MIL-E-1/852D
23 March 1981
SUPERSEDING
MIL-E-1/852C
11 August 1970

MILITARY SPECIFICATION SHEET

ELECTRON TUBE, TRANSMITTING

TYPE 5933WA

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, beam power amplifier, F1 = 50 MHz, F2 = 125 MHz

Outline, Base: See figure 1

Cathode: --- Coated unipotential

Base connections:

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

ABSOLUTE-MAXIMUM RATINGS:

Parameter:	Ef	Eb	Ec1	Ec2	Ib	Ic1	Pp
Unit:	V	Vdc	Vdc	Vdc	mAdc	mAdc	W
Maximum:							
Class B, AF:	6.6	600	---	300	120	---	25
Class B, RF:	6.6	600	---	300	80	---	25
Class C, Telep:	6.6	475	-200	300	83	5	16.5
Class C, Teleg:	6.6	600	-200	300	100	5	25
Minimum:	6.0	---	---	---	---	---	---
TEST CONDITIONS:	6.3	600	-29	300	---	---	---

ABSOLUTE-MAXIMUM RATINGS:

Parameter	Pg2	Pi	Ehk	TE	Modulation	Alt
Unit:	W	W	v	°C	---	ft
Maximum:						
Class B, AF:	3.5	60	135	160	---	60,000
Class B, RF:	2.5	37.5	135	160	---	60,000
Class C, Telep:	2.5	40	135	160	Anode	60,000
Class C, Teleg:	3.5	60	135	160	---	60,000
Minimum:	---	---	---	---	---	---
TEST CONDITIONS:	---	---	---	---	---	---

GENERAL:

Qualification - Required

5933WA

FSC 5960

Requirement or test	Notes	Conditions	AQL (percent defective)	Inspection level or code	Symbol	Limits		Unit
						Min	Max	
Quality conformance inspection, part 1								
Heater current			0.65	II	If	810	990	mA
Heater-cathode leakage			0.65	II	Ihk	---	100	µAdc
Total grid current	1		0.65	II	Ic1	0	-4.0	µAdc
Electrode current (1) (anode)	1		0.65	II	Ib	24	48	µAdc
Electrode current (2) (anode)		Ec1 = -100 Vdc	0.65	II	Ib	---	500	µAdc
Power oscillation		Ec2 = 200 Vdc; Rg1 = 0.01 Meg; Ib = 100 mAdc (max); Ic1 = +6 mAdc; F = 15 MHz; Ecc1 = 0	0.65	II	Po	33	---	W
Short and discontinuity detection			0.4	II	---	---	---	---
Quality conformance inspection, part 2								
Insulation of electrodes		Ep-all = -500 Vdc; Eg1-all = -300 Vdc	2.5	S3	R	50	---	Meg
Electrode current (screen)			2.5	I	Ic2	0	3.0	mAdc
Grid emission	2	Ef = 7.5 V; Ec1 = -70 Vdc	2.5	I	Ic1	0	-6.0	µAdc
Transconductance (1)		Eb = Ec2 = 250 Vdc; Ec1 = -15 Vdc	6.5	I	Sm	4,500	6,500	µmhos
Transconductance (2)		Ef = 5.7 V; Eb = Ec2 = 250 Vdc; Ec1 = -15 Vdc	2.5	I	ΔSm / Ef	---	10	%
Primary grid emission (screen)	4	Eb = Ec2 = 0; Eg2 = 175 Vac	6.5	I	Isc2	0	-750	µAdc
Direct-interelectrode capacitance		Shield No. 312	6.5	Code F	Cg1p	---	0.2	pF
		No shield			Cin	8.0	14	pF
		No shield			Cout	5.3	8.7	pF
Barometric pressure, reduced		Pressure = 55 ±5 mmHg; voltage = 700 Vac	6.5	Note 5	---	---	---	---
Low-frequency vibration		Eb = 250 Vdc; Ec1 = -10 Vdc; Ec2 = 100 Vdc; Rp = 2,000 ohms	2.5	I	Ep	---	250	mVac

Method	Requirement or test	Notes	Conditions	AQL (percent defective)	Inspection level or code	Symbol	Limits Min	Limits Max	Unit
	Quality conformance inspection, part 2 - Continued								
1041	Shock	6	450 G; Ehk = +135 Vdc	6.5	Note 5	---	---	---	---
1031	Vibration fatigue			6.5	Note 5	---	---	---	---
---	Shock and vibration fatigue test end points:								
1031	Low-frequency vibration			---	---	Ep	---	500	mVac
1336	Heater-cathode leakage			---	---	Ihk	---	100	µAdc
1236	Power oscillation (change in individual tubes)			---	---	ΔPo t	---	20	%
1111	Base pin solder depth			---	---	---	---	---	---
1101	Secureness of base, cap, or insert			---	---	---	---	---	---
1216	Base material insulating quality			---	---	---	---	---	---
1105	Permanence of marking			---	---	---	---	---	---

Method	Requirement or test	Notes	Conditions	Symbol	Limits Min	Limits Max	Unit
	Quality conformance inspection, part 3						
1506	Heater-cycling life		Ef = 7.5 V; Ehk = +135 Vdc; Ec1 = Ec2 = Eb = 0; 1 min on, 4 min off	---	---	---	---
1516	Stability life		Ehk = 135 Vdc; Rg1 = 0.01 Meg; TA = room	---	---	---	---
---	Stability life-test end point (1 hour):						
1236	Power oscillation (change in individual tubes)			ΔPo t	---	20	%
1501	Intermittent life	3,7	Ehk = 135 Vdc; Rg1 = 0.01 Meg; TA = room TE = 160°C (min)	---	---	---	---

Requirement or test	Notes	Conditions	Symbol	Limits Min	Limits Max	Unit
Quality conformance inspection, part 3						
Intermittent life-test end points (500 hours):						
Total grid current			Ic1	0	-6.0	µAdc
Heater current			If	800	1,010	mA
Power oscillation (Ef = 5.7 V)			ΔPo / Ef	---	15	%
Power oscillation (change in individual tubes)			ΔPo / t	---	20	%
Power oscillation (overage change)			Avg ΔPo / t	---	15	%
Heater-cathode leakage			Ihk	---	150	µAdc
Insulation of electrodes			R	25	---	Meg
Total defectives			---	---	---	---
Intermittent life-test end points (1,000 hours):						
Total grid current			Ic1	0	-6.0	µAdc
Heater current			If	800	1,010	mA
Power oscillation (change in individual tubes)			ΔPo / t	---	25	%
Power oscillation (average change)			Avg ΔPo / t	---	20	%
Heater-cathode leakage			Ihk	---	150	µAdc
Insulation of electrodes			R	25	---	Meg
Total defectives			---	---	---	---

s test shall be performed at the conclusion of the holding period.
or to this test, the tubes shall be preheated a minimum of 5 minutes at the conditions indicated below. The inute test is not permitted. Test at specified conditions within 3 seconds after preheating. Grid emission ll be the last test performed on the sample selected for the grid-emission test.

Ef	Eb	Ec1	Ec2	Rg1
V	Vdc	Vdc	Vdc	Meg
7.5	600	-29	300	0.01

elope-temperature (TE) requirements, when measured in accordance with the temperature by conduction-band surement (method 1226), will be satisfied if a TUT having bogey Ib (±5 percent) under normal test conditions, is rmined to operate at or above minimum specified temperature at any position in the life-test rack.
test duration shall be of sufficient length to obtain a stabilized negative Isc2 value. Adjust Ec1 (0 to 6 Vdc) ive Pg2 = 5 W. Pg2 shall be calculated as 2.48 times the product of the rectified current and rectified age. A protective resistor of 15,000 ohms shall be placed in series with the primary emission current meter.
s test shall be conducted on the initial lot and thereafter on a lot approximately every 12 months. When one lot passed, the 12-month rule shall apply. In the event of a lot failure, the lot shall be rejected and the eeding lots shall be subjected to this test until a lot passes. MIL-STD-105, sample size code letter E, shall y.
id resistor of 0.1 megohm shall be added; however, this resistor shall not be used when a thyratron-type short cator is employed.

- Continued.

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 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.

8. Revision letters are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

ustodians:
Army - ER
Navy - EC
Air Force - 85

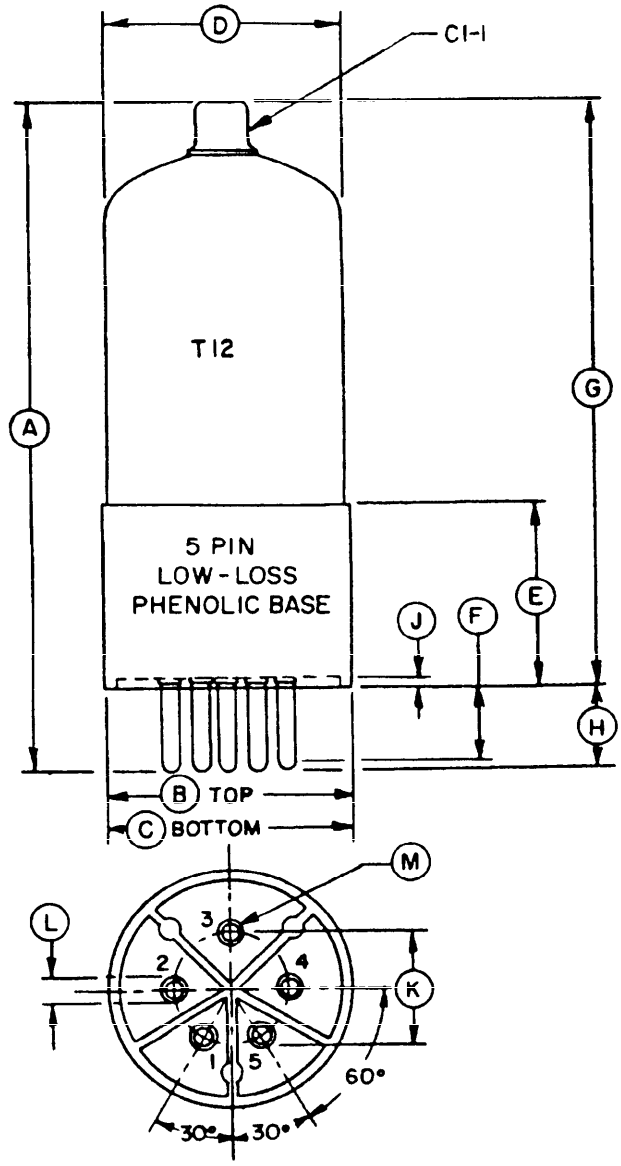
eview activities:
Air Force - 99
DLA - ES

ser activities:
Navy - AS, OS, MC, CG
Air Force - 11

Preparing activity:
Navy - EC

Agent:
DLA - ES

(Project 5960-3240)



Ltr	Dimensions in inches with metric equivalents (mm) in parentheses	
	Minimum	Maximum
Quality conformance inspection, part 1		
A		4.688 (119.08)
B	1.655 (42.04)	1.700 (43.18)
C	1.630 (41.40)	1.655 (42.04)
D		1.562 (39.67)
E	1.245 (31.62)	1.265 (32.13)
F	.430 (10.92)	
G	3.750 (95.25)	4.062 (103.17)
H		.562 (14.27)
J	.075 (1.91)	
K	.750 (19.05) Nom	
L		.195 (4.95)
M	.122 (3.10)	.128 (3.25)

FIGURE 1. Outline drawing of electron tube type 5933 WA.

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OMB Approval
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