

INCH-POUND

MIL-PRF-1/1325F
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SUPERSEDING
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PERFORMANCE SPECIFICATION SHEET
ELECTRON TUBE, NEGATIVE GRID (MICROWAVE)
TYPE 7554

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 the latest issue of MIL-PRF-1.

DESCRIPTION: Triode, pencil, ceramic-metal.

See figure 1.

Mounting position: Any.

Weight: 0.3 ounce (8.5 grams) nominal.

ABSOLUTE RATINGS: Class C amplifier

Parameter:	Ef	Eb	Ec	Ehk	Rk	Rg	Ik	Ic	Pp	TE	Barometric pressure, reduced mm Hg
Unit:	V	V dc	V dc	V	Ohms	Meg	mA dc	mA dc	W	°C	
Maximum:	6.9	250	0	+50	---	0.25	25	6	2.5	225	8
Minimum:	5.7	---	-50	-50	---	---	---	---	---	---	---
Test conditions:	6.3	125	--- g/	---	50	---	---	---	---	---	---

See footnotes at end of table I.

GENERAL:

Qualification - Required.

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TABLE I. Testing and inspection.

Inspection	Method MIL-STD- 1311	Notes	Conditions	Acceptance Level <u>20/</u>	Symbol	Limits		Unit
						Min	Max	
<u>Conformance inspection, part 1</u>								
Total grid current	1266	<u>3/</u>	Eb = 200 V dc; Ec = -2 V dc; Rg = 0.5 MegΩ Rk = 0	0.65	Ic	0	-0.3	μA dc
Electrode current (1) (anode)	1256	---	Ck = 1,000 μF	0.65	Ib	9	19	mA dc
Electrode current (2) (anode)	1256	---	Ec = -5 V dc; Rk = 0	0.65	Ib	---	50	μA dc
Transconductance (1)	1306	---	Ck = 1,000 μF	0.65	Sm	12,500	19,500	μmhos
Output power (1)	4250	<u>4/</u>	Eb = 250 V dc	0.65	Po	1.7	---	W
<u>Conformance inspection, part 2</u>								
Heater current	1301	---	Ef = 6.3 V	---	If	205	245	mA
Heater-cathode leakage	1336	---	Ehk = +60 V dc Ehk = -60 V dc	---	Ihk Ihk	---	+30 -30	μA dc μA dc
Transconductance (2)	1306	<u>5/</u>	Ef = 5.7 V	---	ΔSm Ef	---	15	%
Direct-interelectrode capacitance	1331	<u>1/</u>		---	{ Cgp Cgk Cpk	{ 1.5 3.6 ---	{ 2.70 5.00 0.040	{ pF pF pF
Electrode current (3) (anode)	1256	---	Ec = -2.5 V dc; Rk = 0	---	Ib	100	---	μA dc
Amplification factor	1316	---	Ck = 1,000 μF	---	Mu	55	85	---
Insulation of electrodes	1211	---	E(g-all) = -100 V dc E(p-all) = -300 V dc	---	R	100	---	MegΩ
Output power (2)	4250	<u>4/</u>	Ef = 5.7 V; Eb = 250 V dc; do not retune cavity	---	ΔPo Ef	---	0.2	W
<u>Conformance inspection, part 3</u>								
Sweep frequency vibration	1031	<u>2/ 18/</u>	Ebb = 125 V dc; R1 = 10,000 ohms; Rk = 50 ohms	---	Ep	---	150	mV ac
Variable-frequency vibration	1031	<u>2/ 18/</u>	Ebb = 125 V dc; R1 = 10,000 ohms; Rk = 50 ohms	---	Ep	---	150	mV ac

See footnotes at end of table.

TABLE I. Testing and inspection - Continued.

Inspection	Method MIL-STD- 1311	Notes	Conditions	Acceptance Level <u>20/</u>	Symbol	Limits		Unit
						Min	Max	
<u>Conformance inspection, part 3</u> - Continued.								
Shock	1041	<u>16/ 18/</u>	Hammer angle = 30° No voltages applied.	---	---	---	---	---
Vibration fatigue	1031	<u>17/ 18</u>	2.5 G; fixed frequency; F = 25 Hz (min), 60 Hz (max)	---	---	---	---	---
Shock and vibration- fatigue test end points:	---	---		---				
Sweep and variable- frequency vibration	1031	---		---	Ep	---	200	mV ac
Heater-cathode leakage	1336	---		---	l _{hk}	---	±60	μA dc
Seal fracture	---	<u>6/ 7/</u> <u>18/</u>		---	---	30	---	Lbs
Seal strain	---	<u>7/ 18/</u> <u>19/</u>		---	---	---	---	---
Heater-cycling life	1506	<u>9/ 14/</u>	Group D; E _f = 6.3 V; E _{hk} = 0; E _b = 0; R _k = 0; E _c = 0	---	---	---	---	---
Heater-cycling life-test end points:	---	---		---				
Shorts or open heaters	---	---		---	---	---	---	---
Heater-cathode leakage	1336	---	E _{hk} = +60 V dc E _{hk} = -60 V dc	---	l _{hk} l _{hk}	---	+30 -30	μA dc μA dc
Insulation of electrodes	1211	---	E(g-all) = -100 V dc	---	R	50	---	MegΩ
Stability life test (2 hours)	1516	<u>11/ 12/</u>	Group D; E _b = 215 V dc; R _k = 150 ohms; T _A = room, 25°C ± 5°C; g ₁ grounded	---	---	---	---	---
Stability life-test end-point:	---	---		---				
Transconductance (1)	1306	---		---	ΔS _m t	---	15	%
Survival-rate life test	1521	<u>13/ 15/</u>	Stability life test, or equivalent conditions; T _A = room, 25°C ± 5°C; t = 100 hours	---	---	---	---	---

See footnotes at end of table.

TABLE I. Testing and inspection - Continued.

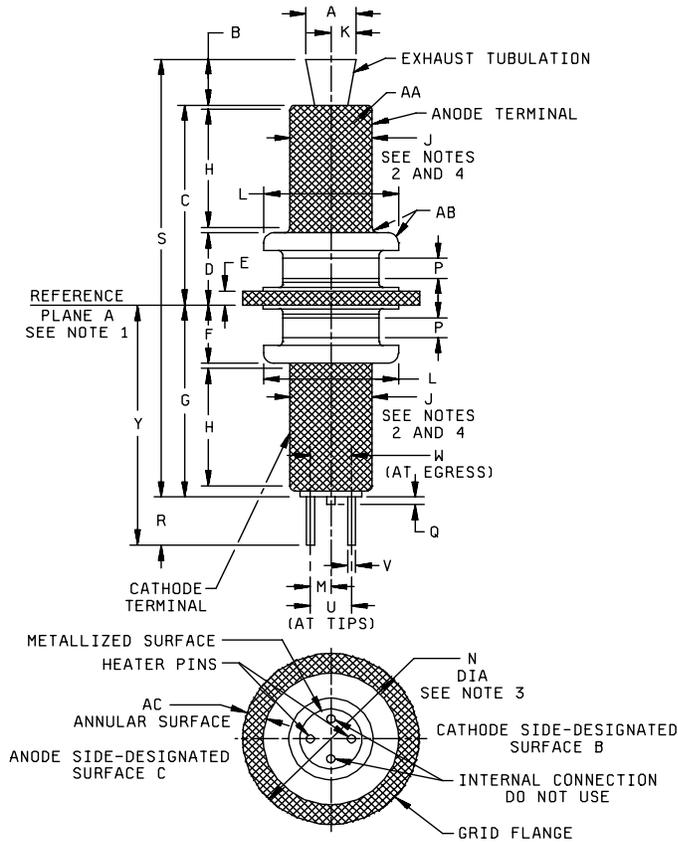
Inspection	Method MIL-STD-1311	Notes	Conditions	Acceptance Level <u>20/</u>	Symbol	Limits		Unit
						Min	Max	
<u>Conformance inspection, part 3</u> - Continued.								
Survival-rate life test end points:	---							
Electrode current (2) (anode)	1256	---		---	Ib	---	50	μA dc
Transconductance	1306	---		---	Sm	9,000	---	μmhos
Intermittent life	1501	<u>10/ 14/</u>	Group C; Ef = 6.3 V; Ebb = 250 V dc	---	t	2,000	---	cycles
Intermittent life-test end points:	---							
Output power (1)	4250	---		---	Po	0.90	---	W
Total grid current	1266	---		---	Ic	---	-1.0	μA dc
Insulation of electrodes	1211	---		---	R	60	---	MegΩ
Barometric pressure, reduced	1002	<u>18/</u>	Pressure = 8 ± 2 mmHg; voltage = 300 V ac	---	---	---	---	---

- 1/ Test in capacitance jig RCA Capacity Adaptor Model H-1756E, or equivalent. A capacitance bridge operating frequency of 1.0 to 2.0 kHz may be used.
- 2/ The tube shall be vibrated perpendicular to the major tube axis through a frequency range from 5 to 500 Hz and back. From 5 to 50 Hz, the tube shall be vibrated at a constant displacement of .0400 ± .0025 inch (1.016 ± 0.064 mm). From 50 to 500 Hz, the tube shall be vibrated at a constant acceleration of 10 ± 2 G. Total time to complete a sweep cycle shall be 10 ± 5 minutes.
- Each tube shall be vibrated for 60 seconds at the frequency which gives maximum vibrational output. If at the end of 60 seconds the vibrational output is still increasing, the vibration shall continue until there is no further increase.
 - The tube shall be rejected for vibrational output voltage exceeding the limit specified herein or failure to pass the continuity and shorts test. For sweep-frequency vibration record the Ep measured over the vibration-frequency range from 50 to 500 Hz and for variable-frequency vibration record the Ep measured over the vibration-frequency range from 5 to 50 Hz.
- 3/ This test is to be the first test performed at the conclusion of the holding period.
- 4/ This test shall be performed in amplifier cavity Amerac Model No. 1244-1, or equivalent. Test frequency shall be 550 ± 10 MHz. Input = 0.2 W. When the amplifier has been tuned, adjust Ec for Ib = 20 mA dc.
- 5/ Transconductance (2) is the percent change in transconductance (1) of an individual tube resulting from a change in Ef.
- 6/ Tube supported at cathode and anode terminals with the grid disk centered. The supports shall be placed .938 ± .016 inch (23.83 ± 0.41 mm) apart. Apply force to the grid disk without shock, perpendicular to the axis of the tube. Inspect for defects described in MIL-PRF-1, appendix D, vacuum seal (metal-to-glass) defect classification.
- 7/ Electrical rejects may be used.
- 8/ Whenever Ec is not specified on any test, the grid shall be grounded directly or through a grid resistor (if specified) except where related MIL-STD-1311 test methods imply grid variance to accomplish the test.

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TABLE I. Testing and inspection - Continued.

- 9/ The no-load to steady-state full load of the heater voltage supply shall be not more than 3 percent. A failure or defect shall consist of an open heater, open cathode circuit, heater cathode short, or heater cathode leakage in excess of the specified heater cycling life-test end-point limit.
- 10/ Test shall be performed in amplifier cavity Amerac Model No. 1244-1, or equivalent. Test frequency shall be 550 to ± 10 MHz. Adjust Rk for Ik = 25 mA dc and Rg for Ig = 6 mA dc.
- 11/ Cycle Ef only, 110 minutes "on", 10 minutes "off".
- 12/ Test shall be performed on a group D basis every 90 days with the lot consisting of the current month and two subsequent months. Failure of any tube shall revert back to group D monthly lot sampling. After three consecutive successful lot submissions have been completed, the test may revert to the quarterly basis.
- 13/ Test shall be performed in accordance with MIL-STD-1311 method 1521 and MIL-PRF-1 every 90 days. Failure of any tube shall revert back to MIL-PRF-1 monthly lot sampling. After three consecutive successful submissions have been completed, the test shall revert to the quarterly basis.
- 14/ A complete cycle is made in a 6 minute period as follows: 3 minutes on, 3 minutes off. This is a destructive test. Mechanical or electrical rejects may be used.
- 15/ Tubes meeting the initial test requirements after stability and survival-rate life tests shall be accepted under this specification.
- 16/ Subject tubes to shock in axes X, Y, and Z for a total of 15 blows, five blows in each axis.
- 17/ Vibrate in axes X and Y only for a total of 64 hours, 32 hours in each axis.
- 18/ This test shall be performed during the initial production and once each succeeding 12-calendar months in which there is production. An accept on zero defect sampling plan shall be used, with sample of three tubes with an acceptance number of zero. In the event of failure, the test will be made as a part of conformance inspection, part 2, with an acceptance level of 6.5 (see 20/). The regular "12-calendar month" sampling plan shall be reinstated after three consecutive samples have been accepted.
- 19/ Use basic test method 2126 (for receiving tubes) for seal strain test of this ceramic tube type.
- 20/ This specification sheet uses accept on zero defect sampling in accordance with MIL-PRF-1, table III.



Ltr	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
Conformance inspection, part 1					
C	.602	.652	15.29	16.56	
G	.590	.630	14.99	16.00	
H	.320	---	8.13	---	
Y	.740	.780	18.80	19.81	
Conformance inspection, part 2					
A	---	.230	---	5.84	
B	---	.180	---	4.57	
D	.213	.253	5.41	6.43	
E	.049	.055	1.24	1.40	
F	.166	.196	4.22	4.98	
J	.245	.252	6.22	6.40	2, 4
K	---	.115	---	2.92	
L	.400	.420	10.16	10.67	
M	.048	.068	1.22	1.73	
N	.547	.557	13.89	14.15	3
P	.035	---	0.89	---	
Q	---	.010	---	0.25	
R	.130	.160	3.30	4.06	
S	---	1.460	---	37.08	
U	.095	.135	2.41	3.43	
V	.019	.022	0.48	0.56	
W	.110	.120	2.79	3.05	
Reference					
AA	.015 Rad		0.38 Rad		
AB	.030 Rad		0.76 Rad		
AC	.060		1.52		

NOTES:

1. Reference plane "A" is defined as that plane against which annular surface "B" of the grid flange abuts.
2. The axis of the anode terminal shall be coincident with the axis of the cathode terminal within .010 inch (0.25 mm).
3. The axis of the cathode terminal shall pass through the exact center of the grid flange (dimension N) within .005 inch (0.13 mm).
4. With annular surface "B" resting on reference plane "A", the axis of the cathode terminal (dimensions H and J) shall be within 2 degrees of a line perpendicular to reference plane "A".

FIGURE 1. Outline drawing of electron tube type 7554.

NOTES

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

Changes from previous issue. 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 previous issue.

Custodians:

Army - CR
Navy - EC
Air Force - 11
DLA - CC

Preparing activity:

DLA - CC

(Project 5960-3729)

Review activities:

Army - AR
Navy - CG, MC
Air Force - 99

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