INCH-POUND

MIL-PRF-1/4K
22 August 2014
SUPERSEDING
MIL-PRF-1/4J
14 June 2007

PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, RECEIVING

TYPE 5654W 1/

Inactive for new design
after 7 March 1997.

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

The requirements for acquiring the electron tube described
herein shall consist of this document and MIL-PRF-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 RATINGS:

Parameter:	Ef	Eb	Ec1	Ec2	Ehk	Rg1	Ic1	Ik	Pp	Pg2	TE	Alt
Unit:	V	V dc	V dc	V dc	v	MegΩ	mA dc	mA dc	W	W	°C	ft
Maximum:	6.9	200	0, -55	155	100	0.1	1.0	20	1.65	0.55	165	(See table I note 1)
Minimum:	5.7	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Test conditions:	6.3	120	-2	120	0	- - -	- - -	- - -	- - -	- - -	- - -	- - -

GENERAL:
Qualification: Not required.
Reliable tube.
This specification sheet uses accept on zero defect sampling in accordance with MIL-PRF-1, table III.

1/ Formerly tube type 5654

TABLE I. Requirement or test.

Requirement or test	MIL-STD-1311 method	Conditions	Symbol	Limits		Unit
				Min	Max	
Conformance inspection, part 1						
Heater current	1301		If	160	190	mA
Heater-cathode leakage	1336		Ihk	- - -	10	μA dc
Total grid current	1266	Rg = 0.5 MegΩ (see notes 2 and 3)	Ic1	0	-0.1	μA dc
Electrode current (1) (anode)	1256	See note 2	Ib	5.0	11.0	mA dc
Electrode current (2) (anode)	1256	Ec1 = -10 V dc; Rp = 0.1 MegΩ	Ib	- - -	200	μA dc
Electrode current (screen)	1256		Ic2	0.8	4.0	mA dc
Transconductance (1)	1306		Sm	3,800	6,200	μmhos
Short and discontinuity detection	1201		- - -	- - -	- - -	- - -
Conformance inspection, part 2						
Insulation of electrodes	1211		- - -	- - -	- - -	- - -
Electrode current (3) (anode)	1256	Ec1 = -5.5 V dc	Ib	5.0	- - -	μA dc
Transconductance (2)	1306	Ef = 5.7 V	$\frac{\Delta Sm}{Ef}$	- - -	15	%
Grid emission	1266	Ef = 7.5 V; Ec1 = - 45 V; Rg1 = 0.1 MegΩ (See note 4)	Isg	0	- 0.5	μA dc

See notes at end of table.

TABLE I. Requirement or test - Continued.

Requirement or test	MIL-STD-1311 method	Conditions	Symbol	Limits		Unit
				Min	Max	
Conformance inspection, part 2 - Continued						
Noise and microphonics	2201	Ef = 6.3 V ac; Ehk = 0; Ecc2 = 200 V dc; Ec1 = 0; Ebb = 200 V dc; Ecal = 175 mV ac; Rk = 1,000 ohms; Rp = 0.1 MegΩ; Rg2 = 0.5 MegΩ; Cg2 = 2 μF	- - -	- - -	- - -	- - -
Direct-interelectrode capacitance	1331	Shield No. 316	Cgip Cin Cout	- - - 3.40 2.45	0.020 4.6 3.25	pF pF pF
Low-frequency vibration	1031	Rp = 10,000 ohms; 10 G; F = 40 Hz	Ep	- - -	200	mV ac
Shock	1041	450 G; Ehk = +100 V dc (see note 5)	- - -	- - -	- - -	- - -
Vibration-fatigue	1031	2.5 G; fixed frequency; F = 25 min, 60 max	- - -	- - -	- - -	- - -
Post-shock and vibration-fatigue test end points:	- - -					
Low-frequency vibration	1031		Ep	- - -	300	mV ac
Heater-cathode leakage	1336		Ihk	- - -	30	μA dc
Transconductance (1)	1306		Sm(1)	3,500	- - -	μmhos
Total grid current	1266		Ic1	0	- 0.2	μA dc
Base strain	1121	See note 7	- - -	- - -	- - -	- - -
Glass strain	2126		- - -	- - -	- - -	- - -
Permanence of marking	1105		- - -	- - -	- - -	- - -

See notes at end of table.

TABLE I. Requirement or test - Continued.

Requirement or test	MIL-STD-1311 method	Conditions	Symbol	Limits		Unit
				Min	Max	
Conformance Inspection, part 3						
Heater-cycling life	1506	Ef = 7.5 V; Ehk = +135 V dc; EC1 = Ec2 = Eb = 0	- - -	- - -	- - -	- - -
Heater-cycling life test end point	- - -					
Heater-cathode leakage	1336		Ihk	- - -	20	μA dc
Stability life	1516	Eb = 150 V dc; Ec1 = 0; Ec2 = 125 V dc; Ehk; = +135 V dc; Rk = 130 ohms; Rg1 = 0.1 MegΩ; TA = room	- - -	- - -	- - -	- - -
Stability life-test end point	- - -					
Change in transconductance (1) of individual tubes	1306		ΔSm t	- - -	10	%
Intermittent life	1501	Stability life-test conditions; TE = +165°C (min) (see note 8)	- - -	- - -	- - -	- - -
Intermittent life-test end points (1,000 hours):	- - -					
Inoperatives	- - -		- - -	- - -	- - -	- - -
Total grid current	1266		Ic1	0	-0.1	μA dc
Heater current	1301		If	160	196	mA
Change in transconductance (1) of individual tubes	1306		ΔSm t	- - -	30	%
Transconductance (2)	1306		ΔSm Ef	- - -	20	%
Heater-cathode leakage	1336		Ihk	- - -	10	μA dc
Insulation of electrodes	1211		R	50	- - -	MegΩ

See notes at end of table.

TABLE I. Requirement or test - Continued.

NOTES:

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

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

3. The insertion of a 1.0 MegΩ resistor in the grid circuit shall change the anode current by not more than 0.5 mA dc. 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	V dc	V dc	V dc	Ohms	MegΩ
7.5	0	125	150	130	0.1

5. A grid resistor of 0.1 MegΩ 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.

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 no defectives for class "A", "B", or "C" defects, respectively (see method 1121), or if no defectives are found in the sample.

   (b) Rejected if there are any defectives for class "A", "B", or "C" defects, respectively.

8. Envelope temperature (TE) requirements, when measured in accordance with the temperature by conduction-band measurement (MIL-STD-1311, 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 the lesser of 20 tubes or 10 percent of lot size and no tube failures shall be permitted.

Referenced documents. In addition to MIL-PRF-1, this specification sheet references MIL-STD-1311.

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 - CR
Navy - EC
Air Force - 85
DLA - CC

Preparing activity:
DLA - CC

(Project 5960-2014-013)

Review activities:
Army - AR, CR4, MI
Navy - AS, CG, MC, OS
Air Force - 99

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