MILITARY SPECIFICATION SHEET

ELECTRON TUBE, RECEIVING

TYPE 6X4WA

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

The complete requirements for procuring the electron tube described herein shall consist of this document and the latest issue of Specification MIL-E-1.

DESCRIPTION: Rectifier, miniature, full-wave, vacuum

Outline	---	5-3 (EIA)
Base	---	E7-1
Envelope	---	T5-1/2
Cathode	---	Coated unipotential

Base connections:

Pin No.	---	1	2	3	4	5	6	7
Element	---	2a	nc	h	h	nc	1a	k

ABSOLUTE-MAXIMUM RATINGS:

Parameter:	Ef	Epp/a	Ehk	R1	CL	Io	ib/a	i surge/a	TE	Alt
Unit:	V	Vac	v	Ohms	µF	mAdc	ma	a	°C	ft
Maximum:	6.9	See note 1	+100	---	---	See note 1	210	1.5	165	See note 1
Minimum:	5.7	---	-450	---	---	---	---	---	---	---
TEST CONDITIONS:	6.3	400 (See note 2)	---	8,200	8	---	---	---	---	---

GENERAL:

Qualification - Required

METHOD	REQUIREMENT OR TEST	CONDITIONS	AQL (PERCENT DEFECTIVE)	INSPECTION LEVEL OR CODE	SYMBOL	LIMITS		UNIT
						MIN	MAX	
	Qualification inspection							
1031	Variable-frequency vibration	No voltages applied	---	---	---	---	---	---
	Quality conformance inspection, part 1							
1201	Short and discontinuity detection		0.4	II	---	---	---	---
1231	Emission (1)	Eb = 50 Vdc (see note 3)	0.4	II	Is	100	---	mAdc
1301	Heater current		0.4	II	If	550	650	mA
1353	Operation of rectifiers	See notes 4 and 5	0.4	II	Io	51	---	mAdc
1336	Heater-cathode leakage	Ehk = -450 Vdc	0.4	II	Ihk	---	75	µAdc
	Quality conformance inspection, part 2							
1211	Insulation of electrodes	See note 3	2.5	S3	R	10	---	Meg
1002	Barometric pressure, reduced	Pressure = 140 ±5 mmHg; voltage = 980 Vac	6.5	See note 6	---	---	---	---
1031	High-frequency vibration	No voltages applied	6.5	Code E	---	---	---	---
1231	Emission (2)	Ef = 5.5 V; Eb = 50 Vdc (see note 3)	2.5	Code H	Is	90	---	mAdc
1041	Shock	450 G; Epp/a = 0	6.5	See note 6	---	---	---	---
1031	Vibration-fatigue		6.5	See note 6	---	---	---	---
---	Post-shock and vibration-fatigue test end points:							
1336	Heater-cathode leakage		---	---	Ihk	---	150	µAdc
1353	Operation of rectifiers		---	---	Io	48	---	mAdc
1121	Base strain	See note 7	---	---	---	---	---	---
2126	Envelope strain		2.5	I	---	---	---	---
1105	Permanence of marking		---	---	---	---	---	---

METHOD	REQUIREMENT OR TEST	CONDITIONS	SYMBOL	LIMITS		UNIT
				MIN	MAX	
	Quality conformance inspection, part 3					
1506	Heater-cycling life	Ef = 7.5 V; Ehk = 100 Vdc; Epp/a = 0; R1 = CL = 0 (1 minute "on", 4 minutes "off")	---	---	---	---
---	Heater-cycling life-test end point:					
1336	Heater-cathode leakage		Ihk	---	150	µAdc
1501	Intermittent life	TA = room See note 8 TE = 165°C (min) (see notes 9 and 10)	---	---	---	---
---	Intermittent-life-test end points (500 hours):	See note 11				
---	Inoperatives		---	---	---	---
1353	Change in operation of rectifiers of individual tubes		Δlo t	---	8.5	%
1301	Heater current		If	550	660	mA
1336	Heater-cathode leakage		Ihk	---	90	µAdc
---	Total defectives		---	---	---	---
---	Intermittent-life-test end points (1,000 hours):	See note 11				
---	Inoperatives		---	---	---	---
1353	Change in operation of rectifiers of individual tubes		Δlo t	---	11.5	%
1301	Heater current		If	550	666	mA
1336	Heater-cathode leakage		Ihk	---	90	µAdc
---	Total defectives		---	---	---	---

NOTES:

1. To simplify the application of the maximum ratings to circuit design, the absolute-maximum ratings are presented in chart form as rating charts I, II, III, and IV. Operating points should be so selected that the boundary limits on rating charts I, II, III, and IV are not exceeded with a bogey tube under the worst probable operating conditions with respect to supply-voltage variation, equipment component variation, equipment control adjustment, and environmental conditions.

   A brief description of each of the rating charts is given below. The values of ac supply voltage as presented refer to the unloaded supply voltages per anode.

   (a) Rating chart I (see figure 1). This chart presents the maximum ratings for ac anode supply voltage and dc output current. The boundary FAEDG defines the limits for capacitor-input filter operation and the boundary FABCDG defines the limits for choke-input filter operation.

   (b) Rating chart II (see figure 2). This chart provides a convenient method for checking conformance with the maximum steady-state peak-anode-current rating. Rating chart II applies to capacitor-input filter operation only.

NOTES: -Continued

1. -Continued

   (c) Rating chart III (see figure 3). This chart shows the minimum value of anode supply resistance (Rs) required to remain within the transient peak-anode-current rating. The value of Rs should be such that it lies to the left of the line on the rating chart at the highest probable value of line voltage. Rating chart III applies to capacitor-input filter operation only.

   (d) Rating chart IV (see figure 4). This chart presents the maximum ratings for ac anode supply voltage and altitude. Rating chart IV refers to both capacitor-input filter and choke-input filter operation.

2. All values of Epp/a refer to the unloaded supply voltage. The ratings refer to rectifier operation with sinusoidal supply voltages within the frequency range of 25 to 1,000 Hz.

3. Test each section separately.

4. In a full-wave circuit, adjust Zp/a so that a bogey tube gives Io = 55 mAdc. A bogey tube has a tube drop of Etd = 22 Vdc at Is = 50 mAdc per anode. Ehk = Eo.

5. This test shall be performed at the conclusion of the holding period.

6. This test shall be conducted on the initial lot and thereafter on a lot approximately every 12 months. In the event of lot failure, the lot shall be rejected and the succeeding lots shall be subjected to this test until a lot passes. When one lot has passed, the 12 month rule shall apply. MIL-STD-105, sample size code letter E, shall apply.

7. Acceptance sampling procedure shall be in accordance with "Base-strain test, miniature, sampling (method 1121)", except that data covered in "Acceptance and rejection criteria" shall be modified as follows:

   (a) Accepted if not more than one defective for class "A", "B", or "C" defects, respectively (see method 1121, or if not more than a total of two defectives are found in the sample.

   (b) Rejected if two or more defectives for class "A", "B", or "C" defects, respectively, or if a total of three or more defectives are found in the sample.

8. In a full-wave life-test circuit, the values specified for Rl and CL may be considered as approximate and shall be adjusted initially to give not less than Io = 55 mAdc and ib/a = 200 ma with a bogey tube. (See note 4.) Ehk = Eo.

9. The life-test sample shall consist of 20 tubes per lot and not more than 1 tube failure shall be permitted. In the event of rejection of the first sample, due to failure of more than 1 tube, a second sample of 40 tubes shall be selected from the lot. Acceptance shall then be based on the combined first and second samples. The total tube failures from the combined first and second samples shall not exceed three.

10. Envelope temperature (TE) requirements, when measured in accordance with the temperature by conduction-band measurement (method 1226), will be satisfied if a tube having bogey Etd (+10 percent at Is = 50 mAdc per anode) under normal test conditions, is determined to operate at or above minimum specified temperature at any position in the life-test rack.

11. The allowable defectives per characteristic shall not be greater than 1 for the first sample and shall not be greater than 3 for combined samples.

12. Revision letters are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

Custodians:
Army - ER
Navy - EC
Air Force - 85

Review activities:
Army - AR, MI
Air Force - 99
DLA - ES

User activities:
Army - AR
Navy - AS, OS, MC, CG
Air Force - 11

Preparing activity:
Navy - EC

Agent:
DLA - ES

(Project 5960-3229)

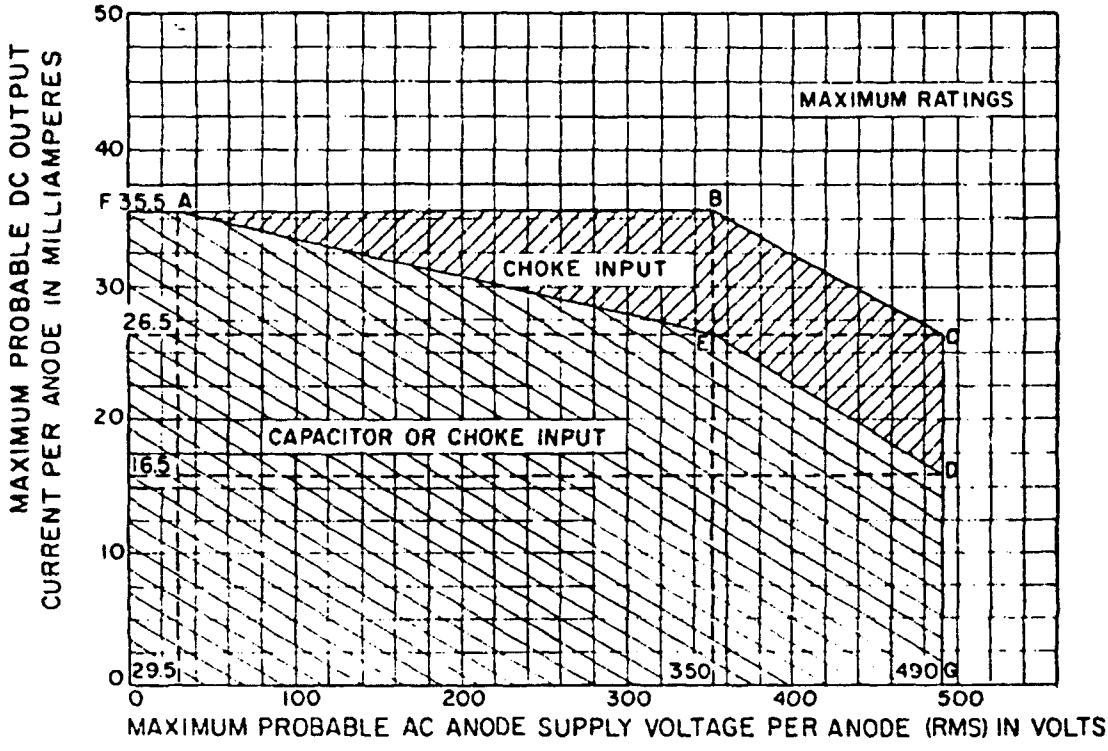

FIGURE 1. Rating chart I.

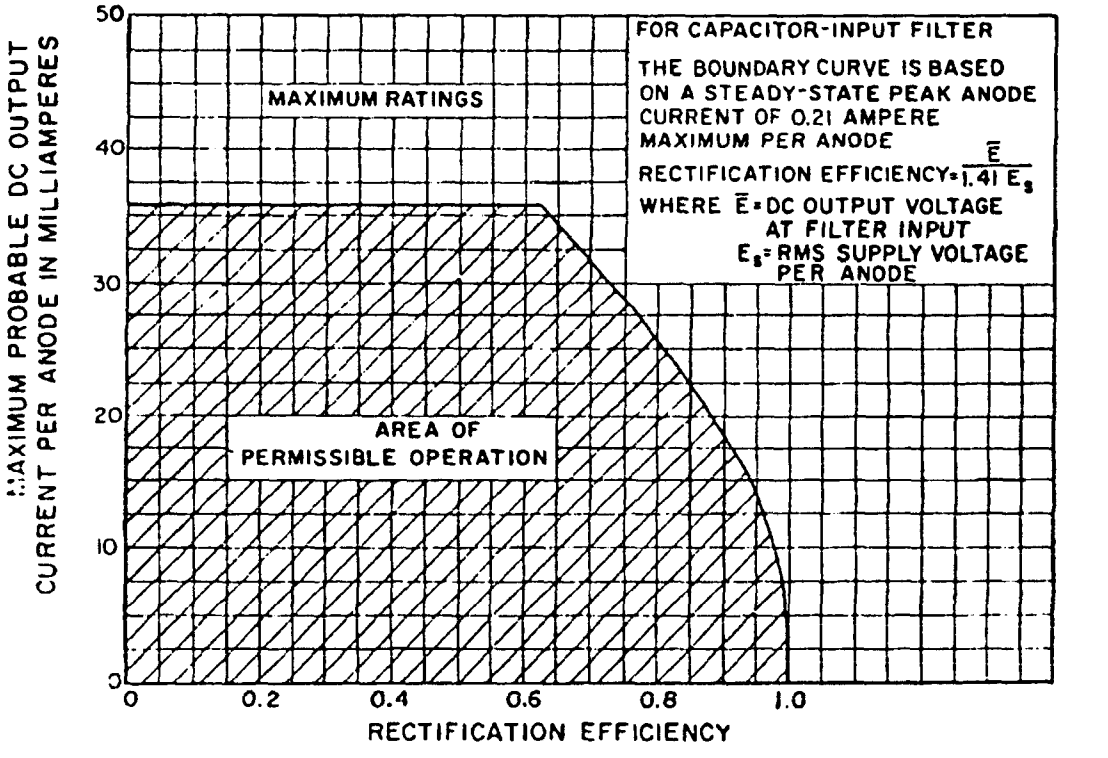

FIGURE 2. Rating chart II.

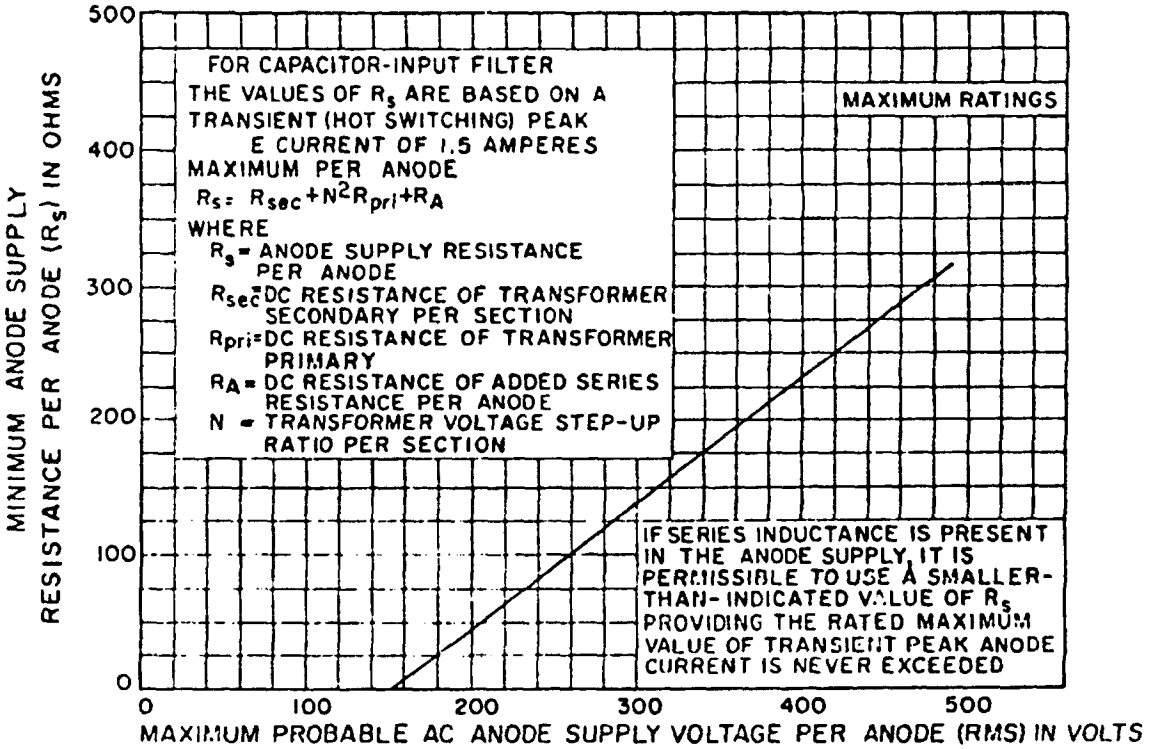

FIGURE 3. Rating chart III.

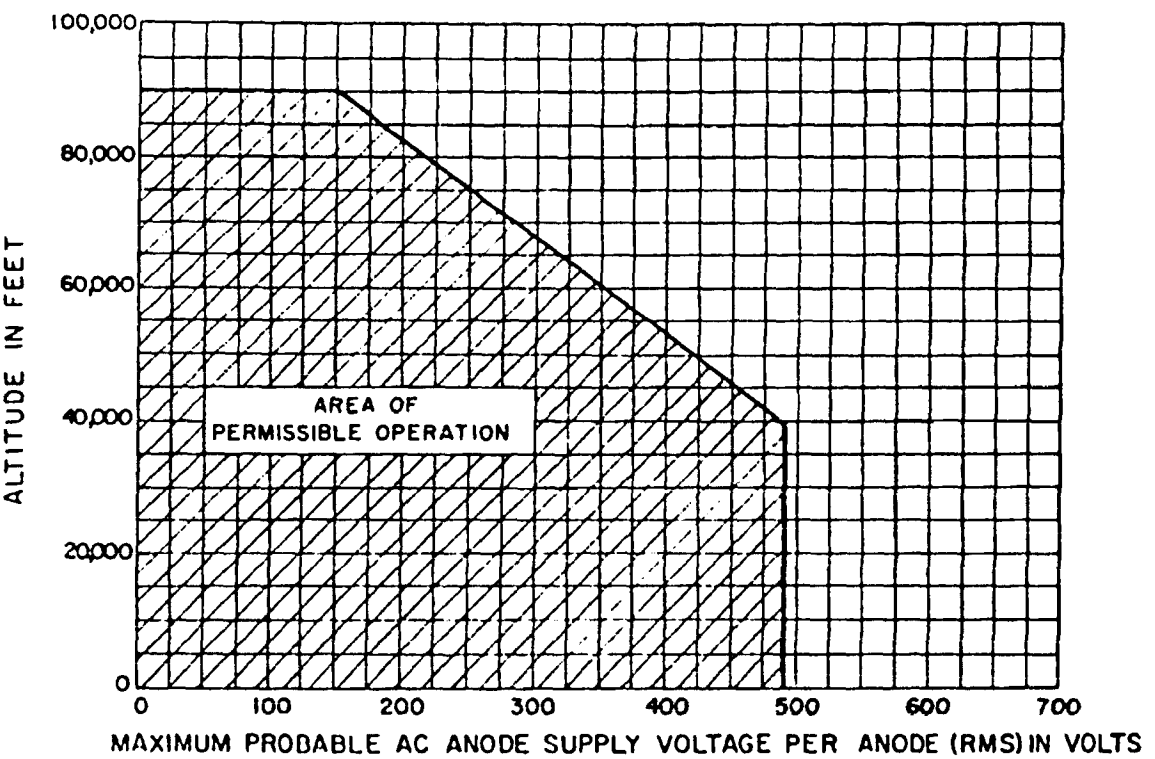

FIGURE 4. Rating chart IV.