

MILITARY SPECIFICATION SHEET

ELECTRON TUBE, RECEIVING

TYPES 5899 AND 6206

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, subminiature, semi-remote

Outline --- 3-1 (EIA)
 Base --- E8-10
 Envelope --- T3
 Cathode --- Coated unipotential

Base connections:

Pin No.	---	1	2	3	4	5	6	7	8
Element (Type 5899)	---	g1	k, g3	h	k, g3	a	h	g2	k, g3
Element (Type 6206)	---	g1	k, sd	h	g3	a	h	g2	k, sd

ABSOLUTE-MAXIMUM RATINGS:

Parameter:	Ef	Eb	Ec1	Ec2	Ec3	Ehk	Rk	Rg1	Ik	Pp	Pg2	TE	Alt
Unit:	V	Vdc	Vdc	Vdc	Vdc	v	Ohms	Meg	mAdc	W	W	°C	ft
Maximum:	6.6	165	0, -55	155	22	200	---	1.1	16.5	0.85	0.25	220	Note 2
Minimum:	6.0	---	---	---	---	---	---	---	---	---	---	---	---

TEST

CONDITIONS: 6.3 100 0 100 0 0 120 --- --- --- --- --- ---
 (see note 1)

GENERAL:

Qualification - Required

METHOD	REQUIREMENT OR TEST	CONDITIONS	AQL (PERCENT DEFECTIVE)	INSPECTION LEVEL OR CODE	SYMBOL	LIMITS		UNIT
						MIN	MAX	
	<u>Quality conformance inspection, part 1</u>							
1256	Electrode current (1) (anode)		0.4	II	Ib	5.2	9.2	mAdc
1256	Electrode current (screen)		0.4	II	Ic2	1.0	3.0	mAdc
1266	Total grid current	Eb = Ec2 = 150 Vdc; Rk = 390 ohms; Rg1 = 1.0 Meg (see note 4)	0.4	II	Ic1	0	-0.3	μAdc
1301	Heater current		0.4	II	If	140	160	mA
1306	Transconductance (1)		0.4	II	Sm	3,800	5,200	μmhos
1336	Heater-cathode leakage		0.4	II	Ihk	---	5.0	μAdc
---	Suppressor	See note 5	0.4	II	---	---	---	---
1201	Short and discontinuity detection		0.4	II	---	---	---	---
	<u>Quality conformance inspection, part 2</u>							
1211	Insulation of electrodes		2.5	I	---	---	---	---
1031	Low-frequency vibration	F = 40 Hz; 15 G; Rp = 10,000 ohms	2.5	I	Ep	---	60	mVac
1246	Audio frequency noise	Eca1 = 70 mVac; Ec2 = 19 Vdc; Rg1 = 0.1 Meg; Rg2 = 1,000 ohms; Rp = 0.2 Meg	2.5	I	EB	---	17	vu
1266	Grid emission	Ef = 7.5 V; Ec1 = -14 Vdc; Rg1 = 1.0 Meg; Rk = 0 (see note 6)	2.5	I	Ic1	0	-0.5	μAdc
1306	Transconductance (2)	Ef = 5.7 V	2.5	I	ΔSm Ef	---	10	%
1306	Transconductance (3)	Ec1 = -14 Vdc; Rk = 0	2.5	I	Sm	1.0	75	μmhos
1311	Anode resistance		---	---	rp	0.175	---	Meg
1331	Direct-interelectrode capacitance	0.405 in. dia shield	6.5	Code F	{ Cg1p Cin Cout	{ --- 3.5 2.9	{ --- 4.5 3.9	{ pF pF pF
1116	Lead fatigue		2.5	Code F	---	---	---	---
1041	Shock	450 G; Ehk = +100 Vdc (see note 7)	---	---	---	---	---	---
1031	Vibration-fatigue test	2.5 G; fixed frequency; F = 25 min, 60 max	6.5	See note 8	---	---	---	---
---	Post-shock and vibration-fatigue test end points:							
1031	Low-frequency vibration		---	---	Ep	---	200	mVac
1336	Heater-cathode leakage		---	---	Ihk	---	20	μAdc

METHOD	REQUIREMENT OR TEST	CONDITIONS	AQL (PERCENT DEFECTIVE)	INSP LEVEL OR CODE	SYMBOL	LIMITS		UNIT
						MIN	MAX	
---	<u>Quality conformance inspection, part 2</u> -Continued							
---	Post-shock and vibration-fatigue test end points: -Continued							
1306	Change in trans-conductance (1) of individual tubes		---	---	ΔS_m t	---	20	%
2126	Glass strain		4.0	I	---	---	---	---
1105	Permanence of marking		---	---	---	---	---	---

METHOD	REQUIREMENT OR TEST	CONDITIONS	AQL (PERCENT DEFECTIVE)	INSP LEVEL OR CODE	ALLOWABLE DEFECTIVES PER CHARACTERISTIC		SYMBOL	LIMITS		UNIT
					1ST SAMPLE	COMBINED SAMPLES		MIN	MAX	
---	<u>Quality conformance inspection, part 3</u>									
1506	Heater-cycling life test	$E_f = 7.0$ V; 1 min "on", 4 min "off" $E_{hk} = 140$ Vac; $E_{c1} = E_{c2} = E_b = E_{c3} = 0$	---	---	---	---	---	---	---	
1516	Stability life test	$E_{hk} = +200$ Vdc; $R_{g1} = 1.0$ Meg; TA = room	---	---	---	---	---	---	---	
---	Stability life-test end point:									
1306	Change in trans-conductance (1) of individual tubes		---	---	---	---	ΔS_m t	---	10	%
1501	Intermittent life test (room temperature)	Stability life-test, or equivalent conditions; TA = room (see notes 9 and 10)	---	---	---	---	---	---	---	
---	Intermittent life-test end point: (room temperature (500 hours))									
1211	Insulation of electrodes		---	---	1	3	R	50	---	Meg
---	Intermittent life-test end point: (room temperature (1,000 hours))									
1219	Insulation of electrodes		---	---	1	3	R	25	---	Meg
1501	Intermittent life test	Stability life-test conditions; TE = +220°C (min) (see note 3)	---	---	---	---	---	---	---	---

METHOD	REQUIREMENT OR TEST	CONDITIONS	AQL (PERCENT DEFECTIVE)	INSP LEVEL OR CODE	ALLOWABLE DEFECTIVES PER CHARACTERISTIC		SYMBOL	LIMITS		UNIT
					1ST SAMPLE	COMBINED SAMPLES		MIN	MAX	
	Quality conformance inspection, part 3 -Continued									
---	Intermittent life-test end points: (500 hours)									
---	Inoperatives		---	---	1	3	---	---	---	---
1266	Total grid current		---	---	1	3	Ic1	0	-0.8	μ Adc
1301	Heater current		---	---	1	3	If	138	164	mA
1306	Change in trans- conductance (1) of individual tubes		---	---	1	3	ΔS_m t	---	20	%
1306	Transconductance (2)		---	---	1	3	ΔS_m Ef	---	15	%
1336	Heater-cathode leakage		---	---	1	3	Ihk	---	10	μ Adc
1211	Insulation of elec- trodes		---	---	1	3	R	50	---	Meg
1306	Transconductance (1), average change		---	---	---	---	Avg ΔS_m t	---	15	%
---	Total defectives		---	---	3	6	---	---	---	---
---	Intermittent life-test end points: (1,000 hours)									
---	Inoperatives		---	---	1	3	---	---	---	---
1266	Total grid current		---	---	1	3	Ic1	0	-0.8	μ Adc
1301	Heater current		---	---	1	3	If	138	164	mA
1306	Change in trans- conductance (1) on individual tubes		---	---	1	3	ΔS_m t	---	25	%
1306	Transconductance (2)		---	---	1	3	ΔS_m Ef	---	20	%
1336	Heater-cathode leakage		---	---	1	3	Ihk	---	10	μ Adc
1211	Insulation of electrodes		---	---	1	3	R	25	---	Meg
---	Total defectives		---	---	4	8	---	---	---	---

NOTES:

- Types 5899 and 6206 are the same except for suppressor grid and cathode connections. The Ec3 column in the heading applies only to type 6206. Type 6206 has not been designed for control or gating purposes using grid 3.
- See "Reduced pressure (altitude) rating", and altitude, maximum peak voltage in the basic document.
- 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 operated at or above minimum specified temperature at any position in the life-test rack.
- This test to be performed at the conclusion of the holding period.
- Reject for open suppressor if anode current does not decrease by a minimum of 10 percent when Ec3 is changed from 0 to -100 Vdc. This test is applicable only to tube type 6206.

NOTES: Continued.

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

Ef	Ec1	Ec2	Ec3	Eb	Rk	Rg1
V	Vdc	Vdc	Vdc	Vdc	Ohms	Meg
7.5	0	100	0	100	120	1.0

7. A grid resistor of 0.1 megohm shall be added; however, this resistor shall not be used when a thyratron-type short indicator is used.
8. This test shall be conducted on the initial lot and thereafter on a lot approximately every 6 months. When one lot has passed, the 6-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. MIL-STD-105, sample size code letter E, shall apply.
9. Eligibility for early release at 500 hours is established if no lot failure due to this life test or the regular 1,000-hour intermittent life test has occurred in the preceding 3 consecutive lots, and the lot under consideration is acceptable at 500 hours. One lot failing the regular 1,000-hour intermittent life test or the 1,000-hour intermittent (room temperature) life test, shall result in a loss of eligibility for the early release procedure. All intermittent (room temperature) life-test samples shall be operated to 1,000 hours.
10. 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 a 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 sample shall not exceed three.
11. 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

Preparing activity:

Navy - EC

Agent:

DLA - ES

Review activities:

Army - MI
Air Force - 99
DLA - ES

(Project 5960-3178)

User activities:

Army -
Navy - AS, MC, CG, SH, OS
Air Force - 11