Attachment 10

CLASS 6—TOXIC (POISONOUS) MATERIALS AND INFECTIOUS SUBSTANCES

A10.1. General Requirements. For military members, failure to observe the provisions from paragraphs A10.2. through A10.10. and any subsequent paragraph(s) hereunder is a violation of Article 92, Uniform Code of Military Justice (UCMJ). Civilian employees who fail to observe the provisions from paragraph A10.2. through A10.10. and any subsequent paragraph(s) hereunder are subject to administrative disciplinary action without regard to otherwise applicable criminal or civil sanctions. Personnel shall not deviate from these provisions and fully comply with cylinder specifications and/or inner/receptacle and outer container selection as specified in each packaging paragraph. **(T-0)**. Not all packaging paragraphs are inclusive and packaging selection is determined by the toxic materials or infectious substances and quantity shipped. This attachment contains information concerning the packaging of Class 6.1 toxic material. The term "toxic" and "poisonous" are used synonymously in this manual. See Attachment 3 for other details concerning Class 6 material.

A10.2. Package Packing Group I Class 6.1 **Toxic Materials** as follows:

A10.2.1. Handling Instructions. These items may produce extremely toxic vapors. Make approved chemical safety mask and clothing available when handling this material, and wear when handling leaking packages. See paragraph 2.8. for additional requirements.

A10.2.2. 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). Do not accept shipments of arsine or phosphine for transportation if packaged in a specification 3AL cylinder. Cylinders containing phosgene must not exceed a filling density of 125 percent. The cylinder may not contain more than 68 kg (150 pounds) of phosgene. Also, test each filled cylinder for leakage before it is offered for transportation to ensure there is 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. **(T-0)**. During which time, make frequent examinations to identify any escape of gas. After the test has been accomplished do not loosen the valve of the cylinder before the cylinder is offered for transportation, and do not loosen during transportation.

A10.3. Package Bromoacetone, Methyl Bromide, Chloropicrin, and Methyl Bromide or Methyl Chloride Mixtures as follows:

A10.3.1. Handling Instructions. These materials and mixtures are extremely dangerous poisons. Make approved chemical safety mask and clothing available when handling this material, and wear when handling leaking packages. See paragraph 2.8. for additional information.

A10.3.2. Packaging Requirements.

A10.3.2.1. Package bromoacetone in a steel (4A), aluminum (4B) wooden box (4C1, 4C2), plywood (4D), reconstituted wood (4F) or other metal (4N) boxes with an inner glass

receptacle or tube in a hermetically-sealed metal receptacle in a corrugated fiberboard carton. A bottle may not contain over 500 g (17.6 ounces) of liquid and 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 may not exceed 11 kg (24 pounds). The package must be tested to the PG I performance level. **(T-0)**.

A10.3.2.2. Package bromoacetone, methyl bromide, chloropicrin and methyl bromide mixtures, chloropicrin and methyl chloride mixtures, and chloropicrin mixtures charged with non-flammable, non-liquefied compressed gas in a 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). This capacity does not apply to shipments of methyl bromide. All cylinders must meet the requirements of A3.3.2. **(T-0)**.

A10.4. Package Liquid Class 6.1 Materials as follows:

A10.4.1. Package in combination packagings with outer drums, barrels, jerricans, or boxes as follows:

Inner packaging	**Outer packaging**
Receptacles: Glass, earthenware, plastic, metal, or glass ampoules **Note:** For PG I material pack inner packagings in a rigid and leakproof receptacle or intermediate packaging containing sufficient absorbent material to absorb the entire contents of all inner packagings before packing the inner packaging(s) in the outer package. **Note:** Ensure inner packaging or receptacle closures of combination packages containing liquids are held securely, tightly and effectively in place by secondary means. See A20.3.	**Drums:** steel (1A2), aluminum (1B2), metal other than steel or aluminum (1N2), plywood (1D), fiber (1G), or plastic (1H2) ***or*** **Barrel:** wood (2C2) **Note:** Wood barrels not authorized for PG I material. ***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) or solid plastic (4H2)

A10.4.2. Package in single packaging drums, barrels, or jerricans as follows:

Inner packaging	**Outer packaging**
Not required	**Drums:** steel (1A1 or 1A2), aluminum (1B1 or 1B2), fiber (1G) with liner, plastic (1H1 or 1H2), or metal other than steel or aluminum (1N1 or 1N2) **Note:** Fiber drum with liner only authorized for PG II and III material. ***or*** **Barrel:** wood (2C1) **Note:** Wood barrel not authorized for PG I material. ***or*** **Jerricans:** steel (3A1 or 3A2), aluminum (3B1 or 3B2), or plastic (3H1 or 3H2)

A10.4.3. Package in the following composite packagings with plastic inner receptacles:

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

A10.4.4. Package in the following composite packages with glass, porcelain, or stoneware inner receptacles:

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*** solid or expanded plastic packaging (6PH1 or 6PH2) ***or*** plywood drum or wickerwork hamper (6PD1 or 6PD2)

A10.4.5. DOT Cylinders. DOT specification cylinders as prescribed for any compressed gas, except specifications 8, 8AL (acetylene) and 3HT.

A10.5. Package Solid Class 6.1 Materials as follows:

A10.5.1. Package in combination packagings with outer drums, barrels, jerricans, or boxes as follows:

Inner packaging	**Outer packaging**
Receptacles: Glass, earthenware, plastic or metal ***or*** glass ampoules	**Drums:** steel (1A1 or 1A2), aluminum (1B1 or 1B2), plywood drum (1D), fiber (1G), plastic (1H1 or 1H2), or metal other than steel or aluminum (1N1 or 1N2) ***or*** **Barrel:** wood (2C2) ***or*** **Jerricans:** steel (3A1 or 3A2), aluminum (3B1or 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)

A10.5.2. 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) **Note:** Plywood drum (1D) not authorized for PG I material. ***or*** **Barrel:** wood (2C1 or 2C2). **Note:** Wood barrels (2C1 or 2C2) not authorized for PG I material. ***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) solid plastic (4H2), or metal other than steel or aluminum (4N) **Note:** Steel (4A) without liner, aluminum (4B) without liner, natural wood (4C1), plywood (4D), reconstituted wood (4F), fiberboard (4G), expanded plastic (4H1) solid plastic (4H2), boxes not authorized for PG I material. ***or*** **Bags:** woven plastic (5H1, 5H2, or 5H3), plastic film (5H4), textile (5L1, 5L2, or 5L3), or paper, multiwall, water-resistant (5M2) **Note:** Bags not authorized for PG I material.

A10.5.3. Package in the following composite packages 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)

A10.5.4. Package in the following composite packages with glass, porcelain, or stoneware inner receptacles:

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

A10.6. Package Class 6.1, PG I, Hazard Zone A and B (Poisonous by Inhalation) as follows:

A10.6.1. Handling Instructions. These items are extremely dangerous. Make approved chemical safety mask and clothing available when handling this material, and wear when handling leaking packages.

A10.6.2. Hazard Zone A Packaging Requirements. Package Class 6.1, PG I materials with an Inhalation Hazard Zone A as follows:

A10.6.2.1. In seamless DOT or UN specification cylinders that conform to 49 CFR Section 173.40 and one of the specifications for cylinders in 49 CFR Part 178, Subpart C, except that specification 8, 8AL, and 39 cylinders are not authorized. Ensure cylinders also meet the requirements of A3.3.2.

A10.6.2.2. In an inner drum (1A1, 1B1, 1H1, 1N1 , or 6HA1), then place in an outer drum (1A2 or 1H2). Test both the inner and outer drum to the PG I performance level. An outer 1A2 drum requires a minimum thickness of 1.35 mm (0.053 inches). An outer 1H2 drum requires a minimum thickness of 6.30 mm (0.248 inches). The capacity of the inner drum may not exceed 220 L (58 gallons). Ensure the outer drum (1A2 or 1H2) can withstand a hydrostatic test pressure of 100kPa (15 psig). Cushion the inner drum within the outer drum with a shock-mitigating, nonreactive material which completely surrounds the inner packaging on all sides. Ensure the inner drum also meets the following requirements:

A10.6.2.2.1. Satisfactorily withstand a hydrostatic pressure test (as outlined in 49 CFR Section 178.605) of 300 kPa (45 psig).

A10.6.2.2.2. Satisfactorily withstand a leakproofness test (as outlined in 49 CFR Section 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.

A10.6.2.2.3. Have screw-type closures that meet all the following requirements:

A10.6.2.2.3.1. Closed and tightened to a torque as prescribed by the closure manufacturer, using a device that is capable of measuring torque.

A10.6.2.2.3.2. Physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transportation.

A10.6.2.2.3.3. Provided with a cap seal that is properly applied according to the cap seal manufacturer's recommendations. Ensure the cap seal is capable of withstanding an internal pressure of at least 100 kPa (15 psig).

A10.6.2.2.4. Meet the following minimum thickness requirements:

A10.6.2.2.4.1. 1A1 and 1N1 drums has a minimum thickness of 1.3 mm (0.051 inch).

A10.6.2.2.4.2. 1B1 drums have a minimum thickness of 3.9 mm (0.154 inch).

A10.6.2.2.4.3. 1H1 drums have a minimum thickness of 3.16 mm (0.124 inch).

A10.6.2.2.4.4. 6HA1 drums the plastic inner containers have a minimum thickness of 1.58 mm (0.0622 inch) and the outer steel drums have a minimum thickness of 0.96 mm (0.0378 inch).

A10.6.2.3. Pack in combination packagings with an inner packaging system that consists of an impact-resistant receptacle of glass, earthenware, plastic, or metal, securely cushioned with a nonreactive absorbent material packed within a leak-tight packaging of metal or plastic. The capacity of the inner receptacle may not exceed 4 L (1 gallon). An inner receptacle that has a closure requires a closure that is held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transportation. Pack the inner packaging system in an outer steel drum (1A2), aluminum drum (1B2), plywood drum (1D), fiber drum (1G), plastic drum (1H2), metal drum (other than steel or aluminum) (1N2), 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), solid plastic box (4H2) or metal box (other than steel or aluminum) (4N). Both the inner packaging system and the outer container each meeting the test requirements of the PG I performance level independently. The total amount of liquid that can be packed in the outer container may not exceed 16 L (4 gallons).

A10.6.3. Hazard Zone B Packaging Requirements. Package Class 6.1, PG I materials with an Inhalation Hazard Zone B as follows:

A10.6.3.1. In seamless DOT or UN specification cylinders that conform to 49 CFR Section 173.40 and one of the specifications for cylinders in 49 CFR Part 178, Subpart C, except that specification 8, 8AL, and 39 cylinders are not authorized. Ensure cylinders also meet the requirements of A3.3.2.

A10.6.3.2. In an inner drum (1A1, 1B1, 1H1, 1N1 , or 6HA1), then place in an outer drum (1A2 or 1H2). Both the inner and outer drum require testing to the PG I performance level. An outer 1A2 drum requires a minimum thickness of 1.35 mm (0.053 inches). An outer 1H2 drum requires a minimum thickness of 6.30 mm (0.248 inches). The capacity of the inner drum may not exceed 220 L (58 gallons). Ensure the outer drum (1A2 or 1H2) can withstand a hydrostatic test pressure of 100kPa (15 psig). Cushion the inner drum within the outer drum with a shock-mitigating, nonreactive material which completely surrounds the inner packaging on all sides. The inner drum must also meet the following requirements:

A10.6.3.2.1. Satisfactorily withstand a leakproofness test (as outlined in 49 CFR Section 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.

A10.6.3.2.2. Have screw-type closures that meet all the following requirements:

A10.6.3.2.2.1. Closed and tightened to a torque as prescribed by the closure manufacturer, using a device that is capable of measuring torque.

A10.6.3.2.2.2. Physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transportation.

A10.6.3.2.2.3. 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).

A10.6.3.2.3. Meet the following minimum thickness requirements:

A10.6.3.2.3.1. 1A1 and 1N1 drums must have a minimum thickness of 0.69 mm (0.027 inch).

A10.6.3.2.3.2. 1B1 drums must have a minimum thickness of 2.79 mm (0.110 inch).

A10.6.3.2.3.3. 1H1 drums must have a minimum thickness of 1.14 mm (0.045 inch).

A10.6.3.2.3.4. 6HA1 drums the plastic inner container must have a minimum thickness of 1.58 mm (0.0622 inch) and the outer steel drum must have a minimum thickness of 0.70 mm (0.027 inch). **(T-0)**.

A10.7. Package Tear Gas Candles as follows: Any newly developed packaging requires approval from 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).

A10.7.1. Pack in steel (4A), aluminum (4B), metal-strapped natural wood box (4C1 or 4C2), metal-strapped plywood box (4D), metal-strapped reconstituted wood box (4F), or other metal (4N). Pack functioning elements not assembled in grenades or devices in a separate compartment within the box, pack in inner boxes, then place inside the outer box, or pack 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 may 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.

A10.7.2. Pack in steel (1A2), aluminum (1B2), plastic (1H2) or other metal (1N2) drums. 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 may not exceed 35 kg (77 pounds).

A10.7.3. DOT 2P and 2Q. Pack in inner containers meeting the DOT 2P or 2Q specification (inside nonrefillable metal containers), then package 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 may not exceed 16 kg (35 pounds).

A10.8. Package Infectious Substances and Genetically Modified Microorganisms as follows:

A10.8.1. Handling Instructions.

A10.8.1.1. Infectious Substance, Affecting Humans, UN2814. This material has the potential to cause disease in humans.

A10.8.1.2. Infectious Substance, Affecting Animals, UN2900. This material has the potential to cause disease in animals.

A10.8.2. The following requirements apply to all shipments of Category A and Category B (in cultures) infectious substances, and genetically modified microorganisms:

A10.8.2.1. Use inner packagings that consist of a leakproof primary receptacle, then place in a leakproof secondary packaging.

A10.8.2.2. Place absorbent material between the primary receptacle and the secondary packaging. If multiple primary receptacles are placed in a single secondary packaging they separate with enough absorbent material to make sure there is no contact between the primary receptacles. Ensure sufficient absorbent material to absorb the entire contents of all primary receptacles.

A10.8.2.3. Place this inner packaging in a rigid outer packaging.

A10.8.2.4. Ensure each package for infectious substances is capable of passing the tests specified in 49 CFR Section 178.609.

A10.8.2.5. Ensure each package is at least 100 mm (3.9 inches) in the smallest overall external dimensions.

A10.8.2.6. Ensure each package of infectious substances has an itemized list of the contents enclosed between the secondary packaging and the outer packaging.

A10.8.2.7. For packages containing material that is unknown but suspected of meeting the criteria for inclusion in Category A and assignment to UN2814 or UN2900, show the words “Suspected Category A Infectious Substance” in parenthesis following the PSN on the itemized list of contents inside the outer package.

A10.8.2.8. Whatever the intended temperature of shipment, ensure the primary receptacle or the secondary packaging used for infectious substances is capable of withstanding without leakage an internal pressure (which produces a pressure differential) of not less than 95 kPa (14 psi). Also, ensure the primary receptacle and the secondary packaging is capable of withstanding temperatures of -40 degrees C to +55 degrees C (-40 degrees F to +131 degrees F).

A10.8.2.9. In addition to the requirements of this paragraph, personnel must also meet the requirements for biological select agents and toxins in the 42 CFR Part 73 (Department of Health and Human Services); 7 CFR Part 331 and 9 CFR Part 121 (Department of Agriculture). **(T-0)**.

A10.8.2.10. Personnel transporting infectious substances, genetically modified microorganisms, or associated biological material must make advanced arrangements to

ensure that all necessary permits are obtained prior to transport and that transport of the samples and specimens occurs without delay of delivery. **(T-0)**.

A10.8.3. In addition to the requirements identified above, package infectious substances, genetically modified microorganisms, and genetically modified organisms as specified below. Exceptional cases, such as whole organs, may require special packaging. Guidance for packaging material that requires temperature control during shipment is contained in DLAI 4145.21/TB MED 284/NAVSUPINST 4610.31, "Preparation of Medical Materiel Requiring Freeze or Chill Environment for Shipment."

A10.8.3.1. Lyophilized substances. Primary receptacles of flame-sealed glass ampoules or rubber stopped glass vials fitted with metal seals.

A10.8.3.2. Liquid or solid substances shipped at ambient temperatures or higher. Primary receptacles of 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, reinforce with adhesive tape.

A10.8.3.3. 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, leak proof outer packaging is required. If dry ice is used, the outer packaging permitting the release of carbon dioxide gasis required. The primary receptacle and the secondary packaging must maintain their integrity at the temperature of the refrigerant used, as well as the temperatures and pressures of transport by aircraft to which they could be subjected if refrigeration were lost. **(T-0)**.

A10.8.3.4. Liquid or solid substances shipped in liquid nitrogen. The primary receptacle and the secondary packaging must maintain their integrity at the temperature of the liquid nitrogen as well as the temperatures and pressures of transport by aircraft to which they could be subjected if refrigeration were lost. **(T-0)**. Refrigerated liquid nitrogen packagings must be metal vacuum insulated vessels or flasks vented to the atmosphere to prevent any increase in pressure within the packaging. The use of safety relief valves, check valves, frangible discs, or similar devices in the vent lines is prohibited. Fill and discharge openings must be protected against the entry of foreign materials that might cause an increase in the internal pressure. Mark package orientation markings on the packaging. Design the packaging to prevent the release of any refrigerated liquid nitrogen irrespective of the packaging orientation. Meet all requirements for shipment of liquid nitrogen.

A10.9. Package Biological Substances, Category B, (formerly Diagnostic Specimens) as follows:

A10.9.1. Except as listed below, Biological Substances, Category B (includes patient/diagnostic specimens containing or believed to contain Biological Substances, Category B) are exempted from all other requirements of this manual (to include a Shipper's Declaration For Dangerous Goods) when offered for transportation or transported in accordance with this paragraph. A patient/diagnostic specimen meeting the definition of a

patient specimen (see Attachment 1), and not containing or believed to contain infectious substance Category A or Category B is not regulated by this manual. A patient/diagnostic specimen meeting the definition of a hazard class is be transported as required for that class. The following requirements apply to Biological Substances, Category B:

A10.9.1.1. Use packaging consisting of a primary receptacle, a secondary packaging, and a rigid outer packaging.

A10.9.1.2. Pack the primary receptacles in secondary packaging in such a way that, under normal conditions of transport, it cannot break, be punctured, or leak the contents into the secondary packaging.

A10.9.1.3. Secure secondary packagings in outer rigid packagings with suitable cushioning material such that any leakage of the contents will not impair the protective properties of the cushioning material or the outer packaging.

A10.9.1.4. Ensure completed package is capable of successfully passing the drop test in 49 CFR Section 178.603 at a drop height of at least 1.2 meters (3.9 feet).

A10.9.1.5. Mark the outer packaging clearly and durably in accordance with paragraphs A14.4.5.3. and A14.4.5.4.

A10.9.1.6. The minimum dimension of at least one surface of the outer packaging is 100 mm (3.9 inches) by 100 mm (3.9 inches).

A10.9.2. Liquid Biological Substances, Category B. Package liquid Biological Substances, Category B as follows:

A10.9.2.1. Pack in leakproof primary receptacles with a volumetric capacity of not more than 1 L (33.8 ounces).

A10.9.2.2. Place absorbent material between the primary receptacle and secondary packaging. If several fragile primary receptacles are placed in a single secondary packaging, they must be individually wrapped or separated so as to prevent contact between them. Ensure the absorbent material is of sufficient quantity to absorb the entire contents of the primary receptacles.

A10.9.2.3. Ensure the secondary packaging is leakproof.

A10.9.2.4. Ensure the primary receptacle or the secondary packaging is capable of withstanding without leakage an internal pressure producing a pressure differential of not less than 95 kPa (0.95 bar, 14 psi) in the range of -40 degrees C to 55 degrees C (-40 degrees F to 130 degrees F).

A10.9.2.5. The maximum quantity contained in each outer packaging, including any material used to stabilize or prevent degradation of the samples, may not exceed 4 L (1 gallon). The outer packaging limitation does not include ice, dry ice, or liquid nitrogen when used to maintain the integrity of the material.

A10.9.3. Solid Biological Substances, Category B. Package solid Biological Substances, Category B as follows:

A10.9.3.1. Pack in siftproof primary receptacle that does not exceed the outer packaging weight limit.

A10.9.3.2. Then pack in siftproof secondary packaging.

A10.9.3.3. If several fragile primary receptacles are placed in a single secondary packaging, they wrap them individually or separate to prevent contact between them.

A10.9.3.4. Except for packages containing body parts, organs, or whole bodies, the outer packaging may not exceed 4 kg (8.8 pounds). This quantity excludes ice, dry ice, or liquid nitrogen, when used to ship specimens cold.

A10.9.3.5. If there is the possibility of residual liquid in the primary receptacle during transport, then use a packaging suitable for liquids, including absorbent material.

A10.9.4. Refrigerated or Frozen Specimens. The following applies:

A10.9.4.1. 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, ensure the outer packaging is leak proof. If dry ice is used, ensure the outer packaging permits the release of carbon dioxide gas.

A10.9.4.2. Liquid or solid substances shipped in liquid nitrogen. Ensure the primary receptacle and the secondary packaging maintains their integrity at the temperature of the liquid nitrogen as well as the temperatures and pressures of transport by aircraft to which they could be subjected if refrigeration were lost. Ensure refrigerated liquid nitrogen packagings are metal vacuum insulated vessels or flasks vented to the atmosphere to prevent any increase in pressure within the packaging. The use of safety relief valves, check valves, frangible discs, or similar devices in the vent lines is prohibited. Protect fill and discharge openings against the entry of foreign materials that might cause an increase in the internal pressure. Mark package orientation markings on the packaging. Design the packaging to prevent the release of any refrigerated liquid nitrogen irrespective of the packaging orientation. Ensure all requirements for shipment of liquid nitrogen are also be met.

A10.10. Package Regulated Medical Waste, N.O.S; Biomedical Waste, **N.O.S.; Clinical Waste, Unspecified, N.O.S.; Medical Waste, N.O.S.** as follows: Use non bulk packagings that meet the PG II performance level.

A10.10.1. Package in the following drums, boxes, or jerricans:

Inner packaging	Outer packaging
Not required	**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), solid plastic (4H2), or other metal (4N) ***or*** **Jerricans:** removable head steel (3A2), aluminum removable head (3B2), or plastic removable head (3H2)

A10.10.2. Additionally, prepare packages in such a manner as they will arrive at their destination in good condition, and present no hazard to persons or animals during transport.

A10.10.3. Packaging tests may be those appropriate for solids when there is sufficient absorbent material to absorb the entire amount of liquid present and the package is capable of retaining liquids. In all other instances accomplish the packaging tests appropriate for liquids.

A10.10.4. Ensure packagings intended to contain sharp objects, such as broken glass and needles are resistant to puncture and retain liquids under the performance test conditions for the packaging.

A10.11. Package Chlorosilanes as follows: Packaging meeting the PG I or PG II performance standard is required.

A10.11.1. Package in the following combination drums, or boxes:

Inner packaging	Outer packaging
Receptacles: glass, or steel	**Drums:** steel (1A2), plywood (1D), fiber (1G), or plastic (1H2) ***or*** **Boxes:** steel (4A), natural wood (4C1 or 4C2), plywood (4D), reconstituted wood (4F), fiberboard (4G), expanded plastic (4H1), or solid plastic (4H2)

A10.11.2. Package in the following composite drums:

Inner receptacle	Outer packaging
Plastic	**Drums:** steel drum (6HA1)

A10.11.3. Package in the following single drums, or jerricans:

Inner packaging	Outer packaging
Not required	**Drums:** steel (1A1) ***or*** **Jerricans:** steel (3A1)

A10.11.4. Package in Cylinders as prescribed for any compressed gas, except Specification 3HT and those prescribed for acetylene (8 and 8AL).

A10.12. Toxins, Extracted From Living Sources, Liquid, N.O.S. or Toxins, Extracted From Living Sources, Solid, N.O.S. Classify toxic substances derived from a plant, animal, or bacterial source which do not contain an infectious substance as Division 6.1 Toxins. Division 6.1 Toxins may be transported by Cargo Aircraft Only as specified in Table A4.1 and Table A4.2. Supplement the proper shipping name a technical name. Packing groups for Division 6.1 Toxic substances are assigned according to toxicity of the material and the degree of danger it poses. Packaging requirements for Division 6.1 Toxins are determined by the Packing Group assigned to them.

A10.12.1. Liquid Division 6.1 toxins are assigned to UN3172, Toxins, extracted from living sources, liquid, N.O.S.

A10.12.1.1. Package liquid Toxins in the following combination drums, or boxes adhering to the quantity per package limits shown:

Inner packaging	**Outer packaging**
Receptacles: glass, plastic or metal **Note**: limit the inner packaging quantity as follows: PG I - glass or plastic– 1.0 L, metal- 2.5 L PG II - glass or plastic– 2.5 L, metal– 5.0 L PG III - glass or plastic– 5.0 L, metal– 10.0 L	**Drums:** steel (1A1 or 1A2), aluminum (1B1 or 1B2), plywood (1D), fiber (1G), plastic (1H1 or 1H2), or other metal (1N1 or 1N2) **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), solid plastic (4H2), or other metal (4N) **or** **Jerricans:** steel (3A1 or 3A2), aluminum (3B1 or 3B2), or plastic (3H1 or 3H2) **Note**: limit the outer packaging quantity as follows: PG I – 30 L, PG II – 60 L, PG III – 220 L

A10.12.1.2. Package liquid Toxins in the following single drums, or jerricans adhering to the quantity per package limits shown:

Inner packaging	**Outer packaging**
Not required	**Drums:** steel (1A1 or 1A2), aluminum (1B1 or 1B2), plastic (1H1 or 1H2), or other metal (1N1 or 1N2) **Jerricans:** steel (3A1 or 3A2), aluminum (3B1 or 3B2), or plastic (3H1 or 3H2) **Note**: limit the outer packaging quantity as follows: PG I – 30 L, PG II – 60 L, PG III – 220 L

A10.12.1.3. Package liquid Toxins in the following composite packagings with plastic inner receptacles adhering to the quantity per package limits shown:

Inner receptacle	Outer packaging
Plastic	**Drums:** steel, aluminum, plywood, fiber, or plastic (6HA1, 6HB1, 6HD1, 6HG1, or 6HH1) ***or*** **Boxes:** steel, aluminum, wooden, plywood, fiberboard, or plastic(6HA2, 6HB2, 6HC, 6HD2, 6HG2, or 6HH2) **Note**: limit the outer packaging quantity as follows: PG I – 30 L, PG II – 60 L, PG III – 220 L

A10.12.2. Solid Division 6.1 Toxins are assigned to UN3462, Toxins, extracted from living sources, solid, N.O.S.

A10.12.2.1. Package solid Toxins in the following combination drums, boxes, or jerricans adhering to the quantity per package limits shown:

Inner packaging	Outer packaging
Receptacles: fiber, glass, paper bag, plastic, plastic bag or metal **Note**: limit the inner packaging quantity as follows: PG I – fiber, glass, paper bag, or plastic bag– 1.0 kg, plastic or metal- 2.5 kg PG II - fiber, glass, paper bag, or plastic bag– 2.5 kg, plastic or metal– 5.0 kg PG III - fiber, glass, paper bag, or plastic bag– 5.0 kg, plastic or metal– 10.0 kg	**Drums:** steel (1A1 or 1A2), aluminum (1B1 or 1B2), plywood (1D), fiber (1G), plastic (1H1 or 1H2), or other metal (1N1 or 1N2) **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), solid plastic (4H2), or other metal (4N) **or** **Jerricans:** steel (3A1 or 3A2), aluminum (3B1 or 3B2), or plastic (3H1 or 3H2) **Note**: limit the outer packaging quantity as follows: PG I – 50 kg, PG II – 100 kg, PG III – 200 kg

A10.12.2.2. Package solid Toxins in the following single drums, boxes, or jerricans adhering to the quantity per package limits shown:

Inner packaging	Outer packaging
Not required	**Drums:** steel (1A1 or 1A2), aluminum (1B1 or 1B2), plywood (1D), fiber (1G), plastic (1H1 or 1H2), or other metal (1N1 or 1N2) **or** **Boxes:** steel (4A), aluminum (4B), ordinary natural wood (4C1), sift-proof natural wood (4C2), plywood (4D), reconstituted wood (4F), fiberboard (4G), solid plastic (4H2), or other metal (4N) **Note:** boxes are not allowed for PG I materials **or** **Jerricans:** steel (3A1 or 3A2), aluminum (3B1 or 3B2), or plastic (3H1 or 3H2) **Note**: Fit fiber, fiberboard, wood and plywood packagings with a suitable liner **Note**: limit the outer packaging quantity as follows: PG I – 50 kg, PG II – 100 kg, PG III – 200 kg

A10.12.2.3. Package solid Toxins in the following composite packagings with plastic inner receptacles adhering to the quantity per package limits shown:

Inner receptacle	Outer packaging
Plastic	**Drums:** steel, aluminum, plywood, fiber, or plastic (6HA1, 6HB1, 6HD1, 6HG1, or 6HH1) ***or*** **Boxes:** steel, aluminum, wooden, plywood, fiberboard, or plastic(6HA2, 6HB2, 6HC, 6HD2, 6HG2, or 6HH2) **Note**: limit the outer packaging quantity as follows: PG I – 50 kg, PG II – 100 kg, PG III – 200 kg

A10.13. UN3546, Articles containing toxic substance, 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:

A10.13.1. When packaged, packagings meeting PG II performance standrds are required.

A10.13.1.1. Pack articles to prevent movement and inadvertent operation during normal conditions of transport.

A10.13.1.2. Pack inner receptacles containing liquids with closures in their outer packagings with their closures correctly oriented.

A10.13.1.3. Where there is no receptacle within the article, ensure the article fully encloses the dangerous goods and prevents 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)

A10.13.2. Robust articles.

A10.13.2.1. 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,

A10.13.2.2. 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.