INCH-POUND
MIL-PRF-62061D
14 August 2009
SUPERSEDING
MIL-PRF-62061C
20 December 1997

PERFORMANCE SPECIFICATION

GENERATOR, ENGINE ACCESSORY: 28 VOLT DC, RATED OUTPUT 300 AMPERE

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

1. SCOPE

1.1 Scope. This specification covers a 28 volt (V) direct current (dc), blower-cooled generator with rated output of 300 amperes (A) (see 6.1).

1.2 Classification. The generators are classified based on differences in their configurations as follows:

Configuration A	-	Generator with mechanically driven blower
Configuration B	-	Generator with built in electrically driven blower
Configuration C	-	Generator with mounted electrically driven blower
Configuration D	-	Generator - Air intake Assembly

1.3 Part or Identification Number (PIN). The PIN to be used for generators acquired to this specification are created as follows (see 3.5.6):

M62061 - X

- X: Type (see 1.2): A - Configuration A; B - Configuration B; C - Configuration C; D - Configuration D
- M62061: Specification number

Comments, suggestions, or questions on this document should be addressed to U.S. Army Tank-automotive and Armaments Command, ATTN: RDTA-EN/STND/TRANS MS#268, 6501 E. 11 Mile Road, Warren, MI 48397-5000 or emailed to DAMI_STANDARDIZATION@conus.army.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at http://assist.daps.dla.mil.

AMSC N/A FSC 2920

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 of 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.

COMMERCIAL ITEM DESCRIPTIONS

A-A-50271 - Plates, Identification

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-461 - Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment (See 4.3)

(Copies of these documents are available online at http://assist.daps.dla.mil/quicksearch/ or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications 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.

US ARMY TACOM DRAWINGS

8717421 - Generator, Engine Accessory (interface)
10889713 - Generator, Engine Accessory (interface)
10889998 - Generator, Engine Accessory (interface)
10914831 - Generator, Engine Accessory (M107) (interface)

(Copies of this drawing are available from the U.S. Army Tank-automotive and Armaments Command, ATTN: RDTA-EN/STND/TRANS MS #268, 6501 E. 11 Mile Road, Warren, MI 48397-5000, or email DAMI_STANDARDIZATION@conus.army.mil.)

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

ASTM INTERNATIONAL

ASTM B117	-	Standard Practice for Operating Salt Spray (Fog) Apparatus (DoD Adopted)
ASTM G21	-	Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi (DoD Adopted)

(Copies of these documents are available from www.astm.org or ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 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, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.1.1.

3.2 Design, materials, and manufacturing processes. Unless otherwise specified, the design, materials, and manufacturing process selection shall be the prerogative of the contractor as long as all articles submitted to the government fully meet the operating, interface, ownership and support, and operating environment requirements specified.

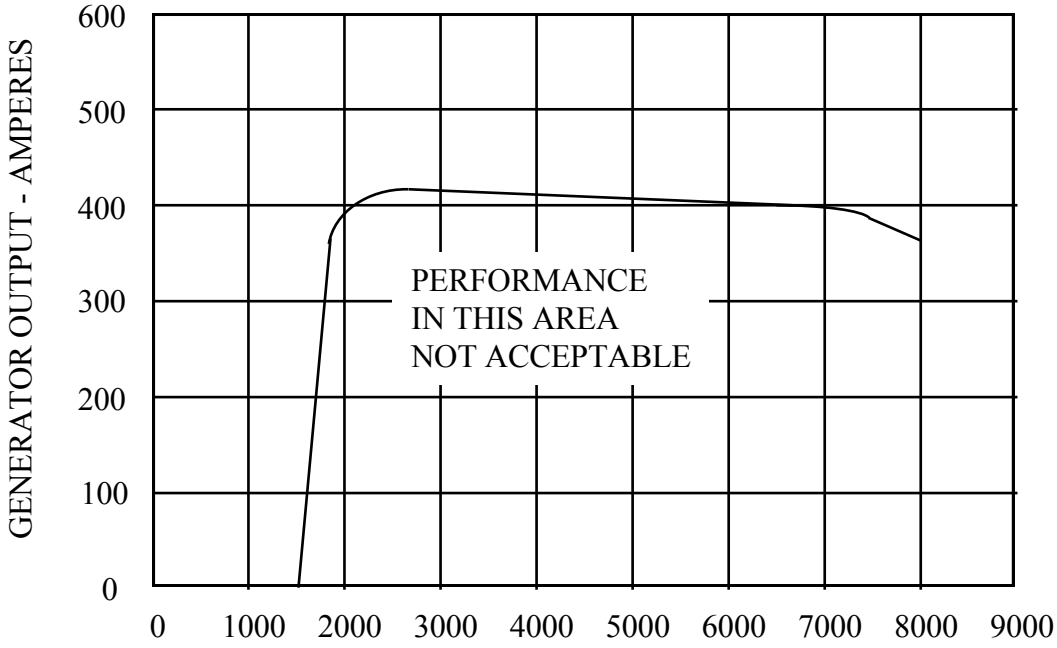
3.2.1 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous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

3.3 Operating requirements.

3.3.1 Polarity. The generator shall be designed to operate within a negatively grounded electrical circuit (see 4.5.1).

3.3.2 Output. The generator shall meet the performance requirements specified in figure 1 (see 4.5.2).

3.3.2.1 Output, performance checkpoint (heat stabilized). The generator shall subsequently meet the requirements at the one stabilized performance checkpoint indicated in figure 1 (see 4.5.2.1).



RPM	AMP (min)	Comments
1500	0	Cut-in-speed
1625	100	
1750	200	
1900	300	Min. speed at rated output
2000	380	Performance checkpoint
2500	425	
3000	425	
4000	425	
5000	425	
6000	415	
8000	360	Max. operating speed
10000	----	Overspeed

NOTE: Generator performance requirements shown above shall be obtained when generator is assembled and tested with blower and adapter.

FIGURE 1. Performance curve.

3.3.2.2 Speeds and current. The generator shall meet the current and voltage requirements at less than the maximum speeds specified below (see 4.5.2.2):

a) Cut-in speed at 28.5 ± 0.1 V at 0 A load (maximum speed allowable: 1425 rpm)
b) Minimum speed at 100 A at 28.5 ± 0.1 V (maximum speed allowable: 1550 rpm)
c) Minimum speed at 300 A at 28.5 ± 0.1 V (maximum speed allowable: 1825 rpm)

3.3.3 Interpole voltage. The voltage measured between the paralleling terminal (D) and the negative terminal (E) shall conform to limits as specified on figure 2 (see 4.5.3).

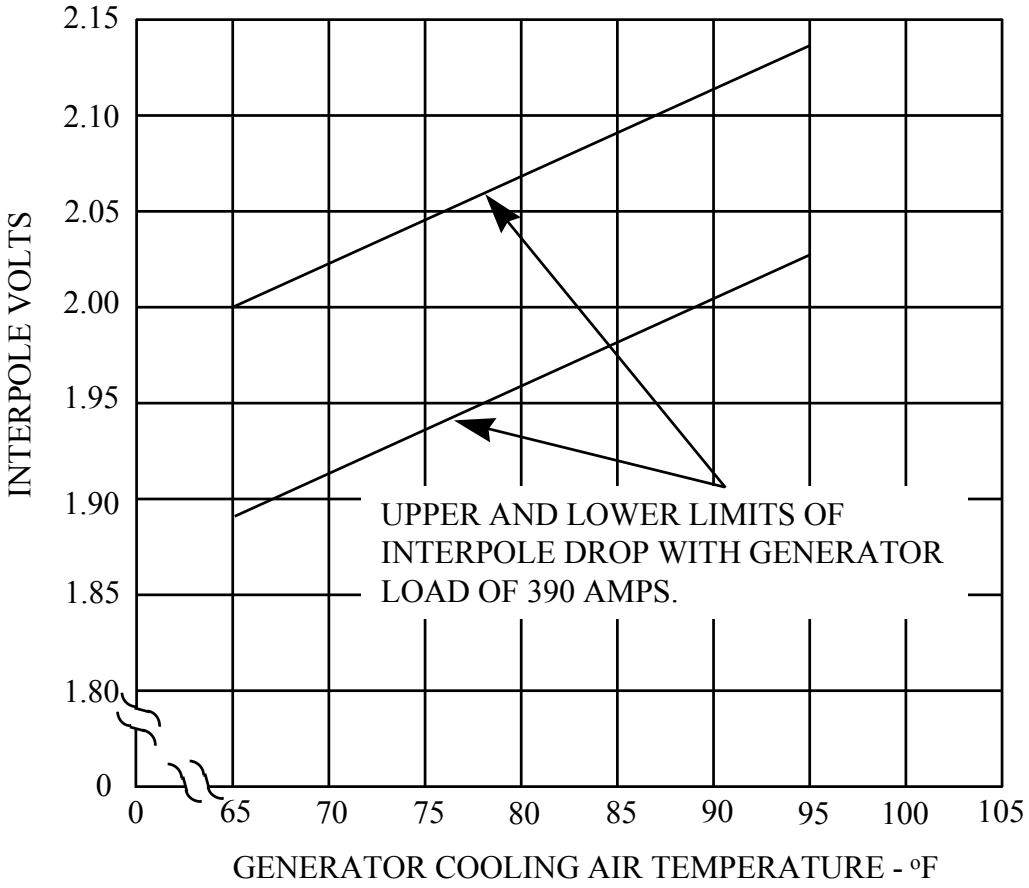


FIGURE 2. Generator interpole voltage drop at 390 amp load vs generator cooling air temperature.

3.3.4 Compounding. The field current shall always increase when the load is increased (see 4.5.4).

3.3.5 Insulation resistance. The generator shall have a resistance of not less than 25 megohms, conductor to conductor and conductor to ground (see 4.5.5).

3.3.6 Ripple. The generator shall meet the following requirements:

a) Fault free and battery only conditions - The upper and lower peaks of ripple voltage shall each be less than 2 V. The frequency components of the ripple shall be within the range of 50 Hertz (Hz) to 200 kilohertz (kHz).
b) Single fault condition (vehicle system operates with generator only, i.e., no battery) - The upper and lower peaks of ripple voltage shall each be less than 7 V. The frequency components of the ripple shall be within the range of 50 Hz to 200 kHz.

3.3.7 Generator flexible drive.

3.3.7.1 Torsional vibration, 100 hours. The flexible drive shall limit the armature amplitude to within plus or minus (±) 5 degrees (°) in torsional vibration (see 4.5.7.1).

3.3.7.2 Torsional vibration, 15 minutes. The flexible drive shall limit the armature amplitude to within ±7° in torsional vibration (see 4.7.5.2).

3.4 Interface requirements.

3.4.1 Design interface. Generator assemblies shall conform to the envelope and mounting dimensions, the electrical and mechanical interfaces, and conform to the applicable configuration specified below (see 1.2 and 4.6.1).

Configuration A	-	Generator with mechanically driven blower (Drawing 8717421 (interface))
Configuration B	-	Generator with built in electrically driven blower (Drawing 10889713 (interface))
Configuration C	-	Generator with mounted electrically driven blower (Drawing 10889998 (interface))
Configuration D	-	Generator - Air intake Assembly (Drawing 10914831 (interface))

3.4.2 Interchangeability. All generator assemblies and all component parts shall be physically and functionally interchangeable with all other component parts of same part number previously furnished under this specification (see 4.6.2).

3.4.3 Electromagnetic compatibility.

3.4.3.1 Conducted emissions. Conducted emissions shall not exceed the values given in CE102 of MIL-STD-461 (see 4.6.3).

3.4.3.2 Radiated emissions. Electric field emissions shall not be radiated in excess of the limits for Army ground applications in RE102 of MIL-STD-461 (see 4.6.3).

3.5 Ownership and support requirements.

3.5.1 Endurance. The generator shall deliver sequentially, as shown, output for 1000 hours. During this time, it shall require no servicing or replacement of parts. The generator shall subsequently meet the requirements of 3.3.2.1 (see 4.7.1).

3.5.2 Overspeed. The generator shall evidence no thrown solder, thrown impregnating compound, damaged insulation, raised armature windings, raised commutator bars or other damage. The generator shall subsequently meet the requirements of 3.3.2.1 (see 4.7.2).

3.5.3 Dielectric strength. The insulation shall evidence no loosening, cracking, charring, burning, smoking or reduction of dielectric strength (see 4.7.3).

3.5.4 Surface finish. All exterior surfaces of the generator assembly shall be black in color except the electrical connections, terminal box, and the extended shaft. No paint shall be applied to mating surfaces on the frame or on the ends of the generator (see 4.7.4).

3.5.5 Safety

3.5.5.1 Asbestos, cadmium and hexavalent chromium. The generator shall not produce any hazards to personnel or the environment resulting from the use of asbestos or cadmium. Hexavalent chromium electroplating, coatings and finishes shall not be used (see 4.7.5.1).

3.5.5.2 Electrical connectors. The generator shall be free of rust, burrs, and scratches. The connections shall have maximum bond from the soldering and/or brazing to the connectors for resilience to vibration and shock to the generator (see 4.7.5.2).

3.5.6 Identification and marking. A nameplate shall be affixed to the exterior of the generator frame in a location as specified on applicable drawings (see 3.4.1). Nameplates shall conform to the non-dimensional requirements of A-A-50271 and shall include the following minimum information (see 4.7.6):

a) Generator, 28 Vdc
b) 300 Amperes
c) Part or Identification number (see 6.6)
d) National stock number
e) Manufacturer’s identification
f) Manufacturer’s serial number

3.6 Operating environmental requirements.

3.6.1 High temperature. The generator frame temperature shall not exceed 320 degrees Fahrenheit (°F). The generator shall evidence no thrown solder, thrown impregnating compound, damaged insulation, raised armature windings, raised commutator bars or other damage. The generator shall subsequently meet the requirements of 3.3.2.1 (see 4.8.1).

3.6.2 Low temperature. The generator shall evidence no thrown solder, thrown impregnating compound, damaged insulation, raised armature windings, raised commutator bars or other damage. The generator shall subsequently meet the requirements of 3.3.2.1 (see 4.8.2).

3.6.3 Shock resistance. The generator shall meet the requirements of 3.3.2.1 when subjected to shock pulses encountered from vehicle operations (see 4.8.3).

3.6.4 Vibration resistance. The generator shall meet the requirements of 3.3.2.1 when subjected to wave form vibration encountered from vehicle operations (see 4.8.4).

3.6.5 Fungus resistance. Unsealed assemblies and sealed assemblies normally disassembled for servicing shall be resistant to the growth of fungus during its operational lifespan (see 4.8.5).

3.6.6 Corrosion resistance. The generator shall meet the requirements of 3.3.2.1 when subjected to prolonged exposure to a corrosive environment when in operation (see 4.8.6).

3.6.7 Sand and dust. The generator shall meet the requirements of 3.3.2.1 when subjected to sand and dust when in operation (see 4.8.7).

4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

a) First article inspection (see 4.1.1)
b) Conformance inspection (see 4.1.2)

4.1.1 First article inspection. Unless otherwise specified (see 6.2), first article inspection shall be performed on preproduction or initial production samples as specified when a first article sample is required (see 3.1). When a first article inspection is required (see 6.2 and 6.3), it shall include all verifications as specified in table I.

4.1.2 Conformance inspection. Conformance inspection shall include the examinations and tests as specified listed in table I (see 6.2 and 6.4).

4.2 Verification methods. Acceptable verification methods included in this section are visual inspections, measurement, sample tests, full scale demonstration tests, simulation, modeling, engineering evaluation, component properties analysis, and similarity to previously approved or previously qualified designs.

4.3 Verification alternatives. The manufacturer may propose alternative test methods, techniques, or equipment, including the application of statistical process control, tool control, or

cost effective sampling procedures to verify performance. See the contract for alternatives that replace verification methods required by this specification.

TABLE I. Classification of inspections.

Title	Requirement	Inspection
Operating requirements	3.3	4.5
Polarity	3.3.1	4.5.1
Output	3.3.2	4.5.2
Output, performance checkpoint (heat stabilized)	3.3.2.1	4.5.2.1
Speeds and current	3.3.2.2	4.5.2.2
Interpole voltage	3.3.3	4.5.3 - 4.5.3.2
Compounding	3.3.4	4.5.4
Insulation resistance	3.3.5	4.5.5 - 4.5.5.2
Ripple	3.3.6	4.5.6
Generator flexible drive	3.3.7	4.5.7
Torsional vibration, 100 hours	3.3.7.1	4.5.7.1
Torsional vibration, 15 minutes	3.3.7.2	4.5.7.2
Interface requirements	3.4	4.6
Design interface	3.4.1	4.6.1
Interchangeability	3.4.2	4.6.2
Electromagnetic compatibility	3.4.3	4.6.3
Ownership and support requirements	3.5	4.7
Endurance	3.5.1	4.7.1
Overspeed	3.5.2	4.7.2
Dielectric strength	3.5.3	4.7.3
Surface finish	3.5.4	4.7.4
Safety	3.5.5	4.7.5 - 4.7.5.2
Identification	3.5.6	4.7.6
Operating environment requirements	3.6	4.8
High temperature	3.6.1	4.8.1
Low temperature	3.6.2	4.8.2
Shock resistance	3.6.3	4.8.3
Vibration resistance	3.6.4	4.8.4
Fungus resistance	3.6.5	4.8.5
Corrosion resistance	3.6.6	4.8.6
Sand and dust	3.6.7	4.8.7

4.4 Inspection conditions.

4.4.1 Atmospheric limits. Unless otherwise specified (see 6.2), all inspections shall be conducted under the following conditions:

a. Air temperature 77 ±15 °F
b. Barometric pressure 725 (+50,-75) millimeters (mm) mercury
c. Relative humidity 50 ±30 percent (%)

4.4.2 Laboratory test conditions. Tests shall be conducted under general laboratory conditions acceptable to the Government. The ambient room temperature shall be maintained at 77 ±15 °F. The test units shall be stabilized for 1 hour before being subjected to the tests. The generator shall be tested in combination with a blower and adapter (see 6.7).

4.4.3 Stabilized temperature. The generator system shall be considered to be temperature stabilized when operations under constant conditions fails to cause a change in the test unit temperature in excess of 2 °F in any 5-minute period of any 20 minute test.

4.4.4 Laboratory test condition. The test circuit of figure 5 or Government approved equivalent shall be used whenever applicable. Readings shall be corrected for variations in the ambient temperature by use of the following formula:

$$\text{Output(corrected)} = \frac{\text{Output (observed)}}{1 + .00214\ (77\text{-}T)}$$

Where T = ambient temperature, °F

4.5 Operating requirements verification.

4.5.1 Polarity. To determine conformance to 3.3.1, the negatively grounded electrical circuit shall be verified by the circuit design/layout.

4.5.2 Output. To determine conformance to 3.3.2, the generator shall be stabilized at the highest attainable frame temperature, not exceeding 165 °F above ambient temperature, at 28.5 V. The generator shall be stabilized at this temperature, unless some factor other than temperature, such as poor commutation, limits the performance at the particular point. To determine conformance, at least six points shall be established on the performance curve, including the following as applicable:

a. Cut-in speed. This speed shall be determined with no resistance in series with the field.
b. Minimum speed at rated output. This speed shall be determined with no resistance in series with the field.
c. Maximum operating speed. This shall be the maximum operating speed as shown on figure 1. It shall be established by adjusting the field resistance.
d. Performance checkpoint.

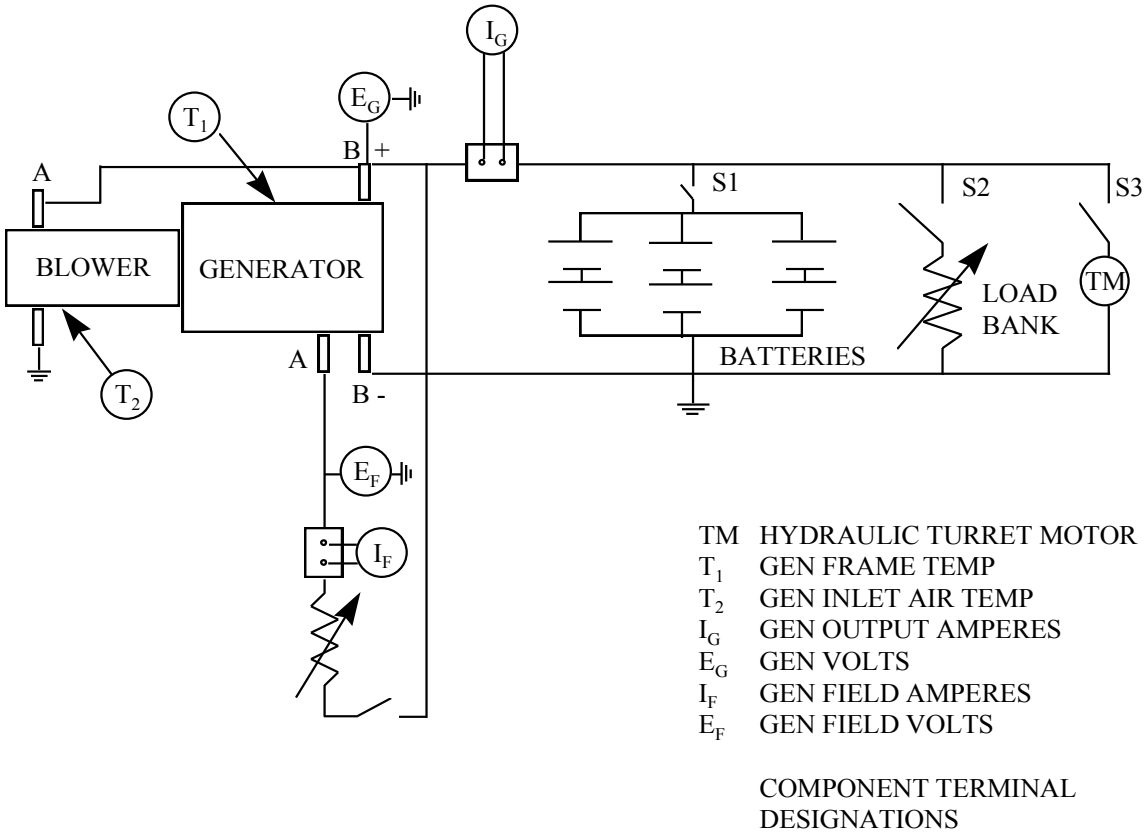


FIGURE 3. Generator test circuit.

4.5.2.1 Output, performance checkpoint (heat stabilized). To determine conformance to 3.3.2.1, the generator shall be subjected to the same test procedure as specified in 4.5.2 except that the output shall be determined at only the one performance checkpoint indicated on the performance curve on figure 1.

4.5.2.2 Speeds and current. To determine conformance to 3.3.2.2, the armature shall rotate freely except for brush drag. Each generator shall be tested at room temperature, 77 ±15 °F and shall not exceed the maximum speeds specified in 3.3.2.2.

4.5.3 Interpole voltage.

4.5.3.1 Instrumentation. To determine conformance to 3.3.3, a standard movement meter shall be used for voltage and current measurements during tests. A standard thermometer shall be used for temperature measurements of generator cooling fan intake air. Thermometer shall be located in line with fan centerline at a distance of 36 in. ±6 in. from fan. Thermometer shall be shielded from any hot surface radiations that may be present. The generator inlet cooling air shall be ducted to simulate the ducting configuration of the generator installation of the M60A1 vehicle (see 3.3.3).

4.5.3.2 Test operation. To determine conformance to 3.3.3, the generator shall be operated with a separately excited field (from a constant power supply) at 5500 rpm with a resistive load of 390 A at 28 V until temperature conditions stabilize. After stabilization, the interpole voltage, load current, terminal voltage and cooling-air temperature shall be measured. Using figure 2, the cooling air temperature equivalent to that measured shall be found. The interpole voltage of the generator must fall within the limits as specified on figure 2 on the ordinate determined by the cooling air temperature.

4.5.4 Compounding. To determine conformance to 3.3.4, field current shall be measured with generators operated at 6500 rpm and the output voltage adjusted and maintained constant at 28.5 ±0.1 V while zero, half and full-rated loads are successively placed on the generator.

4.5.5 Insulation resistance. To determine conformance to 3.3.5, the generator shall be subjected to the insulation resistance test as specified below. During the test the generator and motor commutator brushes shall be raised off the commutator.

4.5.5.1 Apparatus. Insulation-resistance measurements shall be made on an apparatus suitable for the characteristics of the component to be measured such as a megohm bridge, megohm-meter, insulation-resistance test set, or other suitable apparatus. The direct potential applied to the specimen shall be 500 V ±10%. For in-plant quality conformance testing, any voltage may be used provided it is equal to or greater than the minimum potential allowed by the applicable test condition. Unless otherwise specified (see 6.2), the measurement error at the insulation-resistance value required shall not exceed 10%. Proper guarding techniques shall be used to prevent erroneous readings due to leakage along undesired paths.

4.5.5.2 Procedure. When special preparations or conditions such as special test fixtures, reconnections, grounding, isolation, low atmospheric pressure, humidity, or immersion in water are required, they shall be specified. Insulation-resistance measurements shall be made between the mutually insulated points or between insulated points and ground as specified. When electrification time is a factor, the insulation-resistance measurements shall be made immediately after a 2 minute period of uninterrupted test voltage application unless otherwise specified (see 6.2). However, if the instrument-reading indicates that an insulation resistance meets the specified limit, and is steady or increasing, the test may be terminated before the end of the specified period. When more than one measurement is specified, subsequent measurements of insulation resistance shall be made using the same polarity as the initial measurements.

4.5.6 Ripple. To determine conformance to 3.3.6, the generator shall be operated in the test circuit with the battery disconnected. Ripple voltage shall be observed under the conditions listed in table II.

TABLE II. Ripple voltage.

Generator rpm	Generator V ±0.2 V	Generator Output A
2400	28	0
2400	28	100
2400	28	400
4000	28	0
4000	28	100
4000	28	400
6000	28	0
6000	28	100
6000	28	400
8000	28	0
8000	28	100
8000	28	375

4.5.7 Generator flexible drive. To determine conformance to 3.3.7, the generator shall be tested as specified in 4.5.7.1 and 4.5.7.2. The test shall be conducted on a universal joint torsional vibration machine which has a flywheel with at least 20 times the moment of inertia of the armature being tested.

4.5.7.1 Torsional vibration, 100 hours. To determine conformance to 3.3.7.1, the armature shall be subjected to a 100 hour torsional vibration test with ±1° torsional amplitude input to the drive shaft at critical frequencies.

4.5.7.2 Torsional vibration, 15 minutes. To determine conformance to 3.3.7.2, the armature shall be subjected to a 15 minute torsional vibration test with ±2° torsional amplitude input to the drive shaft at critical frequencies.

4.6 Interface requirements verification.

4.6.1 Design interface. To determine conformance to 3.4.1, the generator assemblies mating interface dimensions shall be verified using gaging and measuring equipment.

4.6.2 Interchangeability. To determine conformance to 3.4.2, interchangeability of all generator assemblies and components shall be verified using gaging and measuring equipment.

4.6.3 Electromagnetic compatibility. To determine conformance to 3.4.3, the generator shall be tested in accordance with measurement techniques dealing with electromagnetic compatibility in CE102 and RE102 of MIL-STD-461 or equivalent (see 4.3).

4.7 Ownership and support requirements verification.

4.7.1 Endurance. To determine conformance to 3.5.1, the generator shall be operated as specified in table III.

TABLE III. Endurance test cycle.

Test Step	Generator, rpm (± 25 rpm)	Generator, V (± 0.2 V)	Generator, Output, A (minimum)	Time, Hours
1	2500	28.5	100	8
2	5500	28.5	200	8
3	8000	28.5	300	8
4	2500	28.5	200	8
5	5500	28.5	400	8
6	8000	28.5	100	8
7	2500	28.5	300	8
8	5500	28.5	100	8
9	8000	28.5	200	8

This cycle shall be repeated through four cycles at which time the generator shall then be operated with the armature shaft at an angle of 45 ±1° above the horizontal for two cycles. The generator shall then return to the horizontal for four cycles, then the generator shall be operated with the armature shaft at an angle of 45 ±1° below the horizontal for two cycles. The generator shall then return to the horizontal for the last two cycles to complete 1000 hours. Output current and voltage, and generator speed and temperature shall be measured during the test. Subsequent to the test, the generator shall be subjected to the test as specified in 4.5.2.1.

4.7.2 Overspeed. To determine conformance to 3.5.2, the generator shall be tested for resistance to damage caused by overspeed. The generator shall be stabilized at maximum operating speed. The field circuit shall then be opened and generator speed increased to the overspeed specified on the applicable drawing for 1 minute. The generator shall then be inspected for damage. Subsequent to the test the generator shall be subjected to the test as specified in 4.5.2.1.

4.7.3 Dielectric strength. To determine conformance to 3.5.3, the generator shall be subjected to a ground test of 500 V root mean square (rms) at a frequency of 60 cycles per second (cps) applied for 1 minute. The potential shall be applied to the armature and field terminals with the ground brush raised off the commutator, and with the field ground terminal disconnected.

4.7.4 Surface finish. To determine conformance to 3.5.4, all painted surfaces shall be visually examined.

4.7.5 Safety.

4.7.5.1 Asbestos, cadmium and hexavalent chromium. To determine conformance with 3.5.5.1, the lack of asbestos, cadmium and hexavalent chromium materials shall be verified as in 4.2.

4.7.5.2 Electrical connectors. To determine conformance with 3.5.5.2, the lack of burrs, rust, scratches, loose connections, or excessive slag from the soldering and/or brazing shall be checked optically and physically.

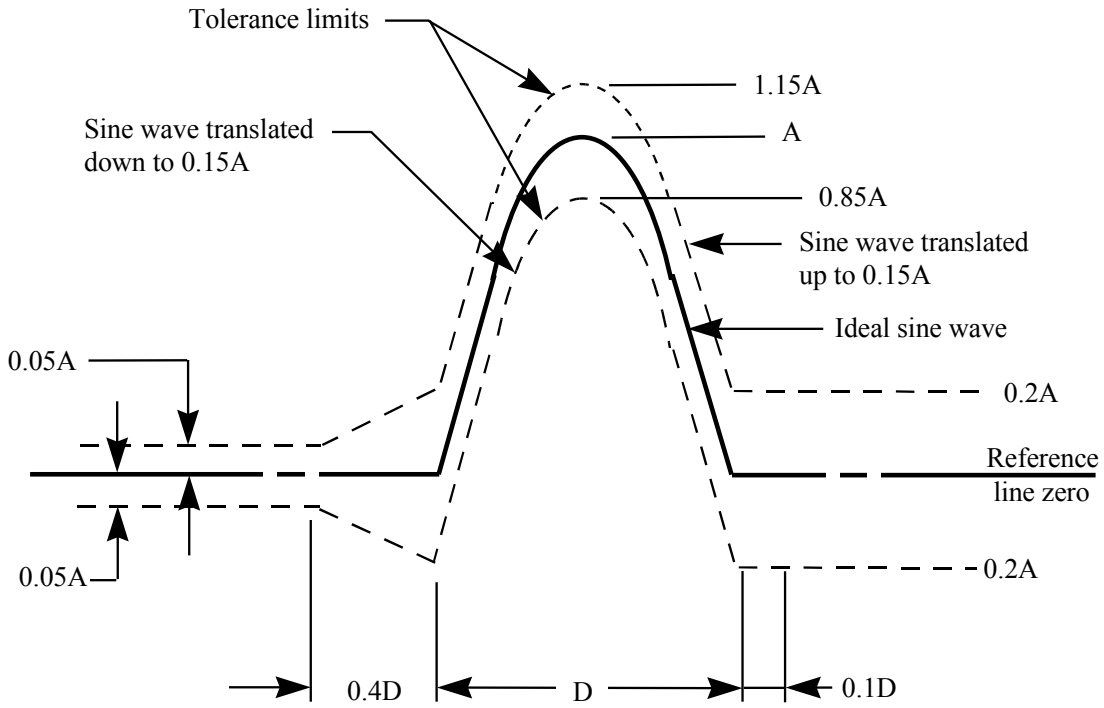
4.7.6 Identification and marking. To determine conformance with 3.5.6, all environmental tests in 4.8 shall be performed, then the markings and identifications shall be re-inspected for readability.

4.8 Operating environment requirements verification.

4.8.1 High temperature. To determine conformance to 3.6.1, the generator shall be tested as follows. The generator shall be stored for 24 hours in an ambient temperature of 160 ±5 °F. The generator shall then be stabilized at average speed at rated output at ambient temperature of 160 ±5 °F. The generator frame temperature shall be measured. After stabilization, the generator shall be operated under these conditions for 4 hours. The generator shall then be inspected to determine conformance to 3.6.1. Subsequent to the test, the generator shall be subjected to the test specified in 4.5.2.1.

4.8.2 Low temperature. To determine conformance to 3.6.2, the generator shall be tested as follows. The generator shall be stored for 24 hours in an ambient temperature of -65 ±5 °F. The generator shall then be stabilized at average speed at rated output, being 5900 rpm, at an ambient temperature of -65 ±5 °F. After stabilization, the generator shall be operated under these conditions for 4 hours. The generator shall then be examined to determine conformance to 3.6.2. Subsequent to the test, the generator shall be subjected to the test specified in 4.5.2.1.

4.8.3 Shock resistance. To determine conformance to 3.6.3, the generator shall be subjected to the half-sine shock pulse wave form as specified in figure 6. The generator shall be mounted on a cradle for the testing. There shall be three shocks in each direction applied along the three mutually perpendicular axes of the test specimen (18 shocks total). The shock pulses shall have a peak value of 50 gravitational units (g's) and a normal duration of 11 milliseconds (ms) in accordance with figure 6. The velocity change (Vi) shall be 11.3 feet/second (ft/sec) in accordance with figure 6. Measurements shall be made before and after the shocks unless otherwise specified (see 6.2), and during the test if specified. Subsequently, the generator shall be subjected to the test specified in 4.5.2.1.



NOTE: The oscillogram should include a time about 3D long with pulse located approximately in the center. The integration to determine velocity change should extend from 0.4D before the pulse to 0.1D beyond the pulse. The acceleration amplitude of the ideal half sine pulse is A and its duration is D. Any measured acceleration pulse which can be contained between the broken line boundaries is a nominal half sine pulse of nominal amplitude A and nominal duration D. The velocity change associated with the measured acceleration pulse is V.

FIGURE 4. Tolerances for half sine wave pulse.

4.8.4 Vibration resistance. To determine conformance to 3.6.4, the generator shall be subjected to the following vibration test. The specimen shall be mounted using suitable mounting apparatus to assure that mounting is free from resonance over the test frequency range. The specimens shall be subjected to a simple harmonic motion having an amplitude of .03 in. (.06 in. maximum excursion), the frequency being varied uniformly between the approximate limits of 10 to 55 Hz and return to 10 Hz. The frequency range shall be traversed in approximately 1 minute. This motion shall be applied for a period of 2 hours in each of 3 mutually perpendicular directions, and shall be tested 12 times for a total of 72 hours. These generators being tested shall be under electric-load conditions to gage its performance in respect with vibrations.

4.8.5 Fungus resistance. To determine conformance to 3.6.5, the generator shall be tested in accordance with ASTM G21 except that the test period shall be continuous 90 days. Upon removal from the cabinet, examination shall be accomplished by means of removable plates or plugs, without disassembly and without disturbing any fungus growths that have developed. Upon completion of the examination and replacement of access port covers, the generator shall be operated for 1 hour, without load at 6500 ±500 rpm before being subjected to the testing specified in 4.5.2.1.

4.8.6 Corrosion resistance. To determine conformance to 3.6.6, a 96 hour 5% salt spray in accordance with ASTM B117 shall be performed on assembled generators. Test specimens shall show no more than a total of 15 isolated pits, none larger than 0.031 in. in diameter in a total of 150 square inches (in^2.), and not more than 5 isolated pits, none larger than 0.031 in. in diameter, in a total of 30 in^2. Prior to the performance tests, the generator shall be operated for 1 hour at 6500 ±500 rpm without load.

4.8.7 Sand and dust. To determine conformance to 3.6.7, the generator shall be tested in a sand and dust test chamber. The sand and dust medium is known commercially as 140-mesh silica flour and is angular in structure. The sand and dust shall have the characteristics, from the U.S. Standard Sieve Series, as follows:

a. 100% of the sand and dust shall pass through a 100-mesh screen.
b. 98 ±2% of the sand and dust shall pass through a 140-mesh screen.
c. 90 ±2% of the sand and dust shall pass through a 200-mesh screen.
d. 75 ±2% of the sand and dust shall pass through a 325-mesh screen.

The specimen shall be placed in a test chamber which has been vented to the atmosphere. The internal temperature of the chamber shall be maintained at 73 °F with a relative humidity that shall not exceed 22% at any time during the test. The sand and dust density shall be raised and maintained at 0.1 to 0.5 gram per cubic foot within the test space. The sand and dust velocity through the test chamber shall be between 41.7 ±8.3 feet per second (ft/s). This portion of the test shall be continued for 6 hours. At the completion of the 6-hour period stated above, the temperature shall then be raised to and maintained at 145 °F for an additional 6 hours with all other conditions remaining the same except a decrease of 12% in humidity. Upon completion of the exposure period, the specimen shall be removed from the chamber and allowed to cool to room temperature. The accumulated dust shall be removed by brushing, wiping, or shaking, with care being taken to avoid introduction of additional dust into the specimen. Under no circumstance shall dust be removed by air blast or vacuum cleaning. The generator, after the sand and dust exposure testing, shall still run and be fully functional.

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 generators described by this performance specification are military unique due to their applications and physical performance which exceed commercial applications. These generators will withstand severe high and low temperature extremes, shock, vibration, fungus, corrosion, and be resistant to sand and dust in a much greater magnitude than a commercial grade generator. These generators are used on the M48, M551, M551A1, M48A5, M88A1, M578, and M110 vehicles.

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of this specification.
b. If required, the specific issue of individual documents referenced (see 2.2.1 and 2.3).
c. When first article is required (see 3.1 and 4.1.1).
d. When conformance inspection is required (see 4.1.2).
e. If atmospheric limits are other than as specified (see 4.4.1).
f. If the measurement error is other than specified (see 4.5.5.1).
g. If the measurement is made other than time specified (see 4.5.5.2).
h. If the shocks are measured other than specified (see 4.8.3).
i. Packaging requirements (see 5.1).

6.3 First article. When requiring a first article inspection, contracting documents should provide specific guidance to offerors. This guidance should cover whether the first article is a first article sample, a first production item, or the number of test items. These documents should also include specific instructions regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Pre-solicitation documents should provide Government waiver rights for samples for first article inspection to bidders offering a previously acquired or tested product. Bidders offering such products who wish to rely on such production testing must furnish evidence with the bid that prior Government approval is appropriate for the pending contract.

6.4 Conformance inspection. Affordable conformance inspection with confidence varies depending upon a number of procurement risk factors. Some of these factors include: Contractor past performance, government schedules and budget, product material and design maturity, manufacturing capital equipment and processes applied, the controlled uniformity of those processes, labor skill and training, and the uniformity of measuring processes and techniques.

During the solicitation, contracting documents should indicate those tests desired from table 1 and their designated frequency based on a risk assessment for the procurements.

6.5 Special equipment.

6.5.1 Transient characteristics. CEC oscillographic tape has furnished satisfactory results for measuring transient characteristics.

6.5.2 Voltage ripple. Tektronix scope, type 545 has proven adequate for measuring voltage ripple.

6.6 Government furnished property. When required, the Government will furnish blower, part number 10898759; adapter, part number 10884044 and cradle, part number 10882774.

6.7 Subject term (key word) listing.

Capacitors
Current
Electrical
Tracked vehicle
Voltage

6.8 Changes from previous issue. The margins of this specification are marked with vertical lines to indicate where changes from the previous issue were made. 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 and relationship to the last previous issue.

Custodians:
Army - AT
Navy - MC
Air Force - 99

Review Activity:
DLA - CC

Preparing Activity:
Army - AT

(Project 2920-2009-002)

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