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MILITARY SPECIFICATION

POWER SUPPLY, TRANSFORMER-RECTIFIER, AIRCRAFT, GENERAL SPECIFICATION FOR

1. SCOPE

1.1 This specification covers general requirements for power supplies that convert power from a nominal 115/200V, 400 cps, alternating-current aircraft electrical system to direct-current power.

1.2 CLASSIFICATION.- The power supplies shall be of the following types and classes as specified (see 6.2):

Type I - Regulated - Contains provisions for regulated output voltage and parallel operation.

Type II - Nonregulated - Does not contain provisions for regulated output voltage and shall depend on the inherent characteristics of the power conversion elements to maintain voltage and provide paralleling within the specified limits.

Class A - Power supplies which are self-cooled and designed to meet the altitude-temperature requirements of MS33543, curve II.

Class B - Power supplies which are self-cooled and designed to meet the altitude-temperature requirements of MS33543, curve I, except that the temperature at sea level shall be 125° C.

Class C - Power supplies which are forced-air cooled and designed to meet the altitude-temperature requirements of MS33543, curve I, except that the temperature at sea level shall be 125° C.

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2. APPLICABLE DOCUMENTS

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

SPECIFICATIONS

Federal

QQ-P-416	Plating, Cadmium (Electrodeposited)

Military

MIL-M-3171	Magnesium Alloy, Processes for Corrosion Protection of
MIL-E-5272	Environmental Testing, Aeronautical and Associated Equipment, General Specification for
MIL-S-7742	Screw Threads, Standard, Optimum Selected Series: General Specification for
MIL-M-7969	Motors, Alternating Current, 400-Cycle, 115/200-Volt System, Aircraft, Class A and Class B, General Specification for
MIL-A-8625	Anodic Coatings, for Aluminum and Aluminum Alloys
MIL-T-9107	Test Reports, Preparation of
MIL-P-17555	Preparation for Delivery of Electronic Equipment, Miscellaneous Electrical Equipment (Except Rotating Electrical Equipment) and Associated Repair Parts
MIL-E-19600	Electronic Modules, Aircraft, General Requirements For
MIL-I-26600	Interference Control Requirements, Aeronautical Equipment
MIL-D-70327	Drawings, Engineering and Associated Lists

STANDARDS

Military

MIL-STD-129	Marking For Shipment and Storage
MIL-STD-130	Identification Marking of U. S. Military Property
MIL-STD-143	Specifications and Standards, Order of Precedence for the Selection of
MIL-STD-704	Electric Power, Aircraft Characteristics and Utilization of

MS33543	Criteria - Temperature And Altitude Range Self Cooled Electric Equipment
MS33586	Metals, Definition of Dissimilar

(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.)

3. REQUIREMENTS

3.1 QUALIFICATION.- The power supply furnished under this specification shall be a product which has been tested, and passed the qualification tests specified herein, and has been listed on or approved for listing on the applicable qualified products list.

3.2 SELECTION OF SPECIFICATIONS AND STANDARDS.- Specifications and standards for necessary commodities and services not specified herein shall be selected in accordance with MIL-STD-143.

3.3 MATERIALS

3.3.1 FUNGUS-PROOF MATERIALS.- Materials that are nutrients for fungi shall not be used where it is practicable to avoid them. Where used and not hermetically sealed, they shall be treated with a fungicidal agent acceptable to the procuring activity. However, if they will be used in a hermetically sealed inclosure, fungicidal treatment will not be necessary.

3.3.2 COMBUSTIBLE MATERIALS.- Materials that support combustion and maintain open flame after the ignition source has been removed shall not be used. High-temperature materials shall be used throughout the power supply.

3.3.3 METALS.- Metals shall be of the corrosion-resistant type or suitably treated to resist corrosion due to fuels, salt spray, or atmospheric conditions that may be encountered in storage or normal service.

3.3.3.1 DISSIMILAR METALS.- Unless suitably protected against electrolytic corrosion, dissimilar metals shall not be used in intimate contact with each other. Dissimilar metals are defined in MS33586.

3.4 DESIGN AND CONSTRUCTION.- Unless otherwise specified in the applicable MS standard, the power supply shall meet the requirements specified herein.

3.4.1 The power supply shall consist of transformers, rectifiers, and other components, except electron tubes, necessary to meet requirements for the performance specified herein and in the applicable MS standard.

3.4.2 INPUT-CURRENT BALANCE.- The current input to each phase of the power supply shall be within 5 percent of the average value of the effective current in all phases for any condition from one-fourth load to full load.

3.4.3 VOLTAGE-ADJUSTMENT RANGE (TYPE I ONLY).- The output voltage of the power supply shall be adjustable over the range specified in the applicable MS standard. The adjustment control shall be readily accessible and provisions shall be made for positive locking.

3.4.4 SERVICE LIFE.- The power supply, with the exception of the fan motor, shall be designed for a service life of at least 8,000 hours without maintenance. The fan motor, if supplied, shall have a life of at least 1,500 hours without maintenance.

3.4.5 COOLING.- The power supply shall be cooled as specified in the applicable MS standard. Fan motors, where specified, shall conform to MIL-M-7969.

3.4.5.1 EXPLOSION-PROOF FAN MOTOR.- The cooling-fan motor shall be an explosion-proof type which shall not be adversely affected internally nor ignite an explosive mixture outside the unit.

3.4.6 ELECTRICAL CONNECTIONS.- Internal wiring of the unit shall be in accordance with the applicable MS standard and shall terminate as specified therein.

3.4.7 Accidental loosening of bolts, screws, and other connections shall be prevented by lockwashers, locknuts, staking, or other approved methods.

3.4.8 PROTECTION.- All ventilating openings shall be of such size as to prevent passage of a 5/16-inch diameter rod.

3.5 PERFORMANCE.- The power supply shall be capable of operating satisfactorily under the following conditions or natural combinations thereof:

a. Temperature-altitude in accordance with MS33543 as specified in the applicable MS standard.

b. Temperature constant at -59° C from sea level to the maximum altitude specified in the applicable MS standard.

c. After prolonged storage at -65° C.

d. Relative humidity up to 100 percent, including conditions wherein condensation takes place in the form of both water and frost.

e. Moist fungi encountered in tropical and semitropical climates.

f. Vibration incident to service use.

g. Exposure to sand and dust as encountered in desert areas.

h. Exposure to atmosphere containing salt-laden moisture.

3.5.1 INPUT POWER.- The power supply shall be capable of operating from an alternating-current power source as specified in MIL-STD-704.

3.5.1.1 POWER FACTOR.- The full-load and half-load power factors shall be not less than that specified in the applicable MS standard.

3.5.2 INPUT VOLTAGE.- Rated input voltage shall be 200V. The type I power supply shall be designed for operation on a voltage range of 190 to 210V.

3.5.2.1 TRANSIENT INPUT VOLTAGE.- The power supply shall be capable of withstanding a transient input of twice-rated voltage for 0.1 second.

3.5.2.2 OUTPUT VOLTAGE.- Unless otherwise specified in the applicable MS standard, the output voltage shall be in accordance with MIL-STD-704 or MIL-E-19600, as applicable.

3.5.3 FREQUENCY.- Rated frequency shall be 400 cps; however, the power supply shall be designed for operation on a frequency range of 380 to 420 cps.

3.5.4 CONTINUOUS RATING.- The power supply shall be capable of delivering a continuous output in accordance with the rating chart shown in the applicable MS standard.

3.5.5 FIVE-MINUTE RATING.- The power supply shall be capable of delivering 150 percent of continuous rated current for cyclical operation of 5 minutes on and 15 minutes off for a period of 7 hours. Under this overload condition, the voltage shall be not less than that specified in the applicable MS standard.

3.5.6 ONE-MINUTE RATING.- The power supply shall be capable of delivering 250 percent of continuous rated current for cyclical operation of 1 minute on and 18 minutes off for a period of 7 hours. Under this overload condition, the voltage shall be not less than that specified in the applicable MS standard.

3.5.7 SHORT-CIRCUIT CAPACITY.- The power supply shall be capable of delivering a short-circuit current of at least 500-percent rated-load current for 1 second.

3.5.8 OVERVOLTAGE.- The power supply shall be capable of continuous operation on an input voltage of 220V.

3.5.9 TEMPERATURE RISE.- The temperature rise of the components shall not exceed their breakdown limit under the temperature and altitude operating conditions shown in the applicable MS standard.

3.5.10 VOLTAGE REGULATION

3.5.10.1 TYPE I REGULATED UNITS.- The power supply shall be so designed that the output voltage will remain within the limits specified in the applicable MS standard when the load on the power supply is varied from no load to full load and the input voltage and frequency are maintained within the limits of 190 to 210V and 380 to 420 cps. No bleeder resistor shall be connected between the direct-current output terminals of the power supply.

3.5.10.2 TYPE II NONREGULATED UNITS.- The power supply shall be so designed that the output voltage will remain within the limits specified in the applicable MS standard when the load on the power supply is varied from the minimum specified load to full load and the input voltage and frequency are maintained within the limits of 195 to 210V and 380 to 420 cps. No bleeder resistor shall be connected between the direct-current output terminals of the power supply.

3.5.10.2.1 At an input voltage of 210V, the no-load output voltage of the type II power supply shall not exceed that specified in the applicable MS standard.

3.5.11 PARALLEL OPERATION

3.5.11.1 TYPE I REGULATED UNITS.- The power supply shall be so designed that two or more units can be operated in parallel. During parallel operation, the output current and voltage shall remain within the limits specified in the applicable MS standard.

3.5.11.2 TYPE II NONREGULATED UNITS.- The power supply shall be so designed that two or more units can be operated in parallel. During parallel operation, the output voltage and current shall remain within the limits of the load division envelope shown in the applicable MS standard. when the units are operated at rated input voltage and frequency.

3.5.12 EFFICIENCY.- The overall efficiency shall be not less than that shown in the applicable MS standard.

3.5.13 RIPPLY VOLTAGE.- The peak ripple in the direct-current output voltage shall not exceed 1.5V.

3.5.14 INSULATION.- The current-carrying parts of the power supply shall be insulated from the frame. The insulation shall be capable of withstanding 1,500V rms at commercial frequency between any terminal and the frame of the power supply.

3.5.15 POSITION.- The power supply shall operate satisfactorily when mounted in any position, except that completely static power supplies shall conform to the requirements of the applicable MS standard.

3.6 INTERCHANGEABILITY.- All parts having the same manufacturer's part number shall be functionally and dimensionally interchangeable. The drawing number requirements of MIL-D-70327 shall govern changes in the manufacturer's part numbers.

3.7 RADIO INTERFERENCE.- The power supply shall meet the radio interference requirements of MIL-I-26600.

3.8 DIMENSIONS AND WEIGHT.- The dimensions and weight of the power supply shall be as specified in the applicable MS standard.

3.9 SCREW THREADS.- Unless otherwise specified, the threads of all machine screws 0.060 inch or larger in diameter shall conform to MIL-S-7742.

3.10 FINISHES AND PROTECTIVE COATINGS

3.10.1 ALUMINUM-ALLOY PARTS.- Wherever practicable, aluminum-alloy parts shall be anodically treated in accordance with MIL-A-8625. The aluminum-oxide film formed by this treatment shall be removed from the actual contact area of all surfaces required to act as a path for electrical current and from the local areas under screws, nuts, et cetera, used for assembly or mounting purposes, to provide adequate bonding connections.

3.10.2 MAGNESIUM-ALLOY PARTS.- Wherever practicable, magnesium-alloy parts shall be surface treated in accordance with MIL-M-3171 to provide protection against corrosion.

3.10.3 PLATING.- Cadmium plating shall be in accordance with QQ-P-416, type II, and of a class that is adequate to achieve the degree of protection required.

3.11 IDENTIFICATION OF PRODUCT.- Equipment, assemblies, and parts shall be marked for identification in accordance with MIL-STD-130. The following information shall be included:

_____ Amp 28V dc
Input 200V, 3 phase, 400 cps
For 28V d-c system

3.12 WORKMANSHIP.- The power supply, including all parts and accessories, shall be constructed and finished in a thoroughly workmanlike manner. Particular attention shall be given to neatness and thoroughness of soldering, wiring, impregnation of coils, marking of parts and assemblies, welding and brazing, painting, riveting, machine-screw assemblies, and freedom of parts from burrs and sharp edges.

3.12.1 SCREW ASSEMBLIES.- Assembly screws and bolts shall be tight. The word tight means that the screw or bolt cannot be appreciably tightened further without damage or injury to the screw, bolt, or threads.

3.12.2 RIVETING.- Riveting operations shall be carefully performed to insure that the rivets are tight and satisfactorily headed.

3.12.3 CLEANING.- The power supply shall be thoroughly cleaned of loose, spattered, or excess solder, metal chips, and other foreign material after final assembly. Burrs and sharp edges, as well as resin flash that may crumble, shall be removed.

4. QUALITY ASSURANCE PROVISIONS

4.1 SUPPLIER RESPONSIBILITY.- The supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own or any other inspection facilities and services acceptable to the Government. Inspection records of the examination and tests shall be kept complete and available to the Government as specified in the contract or order. 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.

4.2 CLASSIFICATION OF TESTS.- The inspection and testing of the power supply shall be classified as follows:

a. Qualification tests

b. Acceptance tests

4.3 TEST CONDITIONS

4.3.1 ATMOSPHERIC CONDITIONS.- Whenever the pressure and temperature existing at the time of the test are not specified definitely, the test shall be made at atmospheric pressure (approximately 29.92 inches Hg) and at room temperature of approximately 25° C. When tests are made with atmospheric pressure or room temperature differing materially from the above values, proper allowances shall be made for the difference from the specified condition.

4.4 QUALIFICATION TESTING

4.4.1 TEST SAMPLES.- The qualification test samples shall consist of 4 complete power supply units representative of the production equipment. The samples shall be identified with the manufacturer's part number and such other information as required by the preparing activity. The samples shall be prepared as follows:

4.4.1.1 DATA TO ACCOMPANY TEST SAMPLES.- The test samples shall be accompanied by the following data:

a. Brief operating data or instructions to enable test personnel to correctly operate the equipment.

b. Engineering data in the form of assembly and detail drawings, wiring diagrams, et cetera.

4.4.2 TEST REPORT, TEST SAMPLES, AND DATA FOR THE PROCURING ACTIVITY.- When the tests are conducted at a location other than the laboratory of the procuring activity, the following shall be furnished to the procuring activity:

a. Test report.- Three copies of a test report in accordance with MIL-T-9107.

b. Test samples.- The samples which were tested, identified by sample number.

c. Data.- The data required under 4.4.1.1.

4.4.3 QUALIFICATION TESTS.- Qualification tests shall consist of all tests described under 4.6, and unless otherwise specified, shall be conducted in the order specified in table I.

TABLE I

SEQUENCE	QUALIFICATION	PARAGRAPH	SAMPLE NUMBER 1	2	3	4
1	Examination of product	4.6.1	X	X	X	X
2	Voltage regulation	4.6.2	X	X	X	X
3	Insulation	4.6.4	X	X	X	X
4	Efficiency	4.6.5	X	X	X	X
5	Frequency influence	4.6.6	X	X	X	X
6	Ripple voltage	4.6.10	X	X	X	X
7	Overvoltage	4.6.13		X		
8	Power factor	4.6.14			X	
9	Transient voltage	4.6.15			X	
10	Parallel operation	4.6.7	X	X		X
11	Overload	4.6.8	X			
12	Variables affecting output voltage	4.6.3	X			
13	Radio interference	4.6.9			X	
14	Endurance	4.6.11	X			X
	Environmental	4.6.12				
15	Low temperature	4.6.12.1			X	
16	Altitude	4.6.12.7			X	
17	Shock	4.6.12.8		X		
18	Acceleration	4.6.12.9		X		
19	Explosion-proof	4.6.12.10		X		
20	Vibration	4.6.12.4			X	
21	Fungus	4.6.12.5			X	
22	Sand & dust	4.6.12.6		X	X	
23	Humidity	4.6.12.2		X		
24	Salt spray	4.6.12.3		X		

4.5 ACCEPTANCE TESTS.- Acceptance tests shall consist of the following:

a. Individual tests

b. Sampling plan and tests.

4.5.1 INDIVIDUAL TESTS.- Each power supply shall be subjected to the following tests as described under 4.6:

a. Examination of product

b. Voltage regulation

c. Insulation.

4.5.2 SAMPLING TESTS

4.5.2.1 SAMPLING PLAN.- Two power supplies shall be selected at random from each 100 or fraction thereof produced and subjected to the following tests as described under 4.6:

a. Transient voltage

b. Short circuit (one time only)

c. Efficiency

d. Frequency influence

e. Ripple voltage

f. Parallel operation.

4.5.2.1.1 REJECTION AND RETEST.- When an item selected from a production run fails to meet the specification, no items still on hand or later produced shall be accepted until the extent and cause of failure have been determined and appropriately corrected. The contractor shall explain to the Government representative the cause of failure and the action taken to preclude recurrence. After correction, all of the tests shall be repeated.

4.5.2.1.1.1 INDIVIDUAL TESTS MAY CONTINUE.- For production reasons, individual tests or other sampling plans may be continued pending the investigation of a sampling test failure. But final acceptance of the entire lot or items on hand or produced later, whichever the case may be, shall not be made until it is determined that all items meet all the requirements of the specification.

4.5.2.1.1.2 DEFECTS IN ITEMS ALREADY ACCEPTED.- The investigation of a test failure could indicate that defects may exist in items already accepted. If so, the contractor shall fully advise the procurement activity of all defects likely to be found and the method of correcting them.

4.6 TEST METHODS

4.6.1 EXAMINATION OF PRODUCT.- The power supply shall be inspected to determine compliance with the requirements specified herein with respect to materials, workmanship, dimensions, weight, and marking.

4.6.2 VOLTAGE REGULATION

4.6.2.1 TYPE I REGULATED UNIT.- The output voltage shall be measured at zero, one-fourth, one-half, three-fourths, and full-rated load at input voltages of 190, 200, and 210V, 400 cps. The output voltage shall remain within the limits specified in the applicable MS standard.

4.6.2.2 TYPE II NONREGULATED UNIT.- The output voltage of the power supply shall be measured at no load and minimum specified load with the input held at 210V, 400 cps. Full-rated resistive load shall be connected and the output voltage measured with the input held at 195V, 400 cps. During this test, the output voltage shall remain within the limits specified in the applicable MS standard.

4.6.3 VARIABLES AFFECTING OUTPUT VOLTAGE.- The output voltage shall be measured under the following conditions. For each temperature condition, the voltage shall remain within the limits specified in the applicable MS standard. For type I regulated units, 190V a-c input shall be used in lieu of 195V.

4.6.3.1 VOLTAGE REGULATION AT AMBIENT TEMPERATURE

4.6.3.1.1 At 195V a-c input and 380 cps, the load shall be varied from no load to full load. Sufficient data shall be taken to accurately plot a voltage regulation curve.

4.6.3.1.2 The test specified in 4.6.3.1.1 shall be repeated at 200V a-c input and 380 cps.

4.6.3.1.3 The test specified in 4.6.3.1.1 shall be repeated at 210V a-c input and 380 cps.

4.6.3.1.4 At zero-output current and 380 cps, the input voltage shall be varied gradually from 190 to 210V and returned. The load shall not be adjusted and data need be recorded only at minimum and maximum input voltage conditions. This test shall be conducted on type I only.

4.6.3.1.5 At 50-percent rated output current, the test specified in 4.6.3.1.4 shall be repeated (type I only).

4.6.3.1.6 At 100-percent rated output current, the test specified in 4.6.3.1.4 shall be repeated (type I only).

4.6.3.2 With the frequency at 420 cps, the tests specified in 4.6.3.1 through 4.6.3.1.6 shall be repeated at 25° ±15° C.

4.6.3.3 VOLTAGE REGULATION AT LOW TEMPERATURE.- The tests specified in 4.6.3.1 and 4.6.3.2 shall be repeated at an ambient temperature of -65° C. The unit shall have been stabilized by at least 4 hours of continuous operation at this temperature at full load.

4.6.3.4 VOLTAGE REGULATION AT MAXIMUM TEMPERATURE.- The tests specified in 4.6.3.1 and 4.6.3.2 shall be repeated at an ambient temperature of 71° C for class A units, 125° C for class B and class C units. The units shall have been stabilized by at least 4 hours of continuous operation at these temperatures at full load.

4.6.4 INSULATION.- A potential of 1,500V rms commercial frequency shall be applied for 1 minute between the input terminals short-circuited together and the output terminals short-circuited together. Breakdown of the insulation shall not occur as a result of this test.

4.6.4.1 For units having auto-transformers, a potential of 1,500V rms commercial frequency shall be applied between the metal enclosure and all the terminals short-circuited together. Breakdown of the insulation shall not occur as a result of this test.

4.6.5 EFFICIENCY.- With the input adjusted at 200V, 400 cps, the full-load efficiency of the power supply shall be measured after an initial 30-minute warmup period. The load shall be reduced to 50-percent resistive and the efficiency measured again. The efficiency shall be not less than that shown in the applicable MS standard.

4.6.6 FREQUENCY INFLUENCE.- The output voltage of the power supply shall be measured at no load and minimum specified load with the input maintained at 210V, 420 cps. Full resistive load shall then be connected and the output voltage measured at an input of 195V, 380 cps and again at 195V, 420 cps. During this test, the direct-current output voltage shall remain within the limits specified in 3.5.10.

4.6.7 PARALLEL OPERATION

4.6.7.1 Two power supplies shall be connected to a common load and the load varied from no load to the combined rated load in 25-percent increments. Load division shall be as specified in 3.5.11. The output voltage during parallel operation shall remain within the limits shown on the applicable MS standard.

4.6.7.2 Three power supplies shall be connected to a common load and the load adjusted to two-thirds of the combined rating of the 3 units. One unit shall be deenergized and the output voltage of the remaining units shall remain within the limits shown in the applicable MS standard.

4.6.8 OVERLOAD

4.6.8.1 The power supply shall be operated for 7 hours, during which time a resistive load of 150 percent is cycled for 5 minutes on and 15 minutes off, the input voltage and frequency being held at 200V, 400 cps. Operation shall be satisfactory and the output voltage and rectifier temperature shall not exceed the maximum allowable values for overload as specified in the applicable MS standard.

4.6.8.2 The power supply shall be operated for 7 hours during which time a resistive load of 250 percent is cycled for 1 minute on and 18 minutes off, the input voltage and frequency being held at 200V, 400 cps. Operation shall be satisfactory and output voltage and rectifier temperature shall not exceed the maximum allowable values for overload as specified in the applicable MS standard.

4.6.8.3 SHORT CIRCUIT.- The power supply shall demonstrate its ability to deliver no less than 500-percent rated-load current under short-circuit conditions with an input voltage and frequency of 200V, 400 cps. The duration of the fault shall be 1 second. This test shall be repeated 3 times, and the power supply shall be allowed to return to ambient temperature before each short-circuit application. No damage shall occur as a result of this test.

4.6.9 RADIO INTERFERENCE.- When specified in the applicable MS standard, both the conducted and radio interference shall be measured at no load, half load, and full load using the test procedures and any applicable test instruments specified in MIL-I-26600. Units exceeding the limits specified in MIL-I-26600 shall be rejected.

4.6.10 RIPPLE VOLTAGE.- The ripple in the direct-current output voltage of the power supply shall be measured at no load, one-fourth, one-half, three-fourths, and full-rated resistive loads. Voltage shall be measured with a 4-microfarad capacitor in series with a peak-reading voltmeter. Peak voltage readings shall be taken with a vacuum-tube voltmeter successively connected for each of the two polarities. The higher of the two readings shall not exceed 1.5V.

4.6.11 ENDURANCE.- The power supply shall be operated for 500 hours under the operating conditions specified in the applicable MS standard. If a motor is used, the power to the unit shall be interrupted once every 24 hours so that the motor shaft comes to rest. After the shaft has been at rest for 5 minutes, the power shall be restored and the endurance test continued. If the motor fails to start after one of the power interruptions, the power supply shall be considered to have failed the endurance test. Thermocouples shall be used to monitor the temperatures of the transformer, the rectifier, and fan-motor case, and bearings (if a motor is used) for indication of maximum temperatures. Upon completion of this test, the power supply shall satisfactorily withstand the test specified in 4.6.2.

4.6.11.1 If a motor is used, and upon completion of the 500-hour test specified in 4.6.11, the power supply shall be subjected to an additional 1,000 hours of operation. During this portion of the test, the transformer and rectifier elements may be electrically disconnected with only the fan motor being energized. The power to the motor shall be interrupted once every 24 hours, as specified in 4.6.11. The ambient temperature shall be such that the motor bearings will be maintained at the maximum stabilized temperature reached during the 500-hour test. There shall be no evidence of bearing deterioration and no damage to the fan-motor assembly at the conclusion of this test.

4.6.12 ENVIRONMENTAL.- The power supply shall be subjected to the following tests in accordance with the specified procedures of MIL-E-5272:

4.6.12.1 LOW TEMPERATURE.- The power supply shall be subjected to low temperature in accordance with procedure II, except that the 72-hour exposure shall be at -65° C and the 24-hour exposure shall be at -59° C. A source of 200V, 3-phase, 400 cps power shall be connected and the power supply operated at no-load during the final hour of the test. Operation shall be satisfactory and no damage shall occur as a result of this test.

4.6.12.2 HUMIDITY.- The power supply shall be subjected to humidity in accordance with procedure I. At the end of the test, the power supply shall show no signs of excessive corrosion and shall satisfactorily withstand the following tests in the order listed:

a. Voltage regulation (at an ambient temperature of 25° C)

b. Efficiency

c. Ripple voltage

d. Insulation test using a potential of 500V in lieu of 1,500V.

4.6.12.3 SALT SPRAY.- The power supply shall be subjected to salt spray for a period of 50 hours in accordance with specified procedure. At the end of the test, the power supply shall show no signs of excessive corrosion and shall satisfactorily withstand the tests listed (a, b, c, and d) under 4.6.12.2.

4.6.12.4 VIBRATION.- The power supply shall be subjected to vibration in accordance with procedure XII and any additional requirements which may be specified in the applicable MS standard. The power supply shall be operated at no load during the test.

4.6.13.4.1 After completion of the test specified in 4.6.12.4, the power supply shall show no signs of damage or loosening of parts and shall satisfactorily withstand the tests listed under 4.6.12.2.

4.6.12.5 FUNGUS.- The power supply shall be subjected to fungus in accordance with procedure I. At the end of the test, the power supply shall show no appreciable growth of fungi and shall satisfactorily withstand the tests listed under 4.6.12.2.

4.6.12.6 SAND AND DUST.- The power supply shall be subjected to sand and dust in accordance with procedure I. At the end of the test, the power supply shall operate satisfactorily and shall withstand the tests listed under 4.6.12.2.

4.6.12.7 TEMPERATURE-ALTITUDE.- The power supply shall be subjected to altitude in accordance with procedure II, except that the altitude condition and ambient temperature shall be as specified in the applicable MS standard. After the 1-hour period, the power supply shall be operated at this condition at rated load for a period of 7 hours.

4.6.12.7.1 TEMPERATURE RISE.- During the altitude test, the power supply shall also be checked for temperature rise. The temperature of the components shall not exceed their breakdown limit.

4.6.12.8 SHOCK.- When specified in the applicable MS standard, the power supply shall be shock tested in accordance with procedure V. At the end of the test, the unit shall operate satisfactorily and shall withstand the tests listed under 4.6.12.2. Damage or failure of any part of the unit during the shock test shall be cause for rejection.

4.6.12.9 ACCELERATION.- When specified in the applicable MS standard, the power supply shall be tested in accordance with procedure III. At the end of the test, the power supply shall operate satisfactorily and shall withstand the tests listed under 4.6.12.2.

4.6.12.10 EXPLOSION-PROOF.- The power supply shall be tested for explosion-proofness in accordance with procedure III. When operated at no load and an input of 220V, 400 cps, the power supply shall not ignite an explosive mixture within or outside the equipment.

4.6.12.10.1 The fan motor shall be removed from the power supply and tested for explosion-proofness in accordance with procedure IV. The fan motor shall demonstrate its ability to contain an explosion.

4.6.13 OVERVOLTAGE.- The power supply shall be operated at rated output current for 7 hours with the input held at 220V, 400 cps. The temperature of the components shall not exceed the maximum critical temperature limit for rated life of the components and no damage shall occur as a result of this test.

4.6.14 POWER FACTOR.- With an input of rated voltage and frequency as specified in 3.5.2 and 3.5.3, the full-load and half-load power factors of the power supply shall be measured after a warmup period of 30 minutes. The power factors shall be not less than specified in the applicable MS standard.

4.6.15 TRANSIENT VOLTAGE.- The power supply shall be subjected to twice-rated input voltage for 0.1 second. No damage shall result from this test and the power supply shall satisfactorily withstand the tests specified in 4.6.2 and 4.6.10.

5. PREPARATION FOR DELIVERY

5.1 PRESERVATION, PACKAGING, AND PACKING.- All preservation, packaging, and packing shall be in accordance with MIL-P-17555. Method II shall be used for extended storage and overseas shipment.

5.2 MARKING FOR SHIPMENT AND STORAGE.- Interior packages and exterior shipping containers shall be marked in accordance with MIL-STD-129. The nomenclature shall be as follows:

POWER SUPPLY, TRANSFORMER-RECTIFIER, AIRCRAFT.

6. NOTES

6.1 INTENDED USE.- The power supplies covered by this specification are intended for use as devices to convert alternating-current electrical energy into direct-current electrical energy. They are intended for continuous duty on aircraft.

6.2 ORDERING DATA.- Procurement documents should specify the following:

a. Title, number, and date of this specification and any applicable MS standard.

b. Type and class of power supply desired (see 1.2).

c. Applicable levels of preservation, packaging, and packing.

6.3 QUALIFICATION.- With respect to products requiring qualification, awards will be made only for such products as have, prior to the time set for opening of bids, been tested and approved for inclusion in the applicable Qualified Products List whether or not such products have actually been so listed by that date. The attention of the suppliers is called to this requirement, 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 orders for the products covered by this specification. The activity responsible for the qualified products list is the Wright Air Development Division, Wright-Patterson Air Force Base, Ohio and information pertaining to qualification of products may be obtained from that activity.

SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 119-R004

INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity *(as indicated on reverse hereof)*.

SPECIFICATION

ORGANIZATION *(Of submitter)*

CITY AND STATE

CONTRACT NO.

QUANTITY OF ITEMS PROCURED

DOLLAR AMOUNT
$

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

☐ YES ☐ NO IF "YES", IN WHAT WAY?

4. REMARKS *(Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)*

SUBMITTED BY *(Printed or typed name and activity)*

DATE

DD FORM 1 APR 63 1426 REPLACES NAVSHIPS FORM 4863, WHICH IS OBSOLETE. C-8279