INCH-POUND

MIL-E-1/175K
17 September 2013
SUPERSEDING
MIL-E-1/175J
28 February 2003

MILITARY SPECIFICATION SHEET

ELECTRON TUBE, RECEIVING

TYPE 5902

Inactive for new design
after 7 March 1997.

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

Requirements for acquiring the electron tube described herein shall consist of this document and MIL-PRF-1.

DESCRIPTION: Pentode, subminiature, beam power

Outline --- 3-3 (EIA).

Base --- E8-10.

Envelope --- T3.

Cathode --- Coated uni-potential.

Base connections:

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

ABSOLUTE- RATINGS:

Parameter:	Ef	Eb	Ec1	Ec2	Ehk	Rk	Rg1	Ik	Pp	Pg2	TE	Alt
Unit:	V	V dc	V dc	V dc	v	Ohms	MegΩ	mA dc	W	W	°C	ft
Maximum:	6.6	165	0, -55	155	200	---	0.55	50	3.7	0.4	220	See note 1
Minimum:	6.0	---	---	---	---	---	---	---	---	---	---	---
Test Conditions:	6.3	110	0	110	0	270	---	---	---	---	---	---

GENERAL:

Qualification – Not required.

This specification sheet uses accept on zero defect sampling in accordance with MIL-PRF-1, table III.

TABLE I. Testing and inspection.

Requirement or test	MIL-STD-1311 Method	Conditions	Symbol	Limits		Units
				Min	Max	
Conformance inspection, part 1						
Electrode current (1) (anode)	1256	See note 2	Ib	23	37	mA dc
Electrode current (2) (anode)	1256	Ec1 = -40 V dc; Rk = 0	Ib	---	100	μA dc
Total grid current (1)	1266	Rgl = 1.0 MegΩ (see note 2)	Icl	0	-1.0	μA dc
Heater current	1301		If	420	480	mA
Heater-cathode leakage	1336		Ihk	---	15	μA dc
Power output (1)	1341	Esig = 6.4 V ac; Rp = 3,000 ohms	Po	0.75	---	W
Short and discontinuity Detection	1201		---	---	---	---
Conformance inspection, part 2						
Insulation of electrodes	1211		R	50	---	MegΩ
Low-frequency vibration	1031	Rp = 2,000 ohms; 15 G; F = 40 Hz	Ep	---	100	mV ac
Audio frequency noise	1246	Ecal = 150 mV ac; Ecc2 = 110 V dc; Ecl = -8.7 V dc; Rk = 0; Rp = 2,000 ohms; Rgl = 0.5 MegΩ; Rg2 = 10,000 ohms; Cg2 = 4.0 μF	EB	---	17	vu
Electrode current (screen)	1256		Ic2	0	4.0	mA dc
Grid currents	1266	Ef = 7.5 V; Ecl = -40 V dc; Rgl = 1.0 MegΩ; Rk = 0 (see note 3)	Is(gl)	0	-2.0	μA dc
Transconductance	1306		Sm	3,500	4,900	μmhos
Anode resistance	1311		rp	0.01	---	MegΩ
Direct-interelectrode capacitance	1331	.405 in. dia shield	Cpq Cin Cout	--- 5.5 6.5	0.20 7.5 8.5	pF pF pF
Power output (2)	1341	Ef = 5.7 V; Esig = 6.5 V ac; Rp -3,000 ohms	ΔPo Ef	---	15	%
Lead fatigue	1116		---	---	---	---

TABLE I. Testing and inspection - Continued.

Requirement or test	MIL-STD-1311 Method	Conditions	Symbol	Limits		Units
				Min	Max	
Conformance inspection, part 2 - Continued						
Envelope strain	2126		---	---	---	---
Shock	1041	450 G: Ebk = +100 V dc; Rg1 = 0.1 MegΩ				
Vibration fatigue test	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	---	40	µA dc
Change in power output (1) of individual tubes	1341		$\frac{\Delta Po}{t}$	---	20	%
Permanence of marking	1105		---	---	---	---
Conformance inspection, part 3						
Stability life test	1516	Eb = Ec2 = 100 V dc; Ehk = +200 V dc; Rgl = 0.47 MegΩ; Rk = 220 ohms; TA = room	---	---	---	---
Stability life test end point:	---					
Change in power output (1) of individual tubes	1341		$\frac{\Delta Po}{t}$	---	10	%
Heater-cycling life test	1506	Ef = 7.0 V; 1 min “on”; 4 min “off”; Ehk = 140 V ac; Ecl = Ec2 = Eb = 0	---	---	---	---
Heater-cycling life-test end point:	---					
Heater-cathode leakage			Ihk	---	40	µA dc
Intermittent life test (room temperature)	1501	Stability life-test, or equivalent conditions; TA = room	---	---	---	---
Intermittent life-test end point (room temperature, 500 hours):	---					
Insulation of electrodes	1211		R	50	---	MegΩ

TABLE I. Testing and inspection - Continued.

Requirement or test	MIL-STD-1311 Method	Conditions	Symbol	Limits		Units
				Min	Max	
Conformance inspection, part 3 - Continued						
Intermittent life-test end point: (room temperature): (1,000 hours)	---					
Insulation of electrodes	1211		R	25	---	MegΩ
Intermittent life test	1501	Stability life-test conditions; TE = +220°C (min) (see note 4)	---	---	---	---
Intermittent life-test end points (500 hours):	---					
Heater current	1301		If	414	492	mA
Heater-cathode leakage	1336		Ihk	---	60	μA dc
Total grid current (1)	1266		Icl	0	-2.0	μA dc
Change in power output (1) of individual tubes	1341		$\frac{\Delta Po}{t}$	---	20	%
Power output (1) average change	1341		Avg. $\frac{\Delta Po}{t}$	---	15	%
Insulation of electrodes	1211		R	50	---	MegΩ
Power output (2)	1341		$\frac{\Delta Po}{Ef}$	---	15	%
Intermittent life-test end points: (1,000 hours)	---					
Inoperatives	---		---	---	---	---
Heater current	1301		If	414	492	mA
Heater-cathode leakage	1336		Ihk	---	60	μA dc
Total grid current (1)	1266		Icl	0	-2.0	μA dc
Change in power output (1) of individual tubes	1341		$\frac{\Delta Po}{t}$	---	25	%
Insulation of electrodes	1211		R	25	---	MegΩ
Power output (2)	1341		$\frac{\Delta Po}{Ef}$	---	20	%

NOTES:

1. See “Reduced pressure (altitude) rating”, and altitude, maximum peak voltage in the basic document.

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

3. Prior to this test, the tube shall be preheated a minimum of 5 minutes at the conditions specified below. The 3-minute test is not permitted. Test at preheat conditions within 3 seconds after preheating. Total grid current (2) shall be the last test performed on the sample selected for the total grid current (2) test.

Ef	Ec1	Ec2	Ec3	Eb	Rk	Rg1
V	V dc	V dc	V dc	V dc	Ohms	MegΩ
7.5	0	100	0	100	220	0.47

4. 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.

Reference 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 5960-2013-024)

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

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