INCH-POUND

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SUPERSEDING
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DETAIL SPECIFICATION

ELECTRON TUBES, PACKAGING OF

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the requirements for the preservation, packing, and container marking of electron tubes and associated accessories (see 6.1).

1.2 Classification. The electron tubes covered by this specification are included within the following packaging groups.

1.2.1 Packaging group 1. Receiving tubes and other electron tubes or devices which do not exceed a 6 by 6 by 15 inch (15.24 by 15.24 by 38.1 centimeters) unit pack size.

1.2.2 Packaging group 4. Cathode ray, picture, storage, and related tube types.

1.2.3 Packaging group 9. Magnetron and other electron tubes containing permanent magnets.

1.2.4 Packaging group 23. Electron tubes (except receiving, magnetron, cathode ray, and related tube types) which do not exceed 18 by 18 by 40-inch (45.72 by 45.72 by 101.6 centimeters) unit pack size.

1.2.5 Packaging group 24. Electron tubes exceeding an 18 by 18 by 40-inch unit pack size.

1.3 Part or Identifying Number (PIN). The PIN to be used for packaging of electron tubes acquired to this specification are created as follows:

M	75 -	XX
Prefix for Military specification	Specification number	Packaging group (see 1.2.1)

Comments, suggestions, or questions on this document should be addressed to: Defense Supply Center Columbus, ATTN: DSCC-VAT, Post Office Box 3990, Columbus, OH 43218-3990 or emailed to Tubesamps@dscc.dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at http://assist.daps.dla.mil.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract (see 6.2).

FEDERAL SPECIFICATIONS

NN-P-71	-	Pallets, Material Handling, Wood, Stringer Construction, 2-Way and 4-Way (Partial).
PPP-B-566	-	Boxes, Folding, Paperboard.
PPP-B-676	-	Boxes, Setup.

COMMERCIAL ITEM DESCRIPTION

A-A-3174	-	Polyolefin Plastic Sheet.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-PRF-1	-	Electron Tubes, General Specification For.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-129	-	Military Marking for Shipment and Storage.
MIL-STD-202	-	Electronic and Electrical Component Parts.
MIL-STD-2073-1	-	DoD Standard Practice for Military Packaging.

(Document copies are available on line at http://assist.daps.dla.mil/quicksearch or from Defense Automation and Production Service, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract (see 6.2).

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ISO 10012-1	-	Quality Assurance Requirements for Measuring Equipment - Part 1: Metrological Confirmation System for Measuring Equipment.

(Copies of these documents are available on line at http://www.ansi.org or from the American National Standards Institute (ANSI), 25 West 43rd Street, 4 Floor, New York, NY 10036.)

ASTM INTERNATIONAL

ASTM-D1974	-	Methods of Closing, Sealing, and Reinforcing Fiberboard Boxes (DoD adopted).
ASTM-D3951	-	Commercial Packaging (DoD adopted).
ASTM-D3953	-	Strapping Flat Steel and Seals (DoD adopted).
ASTM-D4727/D4727M	-	Corrugated and Solid Fiberboard Sheet Stock (Container Grade) and Cut Shapes (DoD adopted).
ASTM-D5118/D5118M	-	Fabrication of Fiberboard Shipping Boxes (DoD adopted).
ASTM-D6251/D6251M	-	Wood-Cleated Panelboard Shipping Boxes (DoD adopted).
ASTM-D5168	-	Fabrication and Closure of Triple Wall Corrugated Fiberboard Containers (DoD adopted).
ASTM-D6880	-	Wood Boxes.

(Copies of these documents are available online at http://www.astm.org or from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

NATIONAL CONFERENCE OF STANDARDS LABORATORIES (NCSL)

NCSL-Z540.1	-	Calibration Laboratories and Measuring and Test Equipment (DoD adopted).

(Copies of the above document are available online at http://www.ncsli.org or from National Conference of Standards Laboratories (NCSL), 2995 Wilderness Place Suite 107, Boulder, CO 80301-5404.)

2.4 Order of precedence. In the event of conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 General. The packaging terms used herein shall be in accordance with the definitions listed in MIL-STD-2073-1.

3.1.1 Pairs and sets. Electron tubes furnished in pairs or sets under one national stock number (NSN) shall be unit packed as one pair or one set, as applicable. When individual unit packs are used to make up a pair or set of tubes, they shall not be taped or glued together but shall be enclosed within a close fitting, unit container.

3.1.2 Hardware. Hardware accompanying electron tubes shall be protected and enclosed within the unit packs in a manner that will not damage the electron tubes or packaging materials. When practical, the hardware should be mounted on each electron tube.

3.1.3 Physical protection. Electron tubes and accessories shall be packaged in a manner that will ensure compliance with applicable requirements of MIL-STD-2073-1 as well as those specified herein.

3.1.3.1 Pins, leads, terminals, and waveguide mounting surfaces. Pins, leads, terminals, and other outward projections shall be protected by means of container design or non-corrosive die-cut inserts or other suitable supporting materials or devices. Waveguide mounting surfaces shall be protected with tight-fitting plastic covers, caps, or other suitable protective materials.

3.1.3.2 Wrapping and cushioning. Wrapping and cushioning materials shall be non-corrosive and dry. The use of hygroscopic or loose fill materials is prohibited for shipboard applications.

3.1.3.3 Blocking and bracing. Blocking and bracing shall conform to best manufacturing practices.

3.1.4 Design and construction. Interior and exterior packs shall be of the design and construction specified herein. Exterior containers shall be of minimum tare and cube consistent with the protection required and shall contain equal quantities of identical stock numbered or otherwise designated items to the greatest extent practicable.

3.1.5 Army acquisitions.

3.1.5.1 Military unit pack quantities. Unless otherwise specified (see 6.2), the quantity per unit pack (QUP) shall be one. Unit and supplementary containers conforming to ASTM-D5118/D5118M shall be utilized in lieu of PPP-B-566 or PPP-B-676 containers.

3.1.5.2 Military intermediate packs. Electron tubes, unit packed in containers less than 64 cubic inches and bearing the same NSN, shall be placed in intermediate containers conforming to ASTM-D5118/ D5118M weather resistant class. Commercial (minimal) intermediate containers shall conform to ASTM-D5118/D5118M domestic class. Intermediate containers shall not exceed 40 pounds (18.144 kilograms) net weight, or a maximum size of 1.5 cubic feet (0.04248 cubic meter) with at least two dimensions not exceeding 16 inches (40.64 centimeters). Intermediate containers shall not be required when the total quantity to be shipped will result in only one intermediate pack per shipping container.

3.1.5.3 Packing. For wood containers conforming to ASTM-D6251/D6251M, when the gross weight exceeds 200 pounds (90.72 kilograms), or the container length and width is 48 x 24 inches (121.92 x 60.96 centimeters) or more and the weight exceeds 100 pounds (45.36 kilograms), 3 x 4 inch (7.62 x 10.16 centimeters) skids (laid flat) shall be applied in accordance with the requirements of the container specification. Palletization shall be required when containers specified in 3.3.1, 3.3.2, and 3.3.3 do not require skids; quantities per destination exceed either a total of 250 pounds or 113.4 kilograms (excluding the pallet) or a volume of 20 cubic feet (0.05663 cubic meter); and the container size permits use of one of the pallet patterns. A quantity of containers, packed as specified, except that container strapping may be omitted, must be placed on a pallet, load type I. For level B and commercial (minimal) packaging, unit or intermediate containers which meet these requirements may be palletized without further packing. The pallet shall conform to NN-P-71, type IV, group I or II woods. The load shall be "bonded" to the pallet by strapping conforming to ASTM-D3953, or shrink film conforming to Commercial Item Description A-A-3174. Stretch wrap is authorized for shipments within the continental United States and for containerized shipments.

3.2 Military preservation.

3.2.1 Cleaning. Electron tubes and accessories shall be cleaned in accordance with MIL-STD-2073-1, 5.2.1 and cleaning inspection provisions as cited within MIL-STD-2073-1, table G.1.

3.2.2 Drying. Electron tubes and accessories shall be dried in accordance with MIL-STD-2073-1.

3.2.3 Preservatives. Contact preservatives shall not be used.

3.2.4 Unit packs.

3.2.4.1 Packaging group 1 (see 1.2.1). Except as specified herein, receiving tubes and other miscellaneous small electron tubes shall be individually unit packed in accordance with physical and mechanical protection of MIL-STD-2073-1. Those that are tunable or adjustable or with silver plated contacts or surfaces shall be unit packed in accordance with water vapor-proof protection of MIL-STD-2073-1. Flexible cushioning material or die-cut devices shall be used to protect each tube having fragile projections (not including sealed off tips and pins). The unit container for physical and mechanical protection and the supplemental container for “water vapor-proof bag, sealed” shall conform to variety 2 of PPP-B-566 or PPP-B-676 for unit packs less than 5 by 5 by 12 inches (12.7 by 12.7 by 30.48 centimeters) or 300 cubic inches (4,916 cubic centimeters). Containers exceeding this size shall conform to ASTM- D5118/D5118M for weather-resistant class.

3.2.4.2 Packaging group 4 (see 1.2.2). Cathode ray and related electron tube types shall be individually unit packed in accordance with physical and mechanical protection methods of MIL-STD-2073-1. Resilient pads, corner blocks, or die-cut devices conforming to ASTM-D4727/D4727M domestic class shall be used to centrally position the tube within each unit pack in a manner to prevent physical damage to the tube from shock and vibration and to prevent tip seals from coming in contact with the container. The unit container shall conform to ASTM-D5118/D5118M for weather-resistant class.

3.2.4.3 Packaging group 9 (see 1.2.3). Except as specified herein, magnetron and other electron tubes having permanent magnets shall be preserved in accordance with physical and mechanical protection methods of MIL-STD-2073-1. Unless otherwise specified in the contract or purchase order (see 6.2), those tubes that are tunable or adjustable or have silver plated contacts or surfaces shall be preserved in accordance with “water vapor-proof bag, sealed” methods of MIL-STD-2073-1 with a supplementary container. The distance between the outer magnetic surfaces and the outside of the unit container shall be no less than the protective distance required in the precautionary handling or magnetic isolation instruction in the MIL-PRF-1 detail specification or manufacturer's tube specification, as applicable. When special instructions are not available, a minimum protective distance of 4 inches shall be maintained. Cushioning, blocking, and bracing shall be as specified herein. The supplementary container shall conform to ASTM-D5118/D5118M for weather-resistant class or, when these box requirements are exceeded, to ASTM-D5168 for weather-resistant class. When specified in the contract or purchase order (see 6.2) or by transportation rules and regulations, magnetic shielding shall be applied in accordance with best manufacturing practices. When shielding is required, MIL-STD-2073-1 methods for “sealed, rigid metal containers”, using sealed metal drums which meet the best available shielding requirements and the magnetic isolation distances specified herein, may be used in lieu of the preservation and unit container requirements described above.

3.2.4.4 Packaging group 23 (see 1.2.4). Except as specified herein, electron tubes (except receiving, magnetron, cathode ray, and related tube types) having a container size ranging from 6 by 6 by 15 inches (15.2 by 15.2 by 38.1 centimeters) to 18 by 18 by 40 inches (45.7 by 45.7 by 101.6 centimeters) shall be preserved in accordance with MIL-STD-2073-1 for physical and mechanical protection. Unless otherwise specified in the contract or purchase order (see 6.2), electron tubes that are tunable or adjustable or have silver plated contacts or surfaces shall be preserved in accordance with MIL-STD-2073-1 “water vapor-proof bag, sealed” method with supplementary container, or with heat sealed bag container. Cushioning, blocking, and bracing shall be as specified herein. The unit container shall conform to ASTM-D5118/ D5118M for weather-resistant class.

3.2.4.5 Packaging group 24 (see 1.2.5). Except as specified herein, electron tubes exceeding an 18 by 18 by 40-inch (45.7 by 45.7 by 101.6 centimeters) unit pack size shall be preserved in accordance with MIL-STD-2073-1 for physical and mechanical protection. Electron tubes that are tunable or adjustable or have silver plated contacts or surfaces shall be preserved in accordance with MIL-STD-2073-1 either for sub-method “container, water vapor-proof, heat sealed bag container” or for sealed, rigid metal container. Cushioning, blocking, and bracing shall be applied as specified herein. The unit container shall conform to ASTM-D6251/D6251M.

3.2.4.6 Accessories (when separately acquired). Accessories, such as shields, retainers, and adapters, shall be unit packed one each in accordance with MIL-STD-2073-1 for physical and mechanical protection. Unit pack quantities for other than one each shall be as specified (see 6.2). The unit container for items exceeding 1 inch (2.54 centimeters) in the smallest overall dimension shall conform to variety 2 of PPP-B-566 or PPP-B-676.

3.2.5 Commercial preservation. Commercial preservation shall be in accordance with ASTM-D3951. Except as specified herein, commercial preservation for electron tubes and accessories shall conform to the MIL-STD-2073-1 requirements. For packaging groups 1, 4, 9, and 23, non-weather (or non-water) resistant versions of the PPP-B-566, PPP-B-676, ASTM-D5118/D5118M, or ASTM-D5168 unit containers shall be used. For packaging group 24, unit containers conforming to ASTM-D6251 domestic type; ASTM-D6880, class 1; ASTM-D5118/D5118M, weather-resistant class (not to exceed the limits of the box specification); or ASTM-D5168 weather-resistant class may be used as the unit container when commercial is specified for packing. Unless otherwise specified in the contract (see 6.2), the quantity per unit pack shall be at the option of the supplier.

3.3 Packing. Packing shall be level A, level B, or Minimal, as specified (see 6.2).

3.3.1 Level A.

3.3.1.1 Packaging groups 1, 4, 9, 23, and accessories. Electron tubes and accessories, preserved as specified in 3.2, shall be packed in wood containers conforming to ASTM-D6251/D6251M. Closure and strapping shall be in accordance with the applicable container specification, except that metal strapping shall conform to ASTM-D3953 for nail-free, flat strapping with coated finish. The requirements for level B packing shall be used when the total quantity of a stock numbered electron tube or accessory for a single destination does not exceed a packed volume of one cubic foot (0.02832 cubic meter).

3.3.1.2 Packaging group 24. The unit container for each electron tube unit packed as specified in 3.2.4.5 will serve as the shipping container. For electron tubes with commercial preservation, the shipping container shall conform to that specified for the level A unit container. Closure, waterproofing, and banding (reinforcement requirements) shall be in accordance with applicable container specification for level A. When necessary to facilitate handling, weather (or water) resistant skid or pallet base shall be applied in accordance with the applicable box specification, or if not specified, in a manner which will adequately support the enclosed tube and facilitate the use of material handling equipment.

3.3.2 Level B.

3.3.2.1 Packaging group 1 and accessories. Electron tubes and accessories, preserved as specified in 3.2, shall be packed in fiberboard containers in accordance with ASTM-D1974 and with ASTM-D5118/D5118M, weather-resistant class, style optional, special requirements. The requirements for box closure, waterproofing, and reinforcing shall be in accordance with ASTM-D1974 and with ASTM-D5118/D5118M for weather-resistant class. Unit containers conforming to ASTM-D1974 and with ASTM-D5118/D5118M, weather-resistant, special requirements require no further packing provided that the requirements for closure, waterproofing, and reinforcing specified herein are met.

3.3.2.2 Packaging groups 4, 9, and 23: not exceeding one cubic foot. Unit packs in packaging groups 4, 9, and 23 with a packed volume not exceeding one cubic foot shall be packed as specified for packaging group 1 (see 3.3.2.1).

3.3.2.3 Packaging groups 4, 9, and 23: exceeding one cubic foot. The military level A unit container for these packaging groups will suffice as the shipping container. For electron tubes with commercial preservation, the shipping container shall conform to that specified for the level A unit container in the applicable packaging group. Closure, waterproofing, and banding (reinforcement requirements) shall be in accordance with the applicable container specification for level B shipment.

3.3.2.4 Packaging group 24. The unit container for each electron tube unit packed as specified in 3.2.4.5 or 3.2.2 will serve as the shipping container. For electron tubes with commercial preservation, the shipping container shall conform to that specified for the level B unit container. Closure shall be in accordance with the applicable container specification for level B. When necessary to facilitate handling, a skid or pallet base shall be applied in accordance with the applicable box specification, or if not specified, in a manner which will adequately support the enclosed tube and facilitate the use of material handling equipment.

3.3.3 Minimal packing.

3.3.3.1 Packaging group 1 and accessories. Packaged electron tubes and accessories shall be packed in fiberboard containers conforming to ASTM-D1974 and to ASTM-5118/D5118M, domestic, style optional, special requirements. Closures shall be in accordance with ASTM-D1974 and with ASTM-D5118/5118M.

3.3.3.2 Packaging groups 4, 9, and 23: not exceeding one cubic foot. Electron tubes in unit containers specified for packaging groups 4, 9, or 23 with a packed volume not exceeding one cubic foot shall be packed as specified for packaging group 1 (see 3.3.3.1).

3.3.3.3 Packaging groups 4, 9, and 23: exceeding one cubic foot. The military level A, B unit container for these packaging groups will suffice as the shipping container. For electron tubes with commercial preservation, the shipping container shall conform to that specified for the level B unit container in the applicable packaging group. Closure shall be in accordance with the applicable container specification.

3.3.3.4 Packaging group 24. The unit container will serve as the shipping container. Closure shall be in accordance with the applicable container specification.

3.3.4 Unitized loads. Unless otherwise specified (see 6.2), unitized loads, commensurate with the level of packing specified in contract or purchase order, shall be used whenever total quantities for shipment to one destination equal 40 ft^3 (1.1328 m^3) or more. Quantities less than 40 ft^3 need not be unitized. Unitized loads shall be uniform in size and quantities to the greatest extent practicable.

3.3.4.1 Level A. Electron tubes, packed as specified in 3.3.1, shall be unitized on pallets with a wood cap (storage aid 5) positioned over each load.

3.3.4.2 Level B. Electron tubes, packed as specified in 3.3.2, shall be unitized as specified in 3.3.4.1, except that weather resistant fiberboard caps (storage aid 4) shall be used in lieu of wood caps.

3.3.4.3 Minimal packing. Electron tubes, packed as specified in 3.3.3, shall be unitized as specified in 3.3.4.2 except that the fiberboard caps shall be class domestic.

3.3.5 Intermediate packs. Electron tubes, unit packed in containers less than 30 cubic inches in size (see 3.2.4.1), shall be further packaged in units of five packs each in an open top box or sleeve which provides a sufficiently tight fit to prevent the individual unit packs from falling out during handling. Accessories, which are not unit packed in boxes (see 3.2.4.6), shall be placed in intermediate containers conforming to variety 2 of PPP-B-566 or PPP-B-676. All intermediate containers shall be uniform in size, shape, and quantities, and shall be of minimum tare and cube and shall contain multiples of 5 unit packs, not to exceed 100 unit packs. No intermediate packs are required when the total quantity shipped to a single destination is less than 100 unit packs.

3.4 Marking. In addition to any other identification marking and special marking required by the contract (see 6.2), and except as specified herein, each unit pack, intermediate and exterior container, and unitized load shall be marked in accordance with MIL-STD-129.

3.4.1 Additional identification marking. The electron tube type number together with the manufacturer's part or identifying number (MFR/PIN) and the Commercial and Government Entity (CAGE) code, shall be marked on interior and exterior containers as specified in MIL-STD-129. The alternate single label for small packs may be used at the option of the contractor for packaging group 1 tubes (see figure 1).

FROM:	NSN_____
	CAGE_____MFR/PIN_____
	ELECTRON TUBES
	(SPACE FOR QUANTITY AND
	___UNIT OF ISSUE)_____
	(SPACE FOR CONTRACT NUMBER)_____
TO:	(SPACE FOR PRES./PACKING
	____LEVELS AND DATE PACKED)_____
	WT._____CU._____
	TYPE NO. _(IF APPLICABLE)_____
	(SPACE FOR SPECIAL MARKING)

FIGURE 1. Alternate single label for small packs.

3.4.2 Special marking.

3.4.2.1 Infrared tubes. Infrared tubes susceptible to damage by prolonged exposure to light shall include the following marking on the unit container: "DO NOT REMOVE FROM CONTAINER EXCEPT FOR USE OR TEST. AVOID PROLONGED EXPOSURE TO LIGHT."

3.4.2.2 Country of origin. When the country of origin does not appear on the tube due to inadequate allowable marking area, the phrase "MADE IN USA" or the abbreviation "U.S.A." shall be marked on each unit container. For electron tubes manufactured in other countries, the phrase shall be changed accordingly.

3.4.2.3 Miscellaneous special markings. Containers for which the upper corner drop tests are not required shall be marked with arrows as specified in MIL-STD-129 (see 4.8.2.1). When applicable, water vapor-proof protection with desiccant method of preservation, radioactive and magnetized material markings shall be applied in accordance with MIL-STD-129.

3.5 First article and conformance inspections. First article and conformance inspections and tests shall be required as specified in 4.5 and 4.6, respectively. Samples for these tests shall be furnished in accordance with procedures outlined in 4.5 and 4.6. Performance of visual and dimensional inspections, rough handling tests, and leakage tests shall conform to inspections and tests outlined in 4.7.1, 4.7.2.1, and 4.7.2.2, respectively. The inspection required for industrial packaging shall be as specified (see 6.2).

3.5.1 Functional requirements.

3.5.1.1 Rough handling test. When packs have been tested in accordance with 4.7.2.1, all materials and components comprising each pack shall be free from damage or evidence of misplacement which might affect the utility of the preservation method or pack. The electron tubes within the tested packs shall show no visible signs of damage. When specified (see 6.2), functional tests in accordance with the sampling and inspection criteria of MIL-PRF-1, table I (sampling and acceptance criteria for qualification) shall be conducted on those electron tubes subjected to the rough handling test to determine freedom from operational malfunction.

3.5.1.2 Leakage test (when applicable). When a barrier enclosed unit pack has been tested in accordance with 4.7.2.2, there shall be no evidence of moisture within the unit pack.

3.6 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.7 Workmanship. The quality of workmanship shall assure acceptance of the completed preservation, packing, and marking requirements in accordance with the inspections specified in section 4.

4. VERIFICATION

4.1 Test equipment and inspection facilities. Test and measuring equipment and inspection facilities of sufficient accuracy, quality, and quantity to permit performance of the required inspection shall be established and maintained by the contractor. The establishment and maintenance of a calibration system to control the accuracy of the measuring and test equipment shall be in accordance with NCSL-Z540.1 and ISO-10012-1.

4.2 Inspection conditions. All inspections shall be performed in accordance with the test conditions specified in the general requirements of MIL-STD-202.

4.3 Classification of inspections. The inspections specified herein are classified as follows:

a. Materials inspection (see 4.4).

b. First article inspection (see 4.5).

c. Conformance inspection (see 4.6).

4.4 Materials inspection. Materials inspection shall consist of certification supported by verifying data that the materials used are in accordance with the applicable requirements specified herein.

4.5 First article inspection. Unless otherwise specified (see 6.2), first article inspection shall be performed by the contractor after award of contract and prior to production at a time and location acceptable to the Government. First article inspection shall not be required (a) when there have been changes in materials, processes, or packaging design that will not adversely affect item protection since the last recorded inspection; (b) when special, detailed packaging instructions are furnished by the acquiring activity; (c) where commercial packaging protection is specified or; (d) (subject to the approval of the administrative contracting officer) when a prior successful inspection was conducted on a like item and pack. In the event electron tubes are supplied to government activities from existing inventories, the applicable first article inspections may be integrated with the conformance inspection requirements.

4.5.1 Sample size. One sample unit consisting of a military pack, as applicable, shall be submitted for first article inspection. The sample for the rough handling test shall consist of a complete pack as prepared for shipment except that when the unit container conforms to ASTM-D5118/D5118M, the sample shall apply to the unit pack. The sample for the leakage test shall be five unit packs selected at random from the first article exterior pack (shipping container).

4.5.2 Inspection routine. The sample shall be subjected to the inspections specified in table I and in table II. The leakage test, when applicable, shall follow the rough handling test.

4.5.3 Failures. One or more failures shall be cause for refusal to grant first article approval.

4.5.4 Resubmission of first article sample. If the sample fails to pass first article inspection, the contractor shall change the preservation and packing processes to correct the cause of the deficiency. First article inspection shall be performed on a corrected sample to prove that the corrective action is acceptable.

TABLE I. Visual and dimensional inspections.

Major defects	Requirement paragraph	Method paragraph
Packaging materials not conforming to referenced specification requirements	3.	4.7.1
Not cleaned or improperly cleaned items	3.2.1 and 3.2.2	
Punctured or improperly fabricated barrier bag	3.2.4.1, 3.2.4.3, 3.2.4.4, and 3.2.4.5	
Incorrect preservation method	3.2.4	
Wrong quantity per unit or intermediate pack	3.2.4 and 3.3.5	
Nonuse or incorrect application of intermediate containers	3.3.5	
Improper box closures	3.3.1, 3.3.2, and 3.3.3	
Omitted, incorrect, or illegible marking	3.4	

TABLE II. Functional inspections.

Test	Requirement paragraph	Method paragraph
Rough handling	3.5.1.1	4.7.2.1
Leakage (when applicable)	3.5.1.2	4.7.2.2

4.6 Conformance inspection. This inspection shall consist of the methods of inspection specified in table I and in table II, respectively.

4.6.1 Inspection lot. An inspection lot, as far as practicable, shall consist of unit or exterior (shipping) packs produced under essentially the same conditions and offered for inspection at one time. For the purpose of selecting samples to be inspected and tested for compliance with the requirements of this specification, either items in process or completed packs, except as stated herein, may be combined into lots without regard to individual items, contracts, or the quantities therein. Unit packs of the same size and made from the same packaging materials may be grouped together except when item complexity, item value, or the complexity of the preservation method warrants that the inspection of such items be performed on a separate basis. A separate application of the sampling or inspection procedure shall be made on these items. The combination of items to be subjected to inspection shall be determined by either the Government or the contractor, subject to the approval of the Government.

4.6.2 Visual and dimensional inspection. Visual and dimensional inspection shall consist of those specified in table I.

4.6.2.1 Sampling plan. Statistical sampling and inspection shall be performed on an inspection lot basis with a random sample of packs selected in accordance with table III. The acceptable levels shall be based upon the zero defective sampling plan. No failures shall be permitted.

TABLE III. Group A sampling plan.

Lot size	Sample size
1 - 13	100 percent
14 - 150	13
151 - 280	20
281 - 500	29
501 - 1,200	34
1,201 - 3,200	42
3,201 - 10,000	50
10,001 - 35,000	60
35,001 - 150,000	74
150,001 - 500,000	90
500,001 and over	102

4.6.2.2 Rejected lots. If an inspection lot is rejected, the contractor may rework it to correct the defects or to screen out the defective units and resubmit for re-inspection. Such lots shall be separate from new lots and shall be clearly identified as re-inspected lots.

4.6.2.3 Disposition of sample units. Sample units which have passed all the inspections specified in table II may be delivered on the contract or purchase order if the lot is accepted.

4.6.3 Functional inspection. Functional inspection shall consist of the tests specified in table II.

4.6.3.1 Sampling plan. Sampling plans shall be as follows:

a. One sample unit for the rough handling test shall be selected whenever the design of the item or packaging is changed.

b. For unit packs requiring waterproof or water vapor-proof barriers, five sample units for the leakage test shall be selected daily at random from the first lot processed each day. Five additional samples shall be selected at random from the day's total production or the number produced if less than five.

c. The leakage test shall also be performed following the rough handling test on unit packs requiring waterproof or water vapor-proof barriers. Five sample units or the number of units contained within the shipping container, if less than five, shall be selected.

4.6.3.2 Failures. One or more failures shall be cause for rejection of the lot.

4.6.3.3 Disposition of sample units. Sample units which have passed the inspections specified in table II may be delivered on the contract or purchase order if the lot is accepted and opened packs have been reprocessed.

4.7 Methods of inspection.

4.7.1 Visual and dimensional inspections. Unit, intermediate, and exterior packs shall be inspected to verify that the materials, designs, methods, physical limitations, marking, and workmanship are in accordance with the applicable requirements (see requirements and table I).

4.7.2 Functional inspections.

4.7.2.1 Rough handling. Packs shall be subjected to the applicable rough handling tests and the interpretation of results or cause for rejection as specified in MIL-STD-2073-1, Appendix G, Appendix F, and 3.5.1.1 herein. The upper corner drops of the free fall drop test shall not be required for those tubes that cannot be inverted without internal damage.

4.7.2.2 Leakage. When a waterproof or water vapor-proof barrier is required, the unit pack shall be subjected to the applicable leakage test and interpretation of results specified in MIL-STD-2073-1, Appendix G, G.4.2, and 3.5.1.2 herein.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The preservation, packing, and marking specified herein are intended for direct shipments to the Government. However, this specification may also be used for the preparation of electron tubes and accessories for shipment from parts contractor to the original equipment manufacturer.

6.2 Ordering data. Acquisition documents should specify the following:

a. Title, number, and date of this specification.

b. Preservation and levels of packing (see 3.2, 3.3, and 5.1).

c. Methods of preservation, if other than that specified (see 3.2.4.3 and 3.2.4.4).

d. If magnetic shielding is required (see 3.2.4.3).

e. Quantity per unit pack, if other than specified (see 3.1.5.1, 3.2.4.6, and 3.2.5).

f. If a unitized load is not required for shipment to one destination when total quantities are equal to 40 cubic feet or more (see 3.3.4).

g. If other identification marking or special marking is required (see 3.4).

h. If electron tube functional inspections are required (see 3.5.1.1).

i. If the contractor is not responsible for the performance of all inspection requirements.

j. If first article inspection is not required (see 4.5).

k. Specification of the inspection required for industrial packaging (see 3.5 and 5.1).

6.3 Inspection for first article. The sample pack submitted for first article inspection (when satisfactorily performed as specified in 4.5) will serve as production standard for subsequent packaging operations. The contractor should inform acquiring activity or activity administering the contract of the time and location of this inspection so that the Government representative will have an opportunity to witness the tests.

6.4 Subject term (key word) listing.
Cathode ray tubes
Magnetic shielding
Magnetron tubes
Marking
Receiving tubes
Special marking

6.5 Environmentally preferable material. Environmentally preferable materials should be used to the maximum extent possible to meet the requirements of this specification. Table IV lists the Environmental Protection Agency (EPA) top seventeen hazardous materials targeted for major usage reduction. Use of these materials should be minimized or eliminated unless needed to meet the requirements specified herein (see 3.).

TABLE IV. EPA top seventeen hazardous materials.

Benzene	Dichloromethane	Tetrachloroethylene
Cadmium and Compounds	Lead and Compounds	Toluene
Carbon Tetrachloride	Mercury and Compounds	1, 1, 1 - Trichloroethane
Chloroform	Methyl Ethyl Ketone	Trichloroethylene
Chromium and Compounds	Methyl Isobutyl Ketone	Xylenes
Cyanide and Compounds	Nickel and Compounds	

6.6 International standardization agreement. Certain provisions of this specification are the subject of STANAG-4012. Amendment, revision or cancellation of this specification may necessitate action to change the agreement or to make appropriate accommodations.

6.7 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Custodians:
Army - CR
Navy - EC
Air Force - 11
DLA - CC

Review activities:
Army - AR, MI, SM
Navy - AS, CG, MC, OS, SH

Preparing activity:
DLA - CC

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NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at http://assist.daps.dla.mil.