

INCH-POUND

MIL-PRF-1/1458D
25 June 1999
SUPERSEDING
MIL-E-1/1458C
24 June 1983

PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, RECEIVING
TYPE 7788

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: Pentode, miniature, RF, sharp cutoff, high transconductance
Outline --- 6-2 (EIA)
Base --- E9-1
Envelope --- T6-1/2
Cathode --- Coated unipotential

Base connections:

Pin No. 1 2 3 4 5 6 7 8 9
Element k g1 k h h g2 a g3 g2

ABSOLUTE RATINGS:

Parameter:	Ef	Eb	Ec1	Ec2	Ec3	Ehk	egk	Rg1
Unit:	V	V dc	V dc	V dc	V dc	v	v	Meg
Maximum:	6.6	250	-25	165	0	100	± 50	1/
Minimum:	6.0	---	---	---	---	---	---	---
Test conditions:	6.3	135	+12.5	165	0	0	---	---

ABSOLUTE RATINGS:

Parameter:	Ik	Pg1	Pp	Pg2	TE	Rk	Alt
Unit:	mA dc	W	W	W	°C	Ohms	ft
Maximum:	50	0.01	5.0	1.0	+170	---	2/
Minimum:	---	---	---	---	---	---	---
Test conditions:	---	---	---	---	---	360	---

See footnotes at end of table I.

GENERAL: Qualification - Required

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TABLE I. Testing and inspection.

Inspection	Method	Conditions	Acceptance level	Inspection level or code	Symbol	Limits		Unit
						Min	Max	
<u>Qualification Inspection</u>								
Sweep-frequency vibration	1031	Ebb = 155 V dc; Ec2 = 160 V dc; Rp = 680 ohms; Ec1 = +7 V dc; Rk = 220 ohms unbypassed	---	---	Ep	---	500	mV dc
<u>Conformance inspection, part 1</u>								
Heater current	1301		0.65	II	If	320	360	mA
Heater-cathode leakage	1336		0.65	II	Ihk	---	13	μ A dc
Total grid current	1266	<u>3/</u>	0.65	II	Ic1	0	-0.1	μ A dc
Electrode current (1) (anode)	1256	Ebb = 120 V dc; Ecc1 = 0; Ecc2 = 150 V dc; Ecc3 = 0; Rk = 47 ohms	0.65	II	Ib	29.0	41.0	mA dc
Electrode current (2) (anode)	1256	Ebb = 120 V dc; Ec1 = -6.0 V dc; Ecc3 = 0; Rk = 47 ohms; Ecc2 = 150 V dc	0.65	II	Ib	---	150	μ A dc
Electrode current (screen grid)	1256		0.65	II	Ic2	4.2	5.8	mA dc
Transconductance (1)	1306		0.65	II	Sm	42,000	58,000	μ mhos
Short and discontinuity detection	1201	egk = 50 v (max)	0.65	II	---	---	---	---
<u>Conformance inspection, part 2</u>								
Insulation of electrodes	1211	E (g1-all) = -50 V dc; E (a-all) = -250 V dc	2.5 2.5	S3	---	---	---	---
Transconductance (2)	1306	Ef = 5.7 V	2.5	I	Δ Sm Ef	---	10	%
Electrode current (3) (anode)	1256		2.5	I	Ib	31	39	mA
Noise and microphonics	2201	Ehk = 0; Ebb = Ecc2 = 200 V dc; Ec1 = 0; Ecal = 600 mV ac; Rk = 1,000 ohms; Rp = 0.1 Meg; Rg2 = 0.5 Meg; Cg2 = 2 μ F	2.5	I	---	---	---	---
Direct-interelectrode capacitance	1331	Shield No. 315	6.5	Code E	Cg1p Cin Cout	---	0.036 17.0 4.5	pF pF pF

See footnotes at end of table.

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TABLE I. Testing and inspection - Continued.

Inspection	Method	Conditions	Acceptance level	Inspection level or code	Symbol	Limits		Unit
						Min	Max	
<u>Conformance inspection, part 2 - Continued</u>								
High-frequency vibration	1031	Rp = 680 ohms; Eb = 155 V dc; Ec2 = 160 V dc; Ec1 = +7 V dc; Rk = 220 ohms unbypassed	6.5	Code H	Ep	---	50	mV ac
Shock	1041	450 G <u>4/</u>	6.5	<u>5/</u>	---	---	---	---
Vibration-fatigue	1031		6.5	<u>5/</u>	---	---	---	---
Shock and vibration-fatigue test end points:	---		---	---	---	---	---	---
High-frequency vibration	1031	Rp = 680 ohms; Eb = 155 V dc; Ec2 = 160 V dc; Ec1 = +7 V dc; Rk = 220 ohms unbypassed	---	---	Ep	---	80	mV ac
Heater-cathode leakage	1336		---	---	lhk	---	25	μA dc
Transconductance (1)	1306		---	---	Sm	40,000	---	μmhos
Total grid current	1266		---	---	lc1	---	-0.2	μA dc
Base strain	1121	<u>6/</u>	---	---	---	---	---	---
Envelope strain	2126		2.5	I	---	---	---	---
Permanence of marking	1105		---	---	---	---	---	---
<u>Conformance inspection, part 3</u>								
Heater-cycling life	1506	Ef = 7.5 V; Ehk = 60 V dc; Eb = Ec1 = Ec2 = 0	---	---	---	---	---	---
Heater-cycling life-test end point:	---		---	---	---	---	---	---
Heater-cathode leakage	1336		---	---	lhk	---	25	μA dc
Stability life	1516	Rk = 360 ohms; Rg1 = 0.47 Meg; TA = room	---	---	---	---	---	---
Stability life-test end point:	---		---	---	---	---	---	---
Change in transconductance (1) of individual tubes	1306		---	---	ΔSm t	---	15	%
Intermittent life	1501	Rk = 360 ohms; Rg1 = 0.47 Meg <u>7/ 8/</u>	---	---	---	---	---	---
Intermittent life-test end points (500 hours)	---	<u>9/</u>	---	---	---	---	---	---

See footnotes at end of table.

TABLE I. Testing and inspection - Continued.

Inspection	Method	Conditions	Acceptance level	Inspection level or code	Symbol	Limits		Unit
						Min	Max	
<u>Conformance inspection, part 3 - Continued</u>								
Total grid current	1266		---	---	Ic1	---	-0.9	μ A dc
Change in transconductance (1) of individual tubes	1306		---	---	ΔS_m t	---	20	%
Transconductance (2)	1306	Ef = 5.7 V	---	---	ΔS_m Ef	---	15	%
Heater-cathode leakage	1336		---	---	lhk	---	25	μ A dc
Insulation of electrodes	1211	E (g1-all) = -50 V dc E (a-all) = -250 V dc	---	---	---	---	---	---
Transconductance (1), average change	1306		---	---	Avg ΔS_m t	---	15	%
Intermittent life-test	---	g/	---	---	---	---	---	---
End points (1,000 hours)								
Total grid current	1266		---	---	Ic1	---	-0.9	μ A dc
Change in transconductance (1) of individual tubes	1306		---	---	ΔS_m t	***	25	%
Heater-cathode leakage	1336		---	---	lhk	---	25	μ A dc
Insulation of electrodes	1211	E (g1-all) = -50 V dc E (a-all) = -250 V dc	---	---	---	---	---	---

1/ Rg1 shall be 0.2 megohm for fixed bias, 0.6 megohm if Rk = 47 ohms, or 3.5 megohms if Rk = 360 ohms.

2/ See "Reduced pressure (altitude) rating", and altitude, maximum peak voltage in the basic document.

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

4/ A grid resistor of 0.1 megohm shall be added, except when a thyratron-type short indicator is used.

5/ This test shall be conducted on the initial lot and thereafter on a lot approximately every 12 months. When one lot has passed, the 12-month rule shall apply. 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.

6/ Acceptance sampling procedure shall be in accordance with method 1121, except that 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, 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

7/ Envelope temperature (TE) requirements, when measured in accordance with the temperature by conduction-band measurement (method 1226), will be satisfied if a TUT 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.

TABLE I. Testing and inspection - Continued.

- 8/ The life-test sample shall consist of 20 tubes per lot and not 1 tube failure shall be permitted. In the event of rejection of the first sample, a second sample of 40 tubes shall be selected from the lot. Acceptance shall then be based on the combined first and second samples and shall not exceed a total of one tube failure.
- 9/ Each characteristic shall be evaluated using an accept on zero, rejection on 1 defect sampling plan.

Custodians:

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

Preparing activity:
DLA - CC

(Project 5960-3511)

Review activities:

Army - MI
Navy - AS, CG, MC, OS, SH
Air Force - 17