Attachment 27

PREPARING EXPLOSIVES PACKAGED PRIOR TO 1 JANUARY 1990

A27.1. General Requirements. Use this attachment to verify existing packaging which is exempt from UN specification packaging requirements according to paragraph A3.3.1.10. The methods of packaging described in this attachment were authorized by 49 CFR and in effect on 31 December 1989.

A27.1.1. See Attachment 17 for certification requirements.

A27.1.2. Use Proper Shipping Names identified in Table A4.1. in place of DOT names described in this attachment.

A27.1.3. See Attachment 5 for special and general handling instructions.

A27.1.4. Comply with Attachment 24 for ammunition or explosives which are packed in freon for safety during movement or which contain toxic substances previously described as a "Class A Poison."

A27.1.5. Unstable, condemned, or deteriorated explosives may not be shipped by military air. Unserviceable explosives may be shipped if otherwise safe for transportation.

A27.1.6. See Attachment 14 and Attachment 15 for marking and labeling requirements.

A27.1.7. Annotate Shipping Papers (e.g., manifest) and Shipper's Declaration For Dangerous Goods (Key 19), "Government owned goods packaged prior to 1 January 1990."

A27.1.8. Damaged or unserviceable packaging may not be shipped by military air. Repackage explosives according to current guidance in Attachment 5.

A27.1.9. See table A27.1. for an explosive or ammunition cross reference. In this table, column 1 contains a list of explosive/ammunition with column 2 giving the paragraph from AFR 71-4 and column 3 identifying the paragraph for that item in this manual.

A27.1.10. Use DOT/Military specification containers specified in this attachment, when applicable. Use UN Specification packaging specified in Attachment 5 when repackaging is required. See Table A27.2. for DOT/Military specification container cross reference.

Table A27.1. Explosive/Ammunition Cross Reference.

Name of Explosive or Ammunition	AFR 71-4 Paragraph	AFMAN 24-204_IP Paragraph
Actuating Cartridges, Explosive, Fire Extinguisher or Actuating Cartridge, Explosive, Valve	5-32	A27.16.
Ammunition for Cannon (with Empty Projectiles; with Inert Loaded Projectiles; with Solid Projectile; without Projectiles; with Tear Gas Projectiles, Class B Explosives; with Explosives Projectiles; with Gas Projectiles; with Illumination Projectiles; with Incendiary Projectiles; with Smoke Projectiles and with Tear Gas Projectiles, Class A Explosives	5-10	A27.2.
Ammunition for Small Arms with Incendiary Projectiles and Ammunition for Small Arms with Explosives Projectiles	5-11	A27.3.
Black Powder and Low Explosives	5-13	A27.4.
Blasting Agent N.O.S.	5-63	A27.31.
Cartridge, Practice Ammunition	5-62	A27.30.
Common Fireworks, Signal Flares, Hand Signal Devices, Smoke Signals, Smoke Candles, Smoke Grenades, Smoke Pots, and Very Signal Cartridges	5-23	A27.9.
Cord, Detonating; Fuse, Mild Detonating, Metal Clad; and Flexible Linear Shaped Charges, Metal Clad	5-25	A27.10.
Detonating, Fuzes, Class C Explosives	5-27	A27.11.
Detonating Fuzes, Class A Explosives; Booster, Explosive; Burster, Explosive and Supplementary Charges, Explosive	5-17	A27.6.
Detonating Primers, Class A Explosives and Detonating Primers, Class C Explosives	5-28	A27.12.
Detonators, Class A Explosives and Detonators, Class C Explosives	5-14	A27.5.
Explosive Bomb; Explosive Mine; Explosive Projectile; Explosive Torpedo; Grenade, Hand, Explosive; and Grenade, Rifle, Explosive	5-29	A27.13.
Explosive Cable Cutters; Explosive Power Device, Class C; Explosive Release Device, or Starter Cartridges, Jet Engine, Class C Explosive	5-30	A27.14.
Explosive Power Device, Class B	5-56	A27.28.
Explosive Rivets	5-31	A27.15.
Fuze, Combination; Fuze, Percussion; Fuze, Time; Fuze, Tracer; or Tracer	5-22	A27.8.
Grenade, Tear Gas Irritating Material	10-37	A27.34.
High Explosives	5-34	A27.18.
High Explosives, Liquids	5-35	A27.18.1.

Name of Explosive or Ammunition	AFR 71-4 Paragraph	AFMAN 24-204_IP Paragraph
High Explosives With Liquid Explosive Ingredients	5-36	A27.18.2.
High Explosives With No Liquid Explosive Ingredient and Propellant Explosives, Class A	5-37	A27.18.3.
High Explosives With No Liquid Explosive Ingredient Nor Any Chlorate	5-38	A27.18.4. – A27.18.12.
Igniter Cord	5-39	A27.19.
Initiating Explosive (Diazodinitrophenol or Lead Monoitroresorcinate)	5-40	A27.20.1.
Initiating Explosive (Guanyl Nitrosomino Guanylidene Hydrazine)	5-41	A27.20.2.
Initiating Explosive (Lead Azide Dextrinated Type Only)	5-42	A27.20.3.
Initiating Explosive (Lead Styphnate (Lead Trinitrosorcinate) or Barium Styphnate, Monohydrate)	5-43	A27.20.4.
Initiating Explosive (Nitro Mannite)	5-44	A27.20.5.
Initiating Explosive (Nitrosoguanadine)	5-45	A27.20.6.
Initiating Explosive (Pentaerythrite Tetranitrate)	5-46	A27.20.7.
Initiating Explosive (Tetrazene)	5-47	A27.20.8.
Initiating Explosive (Fulminate of Mercury)	5-48	A27.20.9.
Oil Well Cartridges	5-64	A27.32.
Propellant Explosives, Solid or Liquid (Class A or B Explosives)	5-51	A27.24.
Railway Torpedoes	5-33.a.(6)	A27.23.
Rocket Ammunition with (Inert Loaded Projectiles, Solid Projectiles, Empty Projectiles, Explosive Projectiles, Gas Projectiles, Smoke Projectiles, Incendiary Projectiles, or Illuminating Projectiles)	5-52	A27.25.
Rocket Engine (Liquid), Class B Explosives	5-61	A27.29.
Rocket Motors; Jet Thrust Units; Igniters, Rocket Motors, Igniters, Rocket Motors; Igniters, Jet Thrust; Igniters, Ramjet Engine (Class B explosives) or Starter Cartridge, Jet Engine	5-50	A27.22.
Rocket Motors; Jet Thrust Units; Igniters, Rocket Motors; or Igniters, Jet Thrust (Class A Explosives)	5-49	A27.21.
Small Arms Ammunition and Small arms Ammunition, Tear Gas Cartridges	5-53	A27.26.
Small Arms Primer; Cannon Primer; Combination Primer; Percussion Cap; Grenades Empty, Primed	5-18	A27.7.
Special Fireworks	5-33	A27.17.

Name of Explosive or Ammunition	AFR 71-4 Paragraph	AFMAN 24-204_IP Paragraph
Toy Caps	5-54	A27.27.
Delay Electric Igniter; Electric Squib; Empty Cartridge Bag with Black Powder Igniter; Fuse Igniter; Fuse Lighter; Igniter Fuse, Metal Clad; Igniter; Safety Squib	5-19	A27.33.

A27.2. Ammunition for Cannon (with Empty Projectiles; with Inert Loaded Projectiles; with Solid Projectile; without Projectiles; with Tear Gas Projectiles, Class B Explosives; with Explosives Projectiles; with Gas Projectiles; with Illumination Projectiles; with Incendiary Projectiles; with Smoke Projectiles and with Tear Gas Projectiles, Class A Explosives. Package in strong wooden or metal containers, or plastic containers approved by military specifications or drawings.

A27.3. Ammunition for Small Arms with Incendiary Projectiles and Ammunition for Small Arms with Explosives Projectiles. Package in strong wooden or metal containers approved by military specifications or drawings not to exceed 175 pounds gross weight.

A27.4. Black Powder and Low Explosives.

A27.4.1. Metal kegs, DOT 1, not less than 7 inches long. Net weight not less than 6 ¼ pounds and no more than 150 pounds.

A27.4.2. Wooden boxes, DOT 14, 15A, 16A, or 19B with inside fiber or metal containers, not over 1 ¾ pound capacity each, or cotton bags at least 4-ounce cotton duck not over 25-pounds capacity each. The maximum gross weight is 140 pounds for DOT 14 and 200 pounds for DOT 15A, 16A, or 19B wooden boxes.

A27.4.3. Wooden boxes, DOT 14, 15A, 16A, or 19B with inside cylindrical fiber cartridge not over 5 inches in diameter nor over 18 inches long, with fiber at least 0.05 inch thick paraffined on outer surface, with joints securely glued or cemented, or strong paraffined paper cartridges not over 12 inches long authorized only for compressed pellets (cylindrical block) seven-eighths of an inch or more in diameter. Completely line boxes with strong paraffined paper, or other suitable waterproofed material, without joints or other openings at the bottom or sides. Authorized maximum gross weight is 75 pounds.

A27.4.4. Fiberboard boxes, DOT 12H, 23F, or 23H, with inside cylindrical fiber cartridges not over 5 inches in diameter nor over 18 inches long, with fiber at least 0.05 inch thick paraffined on outer surface with joints securely glued or cemented, or strong paraffined paper cartridges not over 12 inches long authorized only for compressed pellets (cylindrical block) seven-eighths of an inch or more in diameter. Authorized maximum gross weight is 65 pounds.

A27.4.5. Black Powder (not low explosive), in addition to containers specified above, may be shipped in the following specification containers:

A27.4.5.1. Wooden boxes, DOT 14, 15A, 16A, or 19B with inside cloth or paper bags not over 25 pounds net weight. Ensure the completed shipping package is capable of withstanding a drop of 4 feet without rupture of inner or outer containers. The completed package may not contain more than 50 pounds net weight of black powder.

A27.4.5.2. Fiberboard boxes, DOT 12H, 23F, or 23H with inside cloth, paper, or securely closed polyethylene bags constructed of material not less than 0.004 inch thick. The maximum net weight may not exceed 25 pounds for cloth or paper bags and 50 pounds for polyethylene bags. Inside fiber or metal containers not over 1 pound net capacity each may be used, provided the completed shipping package is capable of withstanding a drop of 4 feet without rupture of the inner or outer containers. The tubes of the box may be eliminated and a single tube as specified in DOT 23F may be substituted. The completed package may not contain more than 50 pounds net weight of black powder.

A27.4.6. Black pellet powder, primed with the electric squib, secured inside the coaxial hole of the pellet powder (with loose ends of the wire of the squib effectively short-circuited) may be shipped in wooden boxes, DOT 14, 15A, 16A, or 19B with inside strong paraffined paper cartridges not over 12 inches long, and authorized only for compressed pellets (cylindrical block) seven-eighths of an inch or more in diameter. Line boxes as prescribed for cylindrical fiber cartridges. Gross weight may not be over 65 pounds.

A27.4.7. Low explosives (not black powder), in addition to the containers specified, may be shipped in the following specification containers:

A27.4.7.1. Wooden boxes, DOT 14, 15A, 16A, or 19B with strong paper bags not over 25 pounds capacity. Gross weight of DOT 15A or 16A boxes may not be over 200 pounds. Gross weight of DOT 14 box may not be over 140 pounds.

A27.4.7.2. Fiberboard boxes. DOT 12H, 23F, 23H, with inside strong paper bags not over 25 pounds capacity. Gross weight may not be over 65 pounds.

A27.4.7.3. Wooden boxes, DOT 15A or 19B, lined with paper, DOT 2L. Authorized for rods or cylinders not less than five-eighths of an inch in diameter.

A27.5. Detonators, Class A Explosives and Detonators, Class C Explosives. Fit detonators snugly in strong inside packaging and snugly overpack in outer packagings as specified in A27.5.7. and A27.5.8. below.

A27.5.1. For devices containing no more than 10 grams of explosives (excluding ignition and delay charges):

A27.5.1.1. No more than 50 devices may be packed in one inside packaging and no more than 500 devices may be packed in one outer packaging.

A27.5.1.2. The gross weight of the completed package may not be over 150 pounds or the gross weight permitted by the specification for the outer packaging used, whichever is less.

A27.5.2. For detonators that are blasting caps (including percussion activated) or delay connectors in metal tubes, the packaging requires is as specified below. Also:

A27.5.3. Cover open ends of any device with appropriate cushioning material.

A27.5.3.1. Fit inside packaging snugly in intermediate packagings consisting of cartons or wrappings made of paper, plastic, or pasteboard.

A27.5.3.2. Separate intermediate packagings from the outer packaging by at least 1 inch of cushioning material.

A27.5.4. For devices containing no more than 3 grams of explosives (excluding ignition and delay charges):

A27.5.4.1. No more than 110 devices may be packed in one inside packaging; and,

A27.5.4.2. No more than 5,000 devices may be packed in one outer packaging.

A27.5.5. Pack detonators that are electric blasting caps, delay connectors in plastic sheaths, or blasting caps with empty plastic tubing containing no more than 3 grams of explosives (excluding ignition and delay charges) with no more than 100 devices in one inside receptacle and no more than 1,000 devices in one outer container.

A27.5.6. Detonators that are blasting caps with safety fuse, blasting caps with metal clad mild detonating cord, blasting caps with detonating cord, or blasting caps with shock tubes are not required to be attached to the safety fuse, metal clad mild detonating cord, detonating cord, or shock tube, and inside packagings are not required if the packagings configuration restricts freedom of movement of the caps and protects them from impact forces. Quantity limitations do not apply to Detonators, Class C Explosives. Container weight limitations do apply.

A27.5.7. Wooden boxes DOT 14, 15A, 16A, or 19B.

A27.5.8. Fiberboard boxes DOT 12H, 23F, or 23H.

A27.6. Detonating Fuzes, Class A Explosives; Booster, Explosive; Burster, Explosive and Supplementary Charges, Explosive. Package in well secured strong tight wooden or metal boxes approved by military specifications or drawings.

A27.6.1. The gross weight of an outer package containing detonating fuzes, Class A, may not exceed 190 pounds.

A27.6.2. Boosters, bursters, and supplementary charges, without detonators, when shipped separately, may not exceed 300 pounds gross weight.

A27.6.3. Ensure a fuze with any radioactive component also meets requirements of Attachment 11.

A27.7. Small Arms Primer; Cannon Primer; Combination Primer; Percussion Cap; Grenades Empty, Primed.

A27.7.1. Package primers (cannon, combination, and small arms), percussion caps, and empty grenades, primed, in strong, tight outside wooden boxes with special provisions for securing the individual packages against movement within the exterior containers.

A27.7.2. Package empty cartridge cases, primed, in strong, tight outside wooden or fiberboard boxes or in DOT21C fiber drums. Construct each drum to the specification requirements for a drum containing at least 250 pounds net weight. Insert a protective corrugated paperboard pad between the contents and the metal for each drum having a metal top or bottom.

A27.7.3. Pack small arms primers containing anvils in:

A27.7.3.1. Cellular Inside Packages. Packages with partitions separating the layers and columns of the primers so that the explosion of a portion of the primers in the completed shipping packages do not cause the explosion of all primers. Then pack in outer

packagings as stated in A27.7.1. or in fiberboard boxes, DOT 12B, equipped with a corrugated fiberboard liner. Ensure the bursting test of the liner is equal to or over that of the box. **Exception**: a liner is not required for a full telescopic style box that may be closed with pressure sensitive tape as specified for DOT 12B. Not more than 5,000 primers may be packed in one outside fiberboard box.

A27.7.3.2. Fiberboard boxes, DOT 23H. Each box is full depth telescopic style, with top section having extended end flaps and bottom section having extended side flaps, set up without glued or stapled joints. Ensure the full height inside perimeter liner, top and bottom pads is made of doublewall corrugated fiberboard. Hand-holes not more than 4 inches by 1 inch, horizontal with top score line are authorized in the ends of boxes. Package primers in cellular inside packages with partitions separating the layers and columns to form a tight fitting pack in the outer packagings. Do not pack more than 50,000 primers in one outside box.

A27.7.4. Small arms primers and percussion caps may be packed with nonexplosive and nonflammable articles, or with small arms ammunition as provided in A27.27. Small arms primers may be included with propellant explosive (solid), class B, in the same outer packagings as provided in A27.24.2. The weight of the small arms primers or percussion caps may not exceed 5 pounds per shipping container. Package percussion caps in metal or other inside boxes. Do not pack more than 500 caps in inside boxes. The construction of the cap or packaging, and the kind and quantity of explosives in each, is such that the explosion of a part of the caps in the completed package does not cause the explosion of all the caps. Package percussion caps in fiberboard boxes, DOT 12B, also:

A27.7.4.1. Do not pack more than 100 caps each in inside metal cans. Not more than 10 metal cans each may then be overpacked in a chipboard box. Pack no more than five chipboard boxes in the 12B fiberboard box. Ensure the completed package is such that an explosion of a part of the caps can not cause the explosion of all the caps.

A27.7.4.2. Pack no more than 100 caps each in inside plastic cans. Then pack the plastic cans in a chipboard box with not more than eight such chipboard boxes tightly packed in the DOT 12B fiberboard box. Ensure the completed package is such that an explosion of part of the caps can not cause the explosion of all of the caps. The gross weight of one outside package may not be more than 150 pounds.

A27.8. Fuze, Combination; Fuze, Percussion; Fuze, Time; Fuze, Tracer; or Tracer. Package in strong, tight, outside wooden boxes, triple-wall fiberboard boxes, or DOT 23F fiberboard boxes. Make special provisions for securing individual packages of fuzes or tracers against movement in the box. The gross weight of each wooden or fiberboard box may not be more than 150 pounds. The gross weight of each DOT 23F fiberboard box may not be over 65 pounds.

A27.9. Package Common Fireworks, Signal Flares, Hand Signal Devices, Smoke Signals, Smoke Candles, Smoke Grenades, Smoke Pots, and Very Signal Cartridges as follows:

A27.9.1. Wooden boxes, DOT 15A, 16A, 19A, or 19B. The gross weight may not be over 100 pounds, however, a gross weight of 500 pounds is authorized for wooden boxes with very signal cartridges only.

A27.9.2. Fiberboard boxes, DOT 12B. The gross weight of fiberboard boxes may not be over 65 pounds.

A27.9.3. Watertight, aluminum drums, 8 inches in diameter, having a rubber gasket and a positive closure. These are authorized only for smoke pots.

A27.9.4. Smoke signals may be packed two each in a Navy-designated preformed polystyrene container banded with pressure-sensitive tape. Pallet loads having a 2-foot high, ¼-inch plywood border around the lower portion of the load. Each polystyrene case may be overwrapped in a heat-sealed polystyrene bag. The minimum thickness of the bag is 0.006 inch. Eighteen such containers may be consolidated in a MIL-B-43096, type II, class 2, wirebound wooden box. Line each face of the box with PPP-F-320, type W6C or equal fiberboard.

A27.9.5. Ensure fireworks, such as sparklers, with match tip or head, or similar igniting point or surface, have each individual tip, head, or similar ignition point or surface entirely covered and securely protected against accidental contact or friction. Except as otherwise specified above, the gross weight of one outside package containing common fireworks may not be over 100 pounds.

A27.10. Cord, Detonating; Fuse, Mild Detonating, Metal Clad; and Flexible Linear Shaped Charges, Metal Clad. Package in wooden or fiberboard boxes or shipping containers approved by military specification or drawings.

A27.11. Detonating, Fuzes, Class C Explosives. Packaging requirements:

A27.11.1. Package in fiberboard boxes, DOT 12H, with or without liners, with well-secured inside paperboard cartons. Use suitable filler or lining materials to prevent movement in the box.

A27.11.2. In well-secured, strong, tight outside wooden or metal boxes approved by military specification or drawing. The gross weight of the outside wooden or metal box may not be over 190 pounds.

A27.12. Detonating Primers, Class A Explosives and Detonating Primers, Class C Explosives. Packaging requirements:

A27.12.1. Wooden boxes, DOT 14, 15A, 16A, or 19B, or fiberboard boxes DOT 12H, 23F, or 23H.

A27.12.2. Shipping containers approved by military specification or drawing.

A27.13. Explosive Bomb; Explosive Mine; Explosive Projectile; Explosive Torpedo; Grenade, Hand, Explosive; and Grenade, Rifle, Explosive. Packaging requirements:

A27.13.1. Pack and secure explosive bombs, mines, projectiles, torpedoes, or grenades in strong wooden or metal boxes, except as provided in (2) below.

A27.13.2. Explosive bombs, mines, projectiles, torpedoes, over 90 pounds in weight, and explosive projectiles of not less than 4 ¾ inches in diameter, may be shipped unboxed if securely fastened to pallets or securely blocked and braced.

A27.13.3. Pack and secure bombs, grenades, or projectiles containing gas, smoke, or incendiary charges and bursting charges in strong wooden or metal boxes.

A27.13.3.1. The gross weight of a box containing more than one grenade or mine may not be over 250 pounds.

A27.13.3.2. The gross weight of a shipping container with more than one explosive bomb, warhead, or projectile may not be over 1,400 pounds.

A27.13.4. Package XM47, XM42, XM42E1, and SX54 mine-dispensing subsystem and XM2,XM12, XM12E1, XM12E2/E3, and XM17 canisters in wooden or metal containers. The following special shipping procedures apply:

A27.13.4.1. Do not stack wooden containers more than three high with a minimum of 3 feet of space above the top containers. Position containers in aircraft to allow a minimum of 2 feet of space in front of the container inspection door. Tiedown containers in such a manner that allows access to inspection door (nets are not considered an obstruction); and

A27.13.4.2. Gross weight of wooden container may not be over 675 pounds.

A27.13.5. BLU 50/B bomblets are packaged in specially designed fiberboard lined plywood boxes. Inside containers consist of ten each bomblets in snug fitting, preformed polyurethane cushioning in a heat-sealed barrier bag.

A27.13.6. Explosive mines may be packaged in metal drums, PA 16, with 14 inside can assemblies with perforated tops, a preformed packing and two base assemblies. Fill drums with liquid freon. Ensure two liquid level sight gauges are located in the top half of the drum for visual monitoring of the liquid level.

A27.13.7. Explosive mines may be packaged in metal drums, PA 17, with inside preformed packing designed to hold mines below liquid freon level. Fill drums with liquid freon. Ensure two liquid level sight gauges are located in the top half of the drums for visual monitoring of the liquid level.

A27.13.8. Package CDU-4/B (SM41E1), CDE-5/B (XM40ES), CDU-10 (XM40ES/SM44) and CDU-14/B (XM64) in wooden boxes approved by military specification or drawing. Fill CDUs with liquid freon and electrically monitor level.

A27.13.9. Explosive bomb, further described as 7.2 inch projector charge, may be shipped assembled to a 40-by 48 inch steel pallet having a gross weight of approximately 2,000 pounds.

A27.13.10. Package explosive bombs, CBU-55/B, containing explosive components and fuel (ethylene oxide) in a CNU-120/E container.

A27.13.11. Package explosive bombs, CBU-55/B, without fuel, in a CNU-120/E container.

A27.13.12. Explosive bombs, CBU-33/A, may be packed in plastic containers CNU-104/E conforming to MIL-P-22748A, class A, grade 6. Loaded containers may not be over 1,200 pounds gross weight.

A27.14. Explosive Cable Cutters; Explosive Power Device, Class C; Explosive Release Device, or Starter Cartridges, Jet Engine, Class C Explosive. Packaging Requirements:

A27.14.1. Fiberboard boxes, DOT 12H, 23F, or 23H. The maximum gross weight may not be over 65 pounds.

A27.14.2. Wooden or metal boxes approved by military specification or drawings. Starter cartridges, jet engine, having igniter wires short-circuited when packed for shipment.

A27.15. Explosive Rivets. Package explosive rivets, containing not more than 375 milligrams of explosive composition each, in unit containers or paperboard. Pack the unit containers or paperboard in strong wooden, fiberboard or metal containers approved by military specification or drawings.

A27.16. Actuating Cartridges, Explosive, Fire Extinguisher or Actuating Cartridge, Explosive, Valve . Package in strong wooden or fiberboard boxes.

A27.17. Special Fireworks. Packaging Requirements:

A27.17.1. Wooden boxes, DOT 15A, 15B, 16A, 19A, or 19B. The maximum gross weight may not be over 500 pounds.

A27.17.2. Fiberboard boxes, DOT 12B. The maximum gross weight may not be over 65 pounds. Illuminating projectiles and airplane flares are not permitted in DOT 12B boxes.

A27.17.3. Package flash or spreader cartridges with not more than 72 grains of flash powder in inside fiberboard cartons or tin cans containing not over six cartridges. Pack no more than 150 inside containers in outside DOT 15A, 16A, 19A, or 19B wooden boxes or DOT 12B fiberboard boxes.

A27.17.4. Package assembled flash cartridge consisting of a paper cartridge shell, small arms primer, and flash composition in inside cartons. The flash composition in the one-piece assembled and ready for firing flash cartridge may not be over 180 grains. Do not pack more than 12 cartridges each in the inside cartons. A maximum of 12 inside cartons may be packed in DOT 15A, 15B, 16A, 19A, or 19B wooden boxes or DOT 12B fiberboard boxes. Flash cartridges, in quantities not over 5 pounds, packaged in small interior wooden boxes, may be packed with nonexplosive, nonflammable, and noncorrosive items.

A27.17.5. Unit pack no more than six flash sheets in an inside container. Intermediate pack no more than 12 unit packages in a pasteboard box or carton and packed in a DOT 15A, 16A, 19A, or 19B wooden box or DOT 12B fiberboard box. The gross weight of wooden boxes may not be over 150 pounds. The gross weight of fiberboard boxes may not be over 65 pounds.

A27.17.6. Package photographic flash powder in specification containers as specified in A27.17.3., except ensure the inside container is strong enough to hold up to 2 ounces each of contents. If bottles are used, pack each bottle in a securely closed fiber mailing tube with metal ends. Not more than forty eight 2-ounce bottles may be packed in an exterior wooden box. When packed in units not over 1-ounce each without bottles in similar fiber mailing tubes and exterior wooden boxes, the gross weight of each exterior box may not be over 150 pounds. The gross weight of exterior fiberboard boxes may not be over 65 pounds.

A27.17.7. Package toy torpedoes in wooden boxes, DOT 15A, 15B, 16A, 19A, 19B, or fiberboard boxes DOT 12B containers. Not more than 20 one-quarter gross cartons totaling not more than five gross of toy torpedoes are authorized per fiberboard box. The gross weight

of a fiberboard box may not be over 35 pounds. The gross weight of a wooden box may not be over 65 pounds.

A27.17.7.1. Do not pack toy torpedoes of any kind with other fireworks.

A27.17.7.2. Pack toy torpedoes containing a cap in sawdust in inside paper or cardboard cartons. The size of the carton may not be less than 4 cubic inches for each grain of explosive.

A27.17.7.3. Pack toy torpedoes containing a mixture of potassium chlorate, black antimony, and sulfur, in an inner container containing not more than 36 torpedoes. Ensure the capacity of this inner container is at least 105 cubic inches, and divided into 12 equal compartments. Fill all vacant space inside the container with sawdust or fine shavings.

A27.17.8. Ship distress signals may be packed in outside DOT 12 fiberboard boxes provided:

A27.17.8.1. They are packed in inside metal containers. Make these containers from at least 24 gauge sheet iron or other metal of equal strength.

A27.17.8.2. The inner container is closed by positive means (not friction).

A27.17.8.3. Inside containers completely fill the outer packaging.

A27.17.8.4. The gross weight is not over 95 pounds.

A27.17.9. Marine location markers (eight each) and aircraft flares (two each) may be packed two each in a Navy-designed, preformed polystyrene container banded with pressure-sensitive tape. Ensure pallet loads have a 2-foot high, ¼-inch plywood border around the lower portion of the load. Polystyrene case may be overwrapped in heat sealed polyethylene bag .006 inch thickness minimum. Consolidate 18 such containers in a wirebound wood box MIL-B-43096, type II, class 2, lined top, bottom and sides with fiberboard, PPP-F-320, grade W6c or equal.

A27.17.10. Illuminating projectiles, incendiary projectiles, and smoke projectiles over 90 pounds in weight each, or of not less than 4 ¾ inches in diameter, may be palletized. Securely block and brace the palletized load according to methods prescribed by the responsible military department. A shipment container is not required.

A27.17.11. Illuminating projectiles, incendiary projectiles, and smoke projectiles less than 4 ¾ inches in diameter may be shipped without being boxed, when palletized and securely blocked and braced with methods prescribed by the responsible military department.

A27.17.12. MK27 Mod O guided missile flares or MK28-3 target flares may be packed in MK2 Mod O metal boxes.

A27.17.13. Practice or exercise warheads containing polytechnics may be shipped two each in a metal box (MK34, Mod O) with a gross weight over 65 pounds.

A27.17.14. Flares may be packed in flame-retardant polystyrene cases. Ship the polystyrene cases palletized and covered with plywood or wirebound sheathing secured with steel strapping.

A27.18. High Explosives.

A27.18.1. High explosives, consisting of a liquid mixed with an absorbent material, require the absorbent (wood pulp or similar material) in sufficient quantity and be of satisfactory quality, and properly dried at the time of mixing. Ensure the nitrate of soda is dried at the time of mixing to less than 1 percent of moisture; and the ingredients are uniformly mixed so that the liquid remains thoroughly absorbed under the most unfavorable atmospheric conditions incident to transportation.

A27.18.2. Mix high explosives containing nitroglycerin or other liquid explosive ingredients uniformly with an absorbent material and a satisfactory antacid. Ensure the antacid is in sufficient quantity to have the neutralizing power of an amount of magnesium carbonate equal to 1 percent of the nitroglycerin or other liquid explosive ingredient.

A27.18.3. High explosive cartridges consist of a column of explosives completely enclosed in a shell made of strong paper or polyethylene or a combination of paper and polyethylene, treated so that it does not absorb the liquid ingredient of the explosive.

A27.18.4. High explosive packaged bags made of strong paper of equally efficient material so treated or of such nature that it does not absorb the liquid ingredient of the explosive.

A27.18.5. Line high explosives packed in boxes with strong, paraffined paper or other suitable material. Ensure the lining is without joints or other openings or with cemented joints at the bottom, ends, or sides of the boxes. For explosives with liquid ingredients, ensure the lining is impervious to such ingredients and also to water. Protect box covers from contact with explosives by lining paper or other suitable material.

A27.18.6. Pack gelatine explosives in cartridges or bags with dry fine wood pulp or sawdust at least ¼ of an inch in depth spread over the bottom of the box or the bottom of the box may have a full area pad formed of an absorptive cellulose sheet which has a nitroglycerin absorptive value equivalent to sawdust as specified. Similar materials are required in boxes for packing all non-gelatinous types of explosives containing 30 percent or more of liquid explosive ingredient.

A27.18.7. Except for high explosive (gelatin dynamite) in cartridges, place all cartridges of high explosives exceeding 4 inches in length and containing more than 10 percent of a liquid explosive ingredient horizontally in boxes. Pack bags with their filling holes up.

A27.18.8. Prevent movement of high explosives contained in cartridges and bags within the boxes by sufficiently tight packing.

A27.18.9. High explosive (dynamite), except gelatin dynamite, packed in bags or in cartridges over 2 inches in diameter and containing not more than 30 percent liquid explosive ingredients may be packed in outer packagings without sawdust and without lining paper, provided each inside or outer packaging is siftproof and is treated to prevent penetration by the commodity with which the container is filled for shipping.

A27.18.10. Pack liquid high explosives in DOT 15L wooden boxes and DOT 15M wooden boxes. The inside metal containers in the DOT 15M containers cannot contain more than 10 quarts of liquid explosives each.

A27.18.11. High Explosives with Liquid Explosive Ingredients.

A27.18.11.1. Package high explosives (dynamite) containing no more than 30 percent liquid explosive ingredients in the following specification containers.

A27.18.11.1.1. Fiberboard boxes, DOT 23G, with no more than one cartridge in each box. The gross weight of the boxes may not be over 65 pounds.

A27.18.11.1.2. Wooden boxes, DOT 14, 15A, 16A, 19B or fiberboard boxes, DOT 12H, 23F, or 23H with inside containers, which are cartridges or bags. Inside cartridges may not be more than 12 inches in diameter by 36 inches in length or 50 pounds gross weight. Securely close inside bags not over 50 pounds each to prevent leakage of contents. The gross weight of wooden boxes may not be over 75 pounds and the gross weight of fiberboard boxes may not be more than 65 pounds.

A27.18.11.1.3. Fiberboard boxes, DOT 23F or 23H, having one inside 26-gauge metal container, measuring not over 8 inches in diameter and 31 inches in length, containing high explosives (ammonium dynamite core) surrounded by a blasting agent. Gross weight may not be more than 65 pounds.

A27.18.11.2. High explosives (dynamite) containing 10 percent or less of a liquid ingredient are prepared for shipment as follows:

A27.18.11.2.1. Packed in DOT 14, 15A, 16A, or 19B wooden boxes or in DOT 12H, 23F, or 23H fiberboard boxes. The gross weight may not be more than 140 pounds.

A27.18.11.2.2. Fiberboard boxes, DOT 23G, with no more than one cartridge in each box. The gross weight of the box may not exceed 65 pounds.

A27.18.11.3. Pack high explosives (dynamite) containing more than 30 percent liquid explosive ingredients in specification containers as follows:

A27.18.11.3.1. Wooden boxes (maximum gross weight 75 pounds), DOT 14, 15A, 16A, or 19B or fiberboard boxes, DOT 12H, 23F, or 23H, with inside containers that consist of:

A27.18.11.3.1.1. Cartridges not over 4 inches in diameter and not over 8 inches in length.

A27.18.11.3.1.2. Redip cartridges having a diameter of 4 to 5 inches and between 8 and 10 inches in length in melted paraffin or equivalent material.

A27.18.11.3.1.3. Enclose two or more cartridges, redipped because of their size, in another strong paper shell to form a completed cartridge not more than 30 inches in length. Dip the resulting cartridge in melted paraffin or equivalent.

A27.18.11.3.1.4. The gross weight of wooden boxes may not be more than 75 pounds and the gross weight of fiberboard boxes may not be more than 65 pounds.

A27.18.11.3.2. In wooden or fiberboard specification boxes as prescribed inside containers may be paper or polyethylene bags meeting the following conditions:

A27.18.11.3.2.1. Paper bags:

A27.18.11.3.2.1.1. Paraffined two-ply paper not over 12 ¾ pounds capacity, securely closed by folding the tops and securing the fold by tape.

A27.18.11.3.2.1.2. Insert no more than two such bags into another two-ply paper

bag that are securely closed and dipped in paraffin after closing.

A27.18.11.3.2.2. Polyethylene bags

A27.18.11.3.2.2.1. May not be less than 0.0004 inches in thickness and no more than 12 ¾ pounds capacity each.

A27.18.11.3.2.2.2. May not be more than two such securely closed bags packed in an intermediate polyethylene or paper bag. Securely close the polyethylene or paper bag and pack in polyethylene lined outside fiberboard boxes.

A27.18.11.3.2.3. The gross weight of wooden boxes may not be over 75 pounds, and the gross weight of fiberboard boxes may not be over 65 pounds.

A27.18.11.4. High explosives (gelatin dynamite and blasting gelatin) packed in specification containers as follows:

A27.18.11.4.1. Fiberboard boxes, DOT 23G, with no more than one cartridge in each box. Gross weight of boxes may not be over 65 pounds.

A27.18.11.4.2. Wooden boxes, DOT 14, 15A, 16A, or 19B or fiberboard boxes, DOT 12H, 23F, or 23H with inside cartridges or bags. The cartridges may not be more than 12 inches in diameter by 36 inches in length or 50 pounds in weight. Ensure bags not completely sealed against leakage are packed with filling holes up. The gross weight for wooden boxes may not be over 75 pounds, and the gross weight of fiberboard boxes may not be over 65 pounds.

A27.18.11.4.3. High explosives (straight gelatin dynamite of 80 percent strength and over and blasting gelatin) are packed in cartridges, or in bulk in outside boxes. When packed in bulk, double line boxes throughout with paper and pack in wooden boxes, DOT 14, 15A, 16A, or 19B or 23 H. Pack DOT 23G fiberboard boxes in an outer container consisting of at least seven-ply heavy kraft paper. Two 3-mil polyethylene bags, one within the other, may be used in place of the double-lining paper when a DOT 12H is the outer packaging. Not more than one such double bag may be packed in DOT 12H fiberboard box. The gross weight of wooden boxes may not be more than 75 pounds and the gross weight of fiberboard boxes may not be over 65 pounds.

A27.18.12. High explosives with no liquid explosive ingredient and propellant explosives, class A. Packaging requirements:

A27.18.12.1. Wooden boxes, DOT 14, 15A, 16A, or 19B. The gross weight may not be more than 140 pounds.

A27.18.12.2. Fiberboard boxes, DOT 12H, 23F, or 23H. The gross weight may not be more than 65 pounds.

A27.18.12.3. Boxes require an inside polyethylene bag having a minimum thickness of 6 mils, or lined with strong paraffined paper or other authorized material, DOT 2L. When such explosives contain over 5 percent moisture, boxes with handholes are not authorized.

A27.18.12.4. Outside boxes. When such explosives are in combination cartridges, consisting of a column of explosive with core of dynamite, they may be shipped when packed in outside boxes. The gross weight may not be over 65 pounds. Completely

enclose the column of explosives in waterproofed cloth or waterproofed paper, which are not more than 6 inches in diameter, 2 inches in length, or 25 pounds gross weight.

A27.18.12.5. Fiberboard boxes, DOT 23G. Gross weight of the box may not be over 65 pounds. The high explosives sensitiveness to percussion may not be greater than that measured by the blow delivered by an 8 pound weight dropping from a distance of 7 inches on a compressed pellet of the explosive 0.03 inch thick and 0.2 inch diameter. The compressed pellet is confined rigidly between hard steel surfaces as in standard Impact Testing Apparatus of the Bureau of Explosives during the test. Pack the high explosives in cartridges when their sensitiveness is greater than the limit prescribed herein. Such explosives, when dry, may be packed in strong siftproof cloth or paper bags of capacity not be over 25 pounds.

A27.18.13. High explosives with no liquid explosive ingredient nor any chlorate. Pack in one of the following outer containers:

A27.18.13.1. When high explosives contain over 5 percent moisture, ensure the box has an inside securely closed polyethylene bag having a minimum thickness of 6 mil; or the box has a DOT 2L lining. Polyethylene is authorized only for materials that do not react with or cause decomposition of the plastic.

A27.18.13.2. When high explosives are in combination cartridges, consisting of a column of explosives with a core of dynamite, they may be packed in exterior containers with 65 pounds as the maximum gross weight. Completely enclose the column of explosives in waterproofed cloth or strong waterproofed paper, not more than 6 inches in diameter, 20 inches in length, or a gross weight of 25 pounds.

A27.18.13.3. Sensitiveness to percussion is not greater than that measured by the blow delivered by an 8-pound weight, dropping from a distance of 7 inches, or compressed pellet of the explosive 0.03-inch thick and 0.20-inch diameter, confined rigidly between hard steel surfaces as in the Standard Impact Testing Apparatus of the Bureau of Explosives. The requirement of packaging in cartridges, bags, or metal containers does not apply to plastic-bonded explosives. Pack and cushion to prevent movement of individual pieces within the outside shipping container. Pack in cartridges when their sensitiveness is greater than the limit prescribed in this section. Such explosives, when dry may be packed in strong siftproof bags, securely closed to prevent leakage, or in metal containers of capacity not over 60 pounds.

A27.18.13.4. Wooden boxes, DOT 14, 15A, 16A, or 19B. Gross weight may not be over 140 pounds. Wooden boxes, having inside metal containers that are tightly and securely closed, may be equipped with handholes in each end that may not be more than 1- by 4-inches and centered laterally not nearer than 1 5/8 inches from top edge of box.

A27.18.13.5. Fiberboard boxes, DOT 12H, 23F, 23G, or 23H. Gross weight may not be over 65 pounds.

A27.18.13.6. Metal drums (single-trip) DOT 17H or 37A having a minimum 0.003-inch thick polyethylene liner. Authorized only for Ammonium Perchlorate with particle size of 5 to 15 micrometers. Maximum capacity is 30 gallons.

A27.18.14. Amatol consisting of 80 percent ammonium nitrate and 20 percent Trinitrotoluene, Ammonium Picrate, Nitroguanidine, Nitrourea, Urea Nitrate, Picric Acid, Tetryl, Trinitroresorcinal, Trinitrotoluene, Pentolite, Cyclotrimethylentrinitramine (desensitized), and Soda Amatol, in dry condition, may be shipped in containers with the following specifications:

A27.18.14.1. Those described in A27.18.13.

A27.18.14.2. Wooden boxes, DOT 14, 15A, 16A, or 19B, with strong paper or cloth bags of capacity not over 50 pounds, packed with filling holes up.

A27.18.14.3. Fiber drums, DOT 21C. Net weight not over 200 pounds.

A27.18.15. Trinitrotoluene and Pentolite in dry condition.

A27.18.15.1. Packed in containers described in A27.18.13.

A27.18.15.2. Packed in containers described in A27.18.14.

A27.18.15.3. Wooden boxes, DOT 14, 15A, 16A, 19B, or with strong paper or cloth bags of capacity not over 100 pounds, packed with filling holes up.

A27.18.15.4. Wooden boxes, DOT 14, 15A, 16A, or 19B, with strong siftproof liners, DOT 2L.

A27.18.15.5. Fiber drums, DOT 21C. Net weight may not be over 200 pounds.

A27.18.15.6. The following materials may be shipped dry, in quantity not more than 4 ounces in one outside package for medical purposes or as reagents, as drugs, medicines, or chemicals without other restriction, when in securely closed bottles or jars properly cushioned to prevent breakage:

A27.18.15.6.1. Ammonium picrate

A27.18.15.6.2. Dipicrylamine

A27.18.15.6.3. Dipicrly sulfide

A27.18.15.6.4. Dinitrophenylhydrazine

A27.18.15.6.5. Nitroguanidine

A27.18.15.6.6. Picramide

A27.18.15.6.7. Picric acid

A27.18.15.6.8. Picryl chloride

A27.18.15.6.9. Trinitroansisole

A27.18.15.6.10. Trinitrobenzene

A27.18.15.6.11. Trintrobenzoic acid

A27.18.15.6.12. Trinitro-m-cresol

A27.18.15.6.13. Trinitronaphthalene

A27.18.15.6.14. Trinitroresorcinol

A27.18.15.6.15. Trinitroltoluene

A27.18.15.6.16. Urea nitrate

A27.18.15.6.17. Triaminotrinitrobenzene

A27.18.15.6.18. Trichlortrinitrobenzene

A27.18.15.6.19. Hexanitrostilbene

A27.18.16. Ship Ammonium Picrate, Picric Acid, Urea Nitrate, Trinitrobenzene, Trinitroresorcinol, Trinitrotoluene, Cyclotrimethylenetrinitramine, Cyclotetra-methylenetetranitramine, Pentaerythrite Tetranitrate (desensitized), or Trinitrobenzoic Acid when wet with not less than 10 pounds of water to each 90 pounds of dry material in containers complying with the following specifications:

A27.18.16.1. Metal barrels or drums, DOT 5B, or fiber drums, DOT 2C. Authorized only for Cyclotrimethylenetrinitramine or Cyclotetra-methylenetetrainitramine, wet with not less than 10 pounds of water to each 90 pounds of dry material in inside containers which are bags made of at least 10-ounce cotton duck rubber or rubberized cloth, and securely closed. The dry weight of Cyclotrimethylenetrinitramine or Cyclotetra-methylenetetranitramine in one metal barrel or drum may not be more than 300 pounds and not more than 225 pounds in fiber drums. Then place each bag containing the Cyclotrimethylenetrinitramine or Cyclotetra-methylenetetranitramine in a rubber bag, rubberized cloth bag, or bag made of suitable watertight material that is securely closed and then placed in the drum. If shipment of cyclotrimethylenetrinitramine is to take place at a time freezing weather is anticipated, wet with a mixture of denatured ethyl alcohol or other suitable antifreeze and water of such proportions that freezing does not occur in transit.

A27.18.16.2. Fiber drum, DOT 21C, with inside polyethylene bag having 0.004 inch minimum thickness and liquid tight closure. Net weight may not be over 200 pounds. Authorized only for wet desensitized Pentaerythrite Tetranitrate.

A27.18.17. Amatol when cast or compressed in a solid block or column, in addition to containers prescribed in A27.18.5. may be shipped in metal drums, DOT 13A, not over 90 pounds gross weight.

A27.18.18. Pack nitrocellulose in wooden boxes complying with DOT 14, 15A, 16A, or 19B, with inside packages as follows:

A27.18.18.1. Wrap in strong paraffined paper or suitable sparkproof material, when containing not more than 1 pound each of dry, uncompressed nitrocellulose. Completed outside package may not contain more than 10 pounds of dry nitrocellulose.

A27.18.18.2. Wrapped in strong paraffined paper when containing compressed sticks or blocks of dry nitrocellulose. Gross weight may not be over 75 pounds.

A27.18.19. Shaped charges, commercial, having exposed lined conical cavities that are covered are be paired together with the cavities facing each other and with one or more pairs in a fiber tube, or so arranged that the conical cavities of the shaped charges at the ends of the column face toward the center of the tube. Fit the shaped charges in the fiber tubes snugly

with no excess space in the outer packaging. Pack shaped charges, commercial, in specification containers as follows:

A27.18.19.1. Wooden boxes, DOT 14, 15A, 16A, or 19B; gross weight may not be over 140 pounds.

A27.18.19.2. Fiberboard boxes, DOT 12H, 23F, or 23H; gross weight may not be over 65 pounds.

A27.18.19.3. Fiberboard boxes, DOT 12B; at least 275 pounds test double-wall corrugated fiberboard, with double-faced corrugated lining board having minimum test of 200 pounds. Pack individual charges of explosives in inside securely closed, waterproof plastic containers, or in securely closed waterproof container having metal ends. Separate inside individual containers by means of double-faced corrugated fiberboard partitions of material not less than 175 pounds (Mullen or Cady). Gross weight may not be over 65 pounds.

A27.18.19.4. Specially designed Navy steel cylindrical containers possessing a shock mitigation system. One each charge, to a container: four containers properly strapped or banded to a pallet.

A27.18.20. Cyclotrimethylenetrinitramine (RDX) (desensitized) in pellet form, dry may also be packed in specification containers as follows:

A27.18.20.1. Wooden box, DOT 15A or 19B, for pellets ¼ of an inch or less in diameter. Pack pellets in a slide-type fiber container with perforated fillers. Securely close all openings of the container with pressure-sensitive tape. Cushion inside containers with at least 2 inches of sawdust between inner and outer containers. No inside container may contain more than ¾ pound net weight of explosive composition, and not more than 10 pounds of net weight explosive composition may be packed in one outside box.

A27.18.20.2. Wooden box, DOT 15A or 19B, for pellets exceeding ¼ inch in diameter. Pack pellets in a fiber tube with positive closures at both ends, and then pack in a fiber container having not more than ¾ pound net weight of explosive composition. Cushion inside containers with at least 2 inches of sawdust between inner and outer containers. Not more than 10 pounds of net weight of explosive composition may be packed in one outer packaging.

A27.18.21. Pack conversion kits, containing Comp. A-3 pellets, eight each to a fiberboard lined, metal ammunition components box, MK2. Securely nest kit components and separately packaged pellets within fiberboard separators in inside fiberboard boxes.

A27.19. Igniter Cord. Pack in strong, tight, outside fiberboard boxes or drums, wooden boxes, or metal containers.

A27.20. Initiating Explosive.

A27.20.1. Diazodinitrophenol or Lead Monoitroresorcinate. Packaged wet with not less than 40 percent by weight of water in:

A27.20.1.1. Metal barrels or drums, DOT 5 or 5B, with inside securely closed bags made of at least 10-ounce cotton duck, rubber, or rubberized cloth. The dry weight of Diazodinitrophenol in one container may not be more than 220 pounds, and the dry weight

of lead mononitroresorcinate in one container may not be over 100 pounds. Place the bags containing Diazodinitrophenol in a rubber bag, rubberized cloth bag, or bag made of suitable watertight material, and then place in the barrel or drum. Fill any empty space in the outside bag with water, and securely close this bag. Allow sufficient outage in the outer packaging to prevent rupturing of the container in freezing weather, or a mixture of denatured alcohol and water may be used to prevent freezing in transit.

A27.20.1.2. Fiber drums, DOT 21C, not over 30-gallon capacity of at least 9-ply construction having in addition, a sheet of steel having a minimum base box of 75 pounds, not less than .008-inch thick, wound between the fifth and sixth plies. Laminate the inside ply of kraft paper on each side with polyethylene to form a waterproof lining. Ensure the bottom head is fiber, metal covered on the outside, and attached to the body to form a watertight joint.

A27.20.1.2.1. Lead Mononitroresorcinate may only be packed wet, with not less than 40 percent by weight of water, and contained in at least two tightly sealed polyethylene bags of at least 0.004-inch thickness; this unit is then be placed in a tightly closed polyethylene bag of at least 0.004-inch thickness, and this assembly is placed within a 0.006-inch thickness polyethylene (or other suitable plastic bag) completely filled with water and tightly closed. The 0.006-inch plastic bag is of such a size as to completely fill the outside shipping container. The dry weight of lead Mononitroresorcinate only in one outer packaging may not be more than 100 pounds.

A27.20.2. Guanyl Nitrosomino Guanylidene Hydrazine. Packed wet with not less than 30 percent by weight of water in metal barrels or drums, DOT 5 or 5B, with 4-ounce duck bag inside containers. Inside the bag, and over the Guanyl Nitrosamino Guanylidene Hydrazine, place a cap of the same fabric, of the same diameter as the bag. Securely tie the bag and place in a strong grain bag and securely tie. The dry weight of Guanyl Nitrosamino Guanylidene Hydrazine in one container may not be over 75 pounds. Pack the bag and contents in the center of the wooden barrel or keg, metal barrel or drum, and entirely surround with not less than 3 inches of well packed sawdust saturated with water. Line the wooden barrel or keg, or metal barrel or drum, with a heavy close-fitting jute bag, closed by secure sewing to prevent escape of sawdust. Inspect the barrel, keg, or drum carefully and stop all leaks. If freezing temperature is anticipated during shipment, use a mixture of denatured ethyl alcohol and water of such proportions that freezing does not occur during transit.

A27.20.3. Lead Azide (dextrinated type or otherwise prepared to effectively control grain size). Packed wet with not less than 20 percent by weight of water. Containers, packaging, and procedures are the same as prescribed in A27.20.2. except that the dry weight of Lead Azide in one container may not be over 150 pounds. The same freezing precautions apply.

A27.20.4. Lead Styphnate (Lead Trinitrosorcinate) or Barium Styphnate, Monohydrate. Packed wet with not less than 20 percent by weight of water in metal barrels or drums, DOT 5, 5B, or 17H with bags of rubber or rubberized cloth inside containers.

A27.20.4.1. Divide the Lead Styphnate or Barium Styphnate, Monohydrate within this bag into a number of smaller packages. Cap the bag with the same material of the same diameter as the bag over the Lead Sytphnate inside the bag.

A27.20.4.2. The dry weight of Lead Styphnate or Barium Styphnate, Monohydrate in one outer container may not be over 150 pounds. Pack the bag and contents in the center of the metal barrel or drum, and entirely surround by not less than 3 inches of well packed sawdust saturated with water.

A27.20.4.3. Line the metal barrel or drum with a heavy, close-fitting, jute bag closed by secure sewing to prevent escape of sawdust. Inspect the barrel or drum carefully and stop all leaks.

A27.20.4.4. If freezing temperature is anticipated during shipment, use a mixture of denatured ethyl alcohol and water of such proportions that freezing does not occur during transit.

A27.20.5. Nitromannite. Packed wet, with not less than 40 percent by weight or water container and packaging procedures are the same as A27.20.1. except that the dry weight of Nitro mannite in one container may not be over 100 pounds. The same freezing precautions apply.

A27.20.6. Nitrosoguanadine. Packed wet with not less than 10 percent by weight of water in metal barrels or drums, DOT 5, 5B, or 17H with inside strong cloth bag. The dry weight of Nitrosoguanidine in one container may not be over 75 pounds.

A27.20.7. Pentaerythrite Tetranitrate. Packed wet with not less than 40 percent by weight of water. Container and packaging procedures are outlined in A27.20.1. Except that the dry weight of Pentaertythrite Tetranitrate in one container may not be over 300 pounds. The same freezing precautions apply.

A27.20.8. Tetrazene. Packed wet with not less than 30 percent by weight of water. Container and packaging are the same as A27.20.2. The dry weight in one container may not be more than 75 pounds. The same freezing precautions apply.

A27.20.9. Fulminate of Mercury. Packed wet with not less than 25 percent by weight of water in DOT 5, 5B, or 17H metal drums or barrels with inside bag made of 4-ounce duck.

A27.20.9.1. Inside the bag and over the Fulminate, place a cap of the same fabric and of the same diameter as the bag. Securely tie the bag and place in a strong grain bag. Securely tie this grain bag.

A27.20.9.2. The dry weight of Fulminate in one container may not be over 150 pounds. Pack the bag and contents in the center of the wooden barrel, keg, or drum, entirely surrounded by not less than 3 inches of well-packed sawdust saturated with water.

A27.20.9.3. Line the barrel or drum with a heavy, close fitting jute bag closed by secure sewing to prevent escape of sawdust. Inspect the barrel or drum carefully, to stop all leaks.

A27.20.9.4. If shipment of Fulminate of Mercury is to take place at a time that freezing weather is to be anticipated, use a mixture of denatured ethyl alcohol and water of such proportions that freezing does not occur in transit.

A27.21. Rocket motors; Jet Thrust Units; Igniters, Rocket Motors; or Igniters, Jet Thrust (Class A Explosives). Package in:

A27.21.1. Wooden boxes or wooden boxes fiberboard lined, DOT 14, 15A, 15E, 16A, or 19B.

A27.21.2. Metal Containers, MIL-D-6054 or other metal containers approved by the DOT.

A27.21.2.1. Igniters or igniter components may be shipped in the same outer packaging with the rocket motor or jet thrust unit if separately packed in unit package (metal can, fiberboard box, etc).

A27.21.2.2. Ship rocket motors in nonpropulsive state. When military air shipment of a rocket motor in a propulsive state is required, obtain written approval from hazard classification authority listed in TB 700-2/NAVSEAINST 8020.8B/T.O. 11A-1-47/DLAR 8220.1, DOD Explosive Hazard Classification Procedures.

A27.22. Rocket Motors; Jet Thrust Units; Igniters, Rocket Motors, Igniters, Rocket Motors; Igniters, Jet Thrust; Igniters, Ramjet Engine (Class B explosives) or Starter Cartridge, Jet Engine. Package requirements:

A27.22.1. Wooden boxes or wooden boxes fiberboard lined, DOT 14, 15A, 15E, 16A, or 19B. Packages containing igniters, ramjet engines may not be over 500 pounds gross weight.

A27.22.2. Wooden boxes, DOT 15B, authorized only for igniters, jet thrust (jato) class B or igniters, rocket motor igniters, ramjet engine, class B explosive. Packages containing igniters, ramjet engine may not be over 500 pounds gross weight.

A27.22.3. Service-designated and NAVAIR/NAVSEA-approved wood or metal containers identified by Ordnance Requirement (OR), MIL-STD, or other appropriate container document, and a letter container designated, such as MK and MOD or CNU numbers.

A27.22.4. MIL-D-6054 drums (MS 63052) with specially designated interior blocking and bracing. Authorized for jet thrust units, class B explosives only.

A27.22.5. LAU-10/A Launcher, using unit load adapterMK58, MOD 1 and palletized with WR-54/ 115C, which consists of 16 units per shipment of rocket motors, class B explosives.

A27.22.6. MK4 metal container with properly designed interior mounting or blocking supports. Authorized for packed one each M77A1 rocket.

A27.22.7. Fiberboard box, DOT 23F, authorized for Igniters, Jet Thrust (jato), Class B, Igniters, Rocket Motor, Class B, or Starter Cartridges, Jet Engine, Class B only packed in tightly closed inside fiberboard boxes, at least 200 pound test (Mullen or Cady), or metal containers. Ensure Starter Cartridges, Jet Engine, have igniter wires short-circuited when packed for shipment.

A27.22.8. Wooden boxes, specification MIL-B-2427, Grade A, Style 4, Type II, containing eight igniters packed one each in inside hermetically sealed metal containers.

A27.22.8.1. Igniters or igniter components may be shipped in the same container with jet thrust units. When approved by military specifications or drawings.

A27.22.8.2. Ship rocket motors in a nonpropulsive state. When military air shipment of a rocket motor in a propulsive state is required, obtain written approval from hazard classification authority listed in TB 70-2/NAVSEAINST 8020.3/T.O. 11A-1-47/DLAR 8220.1, DOD Explosive Hazard Classification Procedures.

A27.23. Railway Torpedoes. Packaging Requirements:

A27.23.1. Wooden boxes, DOT 15A, 15B, 16A, 19A, or 19B are authorized; however, the net weight in wooden boxes may not be over 125 pounds.

A27.23.2. Fiberboard boxes, DOT 12H, 23F, or 23H are authorized; however, the gross weight may not be over 65 pounds.

A27.23.3. Fiberboard boxes, DOT 12B, with inside cartons are authorized. The inside cartons may not contain over 72 track torpedoes each. The gross weight of the exterior fiberboard box may not be over 65 pounds.

A27.23.4. Fiberboard boxes, DOT 12B, without inside containers may be used for not more than 50 track torpedoes provided the smallest dimension of the box is at least 6 inches.

A27.24. Propellant Explosives, Solid or Liquid (Class A or B Explosives). Package Requirements:

A27.24.1. Tight metal cases in tight wooden boxes free from loose knots and cracks, or tight metal containers. Gross weight may not be over 200 pounds.

A27.24.2. Wooden boxes, DOT 14, 15A, or 19B metal lined DOT 2F. Gross weight may not be over 200 pounds.

A27.24.3. Wooden boxes, DOT 14, 15A, 19B, or fiberboard boxes, DOT specifications 23F, or 23H, with inside cloth or paper bags of capacity may not be over 25 pounds net weight. Ensure each bag is capable of withstanding, when filled, at least 2 drops on end from a height of 4 feet without breaking or sifting of contents. Net weight of contents in outer packaging may not be over 50 pounds.

A27.24.4. Wooden boxes, DOT 14, 15A, 15B, 15C, 19B, or fiberboard boxes, DOT 12B, or 23H, with inside DOT 13 metal kegs. Fiberboard boxes may contain not more than six metal kegs not over 5 pounds net weight each in one outer packaging. Gross weight of wooden boxes may not be over 200 pounds, and fiberboard boxes may not be more than 65 pounds.

A27.24.5. Wooden boxes, DOT 14, 15A, 15B, 15C, or 19B fiberboard boxes, DOT 23F or 23H, with inside strong metal containers. A maximum of four inside containers may not be more than 25 pounds each. Gross weight of fiberboard boxes may not be more than 65 pounds.

A27.24.6. Fiber drums, DOT 21C. Drums having wooden heads require a strong sift-proof liner. Authorized net weight not over 265 pounds.

A27.24.7. Wooden boxes, DOT 14, 15A, 16A, or 19B not lined, authorized only for grains not less than 1 inch in diameter or 3 inches in length, provided such grains are tightly packed and are coated with a protective material. Gross weight may not be over 200 pounds.

A27.24.8. Other wooden boxes and fiberboard boxes approved by the military services may be used instead of DOT specification containers.

A27.24.9. Wooden boxes, DOT 14, 15A, 15B, 19B, or fiberboard boxes, DOT 12H, 23F, or 23H with inside fiber or metal containers of not more than a 1 ¾ pound capacity each. Gross weight of wooden boxes may not be over 200 pounds, and fiberboard boxes may not weigh over 65 pounds.

A27.24.10. Conversion kits, containing Propellant Explosives, Class A, are packed eight each to a fiberboard lined, metal ammunition components box, MK2. Nest kit components and separately packaged pellets securely within fiberboard separators.

A27.24.11. Fiberboard boxes, DOT 12H, 23G, or 23H with inside securely closed polyethylene bags having a minimum wall thickness of 6 mils.

A27.24.11.1. Pack Propellant Explosives (Smokeless Powder for Cannon or Small Arms) in water, in containers to comply with the following specifications:

A27.24.11.2. Metal barrels or drums, DOT 5, 5A, 5B, 6B, or 6C.

A27.24.11.3. Wooden boxes, DOT 15A or 19B, metal lined DOT 2F.

A27.24.12. Pack Propellant Explosives (liquid) in specific containers as follows:

A27.24.12.1. Wooden boxes or wooden boxes fiberboard lined, DOT 15A, 15B, or 15E, with inside polyethylene bottles having taped screw cap closures, not over 1-gallon capacity each. Contain each bottle entirely within a polyethylene or other suitable plastic bag formed of material not less than 0.004-inch thickness, with ends securely closed. Enclose each bottle in the plastic bag in a tight metal container, and surround on all sides with at least 2 inches of incombustible cushioning material. Cushion cans in the outside box from each other and the sides, top, and bottom of the container.

A27.24.12.2. Metal barrels or drums, DOT 5B, 6B, 6C, 6D, or 17C, with inside polyethylene, DOT 2S, container packed inside a strong, tight metal drum and securely closed, or inside glass-lined aluminum carboy not over a 12-gallon capacity. Surround inside steel or glass-lined carboy on all sides with at least 2 inches of incombustible absorbent cushioning material uniformly distributed. Polyethylene containers are authorized only for liquids that do not react dangerously with plastic or result in container failure. Containers may not be entirely filled; leave sufficient interior space vacant to prevent leakage or distortion of containers due to expansion of the contents from increased temperatures during transit.

A27.24.13. Pack Propellant Explosives (solid) with small arms primers as follows:

A27.24.13.1. Tightly close inside containers in metal cans or fiber containers, not over 1-pound each or not containing more than one-grain of propellant (not exceeding 5 pounds each). Pack the inside container to prevent movement within the outer packaging.

A27.24.13.2. Not more than 1,000 small arms packed as prescribed in A27.7.3. may be included in one outside shipping container with solid propellant explosives. Pack the inside container to prevent movement within outer packaging.

A27.24.13.3. Wooden boxes, DOT 15A, 15B, 15C, or 19B.

A27.24.13.4. Fiberboard boxes, DOT 12B, 23F, or 23H. Not more than 10 pounds of propellant explosives may be shipped in one outer packaging.

A27.24.14. Package Document Destroyer with starter as follows:

A27.24.14.1. Metal or fiber drums with inside containers and items consisting of five 20-pound packages of sodium nitrate in kraft bags lined with polyethylene; 2 pounds of sodium nitrate, 0.2-0.4 percent Anti-caking Tricalcium Phosphate, and 2 pounds of sugar mixed with ¼ pound of charcoal in kraft bags lined with polyethylene; Two Igniter Incendiary M-25 consisting of the M-201A1 fuse adapted to the M-1 fire starter approximately 1 inch in diameter by 2 ¾ inches high cellulose acetate body filled with petroleum jelly; one 24-inch two mesh wire screen; safety matches. Net weight of contents may not be more than 120 pounds.

A27.24.14.2. Metal drums (Army drawing D-4 11-34) with inside fiber drums and items consisting of sodium nitrate, a 2-inch tube filled with charcoal, sodium nitrate, and sugar. The inside drum is positioned to form a 2-inch annulus which is filled with sodium nitrate.

A27.25. Rocket Ammunition with (Inert Loaded Projectiles, Solid Projectiles, Empty Projectiles, Explosive Projectiles, Gas Projectiles, Smoke Projectiles, Incendiary Projectiles, or Illuminating Projectiles). Pack in strong wooden or metal containers or aluminum containers approved by military specification or drawings.

A27.26. Small Arms Ammunition and Small Arms Ammunition, Tear Gas Cartridges. Pack in pasteboard or other inside boxes, or in partitions designed to fit snugly in the outer packaging, or pack in metal clips. Design the partitions and metal clips to protect the primers from accidental damage. Pack the inside boxes, partitions, and metal clips in securely closed strong outside wooden or fiberboard boxes or metal containers. Blank industrial power load cartridges may be packed in bulk in securely closed fiberboard boxes.

A27.27. Toy Caps. Toy caps may not contain more than an average of ¼ grain of explosive composition per cap, and be packed in inside packages constructed of paperboard not less than 0.013-inch thick, or metal not less than 0.008-inch thick, or noncombustible plastic not less than 0.015-inch thick. Ensure the material provides a complete enclosure, and the minimum dimensions of each side or end of such package may be not less than 1/8 of an inch in height. The number of caps in an inside package is limited so that not more than 10 grains of explosive composition is packed into 1 cubic inch of space, and not more than 17.5 grains of explosive composition of toy caps is packed in any inside container.

A27.27.1. Pack Toy Caps In:

A27.27.1.1. Wooden boxes, DOT 15A, 15B, 16A, 19A, or 19B. Gross weight may not be over 150 pounds.

A27.27.1.2. Fiberboard boxes, DOT 12B. Gross weight may not be over 65 pounds.

A27.27.1.3. Wooden boxes in good condition, and weighing not more than 100 pounds gross.

A27.28. Explosive Power Device, Class B. Packing requirements:

A27.28.1. Wooden boxes or wooden boxes, fiberboard lined, DOT 14, 15A, 15E, 16A, or 19B.

A27.28.2. Containers authorized by military specification or drawings.

A27.29. Rocket Engine (Liquid), Class B Explosives. Pack in strong, airtight metal containers approved by military specification or drawings. Follow handling instructions and special requirements in A3.3.1.8.

A27.30. Cartridge, Practice Ammunition. Pack in inside boxes, partitions, or metal clips to protect primers from accidental firing, then place in:

A27.30.1. A strong wooden box closed by strapping.

A27.30.2. A fiberboard box closed by strapping or taping.

A27.30.3. A metal container.

A27.31. Blasting Agent N.O.S.. Packaging Requirements:

A27.31.1. Ensure rigid packages (e.g., boxes and drums), prepared as for shipment, are capable of withstanding a 4-foot drop onto solid concrete so as to strike the most vulnerable point on the package without rupture of any loss of contents.

A27.31.2. Ensure nonrigid packages (e.g., tubes and bags), prepared as for shipment, are capable of withstanding three 4-foot drops onto solid concrete without rupture of any loss of content.

A27.32. Oil Well Cartridges. Pack so that explosive composition is not over 20 grains per cubic inch of space in the following shipping containers:

A27.32.1. Wooden boxes, DOT 15A, 15B, 16A, 19A, or 19B. Gross weight may not exceed 150 pounds.

A27.32.2. Fiberboard box, DOT 15B. Gross weight may not exceed 65 pounds.

A27.33. Moderate Ammunition Explosive Hazards. Pack in strong fiberboard or wooden boxes. The ammunition may also be packed in wooden or metal barrels or drums.

A27.34. Tear Gas Grenades. Package requirements:

A27.34.1. Metal-strapped wooden boxes, DOT 15A, 15B, 15C or 19B. Ensure functioning elements not assembled in grenades or devices are in a separate compartment of these boxes either inside or separate outside boxes, DOT 15A, 15B, 15C or 19B. Pack and cushion the elements so they do not come in contact with each other or with walls of the boxes during transportation. Not more than 50 grenades and 50 functioning devices may be packed in one outside container. The gross weight of the package may not be over more than 75 pounds.

A27.34.2. Metal drum (single-trip) DOT 37A. Pack functioning elements in separate compartments. Not more than 24 grenades and 24 functioning devices may be packed in one outside container. The gross weight of the container may not be more than 75 pounds.

A27.34.3. Metal container, CNU-79/E, containing dispenser and 40 modules (32 bomblets containing orthochlorbenzalmalononitrile with a limited explosive train for expelling charge so designed and arranged and that neither propagation between modules nor accidental functioning can occur during transportation. Gross weight of container may not be over 1,200 pounds. Mark each outside container “TEAR GAS GRENADES”.

A27.34.4. Grenades or other similar devices may be shipped completely assembled, provided the functioning elements are packed so that they do not accidentally function.

A27.34.5. Riot control canister cluster, E158 or E159 packed in a plywood box, PP-B-601. Mark each outside container “TEAR GAS GRENADE (DEVICE)”.

Table A27.2. DOT/Military Specification Cross Reference.

DOT Specification	Military/Federal Specification	Description
1A	None	Boxed carboys
2C	PPP-B-636, Type CF-DW, 275	Inside containers, corrugated fiberboard carton
2F	PPP-C-96	Inside metal container and liner
2L	None	Lining for boxes
2S	MIL-D-40030, Styles A and B	Polyethylene containers
5	PPP-P-704, Type I, Class 7 and 10	Steel barrels or drums
5B	PPP-P-704, Type I, Class 4; Type III, Class 7 and 8; PPP-D-729, Type 1, Class A and B	Steel barrels or drums
6B	PPP-D-736, Type III and IV	Steel barrels or drums
6C	None	Steel barrels or drums
6D	PPP-C-1337, Type I, Class 3 and 4, Type II	Cylindrical steel overpack, straight sided for inside plastic container
12B	PPP-B-636, Type CF or SF, V3c	Fiberboard boxes
12H	PPP-B-636, Type CF, V3c, Style FTC	Fiberboard boxes
13	None	Metal kegs
13A	None	Metal drums
14	None	Wooden boxes, nailed
15A	PPP-B-621, Styles 1, 2, 2 ¾, 6, and 7, MIL-B-2427, Types I, II, III. MIL-B-48024, Type I and II.	Wooden boxes, nailed.
15B	PPP-B-621, Style 1, 2, 2 ¾, 6, and 7. MIL-B-2427, Type I, II, III. MIL-B-48024, Type I and II	Wooden boxes, nailed
15C	PPP-B-621, Style 1, 2, 2 ¾, 6, and 7. MIL-B-2427, Type I, II, III. MIL-B-48024, Type I and II.	Wooden boxes, nailed
15E	None	Wooden boxes, fiberboard lined
15L	None	Wooden boxes with inside containers for desensitized liquid explosives
15M	None	Wooden boxes, metal lined, with inside containers for desensitized liquid explosives
16A	PPP-B-585; MIL-B-46506	Plywood or wooden boxes, wirebound

DOT Specification	Military/Federal Specification	Description
17C	PPP-P-704, Type I, Class 4 and 9; Type II, Class 10 and 11. PPP-D-736, Type V and VI	Steel drums
17H	PPP-D-729, Type IV; PPP-D-705, Type V; PPP-P-704, Type II, Class 7	Steel barrels or drums
19A	PPP-B-601; MIL-B-48024	Wooden boxes, glued plywood, cleated
19B	None	Wooden boxes, glued plywood, nailed
21C	None	Fiber drum
23F	PPP-B-636, Type CF and SF	Fiberboard boxes
23G	None	Special cylindrical fiberboard box for high explosives.
23H	PPP-B-636, Type SF	Fiberboard boxes
37A	PPP-P-704, Type II, Class 1,3,5,8, and 9; Type III, Class 1,3, and 6; MIL-D-13901	Steel drums