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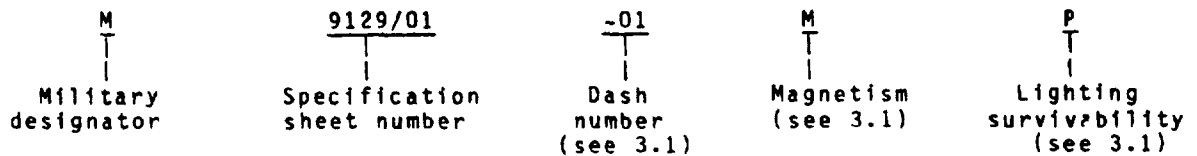
MILITARY SPECIFICATION
 DISCHARGERS, ELECTROSTATIC
 GENERAL SPECIFICATION FOR

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

1. SCOPE

1.1 Scope. This specification covers the general requirements for aircraft electrostatic dischargers used to reduce radiofrequency electromagnetic interference associated with the discharge of aircraft electrostatic charges.

1.2 Military part number. The military part number shall be constructed as follows:



2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

FEDERAL

QQ-S-781	- Strapping, Steel, and Seals.
PPP-B-566	- Box, Folding, Paperboard.
PPP-B-601	- Boxes, Wood, Cleated-plywood.
PPP-B-621	- Boxes, Wood, Nailed and Lock-corner.
PPP-B-636	- Boxes, Shipping, Fiberboard.
PPP-B-676	- Boxes, Setup.

MILITARY

MIL-P-116	- Preservation, Methods of.
MIL-G-5572	- Gasoline, Aviation, Grades 80/87, 100/130, 115/145.
MIL-H-5606	- Hydraulic Fluid, Petroleum Base; Aircraft, Missile, and Ordnance.
MIL-T-5624	- Turbine Fuel, Aviation, Grades JP-4 and JP-5.
MIL-D-83411	- Deicer/anti-icer Fluid (For Runways And Taxiways).

(See supplement 1 for applicable specification sheets.)

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: 2750 ABW Support Division, Gentile AFS, OH 45444; by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

MIL-D-9129D

STANDARDS

FEDERAL

FED-STD-H28 - Screw-Thread Standards for Federal Services.

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
 MIL-STD-129 - Marking for Shipment and Storage.
 MIL-STD-147 - Palletized Unit Loads Validated Oct 1974.
 MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts.
 MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of.
 MIL-STD-831 - Test Reports, Preparation of.
 MIL-STD-889 - Dissimilar Metals.
 MIL-STD-1285 - Marking of Electrical and Electronic Parts.
 MIL-STD-1757 - Lightning Qualification Test Techniques for Aerospace
 Vehicles and Hardware.
 MIL-STD-45662 - Calibration Systems Requirements.

2.1.2 Other Government drawings. The following other government drawings, form a part of this specification to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation.

DRAWINGS

AIR FORCE

7136810 - Tester Assembly, Static Discharger

NAVY

NAVAIR 01-S3AAA-2-3.14 - Testing and Troubleshooting, Avionic Systems, Non-acoustical Sensors, Electronic Countermeasures, Navigation Automated Flight Control and Communications, S3 Aircraft Organizational Maintenance.

(Copies of the specifications, standards, and drawings required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheets. In the event of any conflict between requirements of this specification and the specification sheets, the latter shall govern.

3.2 Qualification. Dischargers furnished under this specification shall be products which are authorized by the qualifying activity for listing on the applicable qualified products list at the time set for opening of bids (see 4.4 and 6.3).

3.2.1 Product modification. Dischargers, qualified under the provisions of this specification, shall not be subsequently altered in manufacture by substitution of materials, design or any other manner to the extent that compliance with the requirements of this specification could be affected.

MIL-D-9129D

3.3 First article inspection. Unless otherwise specified (see 4.5), dischargers furnished under this specification, not covered by specification sheets, shall be a product which has been tested and passed all applicable inspections specified in 4.4.

3.3.1 Information to be furnished with sample. The applicable information, outlined in 6.4, shall be furnished with the sample together with any other pertinent information as required by the Government.

3.4 Materials. Materials shall be as specified herein and the applicable specification sheet (see 3.1). Materials which are not specifically designated shall be inherently fungus resistant and possess such other overall characteristics as to provide for the furnished discharger to meet the requirements of this specification. Acceptance or approval of any constituent material shall not be construed as a guaranty of the acceptance of the finished product.

3.4.1 Metals. All metals used in the construction of the dischargers covered by this specification shall be corrosion resistant or protectively treated to resist corrosion in consonance with the performance requirements specified herein. When dissimilar metals are used in contact with each other, protection against electrolysis and corrosion shall be provided. Metal plating or metal spraying of dissimilar base metals to provide similar or suitable abutting surfaces is permitted. Dissimilar metals are defined in MIL-STD-889.

3.4.2 Nonmetallic materials. Nonmetallic materials and coatings shall not crack, chip, or otherwise deteriorate under temperature extremes, vibration, shock, and moisture conditions. Current carrying, nonmetallic materials shall provide permanent conductivity to the degree that will assure that the complete discharger meets the requirements of this specification.

3.5 Design and construction. Dischargers covered by this specification shall be of the design, construction, and physical dimensions specified herein and in the individual specification sheet (see 3.1).

3.5.1 Mounting. The type of mounting shall be as specified in the individual specification sheet (see 3.1).

3.5.1.1 Adhesives. Dischargers depending upon adhesives for attachment to the aircraft shall be so designed that the tip or body assemblies may be replaced without detachment or replacement of the mounting bracket or base.

3.5.2 Screw threads. Screw threads on removable parts shall be in accordance with FED-STD-H28.

3.6 Performance. Unless otherwise specified (see 3.1), static dischargers shall meet the following performance requirements.

3.6.1 Discharge current. Unless otherwise specified (see 3.1), the discharge current shall be not less than 10 microamperes at a potential difference of 40 kV, applied across 6 inch spacing between the discharger tip and the grounded plate as in figure 1. (see 4.7.2.1).

3.6.2 Radio frequency discharge noise. Unless otherwise specified (see 3.1), the radio frequency total noise voltage (root mean square (rms) value of radio frequency generated and coupled by a discharger while it is discharging current at a rate of 50 microamperes shall be a minimum of either 40 dB (for trailing edge types) or 30 dB (for wing tip types) below the simulated trailing edge when measured in accordance with paragraph 4.7.2.2.

3.6.2.1 Noise voltage peaks. Any peaks of noise voltage at discrete frequencies within the passband shall not exceed the mean noise voltage by more than 20 dB, nor shall this level be permitted to occupy more than 10 percent of total passband width.

MIL-D-9129D

3.6.3 Continuous discharge. Continuous discharge capability shall be a minimum of 50 microamperes for a period of not less than 24 hours without material breakdown or other damage, and shall be capable of meeting the discharge current and radio frequency noise requirements subsequent to the continuous discharge test (see 3.6.1, 3.6.2, and 4.7.2.3).

3.6.4 High discharge current (see 3.1). The resistive portion of the discharger shall be capable of carrying 5 successive applications of current of 400 microamperes for 5 second duration and shall remain within specified resistance limits after the temperature stabilizes back to the pretest conditions (see 4.7.2.4). The test discharger shall be considered to fail this test if the current changes more than 10 percent during the specified 5 seconds "on" interval or if the current level changes more than 5 percent between successive applications of current when specified by "off" intervals of 60 seconds. The test discharger shall also be considered to fail this test if the current flow as indicated by the oscilloscope shows irregularities of "noise" other than that directly due to power supply output voltage ripple.

3.6.5 Electrical flashover. The discharger resistance shall remain within specified resistance limits when tested in accordance with 4.7.3. The dischargers shall be capable of meeting the discharge current and radio frequency discharge noise requirements subsequent to the flashover test (see 3.6.1 and 3.6.2).

3.6.6 Direct current resistance. The resistance of dischargers measured from discharge points to discharger mounting base shall be at 25°C and sea level (see 4.7.4):

- a. Trailing edge mounted = 6 to 200 megohms.
- b. Tip mounted = 6 to 120 megohms.
- c. Resistance shall be measured with a 500 volt minimum megohmmeter.

3.6.6.1 Resistance (-60°C to +45°C). The resistance of dischargers shall remain within specified limits when measured at the extreme temperatures of -60°C and +45°C, compared to the resistance measured at 25°C (see 4.7.4).

3.6.7 Lightning transfer. Dischargers are to be tested for lightning transfer characteristics between the discharger holder section and a simulated aircraft skin (see 4.7.5). MIL-STD-1757, test method T02, zone 2A will be used. The current will be passed through the discharger holder and into the simulated skin. After the passing of the above current, the discharger and holder assembly (if applicable) shall remain intact (see 4.7.5).

3.6.8 Vibration. Dischargers shall be capable of withstanding high frequency vibration without physical damage when tested as specified in 4.7.6.

3.6.9 Shock. Dischargers shall be designed and constructed to withstand specified shock load with no physical damage (see 4.7.7).

3.6.10 Solvent resistance. Dischargers shall show no signs of deterioration from solvent materials when tested as specified in 4.7.8.

3.6.11 Thermal shock. Temperature extremes specified in 4.7.9 shall not result in any damage, or alter the function or operation of any of the dischargers covered by this specification.

3.6.12 Salt spray (corrosion). There shall be no evidence of excessive corrosion. Excessive corrosion is defined as that which interferes with the electrical or mechanical performance, or in the case of plated metals, corrosion which has passed through the plating and attacked the base metal. There shall be no warping, cracking, or other electrical or mechanical damage to the discharger (see 4.7.10).

MIL-D-9129D

3.6.13 Tension. All dischargers shall be so designed and constructed that their attachment into end components and onward into the mounting adapter (if any) shall withstand without damage a load applied as in 4.7.11. The discharger tip assembly shall similarly withstand a load of 10 pounds.

3.6.14 Sand and dust. When tested as specified in 4.7.12, dischargers shall be capable of withstanding sand and dust. There shall be no evidence of excessive abrasion which will interfere with the electrical or mechanical performance. There shall be no evidence of warping, cracking or other electrical or mechanical damage to the discharger (see 4.7.12).

3.6.15 Magnetism. In order for a discharger to qualify as a non-magnetic discharger, it must pass the test specified in 4.7.13.

3.6.16 Lightning survivability. In order to qualify as a lightning survivable discharger a unit must be tested per MIL-STD-1757, test method T02, zone 1A. Following completion of this test, the unit shall remain intact and shall meet the requirements of paragraphs 3.6.1 and 3.6.2 (see 4.7.14).

3.7 Marking. Dischargers shall be permanently and legibly marked in accordance with MIL-STD-1285 and shall include the following information:

- a. Military part number.
- b. Manufacturer's part number and name is optional.
- c. Manufacturer's CAGE.
- d. Date code. The date code shall consist of "MFD", followed by a four-digit number in which the first two digits indicate the month and the last two digits indicate the year; i.e., "MFD-0564" indicates a unit manufactured in May of 1964.

3.8 Workmanship. Dischargers shall be processed in such a manner as to be uniform in quality and shall be free from cracked, loose, or displaced parts, sharp edges, burrs, and other defects that will affect life, serviceability, or ability to meet the requirements of this specification.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.1.2 Test equipment and inspection facilities. Test equipment and inspection facilities shall be of sufficient accuracy, quality, and quantity to permit performance of the required inspection. The manufacturer shall establish calibration of inspection equipment to the satisfaction of the Government. Calibration of the standards which control the accuracy of inspection equipment shall comply with the requirements of MIL-STD-45662.

MIL-D-91290

4.1.3 Mounting for test. Unless otherwise specified, the dischargers shall be mounted by the normal method, including the use of appropriate adhesives if applicable. Non-integral dischargers shall be tested with all applicable holders as specified in the specification sheets.

4.2 Classification of inspection. The inspection requirements specified herein are classified as follows

- a. Qualification inspection (see 4.4).
- b. First article inspection for dischargers not covered by specification sheets (see 4.5).
- c. Quality conformance inspection (see 4.6).

4.3 Inspection conditions. Unless otherwise specified herein, all inspections shall be performed in accordance with the test conditions specified in the "GENERAL REQUIREMENTS" of MIL-STD-202.

4.4 Qualification inspection. Qualification inspection shall be performed at a laboratory acceptable to the Government (see 6.3) on sample units produced with equipment and procedures normally used in production.

4.4.1 Sample. Unless otherwise specified, 10 dischargers (see 3.1) for which qualification is sought, shall be submitted for qualification inspection. The sample shall be taken from a production run or shall be produced with equipment and procedures normally used in production. An additional two samples shall be required for dischargers being qualified to include the magnetism characteristic (see 3.6.15). An additional two samples shall be required for dischargers being qualified to include the lightning survivability characteristic (see 3.6.16).

4.4.2 Inspection routine. The sample units shall be subjected to the qualification inspection specified in table I in the order shown. All sample units shall be appropriately coded or otherwise identified to indicate the tests to which each was subjected. All units shall be subjected to the group I inspection. After group I inspection, the sample units shall be divided and subjected to inspection specified in table I. Non-integral dischargers that can interface with multiple holders shall be subject to the applicable tests in table I with only one of those holders. After completion of the tests in table I with one of the holders, dischargers shall be tested for vibration, lightning transfer and salt spray with each additional holder listed in the specification sheets. There shall be two sample units subjected to vibration, lightning transfer and salt spray, tested sequentially in that order.

4.4.3 Failure. Failure in any of the applicable inspection elements shall be cause for refusal to grant qualification.

4.4.4 Retention of qualification. To retain qualification, the manufacturer shall forward a report at 24-month intervals to the qualifying activity. The qualifying activity shall establish the initial reporting date. The report shall consist of

- a. A summary of the results of the tests performed for inspection of product for delivery, (groups A and B), indicating as a minimum the number of lots that have passed and the number that have failed and the group which they failed. The results of tests of all reworked lots shall be identified and accounted for.
- b. A summary of the results of tests performed for periodic inspection (group C), including the number and mode of failures. The summary shall include results of all periodic inspection tests performed and completed during the 24-month period. If the summary of the test results indicates nonconformance with specification requirements, and corrective action acceptable to the qualifying activity has not been taken, action may be taken to remove the failing product from the qualified products list.

Failure to submit the report within 30 days after the end of each 24-month period may result in loss of qualification for the product. In addition to the periodic submission of inspection data, the contractor shall immediately notify the qualifying activity at any time during the 24-month period that the inspection data indicates failure of the qualified product to meet the requirements of this specification.

MIL-D-9129D

In the event that no production occurred during the reporting period, a report shall be submitted certifying that the company still has the capabilities and facilities necessary to produce the item. If during two consecutive reporting periods there has been no production, the manufacturer may be required, at the discretion of the qualifying activity, to submit the products to testing in accordance with the qualification inspection requirements.

4.4.5 Submission of test data and samples. Unless otherwise specified, the tested dischargers along with a test report covering the associated qualification or first article test shall be submitted to the activity responsible for qualification (see 6.3). The test report shall be prepared in accordance with MIL-STD-831. The tested dischargers shall be identified to indicate the applicable tests to which each has been subjected. The Government reserves the right to require the manufacturer to furnish additional untested samples.

4.5 First article inspection. First article inspection shall be performed for dischargers not covered by specification sheets. First article inspection shall be performed by the manufacturer after award of the contract and prior to production at a laboratory acceptable to the government. First article inspection shall be identical to that required for qualification.

4.6 Quality conformance inspection.

4.6.1 Inspection of product for delivery. Inspection of product for delivery shall consist of groups A and B.

4.6.1.1 Inspection lot. An inspection lot shall consist of all dischargers of the same type produced under essentially the same conditions, and offered for inspection at one time. The lot may include the entire contract quantity, or it may be the production of any convenient time period at the choice of the Government inspector.

4.6.1.2 Group A inspection. Group A inspection shall consist of the inspections specified in table II, in the order shown.

4.6.1.2.1 Sampling plan. A sample of dischargers shall be selected from each inspection lot in accordance with MIL-STD-105. The acceptable quality level (AQL) shall be 1.0 percent defective. Unless otherwise specified in the contract or order, normal inspection level II shall be used at the start of the contract.

4.6.1.2 Rejected lots. If an inspection lot is rejected, the manufacturer may rework it to correct the defects, or screen out the defective units, and resubmit for inspection. Such lots shall be kept separate from new lots and shall be clearly identified as reinspected lots. Resubmitted lots shall be inspected using tightened inspection.

TABLE I. Qualification inspection.

Inspection	Requirement paragraph	Test method paragraph
<u>Group I (all sample units)</u>		
Visual and mechanical inspection	3.1, 3.4, 3.5, 3.7 and 3.8	4.7.1
Discharge current	3.6.1	4.7.2.1
Radio frequency discharge noise	3.6.2	4.7.2.2
<u>Group II (2 sample units)</u>		
Continuous discharge	3.6.3	4.7.2.3
Discharge current	3.6.1	4.7.2.1
Radio frequency discharge noise	3.6.2	4.7.2.2

MIL-D-9129D

TABLE I. Qualification inspection - Continued.

Inspection	Requirement paragraph	Test method paragraph
<u>Group III (2 sample units)</u>		
Electrical flashover	3.6.5	4.7.3
Discharge current	3.6.1	4.7.2.1
Radio frequency discharge noise	3.6.2	4.7.2.2
Lightning transfer	3.6.7	4.7.5
<u>Group IV (2 sample units)</u>		
Direct current resistance	3.6.6	4.7.4
High discharge current	3.6.4	4.7.2.4
Radio frequency discharge noise	3.6.2	4.7.2.2
<u>Group V (2 sample units)</u>		
Vibration	3.6.8	4.7.6
Shock	3.6.9	4.7.7
Discharge current	3.6.1	4.7.2.1
Radio frequency discharge noise	3.6.2	4.7.2.2
Salt spray	3.6.12	4.7.10
<u>Group VI (2 sample units)</u>		
Solvent resistance	3.6.10	4.7.8
Thermal shock	3.6.11	4.7.9
Discharge current	3.6.1	4.7.2.1
Radio frequency discharge noise	3.6.2	4.7.2.2
Tension	3.6.13	4.7.11
Sand and dust	3.6.14	4.7.12
<u>Group VII (2 sample units)</u>		
Lightning survivability	3.6.16	4.7.14
Discharge current	3.6.1	4.7.2.1
Radio frequency discharge noise	3.6.2	4.7.2.2
<u>Group VIII (2 sample units)</u>		
Magnetism	3.6.15	4.7.13

TABLE II. Group A inspection.

Inspection	Requirement paragraph	Test method paragraph
Visual and mechanical inspection	3.1, 3.4, 3.5, 3.7 and 3.8	4.7.1
Discharge current	3.6.1	4.7.2.1
Radio frequency discharge noise	3.6.2	4.7.2.2

MIL-D-9129D

4.6.1.3 Group B inspection. Group B inspection shall consist of the tests specified in table III, in the order shown.

4.6.1.3.1 Sampling plan. Group B inspection shall not be required for contracts or orders of less than 100 units. Dischargers shall be selected at random from sample units which passed group A inspection. The number of sample units required shall be as noted in table III. Failure of any group B tests shall constitute rejection of the lot.

4.6.1.3.2 Rejected lots. If an inspection lot is rejected, the manufacturer may rework it to correct the defects, or screen out the defective units, and resubmit for reinspection. Resubmitted lots shall be inspected using tightened inspection. Such lots shall be separate from new lots, and shall be clearly identified as reinspected lots.

4.6.1.3.3 Disposition of sample units. Sample units which have passed group B inspection may be delivered on the contract or purchase order, if the represented lot is accepted and adhesive mountings were not used during the tests.

TABLE III. Group B inspection.

Inspection	Requirement paragraph	Test method paragraph
<u>Subgroup 1 (2 sample units)</u>		
Direct current resistance	3.6.6	4.7.4
High discharge current	3.6.4	4.7.2.4
Radio frequency discharge noise	3.6.2	4.7.2.2
<u>Subgroup 2 (2 sample units)</u>		
Continuous discharge	3.6.3	4.7.2.3
Discharge current	3.6.1	4.7.2.1
Radio frequency discharge noise	3.6.2	4.7.2.2

4.6.2 Inspection of packaging. Except when industrial packaging is specified, the sampling and inspection of the preservation and interior package marking shall be in accordance with groups A and B quality conformance inspection requirements of MIL-P-116. The sampling and inspection of the packing and marking for shipment and storage shall be in accordance with the quality assurance provisions of the applicable container specification shown in section 5 and the marking requirements of MIL-STD-129. The inspection of industrial packaging shall be as specified in the contract (see 6.2).

4.6.3 Periodic inspection. Periodic inspection shall consist of group C. Except where the results of these inspections show noncompliance with the applicable requirements (see 4.6.2.1.4), delivery of products which have passed groups A and B inspections shall not be delayed pending the results of these periodic inspections.

4.6.3.1 Group C inspection. Group C inspection shall consist of the tests specified in table IV, in the order shown. Group C inspection shall be performed on sample units selected from inspection lots which have passed groups A and B inspections. Group C inspection samples shall be representative of production.

4.6.3.1.1 Sampling plan. Group C inspection shall be performed every 24 months on six sample units. The sample shall be equally divided in three groups of two units each as specified in table IV.

4.6.3.1.2 Failures. If one or more sample units fail to pass group C inspection, the sample shall be considered to have failed.

MIL-D-9129D

4.6.3.1.3 Disposition of sample units. Dischargers which have been subjected to group C inspection shall not be delivered on the contract or purchase order.

TABLE IV. Group C inspection.

Inspection	Requirement paragraph	Test method paragraph
<u>Subgroup 1</u>		
Electrical flashover	3.6.5	4.7.3
Lightning transfer	3.6.7	4.7.5
<u>Subgroup 2</u>		
Vibration	3.6.8	4.7.6
Shock	3.6.9	4.7.7
Discharge current	3.6.1	4.7.2.1
Salt spray	3.6.12	4.7.10
<u>Subgroup 3</u>		
Solvent resistance	3.6.10	4.7.8
Thermal shock	3.6.11	4.7.9
Radio frequency discharge noise	3.6.2	4.7.2.2
Tension	3.6.13	4.7.11
Sand and dust	3.6.14	4.7.12

4.6.3.1.4 Noncompliance. If a sample fails to pass group C inspection, the manufacturer shall notify the qualifying activity and the cognizant inspection activity of such failure and take corrective action on the materials or processes, or both, as warranted, and on all units of product which can be corrected and which were manufactured with essentially the same materials and processes, and which are considered subjected to the same failure. Acceptance and shipment of the product shall be discontinued until corrective action, acceptable to the qualifying activity has been taken. After the corrective action has been taken group C inspection shall be repeated on additional sample units (all tests and examinations, or the test which the original sample failed, at the option of the qualifying activity). Groups A and B inspections may be reinstated; however, final acceptance and shipment shall be withheld until the group C reinspection has shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure shall be furnished to the cognizant inspection activity and the qualifying activity.

4.6.4 Inspection of packaging. The sampling and inspection of the preservation and interior package marking shall be in accordance with the groups A and B quality conformance inspection requirements of MIL-P-116. The sampling and inspection of the packing and marking for shipment and storage shall be in accordance with the quality assurance provisions of the applicable container specification and the marking requirements of MIL-STD-129. The inspection of commercial packaging shall be as specified in the contract (see 6.2).

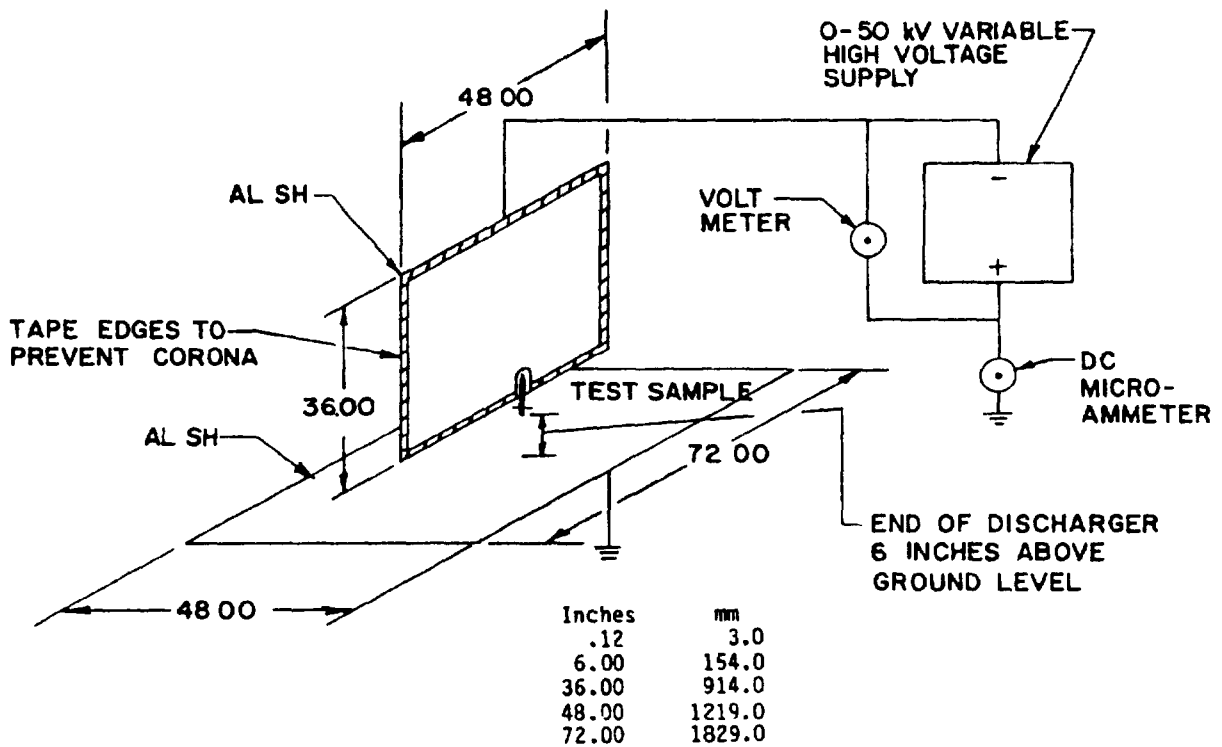
4.7 Methods of inspection.

4.7.1 Visual and mechanical inspection. Dischargers shall be inspected to verify that the physical dimensions, materials, design, construction, marking, and workmanship are in accordance with the applicable requirements.

4.7.2 Discharge current measurement and test.

4.7.2.1 Discharge current (see 3.6.1). Discharge current, voltage and spacing between the discharge points shall be measured, and recorded using the test configuration outlined in figure 1. Any leakage current in the test circuit with the discharger removed shall be subtracted from the specified test current when increasing the test voltage to the specified maximum. Ambient relative humidity and temperature shall be within the ranges of 40 to 60 percent and 16°C to 27°C, respectively.

MIL-D-9129D



NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Unless otherwise specified, the tolerance is ± 12 (3.0 mm).

FIGURE 1. Discharge current test configuration.

MIL-D-9179D

4.7.2.2 Radio frequency discharge noise (see 3.6.2). Radio frequency discharge noise shall be measured using the test configuration outlined in figure 2. The tester shall be in accordance with Air Force Drawing 7136810. The rms voltmeter shall be a "J" Fluke Model 910A, Hewlett Packard Model 3400A, or equivalent. The amplifier, Tektronix type 1121 or equivalent, shall have an input impedance in excess of 1 megohm and a flat frequency response from 5 Hz to 17 MHz. The tester shall be calibrated using a 16 gauge solid metal wire 7 inches long with a radius of curvature on the discharge end equal to one half of the wire diameter. The rms noise voltage generated with the wire discharging 50 μ A will be measured and recorded as the calibration standard. This calibration standard is being specified as being 10 dB below the noise similarly generated by a simulated trailing edge. The discharger will then be installed and its rms noise voltage generated at 50 μ A shall be recorded. The dB noise difference between the simulated trailing edge and discharger shall meet the requirements of paragraph 3.6.2. When testing the calibration standard on the discharger, the end of the standard or the discharge area (as applicable) will break the plane of the cone in figure 2.

4.7.2.3 Continuous discharge test (see 3.6.3). Dischargers shall be subjected to the specified discharge current and time period using the method outlined in figure 1 for applying the required current load. The distance between the test set electrode and the discharger points may be reduced for this test (if the discharge points do not physically contact the electrode) so that the required discharge current may be achieved without excessive voltage. A number of test sets may be operated in parallel with no more than one discharger in each test set, so long as the average recorded discharge current for each discharger is maintained at the required level. The discharger points shall be approximately centered with respect to the test set electrode face. Subsequent to continuous discharge tests, the dischargers shall be retested in accordance with 3.6.1, at the spacings previously recorded, and 3.6.2 for radiofrequency discharge noise. Ambient relative humidity and temperature during the test period shall be 40 to 60 percent and 16°C to 27°C, respectively.

4.7.2.4 High discharge current test (see 3.6.4). Dischargers shall be subjected to specified high current pulses using the method outlined in figure 3 for producing and observing the required current.

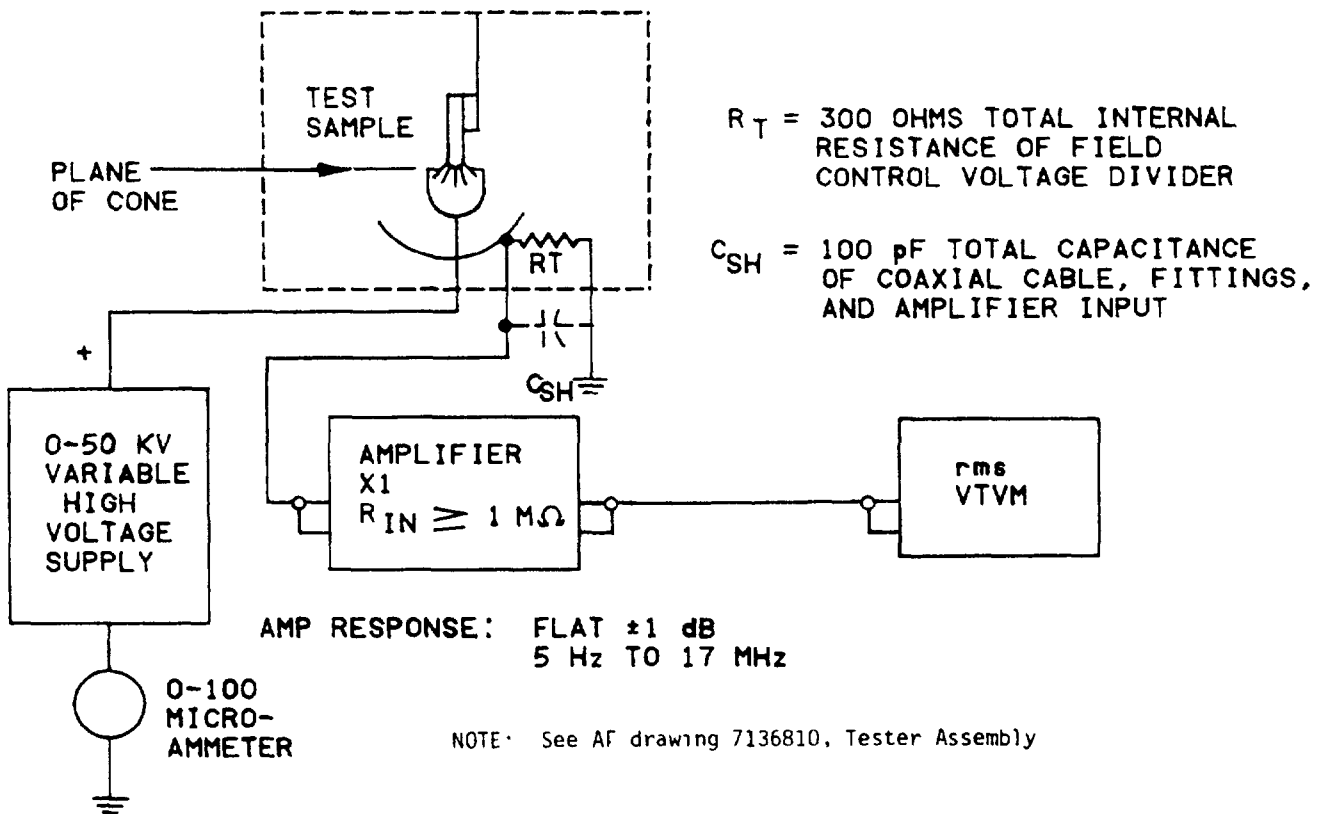
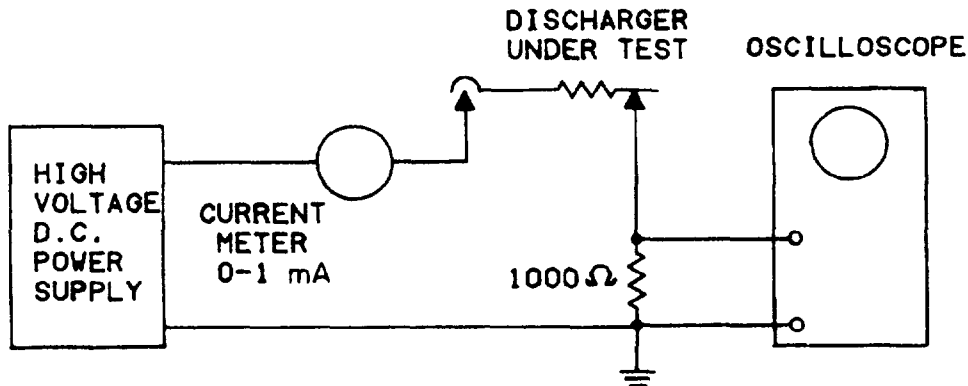
4.7.3 Electrical flashover test (see 3.6.5). The direct current resistance of the discharger shall be measured before and after being subjected to five 200 joule electrical impulses. The resistance of the discharger after the impulses shall be within the specified tolerance, and the discharge current and radiofrequency discharge noise (see 3.6.1 and 3.6.2) shall remain within the required limits. The test configuration shall be in accordance with that shown on figure 4.

4.7.4 Direct current resistance test (see 3.6.6). The direct current resistance shall be measured from the discharge area to the discharger mounting base after a stabilization/soak period of not less than 10 minutes at the specified temperature.

4.7.5 Lightning transfer (see 3.7). The discharger shall be tested in accordance with test method T02, zone 2A, current components B, C and D of MIL-STD-1757, using a dwell time of 125 ms \pm 25 ms for the continuing current. The following details shall apply

- a. Integral dischargers shall be mounted on an aluminum panel .08 inches thick, 12 by 12 inches with the appropriate mounting method procedure.
- b. Non-integral dischargers shall be mounted on their mating holder and the holder shall be attached to an aluminum panel .08 inches thick, 12 by 12 with the appropriate mounting method procedure.
- c. Position the probe within 1 inch of the discharge area.
- d. Apply the current components. It may be required to reposition the probe after application of any one component in order to complete the remainder.
- e. Two dischargers shall be tested as above. The dischargers and holder assemblies (if applicable) shall remain intact.

MIL-D-9129D

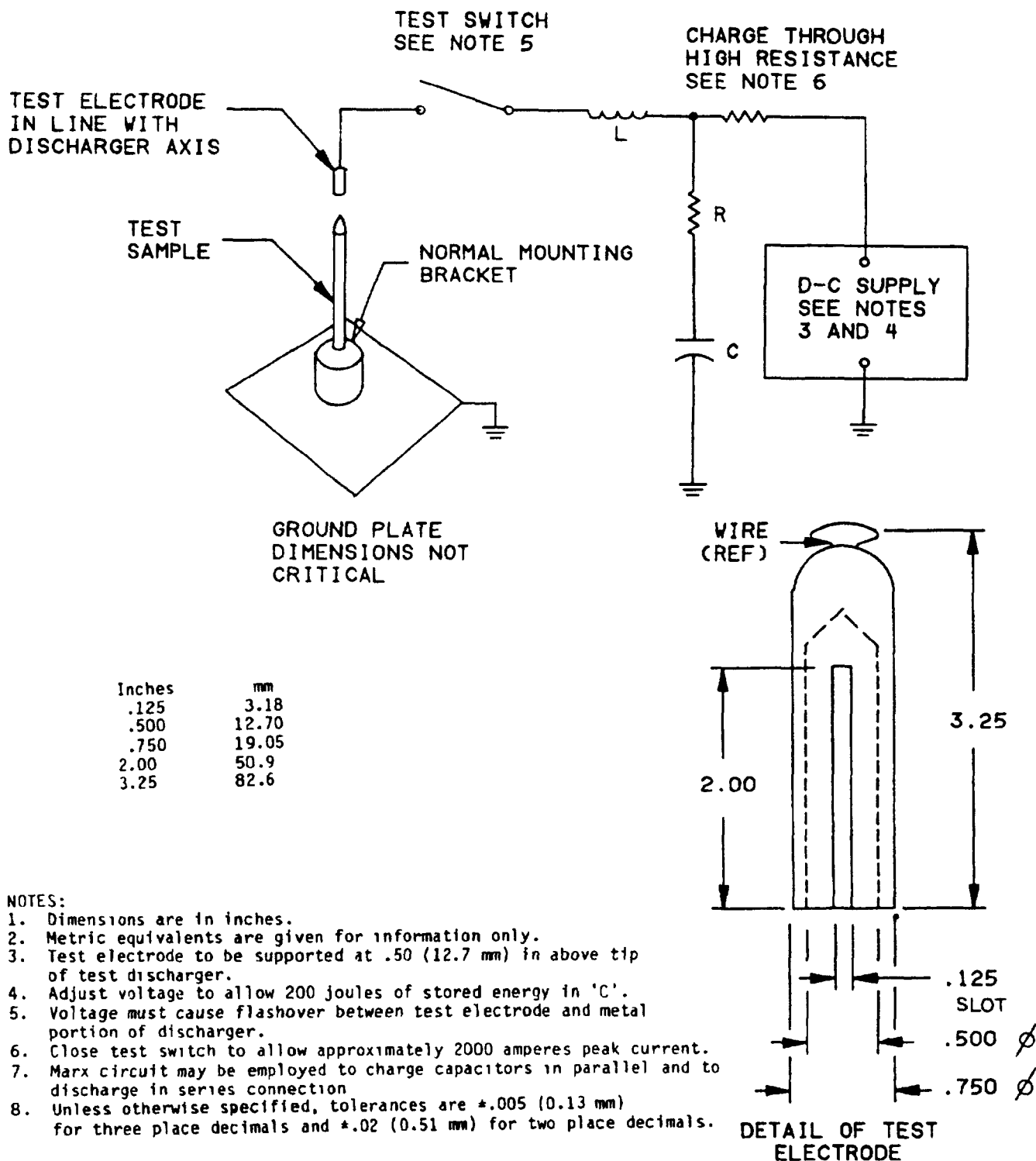
FIGURE 2. Radio frequency noise test configuration.

NOTES

1. Adjust timer for "ON" time of 5 seconds.
2. Adjust high voltage power supply to produce 400 microamperes during first application of current. Do not re-adjust for successive applications to same test discharger.
3. Discharger connection will be at manufacturer's discretion.

FIGURE 3. High current test configuration.

MIL-D-9129D

FIGURE 4. Electrical impulse test configuration

MIL-D-91290

4.7.6 Vibration (see 3.6.8). The discharger shall be tested in accordance with method 204 of MIL-STD-202. The following details shall apply:

- a. All dischargers less than 300 knots:
 - (1) Mounting - Securely attached to a rigid fixture by normal mounting (see 4.1.3).
 - (2) Test condition - C.
 - (3) Inspection after test - Inspect for broken, cracked, or loosened components.
- b. All dischargers less than 600 knots:
 - (1) Mounting - Securely attached to a rigid fixture by normal mounting (see 4.1.3).
 - (2) Test condition - D.
 - (3) Inspection after test - Inspect for broken, cracked, or loosened components.
- c. All dischargers greater than 600 knots:
 - (1) Mounting - Securely attached to a rigid fixture by normal mounting (see 4.1.3).
 - (2) Test condition - E.
 - (3) Inspection after test - Inspect for broken, cracked, or loosened components.

4.7.7 Shock (see 3.6.9). The discharger shall be tested in accordance with method 213 of MIL-STD-202. The following details shall apply.

- a. Mounting - Normal means (see 4.1.2).
- b. Referenced surfaces - No special requirements.
- c. Test condition - I.
- d. Inspection after test - Inspect for broken, cracked, or loosened components.

4.7.8 Solvent resistance test (see 3.6.10). The discharger shall be submerged for a period of 1 hour, in each of the following materials:

- a. Hydraulic fluid (MIL-H-5606).
- b. Jet engine fuel (MIL-T-5624).
- c. Gasoline (MIL-G-5572).
- d. Deicing fluid (MIL-D-83411).

After each soaking period, the discharger shall be inspected for deterioration of nonmetallic components and coatings. On completion of test, the discharger shall be thoroughly dried and inspected for softening or hardening of nonmetallic components and coatings caused by the exposure.

MIL-D-91290

4.7.9 Thermal shock (see 3.6.11). The discharger shall be subjected to temperature cycling in accordance with method 107 of MIL-STD-202. The following details shall apply

- a. Test Condition A for dischargers less than 600 knots and test condition B for dischargers greater than 600 knots.
- b. Measurements - Flexible discharger shall be hand flexed after removal from cold chamber and inspected for breaks or cracks. After completion of test, the discharger shall be inspected for deterioration of material and other damage.

4.7.10 Salt spray (corrosion) (see 3.6.12). The discharger shall be tested in accordance with method 101 of MIL-STD-202. The following details shall apply.

- a. 5-percent salt solution.
- b. Test condition - B.
- c. Following the drying period, the dischargers shall be subjected to 100 percent of rated current for 1 hour.
- d. Following the test, dischargers shall be inspected for compliance with 3.6.6.

4.7.11 Tension test (see 3.6.13). The discharger shall be attached to a metal plate by normal method and subjected to a load of 50 pounds applied along the longitudinal discharger axis between the outer discharger extremities and mounting plate. After test, the discharger shall be inspected for breaks, cracks, separations, or other damage of components or coatings, and separation from the mounting plate.

4.7.12 Sand and Dust (see 3.6.14). The discharger shall be tested in accordance with method 110 of MIL-STD-202. The following details shall apply:

- a. Test condition A for dischargers less than 600 knots. For dischargers greater than 600 knots, test condition A shall apply except that the specified velocity shall be 2,500 ± 500 F.P.M.
- b. Following completion, the test dischargers shall meet the minimum requirements of group I and II of table I tests.

4.7.13 Magnetism (see 3.1 and 3.6.15). Dischargers shall be tested in accordance with NAVAIR 01-S3AAA-2-3.14, section 7.

4.7.14 Lightning survivability (see 3.1 and 3.6.16). Dischargers shall be tested in accordance with test method 102, zone 1A, current Components A and B of MIL-STD-1757 as follows

- a. Repeat the steps of paragraph 4.7.5, steps a through e using the current components A and B as stated above.
- b. Following completion of the test above, the discharger and holder assemblies (if applicable) shall be tested per paragraph 4.7.2.1 and 4.7.2.2 and remain within the required limits to be classified as a lightning survivable discharger.

5. PACKAGING

5.1 Preservation. Preservation shall be level A, B, or C, as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Cleaning. Dischargers shall be cleaned in accordance with MIL-P-116, process C-1.

MIL-D-91290

5.1.1.2 Drying. Dischargers shall be dried in accordance with MIL-P-116.

5.1.1.3 Preservative application. Contact preservatives shall not be used.

5.1.1.4 Unit packs. Each discharger shall be individually unit packed in accordance with MIL-P-116, method III insuring compliance with the applicable requirements of that specification.

5.1.1.5 Intermediate packs. Dischargers, packaged as specified in 5.1.1.4, shall be placed in intermediate containers conforming to variety 2 of PPP-B-566 or PPP-B-676 or class weather resistant of PPP-B-636. Intermediate containers shall be uniform in size, shape and quantities, shall be of minimum tare and cube and 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 is less than 100 unit packs.

5.1.2 Level B. The requirements for the level B preservation of dischargers shall be as specified for level A except that any variety of the intermediate containers specified may be used (see 5.1.1.5).

5.1.3 Level C. The level C preservation for dischargers shall conform to the MIL-STD-794 requirements for this level.

5.2 Packing. Packing shall be level A, B, or C as specified (see 6.2).

5.2.1 Level A. Dischargers, preserved as specified in 5.1, shall be packed in wood boxes conforming to PPP-B-601, overseas type or PPP-B-621, class 2. Closure and strapping shall be in accordance with applicable container specification except that metal strapping shall conform to QQ-S-781, type I, finish A. The requirements for level B packing shall be used when the total quantity of a stock numbered discharger for a single destination does not exceed a packed volume of one cubic foot.

5.2.2 Level B. Dischargers, preserved as specified in 5.1, shall be packed in fiberboard containers conforming to PPP-B-636, class weather resistant, style optional, special requirements. The requirements for box closure, waterproofing, and reinforcing shall be in accordance with method V of the PPP-B-636 appendix.

5.2.3 Level C. Dischargers, preserved as specified in 5.1, shall be packed in fiberboard containers conforming to PPP-B-636, class domestic, style optional, special requirements. Closures shall be in accordance with the appendix thereto.

5.2.4 Unitized loads. Unitized loads, commensurate with the level of packing specified in the contract or order, shall be used whenever total quantities for shipment to one destination equal 40 cubic feet 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.

5.2.4.1 Level A. Dischargers, packed as specified in 5.2.1, shall be unitized on pallets in conformance with MIL-STD-147, load type I, with a wood cap (storage aid 5) positioned over each load.

5.2.4.2 Level B. Dischargers, packed as specified in 5.2.2, shall be unitized as specified in 5.2.4.1 except that weather resistant fiberboard caps (storage aid 4) shall be used in lieu of wood caps.

5.2.4.3 Level C. Dischargers, packed as specified in 5.2.3, shall be unitized as specified in MIL-STD-794 except that conformance to MIL-STD-147 is not required.

5.3 Marking. In addition to any special or other identification marking required by the contract (see 6.2), each unit, intermediate and exterior container and unitized load shall be marked in accordance with the identification marking provisions of MIL-STD-129.

MIL-D-9129D

5.4 General.

5.4.1 Exterior containers. Exterior containers (see 5.2.1, 5.2.2, and 5.2.3) shall be of minimum tare and cube consistent with the protection required and shall contain equal quantities of identical stock numbered items to the greatest extent practicable.

5.4.2 Packaging inspection. The inspection of these packaging requirements shall be in accordance with 4.6.4.

6. NOTES

6.1 Intended use.

6.1.1 Dischargers. Dischargers covered by this specification are for use in the reduction of aircraft precipitation static discharge interference to radio communications and navigational systems.

6.1.2 Packaging requirements. The preservation, packing, and marking herein are intended for direct shipments to the Government. However, at the option of the contractor, or when so specified, the packaging provisions herein are also applicable for the preparation of dischargers for shipment from the 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. Military part number (see 3.1).
- c. Title, number, and date of the applicable specification sheet (see 3.1).
- d. Levels of preservation and packing required (see 5.1 and 5.2).
- e. If special or other identification marking is required (see 5.3).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time set for opening of bids, qualified for inclusion in Qualified Products List (QPL 9129) whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. The activity responsible for the Qualified Products List is 2750 Air Base Wing, Electronic Support Division (2750 ABW/ES), Gentile Air Force Station, OH 45444, and information pertaining to qualification of products may be obtained from that activity.

6.4 First article inspection. Information pertaining to first article inspection of products covered by this specification should be obtained from the acquiring activity for the specific contracts involved. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Military or commercial part number, as applicable.
- c. Samples, submission of data, and test routine, if other than specified (see 4.4.6).
- d. Design and construction (see 3.5).
- e. Performance requirements (see 3.1).

MIL-D-9129D

6.5 Condition for use of level B preservation. When level B preservation is specified (see 5.1.2), this degree of protection should be used for the acquisition of dischargers for resupply worldwide under known favorable handling, transportation, and storage conditions.

6.6 Warning. Potentially hazardous situations could develop in some of the test procedures specified in this specification. Precautions should therefore be taken to insure that test personnel are adequately protected and observe the necessary safety measures at all times.

6.7 Subject (key word) listing.

Discharger, electrostatic
Lightning survivability
Magnetism
Radio frequency discharge noise

6.8 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:

Army - ER
Navy - AS
Air Force - 85

Preparing activity -
Air Force - 85

Agent:
DLA - ES

Review activities:

Army - CE, MI
Air Force - 11, 17, 99

(Project 5920-0426)

User activities:

Navy - MC
Air Force - 14, 19

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