.2. Cells must consist of hermetically sealed metal casings which completely enclose the hazardous material. Pack cells with sufficient cushioning material to secure against movement; and to prevent contact between cells and between cells and the internal surfaces of the outer packaging. Package cells into one of the following outer packages meeting the PG II performance level:

- Steel (1A2), aluminum (1B2), plywood (1D), fiber (1G), or plastic (1H2) drum.
- Ordinary wood (4C1), sift-proof wood (4C2), plywood (4D), reconstituted wood (4F), fiberboard (4G), or plastic (4H2) box.

CLASS 5--OXIDIZING MATERIALS AND ORGANIC PEROXIDES

A9.1. General Requirements. This attachment contains information concerning the packaging and general handling instructions for Class 5.1 (oxidizing material) and Class 5.2 (organic peroxides).

A9.2. General Handling Instructions. Store Class 5 materials in a cool, well-ventilated area away from moisture. Do not store near corrosives.

★**A9.3. Control and Emergency Temperature.** Packaged items in Class 5.2 may require controlled temperature conditions during shipment. Table A9.1 lists the "control temperatures" for specific organic peroxide items (by technical name), when applicable, in column 6a.

- The control temperature is the temperature above which a material may not be offered for transportation.
- The emergency temperature is the temperature at which emergency procedures must be initiated due to imminent danger resulting from overheating of the shipment.
- Table A9.1 identifies emergency temperatures, when applicable, in column 6b. If column 6a or 6b is left blank, there are no control or emergency temperature requirements.

A9.4. Organic Peroxides Table. Table A9.1, Organic Peroxides Table, specifies, by technical name, the organic peroxides authorized for transportation. An organic peroxide identified by technical name in table A9.1 must comply with all of the applicable provisions of the table. An organic peroxide not identified in table A9.1 by technical name or a new formulation of identified organic peroxides requires written approval from the DOT according to 49 CFR 173.128 before transportation. A description of the column headings of table A9.1 are as follows:

- **Technical Name.** The first column specifies the technical name. Use the technical name to determine the applicable UN identification number in column 2.
- **Identification Number.** The second column specifies the UN identification number for a corresponding technical name. Use the identification number to identify the PSN in table A4.1.
- **Concentration of Organic Peroxide.** The third column specifies the concentration (mass percent of organic peroxide) limitations, if any, in mixtures or solutions. The number listed identifies the amount of organic peroxide (by mass) that is authorized for a mixture or solution containing the organic peroxide listed in column 1. Limitations are given as minimums, maximums, or a range, as appropriate. A range includes the lower and upper limits (i.e., 53-100 means from and including 53 percent to and including 100 percent). It is the responsibility of the party producing the material for shipment (contractor or manufacturer) to develop the material within the safe concentration range specified in the table.
- **Concentration of Dilutents.** The fourth column specifies the concentration (mass percent) of dilutent type A (column 4a), dilutent type B (column 4b) or inert solid (column 4c), that must be mixed with the organic peroxide, when required. It is the responsibility of the party producing the material for shipment (contractor or manufacturer) to comply with the safe concentration requirements specified in column 4.
- **Concentration of Water.** Column 5 specifies (in mass percent) the minimum amount of water required in the formulation. If the column is blank, there is no specified requirement for water content.
- **Control and Emergency Temperatures.** Column 6a specifies the control temperature and column 6b specifies the emergency temperature, when required. If a column is left blank, temperature controls are not required.
- **Notes.** Column 7 identifies additional requirements when applicable. The notes are provided at the end of the table.

Table A9.1.

ORGANIC PEROXIDES See A9.4 for instructions on use of this table.

TECHNICAL NAME (1)	UN NUMBER (2)	CONCEN-TRATION (3)	DILUTENT MASS % A (4a)	B (4b)	I (4c)	WATER (MASS %) (5)	CON-TROL (6a)	TEMP (C) EMER-GENCY (6b)	NOTES (7)
ACETYL ACETONE PEROXIDE	UN3105	≤42	≥48			≥8			2
ACETYL ACETONE PEROXIDE as a paste	UN3106	≤32							9
ACETYL BENZOYL PEROXIDE	UN3105	≤45	≥55						
ACETYL CYCLOHEXANESULFONYL PEROXIDE	UN3112	≤82			≥12		-10	0	
ACETYL CYCLOHEXANESULFONYL PEROXIDE	UN3115	≤32		≥68			-10	0	
tert-AMYL HYDROPEROXIDE	UN3107	≤88	≥6			≥6			

Table A9.1. Continued.

TECHNICAL NAME	UN NUMBER	CONCEN-TRATION	DILUETANT MASS % A	B	I	WATER (MASS %)	CON-TROL	TEMP (C) EMER-GENCY	NOTES
(1)	(2)	(3)	(4a)	(4b)	(4c)	(5)	(6a)	(6b)	(7)
tert-AMYL PEROXYBENZOATE	UN3105	≤96	≥4						
tert-AMYL PEROXY-2-ETHYLHEXANOATE	UN3115	≤100					20	25	
tert-AMYL PEROXYNEODECANOATE	UN3115	≤77		≥23			0	10	
tert-AMYL PEROXYPIVALATE	UN3113	≤77		≥23			10	15	
tert-AMYL PEROXY-3,5,5-TRIMETHYLHEXANOATE	UN3101	≤100							
tert-BUTYL CUMYL PEROXIDE	UN3105	≤100							
n-BYTYL-4,4-DI-(TERTBUTYL-PEROXY)-VALERATE	UN3103	>52,≤100							

Table A9.1. Continued.

TECHNICAL NAME (1)	UN NUMBER (2)	CONCEN-TRATION (3)	DILUETANT MASS % A (4a)	B (4b)	I (4c)	WATER (MASS %) (5)	CON-TROL (6a)	TEMP (C) EMER-GENCY (6b)	NOTES (7)
n-BYTYL-4,4-DI-(TERTBUTYL-PEROXY)-VALERATE	UN3106	≤52			≥48				
tert-BUTYL HYDROPEROXIDE	UN3103	>73≤90				≥10			
tert-BUTYL HYDROPEROXIDE	UN3105	≤80	≥20						3
tert-BUTYL HYDROPEROXIDE	UN3109	≤72				≥28			
tert-BUTYL HYDROPEROXIDE and di-tert-BUTYL PEROXIDE	UN3103	≤82 ≥9				≥7			
tert-BUTYL MONOPEROXYMALEATE	UN3102	>52,≤100							

Table A9.1. Continued.

TECHNICAL NAME (1)	UN NUMBER (2)	CONCEN-TRATION (3)	DILUETANT MASS % A (4a)	B (4b)	I (4c)	WATER (MASS %) (5)	CON-TROL (6a)	TEMP (C) EMER-GENCY (6b)	NOTES (7)
tert-BUTYL MONOPEROXYMALEATE	UN3103	≤52	≥48						
tert-BUTYL MONO-PEROXYMALEATE as a paste	UN3108	≤42							
tert-BUTYL MONO-PEROXYPHTHATE	UN3102	≤100							
tert-BUTYL PEROXYACETATE	UN3101	>52,≤77	≥23						
tert-BUTYL PEROXYACETATE	UN3103	≤52	≥48						
tert-BUTYL PEROXYBENZOATE	UN3103	>77,≤100	≥22						
tert-BUTYL PEROXYBENZOATE	UN3105	>52,≤77	≥23						1
tert-BUTYL PEROXYBENZOATE	UN3106	≤52			≥48				

Table A9.1. Continued.

TECHNICAL NAME (1)	UN NUMBER (2)	CONCEN-TRATION (3)	DILUETANT MASS % A (4a)	B (4b)	I (4c)	WATER (MASS %) (5)	CON-TROL (6a)	TEMP (C) EMER-GENCY (6b)	NOTES (7)
tert-BUTYL PEROXYCROTONATE	UN3105	≤77	≥23						
tert-BUTYL PEROXYDIETHYL-ACETATE	UN3113	≤100					20	25	
tert-BUTYL PEROXYDIETHYL ACETATE and tert-BUTYL PEROXYBENZOATE	UN3105	≤33 ≤33	≥33						
tert-BUTYL PEROXY-2-ETHYLHEXANOATE	UN3113	>52,≤100					20	25	
tert-BUTYL PEROXY-2-ETHYLHEXANOATE	UN3117	≤52		≥48			20	25	

Table A9.1. Continued.

TECHNICAL NAME (1)	UN NUMBER (2)	CONCEN-TRATION (3)	DILUETANT MASS % A (4a)	B (4b)	I (4c)	WATER (MASS %) (5)	CON-TROL (6a)	TEMP (C) EMER-GENCY (6b)	NOTES (7)
tert-BUTYL PEROXY-2-ETHYLHEXANOATE and 2,2-DI-(TERT-BUTYLPEROXY)BUTANE	UN3115	≤31 ≤36		≥33			35	40	
tert-BUTYL PEROXY-2-ETHYLHEXANOATE and 2,2-DI-(TERT-BUTYLPEROXY)BUTANE	UN3106	≤12 ≤14	≥14		≥60				
tert-BUTYL PEROXYISOBUTYRATE	UN3111	>52,≤77		≥23			15	20	
tert-BUTYL PEROXYISOBUTYRATE	UN3115	≤52		≥48			15	20	
tert-BUTYL PEROXY ISOPROPYL CARBONATE	UN3103	≤77	≥23						
tert-BUTYL PEROXY-NEODECANOATE	UN3115	>77,≤100					-5	5	

Table A9.1. Continued.

TECHNICAL NAME (1)	UN NUMBER (2)	CONCEN-TRATION (3)	DILUETANT MASS % A (4a)	B (4b)	I (4c)	WATER (MASS %) (5)	CON-TROL (6a)	TEMP (C) EMER-GENCY (6b)	NOTES (7)
tert-BUTYL PEROXY-NEODECANOATE	UN3115	≤77		≥23			0	10	
3-tert-BUTYLPEROXY-3-PHENYLPHTHALIDE	UN3106	≤100							
tert-BUTYL PEROXYPIVALATE	UN3113	>67,≤77	≥23				0	10	
tert-BUTYL PEROXYPIVALATE	UN3115	≤67		≥33			0	10	
tert-BUTYLPEROXY STARYLCARBONATE	UN3106	≤100							
tert-BUTYL PEROXY-3,5,5-TRIMETHYLHEXANOATE	UN3105	≤100							
3-CHLOROPEROXYBENZOIC ACID	UN3102	>57,≤86				≥14			

Table A9.1. Continued.

TECHNICAL NAME (1)	UN NUMBER (2)	CONCEN-TRATION (3)	DILUETANT MASS % A (4a)	B (4b)	I (4c)	WATER (MASS %) (5)	CON-TROL (6a)	TEMP (C) EMER-GENCY (6b)	NOTES (7)
3-CHLOROPEROXYBENZOIC ACID	UN3106	≤57			≥3	≥40			
CUMYL HYDROPEROXIDE	UN3109	≤90	≥10						
CUMYL PEROXYNEODECANOATE	UN3115	≤77		≥23			-10	0	
CUMYL PEROXYPIVALATE	UN3115	≤77		≥23			-5	5	
CYCLOHEXANONE PEROXIDE(S)	UN3104	≤91				≥9			
CYCLOHEXANONE PEROXIDE(S) as a paste	UN3106	≤72							4,9
CYCLOHEXANONE PEROXIDE(S)	UN3105	≤72	≥28						4
CYCLOHEXANONE PEROXIDE(S)	EXEMPT	≤32			≥68				
DIACETONE ALCOHOL PEROXIDES	UN3115	≤57		≥26		≥8			4

Table A9.1. Continued.

TECHNICAL NAME	UN NUMBER	CONCEN-TRATION	DILUETANT MASS % A	B	I	WATER (MASS %)	CON-TROL	TEMP (C) EMER-GENCY	NOTES
(1)	(2)	(3)	(4a)	(4b)	(4c)	(5)	(6a)	(6b)	(7)
DIACETYL PEROXIDE	UN3115	≤27		≥73					5
DI-TERT-AMYL PEROXIDE	UN3107	≤100							
DIBENZOYL PEROXIDE	UN3102	>52,≤100			≥48				2
DIBENZOYL PEROXIDE	UN3102	>78≤94				≥6			2
DIBENZOYL PEROXIDE	UN3104	≤77				≥23			
DIBENZOYL PEROXIDE	UN3106	≤62			≥28	≥10			
DIBENZOYL PEROXIDE as a paste	UN3106	>52,≤62							9
DIBENZOYL PEROXIDE as a paste	UN3108	≤52							9
DIBENZOYL PEROXIDE	UN3106	>35,≤52			≥48				
DIBENZOYL PEROXIDE	EXEMPT	≤35			≥65				

Table A9.1. Continued.

TECHNICAL NAME (1)	UN NUMBER (2)	CONCEN-TRATION (3)	DILUETANT MASS % A (4a)	B (4b)	I (4c)	WATER (MASS %) (5)	CON-TROL (6a)	TEMP (C) EMER-GENCY (6b)	NOTES (7)
DIBENZYL PEROXYDICARBONATE	UN3112	≤87				≥13	25	30	
DI-(4-tert-BUTYLCYCLOHEXYL) PEROXYDICARBONATE	UN3114	≤100					30	35	
DI-(4-tert-BUTYLCYCLOHEXYL) PEROXYDICARBONATE as a stable dispersion in water	UN3119	≤42					30	35	
DI-tert-BUTYL PEROXIDE	UN3107	≤100							
2,2-DI-(tert-BUTYLPEROXY)BUTANE	UN3103	≤52	≥48						
1,1-DI-(tert-BUTYLPEROXY)-CYCLOHEXANE	UN3101	>80,≤100							
1,1-DI-(tert-BUTYLPEROXY)-CYCLOHEXANE	UN3103	>52,≤80	≥20						

Table A9.1. Continued.

TECHNICAL NAME (1)	UN NUMBER (2)	CONCEN-TRATION (3)	DILUETANT MASS % A (4a)	B (4b)	I (4c)	WATER (MASS %) (5)	CON-TROL (6a)	TEMP (C) EMER-GENCY (6b)	NOTES (7)
1,1-DI-(tert-BUTYLPEROXY)-CYCLOHEXANE	UN3105	≤52	≥48						
1,1-DI-(tert-BUTYLPEROXY)-CYCLOHEXANE	UN3106	≤42	≥13		≥45				
1,1-DI-(tert-BUTYLPEROXY)-CYCLOHEXANE	UN3107	≤27	≥36						10
2,2-DI-(4,4-tert-BUTYLPER-OXYCYCLO HEXYL)PROPANE	UN3106	≤42			≥58				
DI-N-BUTYL PEROXYDICARBONATE	UN3115	>27,≤52		≥48			-15	-5	
DI-N-BUTYL PEROXYDICARBONATE	UN3117	,≤27		≥73			-10	0	
DI-SEC-BUTYL PEROXYDICARBONATE	UN3113	>52,≤100					-20	-10	

Table A9.1. Continued.

TECHNICAL NAME (1)	UN NUMBER (2)	CONCEN-TRATION (3)	DILUETANT MASS % A (4a)	B (4b)	I (4c)	WATER (MASS %) (5)	CON-TROL (6a)	TEMP (C) EMER-GENCY (6b)	NOTES (7)
DI-SEC-BUTYL PEROXYDICARBONATE	UN3115	≤52		≥48			-15	-5	
DI-(2-tert-BUTYLPEROXYISO-PROPYL)-BENZENE(S)	UN3106	>42,≤100			≥57				
DI-(2-tert-BUTYLPEROXYISO-PROPYL)-BENZENE(S)	EXEMPT	≤42			≥58				
DI-(tert-BUTYLPEROXY)PHTHALATE	UN3105	>42,≤52	≥48						
DI-(tert-BUTYLPEROXY)PHTHALATE as a paste	UN3106	≤52							
DI-(tert-BUTYLPEROXY)PHTHALATE	UN3107	≤42	≥58						
2,2-DI-(tert-BUTYLPEROXY)-PROPANE	UN3105	≤52	≥48						

Table A9.1. Continued.

TECHNICAL NAME	UN NUMBER	CONCEN-TRATION	DILUETANT MASS % A	B	I	WATER (MASS %)	CON-TROL	TEMP (C) EMER-GENCY	NOTES
(1)	(2)	(3)	(4a)	(4b)	(4c)	(5)	(6a)	(6b)	(7)
2,2-DI-(tert-BUTYLPEROXY)-PROPANE	UN3106	≤42	≥13		≥45				
1,1-DI-(tert-BUTYLPEROXY)-3,3,5-TRIMETHYL CYCLOHEXANE	UN3101	>57,≤100							
1,1-DI-(tert-BUTYLPEROXY)-3,3,5-TRIMETHYL CYCLOHEXANE	UN3106	≤57			≥43				
1,1-DI-(tert-BUTYLPEROXY)-3,3,5-TRIMETHYL CYCLOHEXANE	UN3107	≤57	≥43						
DICETYL PEROXYDICARBONATE	UN3116	≤100					20	25	

DICETYL PEROXYDICARBONATE as a stable dispersion in water	UN3119	≤42					30	35	
DI-4-CHLOROBENZOYL PEROXIDE	UN3102	≤77				≥23			

Table A9.1. Continued.

TECHNICAL NAME	UN NUMBER	CONCEN-TRATION	DILUETANT MASS % A	B	I	WATER (MASS %)	CON-TROL	TEMP (C) EMER-GENCY	NOTES
(1)	(2)	(3)	(4a)	(4b)	(4c)	(5)	(6a)	(6b)	(7)
DI-4-CHLOROBENZOYL PEROXIDE as a paste	UN3106	≤52							
DI-4-CHLOROBENZOYL PEROXIDE	EXEMPT	≤32			≥68				
DICUMYL PEROXIDE	UN3110	>42,≤100			≤57				
DICUMYL PEROXIDE	EXEMPT	≤42			≥58				
DICYCLOHEXYL PEROXYDICARBONATE	UN3112	>91,≤100					5	10	
DICYCLOHEXYL PEROXYDICARBONATE	UN3114	≤91				≥9	5	10	
DIDECANOYL PEROXIDE	UN3114	≤100					15	20	

Table A9.1. Continued.

TECHNICAL NAME	UN NUMBER	CONCEN-TRATION	DILUETANT MASS % A	B	I	WATER (MASS %)	CON-TROL	TEMP (C) EMER-GENCY	NOTES
(1)	(2)	(3)	(4a)	(4b)	(4c)	(5)	(6a)	(6b)	(7)
DI-2,4-DICHLOROBENZOYL PEROXIDE	UN3102	≤77				≥23			
DI-2,4-DICHLOROBENZOYL PEROXIDE as a paste with silicon oil	UN3106	≤52							
DI-(2-ETHYLHEXYL) PEROXYDICARBONATE	UN3113	>77≤100					-20	-10	
DI-(2-ETHYLHEXYL) PEROXYDICARBONATE	UN3115	≤77					-15	-5	
DI-(2-ETHYLHEXYL) PEROXYDICARBONATE as a stable dispersion in water	UN3117	≤42					-15	-5	

Table A9.1. Continued.

TECHNICAL NAME	UN NUMBER	CONCEN-TRATION	DILUETANT MASS % A	B	I	WATER (MASS %)	CON-TROL	TEMP (C) EMER-GENCY	NOTES
(1)	(2)	(3)	(4a)	(4b)	(4c)	(5)	(6a)	(6b)	(7)
DI-(2-ETHYLHEXYL) PEROXYDICARBONATE as a stable dispersion in water (frozen)	UN3117	≤42					-15	-5	
DIETHYL PEROXYDICARBONATE	UN3115	≤27		≥73			-10	0	
2,2-DIHYDROPEROXYPROPANE	UN3102	≤27			≥73				
DI-(1-HYDROXYCYCLOHEXYL) PEROXIDE	UN3106	≤100							
DIISOBUTYRYL PEROXIDE	UN3111	>32,≤52		≥48			-20	-10	
DIISOBUTYRYL PEROXIDE	UN3115	≤32		≥68			-20	-10	
DIISOPROPYL PEROXYDICARBONATE	UN3112	>52,≤100					-15	-5	

Table A9.1. Continued.

TECHNICAL NAME	UN NUMBER	CONCEN-TRATION	DILUETANT MASS % A	B	I	WATER (MASS %)	CON-TROL	TEMP (C) EMER-GENCY	NOTES
(1)	(2)	(3)	(4a)	(4b)	(4c)	(5)	(6a)	(6b)	(7)
DIISOPROPYL PEROXYDICARBONATE	UN3115	≤52		≥48			-10	0	
DIISOTRIDECYL PEROXYDICARBONATE	UN3115	≤100					-10	0	
DILAUROYL PEROXIDE	UN3106	≤100							
DILAUROYL PEROXIDE as a stable dispersion in water	UN3109	≤42							
DI-(2-METHYLBENZOYL)PEROXIDE	UN3112	≤87				≥13	30	35	
2,5-DIMETHYL-2,5-DI-(BENZOYL-PEROXY) HEXANE	UN3102	>82,<100							
2,5-DIMETHYL-2,5-DI-(BENZOYL-PEROXY) HEXANE	UN3106	≤82			≥18				

Table A9.1. Continued.

TECHNICAL NAME	UN NUMBER	CONCEN-TRATION	DILUETANT MASS % A	B	I	WATER (MASS %)	CON-TROL	TEMP (C) EMER-GENCY	NOTES
(1)	(2)	(3)	(4a)	(4b)	(4c)	(5)	(6a)	(6b)	(7)
2,5-DIMETHYL-2,5-DI-(BENZOYL-PEROXY) HEXANE	UN3104	≤82				≥18			
2,5-DIMETHYL-2,5-DI-(tert-BUTYL-PEROXY)HEXANE	UN3105	>52,≤100							
2,5-DIMETHYL-2,5-DI-(tert-BUTYL-PEROXY)HEXANE	UN3106	≤52			≥48				
2,5-DIMETHYL-2,5-DI-(tert-BUTYL-PEROXY)HEXANE-3	UN3103	>52,≤100							
2,5-DIMETHYL-2,5-DI-(tert-BUTYL-PEROXY)HEXANE-3	UN3106	≤52			≥48				
2,5-DIMETHYL-2,5-DI-(2- ETHYL HEXANOYLPEROXY)HEXANE	UN3115	≤100					20	25	

Table A9.1. Continued.

TECHNICAL NAME (1)	UN NUMBER (2)	CONCEN-TRATION (3)	DILUETANT MASS % A (4a)	B (4b)	I (4c)	WATER (MASS %) (5)	CON-TROL (6a)	TEMP (C) EMER-GENCY (6b)	NOTES (7)
2,5-DIMETHYL-2,5-DIHYDROPEROXYHEXANE	UN3104	≤82				≥18			
2,5-DIMETHYL-2,5-DI-(3,5,5-TRI-METHYLHEXANOYL-PEROXY) HEXANE	UN3105	≤77	≥23						
DIMYRISTYL PEROXYDICARBONATE	UN3116	≤100					20	25	
DIMYRISTYL PEROXYDICARBONATE as a stable dispersion in water	UN3119	≤42					20	25	
DI-N-NONANOYL PEROXIDE	UN3116	≤100					0	10	
DI-N-OCTANOYL PEROXIDE	UN3114	≤100					10	15	

Table A9.1. Continued.

TECHNICAL NAME	UN NUMBER	CONCEN-TRATION	DILUETANT MASS % A	B	I	WATER (MASS %)	CON-TROL	TEMP (C) EMER-GENCY	NOTES
(1)	(2)	(3)	(4a)	(4b)	(4c)	(5)	(6a)	(6b)	(7)
DIPEROXY AZELAIC ACID	UN3116	≤27			≥73		35	40	
DIPEROXY DODECANE DIACID	UN3116	>13,≤42			≥58		40	45	
DIPEROXY DODECANE DIACID	EXEMPT	≤13							
DI-(2-PHENOXYETHYL) PEROXYDICARBONATE	UN3102	>85,≤100							
DI-(2-PHENOXYETHYL) PEROXYDICARBONATE	UN3106	≤85				≥15			
DIPROPIONYL PEROXIDE	UN3117	≤27		≥73			15	20	
DI-N-PROPYL PEROXYDICARBONATE	UN3113	≤100					-25	-15	
DISTEARYL PEROXYDICARBONATE	UN3106	≤87			≥13				

Table A9.1. Continued.

TECHNICAL NAME (1)	UN NUMBER (2)	CONCEN-TRATION (3)	DILUETANT MASS % A (4a)	B (4b)	I (4c)	WATER (MASS %) (5)	CON-TROL (6a)	TEMP (C) EMER-GENCY (6b)	NOTES (7)
DISUCCINIC ACID PEROXIDE	UN3102	>72,≤100							7
DISUCCINIC ACID PEROXIDE	UN3116	≤72				≥28	10	15	7
DI-(3,5,5-TRIMETHYL-1,2-DIOXO-LANYL-3) PEROXIDE as a paste	UN3116	≤52					30	35	9
DI-(3,5,5-TRIMETHYL-1,2-DIOXO-LANYL-3)PEROXIDE as a paste	UN3116	≤52					30	33	9
DI-(3,5,5-TRIMETHYLHEXANOYL) PEROXIDE	UN3115	≤82	≥18						
ETHYL-3,3-DI-(tert-BUTYLPEROXY) -BUTRYRATE	UN3105	≤67	≥33						
ETHYL-3,3-DI-(tert-BUTYLPEROXY) -BUTYRATE	UN3103	>77,≤100							

Table A9.1. Continued.

TECHNICAL NAME (1)	UN NUMBER (2)	CONCEN-TRATION (3)	DILUETANT MASS % A (4a)	B (4b)	I (4c)	WATER (MASS %) (5)	CON-TROL (6a)	TEMP (C) EMER-GENCY (6b)	NOTES (7)
ETHYL-3,3-DI-(tert-BUTYLPEROXY) -BUTYRATE	UN3105	≤77	≥23						
ETHYL-3,3-DI-(tert-AMYLPEROXY) -BUTYRATE	UN3106	≤52			≥48				
3,3,6,6,9,9-HEXAMETHYL-1,2,4,5-TETRAOXACYCLONONANE	UN3102	>52,≤100							
3,3,6,6,9,9-HEXAMETHYL-1,2,4,5-TETRAOXACYCLONONANE	UN3105	≤52	≥48						
3,3,6,6,9,9-HEXAMETHYL-1,2,4,5-TETRAOXACYCLONONANE	UN3106	≤52			≥48				
ISOPROPYLCUMYL HYDROPEROXIDE	UN3109	≤72	≥28						

Table A9.1. Continued.

TECHNICAL NAME (1)	UN NUMBER (2)	CONCEN-TRATION (3)	DILUETANT MASS % A (4a)	B (4b)	I (4c)	WATER (MASS %) (5)	CON-TROL (6a)	TEMP (C) EMER-GENCY (6b)	NOTES (7)
p-METHYL HYDROPEROXIDE	UN3105	>55,≤100							
p-METHYL HYDROPEROXIDE	UN3113	≤55	≥45						
METHYLCYCLOHEXANONE PEROXIDE(S)	UN3115	≤67		≥33			35	40	
METHYL ETHYL KETONE PEROXIDE(S)	UN3101	≤52	≥48						4
METHYL ETHYL KETONE PEROXIDE(S)	UN3105	≤45	≥55						4
METHYL ETHYL KETONE PEROXIDE(S)	UN3107	≤40	≥60						4,11
METHYL ISOBUTYL KETONE PEROXIDE(S)	UN3105	≤62	≥19						4

Table A9.1. Continued.

TECHNICAL NAME (1)	UN NUMBER (2)	CONCEN-TRATION (3)	DILUETANT MASS % A (4a)	B (4b)	I (4c)	WATER (MASS %) (5)	CON-TROL (6a)	TEMP (C) EMER-GENCY (6b)	NOTES (7)
ORGANIC PEROXIDE, SOLID TEMPERATURE CONTROLLED	UN3114								6
ORGANIC PEROXIDE, LIQUID, SAMPLE	UN3103								6
ORGANIC PEROXIDE, LIQUID TEMPERATURE CONTROLLED	UN3113								6
ORGANIC PEROXIDE, SOLID, SAMPLE	UN3104								6
PEROXYACETIC ACID, TYPE D,STABILIZED	UN3105	≤43							8
PEROXYACETIC ACID, TYPE E,STABILIZED	UN3107	≤43							8

Table A9.1. Continued.

TECHNICAL NAME (1)	UN NUMBER (2)	CONCEN-TRATION (3)	DILUETANT MASS % A (4a)	B (4b)	I (4c)	WATER (MASS %) (5)	CON-TROL (6a)	TEMP (C) EMER-GENCY (6b)	NOTES (7)
PEROXYACETIC ACID, TYPE F,STABILIZED	UN3109	≤43							8
PINANYL HYDROPEROXIDE	UN3105	>55,≤100							
PINANYL HYDROPEROXIDE	UN3109	≤55	≥45						
TETRAHYDRONAPHTHYL HYDROPEROXIDE	UN3106	≤100							
1,1,3,3-TETRAMETHYLBUTYL HYDROPEROXIDE	UN3105	≤100							
1,1,3,3-TETRAMETHYLBUTYL PEROXY-2-ETHYLHEXANOATE	UN3115	≤100					20	25	
	UN3115	≤37		≥63			-10	0	

Notes applicable to table A9.1.

NOTES:

1. Available oxygen must be less than 4.7 percent.
2. For concentration of less than 80 percent, Item 5 is authorized. For concentration of greater than 80 percent but less than 85 percent, Item 4 is authorized. For concentration of greater than 85 percent, maximum package quantity is Item 2.
3. The dilutent may be replaced by ditert-butyl peroxide.
4. Available oxygen must be less than or equal to 9 percent.
5. Only non-metalic packagings are authorized.
6. Samples may only be offered for transportation when all available data indicates that the sample is no more dangerous than an Organic Peroxide type C, and the sample is packaged in according with table A9.2 or A9.3, Item 2, in quantities less than (10 kg) 22 pounds per shipment, employing all required temperature controls.
7. Addition of water to this organic peroxide will decrease its thermal stability.
8. Mixtures with hydrogen peroxide, water and acid.
9. With Dilutent type A, with or without water.
10. With greater than 3 percent (by mass) ethylbenzene.
11. With greater than 19 percent (by mass) methyl isobutyl ketone.

A9.5. Packaging Requirements for Class 5.2 Organic Peroxides. With the exception of organic peroxide samples, packaging requirements for Class 5.2 organic peroxides are not specified by packaging paragraphs. Determine appropriate containers by using table A4.1 generic proper shipping names in conjunction with table A9.2 or table A9.3. Containers selected from tables A9.2 or A9.3 must pass PG II performance tests and must be POP marked. Table A9.2 applies to liquid organic peroxides. Table A9.3 applies to solid organic peroxides. To determine the packaging requirements for organic peroxides:

- Determine the applicable generic PSN.
- Locate the packaging reference (table and item number) for the generic PSN in column 8 of table A4.1. The technical name and associated table or item reference will be listed in lower case letters beneath the generic PSN entry. Select the table or item reference pertaining to the technical name, but use the generic PSN (with technical name in parenthesis) to certify the shipment. The item number is the last number in the packaging reference (i.e., table A9.2.1 is table A9.2, Item 1). Labels, special provisions, etc., specified for the generic PSN also apply to the technical names listed beneath it.
- Turn to table A9.2 or table A9.3 as specified by column 8 of table A4.1.
- Locate the quantity nearest to the quantity to be shipped. This number represents the maximum net quantity per package authorized. Lesser item numbers (quantities) may be used instead of the item number specified for the material. Quantities specified for greater item numbers will not be used. For example, if the packaging reference is table A9.3.4, item number 4 of table A9.3 represents the maximum net quantity of the material that can be shipped in one package. However, the lesser quantities listed for item numbers 1-3 could also be used; quantities listed for item numbers 5-8 could not be used for the material because the quantities exceed the maximum net quantity per package permitted for the material.
- Go across the row that contains the quantity to be shipped to identify the appropriate container (including applicable notes). Any container fitting the general container description in the table may be used if it has been tested to a PG II (or PG I) performance level.
- Column 8 of table A4.1 specifies the packaging requirements (table and item number) for organic peroxides. Table A9.2 specifies the type of packagings and the maximum net quantity per package authorized for liquid organic peroxides. Table A9.3 specifies the type of packaging and the maximum net quantity per package authorized for solid organic peroxides.

TABLE A9.2.

PACKAGING FOR LIQUID ORGANIC PEROXIDES (See A9.5 for instructions on use of this table.)

TYPE CONTAINERS AND MATERIALS	PACKAGING CODE	Maximum Quantity or Net Mass Permitted per Container							
		A9.2.1	A9.2.2	A9.2.3	A9.2.4	A9.2.5	A9.2.6	A9.2.7	A9.2.8
STEEL DRUM	1A1							60L	225L
STEEL DRUM (1)	1A2							50Kg	200Kg
ALUMINUM DRUM	1B1							60L	225L
FIBER DRUM	1G	0.5Kg	0.5/10Kg	5Kg	5/25Kg	25Kg	50Kg	50Kg	200Kg
PLASTIC DRUM	1H1	0.5L	0.5L	5L	5L	30L	60L	60L	255L
PLASTIC JERRICAN	3H1	0.5L	0.5L	5L	5L	30L	60L	60L	60L
WOOD BOX (1)	4C1	0.5Kg	0.5/10Kg	5Kg	5/25Kg	25Kg	50Kg	50Kg	100Kg
PLYWOOD BOX (1)	4D	0.5Kg	0.5/10Kg	5Kg	5/25Kg	25Kg	50Kg	50Kg	100Kg
FIBERBOARD BOX (1)	4G	0.5Kg	0.5/10Kg	5Kg	5/25Kg	25Kg	50Kg	50Kg	100Kg

TABLE A9.2 Continued

PACKAGING FOR LIQUID ORGANIC PEROXIDES See A9.5 for instructions on use of this table.)

TYPE CONTAINERS AND MATERIALS	PACKAGING CODE	Maximum Quantity or Net Mass Permitted per Container							
		A9.2.1	A9.2.2	A9.2.3	A9.2.4	A9.2.5	A9.2.6	A9.2.7	A9.2.8
PLASTIC RECEPTACLE WITH OUTER STEEL DRUM	6HA1							60L	225L
PLASTIC RECEPTACLE WITH OUTER ALUMINUM DRUM	6HB1							60L	225L
PLASTIC RECEPTACLE WITH OUTER FIBER DRUM	6HG1	0.5L	0.5L	5L	5L	30L	60L	60L	225L
PLASTIC RECEPTACLE WITH OUTER FIBERBOARD BOX	6HG2	0.5L	0.5L	5L	5L	30L	60L	60L	60L

TABLE A9.2 Continued

PACKAGING FOR LIQUID ORGANIC PEROXIDES (See A9.5 for instructions on use of this table.)

TYPE CONTAINERS AND MATERIALS	PACKAGING CODE	Maximum Quantity or Net Mass Permitted per Container							
		A9.2.1	A9.2.2	A9.2.3	A9.2.4	A9.2.5	A9.2.6	A9.2.7	A9.2.8
PLASTIC RECEPTACLE WITH OUTER PLASTIC DRUM	6HH1	0.5L	0.5L	5L	5L	30L	60L	60L	225L
PLASTIC RECEPTACLE WITH OUTER SOLID PLASTIC BOX	6HH2	0.5L	0.5L	5L	5L	30L	60L	60L	60L

NOTES:

1. Packaging only authorized as part of a combination packaging. Inner receptacles must be suitable for liquids.

2. For Items 1 through 6, combination packagings containing organic peroxide type B or C, only plastic bottles, plastic jars, glass bottles, or glass ampules may be used as inner packagings. However, glass may only be used for inner receptacles for Items 1 and 2.

3. Where two values are given (i.e. .5/10 kg), the first applies to the maximum net quantity per inner receptacle and the second applies to the maximum net quantity of the complete package.

4. If no entry for an item number appears in a specific row, then the type of packaging specified for the row is not authorized for the item number.

Table A9.3.

PACKAGING FOR SOLID ORGANIC PEROXIDES See A9.5 for instructions on use

Maximum Quantity or Net Mass Permitted per Container

TYPE CONTAINERS AND MATERIALS	PACKAGING CODE	A9.3.1	A9.3.2	A9.3.3	A9.3.4	A9.3.5	A9.3.6	A9.3.7	A9.3.8
STEEL DRUM	1A2							50Kg	200Kg
ALUMINUM DRUM	1B2							50Kg	200Kg
FIBER DRUM	1G	0.5Kg	0.5/10Kg	5Kg	5/25Kg	25Kg	50Kg	50Kg	200Kg
PLASTIC DRUM	1H2	0.5Kg	0.5/10Kg	5Kg	5/25Kg	25Kg	50Kg	50Kg	200Kg
WOOD BOX	4C1	0.5Kg	0.5/10Kg	5Kg	5/25Kg	25Kg	50Kg	50Kg	100Kg
PLYWOOD BOX	4D	0.5Kg	0.5/10Kg	5Kg	5/25Kg	25Kg	50Kg	50Kg	100Kg
FIBERBOARD BOX	4G	0.5Kg	0.5/10Kg	5Kg	5/25Kg	25Kg	50Kg	50Kg	100Kg
PLASTIC RECEPTACLE WITH OUTER STEEL DRUM	6HA1							50Kg	200Kg

Table A9.3 Continued

PACKAGING FOR SOLID ORGANIC PEROXIDES See A9.5 for instructions on use

TYPE CONTAINERS AND MATERIALS	PACKAGING CODE	Maximum Quantity or Net Mass Permitted per Container							
		A9.3.1	A9.3.2	A9.3.3	A9.3.4	A9.3.5	A9.3.6	A9.3.7	A9.3.8
PLASTIC RECEPTACLE WITH OUTER ALUMINUM DRUM	6HB1							50Kg	200Kg
PLASTIC RECEPTACLE WITH OUTER FIBER DRUM	6HG1	0.5Kg	0.5Kg	5Kg	5Kg	25Kg	50Kg	50Kg	200Kg
PLASTIC RECEPTACLE WITH OUTER FIBERBOARD BOX	6HG2	0.5Kg	0.5Kg	5Kg	5Kg	25Kg	50Kg	50Kg	75Kg
PLASTIC RECEPTACLE WITH OUTER PLASTIC DRUM	6HH1	0.5Kg	0.5Kg	5Kg	5Kg	25Kg	50Kg	50Kg	200Kg
PLASTIC RECEPTACLE WITH OUTER SOLID PLASTIC BOX	6HH2	0.5Kg	0.5Kg	5Kg	5Kg	25Kg	50Kg	50Kg	75Kg

Notes applicable to table A9.3

NOTES:

1. For Items 1 through 6, combination packagings containing organic peroxide type B or C, only nonmetallic packagings are authorized. However, glass may only be used for inner receptacles for Items 1 and 2.
2. Where two values are given (i.e. .5/10 kg) the first applies to the maximum net quantity per inner receptacle and the second applies to the maximum net quantity of the complete package.
3. If no entry for an item number appears in a specific row, then the type of packaging in that row is not authorized for that item number.
4. If fire retardant partitions are used, the maximum net weight of the complete package for Item 2 may be 25 kg.

A9.6. Samples of Organic Peroxides. Samples of new organic peroxides or new formulations of identified organic peroxides for which complete test data is not available, and which are being transported for testing and evaluation, may be transported and assigned a PSN for organic peroxide, type C. Data available to the person offering the material for transportation must indicate that the sample would pose a threat no greater than that of an organic peroxide, type B, and that the control temperature, if any, is sufficiently low to prevent any dangerous decomposition and sufficiently high to prevent any dangerous phase separation. Packaging requirements are as follows:

- The sample must be packaged according to table A9.2. or table A9.3.
- The maximum quantity must not exceed 10 kg (22 pounds) per shipment.
- The PSN must be organic peroxide type C, liquid; organic peroxide type C, solid; organic peroxide type C, liquid, temperature controlled; or organic peroxide type C, solid, temperature controlled, as applicable.

A9.7. Packaging for Class 5.1 Liquids. Package in (see A3.3.5 for additional packaging requirements):
A9.7.1. Steel drum (1A1 or 1A2), aluminum drum (1B1 or 1B2), or metal drum other than steel or aluminum (1N1 or 1N2), with inside glass, earthenware, plastic, or metal receptacles.
A9.7.2. Plywood drum (1D), fiber drum (1G), or plastic drum (1H1 or 1H2), with inside glass, earthenware, plastic, or metal receptacles.
A9.7.3. Wooden barrel (2C2) with inside glass, earthenware, plastic, or metal receptacles. Not authorized for PG I material.
A9.7.4. Steel jerrican (3A1 or 3A2) or plastic jerrican (3H1 or 3H2) with inside glass, earthenware, plastic, or metal receptacles.
A9.7.5. Steel box (4A1 or 4A2) or aluminum box (4B1 or 4B2) with inside glass, earthenware, plastic, or metal receptacles.
A9.7.6. Natural wood box (4C1 or 4C2), plywood box (4D), or reconstituted wood box (4F), with inside glass, earthenware, plastic, or metal receptacles.
A9.7.7. Fiberboard box (4G) with inside glass, earthenware, plastic, or metal receptacles.
A9.7.8. Expanded plastic box (4H1) or solid plastic box (4H2) with inside glass, earthenware, plastic, or metal receptacles.
A9.7.9. Steel drum (1A1 or 1A2), aluminum drum (1B1 or 1B2), or metal drum other than steel or aluminum (1N1 or 1N2).
A9.7.10. Plastic drum (1H1 or 1H2).
A9.7.11. Wooden barrel (2C1). Not authorized for PG I material.
A9.7.12. Steel jerrican (3A1 or 3A2) or plastic jerrican (3H1 or 3H2).
A9.7.13. Single composite package comprised of a plastic receptacle in steel, aluminum, fiber, or plastic drum. (6HA1, 6HB1, 6HG1, or 6HH).
A9.7.14. Single, composite package comprised of a plastic receptacle in steel, aluminum, wooden, plywood, or fiberboard box (6HA2, 6HB2, 6HC, 6HD2, or 6HG2).
A9.7.15. Single, composite package comprised of glass, porcelain, or stoneware in steel, aluminum, or fiber drum (6PA1, 6PB1, or 6PG1).
A9.7.16. Single, composite package comprised of glass, porcelain, or stoneware, in steel, aluminum, wooden, or fiberboard box (6PA2, 6PB2, 6PC, or 6PG2).
A9.7.17. Single, composite package comprised of glass, porcelain, or stoneware in solid or expanded plastic packaging (6PH1 or 6PH2).
A9.7.18. Single, composite package comprised of a plastic receptacle in a plywood drum (6HD1). Not authorized for PG 1 material.
A9.7.19. DOT specification cylinders as prescribed for any compressed gas, except DOT 8 (acetylene) and DOT 3HT.

A9.8. Packaging for Class 5.1 Solids. Package in (see A3.3.5):
A9.8.1. Steel drum (1A1 or 1A2), aluminum drum (1B1 or 1B2), or metal drum other than steel or aluminum (1N1 or 1N2), with inside glass, earthenware, plastic, or metal receptacles.

A9.8.2. Plywood drum (1D), fiber drum (1G), or plastic drum (1H1 or 1H2), with inside glass, earthenware, plastic, or metal receptacles.
A9.8.3. Wooden Barrel (2C2), with inside glass, earthenware, plastic, or metal receptacles.
A9.8.4. Steel jerrican (3A1 or 3A2) or plastic jerrican (3H1 or 3H2) with inside glass, earthenware, plastic, or metal receptacles.
A9.8.5. Steel box (4A1 or 4A2) or aluminum box (4B1 or 4B2) with inside glass, earthenware, plastic, or metal receptacles.
A9.8.6. Natural wood box (4C1 or 4C2), plywood box (4D), or reconstituted wood box (4F), with inside glass, earthenware, plastic, or metal receptacles.
A9.8.7. Fiberboard box (4G) with inside glass, earthenware, plastic, or metal receptacles.
A9.8.8. Solid plastic box (4H2) with inside glass, earthenware, plastic, or metal receptacles.
A9.8.9. Steel drum (1A1 or 1A2), aluminum drum (1B1 or 1B2), or metal drum other than steel or aluminum (1N1 or 1N2).
A9.8.10. Plywood drum (1D). Not authorized for PG I material.
A9.8.11. Plastic drum (1H1 or 1H2).
A9.8.12. Fiber drum (1G).
A9.8.13. Wooden barrel (2C1 or 2C2). Not authorized for PG I material.
A9.8.14. Steel jerrican (3A1 or 3A2) or plastic jerrican (3H1 or 3H2).
A9.8.15. Steel box with liner (4A2), or aluminum box with liner (4B2).
A9.8.16. Steel box (4A1) or aluminum box (4B1). Not authorized for PG I material.
A9.8.17. Natural wood box , siftproof (4C2).
A9.8.18. Plywood box (4D), reconstituted wood box (4F), or natural wood box (4C1). Not authorized for PG I material.
A9.8.19. Fiberboard box (4G). Not authorized for PG I material.
A9.8.20. Expanded plastic box (4H1) or solid plastic box (4H2).
A9.8.21. Bag, woven plastic (5H1, 5H2, or 5H3); bag, plastic film (5H4); bag, textile (5L1, 5L2, or 5L3); bag, paper, multiwall, water-resistant (5M2). Not authorized for PG I material.
A9.8.22. Single, composite package comprised of a plastic receptacle in steel, aluminum, plywood, fiber, or plastic drum (6HA1, 6HB1, 6HD1, 6HG1, or 6HH).
A9.8.23. Single, composite package comprised of a plastic receptacle in steel, aluminum, wood, plywood, or fiberboard box (6HA2, 6HB2, 6HC, 6HD2, or 6HG2).
A9.8.24. Single, composite package comprised of glass, porcelain, or stoneware in steel, aluminum, plywood, or fiber drum (6PA1, 6PB1, 6PD1, or 6PG1).
A9.8.25. Single, composite package comprised of glass, porcelain, or stoneware, in steel, aluminum, wooden, or fiberboard box (6PA2, 6PB2, 6PC, or 6PG2).
A9.8.26. Single, composite package comprised of glass, porcelain, or stoneware in expanded or solid plastic packaging (6PH1 or 6PH2).

A9.9. Iodine Pentafluoride. Package in any DOT specification cylinder, except those specified for acetylene.

A9.10. Oxidizing Substances, Solid, Self-Heating, NOS; Oxidizing Substances, Solid, Flammable, NOS; Oxidizing Substances, Solid, Water Reactive, NOS. Ship according to a competent authority approval (CAA). See 2.5 for more information on CAAs.

A9.11. Bromine Pentafluoride or Bromine Trifluoride. Package bromine pentafluoride or bromine trifluoride in specification cylinders, 3A150, 3AA150, 3B240, 3BN150, 3E1800, 4B240, 4BA240, or 4BW240. Seal each valve outlet by a threaded cap or a threaded plug. No cylinder may be equipped with any pressure relief device. Overpack specification 3E1800 cylinders in a strong wooden box.

CLASS 6-- TOXIC (POISONOUS) MATERIALS AND INFECTIOUS SUBSTANCES

★**A10.1. General Requirements.** This attachment contains information concerning the packaging and general handling instructions for Class 6.1 toxic material. The term "toxic" and "poisonous" are used synonymously in this manual.

A10.2. General Handling Instructions.

- Toxic material can react through the skin, respiratory tract, or gastrointestinal tract. In general, solid toxic material that is improperly packaged will present an ingestion hazard. Dust and mists result primarily in an inhalation hazard. Liquids may be ingested, inhaled as a vapor, or absorbed through the skin.
- Keep cool and away from direct rays of the sun and high temperature. Store away from sources of ignition and fire hazards. Avoid direct contact with the material. Storage areas must be plainly marked with the appropriate placards.
- Keep away from oxidizing materials.
- Make sure personnel exposed to leaking materials wear a protective mask or self-contained breathing apparatus (specific recommendations can be obtained from the medical services.)
- Store away from acids or acid fumes.

A10.3. Packaging for Certain Packing Group I Class 6.1 Toxic Materials.

A10.3.1. **Handling Instructions.** These items are extremely dangerous. Wear approved chemical safety mask and clothing when handling this material. See 2.9 for additional information.

A10.3.2. **Packaging Requirements.** Package in DOT specification 3A1800, 3AA1800, 3AL1800, 3D, 3E1800, and 33 cylinders meeting the requirements of A3.3.2. Specification 3A, 3AA, and 3AL cylinders may not exceed 57 kg (125 pounds) water capacity (nominal). Specification 3D and 33 cylinders may not exceed 127 kg (280 pounds) water capacity (nominal). Shipments of arsine or phosphine will not be accepted for transportation if packaged in a specification 3AL cylinder. Cylinders containing phosgene may not exceed a filling density of 125 percent (see A3.3.2.5). The cylinder may not contain more than 68 kg (150 pounds) of phosgene. Also, each filled cylinder must be tested for leakage before it is offered for transportation and must show absolutely no leakage. This test must consist of immersing the cylinder and valve, without the protection cap attached, in a bath of water at a temperature of approximately 66 degrees C (150 degrees F) for at least 30 minutes. During which time, frequent examinations must be made to identify any escape of gas. After the test has been accomplished the valve of the cylinder must not be loosened before the cylinder is offered for transportation, and must not be loosened during transportation.

A10.4. Bromoacetone, Methyl Bromide, Chloropicrin, and Methyl Bromide or Methyl Chloride Mixtures.

A10.4.1. **Handling Instructions.** These materials and mixtures are extremely dangerous poisons. Wear approved chemical safety mask and clothing when handling this material. See 2.9 for additional requirements.

A10.4.2. **Packaging Requirements.**

A10.4.2.1. Package bromoacetone in a wooden box (4C1, 4C2, 4D, or 4F) with an inner glass receptacle or tube in an hermetically-sealed metal receptacle in a corrugated fiberboard carton. A bottle may not contain over 500 g (17.6 ounces) of liquid and must be cushioned inside the can with at least 12.7 mm (0.5 inch) of absorbent material. The total amount of liquid in the outer box must not exceed 11 kg (24 pounds). The package must be tested to the PG I performance level.

A10.4.2.2. Package bromoacetone in DOT specification 3A, 3AA, 3B, 3C, 3E, 4A, 4B, 4BA, 4BW, or 4C cylinder with a water capacity (nominal) not exceeding 113 kg (250 pounds). All cylinders must meet the requirements of A3.3.2.

A10.4.2.3. Package methyl bromide, chloropicrin and methyl bromide mixtures, chloropicrin and methyl chloride mixtures, and chloropicrin mixtures charged with nonflammable, nonliquefied compressed gas in DOT specification 3A, 3AA, 3B, 3C, 3E, 4A, 4B, 4BA, 4BW, or 4C cylinder with a water capacity (nominal) not exceeding 113 kg (250 pounds). All cylinders must meet the requirements of A3.3.2.

A10.5. Packaging for Liquid Class 6.1 Materials. Package in:

A10.5.1. Steel drum (1A1 or 1A2), aluminum drum (1B1 or 1B2), or metal drum, other than steel or aluminum (1N1 or 1N2) with inside glass, earthenware, plastic, or metal receptacles.

A10.5.2. Plywood drum (1D), fiber drum (1G), or plastic drum (1H1 or 1H2), with inside glass, earthenware, plastic, or metal receptacles.

A10.5.3. Wooden barrel (2C2), with inside glass, earthenware, plastic, or metal receptacles. Not authorized for PG I material.

A10.5.4. Steel jerrican (3A1 or 3A2) or plastic jerrican (3H1 or 3H2), with inside glass, earthenware, plastic, or metal receptacles.

A10.5.5. Steel box (4A1 or 4A2) or aluminum box (4B1 or 4B2) with inside glass, earthenware, plastic, or metal receptacles.
A10.5.6. Natural wood box (4C1 or 4C2), plywood box (4D), or reconstituted wood box (4F), with inside glass, earthenware, plastic, or metal receptacles.
A10.5.7. Fiberboard box (4G) with inside glass, earthenware, plastic, or metal receptacles.
A10.5.8. Expanded plastic box (4H1) or solid plastic box (4H2) with inside glass, earthenware, plastic, or metal receptacles.
A10.5.9. Steel drum (1A1 or 1A2), aluminum drum (1B1 or 1B2), or metal drum, other than steel or aluminum (1N1 or 1N2).
A10.5.10. Plastic drum (1H1 or 1H2).
A10.5.11. Wooden barrel (2C1). Not authorized for PG I material.
A10.5.12. Steel jerrican (3A1 or 3A2) or plastic jerrican (3H1 or 3H2).
A10.5.13. Single, composite package comprised of a plastic receptacle in steel, aluminum, fiber, or plastic drum (6HA1, 6HB1, 6HG1, or 6HH).
A10.5.14. Single, composite package comprised of a plastic receptacle in steel, aluminum, wooden, plywood, or fiberboard box (6HA2, 6HB2, 6HC, 6HD2, or 6HG2).
A10.5.15. Single, composite package comprised of glass, porcelain, or stoneware in steel, aluminum, or fiber drum (6PA1, 6PB1, or 6PG1).
A10.5.16. Single, composite package comprised of glass, porcelain, or stoneware, in steel, aluminum, wooden, or fiberboard box (6PA2, 6PB2, 6PC, or 6PG2).
A10.5.17. Single, composite package comprised of glass, porcelain, or stoneware in solid or expanded plastic packaging (6PH1 or 6PH2).
A10.5.18. Single, composite package comprised of a plastic receptacle in a plywood drum (6HD1). Not authorized for PG I material.
A10.5.19. DOT specification cylinders as prescribed for any compressed gas, except DOT 8 (acetylene) and DOT 3HT.

A10.6. Packaging for Solid Class 6.1 Materials. Package in:
A10.6.1. Steel drum (1A1 or 1A2), aluminum drum (1B1 or 1B2), or metal drum other than steel or aluminum (1N1 or 1N2), with inside glass, earthenware, plastic, or metal receptacles.
A10.6.2. Plywood drum (1D), fiber drum (1G), or plastic drum (1H1 or 1H2), with inside glass, earthenware, plastic, or metal receptacles.
A10.6.3. Wooden barrel (2C2), with inside glass, earthenware, plastic, or metal receptacles.
A10.6.4. Steel jerrican (3A1 or 3A2) or plastic jerrican (3H1 or 3H2) with inside glass, earthenware, plastic, or metal receptacles.
A10.6.5. Steel box (4A1 or 4A2) or aluminum box (4B1 or 4B2) with inside glass, earthenware, plastic, or metal receptacles.
A10.6.6. Natural wood box (4C1 or 4C2), plywood box (4D), or reconstituted wood box (4F), with inside glass, earthenware, plastic, or metal receptacles.
A10.6.7. Fiberboard box (4G) with inside glass, earthenware, plastic, or metal receptacles.
A10.6.8. Solid plastic box (4H2) with inside glass, earthenware, plastic, or metal receptacles.
A10.6.9. Steel drum (1A1 or 1A2), aluminum drum (1B1 or 1B2), or metal drum other than steel or aluminum (1N1 or 1N2).
A10.6.10. Plywood drum (1D). Not authorized for PG I material.
A10.6.11. Plastic drum (1H1 or 1H2).
A10.6.12. Fiber drum (1G).
A10.6.13. Wooden barrel (2C1 or 2C2). Not authorized for PG I material.
A10.6.14. Steel jerrican (3A1 or 3A2) or plastic jerrican (3H1 or 3H2).
A10.6.15. Steel box with liner (4A2), or aluminum box with liner (4B2).
A10.6.16. Steel box (4A1) or aluminum box (4B1). Not authorized for PG I material.
A10.6.17. Natural wood box sift-proof (4C2).
A10.6.18. Plywood box (4D), reconstituted wood box (4F), or natural wood box (4C1.) Not authorized for PG I material.
A10.6.19. Fiberboard box (4G). Not authorized for PG I material.
A10.6.20. Expanded plastic box (4H1) or solid plastic box (4H2).
A10.6.21. Bag, woven plastic (5H1, 5H2, or 5H3); bag, plastic film (5H4); bag, textile (5L1, 5L2, or 5L3); bag, paper, multiwall, water-resistant (5M2). Not authorized for PG I material.
A10.6.22. Single, composite package comprised of a plastic receptacle in steel, aluminum, plywood, fiber, or plastic drum (6HA1, 6HB1, 6HD1, 6HG1, or 6HH).
A10.6.23. Single, composite package comprised of a plastic receptacle in steel, aluminum, wood, plywood, or fiberboard box (6HA2, 6HB2, 6HC, 6HD2, or 6HG2).

A10.6.24. Single, composite package comprised of glass, porcelain, or stoneware in steel, aluminum, plywood, or fiber drum (6PA1, 6PB1, 6PD1, or 6PG1).
A10.6.25. Single, composite package comprised of glass, porcelain, or stoneware, in steel, aluminum, wooden, or fiberboard box (6PA2, 6PB2, 6PC, or 6PG2).
A10.6.26. Single, composite package comprised of glass, porcelain, or stoneware in expanded or solid plastic packaging (6PH1 or 6PH2).

★**A10.7. Class 6.1, PG I, Hazard Zone A and B (Poisonous by Inhalation).** Package Class 6.1, PG I materials with an Inhalation Hazard (Hazard Zone A and B) as follows:
A10.7.1. In DOT specification cylinders as identified in 49 CFR, part 178, subpart C, except that specification 8, 8AL, and 39 cylinders are not authorized. Cylinders must also meet the requirements of A3.3.2.
A10.7.2. In an inner drum (1A1, 1B1, 1N1, 1H1, or 6HA1), then place in an outer drum (1A2 or 1H2). Both the inner and outer drum must be tested to the PG I performance level. The outer 1A2 drum must have a minimum thickness of 1.35 mm (0.053 inches). The outer 1H2 drum must have a minimum thickness of 6.30 mm (0.248 inches). The capacity of the inner drum must not exceed 220 L (58 gallons). The outer drum (1A2 or 1H2) must withstand a hydrostatic test pressure of 100kPa (15 psi). The inner drum must also meet the following requirements:

- Satisfactorily withstand a hydrostatic pressure test (as outlined in 49 CFR, paragraph 178.605) of 550 kPa (80 psig).
- Satisfactorily withstand a leakproofness test (as outlined in 49 CFR, paragraph 178.604) using an internal air pressure at 55 degrees C (131 degrees F) of at least twice the vapor pressure of the material to be packaged.
- Have screw-type closures that meet all the following requirements:
  - Closed and tightened to a torque as prescribed by the closure manufacturer, using a device that is capable of measuring torque.
  - Physically held in place by any means capable of preventing backoff or loosening of the closure by impact or vibration during transportation.
  - Provided with a cap seal that is properly applied according to the cap seal manufacturer's recommendations. The cap seal must be capable of withstanding an internal pressure of at least 100 kPa (15 psi).
- Meet the following minimum thickness requirements:
  - 1A1 and 1N1 drums with a capacity of less than or equal to 120 L (32 gallons) must have a minimum thickness of 1.3 mm (0.051 inches). 1B1 drums with a capacity of less than or equal to 120 L (32 gallons) must have a minimum thickness of 3.9 mm (0.154 inches).
  - 1A1 and 1N1 drums with a capacity greater than 120 L (32 gallons) must have a minimum thickness of 1.7 mm (0.067 inches). 1B1 drums with a capacity greater than 120 L (32 gallons) must have a minimum thickness of 4.7 mm (0.185 inches).

A10.7.2.1. Cushion the inner drum within the outer drum with a shock-mitigating, nonreactive material. There must be a minimum of 5.0 cm (2 inches) of cushioning material between the outer surface (side) of the inner drum and the inner surface (side) of the outer drum, and at least 7.6 cm (3 inches) of cushioning material between the outer surface (top and bottom) of the inner drum and the inner surface (top and bottom) of the outer drum.
A10.7.3. Pack in an inner packaging system that consists of an impact-resistant receptacle of glass, earthenware, plastic, or metal, securely cushioned with a nonreactive absorbent material. The package must be packed within a leak-tight packaging of metal or plastic, then packed in a steel drum (1A2), aluminum drum (1B2), metal drum (other than steel or aluminum (1N2)), plywood drum (1D), fiber drum (1G), plastic drum (1H2), wooden barrel (2C2), steel jerrican (3A2), plastic jerrican (3H2), steel box (4A1 or 4A2), aluminum box (4B1 or 4B2), natural wood box (4C1 or 4C2), plywood box (4D), reconstituted wood box (4F), fiberboard box (4G), expanded plastic box (4H1), or solid plastic box (4H2). The capacity of the inner receptacle must not exceed 4 L (1 gallon). An inner receptacle that has a closure must have a closure which is held in place by any means capable of preventing backoff or loosening of the closure by impact or vibration during transportation. Both the inner packaging system and the outer container must each meet the test requirements of the PG I performance level independently. The total amount of liquid that can be packed in the outer container must not exceed 16 L (4 gallons).
A10.7.4. Pack in a metal drum (1A1, 1B1, or 1N1), or plastic drum (1H1), then placed in a metal drum (1A2 or 1H2), or a plastic receptacle with outer steel drum (6HA1). Both the inner and outer drum must be tested to the PG I performance level. The outer 1A2 drum must have a minimum thickness of 1.35 mm (0.053 inches). The outer 1H2 drum must have a minimum thickness of 6.30 mm (0.248 inches). The capacity of the inner drum (1A1, 1B1, 1N1, or 1H1) must not exceed 220 L (58 gallons). The outer drum (1A2 or 1H2) must withstand a hydrostatic test pressure of 100kPa (15 psi). This package is only authorized for Class 6.1, PG I, Hazard Zone B material. The inner drum must also meet the following requirements:

- Satisfactorily withstand a leakproofness test (as outlined in 49 CFR, paragraph 178.604) using an internal air pressure at 55 degrees C (131 degrees F) of at least twice the vapor pressure of the material to be packaged.

- Have screw-type closures that are:
  - Closed and tightened to a torque as prescribed by the closure manufacturer, using a device that is capable of measuring torque.
  - Physically held in place by any means capable of preventing backoff or loosening of the closure by impact or vibration during transportation.
  - Provided with a cap seal that is properly applied according to the cap seal manufacturer's recommendations. The cap seal must be capable of withstanding an internal pressure of at least 100 kPa (15 psi).
- Meet the following minimum thickness requirements:
  - 1A1 drums with a capacity of less than or equal to 30 L (7.9 gallons) must have a minimum thickness of 0.69 mm (0.027 inches). 1B1 drums with a capacity of less than or equal to 30 L (7.9 gallons) must have a minimum thickness of 2.79 mm (0.110 inches). 1H1 drums with a capacity of less than or equal to 30 L (7.9 gallons) must have a minimum thickness of 1.14 mm (0.045 inches). 6HA1 drums with a capacity of less than or equal to 30 L (7.9 gallons) must have a minimum thickness of 1.58 mm (0.0625 inches) for the inner plastic drum and a minimum thickness of 0.96 mm (0.038 inches) for the outer steel drum.
  - 1A1 drums with a capacity greater than 30 L (7.9 gallons) but less than or equal to 120 L (32 gallons) must have a minimum thickness of 1.08 mm (0.043 inches). 1B1 drums with a capacity greater than 30 L (7.9 gallons) but less than or equal to 120 L (32 gallons) must have a minimum thickness of 3.9 mm (0.154 inches). 1H1 drums with a capacity greater than 30 L (7.9 gallons) but less than or equal to 120 L (32 gallons) must have a minimum thickness of 3.16 mm (0.125 inches). 6HA1 drums with a capacity greater than 30 L (7.9 gallons) but less than or equal to 120 L (32 gallons) must have a minimum thickness of 1.58 mm (0.0625 inches) for the inner plastic drum and a minimum thickness of 0.96 mm (0.038 inches) for the outer steel drum.
  - 1A1 or 1N1 drums with a capacity greater than 120 L (32 gallons) must have a minimum thickness of 1.35 mm (0.053 inches). 1B1 drums with a capacity greater than 120 L (32 gallons) must have a minimum thickness of 4.7 mm (0.185 inches). 1H1 drums with a capacity greater than 120 L (32 gallons) must have a minimum thickness of 3.16 mm (0.124 inches). 6HA1 drums with a capacity greater than 120 L (32 gallons) must have a minimum thickness of 1.58 mm (0.0625 inches) for the inner plastic drum and a minimum thickness of 1.08 mm (0.43 inches) for the outer steel drum.

A10.7.4.1. Cushion the inner drum within the outer drum with a shock-mitigating, nonreactive material. There must be a minimum of 5.0 cm (2 inches) of cushioning material between the outer surface (side) of the inner drum and the inner surface (side) of the outer drum, and at least 7.6 cm (3 inches) of cushioning material between the outer surface (top and bottom) of the inner drum and the inner surface (top and bottom) of the outer drum.

A10.8. Tear Gas Candles. Any newly developed packaging must be approved by the DOT before initial transportation from the manufacturer. Package tear gas candles, tear gas grenades, and similar devices (with more than 2 percent tear gas substance by mass).

A10.8.1. Pack in a metal-strapped natural wood box (4C1 or 4C2), metal-strapped plywood box (4D), or metal-strapped reconstituted wood box (4F). Functioning elements not assembled in grenades or devices must be packed in a separate compartment within the box, packed in inner boxes, then placed inside the outer box, or packed in a separate outside wooden (4C1, 4C2, 4D, or 4F) box. Pack and cushion the elements so they cannot come into contact with each other or in contact with the walls of the box during transportation. No more than 50 items and 50 functioning elements can be packed in one outer container. The gross weight of the outer container must not exceed 35 kg (77 pounds). Tear gas devices can be shipped completely assembled provided the functioning elements are packed so that they cannot accidentally function. Package items completely assembled as specified in this paragraph.

A10.8.2. Pack in steel drum (1A2.) Pack functioning elements in a separate inner packaging or separate compartment. Pack no more than 24 items and 24 functioning elements in one outer drum. The gross weight of the outer container must not exceed 35 kg (77 pounds).

A10.8.3. Pack in inner containers meeting the DOT 2P or 2Q specification (inside nonrefillable metal containers), then packaged in a fiberboard box (4G). Place each inside container into fiberboard tubes with metal ends or a fiberboard box with suitable padding. Pack no more than 30 inner packagings in one outer fiberboard box. The gross weight must not exceed 16 kg (35 pounds).

★A10.9. Infectious Substances (Etiologic Agent). The following requirements apply to all shipments of infectious substances:

- Use inner packagings that consist of a watertight primary receptacle, then place in a watertight secondary packaging.

- Place absorbent material between the primary receptacle and the secondary packaging. If multiple primary receptacles are placed in a single secondary packaging they must be separated with enough absorbent material to make sure there is no contact between the primary receptacles. There must be sufficient absorbent material to absorb the entire contents of all primary receptacles.
- This inner packaging must then be placed in an outer packaging of adequate strength for its capacity, mass, and intended use.
- Each package for infectious substances must be capable of passing the tests specified in 49 CFR 178.609.
- Each package must be at least 100 mm (3.9 inches) in the smallest overall external dimensions.
- Each package of infectious substances must have an itemized list of the contents enclosed between the secondary packaging and the outer packaging.
- Whatever the intended temperature of shipment, the primary receptacle and the secondary packaging used for infectious substances must be capable of withstanding without leakage an internal pressure (which produces a pressure differential) of not less then 95 kPa (14 psi). Also, the primary receptacle and the secondary packaging must be capable of withstanding temperatures of -40 degrees C to +55 degrees C (-40 degrees F to +141 degrees F).
- The commander of the shipping agency can request a technical escort, security escort, military guard, other technically qualified personnel, or a knowledgeable representative of the shipper or recipient to accompany the shipment. If a knowledgeable representative of the shipper or recipient is used, they must be authorized by the Surgeon General, US Department of Health and Human Services, or the Administrator of the Agricultural Research Service, US Department of Agriculture. The commander may make this request if in their opinion inherent factors of public relations, security, economics, or expeditious handling indicates this to be in the best interest of the DoD.
- In addition to the requirements of this paragraph, the requirements of 42 CFR, Public Health, chapter 1, part 72 must be followed.
- Diagnostic specimens and biological products are not subject to the requirements of this manual if they do not contain any material that is or could be classified as an infectious substance.

A10.9.1. In addition to the bullet requirements identified above, package infectious substances as specified below. Exceptional cases, such as whole organs, may require special packaging.

A10.9.1.1. Lyophilized substances. Primary receptacles must be flame-sealed glass ampoules or rubber stopped glass vials fitted with metal seals.

A10.9.1.2. Liquid or solid substances shipped at ambient temperatures or higher. Primary receptacles must be glass, metal, or plastic. Provide a positive means of ensuring a leak proof seal, such as a heat seal, skirted stopper, or metal crimp seal. If screw caps are used, they must be reinforced with adhesive tape.

A10.9.1.3. Liquid or solid substances shipped refrigerated or frozen (ice, prefrozen packs, or dry ice.) Place ice or dry ice outside the secondary packagings. Provide interior supports to secure the secondary packagings in their original position after the ice or dry ice has dissipated. If ice is used, the outer packaging must be leak proof. If dry ice is used, the outer packaging must permit the release of carbon dioxide gas.

A10.9.1.4. Liquid or solid substances shipped in liquid nitrogen. Primary receptacles must be plastic, capable of withstanding very low temperatures. The secondary packaging must also withstand very low temperatures and in most cases will need to be fitted over individual primary receptacles. All requirements for shipment of liquid nitrogen must also be met.

A10.9.2. **Damaged Packages.** Upon discovering damage to the package, which indicates damage to the primary container, the carrier must isolate the container and notify the Director, Center for Disease Control, 1600 Clifton Road NE, Atlanta GA 30333 (telephone number (404) 633-5313), and the shipper.

A10.10. Regulated Medical Waste. Package regulated medical waste in packaging that meet the PG II performance level. Additionally, ensure the packagings is:

- Rigid, leak resistant, and impervious to moisture.
- Of sufficient strength to prevent tearing or bursting under normal conditions of handling and use.
- Sealed to prevent leakage during transport.
- Puncture-resistant for sharps and sharps with residual fluids, break-resistant, and tightly lidded or stoppered for fluids in quantities greater than 20 cubic centimeters.

CLASS 7--RADIOACTIVE MATERIALS

A11.1. General Requirements. This attachment contains information concerning the packaging and general handling instructions for Class 7 (Radioactive Material).

A11.2. General Handling Instructions. Handle radioactive material carefully to ensure there is no contamination of personnel or the transport vehicle. A person may not remain unnecessarily in the immediate vicinity of any package containing radioactive material.

A11.3. Activity Limits for Type A and Type B Packages:

- A Type A package must not contain a quantity of radioactivity greater than A_1 (for special form radioactive material) or A_2 (for normal form radioactive material) as listed in A11.5. Activity limits not listed in A11.5 are determined per 49 CFR 173.433.
- The limits on activity contained in a Type B, Type B(U), or Type B(M) package are those prescribed in A11.5 or in the applicable approval certificate of 49 CFR 173.471 or 173.473.

A11.4. Determining A_1 and A_2 Values for Radionuclides:

- For single radionuclides of known identity, the values of A_1 and A_2 are those given in A11.5. The values of A_1 and A_2 are also applicable for radionuclides contained in (a,n) or (h,n) neutron sources.
- For any single radionuclide of known identity, that is not listed in A11.5, the values of A_1 and A_2 must be determined according to 49 CFR 173.433.

★**A11.5. A_1 and A_2 Values for Radionuclides** are shown in table A11.1.

Table A11.1. Table of A_1 and A_2 Values for Radionuclides.

Symbol of Radionuclide	Element and Atomic Number	A_1(TBq) (Special form)	A_1(Ci) (Special form)	A_2(TBq) (Other form)	A_2(Ci) (Other form)	Specific activity (TBq/g)	Specific activity (Ci/g)
^{225}Ac	Actinium (89)	0.6	16.2	1×10^{-2}	0.270	2.1×10^{3}	5.8×10^{4}
^{227}Ac		40	1080	2×10^{-5}	5.41×10^{-4}	2.7	7.2×10^{1}
^{228}Ac		0.6	16.2	0.4	10.8	8.4×10^{4}	2.2×10^{6}
^{105}Ag	Silver (47)	2	54.1	2	54.1	1.1×10^{3}	3.0×10^{4}
^{108m}Ag		0.6	16.2	0.6	16.2	9.7×10^{-1}	2.6×10^{1}
^{110m}Ag		0.4	10.8	0.4	10.8	1.8×10^{2}	4.7×10^{3}
^{111}Ag		0.6	16.2	0.5	13.5	5.8×10^{3}	1.6×10^{5}
^{26}Al	Aluminum (13)	0.4	10.8	0.4	10.8	7.0×10^{-4}	1.9×10^{-2}
^{241}Am	Americium (95)	2	54.1	2×10^{-4}	5.41×10^{-3}	1.3×10^{1}	3.4
^{242}Am		2	54.1	2×10^{-4}	5.41×10^{-3}	3.6×10^{-1}	1.0×10^{1}
^{243}Am		2	54.1	2×10^{-4}	5.41×10^{-3}	7.4×10^{-3}	2.0×10^{-1}
^{37}Ar	Argon (18)	40	1,080	40	1,080	3.7×10^{3}	9.9×10^{4}
^{39}Ar		20	541	20	541	1.3	3.4×10^{1}
^{41}Ar		0.6	16.2	0.6	16.2	1.5×10^{6}	4.2×10^{7}
^{42}Ar		0.2	5.41	0.2	5.41	9.6	2.6×10^{2}
^{72}As	Arsenic (33)	0.2	5.41	0.2	5.41	6.2×10^{4}	1.7×10^{6}
^{73}As		40	1,080	40	1,080	8.2×10^{2}	2.2×10^{4}
^{74}As		1	27.0	0.5	13.5	3.7×10^{3}	9.9×10^{4}
^{76}As		0.2	5.41	0.2	5.41	5.8×10^{4}	1.6×10^{6}
^{77}As		20	541	0.5	13.5	3.9×10^{4}	1.0×10^{6}
^{211}At	Astatine (85)	30	811	2	54.1	76×10^{4}	2.1×10^{6}
^{193}Au	Gold (79)	6	162	6	162	3.4×10^{4}	9.2×10^{5}
^{194}Au		1	27.1	1	27.0	15×10^{4}	4.1×10^{5}
^{195}Au		10	270	10	270	1.4×10^{2}	3.7×10^{3}
^{196}Au		2	54.1	2	54.1	4.0×10^{3}	1.1×10^{5}
^{198}Au		3	81.1	0.5	13.5	9.0×10^{3}	2.4×10^{5}
^{199}Au		10	270	0.9	24.3	7.7×10^{3}	2.1×10^{5}
^{131}Ba	Barium (56)	2	54.1	2	54.1	3.1×10^{3}	8.4×10^{4}
^{131m}Ba		10	270	0.9	24.3	2.2×10^{4}	6.1×10^{5}
^{133}Ba		3	81.1	3	81.1	9.4	2.6×10^{2}
^{140}Ba		0.4	10.8	0.4	10.8	2.7×10^{3}	7.3
^{7}Be	Beryllium (4)	20	541	20	541	1.3×10^{4}	3.5×10^{5}
^{10}Be		20	541	0.5	13.5	8.3×10^{-4}	2.2×10^{-2}
^{205}Bi	Bismuth (83)	0.6	16.2	0.6	16.2	1.5×10^{3}	4.2×10^{4}

Table A11.1. Continued.

Symbol of Radionuclide	Element and Atomic Number	A_1(TBq) (Special form)	A_1(Ci) (Special form)	A_2(TBq) (Other form)	A_2(Ci) (Other form)	Specific activity (TBq/g)	Specific activity (Ci/g)
^{206}Bi		0.3	8.11	0.3	8.11	3.8×10^{3}	1.0×10^{5}
^{207}Bi		0.7	18.9	0.7	18.9	1.9	5.2×10^{1}
^{210m}Bi		0.3	8.11	3×10^{-2}	0.811	2.1×10^{-5}	5.7×10^{-4}
^{210}Bi (Rae)		0.6	16.2	0.5	13.5	4.6×10^{3}	1.2×10^{5}
^{212}Bi		0.3	8.11	0.3	8.11	5.4×10^{5}	1.5×10^{7}
^{247}Bk	Berkelium (97)	2	54.1	2×10^{-4}	5.41×10^{-3}	3.1×10^{-2}	1.0
^{249}Bk		40	1,080	8×10^{-2}	2.16	6.1×10^{1}	1.6×10^{3}
^{76}Br	Bromine (35)	0.3	8.11	0.3	8.11	9.4×10^{4}	2.5×10^{6}
^{77}Br		3	81.1	3	81.1	2.6×10^{4}	7.1×10^{5}
^{82}Br		0.4	10.8	0.4	10.8	4.0×10^{4}	1.1×10^{6}
^{11}C	Carbon (6)	1	27	0.5	13.5	3.1×10^{7}	8.4×10^{8}
^{14}C		40	1,080	2	54.1	1.6×10^{-1}	4.5
^{41}Ca	Calcium (20)	40	1,080	40	1,080	3.1×10^{-3}	8.5×10^{-2}
^{45}Ca		40	1,080	0.9	24.3	6.6×10^{2}	1.8×10^{4}
47Ca		0.9	24.3	0.5	13.5	2.3×10^{4}	6.1×10^{5}
^{109}Cd	Cadmium (48)	40	1,080	1	27.0	9.6×10^{1}	2.6×10^{3}
^{113m}Cd		20	541	9×10^{-2}	2.43	8.3×10^{4}	2.2×10^{2}
^{115m}Cd		0.3	8.11	0.3	8.11	9.4×10^{2}	2.5×10^{4}
^{115}Cd		4	108	0.5	13.5	1.9×10^{4}	5.1×10^{5}
^{139}Ce	Cerium (58)	6	162	6	162	$2.5 \times 10^{2}6$	$.8 \times 10^{3}$
^{141}Ce		10	270	0.5	13.5	1.1×10^{3}	2.8×10^{4}
^{143}Ce		0.6	16.2	0.5	13.5	2.5×10^{4}	6.6×10^{5}
^{144}Ce		0.2	5.41	0.2	5.41	1.2×10^{2}	3.2×10^{3}
^{248}Cf	Californium (98)	30	811	3×10^{3}	8.11×10^{-2}	5.8×10^{1}	1.6×10^{3}
^{249}Cf		2	54.1	2×10^{-4}	5.41×10^{-3}	1.5×10^{-1}	4.1
^{250}Cf		5	135	5×10^{-4}	1.35×10^{-2}	4.0	1.1×10^{2}
^{251}Cf		2	54.1	2×10^{-4}	5.41×10^{-3}	5.9×10^{-2}	1.6
^{252}Cf		0.1	2.70	1×10^{-3}	2.70×10^{-2}	2.0×10^{1}	5.4×10^{2}
^{253}Cf		40	1,080	6×10^{-2}	1.62	1.1×10^{3}	2.9×10^{4}
^{254}Cf		3×10^{-3}	8.11×10^{-2}	6×10^{-2}	1.62×10^{-2}	3.1×10^{2}	8.5×10^{3}
^{36}Cl	Chlorine (17)	20	541	0.5	13.5	1.2×10^{-3}	3.3×10^{-2}
^{38}Cl		0.2	5.41	0.2	5.41	4.9×10^{6}	1.3×10^{8}
^{240}Cm	Curium (96)	40	1,080	2×10^{-2}	0.541	7.5×10^{2}	2.0×10^{4}
^{241}Cm		2	54.1	0.9	24.3	6.1×10^{2}	1.7×10^{4}

Table A11.1. Continued.

Symbol of Radionuclide	Element and Atomic Number	A_1(TBq) (Special form)	A_1(Ci) (Special form)	A_2(TBq) (Other form)	A_2(Ci) (Other form)	Specific activity (TBq/g)	Specific activity (Ci/g)
^{242}Cm		40	1,080	1×10^{-2}	0.270	1.2×10^{2}	3.3×10^{3}
^{243}Cm		3	81.1	3×10^{-4}	8.11×10^{-3}	1.9	5.2×10^{1}
^{244}Cm		4	108	4×10^{-4}	1.08×10^{-2}	3.0	8.1×10^{5}
^{245}Cm		2	54.1	2×10^{-4}	5.41×10^{-3}	6.4×10^{-3}	1.7×10^{-1}
^{246}Cm		2	54.1	2×10^{-4}	5.41×10^{-3}	1.1×10^{-2}	3.1×10^{-1}
^{247}Cm		2	54.1	2×10^{-4}	5.41×10^{-3}	3.4-6	9.3×10^{-5}
^{248}Cm		4×10^{-2}	1.08	5×10^{-5}	1.35×10^{-3}	1.6×10^{-4}	4.2×10^{-3}
^{55}Co	Cobalt (27)	0.5	13.5	0.5	13.5	1.1×10^{5}	3.1×10^{6}
^{56}Co		0.3	8.11	0.3	8.11	1.1×10^{3}	3.0×10^{4}
^{57}Co		8	216	8	216	3.1×10^{2}	8.4×10^{3}
^{58m}Co		40	1,080	40	1,080	2.2×10^{5}	5.9×10^{6}
^{58}Co		1	27.0	1	27.0	1.2×10^{3}	3.2×10^{4}
^{60}Co		0.4	10.8	0.4	10.8	4.2×10^{1}	1.1×10^{3}
^{51}Cr	Chromium (24)	30	811	30	811	3.4×10^{3}	9.2×10^{4}
^{129}Cs	Cesium (55)	4	108	4	108	2.8×10^{4}	7.6×10^{5}
^{131}Cs		40	1,080	40	1,080	3.8×10^{3}	1.0×10^{5}
^{132}Cs		1	27.0	1	27.0	5.7×10^{3}	1.5×10^{5}
^{134m}Cs		40	1,080	9	243	3.0×10^{5}	8.0×10^{6}
^{134}Cs		0.6	16.2	0.5	13.5	4.8×10^{1}	1.3×10^{3}
^{135}Cs		40	1,080	0.9	24.3	4.3×10^{-5}	1.2×10^{-3}
^{136}Cs		0.5	13.5	0.5	13.5	2.7×10^{3}	7.3×10^{4}
^{137}Cs		2	54.1	0.5	13.5	3.2	8.7×10^{1}
^{64}Cu	Copper (29)	5	135	0.9	24.3	1.4×10^{5}	3.9×10^{6}
^{67}Cu		9	243	0.9	24.3	2.8×10^{4}	7.6×10^{5}
^{159}Dy	Dysprosium (66)	20	541	20	541	2.1×10^{2}	5.7×10^{3}
^{165}Dy		0.6	16.2	0.5	13.5	3.0×10^{5}	8.2×10^{6}
^{166}Dy		0.3	8.11	0.3	8.11	8.6×10^{3}	2.3×10^{5}
^{169}Er	Erbium (68)	40	1,080	0.9	24.3	3.1×10^{3}	8.3×10^{4}
^{171}Er		0.6	16.2	0.5	13.5	9.0×10^{4}	2.4×10^{6}
^{253}Es	Einsteinium (99)	200	5,400	2.1×10^{-2}	5.4×100^{-1}		
^{254}Es		30	811	3×10^{-3}	8.11×10^{-2}		
^{254m}Es		0.6	16.2	0.4	10.8		
^{255}Es							
^{147}Eu	Europium (63)	2	54.1	2	54.1	1.4×10^{3}	3.7×10^{4}

Table A11.1. Continued.

Symbol of Radionuclide	Element and Atomic Number	A_1(TBq) (Special form)	A_1(Ci) (Special form)	A_2(TBq) (Other form)	A_2(Ci) (Other form)	Specific activity (TBq/g)	Specific activity (Ci/g)
^{148}Eu		0.5	13.5	0.5	13.5	6.0×10^{2}	1.6×10^{4}
^{149}Eu		20	541	20	541	3.5×10^{2}	9.4×10^{3}
^{150}Eu		0.7	18.9	0.7	18.9	6.1×10^{4}	1.6×10^{6}
^{152m}Eu		0.6	16.2	0.5	13.5	8.2×10^{4}	2.2×10^{6}
^{152}Eu		0.9	24.3	0.9	24.3	6.5	1.8×10^{2}
^{154}Eu		0.8	21.6	0.5	13.5	9.8	2.6×10^{2}
^{155}Eu		20	541	2	54.1	1.8×10^{1}	4.9×10^{2}
^{156}Eu		0.6	16.2	0.5	13.5	2.0×10^{3}	5.5×10^{4}
^{18}F	Fluorine (9)	1	27.0	0.5	13.5	3.5×10^{6}	9.5×10^{7}
^{52}Fe	Iron (26)	0.2	5.41	0.2	5.41	2.7×10^{5}	7.3×10^{6}
^{55}Fe		40	1,080	40	1,080	8.8×10^{1}	2.4×10^{3}
^{59}Fe		0.8	21.6	0.8	21.6	1.8×10^{3}	5.0×10^{4}
^{60}Fe		40	1,080	0.2	5.41	7.4×10^{-4}	2.0×10^{-2}
^{255}Fm	Fermium (100)	40	1,080	0.8	21.6		
^{257}Fm		10	270	8×10^{-3}	21.6×10^{-1}		
^{67}Ga	Gallium (31)	6	162	6	162	2.2×10^{4}	6.0×10^{5}
^{68}Ga		0.3	8.11	0.3	8.11	1.5×10^{6}	4.1×10^{7}
^{72}Ga		0.4	10.8	0.4	10.8	1.1×10^{5}	3.1×10^{6}
^{146}Gd	Gadolinium (64)	0.4	10.8	0.4	10.8	6.9×10^{2}	1.9×10^{4}
^{148}Gd		3	81.1	3×10^{-4}	8.11×10^{-3}	1.2	3.2×10^{1}
^{153}Gd		10	270	5	135	1.3×10^{2}	3.5×10^{3}
^{159}Gd		4	108	0.5	13.5	3.9×10^{4}	1.1×10^{6}
^{68}Ge	Germanium (32)	0.3	8.11	0.3	8.11	2.6×10^{2}	7.1×10^{3}
^{71}Ge		40	1,080	40	1,080	5.8×10^{3}	1.6×10^{5}
^{77}Ge		0.3	8.11	0.3	8.11	1.3×10^{5}	3.6×10^{6}
^{3}H	Hydrogen (1) (See T- Tritium)						
^{172}Hf	Hafnium (72)	0.5	13.5	0.3	8.11	4.1×10^{1}	1.1×10^{3}
^{175}Hf		3	81.1	3	81.1	3.9×10^{2}	1.1×10^{4}
^{181}Hf		2	54.1	0.9	24.3	6.3×10^{2}	1.7×10^{4}
^{182}Hf		4	108	3×10^{-2}	0.811	8.1×10^{6}	2.2×10^{-4}
^{194}Hg	Mercury (80)	1	27.0	1	27.0	1.3×10^{-1}	3.5
^{195m}Hg		5	135	5	135	1.5×10^{4}	4.0×10^{5}
^{197m}Hg		10	270	0.9	24.3	2.5×10^{4}	6.7×10^{5}
^{197}Hg		10	270	10	270	9.2×10^{3}	2.5×10^{5}

Table A11.1. Continued.

Symbol of Radionuclide	Element and Atomic Number	A_1(TBq) (Special form)	A_1(Ci) (Special form)	A_2(TBq) (Other form)	A_2(Ci) (Other form)	Specific activity (TBq/g)	Specific activity (Ci/g)
^{203}Hg		4	108	0.9	24.3	5.1×10^{2}	1.4×10^{4}
^{163}Ho	Holmium (67)	40	1,080	40	1,080	2.7	7.6×10^{1}
^{166m}Ho		0.6	16.2	0.3	8.11	6.6×10^{-2}	1.8
^{166}Ho		0.3	8.11	0.3	8.11	2.6×10^{4}	7.0×10^{5}
^{123}I	Iodine (53)	6	162	6	162	7.1×10^{4}	1.9×10^{6}
^{124}I		0.9	24.3	0.9	24.3	9.3×10^{3}	2.5×10^{5}
^{125}I		20	541	2	54.1	6.4×10^{2}	1.7×10^{4}
^{126}I		2	54.1	0.9	24.3	2.9×10^{3}	8.0×10^{4}
^{129}I		Unlimited	Unlimited	Unlimited	Unlimited	6.5×10^{-6}	1.8×10^{-4}
^{131}I		3	81.1	0.5	13.5	4.6×10^{3}	1.2×10^{5}
^{132}I	Iodine (53)	0.4	10.8	0.4	10.8	3.8×10^{5}	1.0×10^{7}
^{133}I		0.6	16.2	0.5	13.5	4.2×10^{4}	1.1×10^{6}
^{134}I		0.3	8.11	0.3	8.11	9.9×10^{5}	2.7×10^{7}
^{135}I		0.6	16.2	0.5	13.5	1.3×10^{5}	3.5×10^{6}
^{111}In	Indium (49)	2	54.1	2	54.1	1.5×10^{4}	4.2×10^{5}
^{113m}In		4	108	4	108	6.2×10^{5}	1.7×10^{7}
^{114m}In		0.3	8.11	0.3	8.11	8.6×10^{2}	2.3×10^{4}
^{115m}In		6	162	0.9	24.3	2.2×10^{5}	6.1×10^{6}
^{189}Ir	Iridium (77)	10	270	10	270	1.9×10^{3}	5.2×10^{4}
^{190}Ir		0.7	18.9	0.7	18.9	2.3×10^{3}	6.2×10^{4}
^{192}Ir		1	27.0	0.5	13.5	3.4×10^{2}	9.2×10^{3}
^{193m}Ir		10	270	10	270	2.4×10^{3}	6.4×10^{4}
^{194}Ir		0.2	5.41	0.2	5.41	3.1×10^{4}	8.4×10^{5}
^{40}K	Potassium (19)	0.6	16.2	0.6	16.2	2.4×10^{-7}	6.4×10^{-6}
^{42}K		0.2	5.41	0.2	5.41	2.2×10^{5}	6.0×10^{6}
^{43}K		1.0	27.0	0.5	13.5	1.2×10^{5}	3.3×10^{6}
^{81}Kr	Krypton (36)	40	1,080	40	1,080	7.8×10^{-4}	2.1×10^{-2}
^{85m}Kr		6	162	6	162	3.0×10^{5}	8.2×10^{6}
85Kr		20	541	10	270	1.5×10^{1}	3.9×10^{2}
^{87}Kr		0.2	5.41	0.2	5.41	1.0×10^{6}	2.8×10^{7}
^{137}La	Lanthanum (57)	40	1,080	2	54.1	1.6×10^{-3}	4.4×10^{-2}
^{140}La		0.4	10.8	0.4	10.8	2.1×10^{4}	5.6×10^{5}
^{172}Lu	Lutetium (71)	0.5	13.5	0.5	13.5	4.2×10^{3}	1.1×10^{5}
^{173}Lu		8	216	8	216	5.6×10^{1}	1.5×10^{3}

Table A11.1. Continued.

Symbol of Radionuclide	Element and Atomic Number	A_1(TBq) (Special form)	A_1(Ci) (Special form)	A_2(TBq) (Other form)	A_2(Ci) (Other form)	Specific activity (TBq/g)	Specific activity (Ci/g)
^{174m}Lu		20	541	8	216	2.0×10^{2}	5.3×10^{3}
^{174}Lu		8	216	4	108	2.3×10^{1}	6.2×10^{2}
^{177}Lu		30	811	0.9	24.3	4.1×10^{3}	1.1×10^{5}
MFP	Mixed fission products						
^{28}Mg	Magnesium (12)	0.2	5.41	0.2	5.41	2.0×10^{5}	5.4×10^{6}
^{52}Mn	Manganese (25)	0.3	8.11	0.3	8.11	1.6×10^{4}	4.4×10^{5}
^{53}Mn		Unlimited	Unlimited	Unlimited	Unlimited	6.8×10^{-5}	1.8×10^{-3}
^{54}Mn		1	27.0	1	27.0	2.9×10^{2}	7.7×10^{3}
^{56}Mn		0.2	5.41	0.2	5.41	8.0×10^{5}	2.2×10^{7}
^{93}Mo	Molybdenum (42)	40	1,080	7	189	4.1×10^{-2}	1.1
^{99}Mo		0.6	16.2	0.5	13.5[c]	1.8×10^{4}	4.8×10^{5}
^{13}N	Nitrogen (7)	0.6	16.2	0.5	13.5	5.4×10^{7}	1.5×10^{9}
^{22}Na	Sodium (11)	0.5	13.5	0.5	13.5	2.3×10^{2}	6.3×10^{3}
^{24}Na		0.2	5.41	0.2	5.41	3.2×10^{5}	8.7×10^{6}
^{92m}Nb	Niobium (41)	0.7	18.9	0.7	18.9	5.2×10^{3}	1.4×10^{5}
^{93m}Nb		40	1,080	6	162	8.8	2.4×10^{2}
^{94}Nb		0.6	16.2	0.6	16.2	6.9×10^{-3}	1.9×10^{-1}
^{95}Nb		1	27.0	1	27.0	1.5×10^{3}	3.9×10^{4}
^{97}Nb		0.6	16.2	0.5	13.5	9.9×10^{5}	2.7×10^{7}
^{147}Nd	Neodymium (60)	4	108	0.5	13.5	3.0×10^{3}	8.1×10^{4}
^{149}Nd		0.6	16.2	0.5	13.5	4.5×10^{5}	1.2×10^{7}
^{59}Ni	Nickel (28)	40	1,080	40	1,080	3.0×10^{-3}	8.0×10^{-2}
^{63}Ni		40	1,080	30	811	2.1	5.7×10^{1}
^{65}Ni		0.3	8.11	0.3	8.11	7.1×10^{5}	1.9×10^{7}
^{235}Np	Neptunium (93)	40	1,080	40	1,080	5.2×10^{1}	1.4×10^{3}
^{236}Np		7	189	1×10^{-3}	2.70×10^{-2}	4.7×10^{-4}	1.3×10^{-2}
^{237}Np		2	54.1	2×10^{-4}	5.41×10^{-3}	2.6×10^{-5}	7.1×10^{-4}
^{239}Np		6	162	0.5	13.5	8.6×10^{3}	2.8×10^{2}
^{185}Os	Osmium (76)	1	27.0	1	27.0	2.8×10^{2}	7.5×10^{3}
^{191m}Os		40	1,080	40	1,080	4.6×10^{4}	1.3×10^{6}
^{191}Os		10	270	0.9	24.3	1.6×10^{3}	4.4×10^{4}
^{193}Os		0.6	16.2	0.5	13.5	2.0×10^{4}	5.3×10^{5}
^{194}Os		0.2	5.41	0.2	5.41	1.1×10^{1}	3.1×10^{2}

Table A11.1. Continued.

Symbol of Radionuclide	Element and Atomic Number	A_1(TBq) (Special form)	A_1(Ci) (Special form)	A_2(TBq) (Other form)	A_2(Ci) (Other form)	Specific activity (TBq/g)	Specific activity (Ci/g)
^{32}P	Phosphorus (15)	0.3	8.11	0.3	8.11	1.1×10^{4}	2.9×10^{5}
^{32}P		40	1,080	0.9	24.3	5.8×10^{3}	1.6×10^{5}
^{230}Pa	Protactinium (91)	2	54.1	0.1	2.70	1.2×10^{3}	3.3×10^{4}
^{231}Pa		0.6	16.2	6×10^{-5}	1.62×10^{-3}	1.7×10^{-3}	4.7×10^{-2}
^{233}Pa		5	135	0.9	24.3	7.7×10^{2}	2.1×10^{4}
^{201}Pb	Lead (82)	1	27.0	1	27.0	6.2×10^{4}	1.7×10^{6}
^{202}Pb		40	1,080	2	54.1	1.2×10^{-4}	3.4×10^{-3}
^{203}Pb		3	81.1	3	81.1	1.1×10^{4}	3.0×10^{5}
^{205}Pb		Unlimited	Unlimited	Unlimited	Unlimited	4.5×10^{-6}	1.2×10^{-4}
^{210}Pb		0.6	16.2	9×10^{-3}	0.243	2.8	7.6×10^{1}
^{212}Pb		0.3	8.11	0.3	8.11	5.1×10^{4}	1.4×10^{6}
^{103}Pd	Palladium (46)	40	1,080	40	1,080	2.8×10^{3}	7.5×10^{4}
^{107}Pd		Unlimited	Unlimited	Unlimited	1.9×10^{-5}	5.1×10^{-4}	
^{109}Pd		0.6	16.2	0.5	13.5	7.9×10^{4}	2.1×10^{6}
^{143}Pm	Promethium (61)	3	81.1	3	81.1	1.3×10^{2}	3.4×10^{3}
^{144}Pm		0.6	16.2	0.6	16.2	9.2×10^{1}	2.5×10^{3}
^{145}Pm		30	811	7	189	5.2	1.4×10^{2}
^{147}Pm		40	1,080	0.9	24.3	3.4×10^{1}	9.3×10^{2}
^{148}Pm		0.5	13.5	0.5	13.5	7.9×10^{2}	2.1×10^{4}
^{149}Pm		0.6	16.2	0.5	13.5	1.5×10^{4}	4.0×10^{5}
^{151}Pm		3	81.1	0.5	13.5	2.7×10^{4}	7.3×10^{5}
^{208}Po	Polonium (84)	40	1,080	2×10^{-2}	0.541	2.2×10^{1}	5.9×10^{2}
^{209}Po		40	1,080	2×10^{-2}	0.542	6.2×10^{-1}	1.7×10^{1}
^{210}Po		40	1,080	2×10^{-2}	0.541	1.7×10^{2}	4.5×10^{3}
^{142}Pr	Praseodymium (59)	0.3	5.41	0.2	5.41	4.3×10^{4}	1.2×10^{6}
^{143}Pr		4	108	0.5	13.5	2.5×10^{3}	6.7×10^{4}
^{188}Pt	Platinum (78)	0.6	16.2	0.6	16.2	2.5×10^{3}	6.8×10^{4}
^{191}Pt		3	81.1	3	81.1	8.7×10^{3}	2.4×10^{5}
^{193m}Pt		40	1,080	9	243	5.8×10^{3}	1.6×10^{5}
^{193}Pt		40	1,080	40	1,080	1.4	3.7×10^{1}
^{195m}Pt		10	270	2	54.1	6.2×10^{3}	1.7×10^{5}
^{197m}Pt		10	270	0.9	24.3	3.7×10^{5}	1.0×10^{7}
^{197}Pt		20	541	0.5	13.5	3.2×10^{4}	8.7×10^{5}

Table A11.1. Continued.

Symbol of Radionuclide	Element and Atomic Number	A_1(TBq) (Special form)	A_1(Ci) (Special form)	A_2(TBq) (Other form)	A_2(Ci) (Other form)	Specific activity (TBq/g)	Specific activity (Ci/g)
^{236}Pu	Plutonium (94)	7	189	7×10^{-4}	1.89×10^{-2}	2.0×10^{1}	5.3×10^{2}
^{237}Pu		20	541	20	541	4.5×10^{2}	1.2×10^{4}
^{238}Pu		2	54.1	2×10^{-4}	5.41×10^{-3}	6.3×10^{-1}	1.7×10^{1}
^{239}Pu		2	54.1	2×10^{-4}	5.41×10^{-3}	2.3×10^{-3}	6.2×10^{-2}
^{240}Pu		2	54.1	2×10^{-4}	5.41×10^{-3}	8.4×10^{-3}	2.3×10^{-1}
^{241}Pu		40	1,080	1×10^{-2}	0.270	3.8	1.0×10^{2}
^{242}Pu		2	54.1	2×10^{-4}	5.41×10^{-3}	1.5×10^{-4}	3.9×10^{-3}
^{244}Pu		0.3	8.11	2×10^{-4}	5.41×10^{-3}	6.7×10^{-7}	1.8×10^{-5}
^{223}Ra	Radium (88)	0.6	16.2	3×10^{-2}	0.811	1.9×10^{3}	5.1×10^{4}
^{224}Ra		0.3	8.11	6×10^{-2}	1.62	5.9×10^{3}	1.6×10^{5}
^{225}Ra		0.6	16.2	2×10^{-2}	0.541	1.5×10^{3}	3.9×10^{4}
^{226}Ra		0.3	8.11	2×10^{-2}	0.541	3.7×10^{-2}	1.0
^{228}Ra		0.6	16.2	4×10^{-2}	1.08	1.0×10^{1}	2.7×10^{2}
^{81}Rb	Rubidium (37)	2	54.1	0.9	24.3	3.1×10^{5}	8.4×10^{6}
^{83}Rb		2	54.1	2	54.1	6.8×10^{2}	1.8×10^{4}
^{84}Rb		1	27.0	0.9	24.3	1.8×10^{3}	4.7×10^{4}
^{86}Rb		0.3	8.11	0.3	8.11	3.0×10^{3}	8.1×10^{4}
^{87}Rb		Unlimited	Unlimited	Unlimited	Unlimited	3.2×10^{-9}	8.6×10^{-8}
Rb (natural)		Unlimited	Unlimited	Unlimited	Unlimited	6.7×10^{6}	1.8×10^{8}
^{183}Re	Rhenium (75)	5	135	5	135	3.8×10^{2}	1.0×10^{4}
^{184m}Re		3	81.1	3	81.1	1.6×10^{2}	4.3×10^{3}
^{184}Re		1	27.0	1	27.0	6.9×10^{2}	1.9×10^{4}
^{186}Re		4	108	0.5	13.5	6.9×10^{3}	1.9×10^{5}
^{187}Re		Unlimited	Unlimited	Unlimited	Unlimited	1.4×10^{-9}	3.8×10^{-8}
^{188}Re		0.2	5.41	0.2	5.41	3.6×10^{4}	9.8×10^{5}
^{189}Re		4	108	0.5	13.5	2.5×10^{4}	6.8×10^{5}
Re (natural)		Unlimited	Unlimited	Unlimited	Unlimited		2.4×10^{8}
^{99}Rh	Rhodium (45)	2	54.1	2	54.1	3.0×10^{3}	8.2×10^{4}
^{101}Rh		4	108	4	108	4.1×10^{1}	1.1×10^{3}
^{102m}Rh		2	54.1	0.9	24.3	2.3×10^{2}	6.2×10^{3}
^{102}Rh		0.5	13.5	0.5	13.5	4.5×10^{1}	1.2×10^{3}
^{103m}Rh		40	1,080	40	1,080	1.2×10^{6}	3.3×10^{7}
^{105}Rh		10	270	0.9	24.3	3.1×10^{4}	8.4×10^{5}

Table A11.1. Continued.

Symbol of Radionuclide	Element and Atomic Number	A_1(TBq) (Special form)	A_1(Ci) (Special form)	A_2(TBq) (Other form)	A_2(Ci) (Other form)	Specific activity (TBq/g)	Specific activity (Ci/g)
^{222}Rh	Radon (86)	0.2	5.41	4×10^{-3}	0.108	5.7×10^{3}	1.5×10^{5}
^{97}Ru	Ruthenium (44)	4	108	4	108	1.7×10^{4}	4.6×10^{5}
^{103}Ru		2	54.1	0.9	24.3	1.2×10^{3}	3.2×10^{4}
^{105}Ru		0.6	16.2	0.5	13.5	2.5×10^{5}	6.7×10^{6}
^{106}Ru		0.2	5.41	0.2	5.41	1.2×10^{2}	3.3×10^{3}
^{35}S	Sulphur (16)	40	1,080	2	54.1	1.6×10^{3}	4.3×10^{4}
^{122}Sb	Antimony (51)	0.3	8.11	0.3	8.11	1.5×10^{4}	4.0×10^{5}
^{124}Sb		0.6	16.2	0.5	13.5	6.5×10^{2}	1.7×10^{4}
^{125}Sb		2	54.1	0.9	24.3	3.9×10^{1}	1.0×10^{3}
^{126}Sb		0.4	10.8	0.4	10.8	3.1×10^{3}	8.4×10^{4}
^{44}Sc	Scandium (21)	0.5	13.5	0.5	13.5	6.7×10^{5}	1.8×10^{7}
^{46}Sc		0.5	13.5	0.5	13.5	1.3×10^{3}	3.4×10^{4}
^{47}Sc		9	243	0.9	24.3	3.1×10^{4}	8.3×10^{5}
^{48}Sc		0.3	8.11	0.3	8.11	5.5×10^{4}	1.5×10^{4}
^{75}Se	Selenium (34)	3	81.1	3	81.1	5.4×10^{2}	1.5×10^{4}
^{79}Se		40	1,080	2	54.1	2.6×10^{-3}	7.0×10^{-2}
^{31}Si	Silicon (14)	0.6	16.2	0.5	13.5	1.4×10^{6}	3.9×10^{7}
^{32}Si		40	10,800	0.2	5.41	3.9	1.1×10^{2}
^{145}Sm	Samarium (62)	20	541	20	541	9.8×10^{1}	2.610^{3}
^{147}Sm		Unlimited	Unlimited	Unlimited	Unlimited	8.510^{-10}	2.310^{-8}
^{151}Sm		40	1,080	4	108	9.710^{-1}	2.6×10^{1}
^{153}Sm		4	108	0.5	13.5	1.6×10^{4}	4.4×10^{5}
^{113}Sn	Tin (50)	4	108	4	108	3.7×10^{2}	1.0×10^{4}
^{117m}Sn		6	162	2	54.1	3.0×10^{3}	8.2×10^{4}
^{119m}Sn		40	1,080	40	1,080	1.4×10^{2}	3.7×10^{3}
^{121m}Sn		40	1,080	0.9	24.3	2.0	5.4×10^{1}
^{123}Sn		0.6	16.2	0.5	13.5	3.0×10^{2}	8.2×10^{3}
^{125}Sn		0.2	5.41	0.2	5.41	4.0×10^{3}	1.1×10^{5}
^{126}Sn		0.3	8.11	0.3	8.11	1.010^{-3}	2.810^{-2}
^{82}Sr	Strontium (38)	0.2	5.41	0.2	5.41	2.3×10^{3}	6.2×10^{4}
^{85m}Sr		5	135	5	135	1.2×10^{6}	3.3×10^{7}
^{85}Sr		2	54.1	2	54.1	8.8×10^{2}	2.4×10^{4}
^{87m}Sr		3	81.1	3	81.1	4.8×10^{5}	1.3×10^{7}
^{89}Sr		0.6	16.2	0.5	13.5	1.1×10^{3}	2.9×10^{4}

Table A11.1. Continued.

Symbol of Radionuclide	Element and Atomic Number	A_1(TBq) (Special form)	A_1(Ci) (Special form)	A_2(TBq) (Other form)	A_2(Ci) (Other form)	Specific activity (TBq/g)	Specific activity (Ci/g)
^{90}Sr		0.2	5.41	0.1	2.70	5.1	1.4×10^{2}
^{91}Sr		0.3	8.11	0.3	8.11	1.3×10^{5}	3.6×10^{6}
^{92}Sr		0.8	21.6	0.5	13.5	4.7×10^{5}	1.3×10^{7}
T	Tritium (1)	40	1,080	40	1,080	3.6×10^{2}	9.7×10^{3}
^{178}Ta	Tantalum (73)	1	27.0	1	27.0	4.2×10^{6}	1.1×10^{8}
^{179}Ta		30	811	30	811	4.1×10^{1}	1.1×10^{3}
^{182}Ta		0.8	21,6	0.5	13.5	2.3×10^{2}	6.2×10^{3}
^{157}Tb	Terbium (65)	40	1,080	10	270	5.610^{-1}	1.5×10^{1}
^{158}Tb		1	27.0	0.7	18.9	5.610^{-1}	1.5×10^{1}
^{160}Tb		0.9	24.3	0.5	13.5	4.2×10^{2}	1.1×10^{4}
^{95m}Tc	Technetium (43)	2	54.1	2	54.1	8.3×10^{2}	2.2×10^{4}
^{96m}Tc		0.4	10.8	0.4	10.8	1.4×10^{6}	3.8×10^{7}
^{96}Tc		0.4	10.8	0.4	10.8	1.2×10^{4}	3.2×10^{5}
^{97m}Tc		40	1,080	40	1,080	5.6×10^{2}	1.5×10^{4}
97Tc		Unlimited	Unlimited	Unlimited	Unlimited	5.2×10^{-2}	1.4×10^{-3}
^{98}Tc		0.7	18.9	0.7	18.9	3.2×10^{-5}	8.7×10^{-4}
^{99m}Tc		8	216	8	216	1.9×10^{5}	5.3×10^{6}
^{99}Tc		40	1,080	0.9	24.3	6.3×10^{-4}	1.7×10^{-2}
^{118}Te	Tellurium (52)	0.2	5.41	0.2	5.41	6.8×10^{3}	1.8×10^{5}
^{121m}Te		5	135	5	135	2.6×10^{2}	7.0×10^{3}
^{121}Te		2	54.1	2	54.1	2.4×10^{3}	6.4×10^{4}
^{123m}Te		7	189	7	189	3.3×10^{2}	8.9×10^{3}
^{125m}Te		30	811	9	243	6.7×10^{2}	1.8×10^{4}
^{127m}Te		20	541	0.5	13.5	3.5×10^{2}	9.4×10^{3}
^{127}Te		20	541	0.5	13.5	9.8×10^{4}	2.6×10^{6}
^{129m}Te		0.6	16.2	0.5	13.5	1.1×10^{3}	3.0×10^{4}
^{129}Te		0.6	16.2	0.5	13.5	7.7×10^{5}	2.1×10^{7}
^{131m}Te		0.7	18.9	0.4	10.8	3.0×10^{4}	8.0×10^{5}
^{132}Te		0.4	10.8	0.4	10.8	$1. \times 10^{4}$	3.0×10^{5}
^{227}Th	Thorium (90)	9	243	1×10^{-2}	0.270	1.1×10^{3}	3.1×10^{4}
^{228}Th		0.3	8.11	4×10^{-4}	1.08×10^{-2}	3.0×10^{1}	8.2×10^{2}
^{229}Th		0.3	8.11	3×10^{-5}	8.11×10^{-4}	7.9×10^{-3}	2.1×10^{-1}
^{230}Th		2	54.1	2×10^{-4}	5.41×10^{-3}	7.6×10^{-4}	2.1×10^{-2}
^{231}Th		40	1,080	0.9	24.3	2×10^{4}	5.3×10^{5}

Table A11.1. Continued.

Symbol of Radionuclide	Element and Atomic Number	A_1(TBq) (Special form)	A_1(Ci) (Special form)	A_2(TBq) (Other form)	A_2(Ci) (Other form)	Specific activity (TBq/g)	Specific activity (Ci/g)
^{232}Th		Unlimited	Unlimited	Unlimited	Unlimited	4.0×10^{-9}	1.1×10^{-7}
^{234}Th		0.2	5.41	0.2	5.41	8.6×10^{2}	2.3×10^{4}
Th (natural)		Unlimited	Unlimited	Unlimited	Unlimited	8.1×10^{-9}	2.2×10^{-7}
^{44}Ti	Titanium (22)	0.5	13.5	0.2	5.41	6.4	1.7×10^{2}
^{200}Tl	Thallium (81.1)	0.8	21.6	0.8	21.6	2.2×10^{4}	6.0×10^{5}
^{201}Tl		10	270	10	270	7.9×10^{3}	2.1×10^{5}
^{202}Tl		2	54.1	2	54.1	2.0×10^{3}	5.3×10^{4}
^{204}Tl		4	108	0.5	13.5	1.7×10^{1}	4.6×10^{2}
^{167}Tm	Thulium (69)	7	189	7	189	3.1×10^{3}	8.5×10^{4}
^{168}Tm		0.8	21.6	0.8	21.6	3.1×10^{2}	8.3×10^{3}
^{170}Tm		4	108	0.5	13.5	2.2×10^{2}	6.0×10^{3}
^{171}Tm		40	1,080	10	270	4.0×10^{1}	1.1×10^{3}
^{230}U	Uranium (92)	40	1,080	1×10^{-2}	0.270	1.0×10^{3}	2.7×10^{4}
^{232}U		3	81.1	3×10^{-4}	8.11×10^{-3}	8.3×10^{-1}	2.2×10^{1}
^{233}U		10	270	1×10^{-3}	2.70×10^{-2}	3.6×10^{-4}	9.7×10^{-3}
^{234}U		10	270	1×10^{-3}	2.70×10^{-2}	2.3×10^{-4}	6.2×10^{-3}
^{235}U		Unlimited	Unlimited	Unlimited	Unlimited	8.0×10^{-8}	2.2×10^{-6}
^{236}U		10	270	1×10^{-3}	2.70×10^{-2}	2.4×10^{-6}	6.5×10^{-5}
^{238}U		Unlimited	Unlimited	Unlimited	Unlimited	1.2×10^{-8}	3.4×10^{-7}
U (natural)		Unlimited	Unlimited	Unlimited	Unlimited		
U (enriched 5% or less)		Unlimited	Unlimited	Unlimited	Unlimited		
U (enriched more than 5%)		10	270	1×10^{-3}	2.70×10^{-2}		
U (depleted)		Unlimited	Unlimited	Unlimited	Unlimited		
^{48}V	Vanadium (23)	0.3	8.11	0.3	8.11	6.3×10^{3}	1.7×10^{5}
^{49}V		40	1,080	40	1,080	3.0×10^{2}	8.1×10^{3}
^{178}W	Tungsten (74)	1	27.0	1	27.0	1.3×10^{-3}	3.4×10^{4}
^{181}W		30	811	30	811	2.2×10^{2}	6.0×10^{3}
^{185}W		40	1,080	0.9	24.3	3.5×10^{2}	9.4×10^{3}
^{187}W		2	54.1	0.5	13.5	2.6×10^{4}	7.0×10^{5}
^{188}W							
^{122}Xe	Xenon (54)	0.2	5.41	0.2	5.41	4.8×10^{4}	1.3×10^{6}
^{123}Xe		0.2	5.41	0.2	5.41	4.4×10^{5}	1.2×10^{7}
^{127}Xe		4	108	4	108	1.0×10^{3}	2.8×10^{4}
^{131m}Xe		40	1,080	40	1,080	3.1×10^{3}	8.4×10^{4}

Table A11.1. Continued.

Symbol of Radionuclide	Element and Atomic Number	A_1(TBq) (Special form)	A_1(Ci) (Special form)	A_2(TBq) (Other form)	A_2(Ci) (Other form)	Specific activity (TBq/g)	Specific activity (Ci/g)
^{133}Xe		20	541	20	541	6.9×10^{3}	1.9×10^{5}
^{135}Xe		4	108	4	108	9.5×10^{4}	2.6×10^{6}
^{87}Y	Yttrium (39)	2	54.1	2	54.1	1.7×10^{4}	4.5×10^{5}
^{88}Y		0.4	10.8	0.4	10.8	5.2×10^{2}	1.4×10^{4}
^{90}Y		0.2	5.41	0.2	5.41	2.0×10^{4}	5.4×10^{5}
^{91m}Y		2	54.1	2	54.1	1.5×10^{6}	4.2×10^{7}
^{91}Y		0.3	8.11	0.3	8.11	9.1×10^{2}	2.5×10^{4}
^{92}Y		0.2	5.41	0.2	5.41	3.6×10^{5}	9.6×10^{6}
^{93}Y		0.2	5.41	0.2	5.41	1.2×10^{5}	3.3×10^{6}
^{169}Yb	Ytterbium (70)	3	81.1	3	81.1	8.9×10^{2}	2.4×10^{4}
^{175}Yb		30	811	0.9	24.3	6.6×10^{3}	1.8×10^{5}
^{65}Zn	Zinc (30)	2	54.1	2	54.1	3.0×10^{2}	8.2×10^{3}
^{69m}Zn		2	54.1	0.5	13.5	1.2×10^{5}	3.3×10^{6}
^{69}Zn		4	108	0.5	13.5	1.8×10^{6}	4.9×10^{7}
^{88}Zr	Zirconium (40)	3	81.1	3	81.1	6.6×10^{2}	1.8×10^{4}
^{93}Zr		40	1,080	0.2	5.41	9.3×10^{-5}	2.5×10^{-3}
^{95}Zr		1	27.0	0.9	24.3	7.9×10^{2}	2.1×10^{4}
^{97}Zr		0.3	8.11	0.3	8.11	7.1×10^{4}	1.9×10^{6}

NOTES:
1. For shipments solely within the United States, the A_1 value is .74 TBq (20 curies) for americium and plutonium contained in Am-Be or Pu-Be neutron sources or in nuclear-powered pacemakers.
2. The values of A_1 and A_2 must be calculated according to the procedure specified in 49 CFR 173.433, taking into account the activity of the fission products and of the uranium-233 in addition to that of the thorium.
3. The values of A_1 and A_2 must be calculated according to the procedure specified in 49 CFR 173.433, taking into account the activity of the fission products and plutonium isotopes in addition to that of the uranium.

★**A11.6. Authorized Type A Packages.** Use the following packages for shipment, if they do not contain quantities over A_1 or A_2 as appropriate:

A11.6.1. DOT 7A Type A General Packaging**.**

- Each shipper of a DOT 7A package must maintain on file for at least 1 year after the latest shipment complete documentation of tests and an engineering evaluation or comparative data showing that the construction methods, packaging design, and materials of construction comply with that specification. Unless otherwise required, the shipper is exempt from maintaining this documentation if it is maintained by the Inventory Control Point (national stock number managing activity).
- DOT 7A packaging designed according to the requirements of 49 CFR 178.350 in effect on 30 June 1983 may continue to be used only until 1 April 1997.
- Any other Type A packaging that also meets the applicable standards for fissile materials in 10 CFR Part 71 and authorized in 49 CFR 173.471.

A11.6.2. Any Type B, B(U), or B(M) packaging, authorized in A11.7.

A11.6.3. Any foreign-made packaging that meets the standards of IAEA *Safety Series No. 6* and bears the marking "Type A" used for the import of radioactive materials. Such packaging may be used later for domestic and export shipments of

radioactive materials only if the offeror obtains the applicable documentation specified in A11.6.1. The packaging must conform to the requirements of the country of origin (as indicated by the packaging marking) and the IAEA regulations applicable to Type A packaging.

★**A11.7. Authorized Type B Packages.** Use the following packages for shipment of quantities over A_1 or A_2, as appropriate:
A11.7.1. Any Type B, Type B(U), or Type B(M) packaging that meets the applicable requirements in the regulations of the US Nuclear Regulatory Commission (10 CFR Part 71) and has been approved by that Commission may be shipped per 49 CFR 173.471.
A11.7.2. Any Type B, B(U) or B(M) packaging that meets the applicable requirements of the regulations of the International Atomic Energy Agency (IAEA) in its *Regulations for the Safe Transport of Radioactive Materials, Safety Series No. 6*, and for which the foreign competent authority certificate has been revalidated by DOT according to 49 CFR 173.473. Authorized only for export and import shipments.
A11.7.3. DOT 6M metal packaging, only for solid or gaseous radioactive materials that will not undergo pressure generating decomposition at temperatures up to 121 degrees C (250 degrees F) and do not generate more than 10 watts of radioactive decay heat.
A11.7.4. DOT 20WC, wooden protective jacket, when used with a single, snug-fitting inner DOT 2R. For liquid contents, the inner packaging must comply with 49 CFR 173.412. Not authorized for special form radioactive material.
A11.7.5. DOT 20WC, wooden protective jacket, with a single, snug-fitting inner Type A packaging that has a metal outer wall. Radioactive decay heat must not be over 100 watts. Authorized only for special form radioactive material.
A11.7.6. DOT 21WC, wooden protective overpack, with a single inner DOT 2R. Contents must be loaded within the inner packaging in a manner to prevent loose movement during transportation. The inner packaging must be securely positioned and centered within the overpack so that there will be no significant displacement of the inner packaging if subjected to the 9 meter (30 feet) drop test described in 10 CFR Part 71. Authorized only for special form radioactive material.

★**A11.8. Authorized Packaging-Fissile Materials.**
A11.8.1. Except as provided in A3.3.6.8, package fissile materials containing not more than A_1 or A_2 (as appropriate) in:
A11.8.1.1. DOT 6L, metal packaging, for materials in A11.8.2.1.
A11.8.1.2. DOT 6M, metal packaging, for materials in A11.8.2.2.
A11.8.1.3. Any packaging listed in A11.6, limited to radioactive materials specified in 10 CFR Part 71, Subpart C.
A11.8.1.4. Any other Type A, Type B, Type B(U), or Type B(M) packaging for fissile radioactive materials that also meets the applicable standards for fissile materials in 10 CFR Part 71.
A11.8.1.5. Any other Type A, Type B, Type B(U), or Type B(M) packaging that also meets the applicable requirements for fissile material packaging in section V of the IAEA "*Regulations for the Safe Transport of Radioactive Materials, Safety Series No. 6*," and for which the foreign competent authority certificate has been revalidated by the DOT according to 49 CFR 173.473. Authorized only for export and import shipments.

A11.8.1.6. A 208 L (55 gallon) steel drum (1A2), subject to the following conditions:

- Packaging must meet the PG I performance requirements.
- The quantity may not exceed 350 grams of uranium^{235} in any nonpyrophoric form, enriched to any degree in the uranium^{235} isotope.
- Each drum must have a minimum 18-gauge body and bottom head and 16-gauge removable top head with one or more corrugations in the cover near the periphery.
- Closures must conform to 49 CFR 178.352.
- At least four equally spaced 12 mm (0.5 inch) diameter vent holes must be provided on the sides of the drum near the top, each covered with weatherproof tape or equivalent device.
- Appropriate primary inner containment of the contents and sufficient packaging material, such as plastic or metal jars or cans, must be provided so that DOT 7A provisions are satisfied by the inner packaging.
- Each inner container must be capable of venting if subjected to the thermal test described in 10 CFR Part 71.
- Liquid contents must be packaged per 49 CFR 173.412.
- The maximum weight of contents including internal packaging must not be over 91 kgs (200 pounds) with fissile material content limited as shown in table A11.2:

A11.8.1.7. Any metal cylinder that meets the performance requirements of A11.6 and 49 CFR 178.350 for DOT 7A Type A packaging may be used for the transport of residual "heels" of enriched solid uranium hexafluoride without a protective overpack per table A11.3:

Table A11.2. Fissile Material Content and Transport Index for UN 1A2 Package.		
Maximum U-235 per Package (grams)	**MinimumTransport Index per Package as Fissile Class II**	**Maximum Number of Packages Transported as a Fissile Material Controlled Shipment**
350	1.8	72
300	1.0	129
250	0.5	256
200	0.3	500
150	0.1	500
100	0.1	500
50	Note 1	Note 2

***NOTES*:**
1. Transport index is limited by the external radiation levels.
2. Maximum number is limited by the total transport index.

Table A11.3. Allowable Content of Uranium Hexafluoride (UF_6) "Heels" in a Specification 7A Cylinder.								
Maximum Cylinder Diameter		**Cylinder Volume**		**Maximum Uranium 235 Enrich-ment (Weight %)**	**Maximum "Heel" Weight Per Cylinder**			
					UF_6		**Uranium 235**	
Inches	**Centimeters**	**Cubic Feet**	**L**		**kg**	**(lb)**	**kg**	**(lb)**
5	12.7	0.311	8.8	100.0	0.045	0.1	0.031	0.07
8	20.3	1.359	39	12.5	0.227	0.5	.019	0.04
12	30.5	2.410	68	5.0	0.454	1.0	.015	0.03
30	76	25.64	725	5.0	11.3	25.0	.383	0.84
48	122	108.9	3084	4.5	22.7	50	.690	1.52
		(10 ton)						
48	122	142.7	4041	4.5	22.7	50.0	.690	1.52
		(14 ton)						

A11.8.1.8. DOT 20PF-1, 20PF-2, 20PF-3 or 21PF-1A, 21PF-1B, or 21PF-2 phenolic-foam insulated overpacks with snug fitting inner metal cylinders meeting all of the applicable requirements of A3.1, A3.3.6.1, A3.3.6.2, A11.18 and the following:

- Handling procedures and packaging criteria must comply with US Department of Energy Report Number ORO-651 or ANSI N14.1.
- Quantities of uranium hexafluoride are authorized as shown in table A11.6, with each package assigned a minimum transport index as also shown.

A11.8.2. Package fissile radioactive materials with radioactive content over A_1 or A_2 in either:

A11.8.2.1. DOT 6L Metal Packaging.

- Authorized only for uranium^{235}, plutonium^{239}, or plutonium^{241}, as metal oxide, or compounds that do not decompose at temperatures up to 149 degrees C (300 degrees F).
- Radioactive decay heat output must not be more than 5 watts.
- Radioactive materials in normal form must be packaged in one or more tightly-sealed metal cans or polyethylene bottles within a DOT 2R containment vessel.
- Authorized contents are limited per table A11.4:

Table A11.4. Authorized Contents in Kilograms (Kg) and Conditions for Specification 6L Packages.

Uranium-235		Plutonium (Note 1)		Minimum Fissile Transport Index	Maximum Number of Packages Transported as a Fissile Material Control Shipment
H/X<=3 (Note 2)	3 H/X<=10	H/X<=10	10<=H/X<=20		
14	3.6 (Note 3)	....	....	1.3	80
....	....	2.5	2.4	1.8	50

NOTES:
1. Plutonium solutions are not authorized.
2. H/X is the ratio of hydrogen to fissile atoms in the inner containment with all sources of hydrogen in the containment considered.
3. Volume must not be over 3.6 liters.

A11.8.2.2. DOT 6M Metal Packaging. Authorized only for solid radioactive materials that do not decompose at temperatures up to 121 degrees C (250 degrees F). Radioactive decay heat output must not exceed 10 watts. Radioactive materials in other than special form must be packaged in one or more tightly-sealed metal cans or polyethylene bottles within a DOT specification 2R containment vessel.

- Limit packages of fissile material with a criticality TI equal to 0.0 to 1.6 kg of uranium^{235}; 0.9 kg of plutonium (except that due to the 10-watt thermal decay heat limitation, the limit for plutonium^{238} is 0.02 kg); and 0.5 kg of uranium^{233}. The maximum ratio of hydrogen to fissile material must not be greater than three, including all of the sources of hydrogen within the DOT 2R containment vessel.
- Use table A11.5 to determine maximum quantities of fissile material and other restrictions for materials with a criticality TI if greater than 0.0. The minimum transport index to be assigned per package and, for fissile material, controlled shipments, the allowable number of similar packages per transport vehicle is shown in table A11.5. Where a maximum ratio of hydrogen to fissile material is specified in table A11.5, only the hydrogen interspersed with the fissile material has to be considered. For a uranium^{233} shipment, the maximum inside diameter of the inner containment vessel must not be over 12.1 cm (4.75 inches). Where necessary, use a tight-fitting steel insert to reduce a larger diameter inner containment vessel specified in 49 CFR 178.354 to the 12 centimeters (4.75 inches) limit.

Table A11.5. Authorized Contents for Specification 6M Packages (note 1)

Uranium-233 (note 5)			Uranium-235 (note 4 and 7)			Plutonium (note 2, 3, and 4)			Minimum Transport Index	Maximum Number of Packages Transported as a Fissile Material Control Shipment
Metal or Alloy	Compounds		Metal or Alloy	Compounds		Metal or Alloy	Compounds			
H/X = 0 (note 8)	H/X = 0	H/X <=3	H/X = 0	H/X = 0	H/X <=3	H/X = 0	H/X = 0	H/X <=3		
0.5	0.5	0.5	1.6	1.6	1.6	0.9 (note 9)	0.9 (note 9)	0.9 (note 9)	0	NA
3.6	4.4	2.9	7.2	7.6	5.3	3.1	4.1	3.4	0.1	1,250
4.2 (note 6)	5.2	3.5	8.7	9.6	6.4	3.4	4.5	4.1	0.2	625
5.2 (note 6)	6.8	4.5	11.2	13.9	8.3	4.2	---	4.5	0.5	250
---	---	---	13.5	16.0	10.1	4.5	---	---	1.0	125
---	---	---	---	26.0	16.1	---	---	---	5.0	25
---	---	---	---	32.0	19.5	---	---	---	10.0	12

NOTES:
1. Quantity in kg.
2. Minimum percentage of plutonium-240 is 5 weight percent.
3. 4.5 kilogram limitation of plutonium due to 10 watt decay heat limitation.
4. For a mixture of uranium-235 and plutonium, an equal amount of uranium-235 may be substituted for any portion pf plutonium authorized.
5. Maximum inside diameter of Specification 2R containment vessel must not be greater than 12.1 cm (4.75 inch) see A11.8.2.
6. Granulated or powdered metal with any particle less than 8 mm (0.25 inch) in the smallest dimension is not authorized.
7. Except for material with a criticality TI of 0.0, the maximum permitted uranium-235 enrichment is 93.5 percent.
8. H/X is ratio of hydrogen to fissile atoms in the inner containment.
9. For Pu-238, the limit is 0.02 kg due to the 10 watt thermal decay heat limitation.

A11.8.2.3. Type B, Type B(U) or B(M) packaging that meets the standards for packaging of fissile materials in 10 CFR Part 71, and is approved by the US Nuclear Regulatory Commission per 49 CFR 173.471.
A11.8.2.4. Type B(U) or B(M) packaging that meets the applicable requirements for fissile radioactive materials in section V of the IAEA "*Regulations for the Safe Transport of Radioactive Materials, Safety Series No. 6*," and for which the foreign competent authority certificate has been revalidated by the DOT according to 49 CFR 173.473. Authorized only for export and import shipments.
A11.8.2.5. DOT 20PF-1, 20PF-2, 20PF-3, 21PF-1A, or 21PF-1B phenolic-foam insulated overpacks with snug fitting inner metal cylinders meeting all of the applicable requirements of A3.1, A3.3.6.1, and A3.3.6.2, and the following:

- Handling procedures and packaging criteria must comply with US Department of Energy Report Number ORO-651 or ANSI Standard N14.1.
- Quantities of uranium hexafluoride are authorized as shown in table A11.6, with each package assigned a minimum transport index as also shown.

Table A11.6. Authorized Quantities of Uranium Hexafluoride (UF_6) as Fissile Class II.

Protective Overpack Specification Number	Maximum Inner Cylinder Diameter		Maximum Weight of UF_6 Contents		Maximum U^{235} Enrichment (weight %)	Minimum Transport Index
	Centimeter	Inch	Kilograms	Pounds		
20PF-1	12.7	5	25	55	100.0	0.1
20PF-2	20.3	8	116	255	12.5	4.0
20PF-3	30.5	12	209	460	5.0	1.1
21PF-1A or 21PF-1B (Note 1)	76 (Note 2)	30 (Note 2)	2,250	4,950	5.0	5.0
21PF-1A or 21PF-1B (Note 1)	76 (Note 3)	30 (Note 3)	2,282	5,020	5.0	5.0
21PF-2 (Notes 1)	76 (Note 2)	30 (Note 2)	2,250	4,950	5.0	5.0
21PF-2 (Note 1)	76 (Note 3)	30 (Note 3)	2,282	5,020	5.0	5.0

NOTES:
1. For 76 cm cylinders, the maximum permitted H/U atomic ratio is 0.088.
2. Model 30A inner cylinder (reference: ORO-651).
3. Model 30B inner cylinder (reference: ORO-651).

★**A11.9. Authorized Packaging-Pyrophoric Radioactive Materials.** Package pyrophoric radioactive materials in quantities not over A_2 per package in DOT Type A packagings constructed of materials that do not react nor be decomposed by the contents. Contents must be:

- In solid form and must not be fissile unless excepted by A3.3.6.9.
- Contained in sealed and corrosion resistant receptacles with positive closures (friction or slip-fit covers or stoppers are not authorized).
- Free of water and any contaminants that increase the reactivity of the material.
- Made inert to prevent self-ignition during transport by either:
  - Mixing with large volumes of inerting materials such as graphite or dry sand, or other suitable inerting material, or blended into a matrix of hardened concrete.
  - Filling the innermost receptacle with an appropriate inert gas or liquid.

★**A11.10. Authorized Packaging-Oxidizing Radioactive Materials.** Package certain oxidizing radioactive materials, which are not fissile materials and not in quantities over A_2, in DOT Type A packaging. The requirements apply to the contents and packaging:

- Pack in suitable inside packagings of glass, metal, or compatible plastic.
- Suitably cushion with a material which will not react with the contents.

- Inner packaging and cushioning must be enclosed within an outside packaging of wood, metal, or plastic.
- The package must be capable of meeting the applicable test requirements of 49 CFR 173.465 without leakage of contents.
- The maximum quantity in any package must not be over 11.3 kg (25 pounds).

★**A11.11. Excepted Packages for Limited Quantities of Radioactive Materials.** Radioactive materials whose activity per package is not over the limits specified in A11.15 are excepted from the specification packaging, marking, labeling and, if not a hazardous substance or a hazardous waste, shipping paper certification requirements if:

- The materials are packaged in strong, tight packages that will not leak any of the radioactive materials under normal transportation conditions. Packaging must meet the requirements of A3.3.6.1.
- The radiation level at any point on the external surface of the package is not over 0.005 mSv/h (0.5 mrem/h).
- The nonfixed (removable) radioactive surface contamination on the external surface of the package is not over the limits specified in A3.3.6.11.
- Except as provided in A11.16, the package does not contain more than 15 grams of uranium^{235}.
- The material is otherwise prepared for shipment as specified in A11.12.

★**A11.12. Additional Requirements for Excepted Packages Containing Class 7 (Radioactive Materials).**

- Certify excepted radioactive materials prepared for shipment under A11.11, A11.14, or A11.16 as being acceptable for transportation by having a notice enclosed in or on the package, included with the packing list, or otherwise forwarded with the package. This notice must include the name of the consignor or consignee and one of the following statements as appropriate:
  - "This package conforms to the conditions and limitations specified in 49 CFR 173.421 for radioactive material, excepted package-limited quantity of material, UN2910";
  - "This package conforms to the conditions and limitations specified in 49 CFR 173.424 for radioactive material, excepted package-instruments or articles, UN 2910";
  - "This package conforms to the conditions and limitations specified in 49 CFR 173.426 for radioactive material, excepted package-articles manufactured from natural or depleted uranium, or natural thorium, UN2910";
  - "This package conforms to the conditions and limitations specified in 49 CFR 173.428 for radioactive material, excepted package-empty package, UN2910".
- A limited quantity of radioactive material classed as Class 7 and prepared for shipment under provisions of A11.11, A11.13, A11.14, or A11.16 are not subject to the requirements of this manual except for A3.3.6.4, and incident reporting.
- Annotate the DD Form 1387 shipping label "Nonhazardous."

A11.13. Multiple Hazard Limited Quantity of Radioactive Materials. Except as provided in A11.13.2, when a limited quantity radioactive material meets the definition of another hazard class, it must be:

- Classed for the additional hazard.
- Packaged to conform with requirements specified in A11.11. or A11.14 as appropriate.
- Offered for transportation per requirements applicable to the hazard for which it is classed.

A11.13.1. When a limited quantity radioactive material meets the definition of Class 9 material, or is a combustible liquid in a packaging having a rated capacity of 110 gallons (416 L) or less, it must be:

- Classed as a radioactive material if the material is not a hazardous waste or hazardous substance.
- Classed as a Class 9 material if the material is a hazardous waste or hazardous substance.
- Packaged to conform with requirements specified in A11.11. or A11.14 as appropriate.
- Offered for transportation according to requirements applicable to the hazard for which it is classed.

A11.13.2. When a limited quantity radioactive material which is classed other than a radioactive material under provisions A11.13 or A11.13.1, it is excepted from requirements of A11.12.1, and attachment 17, if the entry "Limited quantity radioactive material" appears on the shipping paper in association with the basic description.

★**A11.14. Excepted Packages for Instruments and Articles.** Instruments and manufactured articles (including clocks, electronic tubes, or apparatus) or similar devices having radioactive materials in gaseous or nondispersible solid form as a component part are excepted from the specification packaging, marking, labeling, and shipping paper certification requirements if:

- Each package meets the requirements of A3.3.6.1.

- The activity of the instrument or article is not over the applicable limit listed in table A11.7.
- The total activity per package is not over the applicable limit listed in table A11.7.
- The radiation level at 10 cm (4 inches) from any point on the external surface of any unpackaged instrument or article is not over 0.1 mSv/h (10 mrem/h).
- The radiation level at any point on the external surface of a package bearing the article or instrument is not over 0.005 mSv/h (0.5 mrem/h); or, for exclusive use domestic shipments, 0.02 mSv/h (2 mrem/h).
- The nonfixed (removable) radioactive surface contamination on the external surface of the package is not over the limits specified in A3.3.6.11.
- Except as provided in A11.16, the package does not contain more than 15 grams of uranium^{235}.
- The instrument or article is otherwise prepared for shipment as specified in A11.12.

★A11.15. Table of Activity Limits-Excepted Quantities and Articles. The limits that apply to instruments, articles, and limited quantities subject to exceptions under A11.12 and A11.14 are shown in table A11.7.

★Table A11.7. Activity Limits for Limited Quantities Instruments and Articles.

	Instruments and Articles (note 1)		
Nature of Contents	**Limits for each instrument and article**	**Package Limits**	**Materials Package Limits**
Solids			
Special Form	10^{-2} A_1	A_1	10^{-3} A_1
Normal Form	10^{-2} A_2	A_2	10^{-3} A_2
Liquids			
Tritiated Water:			
<0.0037 TBq/liter (0.1 Ci/L)			37 TBq (1000 Ci)
0.0037 TBq to 0.037 TBq/L (0.1 Ci to 1.0 Ci/L)			3.7 TBq (100 Ci)
>0.037 TBq/L (1.0 Ci/L)			0.037 TBq (1 Ci)
Other Liquids	10^{-3} A_2	10^{-1} A_2	10^{-4} A_2
Gases			
Tritium (Note 2)	2×10^{-2} A_2	2×10^{-1} A_2	2×10^{-2} A_2
Special Form	10^{-3} A_1	10^{-2} A_1	10^{-3} A_1
Other Forms	10^{-3} A_2	10^{-2} A_2	10^{-3} A_2

NOTES:
1. For mixture of radionuclides see 49 CFR 173.433(b).
2. These values also apply to tritium in activated luminous paint and trtium absorbed on solid carriers.

★A11.16. Excepted Articles Containing Natural Uranium or Thorium. Manufactured articles, in which the sole radioactive material content is natural or unirradiated depleted uranium or natural thorium, are excepted from the specification packaging, marking, labeling, and shipping paper certification requirements if:

- Each package meets the requirements of A3.3.6.1.
- The outer surface of the uranium or thorium is enclosed in an inactive sheath made of metal or other durable protective material.
- The conditions specified in A11.11 are met.
- The article is otherwise prepared for shipment as specified in A11.12.

★A11.17. Transport Requirements for Low Specific Activity (LSA) Radioactive Materials and Surface Contaminated Objects (SCO). In addition to other applicable requirements, prepare LSA materials and SCO as follows:

- The external dose rate must not exceed an external radiation level of 10 mSv/h (1rem/h) at 3 meters from the unshielded material.
- LSA material or SCO that are or contain fissile material must meet all applicable requirements for fissile material.

- The nonfixed (removable) radioactive surface contamination on the external surface of the package is not over the limits specified in A3.3.6.11.
- Ensure external radiation levels comply with A3.3.6.2.
- Do not exceed 100 A_2 for SCO or LSA-II and LSA III, combustible solids and all liquids and gases.

A11.17.1. Pack in a DOT 7A Type A packaging.
A11.17.2. Pack in any Type B, B(U), or B(M), packaging meeting the requirements of 49 CFR 173.416.
A11.17.3. Pack in nonbulk industrial packaging (IP) as authorized in 49 CFR 173.427.

★**A11.18. Uranium Hexaflouride (fissile, fissile excepted, and nonfissile).** Prepare this material for military air shipment according to 49 CFR 173.420.

CLASS 8--CORROSIVE MATERIALS

A12.1. General Requirements. This attachment contains information concerning the packaging and general handling instructions for Class 8 (corrosive materials).

★A12.2. General Handling Instructions for Corrosive Materials.

- Store corrosive materials in a cool, well ventilated area away from sources of heat and oxidizing agents.
- Both the vapor and the liquid are corrosive and irritating and cause burns to the body and damage to the aircraft.
- Properly placard the storage area.
- Ensure protective masks or respirators, rubber gloves, goggles, and other protective clothing as required are readily available.

A12.3. Packaging for Liquid Class 8 Materials. Package in (see A3.3.7):
A12.3.1. Steel drum (1A1 or 1A2), aluminum drum (1B1 or 1B2), or metal drum, other than steel or aluminum (1N1 or 1N2) with inside glass, earthenware, plastic, or metal receptacles.
A12.3.2. Plywood drum (1D), fiber drum (1G), or plastic drum (1H1 or 1H2), with inside glass, earthenware, plastic, or metal receptacles.
A12.3.3. Wooden barrel (2C2), with inside glass, earthenware, plastic, or metal receptacles. Not authorized for PG I material.
A12.3.4. Steel jerrican (3A1 or 3A2) or plastic jerrican (3H1 or 3H2), with inside glass, earthenware, plastic, or metal receptacles.
A12.3.5. Steel box (4A1 or 4A2) or aluminum box (4B1 or 4B2) with inside glass, earthenware, plastic, or metal receptacles.
A12.3.6. Natural wood box (4C1 or 4C2), plywood box (4D), or reconstituted wood box (4F), with inside glass, earthenware, plastic, or metal receptacles.
A12.3.7. Fiberboard box (4G) with inside glass, earthenware, plastic, or metal receptacles.
A12.3.8. Expanded plastic box (4H1) or solid plastic box (4H2) with inside glass, earthenware, plastic, or metal receptacles.
A12.3.9. Steel drum (1A1 or 1A2), aluminum drum (1B1 or 1B2), or metal drum, other than steel or aluminum (1N1 or 1N2).
A12.3.10. Plastic drum (1H1 or 1H2).
A12.3.11. Wooden barrel (2C1). Not authorized for PG I material.
A12.3.12. Steel jerrican (3A1 or 3A2) or plastic jerrican (3H1 or 3H2).
A12.3.13. Single, composite package comprised of a plastic receptacle in steel, aluminum, fiber, or plastic drum (6HA1, 6HB1, 6HG1, or 6HH).
A12.3.14. Single, composite package comprised of a plastic receptacle in steel, aluminum, wooden, plywood, or fiberboard box (6HA2, 6HB2, 6HC, 6HD2, or 6HG2).
A12.3.15. Single, composite package comprised of glass, porcelain, or stoneware in steel, aluminum, or fiber drum (6PA1, 6PB1, or 6PG1).
A12.3.16. Single, composite package comprised of glass, porcelain, or stoneware, in steel, aluminum, wooden, or fiberboard box (6PA2, 6PB2, 6PC, or 6PG2).
A12.3.17. Single, composite package comprised of glass, porcelain, or stoneware in solid or expanded plastic packaging (6PH1 or 6PH2).
A12.3.18. Single, composite package comprised of a plastic receptacle in a plywood drum (6HD1.) Not authorized for PG I material.
A12.3.19. DOT specification cylinders as prescribed for any compressed gas, except DOT 8 (acetylene) and DOT 3HT.
A12.3.20. DS2 may be packaged in:
A12.3.20.1. Wooden box (4C1) or fiberboard box (4G) with inside original 1.3 L (1 1/3 quart) capacity containers. Arrange in snugly fitting cells not more than 12 per box. Place full box size pads against all inside faces of the box. Maximum gross weight is 45.4 kg (100 pounds).
A12.3.20.2. Wooden box (4C1) or fiberboard box (4G) with an inside 19 L (5 gallon) metal drum. Overpack DS2 containers that are not in good condition in metal drums. Cushion the cans with a minimum of 76 mm (3 inches) of vermiculite on all sides.

★A12.4. Packaging for Solid Class 8 Materials. Package in:
A12.4.1. Steel drum (1A1 or 1A2), aluminum drum (1B1 or 1B2), or metal drum, other than steel or aluminum (1N1 or 1N2) with inside glass, earthenware, plastic, or metal receptacles.
A12.4.2. Plywood drum (1D), fiber drum (1G), or plastic drum (1H1 or 1H2), with inside glass, earthenware, plastic, or metal receptacles.
A12.4.3. Wooden barrel (2C2), with inside glass, earthenware, plastic, or metal receptacles.
A12.4.4. Steel jerrican (3A1 or 3A2) or plastic jerrican (3H1 or 3H2), with inside glass, earthenware, plastic, or metal receptacles.
A12.4.5. Steel box (4A1 or 4A2) or aluminum box (4B1 or 4B2) with inside glass, earthenware, plastic, or metal receptacles.
A12.4.6. Natural wood box (4C1 or 4C2), plywood box (4D), or reconstituted wood box (4F), with inside glass, earthenware, plastic, or metal receptacles.
A12.4.7. Fiberboard box (4G) with inside glass, earthenware, plastic, or metal receptacles.
A12.4.8. Solid plastic box (4H2) with inside glass, earthenware, plastic, or metal receptacles.
A12.4.9. Steel drum (1A1 or 1A2), aluminum drum (1B1 or 1B2), or metal drum, other than steel or aluminum (1N1 or 1N2).
A12.4.10. Plywood drum (1D). Not authorized for PG I material.
A12.4.11. Plastic drum (1H1 or 1H2).
A12.4.12. Fiber drum (1G).
A12.4.13. Wooden barrel (2C1 or 2C2). Not authorized for PG I material.
A12.4.14. Steel jerrican (3A1 or 3A2) or plastic jerrican (3H1 or 3H2).
A12.4.15. Steel box with liner (4A2), or aluminum box with liner (4B2).
A12.4.16. Steel box (4A1), or aluminum box (4B1). Not authorized for PG I material.
A12.4.17. Natural wood box sift-proof (4C2).
A12.4.18. Plywood box (4D) or reconstituted wood box (4F). Natural wood box (4C1). Not authorized for PG I material.
A12.4.19. Fiberboard box (4G). Not authorized for PG I material.
A12.4.20. Expanded plastic box (4H1) or solid plastic box (4H2). Not authorized for PG I material.
A12.4.21. Bag, woven plastic (5H1, 5H2, or 5H3); bag, plastic film (5H4); bag, textile (5L1, 5L2, or 5L3); bag, paper, multiwall, water-resistant (5M2).
A12.4.22. Single, composite package comprised of a plastic receptacle in steel, aluminum, plywood, fiber, or plastic drum (6HA1, 6HB1, 6HD1, 6HG1, or 6HH).
A12.4.23. Single, composite package comprised of a plastic receptacle in steel, aluminum, wood, plywood, or fiberboard box (6HA2, 6HB2, 6HC, 6HD2, or 6HG2).
A12.4.24. Single, composite package comprised of glass, porcelain, or stoneware in steel, aluminum, plywood, or fiber drum (6PA1, 6PB1, 6PD1, or 6PG1).
A12.4.25. Single, composite package comprised of glass, porcelain, or stoneware, in steel, aluminum, wooden, or fiberboard box (6PA2, 6PB2, 6PC, or 6PG2).
A12.4.26. Single, composite package comprised of glass, porcelain, or stoneware in expanded or solid plastic packaging (6PH1 or 6PH2).

★A12.5. Batteries, Wet, Filled with Acid; Batteries, Wet, Filled with Alkali; or Batteries, Wet, Nonspillable.
Completely protect against short circuit and securely cushion electric storage batteries containing electrolyte acid or alkali corrosive battery fluid within the outer container. Place batteries inside an acid-proof liner, adequately sealed to prevent leakage in the event of a spill, within the outer container. Pack batteries so that the fill openings or vents, if any, are upward. Do not pack with other articles unless authorized by a specific packaging paragraph. However, batteries may be packed with portable searchlights, battery parts, or hydrometers, if properly cushioned and securely packed in a separate container.
A12.5.1. Packagings identified in this paragraph must meet PG II performance standards. The following specification packagings are authorized for batteries packed without other materials:
A12.5.1.1. Ordinary wood (4C1), sift-proof wood (4C2), plywood (4D), or reconstituted wood (4F) box.
A12.5.1.2. Fiberboard box (4G).
A12.5.1.3. Plywood (1D) or fiber (1G) drum.
A12.5.1.4. Plastic drum (1H2), plastic jerrican (3H2), or solid plastic box (4H2).
A12.5.2. Pack non-spillable batteries in strong outer packagings. To consider a battery non-spillable, it must withstand without leakage the vibration and pressure differential tests specified in 49 CFR 173.159(d). Batteries meeting the additional requirement of Special Provision A67 are considered dry, and are not subject to any other requirements of this manual.

A12.5.3. Package electrolyte, acid, or alkali corrosive battery fluid, packed with storage batteries wet or dry, in one of the following packagings:
A12.5.3.1. Ordinary wood (4C1), sift-proof wood (4C2), plywood (4D) box or reconstituted wood (4F) box, with inside glass receptacles not over 4.0 L (1 gallon) capacity each. Maximum quantity per outside container is 8.0 L (2 gallons.) Cushion and separate the inside containers from batteries by a strong solid wooden partition.
A12.5.3.2. Wooden box (4C1 or 4C2), plywood box (4D), or reconstituted wood (4F) box, with inside plastic bottles not over 1 L (1 quart) capacity each. Pack no more than 24 bottles, securely separated from storage batteries and filling kits in each package.
A12.5.3.3. Package dry storage batteries or battery charger devices in fiberboard boxes (4G) with inner receptacles containing battery fluid. Complete package must conform to PG II requirements. Pack no more than 12 inner receptacles in one outer box. Maximum authorized gross weight is 34 kg (75 pounds).
A12.5.4. The following nonspecification packagings are **authorized for domestic only** shipments of batteries packed without other materials:
A12.5.4.1. One to three batteries of not over 11.3 kg (25 pounds) each, packed in an outside box. Gross weight must not exceed 34 kg (75 pounds).
A12.5.4.2. A maximum of four batteries not over 7 kg (15 pounds) each may be packed in strong outside fiberboard or wooden boxes. They must be cushioned and packed to prevent short circuits. Gross weight must not be over 30 kg (65 pounds).
A12.5.4.3. A maximum of five batteries not over 4.5 kg (10 pounds) each may be packed in an outside fiberboard or wooden box. They must be securely cushioned and packed to prevent short circuits. Gross weight must not exceed 30 kg (65 pounds).
A12.5.4.4. Single batteries not over 34 kg (75 pounds) each, packed in five-sided slipcovers or in completely closed fiberboard boxes. Slipcovers and boxes must be of single or double-faced corrugated fiberboard of at least 91 kg (200 pounds) test strength. The slipcover on the fiberboard box must fit snugly and provide an inside top clearance of at least 1.3 cm (one-half inch) above battery terminals and filler caps with reinforcements in place. When assembled for shipment, the bottom edges of the slipcover may extend to the base of the battery and must not expose more than 25.4 mm (1 inch). The completed package (battery and box or slipcover) must be capable of withstanding a top-to-bottom compression test without damage to the battery terminals, cell covers, or filler caps.
A12.5.4.5. Single batteries exceeding 34 kg (75 lbs) each may be packed in completely closed fiberboard boxes. Boxes must be double-wall corrugated fiberboard of at least 181 kg (400 lbs) test, or solid fiberboard testing at least 181 kg (400 lbs). A box may have holes in its ends provided that the handholes will not materially weaken the box. Sides and ends of the box must not be less than 1.3 cm (0.5 inch); and cushioning must be excelsior pads, corrugated fiberboard, or other suitable cushioning material. Protect the bottom of the battery by a minimum of one excelsior or double-wall corrugated fiberboard pad. Protect the top of the battery by a wood frame, corrugated trays or scored sheets of corrugated fiberboard having minimum test of 91 kg (200 lbs), or other equally effective cushioning material. Ensure the top protection bears evenly on connectors and/or edges of the battery cover to facilitate stacking of batteries. No more than one battery may be placed in one box. The maximum authorized gross weight is 91 kg (200 lbs).

A12.6. Bombs, Smoke, Nonexplosive. Ship bombs, smoke, nonexplosive provided they are without ignition elements, bursting charges, detonating fuses, or other explosive components. The following outer packagings are authorized:
A12.6.1. Ordinary wood (4C1), sift-proof wood (4C2), plywood (4D), or reconstituted wood (4F) box.
A12.6.2. Plywood drum (1D).

★**A12.7. Chemical or First Aid Kits.** This description is intended for boxes, cases, ect., containing small amounts of various hazardous materials used for medical, analytical, or testing purposes. Use A12.7.1 or 12.7.2 for domestic only shipments, and 12.7.3 for all other shipments.
A12.7.1. Chemical kits shipped domestically as NA 1760 are excepted from specification packaging if the following requirements are met:

- The kit may contain only corrosive liquids.
- Liquid is contained in inner receptacles of not over 177 ml (6 fluid ounces) capacity each.
- Cushion the inside containers with sufficient absorbent cushioning material to completely absorb the contents of the individual containers, and protect from damage by other materials in the kit.
- The contents of the kit must be of such a nature and packed so there will be no possibility of the mixture of contents causing dangerous evolution of heat or gas.
- The kit must be a strong wooden or metal container or be packed in a strong wooden or metal container.

A12.7.2. Package chemical kits shipped domestically as NA 1760 and containing corrosive liquids in a fiberboard box (4G) with inner glass receptacles not over 1 L (1 quart) capacity each, securely cushioned and separated from other inside containers. The contents of the kit must be of such a nature and so packed that there will be no possibility of the mixture of contents causing dangerous evolution of heat or gas.
A12.7.3. Pack, mark, and label chemical and first aid kits as prescribed by this manual for the specific hazardous materials contained in the kit. Package as follows:

- In inner receptacles of no more than 250 mL (8.5 fluid ounces) for liquids or 250 g (9 ounces) for solids.
- The total quantity of hazardous material in any one kit must not exceed 1 L (1 quart) for liquids or 1 kg (2.2 pounds) for solids.
- The contents of the kit must be of such a nature and so packed that there will be no possibility of the mixture of contents causing dangerous evolution of heat or gas.
- The PG assigned to the kit as a whole must be the most stringent PG assigned to any individual substance in the kit.
- Pack inner receptacles in one of the following outer packagings:
  - Ordinary wood (4C1), sift-proof wood (4C2), plywood (4D), or reconstituted wood (4F) box.
  - Expanded plastic (4H1) or solid plastic (4H2) box.
  - Fiberboard (4G) box.

A12.8. Gallium. Package gallium metal in semi-rigid plastic inside packaging of not more than a 2.5 kg (5.5 pound) net capacity each, then individually enclosed in a sealed bag of strong, leak-tight, and puncture-resistant material impervious to liquid gallium. Place the sealed bag in a wooden box (4C1 or 4C2), plywood box (4D), reconstituted wood box (4F), fiberboard box (4G), plastic box (4H1 or 4H2), fiber drum (1G), or steel drum (1A2) lined with a strong, leak-tight, and puncture resistant material impervious to liquid gallium. Enclose this packaging in a strong, water-resistant outer packaging that contains dry ice or other means of refrigeration. The refrigeration must be sufficient to maintain the gallium in a completely solid state during the entire anticipated time it will be in transportation to its destination. If a refrigerant is used, all packaging materials must be chemically and physically resistant to the refrigerant and must have impact resistance at the low temperatures of the refrigerant used. If dry ice is used, the outer package must permit the release of carbon dioxide gas.

A12.9. Hydrogen Fluoride, Anhydrous. Package hydrogen fluoride (hydrofluoric acid, anhydrous) in cylinders, DOT 3, 3A, 3AA, 3B, 3C, 3E, 4, 4A, 25, or 38; also DOT 4B, 4BA, 4BW, or 4C, if not brazed. Filling density must not exceed 85 percent of the water weight capacity of the cylinder. Cylinders used exclusively in this manner, may, instead of the periodic hydrostatic retest required by 49 CFR 173.34(e), be given a complete external visual inspection and so documented according to 49 CFR 173.163.

A12.10. Mercury (Metallic and Contained in Articles).
A12.10.1. **Handling Instructions.** Mercury, metallic is a silver, white, odorless, liquid metal. Mercury is poisonous in liquid and vapor form and can be absorbed through the skin at room temperature. It is corrosive to aluminum and its alloys. It expands on freezing, and may crack glass containers.
A12.10.2. **Packaging Requirements.** Packaging must meet the PG I performance level. Pack inner containers with sufficient cushioning material to prevent breakage. Either the inner packaging or the outer packaging must have an inner liner or bags of strong leak-proof and puncture-resistant material, impervious to mercury, completely surrounding the contents and sealed which will prevent the escape of mercury from the package irrespective of its position. Package mercury:
A12.10.2.1. In combination packagings, with inside glass, earthenware, or suitable plastic receptacles of not more than 250 mL (8 ounce) capacity each. The following outer packagings are authorized:
A12.10.2.1.1. Steel drum (1A2) or steel jerrican (3A2).
A12.10.2.1.2. Plywood (4D) or fiber (1G) drum.
A12.10.2.1.3. Ordinary wood (4C1), sift-proof wood (4C2), plywood (4D), or reconstituted wood (4F) box.
A12.10.2.1.4. Fiberboard box (4G).
A12.10.2.2. In iron or steel "quicksilver flasks," packaged in the following outer packagings:
A12.10.2.2.1. Steel drum (1A2) or steel jerrican (3A2).
A12.10.2.2.2. Plywood (4D) or fiber (1G) drum.
A12.10.2.2.3. Ordinary wood (4C1), sift-proof wood (4C2), plywood (4D), or reconstituted wood (4F) box.
A12.10.2.2.4. Fiberboard box (4G).
A12.10.2.3. Use welded steel bottles with inner vaulted bottoms as single packagings. The closure must be a bolt with a conical thread and the opening must not exceed 20 mm (0.79 inches). The maximum authorized net quantity is 35 kg (77 pounds).

A12.10.2.4. Specification packagings are not required for manufactured articles or apparatuses containing mercury when packaged as follows:
A12.10.2.4.1. Manufactured articles or apparatus of which metallic mercury is a component part (manometers, pumps, thermometers, switches, etc.), except as otherwise covered in A12.10. These items must be packaged in a strong outer packaging. The inner liner and cushioning requirements of A12.10.2 apply.
A12.10.2.4.2. Mercury switches and relays are excepted from this manual if they are of the totally enclosed leak-proof type in sealed metal or plastic units. Thermometers, switches, and relays each containing a total quantity of not more than 15 g (0.53 ounces) of mercury, are also excepted if installed as an integral part of a machine or apparatus and so fitted that damage or leakage of mercury is unlikely to occur under conditions normally incident to transport.
A12.10.2.5. Package electrons tubes, mercury vapor tubes, and similar tubes as follows:
A12.10.2.5.1. In strong outer packagings with all seams and joints sealed with self adhesive, pressure-sensitive tape that will prevent the escape of mercury from the package. The maximum net quantity is 450 g (15.9 ounces) of mercury per package.
A12.10.2.5.2. Package tubes with more than 450 g (15.9 ounces) of mercury in strong outer packagings having sealed inner liners or bags of strong leak-proof and puncture-resistant material impervious to mercury, completely surrounding the contents which will prevent the escape of mercury from the package irrespective of its position.
A12.10.2.5.3. Tubes which do not contain more than 5 g (0.2 ounces) of mercury each and that are packed in the manufacturer's original packaging. Maximum total net quantity is 30 g (1.1 ounces) of mercury per package.
A12.10.2.5.4. Tubes which are completely jacketed in sealed leak-proof metal cases and are packed in the manufacturer's original packaging.
A12.10.2.6. Mercurial barometers complying with A12.10.2.4.1, that are loaded and unloaded from an aircraft under the supervision of, and are accompanied in flight by a US weather official or a similar US agency official (for example, Air Weather Service personnel), are excepted from any other requirements of this manual.

A12.11. Nitrating Acid Mixtures; Nitrating Acid Mixtures, Spent; or Nitric Acid. Do not package nitric acid exceeding 40 percent concentration with any other material. Package nitric acid as follows:
A12.11.1. Pack nitric acid in any concentration, which does not contain sulfuric acid or hydrochloric acid as impurities, in:
A12.11.1.1. Stainless steel drum (1A1). Do not ship containers weighing less than 85 percent of their original marked weight. Stainless steel used in drums must be at least 0.9 mm (.035 inches) for 55 L (15 gallon) nominal capacity, 1.2 mm (.047 inches) for 115 L (30 gallon) nominal capacity, and 1.5 mm (.059 inches) for 210 L (55 gallon) nominal capacity. Type 304 or other grades of equivalent corrosion-resistant steel in as-welded condition are authorized for nitric acid concentrations of up to and including 78 percent. In addition to the POP markings, the marking as specified in 49 CFR 173.158(b)(1) must be included on the drum. An example of this marking is: 304HT/1.9/2.7/TW55. For all other concentrations of nitric acid the following are authorized:

- Type 304 heat-treated (quenched in water at 1040 degrees C [1900 degrees F]).
- Stabilized type 347 in the as-welded condition.
- Stabilized type 347 stress-relieved (845-900 degrees C [1550-1650 degrees F]).
- Stabilized type 347 heat-treated (quenched in water at 1040 degrees C [1900 degrees F]).
- Other grades of equivalent corrosion resistance.

A12.11.1.2. Expanded plastic box (4H1), with inner glass receptacles not over 2.5 L (0.66 gallons) capacity each. Pack no more than four glass inner receptacles in one outer packaging.
A12.11.2. Pack nitric acid of 90 percent or greater concentration in a wooden box (4C1, 4C2, 4D, or 4F), with inner glass bottles not over 2.5 L (0.66 gallons) capacity each. The inside containers must be individually overpacked and cushioned in tightly closed metal containers, then packed in the outer container.
A12.11.3. Pack nitric acid, of 80 percent or greater concentration that does not contain sulfuric acid or hydrochloric acid as impurities, in an aluminum drum (1B1). Maximum quantity is 38 L (10 gallons).
A12.11.4. Package nitric acid of more than 70 percent concentration in:
A12.11.4.1. Steel drum (1A2) or aluminum drum (1B2) with inside glass or earthenware containers not over 1 L (1 quart) capacity each or glass ampules not over 0.5 L (1 pint) capacity each.
A12.11.4.2. Plywood drum (1D) or fiber drum (1G) with inside glass or earthenware containers not over 1 L (1 quart) capacity each or glass ampules not over 0.5 L (1 pint) capacity each.
A12.11.4.3. Plastic drum (1H2) or plastic jerrican (3H2) with inside glass or earthenware containers not over 1 L (1 quart) capacity each or glass ampules not over 0.5 L (1 pint) capacity each.
A12.11.4.4. Wooden box (4C1 or 4C2), plywood box (4D), or reconstituted wood box (4F) with inside glass or earthenware containers not over 1 L (1 quart) capacity each or glass ampules not over 0.5 L (1 pint) capacity each.

A12.11.4.5. Fiberboard box (4G) with inside glass or earthenware containers not over 1 L (1 quart) capacity each or glass ampules not over 0.5 L (1 pint) capacity each.
A12.11.5. Package nitric acid of less than 90 percent concentration in a wooden box (4C1 or 4C2), plywood box (4D), or reconstituted wood box (4F) with inside glass bottles not over 2.5 L (0.66 gallons) capacity each.
A12.11.6. Pack nitric acid of 70 percent or less concentration in:
A12.11.6.1. Steel drum (1A2) or aluminum drum (1B2) with inside glass, earthenware, or plastic containers not over 2.5 L (0.66 gallons) capacity each or glass ampules not over 0.5 L (1 pint) capacity each.
A12.11.6.2. Plywood drum (1D) or fiber drum (1G) with inside glass, earthenware, or plastic containers not over 2.5 L (0.66 gallons) capacity each or glass ampules not over 0.5 L (1 pint) capacity each.
A12.11.6.3. Plastic drum (1H2) or plastic jerrican (3H2) with inside glass, earthenware, or plastic containers not over 2.5 L (0.66 gallons) capacity each or glass ampules not over 0.5 L (1 pint) capacity each.
A12.11.6.4. Wooden box (4C1 or 4C2), plywood box (4D), or reconstituted wood box (4F) with inside glass, earthenware, or plastic containers not over 2.5 L (0.66 gallons) capacity each or glass ampules not over 0.5 L (1 pint) capacity each.
A12.11.6.5. Fiberboard box (4G) with inside glass, earthenware, or plastic containers not over 2.5 L (0.66 gallons) capacity each or glass ampules not over 0.5 L (1 pint) capacity each.
A12.11.6.6. Expanded plastic box (4H1) with inside glass bottles of not over 2.5 L (0.66 gallons.)
A12.11.6.7. Single, composite package comprised of glass, porcelain, or stoneware in steel, aluminum, or plywood drum (6PA1, 6PB1, or 6PD1).
A12.11.6.8. Single, composite package comprised of glass, porcelain, or stoneware, in steel, aluminum, or wooden box (6PA2, 6PB2, or 6PC).
A12.11.6.9. Single, composite package comprised of glass, porcelain, or stoneware in expanded or solid plastic packaging (6PH1 or 6PH2).

★**A12.12. Packaging for Class 8 Materials With an Inhalation Hazard (Hazard Zone A and B).** Package Class 8 materials with an Inhalation Hazard (Hazard Zone A and B) as follows:
A12.12.1. In DOT cylinders as identified in 49 CFR, part 178, subpart C, except that specification 8, 8AL, and 39 cylinders are not authorized. Cylinders must also meet the requirements of A3.3.2.
A12.12.2. Packed in an inner drum (1A1, 1B1, 1N1, 1H1, or 6HA1), then placed in an outer drum (1A2 or 1H2). Both the inner and outer drum must be tested to the PG I performance level. The outer 1A2 drum must have a minimum thickness of 1.35 mm (0.053 inches). The outer 1H2 drum must have a minimum thickness of 6.30 mm (0.248 inches). The capacity of the inner drum must not exceed 220 L (58 gallons). The inner drum must also meet the following requirements:

- Satisfactorily withstand a hydrostatic pressure test (as outlined in 49 CFR, paragraph 178.605) of 550 kPa (80 psig).
- Satisfactorily withstand a leakproofness test (as outlined in 49 CFR, paragraph 178.604) using an internal air pressure at 55 degrees C (131 degrees F) of at least twice the vapor pressure of the material to be packaged.
- Have screw-type closures that meet all the following requirements:
  - Closed tightly to a torque as prescribed by the closure manufacturer, using a device that is capable of measuring torque.
  - Physically held in place by any means capable of preventing backoff or loosening of the closure by impact or vibration during transportation.
  - Provided with a cap seal that is properly applied according to the cap seal manufacturer's recommendations. The cap seal must be capable of withstanding an internal pressure of at least 100 kPa (15 psig).
- Meet the following minimum thickness requirements:
  - 1A1 and 1N1 drums with a capacity of less than or equal to 120 L (32 gallons) must have a minimum thickness of 1.3 mm (0.051 inches). 1B1 drums with a capacity of less than or equal to 120 L (32 gallons) must have a minimum thickness of 3.9 mm (0.154 inches).
  - 1A1 and 1N1 drums with a capacity greater than 120 L (32 gallons) must have a minimum thickness of 1.7 mm (0.067 inches). 1B1 drums with a capacity greater than 120 L (32 gallons) must have a minimum thickness of 4.7 mm (0.185 inches).

A12.12.2.1. Cushion the inner drum within the outer drum with a shock-mitigating, nonreactive material. There must be a minimum of 5.0 cm (2 inches) of cushioning material between the outer surface (side) of the inner drum and the inner surface (side) of the outer drum, and at least 7.6 cm (3 inches) of cushioning material between the outer surface (top and bottom) of the inner drum and the inner surface (top and bottom) of the outer drum.
A12.12.3. Pack in an inner packaging system that consists of an impact-resistant receptacle of glass, earthenware, plastic, or metal securely cushioned with a nonreactive absorbent material. The package must be packed within a leak-tight packaging of metal or plastic, then packed in a steel drum (1A2), aluminum drum (1B2), metal drum other than steel or aluminum (1N2),

plywood drum (1D), fiber drum (1G), plastic drum (1H2), wooden barrel (2C2), steel jerrican (3A2), plastic jerrican (3H2), steel box (4A1 or 4A2), aluminum box (4B1 or 4B2), natural wood box (4C1 or 4C2), plywood box (4D), reconstituted wood box (4F), fiberboard box (4G), expanded plastic box (4H1), or solid plastic box (4H2). The capacity of the inner receptacle must not exceed 4 L (1 gallon). An inner receptacle that has a closure must have a screw-type closure, which is held in place by any means capable of preventing backoff or loosening of the closure by impact or vibration during transportation. Both the inner packaging system and the outer container must each meet the test requirements of the PG I performance level independently. The total amount of liquid that can be packed in the outer container must not exceed 16 L (4 gallons).

A12.12.4. Pack in a metal drum (1A1, 1B1, or 1N1), or plastic drum (1H1), then placed in a metal drum (1A2 or 1H2), or a plastic receptacle with outer steel drum (6HA1). Both the inner and outer drum must be tested to the PG I performance level. The outer 1A2 drum must have a minimum thickness of 1.35 mm (0.053 inches.) The outer 1H2 drum must have a minimum thickness of 6.30 mm (0.248 inches). The capacity of the inner drum (1A1, 1B1, 1N1, or 1H1) must not exceed 220 L (58 gallons). This packaging is only authorized for Class 8, Hazard Zone B material. The inner drum must also meet the following requirements:

- Satisfactorily withstand a leakproofness test (as outlined in 49 CFR, paragraph 178.604) using an internal air pressure at 55 degrees C (131 degrees F) of at least twice the vapor pressure of the material to be packaged.
- Have screw-type closures that meet all the following requirements:
  - Closed and tightened to a torque as prescribed by the closure manufacturer, using a device that is capable of measuring torque.
  - Physically held in place by any means capable of preventing backoff or loosening of the closure by impact or vibration during transportation.
  - Provided with a cap seal that is properly applied according to the cap seal manufacturer’s recommendations. The cap seal must be capable of withstanding an internal pressure of at least 100 kPa (15 psig).
- Meet the following minimum thickness requirements:
  - 1A1 drums with a capacity of less than or equal to 30 L (7.9 gallons) must have a minimum thickness of 0.69 mm (0.027 inches). 1B1 drums with a capacity of less than or equal to 30 L (7.9 gallons) must have a minimum thickness of 2.79 mm (0.110 inches). 1H1 drums with a capacity of less than or equal to 30 L (7.9 gallons) must have a minimum thickness of 1.14 mm (0.045 inches). 6HA1 drums with a capacity of less than or equal to 30 L (7.9 gallons) must have a minimum thickness of 1.58 mm (0.0625 inches) for the inner plastic drum and a minimum thickness of 0.96 mm (0.038 inches) for the outer steel drum.
  - 1A1 drums with a capacity greater than 30 L (7.9 gallons) but less than or equal to 120 L (32 gallons) must have a minimum thickness of 1.08 mm (0.043 inches). 1B1 drums with a capacity greater than 30 L (7.9 gallons) but less than or equal to 120 L (32 gallons) must have a minimum thickness of 3.9 mm (0.154 inches). 1H1 drums with a capacity greater than 30 L (7.9 gallons) but less than or equal to 120 L (32 gallons) must have a minimum thickness of 3.16 mm (0.125 inches). 6HA1 drums with a capacity greater than 30 L (7.9 gallons) but less than or equal to 120 L (32 gallons) must have a minimum thickness of 1.58 mm (0.0625 inches) for the inner plastic drum and a minimum thickness of 0.96 mm (0.038 inches) for the outer steel drum.
  - 1A1 or 1N1 drums with a capacity greater than 120 L (32 gallons) must have a minimum thickness of 1.35 mm (0.053 inches). 1B1 drums with a capacity greater than 120 L (32 gallons) must have a minimum thickness of 4.7 mm (0.185 inches). 1H1 drums with a capacity greater than 120 L (32 gallons) must have a minimum thickness of 3.16 mm (0.124 inches). 6HA1 drums with a capacity greater than 120 L (32 gallons) must have a minimum thickness of 1.58 mm (0.0625 inches) for the inner plastic drum and a minimum thickness of 1.08 mm (0.43 inches) for the outer steel drum.

A12.12.4.1. Cushion the inner drum within the outer drum with a shock-mitigating, nonreactive material. There must be a minimum of 5.0 cm (2 inches) of cushioning material between the outer surface (side) of the inner drum and the inner surface (side) of the outer drum, and at least 7.6 cm (3 inches) of cushioning material between the outer surface (top and bottom) of the inner drum and the inner surface (top and bottom) of the outer drum.

★CLASS 9--MISCELLANEOUS HAZARDOUS MATERIAL

A13.1. General Requirements. This attachment contains information concerning the packaging and general handling instructions for Class 9 (Miscellaneous Hazardous Materials).

A13.2. Handling Instructions. Class 9 material is generally considered less hazardous than other hazard classes due to the final form of the packaged material or item for transportation. However, Class 9 materials present a unique and equally hazardous situation during air transport. Personnel must exercise care when handling this material and ensure specific handling instructions located in the packaging paragraphs are observed.

A13.3. Ammonium Nitrate Fertilizers; Benzaldehyde; Dibromodiflouromethane (Diflourodibromomethane); Environmentally Hazardous Substances, NOS; Hazardous Waste, NOS; Other Regulated Substances; Polycholorinated Biphenyls (PCB).

A13.3.1. **Handling Instructions.**

- Do not expose Dibromodiflouromethane to high temperature because, when it decomposes, toxic fumes are emitted. Store in a cool, ventilated area away from flame.
- Contains Otto Fuel II as a liquid propellant. In the event of a leak, avoid direct skin contact, ingestion, or inhalation of vapors. Vapors are toxic and may cause severe headache and nausea.

A13.3.2. **Packaging (Liquid).**

A13.3.2.1. Steel drum (1A1 or 1A2), aluminum drum (1B1 or 1B2), or metal drum, other than steel or aluminum (1N1 or 1N2) with inside glass, earthenware, plastic, or metal receptacles or pack in:

A13.3.2.2. Plywood drum (1D), fiber drum (1G), or plastic drum (1H1 or 1H2), with inside glass, earthenware, plastic, or metal receptacles.

A13.3.2.3. Wooden barrel (2C2), with inside glass, earthenware, plastic, or metal receptacles.

A13.3.2.4. Steel jerrican (3A1 or 3A2) or plastic jerrican (3H1 or 3H2), with inside glass, earthenware, plastic, or metal receptacles.

A13.3.2.5. Steel box (4A1 or 4A2) or aluminum box (4B1 or 4B2) with inside glass, earthenware, plastic, or metal receptacles.

A13.3.2.6. Natural wood box (4C1 or 4C2), plywood box (4D), or reconstituted wood box (4F), with inside glass, earthenware, plastic, or metal receptacles.

A13.3.2.7. Fiberboard box (4G) with inside glass, earthenware, plastic, or metal receptacles.

A13.3.2.8. Expanded plastic box (4H1) or solid plastic box (4H2) with inside glass, earthenware, plastic, or metal receptacles.

A13.3.2.9. Steel drum (1A1 or 1A2), aluminum drum (1B1 or 1B2), or metal drum, other than steel or aluminum (1N1 or 1N2).

A13.3.2.10. Plastic drum (1H1 or 1H2).

A13.3.2.11. Wooden barrel (2C1).

A13.3.2.12. Steel jerrican (3A1 or 3A2) or plastic jerrican (3H1 or 3H2).

A13.3.2.13. Single, composite package comprised of a plastic receptacle in steel, aluminum, fiber, or plastic drum (6HA1, 6HB1, 6HG1, or 6HH).

A13.3.2.14. Single, composite package comprised of a plastic receptacle in steel, aluminum, wooden, plywood, or fiberboard box (6HA2, 6HB2, 6HC, 6HD2, or 6HG2).

A13.3.2.15. Single, composite package comprised of glass, porcelain, or stoneware in steel, aluminum, or fiber drum (6PA1, 6PB1, or 6PG1).

A13.3.2.16. Single, composite package comprised of glass, porcelain, or stoneware, in steel, aluminum, wooden, or fiberboard box (6PA2, 6PB2, 6PC, or 6PG2).

A13.3.2.17. Single, composite package comprised of glass, porcelain, or stoneware in solid or expanded plastic packaging (6PH1 or 6PH2).

A13.3.2.18. Single, composite package comprised of a plastic receptacle in a plywood drum (6HD1).

A13.3.2.19. DOT specification cylinders as prescribed for any compressed gas, except DOT 8 (acetylene) and DOT 3HT.

A13.3.2.20. Fired exercise torpedoes or rockets, with no explosive components, containing Otto fuel II. Package in original or similar container authorized in attachment 5.

A13.3.3. **Packaging (Solid).**

A13.3.3.1. Steel drum (1A1 or 1A2), aluminum drum (1B1 or 1B2), or metal drum, other than steel or aluminum (1N1 or 1N2) with inside glass, earthenware, plastic, or metal receptacles pack in:

A13.3.3.2. Plywood drum (1D), fiber drum (1G), or plastic drum (1H1 or 1H2), with inside glass, earthenware, plastic, or metal receptacles.
A13.3.3.3. Wooden barrel (2C2), with inside glass, earthenware, plastic, or metal receptacles.
A13.3.3.4. Steel jerrican (3A1 or 3A2) or plastic jerrican (3H1 or 3H2), with inside glass, earthenware, plastic, or metal receptacles.
A13.3.3.5. Steel box (4A1 or 4A2) or aluminum box (4B1 or 4B2) with inside glass, earthenware, plastic, or metal receptacles.
A13.3.3.6. Natural wood box (4C1 or 4C2), plywood box (4D), or reconstituted wood box (4F), with inside glass, earthenware, plastic, or metal receptacles.
A13.3.3.7. Fiberboard box (4G) with inside glass, earthenware, plastic, or metal receptacles.
A13.3.3.8. Solid plastic box (4H2) with inside glass, earthenware, plastic, or metal receptacles.
A13.3.3.9. Steel drum (1A1 or 1A2), aluminum drum (1B1 or 1B2), or metal drum, other than steel or aluminum (1N1 or 1N2).
A13.3.3.10. Plywood drum (1D).
A13.3.3.11. Plastic drum (1H1 or 1H2).
A13.3.3.12. Fiber drum (1G).
A13.3.3.13. Wooden barrel (2C1 or 2C2).
A13.3.3.14. Steel jerrican (3A1 or 3A2) or plastic jerrican (3H1 or 3H2).
A13.3.3.15. Steel box (4A1), steel box with liner (4A2), or aluminum box with liner (4B2).
A13.3.3.16. Natural wood box (4C1), natural wood box, sift-proof (4C2.) Plywood box (4D) or reconstituted wood box (4F).
A13.3.3.17. Fiberboard box (4G).
A13.3.3.18. Expanded plastic box (4H1) or solid plastic box (4H2).
A13.3.3.19. Bag, woven plastic (5H1, 5H2, or 5H3); bag, plastic film (5H4); bag, textile (5L1, 5L2, or 5L3); bag, paper, multiwall, water-resistant (5M2).
A13.3.3.20. Single, composite package comprised of a plastic receptacle in steel, aluminum, plywood, fiber, or plastic drum (6HA1, 6HB1, 6HD1, 6HG1, or 6HH1).
A13.3.3.21. Single, composite package comprised of a plastic receptacle in steel, aluminum, wood, plywood, or fiberboard box (6HA2, 6HB2, 6HC, 6HD2, or 6HG2).
A13.3.3.22. Single, composite package comprised of glass, porcelain, or stoneware in steel, aluminum, plywood, or fiber drum (6PA1, 6PB1, 6PD1, or 6PG1).
A13.3.3.23. Single, composite package comprised of glass, porcelain, or stoneware, in steel, aluminum, wooden, or fiberboard box (6PA2, 6PB2, 6PC, or 6PG2).
A13.3.3.24. Single, composite package comprised of glass, porcelain, or stoneware in expanded or solid plastic packaging (6PH1 or 6PH2).
A13.3.4. PCB Transformers. Palletize and tightly seal large transformers (over 400kg [886 pounds]) with PCB to prevent leakage. Place a large sheet of polyethylene under the transformer and extend it at least one quarter of the way up its sides. Provide enough vermiculite to absorb any leakage. These type transformers are exempt from the POP requirements.

A13.4. Consumer Commodities. Ensure items shipped under this paragraph meet the definition of a consumer commodity (see attachament 1). Consumer commodities may only include substances of Class 2 (non-toxic aerosols only), Class 3 (Packing Group II or III only) and Division 6.1 (Packing Group III only) provided such substances do not have a subsidiary risk.

A13.4.1. **Inner Receptacle Requirements.**

- Limit Class 2 substances to aerosol products containing non-toxic solutions and compressed gases packed in inner non-refillable non-metal receptacles not exceeding 120 ml (4 Fl. oz) capacity each, or in inner non-refillable metal receptacles not exceeding 820 ml (28 Fl. oz) capacity each. Flammable aerosols must not exceed 500 ml (17 Fl. oz) capacity each). The following provisions apply to all aerosols under this paragraph:
  - The pressure in the aerosol must not exceed 1,500 kPa at 55°C (217 psi at 130°F) and each receptacle must be capable of withstanding without bursting a pressure of at least 1.5 times the equilibrium pressure of the contents at 55°C (130°F);
  - If the pressure in the aerosol exceeds 970 kPa at 55°C (160 psi at 130° F) but does not exceed 1105 kPa at 55°C (160 psi at 130°F), use an inner metal IP7, IP7A, or IP7B receptacle.
  - If the pressure in the aerosol exceeds 1,105 kPa at 55°C (160 psi at 130°F) but does not exceed 1245 kPA at 55 ^{o}C (180 psi at 130°F), use an inner metal IP7A or IP7B receptacle.

  - If the pressure in the aerosol exceeds 1,245 kPa at 55°C (180 psi at 130°F), use an inner metal IP7B receptacle. IP.7B metal receptacles having a minimum burst pressure of 1,800 kPa may be equipped with an inner capsule charged with a non-flammable, non-toxic compressed gas to provide the propellant function. In this case, the pressures indicated above do not apply to the pressure within the capsule. The quantity of gas contained in the capsule must be so limited that the minimum burst pressure of the receptacle would not be exceeded if the entire gas content of the capsule were released into an aerosol.
  - The liquid content must not completely fill the closed receptacle at 55°C (130°F).
  - Each aerosol exceeding 120 ml (4 Fl. oz) capacity must have been heated until the pressure in the aerosol is equivalent to the equilibrium pressure of the contents at 55°C (130°F) without evidence of leakage, distortion or other defect.
  - Protect the valves by a cap or other suitable means during transport.
- For aerosols containing a biological or medical preparation that will be deteriorated by a heat test and which are non-toxic and non-flammable, packed in inner non-refillable receptacles not exceeding 575 ml (19.4 Fl. oz) capacity each, the following provisions apply:
  - The pressure in the aerosol must not exceed 970 kPa at 55° C (140.7 psi at 130°F).
  - The liquid contents must not completely fill the closed receptacle at 55° C (130°F).
  - One aerosol out of each lot of 500 or less, must be heated until the pressure in the aerosol is equivalent to the equilibrium pressure of the contents at 55° C (130°F) without evidence of leakage, distortion or other defect.
  - Protect the valves by a cap or other suitable means during transport.
- The following apply to Class 3 and Division 6.1 substances:
  - Inner packagings of Class 3 substances must not exceed 500 ml (17 Fl. oz).
  - Inner packagings of Division 6.1 substances must not exceed 500 ml (17 Fl. oz) for liquids and 500 g (18 oz) for solids.

A13.4.2. **Packaging Requirements.** Inner packagings must meet the requirements of A13.4.1. Tightly pack inner packagings in strong outer packagings. UN specification POP packaging is not required. Each completed package as prepared for shipment must not exceed a gross mass of 25 kg (55 lb).

- To prevent leakage during air transport, design and construct each packaging for changes in altitude and temperature.
- Packaging (including closures) in direct contact with dangerous goods must not contain substances that may react dangerously with the contents, form hazardous products or weaken the receptacles.
- Pack and cushion inner packagings that are breakable (such as earthenware, glass or brittle plastic) to prevent any breakage, leakage or movement within the outer packaging during transport. Provide absorbent material for glass or earthenware inner packagings in Class 2 or 3, or liquids of Division 6.1. Include sufficient cushioning material to absorb the liquid contents of the largest inner packaging contained in the outer package. Absorbent and cushioning material must not react dangerously with the contents of the inner packagings. Notwithstanding the above, absorbent material may not be required if the inner packagings are so protected that breakage and leakage of their contents from the outer packaging will not occur. These completed packagings must be capable of withstanding a 1.2 m (4 ft) drop on solid concrete in the position most likely to cause damage.
- Leave sufficient ullage (outage) when filling receptacles for liquids to ensure that neither leakage nor permanent distortion of the receptacle will occur as a result of an expansion of the liquid caused by temperatures changes during transport. Leave a minimum ullage of 2%. Ensure the primary packaging (which may include composite packaging), for which retention of the liquid is a basic function is capable of withstanding without leakage, an internal pressure that produces a pressure differential of not less then 75 kPa (11 psi) or a pressure related to the vapor pressure of the liquid to be conveyed, whichever is the greater (see also A3.1.2).
- Secure stoppers, corks, or other such friction-type closures tightly and effectively in place by positive means. The design of the closure device should prevent incorrect or incomplete closure. Check to ensure the closure is completely and securely closed.

A13.5. Motor Vehicles and Self-Propelled Units. The following requirements apply:

- Use service technical manuals to prepare items for shipment.
- Protect installed batteries to prevent short circuit and secure so that battery fluid will not leak. To secure the battery from short circuit, completely protect the terminal posts from contact (i.e., tape, rubber boots, etc.). When prepared in this manner, it is not required to disconnect the battery or remove it from the equipment.
- Securely fasten original installed equipment in properly configured and approved holders. Do not remove other hazardous materials from their packaging and store in the racks or containers of vehicles or equipment.

- Prepare the item to protect against leakage of fuel during loading, unloading, and transport. Drain and cap units when personnel are unable to accurately determine the amount of fuel, or if the unit is susceptable to fuel spills or leakage. Unless otherwise stated, purging is not required.
- Drain fuel tanks of palletized units. Units palletized due to the aircraft's subfloor requirements may contain fuel in tank.
- When fuel in tank is authorized below, ship only the minimum quantity consistent with operational requirements (see 1.8). The following fuel in tank requirements apply:

A13.5.1. Vehicles and self-propelled units may contain fuel in tank not to exceed one-half tank full. Ensure tanks are securely closed.

A13.5.2. Vehicles and self-propelled units may contain fuel in tank not to exceed three-fourths tank full when transported under the authority of paragraph 3.7. Ensure tanks are securely closed.

- Do not exceed one-half tank full for units loaded on the aircraft cargo ramp and units loaded aboard aircraft with a steep angle of ascent (i.e.,KC-10, KC-135).
- Position units loaded on an aircraft cargo ramp with the fuel tank openings located on the high side of the ramp.

A13.5.3. Liquefied petroleum gas or compressed gas powered vehicles must have the gaseous fuel completely emptied from the pressurized vessel (fuel tank), lines, and regulator. Ensure tanks are securely closed. Purging is not required.

A13.5.4. Boats and watercraft that are loaded on trailers or palletized must be drained to the greatest extent posssible. Units prepared for airdrop and shipped under the authority of paragraph 3.7, may contain fuel in tank not to exceed three-quarters tank full.

A13.5.5. Prepare aircraft and helicopters for transportation according to the requirements of the respective aircraft's shipping manual.

- Remove all munitions and explosives, other than those installed as permanent-type aircraft equipment, according to the pertinent aircraft technical order and A5.3.
- Fasten batteries securely in the holder provided, with the terminals disconnected and protected in such a manner as to prevent damage or short circuits. When batteries are removed and shipped with the aircraft, accomplish packaging and certification according to A12.5.
- Transport fueled helicopters and aircraft with fuel in each tank not to exceed 150 gallons or three-fourths full, whichever amount is least. Do not exceed one-half tank full for units loaded on the aircraft cargo ramp. Fuel leakage must not occur during shipment. No special venting is required other than to maintain a normal aircraft ventilation during flight. Seal vents according to service technical directives. Load tanks to prevent fuel leakage when the loading configuration requires removal of external fuel tanks. When removed in this manner, the tanks are still considered a component of the aircraft or helicopter.

A13.5.6. Units drained, purged and containing no other hazardous material are nonhazardous for transportation. Fuel systems including carburetors, pumps, controls, and fuel tanks must be completely drained, purged, and sealed with appropriate pressure seal type plug and caps with gaskets and "O" rings. Prepare drained and purged aircraft and helicopters according to the appropriate technical directive. If the engine's entire fuel system is purged with MIL-O-6081 grade 1010 oil and sealed with appropriate pressure seal-type metal plugs or caps, gaskets, and O-rings, the item is considered unfueled. The requirements of A13.5.5 apply for installed components. See attachment 17 for documentation requirements.

A13.6. Engines and Support Equipment. Comply with the bullet requirements of A13.5. The following fuel in tank requirements apply:

A13.6.1. Completely drain engine-powered support equipment of fuel. Up to 500 ml (17 ounces) of fuel may be left in engine components and fuel lines provided all lines and fuel tanks are securely closed to prevent leakage of fuel.

A13.6.2. Engine-powered support equipment with large fuel systems that the shipper determines can not be drained to meet the requirements of A13.6.1 must be drained to the maximum extent possible. Ensure no free standing liquid is remaining in the fuel tank, lines, or system.

A13.6.3. Wheeled-engine powered support equipment may contain up to one-half tank of fuel when transported under the authority of paragraph 3.7. Ship only the minimum quantity of fuel consistent with operational requirements. Ensure tanks are securely closed.

A13.6.4. Completely drain single axle equipment loaded with the tongue resting on the aircraft floor. The requirements of A13.6.1 or A13.6.2 apply depending on the type and size of equipment.

A13.6.5. Internal combustion engines that are damaged or inoperable and purging can not be accomplished, or proper purging facilities are unavailable must be drained to the maximum extent possible and install plugs, caps, and covers over all openings as required by technical directives. All other internal combustion engines must comply with A13.6.7.

A13.6.6. Ship the Aerial Bulk Fuel Delivery System (ABFDS) consisting of 3000 gallon bladders under the following conditions:

- Completely drain the bulk fuel bladders. Due to bladder construction there will be residual fuel remaining. Ensure bladders are drained as much as possible.
- Completely drain the pump module. No more than 500 ml (17 ounces) of fuel may be left in engine components.
- Securely close all vents and valves to prevent residual fuel leaks.
- When prepared in this manner, ABFDS may be stacked for shipment.

A13.6.7. Items drained, purged and containing no other hazardous material are nonhazardous for transportation. The following guidance applies:

- Internal combustion engines with or without fuel tanks attached are prepared for shipment and storage according to applicable technical directives. Fuel systems including carburetors, pumps, controls, and fuel tanks must be completely drained, purged, and sealed with appropriate pressure seal type plug and caps with gaskets and "O" rings. See attachment 17 for documentation requirements.
- Repairable fuel assemblies, fuel tanks, and cells that are drained, purged, and sealed according to the applicable technical directive. See attachment 17 for documentation requirements.
- All preserved and packed serviceable fuel assemblies, for example, carburetors, fuel pumps, filters, etc., that are drained and purged of all fuel. In addition, they must be sealed with proper caps, plugs, and covers according to the applicable technical directive. These items are not subject to any other requirements of this manual.
- New engines or engines overhauled by a maintenance depot and containing no other hazard, are not subject to any other requirements of this manual.

A13.7. Battery Powered Equipment and Vehicles. Prepare items powered by wet cell or non-spillable batteries and shipped with the batteries installed as follows:

- Use service technical manuals to prepare items for shipment.
- Securely fasten battery in an upright position so that battery fluid will not leak. Remove the battery and ship according to A12.5 if the item is likely to be shipped in other than an upright position.
- Protect installed batteries to prevent short circuit. To secure the battery from short circuit, completely protect the terminal posts from contact (i.e., tape, rubber boots, etc.). When prepared in this manner, it is not required to disconnect the battery or remove it from the equipment.
- Securely fasten original installed equipment in properly configured and approved holders. Do not remove other hazardous materials from their packaging and store in the racks or containers of vehicles or equipment.
- Wheelchairs equipped with nonspillable batteries must have the batteries protected against short circuits and securely attached to the wheelchair or removed and boxed. Specification packaging is not required.
- Wheelchairs equipped with spillable batteries for carriage on aircraft in cargo compartments that can accommodate upright loading and storage of the wheelchairs must be secured in an upright position in the cargo compartment. Batteries must remain installed and be securely attached to the chair. Protect the terminals against short circuits. Wheelchairs must be deactivated by removing connections at battery terminals or by otherwise disconnecting their power source. Remove the battery and ship according to A12.5 if the item is likely to be shipped in other than an upright position.

A13.8. Lithium Batteries and Cells. The following general requirements apply:

- No cell may contain more than 12 g (0.42 ounces) of lithium or lithium alloy and no battery may contain more than 500 grams (17.6 ounces).
- Each cell and battery must be equipped with an effective means of preventing external short circuit.
- Each cell and battery must incorporate a safety venting device or be designed in such a manner that will preclude a violent rupture under any condition incident to transportation, such as a dead short. Batteries containing cells or series of cells connected in parallel must be equipped with diodes to prevent reverse current flow.
- Cells or batteries may not be offered for transportation or transported if any cell has been discharged to the extent that the open circuit voltage is less than two volts or is less than two-thirds of the voltage of the fully charged cell, whichever is less.
- Cells and batteries must be subjected to the tests prescribed in 49 CFR 173.185(e)(9).
- Completly protect against short circuit and secure within the outer packaging or article.

A13.8.1. **Handling Instructions.** Do not use halon fire extinguishers to combat fires involving lithium-sulfur dioxide (Li-SO_2) batteries. Use water, CO_2, or approved Class-D (recommended) fire extinguisher.

A13.8.2. **Packaging Requirements.** Package lithium cells and batteries in UN specification packaging that meets the PG II performance level as follows:
A13.8.2.1. In strong inner fiberboard containers limited to a maximum of 500 grams (17.6 ounces) of lithium per inner container. Pack inner containers in a removable head metal drum (1A2, 1B2) with a gas-tight gasket. Separate inner containers from each other and from the outer packaging by at least 25 mm (1 inch) of noncombustible cushioning material.
A13.8.2.2. Cells containing no more than 12 g (.42 ounces) of lithium metal which are hermetically sealed, and batteries constructed of such cells, that meet the tests specified in 49 CFR 173.185(e)(9)(iii) may be packaged in a strong outer wooden box (4C1, 4C2, 4D, or 4F), fiberboard box (4G), or fiber drum (1G). Army-procured lithium batteries are manufactured according to MIL-B-49430 and meet the test requirements of 49 CFR 173.185(e)(9)(iii). These batteries are identified by the following battery numbers: BA-5093/U, BA-5112/U, BA-5372/U, BA-5513/U, BA-5557/U, BA-5567/U, BA-5588/U, BA-5590/U, BA-5598/U, BA-5599/U, BA-5600/U, BA-5800/U, BA-5847/U, BA-6598/U.
A13.8.3. Pack equipment with installed lithium batteries in a strong waterproof outer packaging or in an outer packaging made waterproof through the use of a liner. Secure the equipment within the outer packaging to prevent movement, short circuit, or accidental operation during transport. UN specification (POP) packaging is not required.
A13.8.4. Ship lithium batteries packed in equipment under the authority of paragraph 3.8 unpackaged.
A13.8.5. Non-Regulated Lithium Batteries. Lithium batteries are not subject to any other requirements of this manual if they meet the following:

- Each cell with a liquid cathode may contain no more than .5 g (.02 ounces) of lithium or lithium alloy, and each cell of a solid cathode may contain no more than 1.0 g (.04 ounces) of lithium or lithium alloy.
- Each battery with a solid cathode must contain a total quantity of no more than 2 g (.07 ounces) of lithium or lithium alloy, and each battery with a liquid cathode must contain a total quantity of no more than 1.0 g (.04 ounces) of lithium or lithium alloy.
- Each cell or battery containing a liquid cathode must be hermetically sealed.
- Cells must be separated to prevent short circuit. Batteries must be separated to prevent short circuit and must be packed in strong outside containers, except when installed in electronic devices.
- If a liquid cathode battery contains more than .5 g (.02 ounces) of lithium or lithium alloy, or a solid cathode battery contains more than 1.0 g (.04 ounces) of lithium or lithium alloy, it may not contain a liquid or gas that is a hazardous material unless the liquid or gas, if free, would be completely absorbed or neutralized by other material in the battery.

A13.9. Carbon Dioxide, Solid (Dry Ice).
A13.9.1. **Handling Instructions.** Dry ice is extremely cold and will damage human tissue on contact. Store only in well ventilated areas. Never store in hermetically or tightly sealed containers. To minimize carbon dioxide concentration within the aircraft during ground operations, open the cargo/access doors and emergency escape hatches for maximum ventilation.
A13.9.2. **Properties of Carbon Dioxide, Solid.** At temperatures above -78.5 degrees C (-109.3 degrees F) dry ice will sublimate and release carbon dioxide fumes. If the carbon dioxide concentration in the aircraft is over 0.5 percent, crewmembers may suffer shortness of breath. Carbon dioxide concentrations of 3.0 percent are endurable from 1/2 to 1 hour. Concentrations of 5.0 percent are dangerous from 1/2 to 1 hour and concentrations of 9.0 percent are fatal from 5 to 10 minutes. Carbon dioxide is heavier than air; therefore, the highest concentration is at or near floor level. Caution crewmembers against lying on the cargo compartment floor or remaining in the cargo compartment for a prolonged period. If symptoms of overexposure are noted, the use of oxygen and increased ventilation should provide rapid relief.
A13.9.3. **Dry Ice Limitations.**

- Seat passengers forward of and separate by the greatest distance possible (minimum one full pallet position) from dry ice.
- Passenger and crewmembers will not occupy the same pallet position as dry ice.
- Do not carry dry ice in any upper deck compartment.
- Vent the aircraft cargo compartment to the greatest extent possible allowed by the flight profile and envionmental conditions.

A13.9.3.1. **Pressurized Aircraft.** For pressurized aircraft, the amount of dry ice that can be safely shipped by air regardless of the type container used depends on the sublimation rate of the ice, the volume of the aircraft, and the number of air changes per hour. To minimize the sublimation rate, use insulated containers surrounded with insulating blankets and tarpaulin during shipment to the greatest extent possible. To determine the amount of dry ice that can be safely shipped by air, use the formula in figure A13.1.

A13.9.3.2. **Aircraft on Minimum Air Changes.** When aircraft is on minimum air changes per hour, safe loads are drastically reduced. When the aircraft is on the ground longer than 45 minutes, recalculate the safe quantity using new numbers of air changes per hour. Maximum quantities are shown in figure A13.2.

$$X = \frac{VA(0.47)}{32.3}$$

Where:
V= Volume of aircraft
A= Air changes per hour
X= Maximum dry ice loading in pounds

Figure A13.1. Formula For Determining Dry Ice Limitations.

Aircraft	Maximum Amount	
Type	**in Pounds**	**Kilograms**
C-130	600	272
C-135	200	91
C-141B	3430 (See Note)	1555.5
C-17	1170	530

Figure A13.2. Dry Ice Limitations When Aircraft is on Minimum Air Changes.

NOTE: 1,020 pounds (463 kg) with passengers.

A13.9.3.3. **Non-pressurized Aircraft.** For non-pressurized aircraft, the amount of dry ice that can be safely shipped by air depends upon the sublimation rate and ventilation of the aircraft. To minimize the sublimation rate, use insulated containers surrounded with insulating blankets and tarpaulins. The aircraft must have maximum ventilation during the shipment. Under these conditions 1652.6 kg (3,644 pounds) of dry ice can be shipped on a C-141 aircraft. With unpressurized cargo compartment, the quantity of dry ice that can be transported is unlimited if the fumes are vented overboard the aircraft.

A13.9.3.4. **C-5 Aircraft.** Dry ice may be carried in the C-5A cargo compartment under the following aircraft operating conditions:

- During cruise (mach 0.5 and up) and altitudes up to 9144 m (30,000 feet), a safe load of dry ice is 2131.5 kg (4700 pounds.) During cruise (mach 0.6 and up) and altitudes above 9144 m (30,000 feet), a safe load is 1415 kg (3120 pounds.) The Environmental Control System (ECS) must be operated with "both" air-conditioning units on, a "Normal" flow setting on the flow control valve, and the "Intermediate" setting on the alternative air valve.
- During non-pressurized flight up to 3048 m (10,000 feet), a safe load is 2948 kg (6500 pounds.) The auxiliary vent valve must be open for this condition.
- During ground operations with one auxiliary power unit (air turbine motor at idle), a safe operating load is 1338 kg (2950 pounds). The auxiliary vent valve must be open for this condition.

A13.9.3.5. **KC-10 Aircraft.** Dry ice may be carried in the KC-10 cargo compartment under the following aircraft operating conditions:

- No environmental curtain (27 pallet all-cargo configuration.) A safe load of dry ice is 1041 kg (2,295 pounds) with "both" air conditioning packs operating. This weight is reduced to 567.5 kg (1,251 pounds) when "one" air conditioning pack is operating. If "one" air conditioning pack is lost in flight, then accomplish emergency procedures for cabin. Turn Cargo Smoke Light on per KC-10 flight manual T.O. 1C-10(K)A-1, Section II. Include "Smoke Source is not Accessible" portion of procedure except do not put cabin pressure control in manual and do not depressurize cabin.
- Environmental curtain at station 615: A safe load of dry ice is 808 kg (1,782 pounds) with "both" air conditioning packs operating. This weight is reduced to 439.5 kg (969 pounds) when "one" air conditioning pack is operating.
- Environmental curtain at station 879: a safe load of dry ice is 546 kg (1,204 pounds) with "both" air conditioning packs operating. This weight is reduced to 296 kg (653 pounds) when "one" air conditioning pack is operating.

- Environmental curtain at station 615 or 879: If "one" air conditioning pack is lost in flight, then accomplish emergency procedures for cabin, turn cargo smoke light on, mixed passenger and cargo configuration per KC-10 flight manual T.O 1C-10(k) A-1, section II, except do not initiate firefighting procedures.
- During cargo loading, the following procedures apply to minimize carbon dioxide concentration:
  - Ensure APU is running and "both" air conditioning packs are operating.
  - Open number 4 passenger service door for additional ventilation.
  - Open all air inlets in the aerial refueling operators station and close aerial refueling operators hatch.
  - Ensure environmental curtain is closed before flight.

A13.9.3.6. **AMC Contract Aircraft.** Do not transport more than 200 kg (440 lbs) of dry ice in a cargo compartment of AMC contract aircraft without prior approval from HQ AMC/DOJC.

A13.9.4. **Packaging Requirements.** Wrap in Kraft paper, secure with tape, and pack in fiberboard boxes, polystyrene foam containers or other suitable packaging designed and constructed to permit the release of carbon dioxide gas and to prevent a build-up of pressure that could rupture the packaging. UN specification (POP) packaging is not required. Packagings must meet the general requirements of A3.1.

A13.10. Magnetized Material.

A13.10.1. **Handling Instructions.** Do not store magnetic materials suitable for military airlift closer than 4.6 m (15 feet) to compass sensing devices or other devices unduly affected by magnetic fields.

A13.10.2. **Packaging Requirements.** Shield magnetic materials (MIL-S-4473) when required to reduce magnetic field strength to not greater than 5.25 milligauss or two degrees deviation of a magnetic compass at a distance of 15 feet (4.6 m). Provide blocking and bracing as required. Additional packaging details are included in TO 00-25-251. Package magnetic tubes individually in compliance with MIL-E-75. Package magnetically susceptible items to make sure that the distance between the magnetic surface and outside of the innermost container is no less than the protective distance required, and in no instance less than 102 mm (4 inches). Magnetized materials for air shipment are identified as a PG III material. However, specification POP packaging is not required if the magnetized material has a magnetic field strength of less than 0.00525 gauss at 4.6m (15 feet). Magnetic material that has a magnetic field strength greater than 0.00525 gauss at 4.6m (15 feet) is forbidden for air movement.

A13.11. Life-Saving Appliances. Life-saving appliances, self-inflating or nonself-inflating, include (but are not limited to) life raft kits, life vest kits, survival kit assemblies, ejection seats, non-ejection seats, and parachutes that contain small quantities of hazardous material that are required as part of the survival equipment. Kit contents may include, but are not limited to, flammable items (fire starter and matches), ammunition items (cartridges and shells), pyrotechnics (signal flares), and nonflammable compressed gas cylinders (carbon dioxide and breathing oxygen).

A13.11.1. **Handling Instructions.** Store in cool, well-ventilated areas away from fire hazards and sources of heat or ignition. Do not drop or rough handle.

A13.11.2. **Packaging Requirements:**

A13.11.2.1. Pack kits in weather-resistant fiberboard or other securely closed strong outer container. Pack hazardous materials contained in the kit in inner packaging that is adequate to prevent accidental activation. Suitably cushion the inner packagings to prevent movement. Packagings must meet the general requirements of A3.1. UN Specification (POP) packaging is not required.

A13.11.2.2. **Accompanying crew members.** Package life-saving appliances containing small quantities of Class 1 (not to exceed 2.2 pounds N.E.W.) and other hazards in a strong fiberboard box or A-3 bag. Individual assigned kits may be handcarried by crew members. The requirements of A13.11.2.1 for inner packing and cushioning apply. When prepared and handcarried according to this paragraph, the marking and labeling requirements of Attachments 14 and 15 do not apply. Crew members must inform the Air Terminal Operations Center, when transporting life-saving appliances in this manner.

A13.12. Dangerous Goods in Apparatus or Machinery. Apply this description only to apparatus or machinery containing hazardous material as an integral component of the item. Do not use this description for items in which a PSN already exists in table A4.1.

- Apparatus or machinery may only contain hazardous materials permitted as limited quantities under A19.3.
- If more than one hazardous material is present, the material must not be capable of reacting dangerously together.
- The total net quantity of hazardous materials contained in one package must not exceed the following:
  - 1 kg (2.2 lbs) for solids
  - 500 ml (17 ounces) for liquids
  - 0.5 kg (1.1 lbs) for Class 2.2 gases

- Secure or cushion receptacles containing hazardous material to prevent breakage or leakage and to control movement within the item during transport. Cushioning material must not react dangerously with or have protective properties adversly affected by any leakage.
- Ensure that, in the event of damage to receptacles, no leakage of the hazardous material from the apparatus or machinery is possible. A leak-proof liner is required for articles that are completed drained of liquid but not purged. All openings and lines must be capped or sealed according to applicable technical directives.
- Class 2.2 gases must be in authorized cylinders according to attachment 6.
- Pack in strong outer packagings unless the receptacles containing the hazardous material are adequately protected by the construction of the apparatus or machinery. UN specification POP packaging is not required.

A13.13. General Packaging Requirements for Class 9 Materials. Generally, all inside containers for Class 9 and ORM-D packages must meet the requirements of attachment 3 and this paragraph. Provide enough outage for packagings of 208 L (55 gallon) capacity or less, so that the packaging will not be liquid full at 54 degrees C (130 degrees F.) Make sure that when a liquid or solid has an absolute vapor pressure over 110 kPa (16 psi) at 38 degrees C (100 degrees F) the primary packaging is capable of withstanding the inside vapor pressure at 54 degrees C (130 degrees F) without leakage. Package any Class 9 or ORM-D material that may cause a hazard in transportation due to its reaction with water in either an inner or outer waterproof packaging.

A13.13.1. Use any appropriate non-bulk packaging that meets the requirements of attachment 3 to ship liquid or solid Class 9 material. UN specification packaging is not required.

A13.13.2. Package material classified as ORM-D for domestic shipment as follows:

- Pack flammable liquids:
  - In inside metal containers each having a rated capacity of 1 L (1 quart) or less, or other inside containers each having a rated capacity of .5 L (1 pint) or less, packed in strong outside packagings.
  - In inside containers, each having a rated capacity of 4 L (1 gallon) or less, packed in strong outside packagings. This provision only applies if the flash point of the material is 23 degrees C (73 degrees F) or higher.
- Package flammable solids, except for charcoal briquettes, in inside containers having a net weight of .5 kg (1 pound) each or less. Pack inside containers in strong outside packagings having a net weight of 11.3 kg (25 pounds) each or less. See A3.3.8 for commercial form charcoal briquettes.
- Package flammable compressed gases:
  - In inside containers, each having a water capacity of 118 ml, 7.22 cubic inches or less (4 fluid ounces or less.) Pack inside containers in strong outside packagings.
  - In inside metal containers charged with a solution of materials and compressed gas or gases that are nonpoisonous, meeting all of the following:
  - The capacity must not exceed 27.2 fluid ounces (50 cubic inches).
  - The pressure in the container must not exceed 1242 kPa (180 psig) at 54 degrees C (130 degrees F). If the pressure is greater than 966 kPa (140 psig) at 130 degrees F (54 degrees C) but not over 160 psig (1104 kPa) at 54 degrees C (130 degrees F), a specification DOT 2P inside metal container must be used. If the pressure exceeds 1104 kPa (160 psig) at 54 degrees C (130 degrees F), an inside IP.7, IP.7A, or IP.7B metal container must be used. In any event, the metal container must be capable of withstanding, without bursting, a pressure of 1 1/2 times the equilibrium pressure of the contents at 54 degrees C (130 degrees F).
  - The liquid content of the material and gas must not completely fill the container at 54 degrees C (130 degrees F).
  - Pack the containers in strong outside packagings.
  - Each completed container filled for shipment must have been heated until the pressure in the container is equivalent to the equilibrium pressure of the content at 54 degrees C (130 degrees F). There must not be evidence of leakage, distortion, or other defect to the containers.

A13.14. Air Bag Inflators, Air Bag Modules, Seat-belt Pretensioners, and Seat-Belt Modules. Item classification as Class 9 must be approved by DOT according to 49 CFR 173.166. Package in an outer fiberboard (4G), wooden (4C1 or 4C2), reconstituted wood (4F), or plywood (4D) box.

A13.15. Asbestos (Hydrated Mineral Silicates.) Asbestos blue, brown, or white, includes any of the following hydrated mineral silicates: chrysotile, crocidolite, amosite, anthophyllite asbestos, tremolite asbestos, actinolite asbestos, and every product containing any of these materials. Asbestos that is immersed or fixed in a natural or artificial binder material (such as cement, plastic, asphalt, resins, or mineral ore) and manufactured products containing asbestos are not subject to this

paragraph. Asbestos must be loaded, handled, unloaded, and any contamination of aircraft removed in such a manner that will minimize occupational exposure to airborne particles released incident to transportation. Packaging must meet the general packaging requirements of A3.1. Specification POP packaging is not required. Package asbestos in:
A13.15.1. Rigid, leak tight packaging such as metal, plastic, or fiber drums.
A13.15.2. Bags or other nonrigid packaging that are dust and sift-proof. The packages must be palletized and unitized by methods such as shrink-wrapping in plastic or wrapping in fiberboard secured by strapping.
A13.15.3. Bags or other nonrigid packaging that are dust and sift-proof in strong outside fiberboard or wooden boxes.

A13.16. Oiled Material. Properly dry oiled material to prevent spontaneous heating, including carbon paper treated with oxidizable oil, oiled clothing, oil, impregnated or coated with 5 percent or less of animal or vegetable oil. Prepare this material for shipment in packaging meeting the requirements of A13.13 as follows:

- When the nature of the material permits, it must be tightly rolled or coiled, and wrapped or sealed with heavy paper.
- Pack fabricated articles not suitable for rolling or coiling in sealed metal boxes or metal lined wooden boxes.

A13.17. Polystyrene Beads, Expandable, Evolving Flammable Vapors. Pack polystyrene beads or granules, expandable, impregnated with flammable gas or liquid as a blowing agent; and plastic molding materials in dough sheet or extruded rope form, in wood (4C1 or 4C2), plywood (4D), fiberboard (4G), or reconstituted wood (4F) boxes with sealed inner plastic liners. Plywood drums (1D) or fiber drums (1G) with sealed inner plastic liners or metal packaging (1A1, 1A2, 1B1, or 1B2) may also be used.

★MARKING HAZARDOUS MATERIALS

A14.1. General Requirements. Mark hazardous materials according to MIL-STD-129 *Marking for Shipment and Storage* and this manual. Labels may be used to meet marking requirements to the extent they meet all application, placement, size, legibility, and durability requirements for marking.

A14.2. United Nations (UN) Specification Performance Oriented Packaging (POP) Markings. UN specification (POP) markings are mandatory for all packages of hazardous materials unless exempted by 1.7 or a separate approval. A description of the codes and sequence of information contained in the UN specification marking is identified in figure A14.1.

- **Grandfathered POP Items.** Containers packaged before January 1, 1990 may be shipped internationally by military air without the UN specification markings. Annotate the shipping papers with the words, "Government-owned goods packaged before January 1, 1990."

U	The symbol used to certify that the packaging complies with United Nations recommendations.
N	For embossed metal packagings the capital "UN" can be applied as the symbol.
4G	This is a two to four position code.
	The first position indicates the type of packaging and will be one of the following numbers: 1 = Drum 2 = Wooden box 3 = Jerrican 4 = Box 5 = Bag 6 = Composite packaging 7 = Pressure receptacle
	The second position indicates the type of material that the container is made of. For composite packagings, two capital letters (second and third positions) will be used to indicate the type of materials. The first letter indicates the material of the inner receptacle and the second letter indicates the material of the outer packaging. For combination packagings, only the code for the outer packaging will be used. The following letters indicate the type of materials: A = Steel (all types and surface treatments) B = Aluminum C = Natural wood D = Plywood F = Reconstituted wood G = Fiberboard H = Plastic materials L = Textile M = Paper, multi-wall N = Metal (other than steel or aluminum) P = Glass, porcelain, or stoneware
	The third position (fourth position for composite packagings) will be a number indicating the category of packaging within the same type (i.e., 1A1 [non removable head steel drum], 1A2 [removable head steel drum], 6HG1 [plastic receptacle with outer fiber drum] 6HG2 [plastic receptacle with outer fiberboard box]).
	The following special codes may follow the packaging type code:
V	Special packaging meeting the tests specified in 49 CFR 178.601(g)(2).
W	Packaging of the same type as specified by the UN requirements, but not meeting the same general construction requirements. The transport of such packagings is subject to written approval from the competent authority. For approval see 49 CFR 178.601(h).

Figure A14.1. UN Specification POP Marking Codes and Sequence of Instruction.

X1.4 or X15	Identified first is the PG the configuration has been successfully tested too. X is used for PG I. Y is used for PG II. Z is used for PG III. Items of a lesser (less hazardous) PG may be packaged in a packaging that has been tested to a higher PG provided the requirements of the test report are complied with. For single packagings, the PG will be followed by the relative density, rounded off to the first decimal, for which the container has been tested. This may be omitted when the relative density does not exceed 1.2. For packagings intended to contain solids or inner packagings, the PG will be followed by the maximum gross weight, in kilograms, that the packaging configuration has been tested.
100 or S	For single packagings intended to contain liquids, the next marking indicates the maximum test pressure, in kPa, rounded off to the nearest 10 kPa which the container was tested (hydraulic test). For packagings intended to contain solids or inner packagings, use the letter "S." For air shipment of packagings intended to contain inner packagings, see A3..2.1. Also, if the inner packaging is plastic ensure the requirements of A3.1.2 are met.
	The last two digits of the year during which the packaging was manufactured. Packagings of types 1H1, 1H2, 3H1, and 3H2 must also be marked with the month of manufacture. The month of manufacture may be marked on the packaging in a different place than the POP marking.
	The country authorizing the allocation of the mark.
***	The symbol of the party responsible for ensuring that the UN requirements have been met. The symbol must be registered with the US DOT, Office of Hazardous Materials Transportation. In place of a symbol, the in-the-clear name of the party responsible for ensuring the UN requirements have been met can be used. The Department of Defense uses the symbol "DoD."
	Reconditioned packagings must be marked to indicate they have been properly reconditioned. This marking must be applied near the initial marking and must replace the country and symbol of the party responsible for ensuring the UN requirements have been met, or be in addition to the initial marking. After reconditioning a packaging, the reconditioner must apply the following markings in sequence:
USA	The country in which the reconditioning was conducted.
***	The name or registered symbol of the reconditioner.
93	The year the packaging was reconditioned.
R	Enter the letter "R."
L	Enter the letter "L" for every packaging successfully passing the leakproofness test.

Figure A14.1. Continued.

A14.3. General Hazard Communication and Handling Markings.

A14.3.1. **Proper Shipping Name and Identification Number.** Unless otherwise specified, mark all packages containing hazardous materials with the PSN and identification number shown in the alphabetical listing of items in table A4.1.

- Mark the appropriate technical name in parenthesis following the proper shipping name when required by A4.2.2.
- Do not use abbreviations (except "w" (with), "w/o" (without), and "ORM" [other regulated material]).

A14.3.2. **Hazardous Substance.** Mark all packages containing a hazardous substance with the letter "RQ" in association with the PSN. If the PSN does not identify the hazardous substance by name, mark one of the following descriptions on the package, in parentheses, in association with the PSN:

- The technical name of the hazardous substance.
- The waste stream number.
- The letters "EPA" followed by the word "ignitability," "corrosivity," "reactivity," or "EP toxicity," as appropriate, or the corresponding "D" number, as appropriate.

A14.3.3. **Hazardous Waste.** Mark hazardous waste shipments according to this manual, 49 CFR 172, 40 CFR 262.32, and MIL-STD 129.
A14.3.4. **Inhalation Hazard.** Mark each package containing any material that is poisonous by inhalation "Inhalation Hazard."
A14.3.5. **Exemptions and COEs.** Mark each package authorized by a DOT Exemption or a COE with exemption or COE number.
A14.3.6. **Air Eligible Marking.** Mark combination packages, with inner receptacles containing liquid hazardous material, to indicate that the inner receptacles meet the UN performance internal hydraulic pressure standard. Mark the outer container "Air Eligible" to verify the inner containers meet the internal pressure requirement for air eligibility.
A14.3.7. **Orientation Marking (This Side Up).** Pack inside containers used to ship liquid hazardous material within a combination packaging or overpack with filling holes up.

- Mark with orientation arrows meeting the requirements of 49 CFR 172.312 on two opposite sides of the package and ensure the arrows point in the correct upright direction. Orientation labels may be used to meet this marking requirement. The lettering "THIS SIDE UP" or "THIS END UP" may also be included.
- Plainly mark the outside container "THIS SIDE UP" or "THIS END UP" on the cover or top to indicate the position of the inside containers.
- In addition, two sides of a rectangular container and two equal distant points on the circumference of a cylindrical container must be stenciled with the word "UP," with an arrow pointing toward the top of the container. The length of the arrow must not be less than 2.54cm (1 inch) and the shaft not less than 1.3cm (1/2 inch) in width. The size of the arrow must be proportioned to the space available.
- This requirement does not apply to materials in inside metal cans of the nonrefillable type with spun-in head and base without replaceable caps or other closing device, liquids contained in manufactured articles which are leak-tight in all orientations, and packages with hermetically-sealed inner packagings.

A14.3.8. **Inner Packagings Comply with Prescribed Specifications.** Mark the outer container "INNER PACKAGES COMPLY WITH PRESCRIBED SPECIFICATIONS" when:

- Overpacking prescribed UN specification POP containers for consolidation or handling purposes (see 1.13).
- This statement may be used in place of the statement required by A14.4.2.

A14.3.9. **Chemically Contaminated Cargo.** Mark chemically contaminated cargo shipped under the authority of 3.9 with the words, "Contaminated - Do Not Open." Apply by any means that is visible and legible.
A14.3.10. **Dangerous Goods in Machinery or Apparatus.** For items shipped under the PSN "Dangerous Goods in Machinery" or "Dangerous Goods in Apparatus" mark the PSN and UN number on the machinery, apparatus, or packaging (unless exempted by A14.4.8).

A14.4. Marking Requirements Applicable to Class.
A14.4.1. **Class 1.**

- Mark packages of explosives with an EX number or National Stock Number for each explosive. This does not apply if the explosive has an interim hazard classification issued according to A3.3.1.2.
- Mark packages of explosives containing liquids on the top with words "THIS SIDE UP."

A14.4.2. **Class 2.**

- For ethylene oxide prepared and certified according to A6.13.4, mark the top head of the drum "THIS END UP."
- Mark fire extinguishers prepared and certified according to A6.8.3 to indicate year of test and "MEETS DOT REQUIREMENTS." The words "This extinguisher meets all requirements of 49 CFR 173.306" may be displayed in place of "MEETS DOT REQUIREMENTS" on extinguishers manufactured before January 1, 1976.
- Each outside container of cryogenic liquids prepared and certified according to A6.11 must have arrows to indicate upright position and must be marked "KEEP UPRIGHT" and "DO NOT DROP." Hydrogen, cryogenic liquid must meet the marking requirements in 49 CFR 178.57-20 and, the total rate of venting in standard cubic feet per hour (SCFH) must be marked on the top head or valve protection band in letters at least one-half inch high as follows "VENT RATE**SCFH" (with the asterisks replaced by the number representing the total rate of venting, in SCFH).
- For nitric oxide prepared and certified according to A6.20 and the DOT 3A, 3AA, 3AL, or 3E1800 cylinders are overpacked, mark the outer wooden box "INSIDE CONTAINERS COMPLY WITH PRESCRIBED SPECIFICATIONS."
- For compressed gases prepared and certified according to A6.3, mark the outside packaging "INSIDE CONTAINERS COMPLY WITH PRESCRIBED SPECIFICATIONS".
- Refrigerant gases or engine-starting fluid prepared and certified according to A6.5.5 and A6.5.6, mark the outside shipping container "INSIDE CONTAINERS COMPLY WITH PRESCRIBED SPECIFICATIONS."

A14.4.3. **Class 3.** When shipping combustible liquids, mark the shipping container with the type of fuel and the flash point.
A14.4.4. **Class 5.** For bromine pentafluoride or bromine trifluoride prepared and certified according to A9.11 using a DOT 3E1800 cylinder, mark the outside container "INSIDE CONTAINERS COMPLY WITH PRESCRIBED SPECIFICATIONS."
A14.4.5. **Class 6.**

- Permanently mark outside plastic containers used for toxic (poisonous materials), by embossment or other durable means, with the word "POISON" in letters of at least 6.3 mm (1/4 inch) in height. Additional text or symbols may be included in the marking. The marking must be located within 15 cm (6 inches) of the packaging's closure.
- Mark the packages of infectious substances with:
  - The United Nations packaging symbol
  - The text "CLASS 6.2"
  - The last two digits of the year of manufacture of the packaging
  - The State authorizing the allocation of the mark (i.e., USA)
  - The name or registered symbol of the manufacturer

A14.4.6. **Class 7.**

- Mark each package of radioactive materials over 50 kg (110 pounds) to show the gross weight.
- Mark each package of radioactive material that meets the requirements for Type A or Type B packaging on the outside of the package in letters at least 13mm (1/2 inch) high, with the words "TYPE A" or "TYPE B," as appropriate. Do not mark a package that does not meet these requirements. Mark each package of radioactive materials destined for overseas shipment "USA."
- For limited quantities prepared and certified according to A11.11, the outside of the inner packaging or if there is no inner packaging, mark the outside of the packaging itself "Radioactive."
- Mark each Type B, Type B(U), or Type B(M) outer packaging with a trefoil radiation symbol meeting the requirements of 49 CFR Appendix B to Part 172.

A14.4.7. **Class 8.** Mark the outer container of chemical kits prepared and certified according to A12.7 "CHEMICAL KITS" or "FIRST AID KITS" as applicable.
A14.4.8. **Class 9.**

- Wheelchairs for which the battery is removed and boxed for shipment according to A13.7, mark the outer container containing the battery "THIS SIDE UP." This applies any time a battery is authorized to be removed from its holder, boxed, and shipped with equipment.
- Unless packaged, crated, or otherwise enclosed to prevent ready identification, the marking of the article or equipment of Class 9 with the proper shipping name and identification number is not required.

A14.4.9. **Limited Quantities.** Mark packages used for dangerous goods in limited quantities "Limited Quantities" or "LTD QTY."
A14.4.10. **Consumer Commodity and ORM Markings.** Plainly, durably, and legibly mark each package containing a hazardous material meeting the definition of Consumer Commodities and classified as ORM-D with either "ORM-D" or "ORM-D-AIR". Place the marking on at least one side or end immediately following or below the PSN within a rectangle that is approximately 6.3 mm (1/4 inch) larger on each side than the ORM designation. Use the ORM designation for domestic shipments only. Use a Class 9 label for international shipments. The Class 9 label may be used in place of the ORM marking for domestic shipments.

A14.5. Consumer Product Warnings. An article, package, or container may bear a manufacturers consumer warning symbol or statement. Presence of such a symbol or statement does not necessarily mean the article or contents meets the classification criteria as a hazardous material for military air transportation. Reference DoD 6050.5, *Hazardous Material Information System* or product Material Safety Data Sheet if hazard classification information is needed.

★LABELING HAZARDOUS MATERIALS

A15.1. General Requirements. Unless otherwise specified in this manual, apply the appropriate labels to the outside container of packages containing hazardous materials.

- Use labels meeting the commercial color and specifications outlined in 49 CFR 172.411 through 172.450, ICAO Technical Instructions or IATA Dangerous Goods Regulation. Do not use labels that are easily confused by their use, shape, and color, with the standard labels prescribed.
- Labels must be diamond-shaped with each side at least 10 cm (4 inches) long and have a solid line border 6.3 mm (0.25 inches) from the edge.
- The hazard class and division number must be at least 6.3 mm (0.25 inches) and not greater than 12.7 mm (0.5 inches). The label text must be at least 7.6 mm (0.3 inches) and will be in capitalized Roman letters.
- It is the shipping activity's responsibility to establish procedures to locally fund for and procure hazardous material labels and commercial forms.

A15.2. Hazard Labels.

- Place on the outer packaging a primary hazard label based on the hazard classification provided in column 3 of table A4.1. Include the hazard class number in the bottom corner of the primary hazard label. Labels that do not have the class or division number preprinted may be stamped or overprinted with the appropriate hazard class number in the bottom corner of the label.
    - For explosives, include the division number and compatibility group letter. Ensure the compatibility group letter is a capitalized Roman letter.
    - For Division 5.1 oxidizers and Division 5.2 organic peroxides, include the division number in the bottom corner of the label.
- Place on the outer packaging a subsidiary risk label when a subsidiary risk is identified in column 6 of table A4.1. A label identifying any subsidiary risk must not show the class or division number. Obliterate this number (with the same color as the label) if already on the label.
- Attach labels to the part of the package bearing the consignee's name and address.
- Do not place labels over any identifying data on the container. Remove or obliterate any irrelevant labeling already on the packaging.
- When hazardous materials having different classes are packed in the same packaging or outside container, the outside container must be labeled as required for each material (including subsidiary risks). If a primary or subsidiary risk is already adequately identified by the primary hazard or subsidiary risk label of another component, it is not required to repeat this warning by applying another label.
- When hazardous materials are palletized on a 463L or warehouse pallet, ensure the label is clearly visible.
- Position hazardous cargo loaded in the back of a vehicle so the labels are clearly visible, or apply the labels for each hazard loaded in the back of the vehicle to a marker board that is clearly visible.
- Label Chemical or First Aid Kits with the primary hazard label and any subsidiary risk labels applicable to each individual hazard within the kit.
- Label each Limited Quantity package for each dangerous good contained in the package.
- Excepted Quantities container only requires a completed "Dangerous Goods in Excepted Quantities" label attached to the container.
- Label hazardous waste with the appropriate hazard label and properly completed hazardous waste label.
- For items shipped under the PSN "Dangerous Goods in Machinery" or "Dangerous Goods in Apparatus" apply primary and subsidiary risk hazard labels for each hazard contained therein on the machinery, apparatus, or packaging (unless exempted by A15.4.6). Apply Package Orientation (This Way Up) labels to opposite vertical sides when required to ensure liquid hazardous material remain in their intended orientation.
- Do not apply hazard labels to a package containing material which is not regulated.

A15.3. Handling Labels.

- Apply a "Cargo Aircraft Only" label on packagings not permitted on passenger aircraft as identified in column 7 of table A4.1. The "Cargo Aircraft Only" label is not required on cargo shipped according to chapter 3 (see attachment 17 for certification).
- Apply the "Cargo Aircraft Only" label on packagings shipped according to Chapter 3 if diverted as identified in paragraph 3.11.

- Apply a “Magnetized Material” label on packages containing magnetized material. An additional Class 9 label is not required.
- Apply an “Empty” label when the packaging meets the requirements of 1.10. Any container or cylinder shipped as empty must have the previously applied hazard labels removed, obliterated, destroyed, or completely covered by the “EMPTY” label.

A15.4. General Requirements Applicable to Hazard Classes.

A15.4.1. **Class 2.**

- A toxic gas label may be used in place of a poison gas label required by table A4.1.
- For packages containing oxygen, compressed; or oxygen, refrigerated liquid, a label with the word "OXYGEN" may be used in place of a label with the word "OXIDIZER," if the letter size and color are the same as those required for oxidizer. Alternatively, an "OXYGEN" label may be used in place of the "NONFLAMMABLE GAS" and "OXIDIZER" labels required in table A4.1.
- Recoil mechanisms or artillery gun mounts prepared and certified according to A6.6.8, must have a nonflammable compressed gas label applied to each exterior container. However, when shipped as an integral part of the complete weapon system, the nonflammable compressed gas label may be on the weapon or its exterior cover.

A15.4.2. **Class 3.** All flammable liquids, whose vapor pressure (Reid test) is more than 110 kPa (16 psi) at 38 degrees C (100 degrees F), must have a "white bung label," 76 x 127 mm (3 by 5 inches), affixed near the bung or closure of the container.

A15.4.3. **Class 6.** Material classified as an infectious substance, that also meets the definition of a Class 2.3 toxic material or a radioactive material, must also be labeled with a "POISON GAS" label or "RADIOACTIVE" label as appropriate.

A15.4.4. **Class 7.**

- Label each package of radioactive materials, unless excepted by attachment 11. The proper label to affix to a package of radioactive material is based on the radiation level at the surface of the package and the transport index. The proper category of label is determined according to table A15.1. Apply the highest category label required for any of the two determining conditions. Radioactive white-I is the lowest category and radioactive yellow-III is the highest. For example: a package with a transport index of 0.8 and a maximum surface radiation level of 0.6 mSv/h (60 mrem/h) must bear a radioactive yellow-III label (see table A15.1.)

Table A15.1. Radioactive Label Requirements. (See Note)

Transport Index (TI)	Maximum Radiation Level at any Point on the External Surface	Label Category
N/A	Less than or equal to 0.005 mSv/h (0.5 mrem/h)	white-I
More than 0 but not more than 1	More than 0.005 mSv/h (0.5 mrem/h) but less than or equal to 0.5 mSv/h (50 mrem/h)	yellow-II
More than 1 but not more than 10	More than 0.05 mSv/h (50 mrem/h) but less than or equal to 2 mSv/h (200 mrem/h)	yellow-III

NOTE: The category of label must be shown in Key 17 of the Shipper's Declaration for Dangerous Goods form and must also be applied to radioactive materials packages. Any package containing a "highway route controlled quantity" must be labeled as radioactive yellow-III.

- Label each package containing a radioactive material, that also meets the definition of one or more additional hazards, as required by this attachment for the radioactive material and for each additional hazard. For example:
  - Label solid nitrates of uranium or thorium, "RADIOACTIVE" and "OXIDIZER."
  - Label nitric acid solution of radioactive material "RADIOACTIVE" and "CORROSIVE."
- Each package requiring a "RADIOACTIVE" label must have two of these labels affixed to opposite sides of the package. Enter the following information in the blank spaces by legible printing (manual or mechanical), using a durable weather resistant means of marking:
  - **"Contents."** The name of the radionuclides as taken from the listing of radionuclides in table A11.1. Symbols that conform to established radiation protection terminology are authorized, (i.e., 99_{Mo}, 60_{Co}, etc). For

mixtures of radionuclides, list the most restrictive radionuclides, on the basis of radiotoxicity, as space on the label allows. If an overpack is used to consolidate individual packages, this entry may state "MIXED" unless each inside package contains the same radionuclides.

- **"Activity."** Express units in appropriate international units of Becquerals (Bq) or Terabecquerals (Tbq). The customery units, i.e., curies (Ci), mullicuries (mCi), or microcuries (uCi) may be included in parenthesis following the international units. Abbreviations are authorized. For a fissile material, the weight in grams or kilograms of the fissile radioisotope also may be inserted. If an overpack is used to consolidate individual packages, this entry must be determined by adding together the number of curies of the radioactive materials packages contained in the overpack.

- **"Transport Index."** See attachment 1. If an overpack is used to consolidate individual packages, determine this entry by adding together the transport indexes of the radioactive materials packages contained in the overpack. The transport index of the overpack must not exceed 3.0 for passenger-carrying aircraft shipments, or 10.0 for cargo only aircraft shipments (see attachment 22).

A15.4.5. **Class 8.** Batteries prepared and certified according to A12.5 must have a "Package Orientation" labels indicating the upright position (top) of the container.

A15.4.6. **Class 9.**

- Equipment or articles of Class 9 do not require a label unless packaged, crated, or otherwise enclosed to prevent ready identification.
- Certify items containing both limited quantity radioactive and magnetic characteristics to the radioactive material. Although limited quantity radioactive material is exempt from labeling, a magnetic material label must be applied to the shipping container.

★AREA PLACARDING

A16.1. General Requirements. Placard the area surrounding aircraft transporting any hazardous materials when parked according to table A16.1 or Service directives. If Service directives do no contain specific procedures for placarding, use the following guidance:

- Use placards that meet the general design, size, and color specifications of 49 CFR 172.519.
- For explosives, fire and chemical hazard symbols specified in DoD 6055.9-STD may be used in place of placards.
- Conspicuously display placards at the front, rear, and both sides of the aircraft unless emergency response access is restricted. Then post placards at entry points.
- Park aircraft transporting DoD Class 1.1, 1.2, and 1.3 explosives and any material identified as Inhalation hazard zone A in a remote area. Placarding is still required for these materials when parked in a designated restricted, posted, and traffic controlled parking or loading and unloading area.
- Park aircraft transporting all other types of hazardous materials in a placarded area. However, placarding is not required for these materials when parked in a designated restricted, posted, and traffic controlled parking or loading and unloading area.

A16.2. Responsibility for Placards.

- Military hosts are responsible for placarding at military bases.
- At nonmilitary airfields, the agency delivering cargo to the aircraft, or off loading cargo is responsible for making arrangements with the airport manager for identifying the cargo, isolating parking and loading, placarding, firefighting, and disaster response. Arrangements for using en route nonmilitary airfields is the responsibility of the activity having operational control of the aircraft.
- It is the shipping activity's responsibility to establish procedures to locally procure and fund for hazardous material placards.
- A description of the placards is shown in table A16.1.

Table A16.1. Placard Requirements. (see notes)

Area Placards Required for Parked Aircraft Containing Hazardous Cargo

Hazard Class or Division (any quantity)	**Type of Placard**
1.1	EXPLOSIVES 1.1
1.2	EXPLOSIVES 1.2
1.3	EXPLOSIVES 1.3
2.3	POISON GAS
4.3	DANGEROUS WHEN WET
6.1 (PG I, Inhalation hazard only)	POISON
7 (radioactive yellow-III label only)	RADIOACTIVE

Hazard Class or Division (1,001 pounds or more gross weight)	**Type of Placard**
1.4	EXPLOSIVES 1.4
1.5	EXPLOSIVES 1.5
1.6	EXPLOSIVES 1.6
2.1	FLAMMABLE GAS
2.2	NONFLAMMABLE GAS
3	FLAMMABLE
4.1	FLAMMABLE SOLID
4.2	SPONTANEOUSLY COMBUSTIBLE
5.1	OXIDIZER
5.2	ORGANIC PEROXIDE
6.1 (PG I or II, other than PG I inhalation hazard)	POISON
6.1 (PG III)	KEEP AWAY FROM FOOD
6.2	none required
8	CORROSIVE

NOTES:

1. The quantity limitation will be the total gross weight of the packages comprising the shipment or different shipments of the same classification. When cargo contains two or more hazardous articles (other than explosives 1.1, 1.2, and 1.3) which are compatible (see attachment 18), combine the gross weight and quantity for this purpose.
2. EXPLOSIVE 1.2 placards are not required if the area contains both Class 1.1 and 1.2 explosives. Placard the area with EXPLOSIVE 1.1 placards.
3. A “DANGEROUS” placard may be used in place of separate placards for two or more categories of hazardous materials (other than those requiring placard for any quantity) when the aggregate gross weight exceeds 454 kg (1000 lbs). When 2268 kg (5000 lbs) of one category of material is loaded, use specified placard for that material.

★CERTIFYING HAZARDOUS MATERIALS

A17.1. Shipper's Certification. Unless specifically exempted in this manual, the shipping activity must complete a shipper's certification according to this attachment for all military air shipments of hazardous materials. Certify hazardous materials to a packaging reference in this manual. Hazardous material may be certified to the ICAO Technical Instruction, IATA Dangerous Good Regulation, or Title 49 CFR under the following conditions:

- Comply with all requirements of the certifying document.
- Do not exceed the passenger quantity limitations of the certifying document. If the passenger quantity limitations of the certifying document are exceeded or the material is forbidden on passenger aircraft, then the shipment must be certified to this manual.
- Include handling instructions identified in this manual for specific proper shipping names on the certification form in the "Additional Handling Information" block.
- Certify vehicles and support equipment to this manual.
- See A17.2.6 for multiple mode shipments.

A17.2. Shipper's Declaration for Dangerous Goods Certification.

A17.2.1. **Forms Required.** Complete shipper's certification on the "Shipper's Declaration for Dangerous Goods" standard commercial form. Two styles of the commercial form may be used. One style is designed with the "Nature and Quantity of Dangerous Goods" section left open for continuous printing. The other style is designed in a columnar format with the "Nature and Quantity of Dangerous Goods" section blocked and formatted with headings specifying each key entry (figure A17.3). It is the shipping activity's responsibility to establish procedures to locally procure and fund for the Shipper's Declaration for Dangerous Goods form.

- Obtain the form through the procurement system from commercial vendors specializing in hazardous material transportation supplies.
- The form may be locally produced depending on local capabilities and economic feasibility.
- The form must meet the format, size, and color specifications outlined in the IATA Dangerous Goods Regulation, Section 8-*Documentation.*

A17.2.2. **Copies Required.** Complete and sign at least three Shipper's Declaration for Dangerous Goods forms.

- Attach one certification form to the copy of the manifest that is placed on the aircraft.
- Attach one certification form to the originating station file manifest. Intransit or enroute terminals may reproduce (photocopy) the Shipper's Declaration for Dangerous Goods form for their station file if required.
- Place one certification form in a waterproof envelope and attach to the number one piece of the shipment.
- The three original forms used to offer hazardous material for military air transportation must have the vertical red hatch border and certifying official's signature. Carbon signaturers are acceptable.
- Additional copies may be forwarded with the shipment. Vertical red hatch border is not required for any additional copies.

A17.2.3. **Form Completion.** Complete the Shipper's Declaration for Dangerous Goods form either manually (hand printed) or mechanically (typewriter, computer, etc.). The form may be completed by a combination of manual and mechanical means, as required, providing all entries are clear and legible. However, when possible, the shipping activity should complete the form entirely manually or entirely mechanically. Incorrect punctuation or entries that touch column separating lines on the form is not justification for frustrating hazardous cargo.

- The certifying official may make pen and ink changes to any key. Someone other than the certifying official may make pen and ink changes to Keys 2, 3, 5, 8, 9, and 19 without affecting the certification. Personnel making a change to any key must sign above the change. All entries must be durable, clear, and legible on all copies. Shipments may be frustrated if any entry on the form is not clear and legible. If the Shipper's Declaration for Dangerous Goods form is rejected, the correction must be accomplished as described in this paragraph or an entirely new form must be completed and presented to the shipping activity.
- Leave blank any key that does not require an entry (i.e., Key 15 when there is no subsidiary risk).
- If the Shipper's Declaration for Dangerous Goods does not contain sufficient space in any one key to accommodate all of the required information, use an additional Shipper's Declaration as an extension page. Each page must show the page number and total number of pages (Key 4). All pages must have the vertical red hatch border.
- For packages containing items with different proper shipping names, prepare individual Shipper's Declarations for Dangerous Goods for each different PSN in the overpack, consolidated, or stowed load. This is required for military airlift, regardless of the certification document used. Pieces of hazardous cargo with different proper shipping names, thus different Shipper's Declarations, cannot be shipped under the same transportation control number

(TCN). General cargo and hazardous cargo may be shipped under the same TCN and only one original Shipper's Declaration for Dangerous Goods is required (see DoD 4500.32-R for assignment of TCN's). See A17.3 for exceptions related to Chapter 3 operations.

- Only one Shipper's Declaration for Dangerous Goods is required when shipments involve a single item with multiple hazards. Certify to the primary or highest hazard. All additional hazards will be identified by PSN, hazard class, and net quantity in "Additional Handling Information" (Key 19). Additionally, the same form may be used for one or more items with the same PSN and identical hazards. If shipping a kit consisting of more than one container, enter in key 19 the statement: "contained in kit piece number ***" (replace "***" with the piece number which contains the hazardous material).

A17.2.4. **Not Enough Copies or No Copies.** In instances where there are not enough copies of the Shipper's Declaration for Dangerous Goods, a certified "true copy" may be placed with the station file manifest. When making a true copy:

- Annotate all the information verbatim from the original Shipper's Declaration for Dangerous Goods.
- Use the information in the signature block from the original form and annotate it on the true copy, (i.e., John Doe, 2 Oct 90). On the reverse side of the form, type or clearly print the words "True Copy" and the name of the individual who is certifying the form to be a true copy. This official must sign the form in longhand above the typed or printed name. The individual preparing a "true copy" need not be qualified according to A25.3 to certify the Shipper's Declaration for Dangerous Goods is a true copy.

A17.2.5. **Split Shipments.** When a shipment is split according to procedures identified in DoD 4500.32R, the following guidance applies:

- Someone other than the certifying official may change key 5 and key 16 entry for number of packages only. The individual making the change must sign above it.
- All other entries in key 16 (i.e., type of packaging and net quantity) will only be changed by the certifying official.
- Prepare a "true copy" according to A17.2.4. The original shipper's certification form will accompany the aircraft manifest with the first shipment. Attach a split shipment "true copy" to aircraft manifest and station manifest for subsequent shipments. Each Shipper's Declaration must reflect the correct TCN and number of packages.
- Enter statement, "Shipment split at XXX (use Air terminal three letter code) IAW DoD 4500.32R" on reverse side of all Shipper's Declaration forms.

A17.2.6. **Multiple Mode Shipments.** Shipments certified to the ICAO, IATA, or 49 CFR that do not exceed the passenger quantity limitations of the certifying document may use the same Shipper's Declaration for Dangerous Goods for both the commercial and military segment of transport. Include any information required by A17.1. For shipments that exceed the passenger quantity limitations of the ICAO, IATA, or 49 CFR:

- Complete a Shipper's Declaration for Dangerous Goods according to the ICAO, IATA, or 49 CFR for the commercial segment and a separate Shipper's Declaration for Dangerous Goods according to this manual for the military segment.
- Place copies of the Shipper's Declaration for Dangerous Goods needed for subsequent movement in a waterproof envelope on the number one piece of the shipment.
- DoD aerial port personnel will remove the copies of the Shipper's Declaration for Dangerous Goods from the waterproof envelope and obliterate the "cargo aircraft only" label if not required for military transport.

A17.2.7. **Classified Information.** If the information to be entered on the Shipper's Declaration is classified, the following procedures apply:

- Complete the signed original in detail, including essential classified data, and attach to the manifest that is placed on the aircraft. Once the classified information is applied, the Shipper's Declaration for Dangerous Goods must carry the same classification as the highest classification of the entered information.
- The manifest on the aircraft must carry the same classification as the classified information until the classified Shipper's Declaration for Dangerous Goods is detached and handled according to applicable security regulations.
- Complete the station file copy in detail except for the classified information. Enter the following statement in "Additional Handling Information" (Key 19): "See aircraft commander's copy of Shipper's Declaration for Dangerous Goods for complete information."

A17.3. **Exceptions for Chapter 3 Operations.** Except as specified below, prepare the Shipper's Declaration for Dangerous Goods according to this manual for tactical or contingency operations.

- **Key 1.** Show the address of the station where the cargo was certified and the telephone number of the certifier's assigned unit.
- **Key 2 and Key 9.** Show worldwide mobility.
- **Key 5.** Show the mobility transportation control number (TCN). Refer to DoD 4500.32-R, *Military Standard*

Transportation and Movement Procedures, for completing TCN.

- **Key 7.** Although the label is not required on the cargo, Key 7 must have the "Passenger and Cargo Aircraft" block deleted if the material is cargo aircraft only.
- A single Shipper's Declaration for Dangerous Goods may be used to identify and certify more than one type of hazardous material. All hazardous material certified on a single form must be considered a single shipment and controlled by one mobility TCN.
- Cite paragraph 3.4.1 when items are removed from their required packaging and stored in racks or containers of tactical vehicles and equipment according to applicable technical directives.

A17.4. Certification Requirements for Specific Items.

A17.4.1. **Class 1.**

- For captured ammunition and ammunition with unknown characteristics shipped according to A5.5, include in key 17 the reference to A5.5 and the applicable packaging paragraph from table A4.1 (for example, "A5.5/A5.59"). Include a copy of the EOD safety certification. Comply with A17.2.7 for classified information.
- Identify any munition or ordnance item containing OTTO Fuel II as a propellant with the following entry in Key 19: "Contains Otto Fuel II as a liquid propellant. In the event of a leak, avoid direct skin contact, ingestion, or inhalation of vapors. Vapors are toxic and may cause severe headache and nausea."
- Identify fired exercise torpedoes or rockets, no longer containing explosive components, with OTTO Fuel II residue remaining as "Environmentally Hazardous Substance Liquid, N.O.S. (OTTO Fuel II)" and prepare according to A13.3.2.20.

A17.4.2. **Class 2.**

- **Cryogenic Liquids.** For cryogenic liquids prepared according to A6.11 provide venting instructions in Key 19. This is not required if venting procedures are provided in a separate instruction accompanying the shipment. Include the location and description of the vent valve. Also, include one of the following statements for venting the unit:
  - "Vent container to outside of aircraft."
  - "Unit is empty and purged, and does not require venting."
  - "Container is excepted from venting."

A17.4.3. **Class 9.**

A17.4.3.1. **Engines Internal Combustion, Fuel Devices, and Other Equipment.**

- For engines, internal combustion prepared according to A13.5 or A13.6, identify the primary hazard Class 9 description in keys 11-14. In key 19 show:
  - The PSN, hazard class, and net quantity of flammable fuel, and any other additional hazards. When an item is completely drained (but not purged) so that the quantity of fuel is below 500 ml (17 ounces), the shipper's estimate of the quantity of fuel remaining in the unit may be entered.
  - The name and quantity of any non-hazardous fuel in vehicles or equipment tanks.
  - The flash point for flammable and non-hazardous fuel.
  - Include the statement "non-hazardous battery installed" if applicable.
  - Reference to the technical directive used to prepare the item for military air shipment is not required.
- Drained and purged repairable engines and fuel devices prepared according to A13.5.6 and A13.6.7 are not hazardous for transportation. A Shipper's Declaration for Dangerous Goods is required. Complete Keys 1 through 9, 16, 17, and 19 through 22. Annotate in Key 16 the name of the equipment. Annotate "Drained and Purged" in Key 19. A Shipper's Declaration for Dangerous Goods is not required when the packaging paragraph states the item is not subject to any other requirements of this manual.
- Certification is not required for movement of wheelchairs with patients.

A17.4.3.2. **Life-Saving Appliances.** For life-saving appliances, Class 9, prepared according to A13.11, show:

- A specific description and the number of the items packaged for shipment in Key 16. For example; "1 wooden box x 3 self-inflating life vests".
- The PSN, hazard class and net quantity of each hazardous component within the shipping container in Key 19.

A17.4.4. **Competent Authority Approvals (CAA).** If the shipment is packaged and transported under the authority of a CAA, cite the CAA number in Key 17. Mark the shipping papers, "PACKAGING AUTHORIZED BY COMPETENT AUTHORITY OF THE UNITED STATES OF AMERICA (USA)." A copy of the CAA must accompany the shipment.

A17.4.5. **Empty Packaging.** Packagings which are considered empty according to 1.10 require a Shipper's Declaration for Dangerous Goods form. Complete Keys 1 through 9, 16, 17, and 19 through 22. Annotate "Empty package" or "Empty cylinder" as appropriate in Key 16. Key 17 will show "1.10" or "1.10.1" as appropriate. A Shipper's Declaration for

Dangerous Goods form is not required for a hazardous article that has been removed and there is no possibility of remaining residue.

A17.4.6. **Excepted Quantities.** A Shipper's Declaration for Dangerous Goods is not required for excepted quantities prepared according to A19.2. Annotate the shipping papers "Dangerous Goods in Excepted Quantities." See A15.2 for labeling requirements.

A17.4.7. **Grandfathered or Domestic Shipments.** For material shipped according to 1.7.2 or 1.7.3, cite 1.7.2 or 1.7.3 (as applicable) and the corresponding packaging paragraph from AFR 71-4 (for example, "1.7.2/5-38" or "1.7.3/5-38").

A17.5. Completing the Shipper's Declaration for Dangerous Goods. Use figure A17.1 for detailed instructions on accomplishing the shipper's certification form for nonradioactive and radioactive shipments. Use figure A17.2 to determine if a Shipper's Declaration for Dangerous Goods is required for radioactive shipments.

Key 1. Shipper. Enter the address and telephone number where the hazardous material was certified.

Key 2. Consignee. Enter the six-digit Department of Defense Activity Address Code (DODAAC) and/or the in-the-clear geographical location of the ultimate consignee (if known.)

- For shipments of infectious substances, enter also the name and telephone number of a responsible person for contact in an emergency.

Key 3. Air Waybill No. The aircraft manifest number to which the Shipper's Declaration for Dangerous Goods will be attached may be entered in this key. This number need not be entered by the shipper. It may be entered by the accepting operator at the time it is assigned. This key may also be left blank.

Key 4. Page...of...Pages. Enter the page number and total number of pages of the Shipper's Declaration for Dangerous Goods form. Enter "Page 1 of 1 Pages" or leave blank if there are no extension pages.

Key 5. Shipper's Reference Number. Enter the 17-character transportation control number (TCN).

Key 6. Optional Block. Unit cargo identification information may be entered. This key may also be left blank.

Key 7. Shipment Within Passenger Aircraft and Cargo Aircraft Limitations.

- If the shipment is acceptable for movement on both passenger and cargo aircraft, delete "Cargo Aircraft Only."
- If the shipment is allowed on cargo aircraft only, delete "Passengers and Cargo Aircraft."

Key 8. Airport of Departure. Enter the three-digit Port of Embarkation (POE) and/or the in-the-clear geographical location of the airport of departure.

Key 9. Airport of Destination. Enter the three-digit Port of Debarkation (POD) and/or the in-the-clear geographical location of the airport of destination.

Key 10. Shipment Type.

- Delete "Radioactive" if the shipment contains no radioactive material.
- Delete "Nonradioactive" if the shipment contains radioactive material.

Key 11. Proper Shipping Name. Enter the PSN as it appears in table A4.1. Enter the following information, if applicable, in association with the basic description:

- Technical name when required by attachment 4.
- The letters "RQ" preceding the PSN for a hazardous substance (see A4.5).
- The word "TOXIC" for a liquid or solid Class 6.1 PG I or II material if the PSN or hazard class does not identify the material as toxic.

Figure A17.1. Step-by step Instructions for Completing Shipper's Declaration for Dangerous Goods form.

- For materials which are toxic (poisonous) by inhalation, enter the words "TOXIC-INHALATION HAZARD" and "ZONE A", "ZONE B", "ZONE C", or "ZONE D" for gases, or "ZONE A" or "ZONE B" for liquids, as appropriate. The word "TOXIC" need not be repeated if it is already identified in the PSN. Enter "INHALATION HAZARD" and the appropriate zone.
- The words "Dangerous When Wet" when a material meets the definition of a dangerous when wet material.
- The word “Waste” preceeding the PSN for a hazardous material that is a hazardous waste.

Key 12. Class and Division. Enter the hazard class and division number given in column 3 of table A4-1.
- For Class 1 material, include the compatibility group letter and the inhabited building distance (as listed in Joint Hazard Classsification System or Service directives).
- For a single item with more than one hazard, enter the hazard class number of the item's primary hazard.

Key 13. UN, NA, OR ID No. Enter the United Nations (UN), North American (NA), or identification number (ID) given in column 4 of table A4.1. Include the UN, NA, or ID prefix and the number.

Key 14. Packing Group. Enter the application Packing Group (PG) given in column 5 of table A4.1.

Key 15. Subsidiary Risk. Enter the subsidiary risk if given in column 6 of table A4.1.

Key 16. Quantity and Type of Packing.
- Nonradioactive shipments enter:
  - The number of packages (of same type and content) and their type of packaging.
    - Type of packaging listed in this key is the authorized packaging identified in the packaging paragraph. Identify the type of packaging by specification code or text description of the outer packaging. For example: fiberboard box or 4G; metal drum or 1A2; DOT 3A or cylinder.
    - For specifically named self-propelled vehicle and mechanical apparatus enter nomenclature or basic description of the item (i.e., truck, generator, etc.).
  - The weight, volume¸or other applicable measure of the actual hazardous material (per package).
    - Do not include any nonhazardous content of the shipment.
    - Enter the net quantity in metric measurement units. The equivalent English unit of measure may be entered in parenthesis immediately following the metric unit.
    - Show the quantity immediately following the number and type of package (i.e., 2 wooden boxes x 4.5 kg (10 pounds); 1 4G x 5 L (1.3 gallons)).
    - For explosives, Class 1.1, 1.2, and 1.3, enter the "Net Explosive Weight (NEW)" in kilograms (pounds) per package or per pallet (i.e., 3 wooden boxes x 120 kg (264.6 pounds) NEW; 5 metal boxes x 200 kg (441 pounds) NEW). Unless otherwise required, either N/A or the NEW may be entered for Class 1.4, 1.5, 1.6 explosives. Italy and the United Kingdom require the NEW for all explosives entering their country. Entry of pounds in association with kilograms is preferred but not required.
    - Express in kilograms (pounds), not pounds per square inch, the quantity of compressed gas unless otherwise specified in this instruction. When certifying to A6.3 "Small Receptacles Containing Compressed Gases, "A6.8 "Fire Extinguishers," and A6.10 "Cigarette Lighter or Other Similar Devices Charged with Fuel," other units of measure; (i.e., fluid ounces, gallons, or ounces) are specified and may be shown on this form. See also A26.4.
  - When an overpack is used for handling purposes, enter the words “Overpack Used”.
- Radioactive shipments enter:
  - Name or symbol of the radionuclide in the material.
  - Description of the physical and chemical form of the material, if it is not in special form (generic chemical description is acceptable for chemical form). If special form, enter "Special Form."
  - The number of packages (of same type and content), the type of package, and the activity contained in each package in terms of Becquerel or Terabecquerel. The equivalent customary unit of measure (i.e., Ci, mCi, or uCi) may be included in parenthesis.

Figure A17.1. Continued

Key 17. Packing Instructions.

- Nonradioactive shipments enter:
  - The packaging paragraph used to prepare the material for shipment.
  - If the packaging has been approved by a DOT-Exemption, CAA, COE, or waiver cite the approval number (i.e., AFMC 24-204-96-09; COE NA-84-505; DOT-E 3849; etc.)
  - If a POP certified package is overpacked to meet air eligibility requirements, cite A3.2.3 and the applicable packaging paragraph for the material. Cite the applicable packaging paragraph for the material when packing inner containers into a 1A2 drum to meet air eligible and POP configuration requirements.
- Radioactive shipments enter (see figure A17.2, steps 5 and 6 for assistance):
  - Packaging paragraph used to prepare the material for shipment.
  - Category of the package (i.e., “white-I,” “yellow-II,” or “yellow-III”).
  - The transport index, preceded by the prefix "Ti", assigned each package having a "Radioactive Yellow-II" or "Radioactive Yellow-III" label and dimensions of each package (including dimensional units).
  - The fissile class. If the package is exempt enter the words "Fissile Exempt."
  - Maximum allowable number of packages for loading on one aircraft (for fissile class III shipments only).

Key 18. Authorization.

- Nonradioactive shipments enter:
  - When applicable, enter the words "Limited Quantity" or "LTD. QTY."
- Radioactive shipments enter Approval Identification Markings (if relevant). List the package identification markings of any of the documents listed below issued by a competent authority. Include the words "attached" to indicate that the documents are attached to the declaration form.
  - Special form approval certificate.
  - Type B package design approval certificate.
  - Type B(M) package shipment approval certificate.
  - Fissile material package design approval certificate.
  - Fissile material package shipment approval certificate.
  - Special arrangement approval certificate.
  - Any similar documents.

Key 19. Additional Handling Information. Enter:

- The PSN, hazard class, and net quantity of each additional hazard for items with multiple hazards.
- Handling instructions, when specified by a packaging paragraph. Only enter if the handling instruction applies to the material being shipped.
- The name and quantity of non-hazardous fuel contained in tanks of vehicles or equipment. Include statement "non-hazardous battery installed" if applicable.
- The flash point in degrees centigrade when shipping flammable liquids or for any fuel identified in vehicle or equipment tanks. Show the letters "FP," the number, the degree symbol, and "C" (for centigrade). The corresponding Fahrenheit unit of measure may also be included in parenthesis following the centigrade unit.
- The 24-hour Emergency Response number for the hazardous material listed on the Shipper's Declaration for Dangerous Goods. Enter the words "EMERGENCY CONTACT:" followed by the number. See 2.8 for Emergency Response numbers used by DoD activities.
- The control and emergency temperatures for temperature controlled Class 5.2 materials.

Key 20. Name/Title of Signatory. Enter the name and title of the official signing the form.

Key 21. Place and Date. Enter the place and date the material was certified (i.e., Kelly AFB, 1 Jan 97).

Key 22. Signature. The official who certifies that the shipment complies with the requirements of this instruction must sign the form in longhand.

Figure A17.1. Continued.

Step 1. Determine the radionuclide and type of package. Turn to A11.4. Find the radionuclide, its name, and the maximum radioactive quantity (Ci) that can be shipped in a type A package. If a type B container is required, go to Step 3.

Step 2. Determine if a Shipper's Declaration for Dangerous Goods is Required. Turn to table A11.7. Determine the maximum quantity that can be shipped as a limited quantity. This amount will be a fraction of the quantity listed in table A11.1. If the item is a limited quantity, a Shipper's Declaration for Dangerous Goods is not required, but you must comply with A11.11, A11.12, A11.13, or 11.14. Go to Step 3 if the material is not a limited quantity.

Step 3. Enter the Information Required in Key 16. Make a note of the transport index, but do not enter it in Key 16.

Step 4. Determine the Proper Shipping Name (PSN). Select the applicable PSN from table A4.1. Complete the appropriate keys using the information found in table A4.1, columns 2 through 4. Do not complete Key 17 at this point. Make a note of all the basic paragraphs listed in column 8.

Step 5. Select the Packaging Paragraph. Determine the correct packaging paragraph from the list you made in Step 4 based on the type of package used (type A or type B). Determine the paragraph based on the particular container used. Enter this information as the first entry in Key 17.

Step 6. Determine the Label Requirements. Use the transport index, the surface reading, and fissile class, if appropriate, to determine the labels required by Attachment 15. Enter the label required as the category of package entry in Key 17, immediately following the packaging paragraph. Enter the transport index and any remaining information required to complete Key 17.

Step 7. Complete the Remaining Keys of the Shipper's Declaration for Dangerous Goods. Step-by-step instructions for completing the Shipper's Declaration for Radioactive Material are identified in figure A17.1.

Figure A17.2. Determining Certification Requirements for Class 7.

SHIPPER'S DECLARATION FOR DANGEROUS GOODS

Shipper 1	Air Waybill No. 3 Page of Pages 4 Shipper's Reference Number *(optional)* 5
Consignee 2	*(Company logo, name and address optional)* 6
Two completed and signed copies of this Declaration must be handed to the operator	**WARNING** Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties. This Declaration must not, in any circumstances, be completed and/or signed by a consolidator, a forwarder or an IATA cargo agent.
TRANSPORT DETAILS This shipment is within the limitations prescribed for *(delete non-applicable)* 7 PASSENGER AND CARGO AIRCRAFT / CARGO AIRCRAFT ONLY Airport of Departure 8	
Airport of Destination 9	Shipment type *(delete non-applicable)* NON-RADIOACTIVE / RADIOACTIVE 10

NATURE AND QUANTITY OF DANGEROUS GOODS

Dangerous Goods Identification					Quantity and type of packing	Packing Inst.	Authorization
Proper Shipping Name	Class or Division	UN or ID No.	Packing Group	Subsidiary Risk			
11	12	13	14	15	16	17	18

Additional Handling Information

19

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.	Name/Title of Signatory 20 Place and Date 21 Signature *(see warning above)* 22

Figure A17.3. Completed Samples of the Shipper's Declaration for Dangerous Goods.

SHIPPER'S DECLARATION FOR DANGEROUS GOODS (**Provide at least two copies to the airline.**)

Shipper 1	Air Waybill No. 3 Page of Pages 4 Shipper's Reference Number *(optional)* 5
Consignee 2	6

Two completed and signed copies of this Declaration must be handed to the operator

TRANSPORT DETAILS

This shipment is within the limitations prescribed for: *(delete non-applicable)* 7

PASSENGER AND CARGO AIRCRAFT	CARGO AIRCRAFT ONLY

Airport of Departure 8

Airport of Destination: 9

WARNING

Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties. This Declaration must not, in any circumstances, be completed and/or signed by a consolidator, a forwarder or an IATA cargo agent.

Shipment type: *(delete non-applicable)*

NON-RADIOACTIVE	RADIOACTIVE

10

NATURE AND QUANTITY OF DANGEROUS GOODS

Proper Shipping Name, Class, UN Number or Identification Number, Packing Group (if required), number of packages, packing instructions and all other required information as detailed in Subsections 6.6 and 8.1 of IATA Dangerous Goods Regulations.

11,12,13,14,15//16//17//18

Additional Handling Information

19

24 hr. Emergency Contact Tel. No. _____

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Name/Title of Signatory 20

Place and Date 21

Signature *(see warning above)* 22

Figure A17.3. Completed Samples of the Shipper's Declaration for Dangerous Goods.

SHIPPER'S DECLARATION FOR DANGEROUS GOODS

Shipper

ADDRESS AND TELEPHONE NUMBER

Air Waybill No. SKF1C21222

Page of Pages

Shipper's Reference Number *(optional)* FB20594911212XXX

Consignee

645ABW
Wright Patterson AFB OH

(Company logo, name and address optional)

Two completed and signed copies of this Declaration must be handed to the operator

WARNING

Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties. This Declaration must not, in any circumstances, be completed and/or signed by a consolidator, a forwarder or an IATA cargo agent.

TRANSPORT DETAILS

This shipment is within the limitations prescribed for *(delete non-applicable)*

~~PASSENGER AND CARGO AIRCRAFT~~ | CARGO AIRCRAFT ONLY

Airport of Departure

Kelly AFB TX

Airport of Destination Wright Patterson AFB OH

Shipment type *(delete non-applicable)*

~~NON-RADIOACTIVE~~ | RADIOACTIVE

NATURE AND QUANTITY OF DANGEROUS GOODS

Dangerous Goods Identification					Quantity and type of packing	Packing Inst.	Authorization
Proper Shipping Name	Class or Division	UN or ID No.	Packing Group	Subsidiary Risk			
Radioactive Material N.O.S.	7	UN2982			137cs, Alkali Metal, solid, 2 Type A packages X .37TBq (10ci)	A11.6.1 yellow III, Ti0.8	

Additional Handling Information

EMERGENCY CONTACT: (309) 782-3510

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Name/Title of Signatory
William J. Orsini, Foreman

Place and Date
Kelly AFB TX 1 Mar 97

Signature *(see warning above)*

Figure A17.3. Completed Samples of the Shipper's Declaration for Dangerous Goods.

SHIPPER'S DECLARATION FOR DANGEROUS GOODS (Provide at least two copies to the airline.)

Shipper ADDRESS AND TELEPHONE NUMBER	Air Waybill No. Page 1 of 1 Pages Shipper's Reference Number (optional) NBO 1710226193XXX
Consignee NBO171	
Two completed and signed copies of this Declaration must be handed to the operator	**WARNING** **Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties. This Declaration must not, in any circumstances, be completed and/or signed by a consolidator, a forwarder or an IATA cargo agent.**

TRANSPORT DETAILS

This shipment is within the limitations prescribed for: *(delete non-applicable)* PASSENGER AND CARGO AIRCRAFT ~~CARGO AIRCRAFT ONLY~~	Airport of Departure NGV
Airport of Destination: Norfolk VA	Shipment type: *(delete non-applicable)* NON-RADIOACTIVE ~~RADIOACTIVE~~

NATURE AND QUANTITY OF DANGEROUS GOODS
Proper Shipping Name, Class, UN Number or Identification Number, Packing Group (if required), number of packages, packing instructions and all other required information as detailed in Subsections 6.6 and 8.1 of IATA Dangerous Goods Regulations.

Engine, internal combustion,9,UN3166//1 Jeep//A13.5.1

Additional Handling Information
Gasoline,3,100L (25 gal), FP-43°C (-45°F)
Battery, wet, filled with acid,8,2.5L (5 pints)
Fire Extinguisher, 2.2,4.5kg (10 lbs)
24 hr. Emergency Contact Tel. No. 1-800-851-8061

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.	Name/Title of Signatory SSgt M. J. Radcliffe Place and Date Norfolk VA 1 Mar 97 Signature *(see warning above)*

Figure A17.3. Completed Samples of the Shipper's Declaration for Dangerous Goods.

★COMPATIBILITY

A18.1. General Requirements. Do not load packages containing hazardous materials that might react dangerously with one another or transport in a position that would allow interaction between the material in the event of leakage. Segregation requirements for hazardous material on military aircraft are identified in tables A18.1 and A18.2.

- Table A18.1 details segregation requirements for all hazardous materials.
- Table A18.2 specifies compatibility requirements for Class 1.
- A18.4 specifies compatibility requirements for tactical and contingency operations under the authority of chapter 3.

A18.2. Segregation Requirements for All Hazardous Materials. Table A18.1 indicates the explosives and other hazardous materials that must not be loaded, transported, or stored together.

- Only the primary hazard class or division are considered for compatibility, subsidiary-risk and secondary hazards are not considered.
- The absence of any hazard class or a blank space in the table indicates that no restrictions apply.
- The letter "X" at an intersection of horizontal and vertical columns indicates that these articles must not be loaded or stored together. For example, in table A18.1, Class 3 flammable liquids, must not be loaded, transported, or stored with Class 1.1.
- The letter "O" at an intersection of horizontal and vertical columns indicates that these articles must not be loaded, transported, or stored together unless separated by a distance of 2.2 m (88 inches) in all directions. For example, in table A18.1, Class 8 corrosive liquids, must not be loaded, transported, or stored with Class 4.1 flammable solids unless separated by 2.2 m (88 inches) in all directions.
- The "*" at an intersection of horizontal and vertical columns indicates that segregation among different Class 1 materials is identified in table A18.2.
- Be sure to check notes for compatibility.

A18.3. Segregation Requirements for Class 1 Materials. Table A18.2 identifies Class 1 materials that must not be loaded, transported, or stored together.

- A blank space in the table indicates that no restrictions apply.
- The letter "X" at an intersection of horizontal and vertical columns shows that these articles must not be loaded or stored together. For example, do not load or store Class 1.2C with Class 1.2H.
- Unless otherwise authorized, do not pack explosives in the same outside container with other articles. Explosives of the same compatibility group or authorized combination of compatibility groups but a different class number may be packed together, provided that the whole package is treated as though its entire contents were comprised of the lower class number (higher hazard). For example, treat a mixed package of Class 1.2D explosives and Class 1.4D explosives as Class 1.2D explosives. However, when Class 1.5D is packed together with Class 1.2D, treat the whole package as Class 1.1D (for compatibility).
- Noncompatible explosives may be packed together when approved according to TB 700-2/NAVORDINST 8020.3/TO 11A-1-47/DLAR 8220.1, *DoD Explosive Hazard Classification Procedures* or 2.3.2.
- Be sure to check notes for compatibility.

A18.4. Compatibility for Chapter 3. This paragraph prescribes compatibility exceptions for tactical or contingency operations according to 3.6.1. The requirements of tables A18.1 and A18.2 may be deviated from when transporting cargo under the authority of Chapter 3, consistent with operational requirements. Normally incompatible hazardous materials may be transported on the same aircraft when separated to the maximum extent possible. Compatibility waivers are not required. The following restrictions are mandatory:

- Explosives in compatibility groups A, J, K, and L can only be shipped with material in compatibility group S and Class 9.
- Fissile class III radioactive materials (Class 7) cannot be loaded, transported, or stored on the same aircraft with any other hazardous material.
- Class 1.1, 1.2, and 1.3 cannot be shipped with any Inhalation hazard zone A material .
- Class 1.1, 1.2, and 1.3 cannot be shipped with Class 6.1 poisonous liquids, PG I.
- Cyanides or cyanide mixtures (Class 6.1) cannot be loaded, transported, or stored with any corrosive Class 8 material.

Table A18.1. Segregation Table for Hazardous Materials.

Class or Division Note 7	Notes	1.1 1.2	1.3	1.4	1.5	1.6	2.1	2.2	2.3 Gas Zone A	2.3 Gas Other than Zone A	3	4.1	4.2	4.3	5.1	5.2	6.1 Liquid PG I Zone A	7	8 Liquid Only
Notes		**1**													**1**		**4**	**2 3**	**4, 5 6, 8**
1.1 and 1.2	1	*	*	*	*	*	X		X	X	X	X	X	X	X	X	X	X	X
1.3		*	*	*	*	*	X		X	X	X	X	X	X	X	X	X	X	X
1.4		*	*	*	*	*	0		0	0	0		0				0		0
1.5		*	*	*	*	*	0		0	0	0		0				0		0
1.6		*	*	*	*	*	0		0	0	0		0				0		0
2.1		X	X	0	0				X	0			0	0	0	0	0	0	0
2.2																			
2.3 Zone A		X	X	0	0		X				X	X	X	X	X	X			X
2.3 Other than Zone A		X	X	0	0		0				0	0	0	0	0	0			0
3		X	X	0	0	0			X	0		0	0	0	0	0	X		
4.1		X	X						X	0	0						X		0
4.2		X	X	0	0	0	0		X	0	0						X		X
4.3		X	X				0		X	0	0						X		X
5.1	1	X	X				0		X	0	0						X		0
5.2		X	X				0		X	0	0						X		0
6.1 Liquid PG I Zone A	4	X	X	0	0	0	0				X	X	X	X	X	X			X
7	2 3	X	X				0												
8 Liquid Only	4 5 6 8	X	X	0	0	0	0		X	0		0	X	X	0	0	X		

NOTES:

1. Ammonium nitrate fertilizer may be loaded, transported, or stored with Class 1.1 materials.
2. Do not load, transport, or store fissile class III radioactive material (Class 7) on the same aircraft with any other hazardous material.
3. Normal uranium, depleted uranium, and thorium metal in solid form radioactive materials (Class 7) may be loaded and transported with Class 1.1, 1.2, and 1.5 (explosives).
4. Do not load, transport, or store cyanides or cyanide mixtures (Class 6.1) with any Class 8 materials.
5. Separate nitric acid (Class 8) in carboys by 2.2 m (88 inches) in all directions from other corrosives materials in carboys when loaded on the same aircraft.
6. Do not load, transport, or store charged electric storage batteries (Class 8) on the same aircraft with any Class 1.1 or 1.2.
7. Class 6.1 toxic solids and liquids (other than PG I, zone A), corrosive solids, ORM-D, Class 9, and hazardous materials in Excepted Quantities may be transported with each other and all other hazardous materials without compatibility restrictions. Ensure compliance with notes 4, 5, and 6.

8. Class 8 corrosive liquids must not be loaded above Class 4 (flammable solid) material or Class 5 (oxidizing) material.

Table A18.2. Compatibility Table for Class 1 (Explosive) Materials.

Compatibility Group	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**	**N**	**S**
NOTES													
A		**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
B 1, 2,	**X**		**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	
C	**X**	**X**				**X**	**X**	**X**	**X**	**X**	**X**		
D	**X**	**X**				**X**	**X**	**X**	**X**	**X**	**X**		
E	**X**	**X**				**X**	**X**	**X**	**X**	**X**	**X**		
F 3	**X**	**X**	**X**	**X**	**X**		**X**	**X**	**X**	**X**	**X**	**X**	
G 4, 5, 7	**X**	**X**	**X**	**X**	**X**	**X**		**X**	**X**	**X**	**X**	**X**	
H	**X**	**X**	**X**	**X**	**X**	**X**	**X**		**X**	**X**	**X**	**X**	
J	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**		**X**	**X**	**X**	
K	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**		**X**	**X**	
L 6	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**		**X**	**X**
N	**X**	**X**				**X**	**X**	**X**	**X**	**X**	**X**		
S 7	**X**										**X**		

NOTES:
1. Group "B" explosives UN 0255, 0257, UN0267, and UN0361 may be loaded and transported with groups "C," "D," and "E" explosives.
2. Group "B" explosives packaged in an EOD MK 663, MOD O container may be loaded and transported with groups "C" through "H" and group "S" explosives.
3. Group "F" explosives UN 0292 may be loaded and transported with groups "C," "D," and "E" explosives.
4. Group "G" explosives UN 0019, UN 0300, UN 0301, and UN 0325 may be loaded and transported with all other explosives compatible with group "S" explosives.
5. Group "G" explosives UN 0009, UN 0018, UN 0314, UN 0315, UN 0317, UN 0319, and UN 0320 may be transported with groups "C," "D," and "E" explosives.
6. Group "L" explosives must only be loaded and transported with an identical item.
7. Class 1.1 and 1.2 explosives may not be packed with the following explosives: UN 0333, UN 0334, UN 0335, UN 0336, and UN 0337.

A18.5. Classification Codes and Compatibility Groups of Explosives. The classification code for an explosive consists of the class number followed by the compatibility group letter. Compatibility group letters are used to specify the controls required for transportation and storage and to prevent the additional hazard that might occur if certain types of explosives are transported or stored together. All explosives entering the Defense Transportation System must be assigned a final or interim hazard classification

according to A3.3.1.2. Compatibility groups and classification codes for the various types of explosive substances and articles are identified in tables A18.3.

Table A18.3. Classification Codes.

Description of Substances or Article to be Classified	Compatibility Group	Classification Code
Primary explosive substance	A	1.1A
Article containing a primary explosive substance and not containing two or more effective protective features	B	1.1B 1.2B 1.4B
Propellant explosive substance or other deflagrating explosive substance or article containing such explosive substance	C	1.1C 1.2C 1.3C 1.4C
Secondary detonating explosive substances or black powder or article containing a secondary detonating explosive substance, in each case without means of initiation and without a propelling charge, or article containing a primary explosive substance and containing two or more effective protective features	D	1.1D 1.2D 1.4D 1.5D
Article containing a secondary detonating explosive substance, without means of initiation, with a propelling charge (other than one containing flammable liquid or hypergolic liquid)	E	1.1E 1.2E 1.4E
Article containing a secondary detonating explosive substance with its means of initiation, with a propelling charge (other than one containing flammable liquid or hypergolic liquid) or without propelling charge.	F	1.1F 1.2F 1.3F 1.4F
Pyrotechnic substance or article containing a pyrotechnic substance, or article containing both an explosive substance and illuminating, incendiary, tear-producing or smoke producing substance (other than a water-activated article or one containing white phosphorus, phosphide or flammable liquid or gel or hypergolic liquid.	G	1.1G 1.2G 1.3G 1.4G
Article containing both an explosive and white phosphorus	H	1.2H 1.3H
Article containing both an explosive substance and flammable liquid or gel	J	1.1J 1.2J 1.3J
Article containing both an explosive substance and a toxic chemical agent	K	1.2K 1.3K

Table A18.3. Classification Codes Continued.

Description of Substances or Article to be Classified	Compatibility Group	Classification Code
Explosive substance or article containing an explosive substance and presenting a special risk (e.g., due to water-activation or presence of hybergolic liquids phosphides or pyrophoric substances) needing isolation of each type.	L	1.1L 1.2L 1.3L
Articles containing only extremely insensitive detonating substances	N	1.6N
Substance or article so packed or designed that any hazardous effects arising from accidental functioning are limited to the extent that they do not significantly hinder or prohibit fire fighting or other emergency response efforts in the immediate vicinity of the package.	S	1.4S

EXCEPTED AND LIMITED QUANTITIES

A19.1. Quantities. Excepted and limited quantities are authorized on military aircraft according to 2.7. These small quantities of hazardous materials are exempted from certain requirements of this manual as identified in this attachment.

★**A19.2. Excepted Quantities.** Small quantities of hazardous materials are exempt from the specification packaging, marking, labeling, certification and compatibility requirements of this manual if the provisions of this paragraph are met.
A19.2.1. Do not ship the following material as an excepted quantity:

- Class 1 material.
- Class 2, division 2.1 and 2.3; or division 2.2 material having a subsidiary risk.
- Material having a primary or subsidiary risk of Class 4 in PG I.
- Class 4.1 self-reactive material.
- Material having a primary or subsidiary risk of Class 5 in PG I.
- Material having a primary or subsidiary risk of Class 6.1, in PG I, by reason of inhalation toxicity.
- Class 6.2 material.
- Class 7 material.
- Material having a primary or secondary risk of Class 8 in PG I.
- Magnetized material (Class 9).
- Hazardous material contained within a device which is a component part of an otherwise nonhazardous item (except for temperature sensing devices) such as mercury switches in electrical equipment. Prepare the hazardous material according to the requirements for the hazard. If the material is not regulated as a hazardous material, ship the item as general cargo.
- Material identified as "Cargo Aircraft Only" in table A4.1.

A19.2.2. **Maximum Net Quantity for Excepted Quantities.** The maximum net quantity of hazardous material allowed in each inner packaging and the total net quantity allowed in each outer packaging are given in table A19.1. Refer to A19.2.1 to determine if the material qualifies for the excepted quantities provision and that table A19.1 is applicable. If the quantity limitations of table A19.1 are exceeded, the excepted quantity provision must not be used and the material must be prepared according to the requirements for the individual material.

Table A19.1. Quantity Limits for Inner and Outer Packaging.

Class of Primary or Subsidiary Risk	Packing Group I Packagings		Packing Group II Packagings		Packing Group III Packagings	
	Inner	Outer	Inner	Outer	Inner	Outer
2.2	See (note 1) and (note 2)		See (note 1) and (note 2)		See (note 1) and (note 2)	
3	30 mL	300 mL	30 mL	500 mL	30 mL	1 L
4	Forbidden		30 g or	500 g or	30 g or	1 kg or
			30 mL	500 mL	30 mL	1 L
5 (note 3)	Forbidden		30 g or	500 g or	30 g or	1 kg or
			30 mL	500 mL	30 mL	1 L
6	1 g or	300 g or	1 g or	500 g or	30 g or	1 kg or
	1 mL	300 mL	1 mL	500 mL	30 mL	1 L
8	Forbidden		30 g or	500 g or	30 g or	1 kg or
			30 mL	500 mL	30 mL	1 L
9 (note 4)	Not Applicable		30 g or	500 g or	30 g or	1 kg or
			30 mL	500 mL	30 mL	1 L

NOTES:
1. Packing groups are not used for this hazard class.
2. For inner packaging, the quantity contained in each receptacle must not exceed a water capacity of 30 ml. For outer packaging, the sum of the water capacities of all the inner packaging must not exceed 1 L.
3. For Class 5.2, PG II, the maximum total net quantity allowed in the outer packaging is 500 g or 250 ml.
4. For Class 9 material, if no PG is given in table A4.1, PG II quantities must be used.

A19.2.3. **Inner Packaging.** Each inner packaging must be plastic (with a minimum thickness of 0.2 mm), glass, earthenware, or metal. The inner packaging must not react with, or be decomposed by, the material contained therein.
A19.2.4. **Closures.** Closures must be held securely, tightly, and effectively in place with tape, self-shrink plastic, wire, or other positive means.
A19.2.5. **Liquids.** Liquids must not completely fill inner packaging at a temperature of 55 C (130 F).
A19.2.6. **Intermediate Packaging.** Securely pack each inner packaging in an intermediate packaging with cushioning material. The intermediate packaging must completely contain the contents in case of breakage or leakage, regardless of packaging orientation. For liquid hazardous material, the intermediate packaging must contain sufficient absorbent cushioning material to absorb the entire contents of the inner packaging.
A19.2.7. **Outer Packaging.** Securely pack the intermediate packaging in a strong, rigid, outer packaging (i.e., fiberboard, wood).
A19.2.8. **Overpacks.** Overpacks may be used and may contain packages of nonhazardous material. All material in the same outer packaging and overpack must be compatible.
A19.2.9. **Dimensions of Outer Package.** Two of three outside dimensions of the outer package must measure at least 100 mm (4 inches). If the outer package is in the shape of a cylinder, it must have a minimum height and diameter of 100 mm (4 inches) each.
A19.2.10. **Other Hazardous Materials and Materials in Excepted Quantities.** A package containing hazardous material in excepted quantities must not contain other hazardous material that are regulated by this manual (requires a Shipper's Declaration for Dangerous Goods).
A19.2.11. **Different Materials in One Outer Packaging.** When different hazardous materials are contained in one outer packaging, use the formula listed below to determine the quantities that can be included in one outer packaging. The quantities of different hazardous materials contained in each outer packaging must be such that "Q" is less than or equal to 1.0, "Q" is calculated using the formula:

$$nl/Ml + n2/M2 + n3/M3 \ldots = Q$$

(nl, n2, etc. is the actual net quantity of each different hazardous material. Ml, M2, etc. is the maximum net quantity permitted for the material and packing group in the outer packaging according to table A19.1.) For example:

- There are 15 inner packages at 20 ml each of Class 3, PG II , and 5 inner packages at 30 ml each of Class 8, PG II in one outer packaging: 300 ml/500 ml + 150 ml/500 ml = 0.6 + 0.3 = 0.9. The result is less than 1.0, so the material can be shipped in one outer packaging.
- There are 5 inner packages at 30 ml each of Class 3, PG II, and 15 inner packages at 30 g each of Class 8, PG II in one outer packaging: 150 ml/500 ml + 450 g/500 g = 0.3 + 0.9 = 1.2. The result is greater than 1.0, so the item can not be shipped in one outer packaging.

A19.2.12. **Package Performance Tests.** The complete package (inner plus outer packaging), must be capable of withstanding the test specified in A19.2.12.1 without breakage or leakage of the inner packaging and without significant reduction in effectiveness. Tests must be carried out on the packaging prepared as for transport. Inner receptacles must contain at least 95 percent of their capacity for solids and 98 percent of their capacity for liquids. The material to be transported in the packaging may be replaced by another material, except where this would invalidate the results of the tests. When another material is substituted for a solid, the material must have the same physical characteristics (i.e., mass, grain size) as the material to be shipped. When another material is substituted in the drop test for liquids, its relative density (specific gravity) and viscosity shall be similar to the material to be shipped.
A19.2.12.1. For packaging with six sides (i.e., fiberboard box), the following free drops onto a solid, unyielding, flat, and horizontal surface from 1.8 m (6 ft) is required. Each test may be performed on different but identical containers.

- One drop flat on the bottom.
- One drop flat on the top.
- One drop flat on the long side.
- One drop flat on the short side.
- One drop on a corner at the junction of three intersecting edges.

A19.2.12.2. For cylindrical packaging, the following free drops onto a solid, unyielding flat and horizontal surface from 1.8 m (6 ft) is required:

- One drop diagonally on chime or circumferential seam edge.
- One drop on the weakest part (i.e., a closure) not tested by the first drop.

A19.2.12.3. A force applied to the top surface for a duration of 24 hours, equivalent to the weight of identical packages if stacked to a height of 3 m (10 ft), including the test sample.

A19.3. Dangerous Goods in Limited Quantities. Limited quantities may be certified to this paragraph or to the most current ICAO Technical Instructions or IATA Dangerous Goods Regulation. Comply with all requirements of the document used including the inner packaging and outer packaging quantity limits. Pack limited quantities in good quality combination packagings using only the inner and outer packaging combinations authorized. The packagings must also meet the general packaging requirements of attachment 3. Single packagings, including composite packagings, are not permitted. The gross weight of a "limited quantity" package must not exceed 30 Kg (66 pounds). Quantity limits must not exceed the amounts authorized by table A19.2. If all the requirements of this paragraph and the quantity limits of table A19.2 are met, the combination packaging need not meet (or be marked) with the UN POP requirements.

A19.3.1. **Dangerous Goods not Permitted in Limited Quantities:**

- Materials forbidden in table A4.1.
- Materials identified as “Cargo Aircraft Only” in table A4.1.
- All materials in PG I.
- Class 1 and 7 materials.
- Class 2.3 and 6.2.
- Class 2.1 materials (other than aerosols).
- Refrigerated liquefied gases.
- Class 4.1 self-reactive substances.
- Class 4.2 or any material with a subsidiary risk of 4.2.
- Materials with UN numbers of 2794, 2795, or 3028.
- Class 9 materials except "ammonium nitrate fertilizers (UN 2071)" and "dibromodifuoromethane (UN 1941)."

A19.3.2. **Dangerous Goods Permitted in Limited Quantities:**

- Aerosols of Class 2.1 and 2.2.
- Gases of Class 2.2 without a subsidiary risk (excluding refrigerated liquefied gases).
- Class 3 (excluding PG I).
  Class 4.1 (excluding PG I and Class 4.1 self-reactive substances).
- Class 4.3 solids only (excluding PG I).
- Class 5.1 (excluding PG I).
- Class 5.2 only when contained in a "Polyester Resin Kit (ID 8017)," Chemical Kit (ID 8004)," or "First Aid Kit (ID 8004)" (excluding PG I).
- Class 6.1 (excluding PG I).
- Class 8 (excluding PG I, UN2794, UN2795 and UN3028).
- UN2071 and UN1941.

A19.3.3. **Different Dangerous Goods in Limited Quantities in one Package.** When different dangerous goods in limited quantities are packed together in one outer packaging, the quantities must be as follows:

A19.3.3.1. Class 3 and 8, and Class 4.1, 4.3 (solid), 5.1, 5.2, and 6.1 must not exceed the lowest net quantity per package (of the most restrictive single material in the package) as listed in table A19.2. For calculation purposes, when a package contains both liquid and solids, convert the quantities for the liquids into kilograms in order to determine that the permitted maximum net quantity per package has not been exceeded. The "Q" value formula is not applicable for limited quantities.

A19.3.3.2. Class 2 and 9, when packed without any other dangerous goods, the gross weight of the package must not exceed 30 Kg (66 pounds).

A19.3.3.3. Class 2 and 9, when packed with other dangerous goods, must meet the requirements of A19.3.3.2. In addition, the maximum net quantity of all the other dangerous goods (other than class 2 and 9) must not exceed the requirements of A19.3.3.1.

A19.3.4. **Package Performance Tests**. Limited quantity packages must meet the following test requirements:

- The package, as prepared for transport, must be capable of withstanding a 1.2 m (4 ft) drop test onto a rigid, nonresilient, flat, horizontal surface, in a position most likely to cause the most damage. After the test, the package must not show any damage which is likely to affect safety during transport and there must be no leakage from the inner packagings.
- Each package offered for transport must be capable of withstanding a force applied to the top surface of the package (for a duration of 24 hours) equivalent to the total weight of identical packages if stacked to a height of 3 m (9.8 ft). The stack height includes the test sample. There cannot be any significant reduction in the package's effectiveness and there cannot be any breakage or leakage of any inner packaging.

TABLE A19.2				
MAXIMUM QUANTITIES - CLASSES 2 - 9				
Class or Division	Packing Group	Physical State	Inner Packaging	Per Package
2	--	Gas (note 1)	120 mL (note 2)	30 kg G
3	II	Liquid	500 mL	1 L
	III	Liquid	5 L	10 L
4.1	II	Solid	500 g	5 kg
	III	Solid	1 kg	10 kg
4.3	II	Solid	500 g	5 kg
	III	Solid	1 kg	10 kg
5.1	II	Liquid	100 mL	500 mL
	II	Solid	500 g	2.5 kg
	III	Liquid	500 mL	1 L
	III	Solid	1 kg	10 kg
5.2	--	Liquid	30 mL	500 mL
	--	Solid	100 g	1 kg
6.1	II	Liquid	100 mL	1 L
	II	Solid	500 g	1 kg
	III	Liquid	500 mL	2 L
	III	Solid	1 kg	10 kg
8	II	Liquid	100 mL	500 mL
	II	Solid	500 g	5 kg
	III	Liquid	500 mL	1 L
	III	Solid	1 kg	5 kg
9	III	Liquid/Solid	5 L	30 kg G

NOTES:

1. For gases, the quantity is the water capacity of the inner packaging.
2. Aerosols containing only a nontoxic substance or substances in inner nonrefillable metal or plastic receptacles, the capacity of the inner packaging must not exceed 1000 mL (34 fl oz).

★ABSORBENT CUSHIONING REQUIREMENTS

A20.1. Absorbent Material General Requirements. For combination packagings, use cushioning materials suitable for the absorption of liquid hazardous materials in the event of leakage from the primary receptacle. Ensure cushioning materials used are satisfactory in all respects. Ensure the material is not capable of reacting adversely with the contents of the package and is noncombustible. Do not use asbestos. The following requirements apply to the use of absorbent cushioning material for combination packagings:

- Use absorbent cushioning material to package liquids in PG I and II.
  - Each package containing a liquid in PG I must include sufficient cushioning material to absorb the entire contents of the inner containers.
  - Each package containing a liquid in PG II must include sufficient cushioning material to absorb the contents of any one inner container. If the inner containers vary in size, include sufficient cushioning material to absorb the contents of the inner receptacle containing the greatest quantity of liquid.
- Absorbent cushioning material is not required for liquids in PG III.
- Absorbent cushioning material is not required for Paint in PG II.
- Use absorbent cushioning material as required above when overpacking containers holding liquids that do not meet the pressure requirements for air shipments.
- When absorbent cushioning material is required and the outer packaging is not liquid-tight, use a means of containing the liquid in the event of leakage. This may take the form of a leak-proof liner, plastic bag, or other equally efficient means of containment. When securely closed polyethylene (4 mil minimum) bags are used to contain the cushioning and hazardous liquid, the bags must be of sufficient size to form a liner for the exterior container, or a bag for the interior container.
- When overpacking individual packagings that already meet air-eligibility requirements use enough cushioning material to secure and position the packagings against damage. The cushioning material, absorbent or nonabsorbent, must completely fill any void space in the container.
- Absorbent cushioning material is not required for containers that have met the POP test requirements (including the hydrostatic pressure test) as a single packaging.

A20.2. Determining the Amount Required. Use table A20.1 as a guide to determine the amount of vermiculite or diatomaceous earth required for overpacking and cushioning liquid hazardous materials. Other equivalent cushioning materials may be used to meet A20.1 requirements.

- The amounts identified in table A20.1 are the minimum requirements. When exact quantities of cushioning materials are not found in table A20.1, make an approximation based on quantities listed.
- When placing cushioning materials into the container, consider settling of the cushioning materials during transportation. Use enough cushioning material to compensate for any settling that may occur.
- When POP test report identifies an amount larger than table A20.1, use the amount identified in the POP test report.

Table A20.1. Absorbent Material Requirements in Inches.

	A	B	C	D	E
RULE	**If quantity is**	**Then to ship use: Vermiculite, Type 1, Grade 3 (fine), or Type 1, Grade 4 (super fine)**		**Diatomaceous Earth**	
		Centimeters (inches)		**Centimeters (inches)**	
		On sides	**On top and bottom**	**On sides**	**On top and bottom**
1	.50 L (1 pt)	2.54 cm (1.0)	3.81 cm (1.5)	5.08 cm (2.0)	11.43 cm (4.5)
2	1.0 L (1 qt)	2.54 cm (1.0)	5.08 cm (2.0)	5.08 cm (2.0)	13.97 cm (5.5)
3	3.8 L (1 gal)	3.81 cm (1.5)	6.35 cm (2.5)	10.16 cm (4.0)	15.24 cm (6.0)
4	7.6 L (2 gals)	5.08 cm (2.0)	10.16 cm (4.0)	11.43 cm (4.5)	24.13 cm (9.5)
5	19.0 L (5 gals)	7.62 cm (3.0)	15.24 cm (6.0)	15.24 cm (6.0)	34.29 cm (13.5)
6	24.6 L (6.5 gals)	8.89 cm (3.5)	16.51 cm (6.5)	17.78 cm (7.0)	36.83 cm (14.5)
7	49.3 L (13 gals)	10.16 cm (4.0)	19.05 cm (7.5)	20.32 cm (8.0)	39.37 cm (15.5)
8	56.8 L (15 gals)	11.43 cm (4.5)	20.32 cm (8.0)	24.13 cm (9.5)	45.74 cm (18.0)

NOTE: Personnel requiring assistance with cushioning material should contact the Air Force Packaging Technology and Engineering Facility, 5215 Thurlow Street, Wright-Patterson AFB OH 45433-5540, (937) 257-4234/4519 or DSN 787-4234/4519.

★BRIEFING AGENCY REQUIREMENTS

A21.1. Briefing Agency. This attachment outlines the information that the briefing agency is required to provide to the aircraft commander (or designated representative) according to 1.2.9.

A21.2. Informational Requirements. The briefing agency must advise the aircraft commander (or designated representative) of:

- The PSN, hazard class, identification number, and PG prescribed in this manual for each hazardous material aboard the aircraft.
- The total quantity in weight or volume.
- The location of the hazardous item in the aircraft.
- Net explosive weight (NEW) of Class 1.1, 1.2, and 1.3 explosives, or of Class 1.4, 1.5, and 1.6 explosives when required.
- The requirement for escorts, couriers, and protective equipment.
- The number of passengers permitted aboard the aircraft.
- The procedures to use in an emergency.
- All cargo being carried under the terms of a DOT exemption, a DoD certification of equivalency (COE), a CAA, or a waiver.

A21.3. Notification Statements. The briefing agency must include one of the statements identified below on the hazardous cargo manifest when transporting hazardous materials on aircraft. Apply these statements by programmed wording, rubber stamps, or typewriter.

- **Air terminal inspection certification statement:** "ALL HAZARDOUS MATERIALS COVERED BY THIS MANIFEST HAVE BEEN INSPECTED AND FOUND TO BE PACKAGED IN THE PROPER OUTSIDE CONTAINER, FREE OF VISIBLE DAMAGE AND LEAKS, AND IS PROPERLY CERTIFIED. (Air terminal representative signature).
- **Aircrew briefing certification statement:** "I HAVE BEEN BRIEFED ACCORDING TO AFJMAN 24-204, PARAGRAPH 1.2.9, ON HAZARDOUS CARGO COVERED BY THIS MANIFEST. (Aircraft crewmember signature).

A21.4. **Post Briefing Responsibilities.** After receiving the briefing, the aircraft commander (or designated representative) will:

- Sign the cargo manifest.
- Return the signed copy, with the attached Shipper's Declaration for Dangerous Goods to the terminal record-keeping activity for retention.
- When crew changes occur, terminal personnel will brief the oncoming aircraft commander or designated representatives required by A21.2. The briefing must cover all hazardous materials (onload and throughload).
- For throughload hazardous cargo, the oncoming aircraft commander (or designated representative) signs a copy of the throughload manifest indicating that the briefing has been received.
- Keep the manifest, reflecting the certification for a hazardous cargo briefing, according to current files, maintenance, and disposition instructions.

★PASSENGER MOVEMENT ON AIRCRAFT TRANSPORTING HAZARDOUS MATERIALS

A22.1. Passenger Eligibility. Table A4.1, column 7 provides passenger eligibility codes that identify passenger movement restrictions with hazardous materials.

- Use table 4.1 and table A4.2 to determine passenger movement eligibility with a specific material.
- Do not move passengers with cargo coded as "Cargo Aircraft Only" unless exempted by this manual. Obtain a passenger deviation when required by this attachment.
- Aircraft transporting personnel with hazardous materials must be equipped with serviceable oxygen equipment and oxygen supply for all personnel. Supplemental oxygen is not required when transporting Air, refrigerated liquid; and Engines, internal combustion..

A22.1.1. **Passenger Deviations.** Move passengers with hazardous materials coded as "Cargo Aircraft Only" consistent with operational requirements. Prevent exposure of passengers to the hazardous material. Deviations authorizing the movement of passengers with cargo aircraft only material is granted only for exceptional cases.

- Contact the MAJCOM, number Air Force,or Service having operational control of the aircraft for passenger deviations.
- When a deviation has been approved, type, print, or stamp on all copies of the passenger manifest the following information: "AUTHORITY TO MOVE PASSENGERS WITH CARGO AIRCRAFT ONLY CODED MATERIAL IS APPROVED. DEVIATION NUMBER:_____."
- Separate passengers from the hazardous cargo.
- An aircrew member must provide surveillance to ensure passengers are safe and maintain a maximum distance from the hazardous cargo.
- Deviations are not required for:
  - Guards.
  - Couriers.
  - Technical escorts responsible for cargo.
  - Crew chiefs and maintenance personnel assigned to support the aircraft transporting the hazardous material.
  - DoD duty passengers transported with material coded P4 in column 7 of table A4.1.

A22.1.2. **Radioactive Material Passenger Restrictions.**

- Packages with a radioactive yellow II or radioactive yellow III label may not be transported on passenger aircraft unless:
  - The transport index is not over 1.0 for a package required to be labeled radioactive yellow II.
  - The transport index is not over 3.0 for a package required to be labeled radioactive yellow III.
- Radioactive material requiring a label must be separated from personnel and passengers by the greatest distance possible. Radioactive yellow II and yellow III material must be separated by a minimum of 2 pallet positions (176 in) at all times while on the aircraft. If the total transport index of all packages on the aircraft exceeds 50, the separation distance between the surfaces of the radioactive materials packages and the surfaces bounding the space occupied by persons or animals must be at least 9 meters (30 feet).
- Do not offer Type B(M) packages for transportation on passenger-carrying aircraft.
- Except as provided in A11.12, no person may carry any radioactive material other than a radioactive material intended for use in, or incident to, research, medical diagnosis, or treatment aboard a passenger aircraft.

A22.2. Carriage of Hazardous Materials by Passengers. Passengers must not carry hazardous materials on military aircraft. The exceptions listed below are not subject to any other requirements of this manual (nonregulated) when carried by a crewmember or passenger.

- Material in aerosol containers not exceeding 473.1 ml (16 fluid ounces) or 2.205 kg (1 pound) per container when carried in crewmember or passenger baggage (including carry-on baggage), unless they are classified as poisonous or irritating material. The total quantity of the excepted articles carried by any crewmember or passenger in carry-on or checked baggage must not exceed 2136 g or 2217.8 ml (75 net weight ounces and fluid ounces).
- Oxygen, or any hazardous material used for the generation of oxygen, carried for medical use by a passenger according to 14 CFR 121.574 or 135.114.
- For human beings or animals with an implanted medical device, such as a heart pacemaker, that contains radioactive material or with radio-pharmaceuticals, that have been injected or ingested.

- Carbon dioxide gas cylinders worn by passengers for the operation of mechanical limbs. Spare cylinders of a similar size for the same purpose, in sufficient quantities to ensure an adequate supply for the duration of the journey are authorized in carry-on and checked baggage.
- Catalytic hair curlers containing hydrocarbon gas carried in carry-on or checked baggage. The safety cover must be securely fitted over the heating element. Gas refills are not permitted. Not more than one curler per person is authorized.
- Alcoholic beverages not exceeding 70 percent by volume, when packed in receptacles of less than 5 L may be in carry-on or checked baggage.
- Dry ice, in quantities not exceeding 2 kg (4.4 lbs) per passenger when used to pack perishables in carry-on or checked baggage, provided the package permits the release of carbon dioxide gas.
- Safety matches or a lighter carried by an individual for use by the individual. However, lighters containing unabsorbed liquid fuel (other than liquefied gas), lighter fuel and lighter refills are not permitted on one's person or in checked or carry-on baggage.
- Securely boxed, cartridges for sporting purposes (in Class 1.4S), in quantities not exceeding 5 kg (11 lbs) gross weight per passenger may be in checked baggage for personnel use, excluding ammunition with explosive or incendiary projectiles. Do not combine allowances for more than one passenger into one or more packages. This approval does not authorize the carriage of military issue ammunition in personal baggage.
- Wheelchairs or other battery-powered mobility devices with spillable or nonspillable batteries, provided that the battery is disconnected, battery terminals are insulated to prevent accidental short circuits and the battery is securely attached to the wheelchair or mobility device may be carried in checked baggage. Load and store batteries attached to these devices with there filling holes upright.
- A mercurial barometer carried by a representative of a government weather bureau or other similar official agency may be in carry-on baggage. However, package the barometer in a strong outer packaging, having a sealed inner liner or a bag of strong leak proof and puncture resistant material impervious to mercury, which will prevent the escape of mercury from the package irrespective of its position.
- One small carbon dioxide cylinder fitted into a self-inflating life jacket plus one spare cartridge may be carried in carry-on and checked baggage. However, the life jackets cannot contain any explosives, pyrotechnic, or flammable devices.
- Heat producing articles such as underwater torches (diving lamps) and soldering irons may be in carry-on baggage.
- Scuba diving tanks containing not more than 25 pounds per square inch at 21 degrees C (70 degrees F) may be shipped as checked baggage. A tag or label must be affixed to the tank by a dive shop or licensed individual to indicate service was performed.

★USE OF CONTRACT AIR CARRIERS

A23.1. Contract Air Carriers. Commercial airlift of military hazardous materials utilizing contract air carriers is authorized according to Department of Transportation Exemptions (DOT-E) 7573 and 9232, and this manual.

A23.2. DOT-E 7573. The DoD is authorized to transport hazardous materials via AMC commercial contract cargo aircraft under the authority of DOT-E 7573 according to the following conditions:

- The pilot in charge is notified in writing that the exemption is being used and a copy of DOT-E 7573 must accompany the shipment. See attachment 21 for the statement required on the hazardous cargo manifest and briefing requirements.
- Hazardous material shipments are in complete compliance with this manual.
- Segregation compatibility requirements of tables A18.1 and A18.2 apply.
- Ensure compliance with all other requirements of the exemption.

A23.3. DOT-E 9232. DOT-E 9232 applies only under the following conditions:

- During a declared national emergency.
- In defense crisis conditions which require the activation of any state of the Civil Reserve Air Fleet (CRAF) program, or the use of foreign-flag aircraft made available to the United States Government (USG) pursuant to formal security agreements between the USG and the involved foreign government.
- During rapid deployment of US Armed Forces.
- The following special provisions also apply:
  - A copy of the exemption must accompany the shipment. Notify the pilot in command, in writing, that the exemption is being exercised.
  - Include a summary of hazardous materials on the cargo manifest.
  - Hazardous material shipments are in complete compliance with this manual.
  - The troop commander must identify to the aircraft commander (or designated representative) in writing, any individual issue of hazardous materials that are included in rucksacks or field packs, which are not already included on the cargo manifest. Identify hazardous materials by PSN, hazard class, UN identification number, PG, and net quantity.
  - Load hazardous materials only in the cargo compartment of passenger carrying aircraft. Hazardous materials (including small arms ammunition) are not authorized in the passenger compartment.
  - Do not remove hazardous materials from required packaging and place in equipment or vehicle racks and containers.
  - Agreement signed by the airfield operator in advance of the operation which includes, as a minimum, an emergency response plan. Agreements are maintained by HQ AMC/DO.

A23.4. Use of Passenger Carrying Aircraft. When requirements dictate movement of passengers with hazardous materials on contract aircraft ensure the material is prepared according to 49 CFR 100-199. Type and quantity of material authorized will be according to 49 CFR 172.101 for passenger carrying aircraft.

★SPECIAL CARGO REQUIREMENTS

A24.1. Material Requiring SAAM Airlift. This attachment identifies requirements for technical escorts and other extensive protective measures for extremely hazardous materials. The provisions of this attachment apply to the following shipments:

- Material identified in table A4.1 as Special Provision 1 (SP1) which include, but are not limited to, Class 6.1, PG 1, hazard zone A and Class 2.3 hazard zone A toxic material.
- Class 1, compatibility group K.
- Fissle Class III Radioactive Material.
- Infectious substances (etiologic agent) and biological research material requiring a technical escort for safety concerns.

A24.2. Transportation Requirements.

- Transport the materials identified in A24.1 by Special Assignment Airlift Mission (SAAM) only. Process SAAM requests, cargo clearance, and appropriate confirmations according to AFR 76-38/AR 59-8/OPNAVINST 4630.18E/MCO 4630.6D/DLAR 4540.9.
- When Class 6.1, PG I, hazard zone A and Class 2.3, hazard zone A toxic materials are shipped by air, the consignor is required to furnish or ensure availability of:
  - Complete protective clothing and equipment for all aircrew members.
  - Qualified technical escort personnel, applicable decontamination and detection equipment or supplies, and suitable first-aid equipment or supplies to cope with leaking containers during airlift.
- Fissile class III shipments must incorporate transportation controls that are performed by the shipper or carrier, as appropriate, to provide nuclear criticality safety, and protect against loading, storing, or transporting that shipment with any other fissile material.
- Transport Fissile class III shipments in an aircraft:
  - Assigned to the exclusive use of the shipper with a specific restriction for the exclusive use to be provided in the appropriate arrangements between shipper and carrier and with instructions to that effect issued with the shipping papers.
  - That does not contain other packages of radioactive material requiring one of the labels prescribed in attachment 15.

A24.3. Technical Escorts. Furnish technical escorts when service regulations (or cargo clearance arrangements) require it, or when the shipping activity's medical or flight safety personnel dictate. The shipping activity must initiate action to furnish the qualified personnel, when they are required. They must also furnish technical escorts or other personnel to accompany shipments of infectious substances (etiologic agents) or plant quarantine materials per A10.9. When the shipping activity is required to furnish qualified personnel, it will also initiate action to furnish all required protective clothing and equipment for crew members, in addition to the appropriate decontamination detection and emergency first-aid equipment. The escort has complete jurisdiction over the cargo as it pertains to normal security, safety, protection of personnel, repair, and disposal of containers. However, in the following situations, escort authorities are primarily technical advisors, and are subordinate to:

- The aircraft commander in matters of flight operations and safety.
- The base installation commander in matters affecting the safety and mission of the command.

A24.4. Shipping Documents for Infectious Substances (Etiologic Agents). All shipments of infectious substances (etiologic agents) must be accompanied by an etiologic agent and plant quarantine material shipment record. This record must be prepared by the consignor (shipper).

- If the shipping document is classified, it must be in the custody of the technical escort or other qualified personnel accompanying the shipment. In the absence of accompanying personnel, and if the document is not classified, the shipper will place the original and one copy in the outermost container of the number one package.
- On receipt at the receiving installation, a record of the shipment's condition should be made under "Remarks." Two copies of the completed form should be forwarded directly to the Commanding Officer, US Army, Fort Detrick, Frederick MD 21701-5000, Attn: (1) Transportation Officer, and (2) Liaison Officer (USPHS). This creates a permanent record file which is in compliance with agreements between DoD and the Department of Health and Human Services; and also between DoD and the Department of Agriculture.
- On all shipments (except diagnostic specimens) escorted or not escorted, the agency receiving the shipment is responsible for forwarding the report indicated above within 2 hours of receipt.

A24.5. Aircrew Jettison Criteria. For cargo consisting of Class 6.1, PG I, hazard zone A toxic material; Class 2.3, hazard zone A toxic material; infectious substances; biological agents; or radioactive material (other than excepted quantities), the jettison criteria are as follows:

- Must not be jettisoned over land.
- May not be jettisoned over water unless the cargo, in addition to size criteria, weighs at least 1.6 g/cm^3 (100 lbs/ft^3) to ensure sinking. Also, the cargo must be jettisoned at least 19.3 kilometers (12 miles) offshore, and preferably beyond a shelf, in water 100 fathoms (600 ft) or more in depth. The aircraft commander is given a predeparture briefing on acceptable jettisoning locations based on the above criteria. When cargo is jettisoned to decrease weight, jettison all other cargo before hazardous cargo.
- When cargo is leaking and is beyond control of the escort to repair or neutralize, the escort must inform the aircraft commander. The decision of jettisoning will rest with the aircraft commander. In this instance, the commander may jettison the cargo over water without regard to weight or depth criteria.
- When the cargo weighs less than 1.6 g/cm^3 (100 lb/ft^3) or when size of cargo would not permit inflight jettisoning, model of aircraft selected for overwater missions must be based on two-engine performance from equal time point (ETP) to destination. Aircraft performance is based on aircraft remaining airborne when all cargo except the hazardous cargo is jettisoned.

★HAZARDOUS MATERIALS INITIAL AND REFRESHER TRAINING

A25.1. Training General Requirements. This attachment identifies the hazardous material training required by paragraph 1.3. Commanders assign hazardous material workers into one of four functional groups. Training requirements are based on functional group. This approach provides basic hazardous materials training applicable to all personnel at the first level. Trainers then provide more detailed training to supplement the basic level of training based on specific job responsibilities.

A25.2. Training for Noncertifying Officials. Train individuals according to the following general areas of responsibility. Unless otherwise required by Service/Agency directives, training may be performed locally. Trainers should develop training specific to the individuals hazardous material duties. The courses listed are suggested DoD courses that may be used to satisfy the applicable level of training. Telephone contact numbers are listed the first time the training location is identified. Commercial or other government sources may also be used to the extent it satisfies the required level of training.

- **Handlers.** Trainers ensure training covers basic hazardous material familiarization, awareness, and communication requirements. This includes hazard classification, marking, labeling, placarding, documentation, compatibility, and safety (including emergency response information). Training will also include handling and job (function) specific requirements.
  - HAZMAT Familiarization and Safety in Transportation, 49 CFR Subpart H; Computer Based Training, U.S. Army Defense Ammunition Center and School, Savanna IL 61074-9639. Telephone DSN 585-8934/8998 or commercial (815) 273-8934/8998.
  - Hazardous Materials Handling, SMPT-5, Accredited Off-Campus Instruction (AOCI), Satellite Education Network (SEN), or Correspondence, School of Military Packaging Technology, Aberdeen Proving Ground MD 210005-5001. Telephone DSN 298-5185 or commercial (410) 278-5185.
  - Transportation of Hazardous Material for Supervisors, A822-0014, Navy Supply Corps School, Athens GA 30606. Telephone DSN 588-7207/7215 or commercial (706) 354-7207/7215.
  - Storage and Handling of Hazardous Materials (R511-Intitial or R611-Refresher), DLA Environmental and Safety Training Center (DCPSO-TS), Battle Creek MI, 49017-3026. Telephone DSN 932-7051 or commercial (616) 961-7051.
- **Packers.** Packers, who do not certify, must work closely with the preparer (certifier) and must not close (seal) the container until the preparer (certifier) has validated the packaging. Trainers ensure that packers are knowledgeable in all aspects of handlers requirements with additional emphasis in hazardous materials packaging requirements.
  - PC-POP III (Resident or On Site), Distribution Operations Support Office, Richmond VA 23297-5083. Telephone DSN 695-5445/4788 or commercial (804) 279-5445/4788.
  - Storage and Handling of Hazardous Materials (R530-Initial or R630-Refresher), DLA Environmental and Safety Training Center (DCPSO-TS), Battle Creek MI, 49017-3026.
- **Inspectors.** In addition to handlers requirements, trainers ensure that inspectors are knowledgeable in the use of commercial and military hazardous materials documents, and shipping papers. Inspectors should be familiar with appropriate packaging specifications.
  - Hazardous Materials Inspector Initial (Exportable) (L6AZS2T000-000), 345 TRS/TTTD, Lackland AFB TX 78236-5427. Telephone DSN 473-4917 or commercial (210) 671-4917.
  - Transportation of Hazardous Material for Supervisors, A822-0014, Navy Supply Corps School, Athens GA 30606.

A25.3. Training for Certifying Officials. Preparers (certifying officials), as defined in 1.2.3, are authorized to accomplish the Shipper's Declaration for Dangerous Goods certification according to 1.2.8. Supervisors must consult DoD Catalog 5010.16-c *Defense Management Education and Training* to select the most appropriate course for the individual based on course prerequisites. Train preparers based on one of the following function specific requirements:

A25.3.1. **Preparers.** Personnel whose primary duty is preparing and certifying all types of hazardous materials shipments on a daily basis. Trainers should evaluate individual needs to ensure sufficient packaging knowledge or provide additional packaging training if required. These individuals must have satisfactorily completed one of the qualifying courses:

A25.3.1.1. **Initial Training Courses.** Personnel identified in A25.3.1 must satisfactorily complete one of the initial training courses identified below as a prerequisite to certifying the Shipper's Declaration for Dangerous Goods for airlift of hazardous cargo.

- Hazardous Material Preparer Course (L3AZR2T000 005, Resident or L4AZT2T000 005, On Site), 345 TRS/TTTD, Lackland AFB TX 78236-5427.

- Technical Transportation of Hazardous Materials (AMMO-L-17, Resident or AMMO-L-17OS On Site), U.S. Army Defense Ammunition Center and School, Savanna IL 61074-9639.
- Installation Traffic Management of Hazardous Materials (Initial) (AMMO-L-9) (Resident), U.S. Army Defense Ammunition Center and School, Savanna IL 61074-9639.
- Defense Packaging of Hazardous Materials for Transportation, 8B-F7(JT), Resident and On Site, School of Military Packaging Technology (SMPT), Aberdeen Proving Ground MD 21005-5001.
- Transportation of Hazardous Material-Basic (A-822-0012), Navy Supply Corps School, Athens, GA 30606-5520. Telephone DSN 588-7215 or commercial (706) 354-7215/7240.

A25.3.1.2. **Refresher Training Courses.** Personnel, who have previously completed one of the courses specified in A25.3.1.1, must satisfy the 24-month refresher training requirement of A25.4 by completing one of the following courses:

- Hazardous Material Preparer Refresher (Exportable) (L6AZS2T000 001), 345 TRS/TTTD, Lackland AFB TX 78236-5427. This course approved for Air Force activities only.
- General Transportation of Hazardous Materials (AMMO-L-16, Resident or AMMO-L-160S, On Site), US Army Defense Ammunition Center and School, Savanna IL 61074-9639.
- Defense (Refresher) Packaging of Hazardous Materials for Transportation, 8B-F35 (JT) Resident and On Site, School of Military Packaging Technology (SMPT), Aberdeen Proving Grounds MD 21005-5001.
- Transportation of Hazardous Material-Recertification (A-822-0011), Navy Supply Corps School, Athens GA 30606-5520.

A25.3.2. **Preparers (Technical Specialist).** Technical specialists are personnel trained and qualified to prepare for shipment only those hazardous materials within their specialty (such as, vehicle maintenance personnel are technical specialists for vehicles). Technical specialists can only sign the Shipper's Declaration for Dangerous Goods form as a certifying official on items they are technically qualified to maintain and prepare for shipment. For the purposes of this manual, a technical specialist will:

- Be designated by the Commander.
- Be authorized to certify those items within the technical specialty, unique to the unit or activity's requirement.
- Be trained in packaging, preparation, marking, labeling, certification, and all other aspects of this manual relevant to the specific hazardous materials within the individual's specialty.
- This authorization applies to tactical or contingency operations and channel movement.
- Training for completion of the shipper's certification must be conducted by a qualified Preparer as identified in A25.3.1.

A25.4. Training Frequency. All hazardous material personnel must receive initial training and subsequent refresher training at 24-month intervals. Train individuals based on functional group requirements.

- Each Service or major command (MAJCOM) may grant an extension to this qualification expiration date for a period not to exceed 60 calendar days during which eligible personnel must receive training.
- Each Service or MAJCOM may grant successive 60-day extensions to a person's qualification expiration date for long-term tactical or contingency operations. In this instance, personnel extended past their initial 60-day extension may only certify hazardous materials moved according to the tactical or contingency operation. Once personnel return to normal duty, train each person as specified in this attachment.
- Each Service or MAJCOM is responsible for management of the extension authority and can establish more stringent training frequencies to enhance training requirements.

A25.5. Training Records. Test all hazardous material personnel and maintain a record of the training provided. Maintain and dispose of records according to an approved Records Disposition Schedule. As a minimum, maintain the record for as long as the person works for the DoD as a hazardous material employee and for 90 days after separation from the DoD. This record must indicate the following:

- Name of person who received the training.
- Date training took place.
- A description, copy, or location of training materials used to train the person.
- The name and address of the person who provided the training.
- Certification statement of completion of training and testing.

A25.6. Certification Under Combat Conditions. An aircraft commander (or representative designated by the commander) may accept a hazardous materials shipment under a combat situation without regard to the above training.

A25.7. Non-DoD Personnel Certifying Hazardous Material Shipments. Non-DoD personnel preparing hazardous materials for transportation by military air must do so according to this manual. DoD does not require non-DoD personnel to complete the training courses specified in this attachment. However, these individuals must meet the requirements of Title 49 CFR Part 172 Subpart H *Training* for all employees having responsibility for preparing hazardous materials for shipment. Training must include function specific duties related to military air transportation. Non-DoD personnel who desire the training outlined in this attachment must contact their contract administration office.

★TABLE OF EQUIVALENTS AND NET QUANTITY OF GAS CONVERSION FORMULAE

A26.1. Metrics. Figure A26.1 provides a list of metric prefixes.

Deci	0.1	Deca	10
Centi	0.01	Hecto	100
Milli	0.001	Kilo	1,000
Micro	0.000001	Mega	1,000,000
Nano	0.000000001	Gica	1,000,000,000
Pico	0.000000000001	Tera	1,000,000,000,000

Figure A26.1. Metric Prefixes.

A26.2. Miscellaneous Conversions. Figure A26.2 provides a list of general miscellaneous conversions for use with this manual.

VOLUME:		**WEIGHT:**	
1 liter	0.264 gallon, 1.057 quarts, 61.025 cubic inches, 33.815 fluid ounces	1 gram	0.03527 ounces, 0.0022 pounds avoidupois
1 cubic foot	28.32 liters, 7.481 gallons, 1728 cubic inches	1 kilogram	2.205 pounds, 35.274 ounces
1 cubic meter	1000 liters, 35.31 cubic feet, 264.2 gallons	1 pound	0.4536 kg
1 milliliter	0.0338 oz	1 ounce	28.35 gram
1 gallon	3.785 l	**PRESSURE:**	
1 oz	29.57 ml	1 pound per square inch	6.895 kilopascal
LENGTH:		1 kilopascal	0.145 psi
1 centimeter	0.3937 inches	**RADIOACTIVE ACTIVITY:**	
1 meter	3.28 feet, 39.37 inches	1 TBq	27 Ci
1 inch	2.54 cm, 25.4 mm	1 Sv/hr	100 rem/hr
1 foot	0.3048 m	1 rem/hr	0.01 Sv/hr
1 millimeter	0.03937 in		

Figure A26.2. Miscellaneous Conversions.

A26.3. Temperature Conversion. Use figure A26.3 to convert temperatures between celsius and fahrenheit.

C = (F-32) times 5/9
F = (C times 9/5) + 32
K = C - 273
C = degrees Celsius
F = degrees Fahrenheit,
K = degrees Kelvin (absolute)

Figure A26.3. Temperature Conversion Formulae.

A26.4. Net Quantity of Gas Conversion Formulae. Use figure A26.4 to determine the net hazard of a compressed gas by converting PSI of a cylinder into pounds. Use figure A26.5 to determine the molecular weight or specific gravity required to complete the formula.

Formula (1) P= 0.00512 x A x B x C

or

Formula (2) P= .0001744 x A x B x M

where: P= weight of gas in pounds

A= pressure in pounds per square inch

B= volume of cylinder in cubic feet

C= specific gravity of the gas

M= molecular weight of the gas molecule

Figure A26.4. Net Quantity of Gas Conversion Formulae.

NOTE: Use Formula (1) for calculation using the specific gravity value. Use Formula (2) for calculation using the molecular weight value.

A26.4.1. Example for Determining Net Quantity of Gas. The following information is known or determined by examination of the cylinder. Measure the cylinder's height from the external base to the valve seat. Measure the external diameter (width). Assume the cylinder does not cone at the top.

- **Example 1.**

Tank measurements:

Height: 50 inches — Diameter = 2 x (radius)

Diameter: 9 inches — R (inches) = 9/2 = 4.5

Tank contents: CO_2

Internal Pressure: 900 psi

Tank Volume

$V = \pi r^2 h$

$V = \pi$ (4.5 inches)^2 x (50 inches)

= {3181 inches}^{3} x {1/1728 (Ft^3/inches^3)}

$V = 1.841$ Ft^3

P (pounds of gas) = 0.00512 x A x B x C

= {0.00512 in^2/Ft^3} x {900 psi} x {1.841 Ft^3} x {1.516}

P = 12.9 pounds

- **Example 2.**
  Tank measurements:
  Height: 40 inches — Diameter = 2 x (radius)
  Diameter: 12 inches — R (inches) = 12/2 = 6
  Tank contents: C_2H_2
  Internal Pressure: 500 psi

  Tank Volume
  $V = \pi r^2 h$
  $V = \pi$ (6 inches)^2 x (40 inches)
  = {4524 inches^3} x {1/1728 (Ft^3/inches^3)}
  V = 2.618 Ft^3

  P (pounds of gas) = 0.00512 x A x B x C
  = {0.00512 in^2/Ft^3} x {500 psi} x {2.618 Ft^3} x {0.897}
  P = 6.01 pounds

- **Example 3.**
  Tank measurements:
  Height: 50 inches — Diameter = 2 x (radius)
  Diameter: 9 inches — R (inches) = 9/2 = 4.5
  Tank contents: CO_2
  Internal Pressure: 900 psi
  Tank Volume
  $V = \pi r^2 h$
  $V = \pi$ (4.5 inches)^2 x (50 inches)
  = {3181 inches}^{3} x {1/1728 (Ft^3/inches^3)}
  V = 1.841 Ft^3

  P = 0.0001744 x A x B x M
  = 0.0001744 x (900 psi) x (1.841 Ft^3) x (44.00)
  P = 12.7 pounds

- **Example 4.**
  Tank measurements:
  Height: 40 inches — Diameter = 2 x (radius)
  Diameter: 12 inches — R (inches) = 12/2 = 6
  Tank contens: C_2H_2
  Internal Pressure: 500 psi

  Tank Volume
  $V = \pi r^2 h$
  $V = \pi$ (6 inches)^2 x (40 inches)
  = {4524 inches^3} x {1/1728 (Ft^3/inches^3)}
  V = 2.618 Ft^3

  P = 0.0001744 x A x B x C
  = 0.0001744 x (500 psi) x (2.618 Ft^3) x (26.00)
  P = 5.94 pounds

A26.5. Properties of Common Gases. Figure A26.5 is a list of the molecular weight and specific gravity of common gases.

GAS	SYMBOL	MOLECULAR WEIGHT	SPECIFIC GRAVITY
Helium	He	4.00	0.138
Argon	A	40.00	1.377
Air	-	29.00	1.000
Oxygen	O^2	32.00	1.103
Nitrogen	N^2	28.00	0.966
Hydrogen	H^2	2.00	0.0695
Nitric Oxide	NO	30.00	1.034
Carbon Monoxide	CO	28.00	0.965
Hydrochloric Acid	HCl	36.50	1.256
Steam	H^2O	18.00	0.623
Carbon Dioxide	CO^2	44.00	1.516
Nitrous Oxide	N^2O	44.00	1.518
Sulfur Dioxide	SO2	64.00	2.208
Ammonia	NH^3	17.00	0.587
Acetylene	C^2H^2	26.00	0.897
Methyl Chloride	CH^2Cl	50.50	1.738
Methane	Ch^4	16.00	0.553
Ethylene	$C2H^4$	28.00	0.967

Figure A26.5. Properties of Common Gases.