

APPENDIX 4-A

STORAGE OF GERMANIUM METAL

1. *Description*

- a. Germanium metal, high purity, is received for storage in the form of ingots which shall have a uniform trapezoidal shape. Minimum length of each ingot shall be 43 centimeters (cm.) and the maximum length shall be 56 centimeters. The minimum diagonal cross section of the ingot shall be 25 millimeters (mm.) and the maximum diagonal cross section shall be 63.5 millimeters. The germanium metal shall be zone refined and shall be capable of being converted into optical grade germanium metal.
- b. Each production lot will consist of 15 to 20 kilograms (kg.) of homogeneous germanium metal, zone refined into ingots from a production heat, and traceable to the production heat from which it was made. All ingots will be solid and sound, be free of holes, chips, inclusions and cracks. The ingots will be cleaned by chemical etching and be of uniform color and quality.
- c. Acquired Germanium metal will meet the Purchase Specification P-114-R (Current Edition).

2. *Packaging*

- a. *Ingot.* Ingots in a production lot will be individually wrapped in a new, clean, transparent polyethylene bag which has a minimum thickness of 0.004 inch (4 mil.). The bag will be closed by heat sealing. The packaged ingot will be wrapped in cushioning material to prevent damage during shipment.
- b. *Boxes.* The ingots in a production lot (usually 4, 6 or 9 ingots) shall be packed in a new wooden box which meets the requirements of the purchase specification and contract. The box shall be sealed by nails, and banded around the girth of the box by two (2) steel bands.
- c. Germanium ingots will be received for storage on new wooden pallets normally with twenty or thirty five boxes/pallet.

3. *Marking*

- a. *Ingot.* Each ingot shall be permanently marked in the middle of the top surface with the product name or chemical symbol Ge, the ingot serial number, and name of producer. The producer's name may be abbreviated.

(1) After the ingot has been marked by the producer, the ingot shall be chemically etched to clean the metal.

- b. *Boxes.* Sufficient aluminum tags, conforming to the requirements of the DLA Strategic Materials Identification Specification T-1 - Tags: Aluminum, Embossed, latest revision, shall be affixed to each box and shall be marked with the following information.

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- (1) Name of Material
- (2) Production Lot Number
- (3) Number of Ingots
- (4) Name of Producer
- (5) Country of Origin
- (6) Gross Weight (Pounds Avordupois/Kilograms)
- (7) Net Weight (Kilograms)
- (8) Government Contract Number
- (9) Strategic Materials Purchase Specification Number and Date

c. Identification of material will be obtained from documents accompanying each shipment. If shipments are received without identifying documents, or if the markings are not in agreement with those shown on the documents and/or shipping instructions, DLA Strategic Materials will be notified immediately.

4. *Storage*

- a. Germanium ingots will be stored indoors, in a sprinklered vault or vault-like area of a warehouse.
- b. Storage identity shall be maintained by contract and production lot number as indicated on each box and in shipping instructions. Complete description of each lot of germanium shall be indicated on a locator card which shall be prominently displayed on and securely attached to the tier in each multi-tiered rack or stack. DLA Strategic Materials storage sites will use the Warehouse Material Identification Card (DLA-SM Form 41) for this purpose.
- c. Palletized boxes will be stored in uniform multi-tiered racks or be stacked three pallets high so as to facilitate the taking of an inventory at any time by physical count and computation.
- d. Storage will be kept at least thirty-six inches below automatic sprinkler heads. A minimum clearance of twenty-four inches will be maintained between stored material and all walls for inspection purposes.

5. *Precautions To Be Taken*

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a. *Health.* None. Since germanium is in the form of solid metal ingots, no airborne dusts should be generated.

b. *General.* Rough handling may cause extensive damage to wooden boxes or pallets. When being received, if any of the boxes show evidence of damage, the box(es) will be opened to determine the extent of such damage. If there is no damage to the material, the box(es) will be returned as nearly as possible to its original condition prior to being placed in permanent storage. Damaged boxes or pallets would be replaced. Severe damage will be reported in the usual manner by an Transportation Discrepancy Report. Proper care shall be exercised in handling and shipping to avoid damage.

6. *Security*

a. Eight seals shall be affixed through holes bored in the top and bottom corners of the box to maintain the integrity of the box contents.

b. Entry into vault areas for the purpose of shipments, inventory or inspections will be documented by use of logs, and/or custodial reports.

c. Access into vault areas will be controlled by the Depot Manager of the facility where the material is stored. Depots will implement their internal security procedures for this type of valuable material.

7. *Average Storage Factor*

a. Ingots - 1,000-2,000 lbs./sq. foot for ground level warehouses or the weight/sq. foot rated for the warehouse the material is stored in.

FOR ADDITIONAL INFORMATION ON THIS COMMODITY REFER TO THE SAFETY DATA SHEET, OR MOST CURRENT PURCHASE SPECIFICATION.