MILITARY SPECIFICATION SHEET

ELECTRON TUBE, RECEIVING

TYPE 5654W 1/

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: Pentode, miniature, RF sharp cutoff

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

Base connections:

Pin No.	---	1	2	3	4	5	6	7
Element	---	g1	k,g3 int sd	h	h	a	g2	k,g3 int sd

ABSOLUTE-MAXIMUM RATINGS:

Parameter:	Ef	Eb	Ec1	Ec2	Ehk	Rg1	Ic1	Ik	Pp	Pg2	TE	Alt
Unit:	V	Vdc	Vdc	Vdc	v	Meg	mAdc	mAdc	W	W	°C	ft
Maximum:	6.9	200	0,-55	155	100	0.1	1.0	20	1.65	0.55	165	(See note 1)
Minimum:	5.7	---	---	---	---	---	---	---	---	---	---	---
TEST CONDITIONS:	6.3	120	-2	120	0	---	---	---	---	---	---	---

GENERAL:

Qualification - Required.

Reliable tube

1/ Formerly tube type 5654

METHOD	REQUIREMENT OR TEST	CONDITIONS	AQL (PERCENT DEFECTIVE)	INSPECTION LEVEL OR CODE	SYMBOL	LIMITS MIN	LIMITS MAX	UNIT
	Quality conformance inspection, part 1							
1301	Heater current		0.4	II	If	160	190	mA
1336	Heater-cathode leakage		0.4	II	Ihk	---	10	uAdc
1266	Total grid current	Rg = 0.5 Meg (see notes 2 and 3)	0.4	II	Ic1	0	-0.1	uAdc
1256	Electrode current (1) (anode)	See note 2	0.4	II	Ib	5.0	11.0	mAdc
1256	Electrode current (2) (anode)	Ec1 = -10 Vdc; Rp = 0.1 Meg	0.4	II	Ib	---	200	uAdc
1256	Electrode current (screen)		0.4	II	Ic2	0.8	4.0	mAdc
1306	Transconductance (1)		0.4	II	Sm	3,800	6,200	umhos
1201	Short and discontinuity detection		0.4	II	---	---	---	---
	Quality conformance inspection, part 2							
1211	Insulation of electrodes		2.5	I	---	---	---	---
1256	Electrode current (3) (anode)	Ec1 = -5.5 Vdc	2.5	I	Ib	5.0	---	uAdc
1306	Transconductance (2)	Ef = 5.7 V	2.5	I	ΔSm/Ef	---	15	%
1266	Grid emission	Ef = 7.5 V; Ec1 = -45 V; Rg1 = 0.1 Meg (See note 4)	2.5	I	Ig	0	-0.5	uAdc
2201	Noise and microphonics	Ef = 6.3 Vac; Ehk = 0; Ec2 = 200 Vdc; Ec1 = 0; Ebb = 200 Vdc; Ecal = 175 mVac; Rk = 1,000 ohms; Rp = 0.1 Meg; Rg2 = 0.5 Meg; Cg2 = 2 uF	2.5	I	---	---	---	---
1331	Direct-interelectrode capacitance	Shield No. 316	6.5	Code E	Cgip Cin Cout	--- 3.80 2.45	0.020 4.6 3.25	pF pF pF
1031	Low-frequency vibration	Rp = 10,000 ohms; 10 G; F = 40 Hz	6.5	Code H	Ep	---	200	mVac
1041	Shock	450 G; Ehk = +100 Vdc (see note 5)	---	See note 6	---	---	---	---

METHOD	REQUIREMENT OR TEST	CONDITIONS	AQL (PERCENT DEFECTIVE)	INSPECTION LEVEL OR CODE	SYMBOL	LIMITS MIN	LIMITS MAX	UNIT
	Quality conformance inspection, part 2 -Continued							
1031	Vibration-fatigue	2.5 G; fixed frequency; F = 25 min, 60 max	6.5	See note 6	---	---	---	---
---	Post-shock and vibration-fatigue test end points:							
1031	Low-frequency vibration		---	---	Ep	---	300	mVac
1336	Heater-cathode leakage		---	---	Ihk	---	30	uAdc
1306	Transconductance (1)		---	---	Gm(1)	3,500	---	umhos
1266	Total grid current		---	---	Icl	0	-0.2	uAdc
1121	Base strain	See note 7	---	---	---	---	---	---
2126	Glass strain		2.5	I	---	---	---	---
1105	Permanence of marking		---	---	---	---	---	---

METHOD	REQUIREMENT OR TEST	CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	UNIT
	Quality conformance inspection, part 3					
1506	Heater-cycling life	Ef = 7.5 V; Ehk = +135 Vdc; Ec1 = Ec2 = Eb = 0	---	---	---	---
---	Heater-cycling life test end point					
1336	Heater-cathode leakage		Ihk	---	20	uAdc
1516	Stability life	Eb = 150 Vdc; Ec1 = 0; Ec2 = 125 Vdc; Ehk = +135 Vdc; Rk = 130 ohms Rg1 = 0.1 Meg; TA = room	---	---	---	---
---	Stability life-test end point					
1306	Change in transconductance (1) of individual tubes		ΔGm t	---	10	%

METHOD	REQUIREMENT OR TEST	CONDITIONS	SYMBOL	LIMITS MIN	LIMITS MAX	UNIT
	Quality conformance Inspection, part 3 -Continued					
1501	Intermittent life	Stability life-test conditions; TE = +165°C (min)(see notes 8 and 9)	---	---	---	---
---	Intermittent life-test end points (1,000 hours)					
---	Inoperatives		---	---	---	---
1266	Total grid current		Ic1	0	-0.1	uAdc
1301	Heater current		If	160	196	mA
1306	Change in transconductance (1) of individual tubes		ΔGm t	---	30	%
1306	Transconductance (2)		ΔGm Ef	---	20	%
1336	Heater-cathode leakage		Ihk	---	10	uAdc
1211	Insulation of electrodes		R	50	---	Meg

NOTES:

1. See "reduced pressure (altitude) rating" and altitude, maximum peak voltage in MIL-E-1.

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

3. The insertion of a 1.0-megohm resistor in the grid circuit shall change the anode current by not more than 0.5 mAdc. This is an alternative test.

4. Prior to this test, tubes shall be preheated a minimum of 5 minutes operating at the conditions specified below. The 3-minute test shall not be permitted. Test at specified conditions within 3 seconds after preheating. Grid emission shall be the last test performed on the sample selected for the grid-emission test.

Ef	Ec1	Ec2	Eb	Rk	Rg1
V	Vdc	Vdc	Vdc	Ohms	Meg
7.5	0	125	150	130	0.1

5. A grid resistor of 0.1 megohm shall be added; however, this resistor shall not be used when a thyratron-type short indicator is employed.

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. 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 Ib (±5 percent) under normal test conditions, is determined to operate at or above minimum specified temperature at any position in the life-test rack.

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. 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 - ME, AV
Navy - AS, OS, MC, CG
Air Force - 11

Preparing activity:
Navy - EC

Agent:
DLA - ES

(Project 5960-3222)