INCH-POUND

MIL-DTL-39032E
w/ Amendment 2
29 November 2012
SUPERSEDING
MIL-DTL-39032E
w/ Amendment 1
16 August 2005

DETAIL SPECIFICATION

RESISTORS, 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 all types of resistors and associated accessories which are primarily FSC 5905.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4 or 5 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 documents cited in sections 3, 4 or 5 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.

FEDERAL SPECIFICATIONS

A-A-3174	-	Plastic Sheet, Polyolefin.
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.

FEDERAL STANDARDS

FED-STD-123	-	Marking for Shipment (Civil Agencies).

Comments, suggestions, or questions on this document should be addressed to: DLA Land and Maritime, ATTN: VAT, Post Office Box 3990, Columbus, OH 43218-3990 or emailed to resistors@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at https://assist.dla.mil.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-DTL-117 - Bags, Heat-Sealable.
MIL-D-3464 - Desiccants, Activated, Bagged, Packaging Use and Static Dehumidification.
MIL-PRF-26 - Resistors, Fixed, Wire Wound (Power Type), General Specification for.
MIL-R-93 - Resistors, Fixed, Wire Wound (Accurate), General Specification for.
MIL-PRF-914 - Resistor Networks, Fixed, Film, Surface Mount, Nonestablished Reliability, and Established Reliability, General Specification for
MIL-R-10509 - Resistors, Fixed, Film (High Stability), General Specification for.
MIL-PRF-18546 - Resistors, Fixed, Wire Wound (Power Type, Chassis Mounted), General Specification for.
MIL-PRF-22097 - Resistors, Variable, Nonwire Wound, (Adjustment Type), General Specification for.
MIL-PRF-22684 - Resistors, Fixed, Film, (Insulated), General Specification for.
MIL-PRF-23648 - Resistors, Thermal (Thermistor) Insulated, General Specification for.
MIL-PRF-27208 - Resistors, Variable, Wire Wound, Nonprecision, General Specification for.
MIL-PRF-32159 - Resistors, Chip, Fixed, Film, Zero Ohm, Industrial, High Reliability, Space Level, General Specification for.
MIL-PRF-32192 - Resistors Chip, Thermal (Thermistor), General Specification for.
MIL-PRF-39005 - Resistors, Fixed, Wire Wound (Accurate), Nonestablished Reliability, Established Reliability, General Specification for.
MIL-PRF-39007 - Resistors, Fixed, Film, Wire Wound (Power Type), Nonestablished Reliability, Established Reliability, and Space Level, General Specification for.
MIL-PRF-39009 - Resistors, Fixed, Film, Wire Wound (Power Type, Chassis Mounted), Nonestablished Reliability, and Established Reliability, General Specification for.
MIL-PRF-39015 - Resistors, Variable, Wire Wound, (Lead Screw Actuated), Nonestablished Reliability, and Established Reliability, General Specification for.
MIL-PRF-39017 - Resistors, Fixed, Film (Insulated), Nonestablished Reliability, and Established Reliability, General Specification for.
MIL-PRF-39035 - Resistors, Variable, Nonwire Wound (Adjustment Type), Nonestablished Reliability, and Established Reliability, General Specification for.
MIL-PRF-49462 - Resistors, Fixed, Film, High Voltage, General Specification for.
MIL-PRF-49465 - Resistors, Fixed, Metal Element (Power Type), (Very Low Resistance Values), General Specification for.
MIL-PRF-55182 - Resistors, Fixed, Film, Nonestablished Reliability, Established Reliability, and Space Level, General Specification for.
MIL-PRF-55342 - Resistors, Fixed, Film, Chip, Nonestablished Reliability, Established Reliability, Space Level, General Specification for.
MIL-PRF-81705 - Barrier Materials, Flexible, Electrostatic Discharge Protective, Heat-Sealable.
MIL-PRF-83401 - Resistor Networks, Fixed, Film, and Capacitor-Resistor Networks, Ceramic Capacitor and Fixed, Film Resistors, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-129 - Standard Practice for Military Marking for Shipment and Storage.
* MIL-STD-147 - Palletized Unit Loads.
MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts.
MIL-STD-1686 - Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices).
MIL-STD-2073-1 - Standard Practice for Military Packaging.
MS20003 - Indicator, Humidity, Card, Three Spot, Impregnated Areas (Cobaltous Chloride).

* (Copies of these documents are available online at https://assist.dla.mil/quicksearch/ or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, 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 the documents which are those listed in the solicitation or contract.

INTERNATIONAL ORGANIZATION for STANDARDS (ISO)

ISO/IEC 16388 - Bar Code Symbology Specification

* (Copies of this document are available from http://www.iso.org/ or from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036.)

* IPC

* IPC/JEDEC J-STD-609 - Marking and Labeling of Components, PCBs and PCBAs to Identify Lead (Pb), Pb-Free and Other Attributes.

* (Copies of these documents are available online at http://www.ipc.org or from the IPC, 3000 Lakeside Drive, 309 S, Bannockburn, IL 60015.)

AMERICAN SOCIETY FOR TESTING AND MATERIAL (ASTM)

* ASTM-D1974/D1974M - Standard Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Boxes.
ASTM-D3951 - Standard Practice for Commercial Packaging.
ASTM-D3953 - Steel and Seals, Flat, Strapping.
* ASTM-D5118/D5118M - Standard Practice for Fabrication of Fiberboard Shipping Boxes.
* ASTM-D6251/D6251M - Standards Specification for Natural Wood-Cleated-Panel Board Shipping Boxes.
ASTM-D6880-05 - Standard Specification for Wood Boxes.

* (Copies of these documents are available online at http://www.astm.org or from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania, 19428-2959.)

* 2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein (except for related, specification sheets), 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. REQUIREMENT

3.1 Shipments to Government activities.

3.1.1 General. The packaging terms used herein shall be in accordance with the definitions listed in MIL-STD-129 and MIL-STD-2073-1. The following general requirements apply, as applicable, to military and commercial packaging.

3.1.1.1 Pairs and sets. Resistors furnished in pairs or sets under one national stock number (NSN) shall be unit packed as one pair or one set, as applicable. Unless otherwise specified, unit of issue (each, pair, set, etc.) shall be individually unit packed.

3.1.1.2 Hardware. Hardware accompanying resistors shall be protected and enclosed within the unit packs in a manner that will not damage the resistors or packaging materials. When practical or when the resistors are not otherwise protected, the hardware should be mounted on each resistor.

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

* 3.1.1.4 Wrapping and cushioning of leads and terminals for non-ESD resistors. For other than axial-leaded resistors, the leads, terminals, and resistor bonds shall be protected by container design, die cut inserts, vials, or suitable noncorrosive supporting materials or devices. Leads or terminals shall extend outward and be maintained in a configuration as manufactured without causing undue loads or stresses capable of causing damage to the resistors. Materials used to maintain item position and lead configuration shall permit item removal and replacement without bending the leads. Materials used shall be noncorrosive materials and shall not crumble, flake, powder, or shed. These materials shall be in accordance with MIL-STD-2073-1, appendix J, table IV and IVa for wrapping materials, and appendix J, table V and Va for cushioning materials. No special physical protection or lead protection is required for axial leaded resistors. (NOTE: Wrapping and cushioning for ESD resistors shall be in accordance with 3.1.8 herein.)

3.1.1.5 Exterior containers. 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.

3.1.2 Preservation. Preservation shall be in accordance with military or commercial packaging, as specified (see 6.2).

3.1.2.1 Military.

3.1.2.1.1 Cleaning. Resistors and accessories shall be clean or be cleaned in accordance with MIL-STD-2073-1, table J.II.

3.1.2.1.2 Drying. Resistors and accessories shall be dry or be dried in accordance with MIL-STD-2073-1, paragraph 5.2.1.

3.1.2.1.3 Preservatives. Contact preservatives shall not be used.

3.1.2.1.4 Unit packs.

* 3.1.2.1.4.1 Hermetically sealed resistors except established reliability types. Hermetically sealed resistors (including ballast tubes) shall be individually unit packed or as specified in the contract or order in accordance with MIL-STD-2073-1 (method 10). When the net weight of resistors exceeds 5 pounds (2.268 kilograms), the unit container shall conform to ASTM-D5118/D5118M class weather resistant, style optional, special requirements.

3.1.2.1.4.2 Nonhermetically sealed resistors and all established reliability types. These resistors shall be individually unit packed in accordance with the procedures specified in table I. Unless otherwise specified in the contract, resistors conforming to MIL-PRF-39017 shall be unit packed 5 each (see 6.2).

3.1.2.1.5 Accessories (when separately acquired). Accessories, such as mounting brackets, shall be unit packed one each in accordance with MIL-STD-2073-1 (method 10). Unit pack quantities for other than one each shall be as specified (see 6.2).

3.1.2.1.6 Supplementary containers. Resistors and accessories unit packed in a bag or envelope exceeding 15 cubic inches (245.85 cubic centimeters) shall be placed within a supplementary container conforming to PPP-B-566 or PPP-B-676.

* 3.1.2.1.7 Intermediate packs. When the unit pack is a bag of any type or the unit pack is less than 64 cubic inches (1,049 cubic centimeters), uniform quantities of resistors or accessories of the same NSN shall be placed in intermediate containers conforming to PPP-B-566, PPP-B-676, or ASTM-D5118/D5118M. Intermediate containers shall contain multiples of five unit packs not to exceed 100 unit packs. No intermediate packs are required when the total quantity shipped to a single destination will result in only one intermediate pack per shipping container.

3.1.2.2 Commercial packaging. Commercial packaging preservation shall conform to ASTM-D3951.

3.1.3 Packing. Packing shall be military level A, military level B or minimal packing (see 6.2).

* 3.1.3.1 Military level A. Resistors and accessories, preserved as specified in 3.1.2 shall be packed in wood containers conforming to ASTM-D6251/D6251M, overseas type or ASTM-D6880-05, class 2. Closure and strapping shall be in accordance with the applicable container specification except that metal strapping shall conform to ASTM-D3953. The requirements for military level B packing shall be used when the total quantity of a stock numbered resistor or accessory for a single destination does not exceed a packed volume of 1 cubic foot (0.02832 cubic meter).

* 3.1.3.2 Military level B. Resistors and accessories, preserved as specified in 3.1.2, shall be packed in fiberboard containers conforming to ASTM-D5118/D5118M (class weather resistant, style optional, special requirement). The requirements for box closure, waterproofing, and reinforcing shall be in accordance ASTM-D1974/D1974M (method V).

TABLE I. Unit pack requirements for resistors intended for shipment to Government facilities.

Type	Physical protection	Unit pack	Bag/material construction	Marking	Additional requirements
ESD sensitive resistors					
Film chips MIL-PRF-55342 MIL-PRF-32159	Pouch made from MIL-PRF-81705, type II or type III material.	1 1	Heat sealed MIL-DTL-117 bag, type I, class F, style I. Made from MIL-PRF-81705 material.	See 3.1.5	See 3.1.2.1.6 and 3.1.3
Film networks MIL-PRF-914 MIL-PRF-83401	MIL-STD-2073-1 formed support with surface resistivity $<10^{12}$ ohms per square.	1 1	See film chips.		
Ultra precision, axial leads MIL-PRF-55182	No requirements.	1	See film chips.		
Non-ESD sensitive resistors					
Axial lead, film composition MIL-R-10509 MIL-PRF-22684 MIL-PRF-39017 MIL-PRF-49462	No requirements.	1 1 5 1	Heat sealed MIL-DTL-117 type I, class E, style 1, 2, or 3; type I.	See 3.1.5	See 3.1.2.1.6 and 3.1.3
Axial lead, fixed and variable (including lug types) MIL-PRF-26 MIL-R-93 MIL-PRF-18546 MIL-PRF-39005 MIL-PRF-39007 MIL-PRF-39009 MIL-PRF-49465	No requirements.	1 1 1 1 1 1 1	Same as axial lead, film		
Temperature sensitive MIL-PRF-23648 MIL-PRF-32192	No requirements.	1 1	Same as axial lead, film		
Variable, trim pots, excluding those with antifriction bearings MIL-PRF-22097 MIL-PRF-27208 MIL-PRF-39015 MIL-PRF-39035	No requirements.	1 1 1 1	Same as axial lead, film		
Variable with antifriction bearings	MIL-STD-2073-1, method 51, cushioning in accordance with 3.1.1.4, MIL-D-3464 desiccant, MS20003 humidity indicator	1	Same as axial lead, film		

3.1.3.3 Minimal packing. Minimal packing shall conform to ASTM-D3951 (class domestic style optional, special requirements).

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

* 3.1.4.1 Military level A. Resistors, packed as specified in 3.1.3.1, shall be unitized on pallets in accordance with MIL-STD-147 load type I, with a wood cap (storage aid 5) positioned over each load.

3.1.4.2 Military level B. Resistors, packed as specified in 3.1.3.2, shall be unitized as specified in 3.1.4.1 except that weather resistant fiberboard caps (storage aid 4) shall be used in lieu of wood caps.

3.1.4.3 Commercial unitized. Commercial unitized shall conform to ASTM-D3951.

3.1.5 Marking. The following marking is mandatory for shipments both to United States Government and non-Government activities.

* 3.1.5.1 Standard marking. In addition to any special or other identification marking required by the contract (see 6.2), each unit, supplementary, intermediate, and exterior container and unitized load shall be marked in accordance with the latest revision and notices of MIL-STD-129. The complete military or contractor's type or Part or Identifying Number (PIN), as applicable, shall be marked on all unit and intermediate packs in accordance with the identification marking provisions of MIL-STD-129. When specified in the contract (see 6.2), the marking of domestic shipments for civil agencies shall be in accordance with FED-STD-123.

3.1.5.2 Special marking. In addition to the marking requirements of 3.1.5.1, and regardless of the level or type of packaging specified of the unit, supplementary, intermediate, and exterior containers and unitized loads for those resistors specified in 3.1.8 shall be marked with the sensitive electronic device unit pack label and the sensitive electronic device caution label (as applicable) specified in MIL-STD-129.

3.1.5.3 Additional unit pack marking of FSC 5905 commodity specification resistors. Unit packs of resistors conforming to FSC 5905 commodity specifications shall additionally be marked with the following:

a. Date code and (when authorized) JAN marking.

b. Manufacturer's production lot code.

* c. E-code marking per IPC/JEDEC J-STD-609, if applicable.

3.1.5.4 Small item additional unit pack marking. MIL-PRF-55342 resistor unit packs shall contain the warning statement "Use caution when opening, item is very small and may require magnification to be seen." The warning statement shall be applied by label or by marking so as to be readily visible before opening the bag.

3.1.6 First article and conformance inspections. First article and conformance inspections and tests shall be required as specified in 4.3, 4.4 and 4.5, respectively. Samples for these tests shall be furnished in accordance with the procedures outlined in 4.4 and 4.5. The performance of the visual and dimensional inspections, rough handling tests, and leakage tests shall conform to the inspections and test outlined in 4.5.1, 4.5.2.1, and 4.5.2.2, respectively.

3.1.6.1 Functional requirements.

3.1.6.1.1 Rough handling test (when specified, see 6.2). When packs have been tested in accordance with 4.5.2.1, 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 resistors and associated accessories within the tested packs shall show no visible signs of damage. When specified in the contract (see 6.2), functional tests in accordance with the group A inspection requirements of the applicable commodity specification shall be conducted on those resistors subjected to the rough handling test to determine freedom from operational malfunction. The examination of the resistors tested under this group A inspection shall be in accordance with the visual and mechanical inspection requirements specified in the applicable resistor commodity specification.

3.1.6.1.2 Leakage test (when applicable). When a barrier enclosed unit pack has been tested in accordance with 4.5.2.2, there shall be no evidence of moisture within the unit pack.

* 3.1.7 Army acquisition (additional requirements for military and commercial unit packs). The quantity per unit pack (QUP) shall be one, except as specified in 3.1.2.1.4. Unit and supplementary containers conforming to ASTM-D5118/D5118M shall be utilized in lieu of PPP-B-566 or PPP-B-676 containers.

* 3.1.7.1 Military and commercial intermediate packs. Units packed in containers less than 64 cubic inches and bearing the same NSN, shall be placed in intermediate containers conforming to ASTM-D5118/D5118M (class weather-resistant). Commercial intermediate containers shall conform to ASTM-D5118/D5118M (class domestic). 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.

* 3.1.7.2 Military level A, level B, and minimal packing. For wood containers conforming to ASTM-6251/D6251M or ASTM-D6880-05, 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 inches (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 3.1.4 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 (0.5563 cubic meter); and the container size permits use of one of the pallet patterns of MIL-STD-147. A quantity of containers, packed as specified, except that container strapping may be omitted, shall be placed on a pallet, load type I conforming to MIL-STD-147. For military level B and minimal, 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 (type I, finish A) or shrink film conforming to A-A-3174 (type IV). Stretch wrap in accordance with MIL-STD-147 is authorized for shipments within the continental United States and for containerized shipments. Radio frequency identification device pallet tag and identification shall be place on top of the shrink film for easier reading.

3.1.7.3 Bar code marking. Bar code markings are required and shall be applied in accordance with MIL-STD-129 and ISO/IEC 16388.

3.1.8 Electrostatic discharge (ESD) protection for resistors. A list of the Department of Defense specifications for resistors that are sensitive to ESD is shown in table II. ESD sensitivity classification, definitions, and ESD control program requirements are defined in MIL-STD-1686.

* 3.1.8.1 ESD protection for level of preservation military and commercial. Resistors that are susceptible to electrostatic field forces shall be placed individually within barrier material conforming to MIL-PRF-81705 (type I) and heat sealed.

3.1.8.1.1. Bag material. Bags constructed to comply with ESD requirements shall be in accordance with MIL-DTL-117 (type I, Class F, style 1). In addition, MIL-PRF-81705 (type II or type III material) is acceptable for DoD shipments.

TABLE II. Specification, styles, and PIN for ESD sensitive resistors.

Specification	Style designator	PIN		Specification	Style designator	PIN
MIL-PRF-55342				MIL-PRF-32159		
/1	RM0502	M55342*01******		/1	RCZ0502	M32159*01*
/2	RM0505	M55342*02******		/2	RCZ0505	M32159*02*
/3	RM1005	M55342*03******		/3	RCZ1005	M32159*03*
/4	RM1505	M55342*04******		/4	RCZ1505	M32159*04*
/5	RM2208	M55342*05******		/5	RCZ2208	M32159*05*
/6	RM0705	M55342*06******		/6	RCZ0705	M32159*06*
/7	RM1206	D55342*07******		/7	RCZ1206	M32159*07*
/8	RM2010	M55342*08******		/8	RCZ2010	M32159*08*
/9	RM2512	M55342*09******		/9	RCZ2512	M32159*09*
/10	RM1010	M55342*10******		/10	RCZ1010	M32159*10*
/11	RM0402	M55342*11******		/11	RCZ0402	M32159*11*
/12	RM0603	M55342*12******		/12	RCZ0603	M32159*12*
/13	RM0302	M55342*13******		/13	RCZ0302	M32159*13*
MIL-PRF-914				MIL-PRF-55182		
/3	RNS030	M914*03********		/1	RNC55	RNC55*******
/4	RNS040	M914*04********		/1	RNN55	RNN55*******
/5	RNS050	M914*05********		/1	RNR55	RNR55*******
MIL-PRF-83401				/2	RNC57	RNC57*******
/1	RZ010	M8340101*******		/2	RNN57	RNN57*******
/2	RZ020	M8340102*******		/2	RNR57	RNR57*******
/3	RZ030	M8340103*******		/3	RNC60	RNC60*******
/4	RZ040	M8340104*******		/3	RNN60	RNN60*******
/5	RZ050	M8340105*******		/3	RNR60	RNR60*******
/6	RZ060	M8340106*******		/5	RNC65	RNC65*******
/7	RZ070	M8340107*******		/5	RNN65	RNN65*******
/8	RZ080	M8340108*******		/5	RNR65	RNR65*******
/9	RZ090	M8340109*******		/6	RNC70	RNC70*******
/10	RZ100	M8340110*******		/6	RNN70	RNN70*******
/13	RZ130	M8340113*******		/6	RNR70	RNR70*******
/14	RZ140	M8340114*******		/7	RNC50	RNC50*******
/15	RZ150	M8340115*******		/7	RNN50	RNN50*******
/18	RZ180	M8340118*******		/7	RNR50	RNR50*******
/19	RZ190	M8340119*******		/10	RNC75	RNC75*******
/21	RZ210	M8340121*******		/10	RNN75	RNN75*******
/22	RZ220	M8340122*******		/10	RNR75	RNR75*******
/23	RZ230	M8340123*******		/11	RNC51	RNC51*******
/24	RZ240	M8340124*******		/11	RNN51	RNN51*******
				/11	RNR51	RNR51*******
				/12	RNC56	RNC56*******
				/12	RNN56	RNN56*******
				/12	RNR56	RNR56*******

3.2 Shipment to non-Government activities.

3.2.1 Non-ESD sensitive resistors. Shipments to original equipment manufacturers (OEM) and packaging distributors shall be in accordance with good commercial practices (see table III).

3.2.2 ESD sensitive resistors. Shipment of ESD sensitive resistors to OEM's and packaging distributors shall conform to the following requirements as shown in table III.

3.2.2.1 Packaging material surface resistivity. Tape and reel, waffle pack, and other type carriers used in packaging shall have a surface resistivity of less than 10^{12} ohms per square inch.

* 3.2.2.2 Container. Tape and reel, waffle pack, and other type carriers used in packaging, if required, shall be placed in a bag conforming to MIL-DTL-117 (type I, class F, style 1) using barrier material conforming to MIL-PRF-81705 (type I) as specified (see 6.2.2).

3.3 Recycling, 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 promoted economically advantages life cycle costs.

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

a. Materials inspection (see 4.2).

b. First article inspection (see 4.3).

c. Conformance inspection (see 4.4).

4.1.1 Inspection conditions. All inspections shall be performed in accordance with the test conditions specified in the "GENERAL REQUIREMENTS" of MIL-STD-202.

4.2 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.

TABLE III. Shipment to non-Government facilities.

Type	Physical protection	Bag/material construction	Marking
ESD sensitive resistors			
Film chips MIL-PRF-55342 MIL-PRF-32159 (tape and reel) (waffle pack)	Use materials with surface resistivity less than 10^{12} ohms per square. Use carrier pack and top material with surface resistivity less than 10^{12} ohms per square	Tape and reel wrapped in MIL-PRF-81705 type I, II, or III material, if required (see 6.2.2). Waffle pack made of or wrapped in MIL-PRF-81705 type I, II, or III material, if required (see 6.2.2).	See 3.1.5
Film networks MIL-PRF-914 MIL-PRF-83401 (tube pack)	Same as film chip	Tube packs made of or wrapped in MIL-PRF-81705 type I, II, or III material, if required (see 6.2.2).	
Ultra precision, axial leads MIL-PRF-55182 (tape and reel) (bulk)	No requirements. No requirements.	Box or bag wrapped in MIL-PRF-81705 type I, II, or III material, if required (see 6.2.2). Box or bag wrapped in MIL-PRF-81705 type I, II, or III material, if required (see 6.2.2).	
Non-ESD sensitive resistors			
Axial lead, film composition MIL-R-10509 MIL-PRF-22684 MIL-PRF-39017 MIL-PRF-49462 (tape and reel) (bulk)	No requirements. No requirements.	No requirements. No requirements.	See 3.1.5
Axial lead, fixed and variable (including lug types) MIL-PRF-26 MIL-R-93 MIL-PRF-18546 MIL-PRF-39005 MIL-PRF-39007 MIL-PRF-39009 MIL-PRF-49465	No requirements.	No requirements.	
Temperature sensitive MIL-PRF-23648 MIL-PRF-32192	No requirements.	No requirements.	
Variable, trim pots, excluding Those with antifriction bearings MIL-PRF-22097 MIL-PRF-27208 MIL-PRF-39015 MIL-PRF-39035	No requirements.	No requirements.	
Variable with antifriction bearings	MIL-STD-2073-1, method 51, cushioning in accordance with 3.1.1.4, MIL-D-3464 desiccant, MS20003 humidity indicator	No requirements.	

4.3 First article inspection. When 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 no changes in materials, processes, or packaging design that will adversely affect item protection since the last recorded inspection.

b. When detailed packaging instructions are furnished by the acquisition activity.

c. When commercial packaging is specified.

d. When a prior successful inspection was conducted on a like item and pack (subject to the approval of the administrative contracting officer).

4.3.1 Sample size. One sample unit consisting of military level A or level B, as applicable, fully packed shipping container shall be submitted for first article inspection. The sample for the rough handling test shall consist of the pack selected for first article inspection. The sample for the leakage test shall be five unit packs selected at random from the first article exterior pack (shipping container).

4.3.2 Inspection routine. The sample shall be subjected to the inspections specified in table IV and table V. The leakage test, when applicable, shall follow the rough handling test.

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

4.3.4 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.

4.4 Conformance inspection. This inspection shall consist of the inspections and tests specified in table IV and table V.

4.4.1 Shipments to Government activities.

4.4.1.1 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 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.

4.4.1.2 Visual and dimensional inspection. Visual and dimensional inspection shall consist of those inspections specified in table IV.

TABLE IV. Visual and dimensional inspections.

Major defects	Requirement paragraph	Method paragraph
Preservation and packing materials not conforming to referenced specification requirements	3.1.1, 3.1.2, 3.1.3, and 3.2	4.5.1
Improper field force protection (shielding)	3.1.8 and 3.2	
Punctured or improperly fabricated barrier bag	3.1.1.4 and 3.2	
Uncleaned or improperly cleaned items	3.1.2.1.1 and 3.2	
Incorrect preservation method	3.1.2.1.3 and 3.2	
Wrong quantity per unit pack	3.1.2.1.4	
Nonusable or incorrect kind or application of intermediate containers	3.1.2.1.7 and 3.2	
Improper box closures	3.1.3 and 3.2	
Omitted, incorrect, or illegible marking	3.1.5 and 3.2	

4.4.1.3 Sample plan. A sample of five packages shall be randomly selected. If one or more defects are found, the inspection lot shall be screened and the defective packages removed. A new sample of five packages shall be randomly selected. If any defects are found in the second sample, the inspection lot shall be rejected and shall not be supplied to the resistor specification.

4.4.1.4 Disposition of sample units. Sample units which have passed all the inspection specified in table IV may be delivered on the contract, provided the lot is accepted.

4.4.2 Shipments to non-Government facilities. Shipments to non-Government facilities shall be for the visual and dimensional inspections specified in table IV.

4.4.3 Functional inspection. Functional inspection shall consist of the tests specified in table V.

TABLE V. Functional inspections.

Test	Requirement paragraph	Method paragraph
Rough handling (when specified)	3.1.6.1.1	4.5.2.1
Leakage (when applicable)	3.1.6.1.2	4.5.2.2

4.4.3.1 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 (see MIL-STD-2073-1 packaging design validation provisions).

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.

c. The leakage test shall also be performed following the rough handling test on unit packs requiring waterproof water-vapor proof barriers. Five containers (if less than five) shall be selected.

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

4.4.3.3 Disposition of sample units. Sample units which have passed the inspections specified in table V may be delivered on the contract, if the lot is accepted and opened packs have been reprocessed.

4.4.3.4 Noncompliance. If a sample fails to pass the inspections specified in table IV, the contractor shall take corrective action on the materials or processes or both, as warranted, on all units, intermediate, and exterior (shipping) packs which can be corrected and which were processed under essentially the same conditions, with essentially the same materials, and which are considered subject to the same failure. Acceptance of the unit, intermediate, and exterior packs shall be discontinued until corrective action has been taken and the applicable inspections specified in table IV have been repeated on additional sample units (all inspections or the inspection which the original sample failed, at the option of the Government). Inspections specified in table IV may be reinstituted; however, final acceptance shall be withheld until the reinspection in accordance with table IV has shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure and corrective action taken shall be furnished to the administrative contracting officer.

4.5 Methods of inspections and tests.

4.5.1 Visual and dimensional inspections. Unit, intermediate, and exterior packs shall be examined to verify that the materials, designs, methods, physical limitations, marking, and workmanship are in accordance with the applicable requirements (see 3.1.1 through 3.1.8).

4.5.2 Functional tests.

4.5.2.1 Rough handling. Packs shall be subjected to the applicable rough handling tests and the interpretation of results or cause for rejection as specified in 3.1.6.1.1 and MIL-STD-2073-1.

4.5.2.2 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 as specified in 3.1.6.1.2 and MIL-STD-2073-1.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When 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, packaging, packing, and marking specified herein are intended for direct shipments to the Government and to OEM packaging distributors. Unless otherwise designated, the general requirements (3.1) and marking requirements (3.1.5) are applicable for the preparation of military specification on resistors and accessories for shipment from the parts manufacturer to non-Government facilities.

6.2 Acquisition requirements.

6.2.1 Shipments to Government activities. Acquisition documents should specify the following:

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

b. Levels of preservation and packing (see 3.1.2 and 3.1.3).

c. Quantity per unit pack, if other than specified (see 3.1.2.1.4).

d. If a unitized load is not required for shipment to one destination when total quantities are equal to 40 cubic feet or more (see 3.1.4).

e. Whether any other standard or special marking is required (see 3.1.5).

f. If FED-STD-123 is required for civil agency marking (see 3.1.5.1).

g. If a rough handling test is required (see 3.1.6.1.1).

h. If resistor functional tests are required (see 3.1.6.1).

i. If the contractor is not responsible for the performance of all inspection requirements (see 4.1).

j. If first article inspection is not required (see 4.3).

6.2.2 Shipments to non-Government activities. Acquisition documents should specify the following:

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

b. Levels of preservation and packing and specify the packaging material to be used if the material is sensitive to ESD charges (MIL-STD-1686).

c. Whether any standard or special markings are required.

d. Quantity per unit pack.

6.3 Inspection for first article. The sample pack submitted for first article inspection (when satisfactorily performed as specified in 4.3) will serve as the production standard for subsequent packaging operations. The contractor should inform the acquisition activity or the activity administering the contract of the time and location of the inspection so that the Government representative will have an opportunity to witness the tests.

6.4 Definition. A hermetic seal is defined as a fusion of metal to metal, glass to glass or metal to glass.

6.5 Subject term (key word) listing.

Electrostatic discharge protection
Environmental field force protection
Film resistors
Fixed resistors
Hermetically sealed resistors
Nonhermetically sealed resistors
Packing
Physical protection
Preservation
Resistor accessories
Resistor chips
Resistor networks
Shielding
Special marking
Variable resistors

* 6.6 Amendment notations. The margins of this specification are marked with asterisks to indicate modifications generated by this amendment. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations.

Custodians:
Army - CR
Navy -EC
Air Force - 85
DLA - CC

Preparing activity:
DLA - CC

Review activities:
Army - AR, AT, MI, SM
Navy - SH
Air Force – 99

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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 https://assist.dla.mil.