Attachment 13

CLASS 9--MISCELLANEOUS HAZARDOUS MATERIAL

A13.1. General Requirements. For military members, failure to obey the mandatory provisions from paragraphs A13.2. through A13.18. and any provisions of mandatory subparagraph(s) hereunder is a violation of Article 92, Uniform Code of Military Justice (UCMJ). Civilian employees who fail to obey the provisions from paragraph A13.2. through A13.18. and any provisions of mandatory subparagraph(s) hereunder are subject to administrative disciplinary action without regard to otherwise applicable criminal or civil sanctions. This attachment contains a multitude of Class 9 commodities and personnel shall not deviate from unique packaging instructions provided. **(T-0)**. Not all packaging paragraphs are inclusive and packaging selection is based on the category of the hazard. This attachment contains information concerning the packaging and general handling instructions for Class 9 (Miscellaneous Hazardous Materials). See Attachment 3 for other details concerning Class 9 material.

A13.2. Package Ammonium Nitrate Fertilizers; Benzaldehyde; Dibromodifluoromethane (Difluorodibromomethane); Environmentally Hazardous Substances, N.O.S.; Fish Meal, Stabilized; Fish Scrap, Stabilized; Hazardous Waste, N.O.S.; Other Regulated Substances; Polycholorinated Biphenyls (PCB); Zinc Dithionite, Zinc Hydrosulfite as follows:

A13.2.1. Handling Instructions.

A13.2.1.1. Do not expose Dibromodifluoromethane to high temperature because, when it decomposes, toxic fumes are emitted. Store in a cool, ventilated area away from flame.

A13.2.1.2. Environmentally Hazardous Substances, N.O.S. technical name (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.

A13.2.2. Package Class 9 Liquids as follows:

A13.2.2.1. Package in combination packagings with outer drums, barrels, jerricans, or boxes as follows:

Inner packaging	Outer packaging
Receptacles: Glass, earthenware, plastic, or metal	**Drums:** steel (1A2), aluminum (1B2), or metal, other than steel or aluminum (1N2), plywood (1D), fiber (1G), or plastic (1H2) ***or*** **Barrel:** wooden (2C2) ***or*** **Jerricans:** steel (3A2), aluminum (3B2) or plastic (3H2) ***or*** **Boxes:** steel (4A), aluminum (4B), natural wood (4C1 or 4C2), plywood (4D), reconstituted wood (4F), fiberboard (4G), expanded plastic (4H1), solid plastic (4H2), or metal, other than steel or aluminum (4N)

A13.2.2.2. Package in single packaging drums, jerricans, or barrels as follows:

Inner packaging	Outer packaging
Not required	**Drums:** steel (1A1 or 1A2), aluminum (1B1 or 1B2), fiber (1G), plastic (1H1 or 1H2) or metal, other than steel or aluminum (1N1 or 1N2) ***or*** **Barrel:** wooden (2C1) ***or*** **Jerricans:** steel (3A1 or 3A2), aluminum (3B1 or 3B2), or plastic (3H1 or 3H2)

A13.2.2.3. Package in following composite packagings with plastic inner receptacles:

Inner receptacle	Outer packaging
Plastic	**Drums:** steel, aluminum, plywood, fiber, or plastic (6HA1, 6HB1, 6HD1, 6HG1, or 6HH1) ***or*** **Boxes:** steel, aluminum, wooden, plywood, or fiberboard (6HA2, 6HB2, 6HC, 6HD2, or 6HG2)

A13.2.2.4. Package in following composite packagings with glass, porcelain, or stoneware:

Inner receptacle	Outer packaging
Glass, porcelain, or stoneware	**Drums:** steel, aluminum, or fiber (6PA1, 6PB1, or 6PG1) ***or*** **Boxes:** steel, aluminum, wooden, or fiberboard (6PA2, 6PB2, 6PC, or 6PG2) ***or*** expanded plastic packaging (6PH1 or 6PH2) ***or*** plywood drum or wickerwork hamper (6PD1 or 6PD2)

A13.2.2.5. DOT Cylinders. DOT specification cylinders as prescribed for any compressed gas, except acetylene (DOT 8, 8AL) and DOT 3HT.

A13.2.2.6. Fired exercise torpedoes or rockets, with no explosive components, containing Otto fuel II. Package in original or similar container authorized in Attachment 5.

A13.2.3. Package Class 9 Solids as follows:

A13.2.3.1. Package in combination packagings with outer drums, barrels, jerricans, or boxes as follows:

Inner packaging	Outer packaging
Receptacles: Glass, earthenware, plastic, or metal	**Drums:** steel (1A1 or 1A2), aluminum (1B1 or 1B2), plywood (1D), fiber (1G), plastic (1H1 or 1H2) or metal, other than steel or aluminum (1N1 or 1N2) ***or*** **Barrel:** wooden (2C2) ***or*** **Jerricans:** steel (3A1 or 3A2), aluminum (3B1 or 3B2), or plastic (3H1 or 3H2) ***or*** **Boxes:** steel (4A), aluminum (4B), natural wood (4C1 or 4C2), plywood (4D), reconstituted wood (4F), fiberboard (4G), solid plastic (4H2), or metal, other than steel or aluminum (4N)

A13.2.3.2. Package in single packaging drums, barrels, jerricans, boxes, or bags as follows:

Inner packaging	Outer packaging
Not required	**Drums:** steel (1A1 or 1A2), aluminum (1B1 or 1B2), plywood (1D), fiber (1G), plastic (1H1 or 1H2), or metal, other than steel or aluminum (1N1 or 1N2) ***or*** **Barrel:** wooden (2C1 or 2C2) ***or*** **Jerricans:** steel (3A1 or 3A2), aluminum (3B1 or 3B2), or plastic (3H1 or 3H2) ***or*** **Boxes:** steel (4A), steel with liner (4A), aluminum (4B), aluminum with liner (4B), natural wood (4C1), natural wood, sift-proof (4C2), plywood (4D), reconstituted wood (4F), fiberboard (4G), expanded plastic (4H1) or solid plastic (4H2), or metal, other than steel or aluminum (4N) ***or*** **Bags:** woven plastic (5H1, 5H2, or 5H3), plastic film (5H4), textile (5L1, 5L2, or 5L3), or paper, multiwall, water-resistant (5M2) **Note**: Bags are not authorized for PG I materials.

A13.2.3.3. Package in the following composite packagings with plastic inner receptacles:

Inner receptacle	Outer packaging
Plastic	**Drums:** steel, aluminum, plywood, fiber, or plastic (6HA1, 6HB1, 6HD1, 6HG1, or 6HH1) ***or*** **Boxes:** steel, aluminum, wood, plywood, or fiberboard (6HA2, 6HB2, 6HC, 6HD2, or 6HG2) **Note:** Boxes are not authorized for PG I materials.

A13.2.3.4. Package in the following composite packagings with glass porcelain, or stoneware inner receptacles:

Inner receptacle	Outer packaging
Glass, porcelain, or stoneware	**Drums:** steel, aluminum, plywood, or fiber (6PA1, 6PB1, 6PD1, or 6PG1) ***or*** **Boxes:** steel, aluminum, wooden, or fiberboard (6PA2, 6PB2, 6PC, or 6PG2) ***or*** expanded or solid plastic packaging (6PH1 or 6PH2)

A13.2.3.5. DOT Cylinders. DOT specification cylinders as prescribed for any compressed gas, except acetylene (DOT 8, 8AL) and DOT 3HT.

A13.2.4. 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 absorbent material to absorb any leakage. These type transformers are exempt from UN specification packaging requirements.

A13.3. Package Consumer Commodities as follows:

A13.3.1. The following applies:

A13.3.1.1. As of January 1, 2013, a "consumer commodity" when offered for transportation by aircraft may only include articles or substances of Class 2 (non-toxic aerosols only), Class 3 (Packing Group II and III only), Division 6.1 (Packing Group III only), UN3077, UN3082, UN3175, UN3334, and UN3335, provided such materials do not have a subsidiary hazard and are authorized aboard a passenger-carrying aircraft.

A13.3.1.2. Items are limited to those permitted as a limited quantity according to A19.3.2.

A13.3.1.3. Use a strong outer package. UN specification packaging is not required.

A13.3.1.4. Each final completed package may not exceed 30 kg G (66 pounds).

A13.3.1.5. Ensure completed packages containing breakable or brittle inner packages are capable of withstanding a 4 foot drop on solid concrete.

A13.3.1.6. Use packaging meeting general requirements of Attachment 3.

A13.3.2. Package Class 2 (Non-Toxic Aerosols) in packages meeting the following provisions:

A13.3.2.1. Limit Class 2 substances to inner non-refillable non-metal receptacles not exceeding 120 ml (4 fluid ounces) capacity each, or in inner non-refillable metal receptacles not exceeding 820 ml (28 fluid ounces) capacity each. Flammable aerosols may not exceed 500 ml (17 fluid ounces) capacity each. The following provisions apply to all aerosols under this paragraph:

A13.3.2.1.1. The pressure in the aerosol may not exceed 1,245 kPa at 55 degrees C (180 psi 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) **(T-0)**.;

A13.3.2.1.2. If the pressure in the aerosol exceeds 970 kPa at 55 degrees C (140 psi at 130 degrees F) but does not exceed 1105 kPa at 55 degrees C (160 psi at 130 degrees F), use an inner metal DOT 2P, or IATA/ICAO IP7A or IP7B inner metal receptacle.

A13.3.2.1.3. If the pressure in the aerosol exceeds 1,105 kPa at 55 degrees C (160 psi at 130 degrees F) but does not exceed 1245 kPa at 55 degrees C (180 psi at 130 degrees F), use an inner metal DOT 2Q or IATA/ICAO IP7A or IP7B receptacle.

A13.3.2.1.4. If the pressure in the aerosol exceeds 1,245 kPa at 55 degrees C (180 psi at 130 degrees F), use an inner metal IATA/ICAO IP7B receptacle. IP7B 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 is limited so the minimum burst pressure of the receptacle would not be exceeded if the entire gas content of the capsule were released into an aerosol.

A13.3.2.1.5. The liquid content may not completely fill the closed receptacle at 55 degrees C (130 degrees F).

A13.3.2.1.6. Ensure each aerosol exceeding 120 ml (4 fluid ounces) capacity has 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 defect.

A13.3.2.1.7. Protect the valves by a cap or other suitable means during transport.

A13.3.2.2. For aerosols containing a biological or medical preparation that may 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 fluid ounces) capacity each, the following provisions apply:

A13.3.2.2.1. The pressure in the aerosol may not exceed 970 kPa at 55 degrees C (140.7 psi at 130 degrees F).

A13.3.2.2.2. The liquid contents may not completely fill the closed receptacle at 55 degrees C (130 degrees F).

A13.3.2.2.3. Ensure one aerosol out of each lot of 500 or less, is 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 defect.

A13.3.2.2.4. Protect the valves by a cap or other suitable means during transport.

A13.3.3. Liquids. Inner packagings may not exceed 500 mL (16.9 ounces) each. Liquids may not completely fill an inner packaging at 55 °C.

A13.3.4. Solids. Inner packagings may not exceed 500 g (1.0 pounds) each.

A13.4. Prepare Vehicles as follows: The following general requirements apply:

A13.4.1. Compliance With Technical Orders. Use the vehicle service or technical manual to prepare item for shipment.

A13.4.2. Fuel Limitations. Comply with paragraph A3.3.3.4. when determining actual fuel level requirements to meet operational needs. Each liquid vehicle fuel tank may be no more than one-half full with the following **exceptions**:

A13.4.2.1. When the technical manual requires draining and purging.

A13.4.2.2. Drain and cap when unit is susceptible to fuel spills or leakage (see paragraph A3.3.3.6.).

A13.4.2.3. When loaded on the aircraft cargo ramp, drain vehicle fuel tank if the fuel tank openings cannot be located on the high side of the ramp.

A13.4.2.4. When palletized or loaded on a trailer, drain fuel tanks. Units palletized due to the aircraft's subfloor requirements may contain fuel in tank.

A13.4.2.5. When transported under the authority of Chapter 3 of this manual, the following fuel limitations apply:

A13.4.2.5.1. Each liquid vehicle fuel tank may not exceed three-fourths full.

A13.4.2.5.2. Units on the aircraft cargo ramp or when loaded on the aircraft with a steep angle of ascent (e.g., KC-10, KC-135) may not exceed one-half full per tank.

A13.4.2.5.3. Series M998 High Mobility Multi-Wheeled Vehicles (HMMWV) may face aft on the cargo ramp with the fuel tank opening on the low side of the ramp. Fuel (JP-8 or diesel only) may not exceed one-half tank. Ensure vehicles are equipped with a fuel injection delivery system, and an open vent line to allow pressure equalization during decompression.

A13.4.2.6. Drain fuel from boats and other watercraft loaded on trailers or palletized to the greatest extent possible. When transported or airdropped under the authority of Chapter 3 of this manual, each integral fuel tank may be three-fourths full. During exercises/training (insertion, rescue, etc.), ensure fuel levels are the minimum amount necessary to meet mission objective, not to exceed three-fourths full. Only approved portable non-bulk fuel tanks may contain fuel.

A13.4.2.7. 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. Ensure fuel leakage does not occur during shipment. No special venting is required other than to maintain normal aircraft ventilation during flight. Seal vents according to the pertinent service technical directive. 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.

A13.4.2.8. When aircraft wings are removed from aircraft body, completely drain fuel tanks within wings. Purging is not required. When transported with the original aircraft body, consider all pieces as a single unit for identification on the Shipper's Declaration form.

A13.4.2.9. Unmanned aerial vehicles (UAV) prepared according to technical publications/manuals may be shipped drained but not purged. Remaining fuel levels will be as specified in the appropriate technical publication/manual. **(T-0)**.

A13.4.2.10. When loaded in a freight container, drain vehicle fuel tank. Purge the fuel tank and system if required by the item's technical directive, or if the flash point of the fuel is less than 38 degrees C (100 degrees F). In the absence of specific draining and purging procedures:

A13.4.2.10.1. Completely drain all fuel

A13.4.2.10.2. Run engine until it stalls

A13.4.2.10.3. Allow fuel tanks and lines to remain open for 24 hours.

A13.4.2.10.4. Ensure installed batteries are non-spillable or non-regulated. If battery is non-regulated and no other hazards are present (e.g., fire extinguisher), a Shipper's Declaration is not required. Comply with A3.1.16.

A13.4.2.11. Ensure fuel servicing vehicles have refueling system bulk tank and lines purged (for liquids with a flash point less than 38 degrees C (100 degrees F)) or drained to the maximum extent possible (for liquids with a flash point at or above 38 degrees C (100 degrees F)) according to technical directives (technical orders, field manuals, etc.) so that no more than 5 gallons of fuel remains in the tank/lines.

A13.4.2.12. Completely empty gaseous fuel from any non-DOT specification pressurized vessel (fuel tank), lines, and regulator on liquefied petroleum gas or compressed gas powered vehicles. Ensure tanks are securely closed. Purging is not required.

A13.4.2.13. Liquefied petroleum gas or compressed gas powered vehicles containing a DOT specification cylinder as the gaseous fuel tank do not require draining. Comply with all requirements of Attachment 6 for the material and cylinder specification. Tightly close and secure cylinder shut off valve. Completely empty lines and regulator of flammable gas and vapors.

A13.4.2.14. Fuel cell powered vehicles. Secure and protect the fuel cell in a manner to prevent damage to the fuel cell. Describe equipment (other than vehicles, engines or mechanical equipment) such as consumer electronic devices containing fuel cells (fuel cell cartridges) as ‘‘Fuel cell cartridges contained in equipment.’’

A13.4.2.15. added: Liquid fueled vehicles rigged for airdrop or vehicles being transported as cargo to a staging area for a subsequent airdrop may be no more than three-fourths full. Do not load platforms containing vehicles rigged for airdrop with fuel tanks three-fourths full on the aircraft ramp.

A13.4.3. Accessorial hazards. Ensure installed components, equipment, and vehicle accessorial hazards (e.g., fire extinguishers, jerricans, etc.) are in properly configured and approved holders designed for use with the vehicle. The following applies:

A13.4.3.1. Do not remove other hazardous materials from their packaging and store in the racks or containers of vehicles or equipment unless authorized by paragraph A5.2. Special

Operations Forces and Joint Service Explosive Ordnance Disposal (EOD) units have an operational requirement and are authorized to load Hazardous Materials (HAZMAT) within unit vehicles for air shipment in accordance with the requirements established in DTR part III, Appendix H. Ensure these hazardous materials remain packaged unless authorized by paragraph A5.2.

A13.4.3.2. Secure batteries upright in designed holders except non-spillable batteries meeting Table A4.2., Special Provision A67 as nonhazardous. Orient non-spillable batteries in a manner to fit designed holder. Protect the terminals of installed batteries to prevent short circuit by use of battery boxes, protective covers, taping, etc. If battery cables are disconnected, they must be secured away from terminals, and the terminals protected.

A13.4.3.3. When loaded in a freight container, remove acid or alkali batteries and package according to A12.4. Do not ship packaged wet-cell batteries inside a freight container unless accessible during flight. Non-spillable and non-hazardous gel-type batteries may remain in the vehicle holder provided they remain upright and the cables are disconnected. Tape the ends of the cables/terminals to prevent short circuit.

A13.4.3.4. Drain engines, generators, and other equipment that are by design an approved part of an M-Series vehicle to the greatest extent possible (not to exceed 17 ounces) except the tanks may be one-half full when the vehicle is transported under the authority of Chapter 3 of this manual. Always drain engines and generators mounted to a vehicle, SE or trailer for convenience of movement or handling to the greatest possible extent. Purging is not necessary unless required by the item's technical instructions. Use UN Specification packaging (e.g., jerricans) for transport of spare fuel whenever possible.

A13.4.3.5. Prepare aircraft and helicopters for transportation according to the requirements of the respective aircraft's shipping manual.

A13.4.3.5.1. Remove all munitions and explosives, other than those installed as permanent-type aircraft equipment, according to the pertinent aircraft technical order and A3.3.1.9.

A13.4.3.5.2. Emergency equipment (e.g., life vests, signal kits, etc.) required for safe operation of the aircraft, helicopter, or boat when transported according to DTR, Part III, do not require removal if secured in approved holders/racks.

A13.4.3.5.3. Fasten batteries securely in the holder provided, with the terminals 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 A12.4.

A13.4.3.6. Air-bag modules installed as a vehicle component are not subject to any other requirements of this manual.

A13.4.3.7. Lithium batteries. Secure lithium batteries contained in vehicles, engines, or mechanical equipment in the battery holder of the vehicle, engine, or mechanical equipment, and protect in such a manner as to prevent damage and short circuits (e.g., by the use of non-conductive caps that cover the terminals entirely). Prototype or low production lithium batteries securely installed, each lithium battery must be of a type that

has successfully passed each test in the UN Manual of Tests and Criteria, or approved by the Associate Administrator of the DOT. **(T-0)**.

A13.5. UN3548, Articles containing miscellaneous dangerous goods, N.O.S. are authorized when classified per paragraph A4.2.3., maximum net quantity per package 60 L for liquids and 100 kg for solids, when packaged, or unpackaged as follows:

A13.5.1. When packaged, packagings meeting Packing Group II performance standard is required.

A13.5.1.1. Pack articles to prevent movement and inadvertent operation during normal conditions of transport.

A13.5.1.2. Pack inner receptacles containing liquids with closures correctly oriented in their outer packagings.

A13.5.1.3. Where there is no receptacle within the article, ensure the article fully encloses the dangerous goods and prevent their release under normal conditions of transport.

Inner packaging	**Outer packaging**
Receptacles: constructed of suitable materials and secured in the article in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents into the article itself or the outer packaging.	**Drums:** removable head steel (1A2), removable head aluminum (1B2), removable head metal other than steel or aluminum (1N2), plywood (1D), fiber (1G), or removable head plastic (1H2) ***or*** **Boxes:** steel (4A), aluminum (4B), ordinary natural wood (4C1), sift-proof natural wood (4C2), plywood (4D), reconstituted wood (4F), fiberboard (4G), expanded plastic (4H1), or solid plastic (4H2), other metal (4N) ***or*** **Jerricans:** removable head steel (3A2), plastic removable head (3H2), or aluminum removable head (3B2)

A13.5.2. Robust articles.

A13.5.2.1. Robust articles may be transported in strong outer packagings constructed of suitable material and of adequate strength and design in relation to the packaging capacity and its intended use; or,

A13.5.2.2. Robust articles may be transported unpackaged or on pallets when the dangerous goods are afforded equivalent protection by the article in which they are contained.

A13.6. Package Battery Powered Equipment and Vehicles as follows: Prepare items powered by wet cell or non-spillable batteries (includes items with batteries as an installed integral component e.g., tactical shelters, trailers, etc.) as follows:

A13.6.1. Use vehicle or equipment service technical manuals to prepare items for shipment.

A13.6.2. Secure batteries upright in designed holders except non-spillable batteries meeting Table A4.2., Special Provision A67 as nonhazardous, may be oriented in a manner to fit designed holder. Protect the terminals of installed batteries to prevent short circuit by use of battery boxes, protective covers, taping, etc. If battery cables are disconnected, secure them away from terminals, and protect the terminals. Remove the battery and ship according to A12.4. if the item is likely to be shipped in other than an upright position.

A13.6.3. 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.

A13.6.4. Protect the batteries of wheelchairs equipped with non-spillable batteries against short circuits and securely attach to the wheelchair or remove and box. Specification packaging is not required.

A13.6.5. 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. **(T-0)**. Ensure batteries remain installed and securely attached to the chair. Protect the terminals against short circuits. Deactivate wheelchairs by removing connections at battery terminals or by otherwise disconnecting their power source. Remove the battery and ship according to A12.4. if the item is likely to be shipped in other than an upright position.

A13.6.6. Lithium batteries. Securely fasten lithium batteries contained in vehicles, engines, or mechanical equipment in the battery holder of the vehicle, engine, or mechanical equipment, and be protect in such a manner as to prevent damage and short circuits (e.g., by the use of non-conductive caps that cover the terminals entirely). Prototype or low production lithium batteries securely installed, each lithium battery must be of a type that has successfully passed each test in the UN Manual of Tests and Criteria, or approved by the Associate Administrator of the DOT. **(T-0)**.

A13.7. Lithium Cells and Batteries.

A13.7.1. Ensure lithium cells and batteries meet the requirements of paragraph A3.3.9.2. except paragraph A3.3.9.2.3.

A13.7.2. Package cells and batteries as follows:

A13.7.2.1. Package cells and batteries in combination packagings with non-metallic inner packagings that completely enclose the cell or battery, and separate the cells or batteries from contact with equipment, other devices, or conductive materials (e.g., metal) in the packaging. Pack inner packaging inside an outer metal box (4A, 4B, or 4N), wooden box (4C1, 4C2, 4D, or 4F), fiberboard box (4G), or solid plastic box (4H1 or 4H2), metal drum (1A2, 1B2, or 1N2), fiber drum (1G), plastic drum (1H2), plywood drum (1D), plastic jerrican (3H2), or metal jerrican (3A2 or 3B2). Packaging meeting PG II performance level is required. UN Specification packaging is not required when individual spare batteries are hand-carried according to Chapter 3 of this manual.

A13.7.2.2. Batteries exceeding 12 kg. Individual batteries or battery assemblies exceeding a gross weight of 12 kg (26.5 lbs.) employing a strong, impact-resistant outer casing and assemblies of such batteries, may be packed in strong outer packagings, in protective enclosures (e.g., in fully enclosed wooden slatted crates) or on pallets or other handling

devices, instead of packages meeting the UN performance packaging requirements identified in paragraph A13.7.2.1. above. Secure batteries to prevent inadvertent movement, and ensure the terminals do not support the weight of other superimposed elements. Identify batteries or battery assemblies packaged in this manner as “P4” for movement with passengers.

A13.7.2.3. Large packagings. The following large packagings meeting the PG II performance level are authorized for a single battery: metal packaging fitted with an electrically non-conductive lining material (50A, 50B, 50N), rigid plastic (50H), wooden (50C, 50D, 50F), rigid fiberboard (50G).

A13.7.3. Do not place lithium batteries (UN3480 and UN3090 only) in the same package or overpack as hazardous materials classified in Class 1 (other than Division 1.4S), Division 2.1, Class 3, Division 4.1 or Division 5.1.

A13.8. Lithium Batteries Contained in Equipment.

A13.8.1. Ensure lithium cells and batteries meet the requirements of paragraph A3.3.9.2. except paragraph A3.3.9.2.3.

A13.8.2. UN specification packaging is not required. Pack equipment with installed lithium batteries in an outer packaging constructed of suitable material of adequate strength and design in relation to the capacity and intended use of the packaging, unless the lithium cells or batteries are afforded equivalent protection by the equipment in which they are contained. Secure the equipment within the outer packaging to prevent movement, short circuit, and accidental operation during transport.

A13.8.2.1. Package additional cells or batteries in accordance with A13.7.2.

A13.8.2.2. If package contains cells or batteries in equipment and other cells or batteries packed with equipment, mark the package with the proper shipping name ``Lithium metal batteries packed with equipment'' or ``Lithium ion batteries packed with equipment'' as appropriate.

A13.8.2.3. Securely fasten lithium batteries contained in vehicles, engines, or mechanical equipment in the battery holder of the vehicle, engine, or mechanical equipment and protect in such a manner as to prevent damage and short circuits (e.g., by the use of non-conductive caps that cover the terminals entirely).

A13.8.3. For airdrop missions authorized according to Chapter 3 of this manual, pack electronic equipment hand carried in a rucksack, in a shipping (airdrop) container, or as a door bundle depending on mission requirements. Shipper’s Declaration for Dangerous Goods certification is not required.

A13.9. Lithium Batteries Packed With Equipment.

A13.9.1. Ensure Lithium cells and batteries meet the requirements of paragraph A3.3.9.2. except paragraph A3.3.9.2.3.

A13.9.2. Pack the cells or batteries in inner packagings that completely enclose the cell or battery and prevent short circuits, including shifting that could lead to short circuits. The inner packagings are then placed in outer packagings as follows:

A13.9.2.1. Pack in packagings that meet the Packing Group II performance requirements as specified in paragraph A13.7.2. then pack with equipment. OR

A13.9.2.2. Pack in with equipment in packagings that meet the Packing Group II performance requirements as specified in paragraph A13.7.2.

A13.9.2.3. Large packagings. The following large packagings meeting the PG II performance level are authorized for batteries packed with a single piece of equipment: metal packaging fitted with an electrically non-conductive lining material (50A, 50B, 50N), rigid plastic (50H), wooden (50C, 50D, 50F), rigid fiberboard (50G).

A13.9.3. For missions authorized according to Chapter 3 of this manual, electronic equipment may be hand carried in a rucksack, packed in a shipping (airdrop) container, or in a door bundle depending on mission requirements. Shipper's Declaration for Dangerous Goods certification is not required.

A13.10. Package Carbon Dioxide, Solid (Dry Ice) as follows:

A13.10.1. 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.

A13.10.2. Packaging Requirements.

A13.10.2.1. 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 packaging is not required.

A13.10.2.2. Prepare DOD medical shipments requiring use of dry ice according to DLAR 4145.21/TB MED 284/NAVSUPINST 4610.31A, *Preparation of Medical Material Requiring Freeze or Chill Environment for Shipment.*

A13.10.2.3. Prepare non-hazardous shipments requiring dry ice according to technical directives or industry standards. Ensure outer packaging is fiberboard boxes, polystyrene foam containers, or other suitable packaging designed and constructed to permit the release of carbon dioxide gas and to prevent build-up of pressure that could rupture the packaging. UN specification packaging is not required.

A13.11. Package Magnetized Material as follows:

A13.11.1. 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.

A13.11.2. Packaging Requirements. Shield magnetic materials 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 4.6 m (15 feet). Ensure that meters used to measure the

magnetic field are properly operational, and whenever possible, that the item be measured by two different devices. 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). UN specification packaging is not required. Magnetic material that has a magnetic field strength greater than 0.00525 gauss at 4.6m (15 feet) is forbidden for air movement.

A13.12. Package Life-Saving Appliances as follows: 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).

A13.12.1. Handling Instructions. Store in cool, well-ventilated areas away from fire hazards and sources of heat or ignition. Do not drop or rough handle.

A13.12.2. Packaging Requirements:

A13.12.2.1. 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 meeting the general requirements of A3.1. is required. UN specification packaging is not required.

A13.12.2.2. Individually assigned kit hand carried by a crewmember. This paragraph applies only to support operations involving recovery of inoperable aircraft or return of a flight crewmember as a passenger to maintain accountability of an individually assigned kit. For unit deployments see paragraph 3.5. or transport as palletized cargo according to A13.12.2.1. This does not apply to contract passenger or commercial aircraft. The following applies:

A13.12.2.2.1. Package life-saving appliances in a strong outer container or A-3 bag. The requirements of A13.12.2.1. for inner packing and cushioning apply.

A13.12.2.2.2. Individual assigned kits may be handcarried by crew members. Crew members inform the Air Terminal Operations Center, when transporting life-saving appliances in this manner. Store items directed by the transporting aircraft commander.

A13.12.2.2.3. When prepared and handcarried according to this paragraph, no other requirements of this manual apply while in kit is in possession of the crewmember.

A13.13. Package Dangerous Goods in Apparatus or Machinery as follows: Apply this description only to apparatus or machinery containing hazardous material as an integral component of the item. This description may also be used for items that are normally a part of an end item or required to serve an operational function, but are removed and shipped separately

(e.g., fuel tanks or bladders). Do not use this description for machinery or apparatus for which a PSN already exists in Table A4.1. The following applies:

A13.13.1. For other that fuel system components, apparatus or machinery may only contain hazardous materials permitted as limited quantities under A19.3., or authorized magnetized material, or gasses of Division 2.2 without subsidiary hazard, but excluding refrigerated liquefied gasses.

A13.13.2. If more than one hazardous material is present, the material may not be capable of reacting dangerously together.

A13.13.3. The total net quantity of hazardous materials contained in one package may not exceed the following:

A13.13.3.1. 1 kg (2.2 pounds) for solids

A13.13.3.2. 500 ml (17 ounces) for liquids

A13.13.3.3. 0.5 kg (1.1 pounds) for Class 2.2 gases

A13.13.4. Secure or cushion receptacles containing hazardous material to prevent breakage or leakage and to control movement within the item during transport. Cushioning material may not react dangerously with or have protective properties adversely affected by any leakage.

A13.13.5. 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. Seal or cap all openings and lines according to applicable technical directives.

A13.13.6. Ensure Class 2.2 gases are in authorized cylinders according to Attachment 6.

A13.13.7. 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 packaging is not required.

A13.14. Package Class 9 Materials as follows: UN specification packaging is not required for material packaged according to this paragraph. Use any appropriate non-bulk packaging that meets the requirements of Attachment 3 to ship liquid or solid material. The following applies.

A13.14.1. Provide enough outage for packagings of 208 L (55 gallon) capacity or less, so that the packaging is not liquid full at 54 degrees C (130 degrees F).

A13.14.2. 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.

A13.14.3. Package material that may cause a hazard in transportation due to its reaction with water in either an inner or outer waterproof packaging.

A13.15. Package Air Bag Inflators, Air Bag Modules, and Seat-Belt Pretensioners as follows: Item are classified as Class 9 are approved by DOT according to 49 CFR Section 173.166. Package in boxes, drums, or jerricans as follows:

Inner packaging	Outer packaging
Not required.	**Boxes:** steel (4A), aluminum (4B), wooden (4C1 or 4C2), plywood (4D), reconstituted wood (4F), fiberboard (4G), plastic (4H1 or 4H2), or other metal (4N) ***or*** **Drums:** steel (1A2), aluminum (1B2), plywood (1D), fiber (1G), plastic (1H2), or other metal (1N2) ***or*** **Jerricans:** steel (3A2), aluminum (3B2), or plastic (3H2)

A13.16. Package Asbestos (Hydrated Mineral Silicates) as follows: Asbestos blue, Adsorbed gas. A gas which when packaged for transport is adsorbed onto a solid porous material resulting in an internal receptacle pressure of less than 101.3 kPa at 20 °C and less than 300 kPa at 50 °C. 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. Ensure asbestos is loaded, handled, unloaded, and any contamination of aircraft removed in such a manner that minimizes occupational exposure to airborne particles released incident to transportation. Packaging meeting the general packaging requirements of A3.1. is required. UN specification packaging is not required. Package asbestos in:

A13.16.1. Rigid, leak tight packaging such as metal, plastic, or fiber drums.

A13.16.2. Bags or other nonrigid packaging that are dust and sift-proof. Ensure the packages are palletized and unitized by methods such as shrink-wrapping in plastic or wrapping in fiberboard secured by strapping.

A13.16.3. Bags or other nonrigid packaging that are dust and sift-proof in strong outer fiberboard or wooden boxes.

A13.17. Package Polymeric Beads, Expandable and Plastic Molding Compound as follows: Pack polymeric beads or granules, expandable, evolving flammable vapor and plastic molding compound in dough, sheet or extruded rope form, evolving flammable vapor in boxes or drums as follows:

Inner packaging	Outer packaging
Sealed plastic liner	**Boxes:** steel (4A), aluminum (4B), wood (4C1 or 4C2), plywood (4D), fiberboard (4G), reconstituted wood (4F), plastic (4H1 or 4H2), or other metal (4N) ***or*** **Drums:** plywood (1D) or fiber (1G) **Note:** Vapor tight metal or plastic drums (1A1, 1A2, 1B1, 1B2, 1H1, 1H2, 1N1, or 1N2) may also be used (without liner).

A13.18. Package Chemical or First Aid Kits as follows:

A13.18.1. This description is intended for boxes, cases, etc., containing small amounts of various hazardous materials used for medical, analytical, or testing purposes.

A13.18.1.1. Ensure the PG assigned to the kit as a whole is the most stringent PG assigned to any individual substance in the kit.

A13.18.1.2. Ensure the contents of the kit is of such a nature and so packed that there is no possibility of the mixture of contents causing dangerous evolution of heat or gas.

A13.18.1.3. The only hazardous materials authorized in the kits are substances authorized as limited quantities according to A19.3.2., and excepted quantities according to A19.2., provided the inner packaging requirements of A19.2.3. are met.

A13.18.2. Package as follows:

A13.18.2.1. Except for Division 5.2, in inner receptacles of no more than 250 mL (8.5 fluid ounces) for liquids or 250 g (9 ounces) for solids. For Division 5.2 (organic peroxide) Type D, E and F (only), inner receptacles of no more than 125 mL for liquids or 250 g for solids.

A13.18.2.2. The total quantity of hazardous material in any one kit may not exceed 1 L (1 quart) for liquids or 1 kg (2.2 pounds) for solids. The total quantity of dangerous goods in any one package may not exceed 10 kg (22 pounds).

A13.18.2.3. Protect inner receptacles from other materials in the kit and pack in wood (4C1 or 4C2), plywood (4D), reconstituted wood (4F), expanded plastic (4H1), solid plastic (4H2), fiberboard (4G), steel (4A), or aluminum (4B) box.

A13.18.3. Refer to Table A19.2., **Note** 1 for limited quantities of hazardous material in Chemical or First Aid Kits.

A13.19 Capacitors.

A13.19.1. Ensure capacitors, including capacitors containing an electrolyte that does not meet the definition of any hazard class or division as defined in this manual, conform to the following requirements:

A13.19.1.1. Ensure capacitors not installed in equipment are transported in an uncharged state;

A13.19.1.2. Protect each capacitor against a potential short circuit hazard in transport as follows:

A13.19.1.2.1. When a capacitor's energy storage capacity is less than or equal to 10 Wh or when the energy storage capacity of each capacitor in a module is less than or equal to 10 Wh, protect the capacitor or module against short circuit or fit with a metal strap connecting the terminals; or

A13.19.1.2.2. When the energy storage capacity of a capacitor or a capacitor in a module is more than 10 Wh, fit the capacitor or module with a metal strap connecting the terminals;

A13.19.1.3. Capacitors containing an electrolyte that meets the definition of one or more hazard class or division as defined in this part, design them to withstand a 95 kPa (0.95 bar, 14 psi) pressure differential;

A13.19.1.4. Design and Construct capacitors to safely relieve pressure that may build up in use, through a vent or a weak point in the capacitor casing. Contain any liquid that is released upon venting by the packaging or by the equipment in which a capacitor is installed; and

A13.19.1.5. Mark capacitors with the energy storage capacity in Wh.

A13.19.2. Securely cushion and pack capacitors within strong outer packagings. Capacitors installed in equipment may be offered for transport unpackaged or on pallets, when the capacitors are afforded equivalent protection by the equipment in which they are contained.

A13.19.3. Capacitors containing an electrolyte not meeting the definition of any hazard class or division as defined in this manual, including when installed in equipment, are not subject to any requirements of this manual other than those in A13.19.1. above.

A13.19.4. Capacitors containing an electrolyte that meets the definition of one or more hazard class or division as defined in this manual, with an energy storage capacity of 10 Wh or less are not subject to any requirements of this manual, other than those in A13.19.1. above, when they are capable of withstanding a 1.2 m (3.9 feet) drop test unpackaged onto a rigid, non-resilient, flat and horizontal surface without loss of contents.

A13.19.5. Capacitors containing an electrolyte meeting the definition of one or more hazard class or division as defined in this manual, that are not installed in equipment, and with an energy storage capacity of more than 10 Wh are subject to the requirements of this manual.

A13.19.6. Capacitors installed in equipment and containing an electrolyte meeting the definition of one or more hazard class or division as defined in this manual, not subject to any

requirements of this manual, other than those in A13.19.1. above, provided the equipment is packaged in a strong outer packaging and in such a manner as to prevent accidental functioning of the capacitors during transport. Large, robust equipment containing capacitors may be offered for transport unpackaged or on pallets when the capacitors are afforded equivalent protection by the equipment in which they are contained.

A13.20. UN3530, Engine, internal combustion, or Machinery, internal combustion This entry is for engines and machines with internal combustion engines powered by fuels that are marine pollutants but do not meet the criteria of any other Class or Division. The following general requirements apply:

A13.20.1. Compliance With Technical Orders. Use the equipment service technical manual to prepare items for shipment.

A13.20.2. Fuel Limitations. Completely drain engine-powered SE 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. Drain and purge when required by the applicable technical manual. The following exceptions/additional restrictions apply:

A13.20.2.1. Drain engine-powered SE with large fuel systems that the shipper determines cannot be drained to 500 ml (17 ounces) within the mechanical limits of the equipment to the extent no free standing liquid remains in the fuel tank, lines, or system.

A13.20.2.2. When transported under the authority of Chapter 3 of this manual, wheeled-engine powered SE may contain up to one-half tank of fuel. Ship only the minimum quantity of fuel consistent with operational requirements. Ensure tanks are securely closed. Drain non-wheeled engine powered SE so no more than 500 ml (17 ounces) of residual fuel is remaining.

A13.20.2.3. Completely drain single axle equipment loaded with the tongue resting on the aircraft floor.

A13.20.2.4. Ensure engines that are damaged or inoperable and purging cannot be accomplished, or proper purging facilities are unavailable are drained to the maximum extent possible and install plugs, caps, and covers over all openings as required by technical directives.

A13.20.2.5. Engines which are drained and purged according to the responsible technical manual, and containing no other hazardous material, are nonhazardous for transportation. Comply with paragraph A3.1.16.4.

A13.20.2.6. Where an engine or machine could possibly be handled in other than an upright position, secure the engines or machinery in a strong, rigid outer packaging in an orientation to prevent accidental leakage and prevent any movement during transport which would change in orientation or cause them to be damaged.

A13.20.2.7. When loaded in a freight container, drain fuel tanks. Purge the fuel tank and system if required by the item's technical directive, or if the flash point of the fuel is less than 38 degrees C (100 degrees F). In the absence of specific draining and purging procedures:

A13.20.2.7.1. Completely drain all fuel.

A13.20.2.7.2. Run engine until it stalls.

A13.20.2.7.3. Allow fuel tanks and lines to remain open for 24 hours.

A13.20.2.7.4. Ensure installed batteries are non-spillable or non-regulated.

A13.20.2.8. When unit is susceptible to fuel spills or leakage (see paragraph A3.3.3.6.), drain and cap unit.

A13.20.3. Accessorial hazards. Ensure installed components, equipment, and accessorial hazards (e.g., fire extinguishers, jerricans, etc.) are in properly configured and approved holders designed for use with the unit. The following applies:

A13.20.3.1. Secure batteries upright in designed holders except non-spillable batteries meeting Table A4.2., Special Provision A67 as nonhazardous, may be oriented in a manner to fit designed holder. Protect the terminals of installed batteries to prevent short circuit by use of battery boxes, protective covers, taping, etc. If battery cables are disconnected, secure them away from terminals, and protect the terminals.

A13.20.3.2. When loaded in a freight container, remove acid or alkali batteries and package according to A12.4. Do not ship packaged wet-cell batteries inside a freight container unless accessible during flight. Non-spillable and non-hazardous gel-type batteries may remain in the equipment holder provided they remain upright and the cables are disconnected. Tape the ends of the cables/terminals to prevent short circuit.