MILITARY SPECIFICATION SHEET

ELECTRON TUBE, RECEIVING

TYPE 5963

The complete requirements for procuring the electron tube described herein shall consist of this document and the latest issue of Specification MIL-E-1.

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

DESCRIPTION: Twin triode, miniature

(A) 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	---	2a	2g	2k	h	h	1a	1g	1k	hct

ABSOLUTE-MAXIMUM RATINGS:

Parameter:	Ef	Eb	Ec	Ehk	Ik/k	Rb/b	Rg/g	Pp/a	Pg/g	TE	(A) Alt
Unit:	V	Vdc	Vdc	v	mAdc	Meg	Meg	W	W	°C	ft
Maximum:	13.9	250	0	90	20	---	0.5	2.5	0.5	120	(Note 2)
	6.9	---	---	---	---	---	(Note 1)	---	---	---	---
Minimum:	11.3	---	-100	---	---	---	---	---	---	---	---
	5.7	---	---	---	---	---	---	---	---	---	---
		Ebb Vdc	Ecc Vdc								
TEST CONDITIONS:	12.6	150	0	---	---	0.02	0.047	---	---	---	---

GENERAL:

Qualification - Required

(A) denotes changes

METHOD	REQUIREMENT OR TEST	CONDITIONS	AQL (PERCENT DEFECTIVE)	INSPECTION LEVEL OR CODE	SYMBOL	LIMITS MIN	LIMITS MAX	UNIT
	Quality conformance inspection, part 1							
1266	Total grid current	Eb = 250 Vdc; Ecc = -9 Vdc; Rg = 0.5 Meg; Rb = 0 (see note 4)	0.65	II	Ic	---	-1.5	µAdc
1306	Transconductance (1)	Eb = 67.5 Vdc; Rb/b = 0; Rg/g = 0	0.65	II	Sm	2,600	3,800	µmhos
1201	Short and discontinuity detection		0.4	II	---	---	---	---
1301	Heater current		0.65	II	If	138	162	mA
1336	Heater-cathode leakage	See note 3	0.65	II	Ihk	---	10	µAdc
1256	Electrode current (1) (anode)	See note 3	0.65	II	Ib	4.6	5.4	mAdc
1256	Electrode current (2) (anode)	Ecc = -15 Vdc (see note 3)	0.65	II	Ib	---	50	µAdc
	Quality conformance inspection, part 2							
1211	Insulation of electrodes		2.5	I	R	100	---	Meg
1306	Transconductance (2)	Ef = 11.4 V; Eb = 67.5 Vdc; Rg/g = 0; Rb/b = 0 (see note 3)	2.5	I	ΔSm Ef	---	15	%
1316	Amplification factor	Eb = 67.5 Vdc; Rb/b = 0; Rg/g = 0 (see note 3)	---	---	Mu	18	24	---
1331	Direct-interelectrode capacitance	No shield (note 3)	6.5	Code E	Cgp	1.20	1.80	pF
		No shield (note 3)			Cin	1.60	2.20	pF
		No shield, section 1			Cout	0.35	0.65	pF
		No shield, section 2			Cout	0.24	0.46	pF
		No shield			Cg1-g2	---	0.010	pF
1031	Low-frequency vibration	Ebb = 250 Vdc; Ec = -8.5 Vdc; Rb = 2,000 ohms; Rg = 0; 10 G; F = 40 Hz (see note 5)	6.5	Code H	Ep	---	150	mVac
(A) 1121	Base strain		---	---	---	---	---	---
(A) 2126	Glass strain		4.0	S3	---	---	---	---
(A) 1106	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	
	Quality conformance inspection, part 3									
1506	Heater-cycling life	Ef = 7.5 V; heater in parallel; Ehk = +135 Vdc; Ec = Eb = 0; cycle 1 minute "on", 4 minutes "off"	---	---	---	---	---	---	---	---
---	Heater-cycling life-test end point	Heater-cathode leakage	---	---	---	---	Ihk	---	20	µAdc
1521	Survival-rate life	Eb = 250 Vdc; Ec = -9 Vdc; Ehk = +135 Vdc; Rg/g = 0.5 Meg; Rb/b = 0	---	---	---	---	---	---	---	---
---	Survival-rate life-test end point	Short and discontinuity detection	---	---	---	---	---	---	---	---
1511	Cathode-interface life	Heaters in parallel (see note 6)	---	---	---	---	---	---	---	---
---	Cathode-interface life-test end point	See note 7	---	---	1	3	Ri	---	25	Ohms
1501	Intermittent life	Eb = 250 Vdc; Ec = -9 Vdc; Ehk = +135 Vdc; Rg/g = 0.5 Meg; Rb/b = 0; TE = 120°C (min)	---	---	---	---	---	---	---	---
---	Intermittent life-test end points (500 hours)	Inoperatives	---	---	1	3	---	---	---	---
		Total grid current	---	---	1	3	Ic	---	-2.0	µAdc
		Heater current	---	---	1	3	If	138	164	mA
		Change in anode current (1) of individual tubes	---	---	1	3	ΔIb t	---	1.0	mAdc
		Change in transconductance (1) of individual tubes	---	---	1	3	ΔSm t	---	20	%
		Transconductance (2)	---	---	1	3	ΔSm Ef	---	15	%
		Heater-cathode leakage	---	---	1	3	Ihk	---	20	µAdc
		Insulation of electrodes	---	---	1	3	R	50	---	Meg
		Average change in transconductance (1)	---	---	---	---	Ave ΔSm t	---	15	%
		Total defectives	---	---	3	5	---	---	---	---
---	Intermittent life-test end points (1,000 hours)	Inoperatives	---	---	2	4	---	---	---	---
		Total grid current	---	---	2	4	Ic	---	-2.0	µAdc
		Heater current	---	---	2	4	If	138	164	mAdc
		Change in anode current (1) of individual tubes	---	---	2	4	ΔIb t	---	1.0	mAdc
		Change in transconductance (1) of individual tubes	---	---	2	4	ΔSm t	---	20	%
		Transconductance (2)	---	---	2	4	ΔSm Ef	---	15	%
		Heater-cathode leakage	---	---	2	4	Ihk	---	20	µAdc
		Insulation of electrodes	---	---	2	4	R	25	---	Meg
		Total defectives	---	---	4	7	---	---	---	---

NOTES:

1. This value is for operation under fixed-bias conditions; with cathode bias, Rg/g may be 1.0 megohm, maximum.

2. Altitude test not required as operating voltage is less than 280 volts. Requirements covering altitude vs. voltage breakdown relationship are specified in the basic document.

3. Test each unit separately.

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

5. Tie 1k to 2k; 1g to 2g; and 1a to 2a.

(A) 6. The life-test sample shall consist of 20 tubes, and not more than 1 tube failure shall be permitted. In the event of rejection of the first sample due to 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 samples shall not exceed three. A life-test defect is defined as a failure to meet the life-test end-point limits as specified on the tube specification sheet. The life-test sample shall be read at 500 (+48, -24) hours.

7. Ef = 5.7 V (heaters in parallel), Eb = 100 Vdc, adjust Ec to obtain an anode current of 1.5 milliamperes.

Custodians:
Army - EL
Navy - EC
Air Force - 85

Review activities:
Army - EL, MI, MU
Navy -
Air Force - 11, 85
DSA - ES

User activities:
Army - MC
Navy - AS, OS, MC, CG, SH
Air Force - 19

Preparing activity: Army - EL

Agent: DSA - ES

(Project 5960-2401-48)

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Department of the Army
Headquarters
U.S.Army Electronics Command
Fort Monmouth, New Jersey 07703

POSTAGE AND FEES PAID

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SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 22-R255

INSTRUCTIONS: This sheet is to be filled out by personnel, either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity. Comments and suggestions submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or serve to amend contractual requirements.

SPECIFICATION
MIL-E-1/1516A Electron Tube, Receiving, Type 5963

ORGANIZATION

CITY AND STATE

CONTRACT NUMBER

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

☐ YES ☐ NO *(If "yes", in what way?)*

4. REMARKS *(Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity.)*

SUBMITTED BY *(Printed or typed name and activity - Optional)*

DATE

DD FORM 1 JAN 66 1426

REPLACES EDITION OF 1 OCT 64 WHICH MAY BE USED.

ESC-PM 1068-68