MIL-T-22143A(WEP)
20 MAY 1960
SUPERSEDING
MIL-T-22143(AER)
15 SEPTEMBER 1959

MILITARY SPECIFICATION

TELETYPEWRITER, TT-264/AG

This specification has been approved by the
Bureau of Naval Weapons, Department of the Navy.

1. SCOPE

1.1 Scope - The equipment covered by this specification is a transmitting and receiving page printing telegraph set, which may be operated into, or out of, a converter for use over half duplex (simplex) or full duplex radio communication links between aircraft and properly equipped surface stations or other aircraft.

1.2 Classification - The Teletypewriter TT-264/AG shall be of one type and shall consist of the following items:

Items	Type Designation	Appl. Para.
Transmitting Keyboard	(*)	3.3.1
Receiving Page Printer	(*)	3.3.2
Connecting Chassis (including Internal line battery supply)	(*)	3.3.3
Airborne type carrying case	(*)	3.3.4
Automatic Paper Winder	(*)	3.3.5
Mounting	(*)	3.3.4.2

NOTE: (*) See paragraph 6.2.

1.3 Compatibility Requirement - The equipment shall be capable of operating with the following equipments which are not to be supplied as part of this equipment.

Unit	Type Designation
Radio Set	AN/ARC-38 (Modified for FSK operation)
Keyer, Frequency Shift	KY-302/ARC-38 Collins Radio Co. Model 706B-1 or an approved equivalent equipment
Control, FSK	Collins Radio Co. Model 614C-4 or an approved equivalent equipment

2. DOCUMENTS

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

SPECIFICATIONS

Military

MIL-C-172 Cases; Bases, Mounting; and Mounts, Vibration (For Use with Electronic Equipment in Aircraft)

MIL-E-4682	Electron Tubes and Transistors, Choice and Application of
MIL-W-5088	Wiring; Aircraft, Installation of
MIL-E-5400	Electronic Equipment, Aircraft, General Specification for
MIL-T-5422	Testing, Environmental Aircraft Electronic Equipment
MIL-I-6181	Interference Limits, Tests and Design Requirements, Aircraft Electrical and Electronic Equipment
MIL-P-7788	Plate, Plastic, Cockpit and Interior Controls Lighting
MIL-P-17555	Preparation for Delivery of Electronic Equipment, Miscellaneous Electrical Equipment (Except Rotating Electrical Equipment) and Associated Repair Parts
MIL-T-18303	Test Procedures, Preproduction and Inspection, For Aircraft Electronic Equipment, Format for
MIL-N-18307	Nomenclature and Nameplates for Airborne Electronic and Associated Equipment

STANDARDS

Military

MS 25245	Connections, Input Power Airborne Electronic Equipment; 28-Volt DC, 115-Volt Single-Phase AC, or 115/200 Volt 3-Phase AC, or Combinations
MIL-STD-704	Electric Power, Aircraft, Characteristics and Utilization of

Bureau of Naval Weapons

SAR-300	Material Changes and Material Bulletins, Preparation of

2.2 Availability of Documents -

(1) When requesting applicable documents give both the title and number. Copies of this specification and applicable documents may be obtained upon application to the Commanding Officer, Naval Supply Depot, (CDS), 5801 Tabor Avenue, Philadelphia 20, Pennsylvania.

3. REQUIREMENTS

3.1 Parts and Materials - In the selection of parts and materials, fulfillment of major design objectives shall be the prime consideration. In so doing the following shall govern:

(1) Parts and materials as approved by Specification MIL-E-5400 shall be given first consideration.

(2) Nonrepairable subassemblies, as outlined in Specification MIL-E-5400, shall be used when practicable. The general size of the subassembly, and the amount of circuitry to be included therein shall be approved by the procuring activity. Nonrepairable subassemblies must be reliable. A mean-time-to failure of more than 5000 hours should be the goal of each.

(3) When previously produced models of this equipment did not use non-repairable subassemblies, the design shall not be changed to employ non-repairable assemblies without the approval of the procuring activity.

3.1.1 Nonstandard Parts and Material Approval - Approval for the use of non-standard parts and materials shall be obtained as outlined in Specification MIL-E-5400.

3.1.2 Electron Devices - Transistors and diodes shall be chosen and applied, and the complements reported as outlined in Specification MIL-E-4682. The complement report must be submitted to the procuring activity for review and approval prior to preproduction testing. No electron tubes shall be used.

3.2 Design and Construction -

3.2.1 General - This equipment shall fulfill all applicable design and construction requirements of Specification MIL-E-5400 unless otherwise specified herein.

3.2.2 Service Conditions - The equipment shall operate satisfactorily under any of the environmental and mechanical service conditions or reasonable combination of these conditions as specified in Specification MIL-E-5400 for Class 1 equipment.

3.2.3 Standard Conditions - The following conditions shall be used as a basis to establish normal performance requirements and for making laboratory bench tests.

Temperature	Room ambient (30°C ± 10°C)
Altitude	Normal ground
Vibration	None
Humidity	Room ambient up to 90% relative humidity
Input power voltage	115 ± 1.0 V AC

3.2.4 Total Weight - The total weight of the equipment, excluding a full size standard paper roll and external cables, shall be a minimum consistent with good design and shall not exceed 30 pounds.

3.2.5 Operational Stability - The equipment shall operate with optimum performance for 100 hours, continuously or intermittently, without the necessity for readjustment of any controls which are inaccessible during flight.

3.2.6 Operating Life -

3.2.6.1 Reliable Operating Life - The equipment shall have a reliable operating life of at least 250 hours without removal for bench servicing. Parts requiring servicing or replacement at the end of this interval to renew this service life shall be specified by the manufacturer.

3.2.6.2 Total Operating Life - The equipment shall have a minimum total operating life of 2,000 hours with reasonable servicing and replacement of parts. Parts requiring replacement within this interval and the life of such parts shall be specified by the manufacturer.

3.2.7 Interconnection Cabling - This equipment shall be capable of satisfactory operation using external wiring in accordance with the applicable requirements of Specification MIL-W-5088. The external wiring shall be unshielded, except that a minimum number of the individual wires may be shielded when demonstrated as necessary to meet interference control requirements and provided the assembly of the cable to its plugs may be easily accomplished.

3.2.8 Cables and Connectors - The equipment shall provide for the use of cables and connectors in accordance with Specification MIL-E-5400. However, cables and that portion of the connectors which is to be attached to the cables shall not be supplied as part of the equipment. An appropriate power cord six feet long shall be provided.

3.2.8.1 Signal Cords - A pair of six-foot two conductor cords shall be provided. These cords shall have connectors which are compatible with the connectors furnished on the equipment listed in paragraph 1.3.

3.2.9 Input Power Requirements - The equipment shall meet all applicable requirements of Specification MIL-STD-704 and shall give specified performance when provided with power from the following sources with characteristics as defined in MIL-STD-704. The power required shall not exceed the amounts shown.

(1) 115 V.A.C. single phase Category C 500 VA

3.2.10 Input Power Connection - Input power connections shall be in accordance with MS 25245.

3.2.11 Overload Protection - Overload protection for the equipment shall be provided in the equipment. All parts and circuits of the equipment which are likely to carry an overload due to any failures or poor adjustments shall have suitable protective devices or shall be proportioned to withstand such overload without permanent damage to the equipment. The use of fuses and other protective devices shall be held to a minimum.

3.2.11.1 Undervoltage Protection - The equipment shall not be damaged by voltages below the minimum specified herein and shall automatically resume normal operation when the voltage is returned within limits.

3.2.12 Nomenclature and Nameplates - Nomenclature assignment and nameplate approval for equipment identification shall be in accordance with Specification MIL-N-18307. See paragraph 6.2.

3.2.13 Interchangeability - The equipment shall meet the interchangeability requirements as specified in Specification MIL-E-5400.

3.2.14 Maintenance Provisions and Field Testing - Provisions for maintenance shall be as specified in Specification MIL-E-5400. Specific test points and test facilities shall be provided to the greatest extent practicable for ease of field testing and maintenance.

3.2.15 Radio Interference Control - The generation of radio interference by the equipment and vulnerability of the equipment to radio interference shall be controlled within the limits of Specification MIL-I-6181, unless otherwise specified herein.

3.2.16 Warm-Up Time - The time required for the equipment to warm-up prior to operations shall be kept to a minimum and shall not exceed 40 minutes at ambient temperature of -54°C.

3.3 Performance Requirements - The performance of the equipment shall be as specified hereinafter. These performance requirements shall apply under both standard and service conditions, unless otherwise specified herein.

3.3.1 Transmitting Keyboard (*) - The keyboard which contains the transmitting contacts shall be a standard communications three row keyboard containing thirty-two character keys including the space bar. The keyboard shall also contain a "Break" key and a "Repeat" key. Bank on keys shall be a standard .25 inch, spacing between key tops shall not be less than 0.75 inch and spacing between edges of adjacent key tops shall not be less than 0.18 inch.

3.3.1.1 "Send-Receive" Switch - The keyboard shall be provided with a "send-receive" switch. Placing the switch in the "Send" position shall permit transmission of a message by causing electrical connection with a radio transmitting circuit and shall allow recording of a "home" copy on the Receiving Page Printer. Placing the switch in the "Receive" position shall short out the signal line ahead of the "Break" key and retain a closed loop no matter what key may be struck on the keyboard. In "Receive" position, received messages only shall be recorded on the Receiving Page Printer."

3.3.1.2 "Break" Key - A "Break" key shall be provided to enable the operator to open the transmit signal loop in the event it becomes necessary to signal the operator of a distant station to stop the transmission. Depression of the "Break" key shall cause the transmission of a spacing signal.

3.3.1.3 "Repeat" Key - A "Repeat" key shall be provided, which when depressed, shall cause the continuous transmission of the electrical signal corresponding to that of the last key lever operated, so long as the "Repeat" key is held depressed. When the "Repeat" key is held down, the last character key lever which had been depressed no longer need be held down to effect continuous transmission of the electrical signal corresponding to that last character key lever."

3.3.1.4 "Bell" Key - The "Bell" key shall be the letter "s" key when the keyboard is placed in the "Fig" or upper case condition. Striking the "Bell" key shall cause the bell to ring once at both the transmitting and receiving station in order to summon an operator to a normally unattended machine. This "on-line" function will work only in the upper case or "Fig" condition.

3.3.1.5 Keyboard Touch - The pressure required to operate any key lever shall be 8 ± 2 ounces.

3.3.1.6 Keyboard Interlock - Depressing one key shall physically prevent depressing another key until the first key is released.

3.3.1.7 Keyboard Stowage - Provision shall be made for storing the keyboard completely beneath the Receiving Page Printer when the equipment is being used for receive only purposes. Provision shall also be made for easily sliding the keyboard out to operating position (in front of the Receiving Page Printer) or further out and completely free of the equipment. When the keyboard is placed in storage position or completely removed from the equipment, the transmitting signal lines shall be automatically shorted, but shall not affect the operation of the page printer.

3.3.1.8 Keyboard (Remote Operation) - The keyboard shall be capable of remote operation, when provided with a small drive motor and necessary gears and/or drive belts. When operated remotely, the keyboard shall be completely independent from the printer unit except for wire connection. The remote keyboard shall operate at any of the speeds specified in this specification.

3.3.1.9 Distortion of Transmitted Signals - The electrical signals emitted from the transmitting contacts shall contain not more than 5 per cent each, bias and end distortion generated by the keyboard.

3.3.1.10 Keyboard Weight and Size - The keyboard, exclusive of attachments necessary to operate in accordance with paragraph 3.3.1.8, shall not weigh more than 5.0 pounds and shall have a size not greater than 12 inches wide by 8.25 inches deep by 1.5 inches high.

3.3.1.11 Keyboard Operating Light - A suitable lamp or lamps, controlled by an "On-Off" switch, shall be provided to illuminate the keyboard when the keyboard is operated as an integral part of the receiving printer. The same light source may be used to provide suitable illumination of the printed copy as specified in 3.3.2.9.

3.3.1.12 Keyboard Signaling Requirements - The keyboard transmitter shall be capable of furnishing radio transmitting FSK terminal equipment with standard 7.42 unit, start-stop, serial Baudot code signals on a 100 ma 28 volt D. C. line. Signal line battery shall be furnished internally from the connecting chassis, or during remote operation from an applique power supply unit.

3.3.2 Receiving Page Printer (*) - The page printer shall employ a type cylinder or similar device which is located behind the recording medium such that a neutral position or space is not required in order to render visible the last character printed. The type cylinder shall be separated from the inking facility by the recording medium.

3.3.2.1 Character Storage - There shall be no storage of selection (characters). The selector shall begin to position the type immediately upon receipt of the first intelligence pulse and shall complete that positioning and begin printing a character, immediately after receipt of the fifth intelligence pulse.

3.3.2.2 Line Capacity - The printer shall be capable of printing 75 characters per line with automatic carriage return and line feed at that point.

3.3.2.3 Line-Feed - Provision shall be made for the operator to choose either single or double line-feed. Line-feed shall be both an "on-line" and "off-line" function.

3.3.2.4 Off-Line Functions - Provisions shall be made for pushbutton operated line feed carriage return, "Figs" or upper case shift, and "Letters" or lower case shift.

3.3.2.5 Type - Recorded characters shall be PICA 10 point type.

3.3.2.6 Standby Provisions - Provisions shall be made to automatically stop the motor when signals are not received and automatically start the motor when signals are received. A time delay motor stop may be employed for this purpose where the time delay is approximately 60 seconds.

3.3.2.7 Recording Medium - The printer shall use a standard full size roll of pressure feed paper 4.5 inches in diameter by 8.5 inches in length. The recording medium holder shall be so designed as to permit the operator to readily change the recording medium.

3.3.2.8 Recording Medium Handling - Provision shall be made to insure proper alignment of the recording medium as it is fed through the printer during operation. A suitable mechanism shall be provided to insure positive and uniform feed through the equipment. Manual means shall also be provided to feed the recording medium in either forward or reverse direction.

3.3.2.9 Printed Copy Light - A suitable lamp, controlled by an "On-Off" switch, shall be provided to illuminate the printed copy.

3.3.2.10 Inking Medium - The printer shall be capable of using a standard .5 inch Underwood or similar type ribbon. The ribbon shall be self-reversing with sequential movement such that the ribbon will not be struck twice in the same place by successively operated key levers.

3.3.2.11 Signaling Requirements - The printer shall be capable of operating on standard FSK 7.42 unit, start-stop, serial Baudot code signals on currents not less than 10 ma and not greater than 80 ma.

3.3.2.12 Printer Ranging - Provision shall be made for ranging the page printer such that the selector starting point may be adjusted to the most efficient operating position. For purposes of ranging, a one-unit signal pulse at 60 wpm (368 opm) shall be considered to have a duration of 22 milliseconds.

3.3.2.13 Received Signal Distortion - Proper operation of the printer shall be maintained on signals containing as much as 35 per cent marking or spacing bias and as much as 30 per cent marking or spacing end distortion.

3.3.3 Connecting Chassis (*) - The electrical connecting chassis shall support the printer, paper roll mechanism, power supplies, circuit switches, receptacles, fuses, option patchboard, interconnecting wiring, signal line adjusting potentiometer, and tracks for mounting the keyboard in either an operating or storage position.

3.3.4 Airborne Type Carrying Case (*) - An airborne type carrying case shall be provided for housing the Transmitting Keyboard, Receiving Page Printer and Connecting Chassis.

3.3.4.1 Airborne Type Carrying Case Size - The combined unit, keyboard, printer, and connecting chassis in the case (in receive-only position) with full paper roll shall have a size not greater than 13.5 inches wide by 14.75 inches deep by 6.4 inches high.

3.3.4.2 Mounting Base (*) - The mounting base, when fully loaded with carrying case, etc., shall not exceed 1.25 inches in height.

3.3.5 Automatic Paper Winder (*) - An automatic paper winder shall be provided to store printed copy so as to prevent the copy from interfering with the keyboard or the operator's vision. The winder shall function as a take-up spool and shall be mounted externally to and separate from the combined unit and mounting base as specified in 3.3.4.1 and 3.3.4.2 respectively. The take-up spool shall be easily removable by the operator.

3.3.5.1 Winder Operation - The automatic paper winder shall require connection only to a power source to place the winder in operating condition. An "on-Off" power switch shall be provided.

3.3.5.2 Winder Capacity - The winder shall have a capacity permitting take-up of a standard full size roll of pressure feed paper 4.5 inches in diameter by 8.5 inches in length.

3.3.6 On-Off Power Switch - The TT-264/AG Teletypewriter shall have a completely self-contained electrical system which requires only connection to a primary power source to place the equipment in operating condition. An on-off power switch with suitable fusing shall be provided.

3.3.7 Signal Line Battery - The TT-264/AG Teletypewriter shall be capable of supplying its own signal line battery as well as signal line battery for other equipments such as reperforators and other printers not to exceed 100 ma at 28 volts.

3.3.8 General Electrical Requirements - All circuits in the equipment shall be properly fused. All electrical connections shall be brought into the rear apron of the printer through a standard JAN-type screw connector.

3.3.9 Teletypewriter Signaling Requirements - The TT-264/AG shall be capable of operating on standard 7.42 unit, "start-stop," serial Baudot code signals of currents not less than 10 ma and not greater than 80 ma. The 7.42 unit Baudot code is that code which, for each alpha-numerical character, has a particular combination of pulses comprising a start pulse and five intelligence pulses of equal duration, and a stop pulse of duration 1.42 times the length of the intelligence pulses. Operation shall be on a neutral, "start-stop" basis.

3.3.10 Signaling Speeds - The TT-264/AG Teletypewriter shall be capable of transmission and reception of signals at speeds of 60 wpm (368 opm), 75 wpm (460 opm), and 100 wpm (600 opm). Change in speed shall be accomplished by a single gear change and may be accomplished by the operator in a time interval not greater than one minute. The TT-264/AG shall be supplied with gears for 60 wpm (368 opm) and 100 wpm (600 opm) speeds. A single operation is herein defined as the transmission or reception of one alpha-numerical character.

4. QUALITY ASSURANCE PROVISIONS

4.1 General - Equipments shall be subjected to the following tests to determine conformance with all the applicable requirements:

(1) Preproduction Tests

(2) Acceptance Tests

(3) Life Test

4.2 Preproduction Tests - Preproduction tests shall be made on one or more equipments representative of the production equipments to be supplied under the contract. Preproduction tests shall consist of the following:

(1) Contractor's Demonstration Tests

(2) Service Approval Tests

4.2.1 Contractor's Demonstration Tests - Contractor's demonstration tests shall be accomplished under the responsibility of the contractor and shall be conducted in accordance with the approved test procedure of 4.5. Data obtained by the contractor in conducting these tests shall be submitted to the procuring activity for review and approval prior to shipping the equipment to the specified destination for service approval tests. The Government Inspector and the procuring activity shall be advised when tests are to be conducted so that a representative may be designated to witness or supervise the tests when so desired. Contractors not having adequate facilities to conduct all required tests shall obtain the services of a commercial testing laboratory satisfactory to the procuring activity.

4.2.2 Service Approval Tests - The service approval model shall consist of one equipment representative of the production equipment to be supplied under the contract. This may be the same equipment that was subjected to the contractor's demonstration tests. This equipment shall be delivered to the destination specified by the procuring activity. When the tests of 4.2.1 are supervised, the procuring activity may, when conducting service approval tests, omit all tests which will duplicate tests previously conducted by the contractor; however, in conducting service approval tests, the procuring activity reserves the right to repeat any test previously conducted when deemed necessary.

4.2.2.1 Accessory Material - In addition to the complete equipment submitted for service approval tests, the contractor shall also submit the accessory material and design and test data specified in Specification MIL-E-5400. The design and test data shall include the data obtained by the contractor in testing to Specification MIL-T-5422. This information shall indicate the physical and electrical characteristics of the equipment and establish the equipment's compliance with applicable requirements.

4.2.3 Scope of Tests - Preproduction tests shall include all tests deemed necessary to determine that the equipment meets all the requirements of this specification and the contract. Preproduction tests shall include environmental tests in accordance with Specification MIL-T-5422 and interference tests in accordance with Specification MIL-I-6181. The sampling and testing of plastic lighting plates shall be in accordance with Specification MIL-P-7788.

4.2.4 Preproduction Approval - Approval of the preproduction model shall be by the procuring activity upon satisfactory completion of all tests. No production equipments shall be delivered prior to the approval of the preproduction model. Prefabrication of production equipment prior to the approval of the preproduction model is at the contractor's own risk. The approved preproduction model will be returned to the contractor for his use in the fabrication and testing of equipment to be submitted for acceptance. The preproduction model shall not be considered as one of the equipments under the contract; however, it may be reworked by the contractor and submitted for acceptance as a production equipment.

4.3 Acceptance Tests - The contractor shall furnish all samples and shall be responsible for accomplishing the acceptance tests. All inspection and testing shall be under the supervision of the Government Inspector. Contractors not having testing facilities satisfactory to the procuring activity shall engage the service of a commercial testing laboratory acceptable to the procuring activity. The contractor shall furnish test reports showing quantitative results for all acceptance tests. Such reports shall be signed by an authorized representative of the contractor or laboratory as applicable. Acceptance or approval of material during the course of manufacture shall not be construed as a guarantee of the acceptance of the finished product. Acceptance tests shall consist of the following:

(1) Individual Tests

(2) Sampling Tests

(3) Special Tests

4.3.1 Individual Tests - Each equipment submitted for acceptance shall be subjected to the individual tests. These tests shall be adequate to determine compliance with the requirements of material, workmanship, operational adequacy and reliability. As a minimum, each equipment accepted shall have passed the following tests:

(1) Examination of Product

(2) Operational Test

(3) Manufacturing Reliability Test

4.3.1.1 Examination of Product - Each equipment shall be examined carefully to determine that the material and workmanship requirements of Specification MIL-E-5400 have been met.

4.3.1.2 Operational Test - Each equipment shall be operated long enough to permit the equipment temperature to stabilize and to check sufficient characteristics and record adequate data to assure satisfactory equipment operation.

4.3.1.3 Manufacturing Reliability Test - Each equipment shall be operated for a period of 6 hours without failure, under the conditions specified herein. A failure shall be defined as anything which causes malfunctioning of the equipment. Only those adjustments will be permitted which can be made by using such controls and adjustments accessible to the operator during the normal use of the equipment.

Temperature	Ambient room
Humidity	Ambient room
Vibration (10 minutes)	Any selected frequency within the range of 20 to 30 cps (excluding resonant points) and a minimum acceleration of ± 3 g's

The equipment shall be vibrated (without vibration isolators) for a period of 10 minutes prior to the beginning of the 6-hour period of operation. Where feasible, the equipment shall be operated during this vibration period for the purpose of detecting flaws and imperfect workmanship. Operation within the specified limits of satisfactory performance is not necessarily required during the vibration period. The direction of vibration should be vertical to the normal mounting plane for 5 minutes and lateral to that plane for 5 minutes. Where it is not feasible to vibrate the equipment in 2 directions the vertical direction shall be used. During the 6-hour period of operation following the 10-minute vibration period, the equipment shall be mechanically cycled periodically through its various phases of operation. Should a failure occur, it should be repaired and the test started over, except the 10-minute vibration period need not be repeated when it is certain the failure was not a result of the vibration. Should repetitive failures occur, corrective action shall be taken to eliminate this defect from future equipment. A record shall be kept of all failures. The 6-hour period specified above may be composed of two 3-hour periods to conform with standard working hours.

4.3.2 Sampling Tests - Sampling tests shall be conducted on complete equipments which have successfully passed the individual tests. The following equipments shall be selected by the Government Inspector for sampling tests.

Quantity of Equipments Offered for Acceptance	Quantity to be Tested
First 10	1
Next 50	1
Next 75	1
Next 100	1
	1 for each additional 200 or fraction thereof

4.3.2.1 Scope of Tests - As a minimum, each equipment selected for sampling tests shall be subjected to the following tests:

(1) Complete operational test at ambient room conditions and nominal input voltages, making all necessary measurements to assure that all applicable specification requirements have been met.

(2) Repeat the test of (1) above using the highest and lowest specified input voltages and frequencies.

(3) Reliability test specified in 4.3.1.3, except that the test duration shall be 30 hours.

4.3.3 Special Tests - Special tests shall be conducted on a quantity of equipments for the purpose of checking the effect of any design or material change on the performance of the equipment and to assure adequate quality control. The equipment selected for special tests may be selected from equipments previously subjected to the sampling test.

4.3.3.1 Special Tests Schedule - Selection of equipments for special tests shall be made as follows:

(1) On an early production equipment.

(2) On an equipment midway of the production run.

(3) On an early equipment after an engineering change.

(4) Whenever failure reports or other information indicate additional equipments should be tested. (This will be determined by the procuring activity.

Exceptions from the above may be necessary when the number of equipments procured under contract or other factors affecting performance may require a variation to assure satisfactory quality control.

4.3.3.2 Scope of Tests - Special tests shall consist of such tests as approved by the procuring activity. Test procedures previously approved for the preproduction and sampling tests shall be used where applicable. When not applicable, the contractor shall prepare a test procedure and submit it to the procuring activity for approval prior to conducting the tests. As a minimum, the following tests shall be made, except that for those equipments selected as a result of design changes and failure reports, only such tests required to check the characteristics in question need be conducted.

(1) Temperature - Altitude Tests

(2) Vibration Test (90 minutes cycling - in each of 3 planes)

(3) Humidity Tests

4.3.4 Equipment Failure - Should a failure occur during either the sampling or special tests, the following action shall be taken:

(1) Determine the cause of failure.

(2) Determine if the failure is an isolated case or design defect.

(3) Submit to the procuring activity for approval, proposed corrective action intended to reduce the possibility of the same failure(s) occurring in future tests.

(4) Where practical, include a test in the individual test to check all equipment for this requirement until reasonable assurance is obtained that the defect has been satisfactorily corrected.

4.4 Life Test - A 300-hour life test shall be conducted at the contractor's plant on an early equipment representative of the current production. The life tests shall be performed under the conditions specified in 4.4.1. The life test sample shall be selected by the Government Inspector in accordance with the following: (Equipments which have successfully passed the sampling tests or special tests may be selected for life tests.)

Quantity of Equipments Offered for Acceptance	Quantity to be Tested
First 25	1
Next 175	1
Next 300	1
	1 for each additional 500 or fraction thereof

4.4.1 Test Conditions - The life test shall be conducted under the following simulated service conditions:

Temperature	Normal room temperature
Altitude	Normal room
Humidity	Room ambient
A. C. Voltage	115 ± 5 volts (at lowest applicable frequency)

4.4.2 Test Periods - The test may be run continuously or intermittently. Any period of operation shall be of sufficient duration to permit the equipment temperature to stabilize. Periodically, the equipment shall be turned on and off several times and put through its various phases of operation.

4.4.3 Performance Check - At approximately 8-hour intervals during the test, a limited performance check shall be made. The performance check proposed by the contractor shall be subject to approval by the procuring activity.

4.4.4 Test Data - The contractor shall keep a daily record of the performance of the equipment, making particular note of any deficiencies or failures. In the event of part failures, the defective part shall be replaced and the operation resumed for the balance of the test period. A record shall be kept of all failures throughout the test, including all tube failures. This record shall indicate the following:

(1) Part type number

(2) The circuit reference symbol number

(3) The part function

(4) Name of the manufacturer

(5) Nature of the failure

(6) The number of hours which the part operated prior to failure.

4.4.4.1 Failure Report - In the event of a failure, the Government Inspector shall be notified immediately. A report shall be submitted to the procuring activity upon completion of the test. In this report, the contractor shall propose suitable and adequate design or material corrections for all failures which occurred. The procuring activity will review such proposals and determine whether they are acceptable.

4.4.5 Reconditoning of Life Test Samples - An equipment which has been subjected to the life tests shall be reconditioned as follows:

(1) On completion of the life test, the equipment shall be reworked by the contractor by replacing all tubes and "wear" items. The "wear" items shall be determined by agreement between the contractor and the procuring activity.

(2) After reworking, the contractor shall resubmit the equipment for acceptance.

4.5 Test Procedures - The procedures used for conducting preproduction tests, acceptance tests and life tests shall be prepared by the contractor and submitted to the procuring activity for review and approval. The right is reserved by the procuring activity or the Government Inspector to modify the tests or require any additional tests deemed necessary to determine compliance with the requirements of this specification or the contract. Specification MIL-T-18303 shall be used as a guide for preparation of test procedures. When approved procedures are available from previous contracts the procuring activity will furnish the procedures to be used for testing.

4.6 Presubmission Testing - No item, part or complete equipment shall be submitted by the contractor until it has been previously tested and inspected by the contractor and found to comply, to the best of his knowledge and belief, with all applicable requirements.

4.7 Rejection and Retest - Equipment which has been rejected may be reworked or have parts replaced to correct the defects and be resubmitted for acceptance. Before resubmitting, full particulars concerning previous rejection and the action taken to correct the defects found in the original shall be furnished the Government Inspector. Units rejected after retest shall not be resubmitted without the specific approval of the procuring activity.

4.8 Equipment Changes - After approval of the preproduction model, no changes which affect weight, installation interchangeability and interchangeability of maintenance parts or assemblies shall be incorporated in the equipment unless approved by the procuring activity. To obtain procuring activity approval, the contractor shall submit an Engineering Change Proposal (ECP) giving the necessary information concerning the change. This shall apply for either a procuring activity recommended change or a contractor's proposed change. When required, the contractor shall also prepare a Material Change (MC) and a Material Bulletin (MB) to cover the approved change. Engineering Change Proposals, Material Changes and Material Bulletins shall be prepared in accordance with SAR-300.

5. PREPARATION FOR DELIVERY

5.1 General - All major units and parts of the equipment shall be preserved, packaged, packed and marked for the level of shipment specified in the contract or order in accordance with Specification MIL-P-17555.

6. NOTES

6.1 Test Values - Normal and limiting values of performance data shall be determined at an input voltage of 115 ± 1.0 V AC. These data are to be used in testing the equipment at installation points for compliance with minimum acceptable standards of performance.

6.2 The parentheses (*), when used in the type designation, shall be replaced by either a number or letter furnished by the procuring activity upon application by the contractor for assignment of nomenclature in accordance with 3.2.9. The complete type number shall be used on nameplates, shipping records and instruction books, as applicable.

6.3 Performance Objectives - Minimum size and weight, simplicity of operation, ease of maintenance, and an improvement in the performance and reliability of the specific functions beyond the requirements of this specification are objectives which shall be considered in the production of this equipment. Where it appears a substantial reduction in size and weight or improvement in simplicity of design, performance, ease of maintenance or reliability will result from the use of materials, parts and processes other than those specified in Specification MIL-E-5400 it is desired their use be investigated. When investigation shows advantages can be realized, a request for approval shall be submitted to the procuring activity for consideration. Each request shall be accompanied by complete supporting information.

6.4 Precedence of Documents - When the requirements of the contract, this specification or applicable subsidiary specifications are in conflict, the following precedence shall apply:

(1) Contract - The contract shall have precedence over all referenced documents.

(2) This Specification - This specification shall have precedence over all applicable subsidiary documents. Deviations from this specification, or from subsidiary documents where applicable, may be made only upon written approval.

(3) Referenced Specifications - Any referenced specification shall have precedence over all applicable subsidiary specifications referenced therein. All referenced specifications shall apply to the extent specified.