

19 December 1969

MILITARY SPECIFICATION

SUPPRESSOR, ELECTRICAL TRANSIENT MX-7778()/GRC

1. SCOPE

1.1 This description covers the requirements for a shunt-type transient suppressor assembly designated as Suppressor, Electrical Transient MX-7778()/GRC. (See 6.1 and 6.3)

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

SPECIFICATIONS

FEDERAL

T-T-871	Twine, cotton, wrapping
PPP-B-20	Bag, Cotton, Mailing
PPP-B-636	Box, Fiberboard
PPP-F-320	Fiberboard, Corrugated and Solid, Sheet Stock (Container Grade) and Cut Shapes
PPP-P-291	Paperboard, Wrapping, Cushioning
PPP-T-45	Tape, Gummed, Paper, Reinforced and Plain, for Sealing and Securing
PPP-T-97	Tape, Pressure-Sensitive Adhesive, Filament Reinforced

MILITARY

MIL-P-116	Preservation, Methods of
MIL-T-152	Treatment, Moisture and Fungus Resistant, of Communications, Electronic and Associated Electrical Equipment
MIL-V-173	Varnish, Moisture and Fungus Resistant, for the Treatment of Communications, Electronic and Associated Electrical Equipment
MIL-S-901	Shock Tests, H.I. (High-Impact), Shipboard Machinery, Equipment and Systems, Requirements for (Navy)
MIL-P-11268	Parts, Materials, and Processes Used in Electronic Communication Equipment

MIL-S-55689(EL)

MIL-M-13231	Marking of Electronic Items
MIL-F-14072	Finishes for Ground Signal Equipment
MIL-I-46058	Insulating Compound, Electrical (For Coating Printed Circuit Assemblies)

STANDARDS

FEDERAL

FED-STD-595	Colors
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MILITARY

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-147	Palletized and Containerized Unit Loads, 40 Inch x 48 Inch Pallets, Skids, Runners or Pallet Type Base
MIL-STD-252	Wired Equipment, Classification of Visual and Mechanical Defects
MIL-STD-454	Standard General Requirement for Electronic Equipment
MIL-STD-810	Environmental Test Methods

DRAWINGS

ELECTRONICS COMMAND

SC-A-46439	List of Accessories for Package Tester
SM-D-632651	Cable Assembly, Special Purpose, Electrical CX-10613/G
SM-D-632654	Installation of Suppressor MX-7778/GRC
DL-SM-A-632660	Suppressor, Electrical Transient MX-7777()/GRC

(Copies of documents required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer. Both the title and number or symbol should be stipulated when requesting copies).

3. REQUIREMENTS

3.1 Description. - Suppressor, Electrical Transient MX-7778()/GRC is of the shunt type, capable of operating from a 28 volt, 100 to 400 ampere vehicular power supply. (See 6.3)

3.2 Preproduction samples. - The contractor shall furnish three preproduction samples for approval, if required by the contract. (See 4.3 and 6.2.d)

3.3 Construction. - The equipment shall be constructed in accordance with the requirements of this specification, and of the following drawings; DL-SM-A-632660, SM-D-632651 and SM-D-632654 (including the requirements for parts, materials, and processes thereon). In the event of conflict, the technical requirements of this specification shall govern over the drawings. (See 3.6)

3.3.1 Bounce Preconditioning. - The equipment shall meet the requirements herein, without subsequent processing, after subjection to the bounce preconditioning specified in 4.5.4.

3.4 Electrical Requirements.

3.4.1 Power. - The equipment shall operate with tactical radios operating from a 28 volt 100 to 400 amp vehicular power supply.

3.4.2 Voltage limitation. - With the output of the transient suppressor open circuited and the input voltage adjusted such that the zener diode draws 1 ± 0.1 amperes, the maximum allowable output voltage shall be within a range of from 34.0 to 38.0 volts referred to a zener case temperature of 30 degrees C. The unit shall be tested normally with a zener case temperature of 30 degrees C. When test requirements are at temperatures other than 30 degrees C, subtract 31 mv per degree C from the output voltage for a lower zener case temperature and add 31 mv per degree C to the output voltage for a higher zener case temperature. (See 4.7.1).

3.4.3 Circuit breaker operation.

3.4.3.1 Load, Electrical. - With the output load drawing 70 ± 0.5 amperes, the suppressor circuit breaker shall trip within 5 seconds in a 77 ± 5 degrees F. environment. The unit shall be tested normally in a 77 ± 5 degree F. environment. When test requirements are at a -40 degree F. environment, the circuit breaker shall trip within 30 seconds. When test requirements are at +155 degree F. environment, the circuit breaker shall trip within 5 seconds. (See 4.7.2.1)

3.4.3.2 No Load, (Thermal). - With the output of the suppressor open-circuited and the input voltage adjusted such that the zener diode draws a current of 20 ± 0.5 amperes, the circuit breaker shall trip within 5 minutes. The unit shall be allowed to temperature stabilize for 5 minutes before further testing. (See 4.7.2.2)

3.4.4 Pulsing. - The suppressor shall operate, without the circuit breaker tripping, when pulsed five successive times at ten-second intervals at the input, with a $100 + 0, - 5V$, 50 millisecond pulse as measured without the suppressor connected from a power supply having a $0.50 + 0, - .05$ ohms internal impedance and capable of supplying 200 amperes for 50 milliseconds. Series connected storage batteries having a total internal and external resistance of $0.50 + .00$ ohms as measured during the pulse and ahead of the
-.05

suppressor, can be used. The rise in output voltage of the suppressor during each pulse measured from 1 millisecond after the start of the pulse to the end of the pulse shall not exceed 7.0 volts. The assembly shall meet the requirements of 3.4.2 after pulsing. (See 4.7.3)

3.4.5 Voltage Drop. - The total voltage drop measured at the positive and negative terminals of both mating connectors to the suppressor shall not exceed 0.20 volts with a $45 + 0 - 0.5$ amperes output load. The input voltage to the suppressor shall not exceed 30.0 volts during the test. (See 4.7.4)

3.5 Service Conditions. - The equipment shall meet the following service conditions. The unit shall meet the electrical requirements of 3.4.2, 3.4.3, 3.4.4, and 3.4.5 in those service conditions requiring unit operation. Continuous use for a period of 5 years, under the world-wide environmental conditions specified in 3.5.1 through 3.5.10 with a duty cycle of 8 hours on and 4 hours off and with no more than normal maintenance and replacement of parts. Where the contractor is required to make a selection of parts, materials, processes, construction methods, etc., he shall be guided by this requirement and 6.8. Approval of the preproduction samples (see 3.2) shall be considered as compliance with this requirement. (See 4.6)

3.5.1 Temperature. -

3.5.1.1 High Temperature. - The unit shall not be damaged when subjected to a storage temperature of $+ 160^{\circ}F$. The unit shall meet the electrical requirements of 3.5 when operating at an ambient temperature of $+ 155^{\circ}F$. The circuit breaker shall not trip when the unit is subjected to a load current of 45 amperes for 90 minutes when operating at an ambient temperature of $155^{\circ}F$. (See 4.6.1.1)

3.5.1.2 Low Temperature. - The unit shall not be damaged when subjected to a storage temperature of $- 65^{\circ}F$. The unit shall meet the electrical requirements of 3.5 when operating at an ambient temperature of $- 40^{\circ}F$. (See 4.6.1.2)

3.5.2 Relative Humidity. - The equipment shall meet the requirements of 3.5 when tested in accordance with 4.6.2.

3.5.3 Altitude. - The equipment shall not be damaged when subjected to an altitude of 50,000 feet above sea level. The equipment shall meet the requirements of 3.5 when subjected to an altitude of 10,000 feet above sea level. (See 4.6.3)

3.5.4 Vibration. -

3.5.4.1 Resonant Search. - The equipment shall have no resonances in the frequency range of 10-55 cps that exceed twice the amplitude of the applied vibration when tested in accordance with 4.6.4.1.

3.5.4.2 Bounce. - The equipment shall show no more than surface abrasion when tested in accordance with 4.6.4.2.

3.5.5 Shock, Ballistic. - The equipment shall meet the requirements of 3.5 following the test in accordance with 4.6.5.

3.5.6 Sand and Dust. - The equipment shall show no mechanical or electrical damage when tested in accordance with 4.6.6.

3.5.7 Immersion. - The equipment shall be capable of being immersed as described in 4.6.7 without any evidence of water leakage.

3.5.8 Orientation. - The equipment shall meet the requirements of 4.6.8 at an orientation of 20 degrees from normal operating position. (See 4.6.8)

3.5.9 Salt Fog. - When subjected to salt atmosphere described in 4.6.9 the unit shall show no corrosion of finishes or metals. Such corrosion shall be defined as any visible degradation of the equipment surfaces that can be attributed to flaky, pitted, blistered or otherwise loosened finish or metal surface. (See 4.6.9)

3.5.10 Fungus. - When tested in accordance with 4.6.10 the unit shall not result in visible evidence of viable fungus growth on any equipment surfaces.

3.6 Parts, Materials, and processes. - Parts, materials, and processes shall be as specified on the applicable drawings, or as specified herein when not specified on the applicable drawing. When not specified, parts, materials, and processes which will enable the equipment to meet the performance requirements cited in this specification shall be used conforming to MIL-P-11268. (See 3.3)

3.7 Finish. - The equipment shall be finished in accordance with Specification MIL-F-14072 and the equipment drawings. (See 4.4)

3.7.1 Color. - The final paint film on Type I surfaces shall be smooth semigloss, green, color conforming to Nr. X24087 of Federal Standard FED-STD-595. (See 4.4)

3.8 Marking. - Marking shall conform to Specification MIL-M-13231. Panel marking shall be Group I as described in that specification. (See 4.4)

3.8.1 Visibility. - Wherever practicable, parts shall be so mounted that their identification markings will be readily visible with minimum disassembly of the equipment. (See 4.4)

3.8.2 Serial numbers. - Each unit, MX-7778()/GRC shall be serial numbered. (See 4.4)

3.8.3 Moisture and fungus proof (MFP) treatment for equipment and assemblies. - An MFP coating in accordance with MIL-V-173 shall be applied as specified in MIL-T-152 to equipments, assemblies, and parts which have been cleaned prior to coating to remove such contaminants as lubricating oils, mold release agents, sand, corrosion products, solder fluxes, fingerprints and dust. It is required that printed circuit boards receive a conformal coating per MIL-I-46058. (See 4.6.10)

3.9 Interchangeability. - Like units, assemblies, subassemblies and replaceable parts shall conform to requirement 7 of MIL-STD-454. (See 4.8)

3.10 Technical literature, tools and running spare parts. - Technical literature, tools and running spare parts shall be furnished as specified in the contract. Running spare parts shall be identical to corresponding parts in the equipment furnished on order. (See 6.2g & 6.2h)

3.11 Workmanship. - The equipment shall be manufactured and assembled in accordance with requirement 9 of MIL-STD-454 and the applicable portions of the following paragraphs:

(a) In Specification MIL-P-11268:

(1) General requirements for plastic material and plastic parts.

(2) Wiring and cabling, including: Slack, Protection, clearance, splicing, connections in general, grounding, shielding on wire and cable.

(3) Flux and cleaning agents for solder.

(4) Soldering.

(5) Cleaning.

(6) Riveting.

(7) General requirements for securing of parts.

- (8) Welding.
 - (9) Tropicalization.
 - (10) Mechanical operation of controls.
 - (11) Self-tapping screws.
- (b) In this Specification:
- (1) Marking.
 - (2) Finish.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. - Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to 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 that supplies and services conform to prescribed requirements.

4.2 Classification of inspection. - Inspection shall be classified as follows:

- (a) Preproduction inspection (does not include preparation for delivery). (See 4.3)
- (b) Inspection covered by subsidiary documents. (See 4.4)
- (c) Quality conformance inspection:
 - (1) Quality conformance inspection of equipment before preparation for delivery. (See 4.5)
 - (2) Quality conformance inspection of preparation for delivery.

4.3 Preproduction inspection. - This inspection shall consist of the inspection specified in the subsidiary documents covering the items listed in 4.4, and the inspection specified in group A, group B, and Environmental/Design Inspection. (See Tables II, III and I respectively.) The inspection requirements of 4.5.1 and 4.5.2, Group A and Group B, shall be performed on all samples prior to environmental/design inspection. Environmental/design inspection shall be performed on the samples specified and in the sequence shown in Table I.

TABLE I Environmental/Design Inspection

<u>Inspection</u>	<u>Req. Para.</u>	<u>Insp. Para.</u>
Sample # 1		
Low Temperature	3.5.1.1	4.6.1.1
High Temperature	3.5.1.2	4.6.1.2
Orientation	3.5.8	4.6.8
Relative Humidity	3.5.2	4.6.2
Sample # 2		
Altitude	3.5.3	4.6.3
Salt Fog	3.5.9	4.6.9 (Note A)
Sample # 3		
Immersion	3.5.7	4.6.7
Sand-Dust	3.5.6	4.6.6
Vibration, Resonant Search	3.5.4.1	4.6.4.1
Vibration, Bounce	3.5.4.2	4.6.4.2
Shock, Ballistic	3.5.5	4.6.5
Fungus	3.5.10	4.6.10 (Note A)

NOTE A. - The equipment shall be thoroughly washed, cleaned, dried and refurbished, if necessary, before proceeding with subsequent tests.

4.4 Inspection covered by subsidiary documents. - The following shall be inspected under the applicable subsidiary documents as part of the inspection before preparation for delivery:

<u>Item</u>	<u>Where Required</u>
Parts, Materials & Processes	3.6
Finish	3.7
Color	3.7.1
Marking	3.8
MFP Treatment	3.8.3
Tech Lit, Tool & Running spare parts	3.10

4.5 Quality conformance inspection of equipment before preparation for delivery. - The contractor shall perform the inspection specified in 4.4 and 4.5.1 through 4.5.4. This does not relieve the contractor of his responsibility for performing any additional inspection which is necessary to control the quality of the product and to assure compliance with all specification requirements. The government will review and evaluate the contractor's inspection procedures and examine the contractor's inspection records.

4.5 (Cont'd) In addition, the government, at its discretion, may perform all or any part of the specified inspection, to verify the contractor's compliance with specified requirements. Test equipment and facilities for government verification inspection shall be made available by the contractor.

4.5.1 Group A Inspection. - Each unit of each lot of equipment shall be inspected for conformance to all the inspection and test requirements of Table II. Each lot will be subject to verification, utilizing the procedures of MIL-STD-105 using the general inspection levels and the AQL's indicated in Table II. Group A inspection shall be performed in any order which is satisfactory to the Government. (See 6.6)

<u>Inspection</u>	<u>TABLE II - Group A Inspection</u>		<u>AQL</u>	
	<u>Req. Par.</u>	<u>Insp. Par.</u>	<u>Major</u>	<u>Minor</u>
Visual & Mechanical	3.11	4.9	1.0%	4.0%
Voltage limitation	3.4.2	4.7.1	1.0%	*
Load, Electrical	3.4.3.1	4.7.2.1	FOR THE	*
No Load, Thermal	3.4.3.2	4.7.2.2	GROUP	*
Pulsing	3.4.4	4.7.3		*

* All electrical defects are considered major.

4.5.2 Group B inspection. - This inspection, including sampling, shall conform to Table III and to the procedures for small sample inspection of Standard MIL-STD-105. The inspection level for this inspection shall be S-4 for normal, tightened and reduced inspection. Group B inspection shall normally be performed on inspection lots that have passed Group A inspection and on samples selected from units that have been subjected to and met Group A inspection.

TABLE III - Group B Inspection

<u>Inspection</u>	<u>Req. Par.</u>	<u>Insp. Par.</u>	<u>AQL</u>
Voltage drop	3.4.5	4.7.4	4.0%
Interchangeability	3.9	4.8	6.5%

4.5.3 Group C inspection. - This inspection shall be as listed in Table IV, and shall normally be performed on sample units that have been subjected to and met Group A and Group B inspection.

TABLE IV - Group C Inspection

<u>Inspection</u>	<u>Req. Para.</u>	<u>Insp. Para.</u>
Group I		
Immersion	3.5.7	4.6.7
Group II A		
High Temperature	3.5.1.1	4.6.1.1
Low Temperature	3.5.1.2	4.6.1.2
Altitude	3.5.3	4.6.3
Salt Fog	3.5.9	4.6.9
Group II B		
Vibration, Resonant Search	3.5.4.1	4.6.4.1
Vibration, Bounce	3.5.4.2	4.6.4.2
Shock, Ballistic	3.5.5	4.6.5
Group III A		
Orientation	3.5.8	4.6.8
Relative Humidity	3.5.2	4.6.2
Group III B		
Sand and Dust	3.5.6	4.6.6
Fungus	3.5.10	4.6.10

4.5.3.1 Sampling for Group C Inspection. -

4.5.3.1.1 Group I, Table IV. - Two samples shall be selected at random, from each 100 equipments produced and subjected to each inspection specified. The first two samples shall be selected at the start of the contract from the first quality conformance lot. (See 4.5)

4.5.3.1.2 Groups II A and II B. - Two samples shall be selected at random for each sub-group, from each 500 equipments produced and subjected to each inspection specified. The first two samples shall be selected at the start of the contract from the first quality conformance inspection production lot. (See 4.5)

4.5.4.1.3 Groups III A and III B. - One sample shall be selected at random for each sub-group, from each 1000 equipments produced and subjected to the inspection specified. The first sample shall be selected at the start of the contract from the first quality conformance inspection production lot. (See 4.5)

4.5.3.1.4 Reinspection of conforming Group B and Group C sample units. - Unless otherwise specified, sample units which have been subjected to and passed group B and/or group C inspection, provided that they are resubjected to and pass Group A inspection after repair of all damage, may be accepted on contract.

4.5.3.2 Non-Compliance. - The contractor shall immediately report in writing each Group C failure occurrence, including details of the failure and characteristics affected. The contractor shall immediately investigate the cause of the failure and further report the results of investigation and details of proposed corrective action in (i) the process and materials, as applicable, and (ii) all units of product which were manufactured under the same conditions and which the government considers subject to the same failure. Reports shall be forwarded to the responsible technical activity designated in the contract through the quality assurance representative. After corrective action has been taken, additional sample units shall be subjected to Group C inspection (all inspections, or the inspections which the sample failed, at the option of the government) and Group A and B may be reinstated ; however, final acceptance and shipment will be withheld until the Group C reinspection results have shown that the corrective action was effective.

4.5.4 Bounce Preconditioning. - Each unit of each lot shall be placed in its normal operating position on the table of the Package Tester, Type 1000-SC, as made by the L.A.B. Corporation, Skaneateles, New York, or equal. The package tester, shafts in phase, shall have a speed such that it is possible to insert a 1/32 inch thick strip of material under one corner or edge of the unit to a distance of 3 inches as the unit bounces. The unit shall be subjected to this preconditioning for 1 minute. After bounce preconditioning, the unit shall not be repaired, aligned, cleaned, or otherwise changed prior to subjection to acceptance inspection. (See 3.3.1)

4.6 Service condition tests. - The following service condition tests shall be performed on the equipment. When a test requires measurements to be made before, during or after the test, the following tests shall be performed: 4.7.1, 4.7.2, 4.7.3 and 4.7.4. (See 3.5)

4.6.1 Temperature tests. -

4.6.1.1 High Temperature. - The equipment shall be subjected to Test Method 501, Procedure II of MIL-STD-810. The maximum storage ambient temperature shall be + 160°F in Step 7. Following tests of 4.6 in Step 8 the unit shall be subjected to a 45 ampere load for 90 minutes as specified in 3.5.1.1 at the 155°F operating ambient temperature and shall meet the requirements of 3.5.1.1. In Step 10 the unit shall be subjected to the tests of 4.6.

4.6.1.2 Low Temperature. - The equipment shall be subjected to the test of Method 502, Procedure I of MIL-STD-810. The storage temperature ambient shall be - 65°F. The operating temperature ambient shall be - 40°F. During operating conditions the unit shall be subjected to the tests of 4.6. (See 3.5.1.2)

4.6.2 Humidity Test. - The equipment shall be subjected to the test of Method 508, Procedure II of MIL-STD-810. Tests of 4.6 shall be made during the last 5 hours of the final cycle of Step 6 and as otherwise specified in Procedure II. (See 3.5.2)

4.6.3 Altitude test. - The equipment shall be subjected to the test of Method 500, Procedure I of MIL-STD-810. During the operating cycle the equipment shall be subjected to the tests of 4.6. (See 3.5.3)

4.6.4 Vibration tests. -

4.6.4.1 Resonance search. - The equipment shall be subjected to the test of Method 514, Procedure IX, Part 1 of MIL-STD-810. When practicable, package tester accessories shall be selected from those listed on Drawing SC-A-46439. (See 3.5.4.1)

4.6.4.2 Bounce. - The equipment shall be subjected to the test of Method 514, Procedure IX, Part 2 of MIL-STD-810. (See 3.5.4.2)

4.6.5 Shock test, ballistic. - The test shall be conducted on the "Shock Testing Machine for Lightweight Equipment" shown in Specification MIL-S-901. The equipment shall be secured in its normal operating position to the steel plate by means of the same fasteners used for vehicular installation of the equipment. The test shall consist of a total of 9 blows: One each 1 foot blow, 3 foot blow, and 5 foot blow on the back, side, and top of the test plate. As an alternative to reorienting the test plate for the blows on the side of the plate, equivalent rotation of the equipment under test is permissible. The tests of 4.6 shall be performed at the conclusion of the three 5 foot blows. On the 5 foot blow, resetting of the circuit breaker is acceptable. (See 3.5.5)

4.6.6 Sand and dust test. - The equipment shall be subjected to the test of Method 510, Procedure I of MIL-STD-810. The equipment shall be subjected to the tests of 4.6 following the test. (See 3.5.6)

4.6.7 Immersion test. - The equipment shall be subjected to the test of Method 512, Procedure I of MIL-STD-810. (See 3.5.7)

4.6.8 Orientation test. - The equipment shall be inclined for a minimum of 1 minute in each plane (forward, backward, left and right) to an angle of 20 degrees. During inclination in each plane, the equipment shall be subjected to the tests of 4.7.2 and 4.7.3. (See 3.5.8)

4.6.9 Salt Fog. - The equipment shall be subjected to the test of Method 509 of MIL-STD-810. The unit shall meet the requirements of 3.5.9.

4.6.10 Fungus. - The equipment shall be subjected to the test of Method 508, Procedure I of Standard MIL-STD-810. Gasket sealed or other non-hermetic sealed test items shall be opened during exposure and internal areas shall be sprayed with spore suspension as well as external surfaces.

4.6.10 (Fungus - Cont'd). - Examination at the conclusion of the exposure period shall meet the requirements of 3.5.10.

4.7 Electrical tests. -

4.7.1 Voltage limitation test. - Using standard laboratory test instruments the transient suppressor shall be tested for conformance to the requirements of 3.4.2.

4.7.2 Circuit breaker operation test. -

4.7.2.1 Load, Electrical. - Using standard laboratory test instruments the transient suppressor shall be tested for conformance to the requirements of 3.4.3.1.

4.7.2.2 No Load, Thermal. - Using standard laboratory test instruments the transient suppressor shall be tested for conformance to the requirements of 3.4.3.2.

4.7.3 Pulse test. - Using standard laboratory test instruments the transient suppressor shall be tested for conformance to the requirements of 3.4.4.

4.7.4 Voltage drop test. - Using standard laboratory test instruments the transient suppressor shall be tested for conformance to the requirements of 3.4.5.

4.8 Interchangeability. - The dimensions listed below shall be measured to determine conformance to the physical interchangeability requirements of 3.9. When a listed dimension is not within specified or design limits, it shall be considered a major defect.

(a) External and internal dimensions of cases, covers and insertable assemblies, when such dimensions affect mating of parts.

(b) Dimensions of cavities, when such dimensions affect insertion of items.

(c) Location of hinges and fasteners on separable parts or assemblies which must mate, such as cases, covers and mountings.

(d) Location of connectors, locking pins, fasteners, slides, and mountings which receive mating parts of plug-in assemblies and major units, and location of the mating parts on the plug-in assembly or major unit.

(e) Size and form of special threads.

4.9 Visual and mechanical inspection. - Equipment shall be examined for the defects listed in MIL-STD-252.

4.10 Rough handling test (preparation for delivery). - When the rough handling test in accordance with MIL-P-116 is required by contract (See 6.2.d(2)) the unit shall be subjected to the tests of 4.6 to determine freedom from malfunction caused by the rough handling.

5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging. - Preservation and packaging shall be level A or C, as specified. (See Section 6b)

5.1.1 Level A. -

5.1.1.1 Cleaning. - Cleaning components of the MX-7778()/GRC shall be accomplished in accordance with process C-1 of MIL-P-116.

5.1.1.2 Drying. - Drying of components shall be accomplished in accordance with the applicable procedures of MIL-P-116.

5.1.1.3 Preservation application. - None required.

5.1.1.4 Unit packaging. - Unit packaging shall be in accordance with the methods prescribed in MIL-P-116 and as specified herein.

5.1.1.4.1 Technical literature. - Each Technical Literature shall be packaged Method IC-1.

5.1.1.4.2 Cable Assembly CX-10613/G. - Each cable assembly shall be packaged Method III, as follows: Coil each cable into a coil of proportionate dimensions and tie in three places with cotton twine conforming to T-T-871, securing the connectors to the coil with the ties.

5.1.1.4.3 Template. - The template shall be packaged Method IC-1.

5.1.1.4.4 Mount, screws, washers, nuts, ground strap and shock mounts. - The mount, screws, washers, nuts, ground straps and shock mounts shall be packaged Method III, as follows: Place the screws, washers, nuts and shock mounts within a cloth draw string bag, conforming to PPP-B-20. Secure the bagged hardware to the mounting. Cushion the mount by wrapping in paperboard cushioning material conforming to PPP-P-291, Type I. Secure the cushioning with gummed paper tape conforming to PPP-T-45. Grade A, Type III.

5.1.1.4.5 MX-7778()/GRC. - MX-7778()/GRC, shall be packaged Method III, as follows: Cushion each MX-7777()/GRC on all surfaces with cells or pads or both of fiberboard conforming to PPP-B-320, W5c, weather resistant designed and fabricated to protect all projections and absorb the shock of impact in handling and transit. Place the cushioned unit together with the technical literature, cable assembly, template, mount, screws, nuts, washers, shock mounts and ground strap, packaged as specified in 5.1.1.4.1 through 5.1.1.4.4, within a close-fitting fiberboard box conforming to PPP-B-636, W6c, weather resistant. Box closure shall be as specified in the appendix of the box specification.

5.1.2 Level C, MX-7778()/GRC. - Components of the MX-7778()/GRC shall be packaged in a manner that will afford adequate protection against corrosion, deterioration and damage during shipment from the supply source to the first receiving activity.

5.2 Packing. - Packing shall be Level A, B or C as specified.
(See 6b)

5.2.1 Level A. -

5.2.1.1 A quantity of MX-7778()/GRC packaged as specified in 5.1 shall be packed within a close-fitting fiberboard box conforming to PPP-B-636, Type CF, class weather resistant, special requirements use. Box closure shall be as specified in the appendix of the box specification. To facilitate palletization, fiberboard boxes shall be uniform in size and contain equal quantities of packed items to the greatest extent practicable.

5.2.1.2 Palletized load. - A quantity of containers packed as specified in 5.2.1.1 shall be placed on a pallet, load Type 1, conforming to MIL-STD-147. A fiberboard cap shall be employed over the load having two sides extending down the stacked load at least 12 inches to accommodate marking requirements. The cap shall be fabricated of fiberboard conforming to PPP-F-320, class weather-resistant, W5s. The load shall be bonded to the pallet by strapping.

5.2.1.3 Less than palletized load. - When quantities per destination are less than a pallet load, containers specified in 5.2.1.1, shall be reinforced by pressure sensitive filament tape conforming to PPP-T-97, Tape IV as specified in the appendix of the box specification. No further packing shall be required.

5.2.2 Level B. - MX-7778()/GRC packaged as specified in 5.1, shall be packed as specified in 5.2.1.

5.2.3 Level C. - MX-7778()/GRC packaged as specified in 5.1, shall be packed as specified in 5.2.1, except that the pallets, fiberboard boxes and fiberboard caps shall be of the type, size and kind commonly used for the purpose and shall comply with the rules and regulations of the common carrier as applicable to the mode of transportation. Packing shall be accomplished in a manner that afford adequate protection to the package and its contents during shipment from the supply source to the first receiving activity.

5.3 Marking. - In addition to any special marking required by the contract or order, interior packages and exterior shipping containers shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use. - The transient suppressor is intended to be used with tactical radios (AN/VRC-12, AN/VRC-53, AN/GRC-106 and their configurations when operated from tracked vehicular power supplies) in all tracked vehicles.

6.2 Ordering data. - Procurement documents should specify the following:

(a) Title, number, and date of this specification and any amendment thereto.

(b) Level of packaging and level of packing required for shipment. (Level A, level B, or level C).

(c) The specific paragraphs of Section 5 which are applicable to this procurement.

(d) Preproduction inspection:

(1) Three sample units of each item cited in the section 1 are generally required so that lengthy and potentially damaging environmental tests can be performed on several sample units. (See 3.2)

(2) Preproduction pack(s) as follows:

(a) Makeup of pack(s).

(b) Number of each kind of pack to be submitted.

(c) Inspection to be performed thereon.

(e) Marking and shipping of samples.

(f) Place of final inspection.

(g) Technical literature required. (See 3.10)

(h) Quantity of tools and running spare parts required.
(See 3.10)

(i) Submission of the statement of treatment covering tropicalization of material as soon as possible after award of contract. This statement should be submitted to the contracting officer. (See 3.8.4)

6.3 Nomenclature. - The parenthesis in the nomenclature will be deleted or replaced by a letter identifying the particular design; for example: MX-7778W/GRC. The contractor should apply for nomenclature in accordance with the applicable clause in the contract. (See 1.1)

6.4 Color. - The color chip furnished by the procuring agency (See 3.7.1) will be color chip no. X-24037, and may be obtained upon request to Commanding General, Coating and Chemical Laboratory, Aberdeen Proving Grounds, Maryland.

6.5 Group C Inspection. - Approval to ship may be withheld, at the discretion of the Government, pending the decision from the contracting officer on the adequacy of corrective action. (See 4.5.3.4)

6.6 Location of inspection. - It is desirable that the inspection be performed at a location that will minimize handling (which might cause damage to the equipment) after this inspection is completed. It is recommended that the entire lot (including all previously inspected sample units) be sampled and inspected immediately prior to packaging.

6.7 Verification inspection. - Verification by the Government will be limited to the amount deemed necessary to determine compliance with the contract and will be limited in severity to the definitive quality assurance provisions established in this specification and the contract. The amount of verification inspection by the Government will be adjusted to make maximum utilization of the contractor's quality control system and the quality history of the product.

6.8 Qualitative material requirements. - The following service conditions were considered in the design of the equipment and are given here as a guide for the contractor where he is required to make a selection of parts, materials, processes, constructive methods, etc.

6.8.1 Temperature. -

(a) Operating: Ambient temperature in the range of + 155°F to - 40°F. (The temperature includes effect of sun-load.) Exposure at the high temperature extreme not to exceed 4 hours, and at the low temperature extreme not to exceed 72 hours, at any one time.

(b) Non-operating: Exposure in the range of + 160°F to + 80°F; exposure at the high temperature extreme not to exceed 4 hours, and at the low temperature extreme not to exceed 24 hours, at any one time.

6.8.2 Relative humidity. - Exposure to 97 percent relative humidity for 20 hours; and exposure at 100 percent relative humidity, the condensation, for 4 hours for each 24 hour period.

6.8.3 Altitude (elevation). -

(a) Operating: Up to 10,000 feet above sea level.

(b) Non-operating: Up to 50,000 feet above sea level.

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6.8.4 Orientation. -

(a) Operating. - Any orientation up to 20 degrees from normal operating position (that is: forward, backward, left, or right).

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