

MIL-PRF-1/810E
 17 September 1999
 SUPERSEDING
 MIL-E-1/810D
 17 March 1969

PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, CATHODE RAY
TYPE 5AWP2

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: Electrostatic deflection and focus, flat face, single beam, multiband post accelerator.

DIMENSIONS AND PIN CONNECTIONS: See figure 1.

ABSOLUTE RATINGS:

Parameter:	Ef	Ec1	Eb1	Eb2	Eb3	ed	Rg	Zd	Ehk	Eb3/Eb2	Alt
Unit:	V	V dc	V dc	V dc	V dc	v	Meg	Meg	V dc	Ratio	ft
Maximum:	6.9	0,	1,700	3,850	16,500 1/ 4,500	1,320	1.5	1.0 2/ ---	±180	4.5 3/ ---	10,000
Minimum:	5.7	-200	---	1,000		---	---	---	---	---	---
Test conditions:	6.3	Adjust	Focus	2,300	10,300	---	---	1.0	---	4.5	---

See footnotes at end of table I.

GENERAL:

Qualification: Required.

TABLE I. Testing and inspection.

Inspection	Method	Conditions	Acceptance Level 10/	Symbol	Limits		Unit
					Min	Max	
<u>Conformance inspection, part 1</u>							
Voltage breakdown	5201		0.65	---	---	---	---
Voltage breakdown (electrostatic types)	5201		0.65	---	---	---	---
Gas "cross"	5206	Ib3 = 50 μ A dc 9/	0.65	---	---	---	---
Screen and faceplate blemishes	5106		0.65	---	---	---	---
Modulation	5223	Ib3 = 25 μ A dc	0.65	ΔE_{C1}	---	35	V dc
Spot position (electrostatic deflection)	5231		0.65	---	---	15	mm
Spot displacement (leakage)	5231		0.65	Displ	---	10	mm
Grid cutoff voltage	5241		0.65	E_{C1}	-35	-55	V dc
Pattern distortion	---	7/	0.65	---	---	---	---
Grid No. 1 leakage current	5251		0.65	I_{C1}	---	3	μ A dc
Anode No. 1 leakage current	5251		0.65	I_{B1}	---	5	μ A dc
Anode No. 2 leakage current	5251		0.65	I_{B2}	---	5	μ A dc
<u>Conformation inspection part 2</u>							
Heater current	1301		6.5	If	540	660	mA
Electrode current (anode No. 1)	5201		6.5	I_{B1}	-15	10	μ A dc
Electrode current (cathode)	5201	Ib3 = 50 μ A dc 4/	6.5	Ik	---	1,000	μ A dc
Base alignment (electrostatic types)	5101	+3D4, pin No. 5	6.5	---	---	---	---
Side terminal alignment (electrostatic types)	5101	+3D4	6.5	---	---	---	---
Side terminal and base alignment (electrostatic types)	5101	Pin No. 5	6.5	---	---	---	---
Neck and base alignment (electrostatic types)	5101		6.5	---	---	---	---
Angle between traces	5101		6.5	---	89	91	Degrees

See footnotes at end of table.

TABLE I. Testing and inspection - Continued.

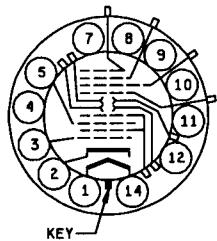
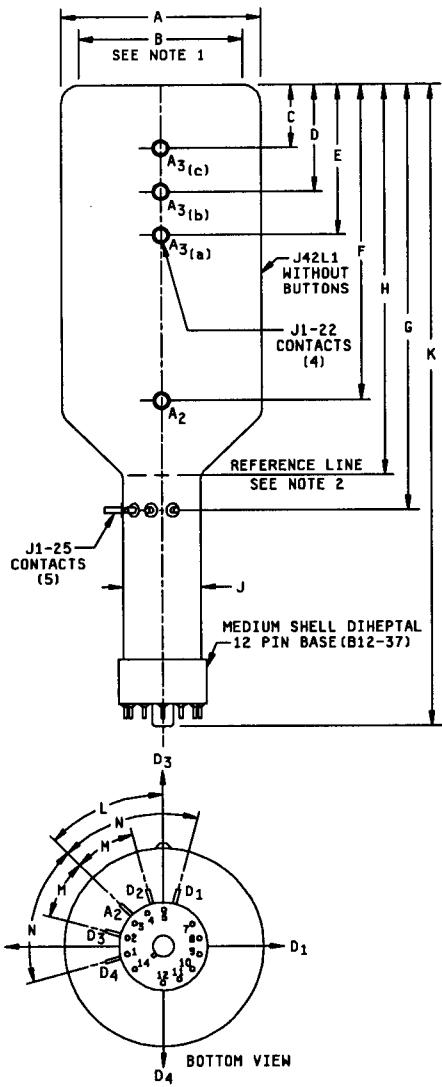
Inspection	Method	Conditions	Acceptance Level <u>10/</u>	Symbol	Limits		Unit
					Min	Max	
<u>Conformance inspection, part 2 - Continued</u>							
Stray light emission (conventional types)	5216	Eb2 = 3,850 V dc; Eb3 = 16,500 V dc	6.5	---	---	---	---
Screens	5221		6.5	cb1	370	---	cb
Line width "A" (electrostatic deflection)	5226	Ib3 = 25 μ A dc	6.5	Width	---	0.40	mm
Line width "B" (electrostatic deflection)	5226	Ib3 = 25 μ A dc	6.5	Width	---	0.60	mm
Focusing voltage at cutoff	5246		6.5	Eb1	---	730	V dc
Focusing voltage at modulation condition	5246		6.5	Eb1	500	---	V dc
Deflection factor (ID2)	5248	5/	6.5	DF	113	128	V dc/inch
Deflection factor (3D4)	5248		6.5	DF	113	128	V dc/inch
Heater-cathode leakage	5251		6.5	Ihk	---	10	μ A dc
Secureness of base, cap, or insert	1101		6.5	---	---	---	---
<u>Conformation inspection part 3</u>							
Life-test provisions	---	Group C; Ib3 = 12.5 μ A dc; t = 500 hours (min)	---	---	---	---	---
Life-test end points	---	Ib3 = 18.75 μ A dc, modulation Line width "A" Line width "B" Heater-cathode leakage Grid No. 1 leakage Anode No. 1 leakage Anode No. 2 leakage	---	ΔE_{C1}	---	35	V dc
			---	Width	---	0.40	mm
			---	Width	---	0.60	mm
			---	Ihk	---	30	μ A dc
			---	Ic1	---	5	μ A dc
			---	Ib1	---	15	μ A dc
			---	Ib2	---	15	μ A dc
<u>Periodic-check tests</u>							
Neck and bulb alignment (electrostatic deflection)	5101		---	Dla	---	2.25	Inch
Face tilt	5101		---	---	---	---	---
Cathode illumination	5216		---	---	---	10×10^{-6}	fL

See footnotes at end of table.

TABLE I. Testing and inspection - Continued.

Inspection	Method	Conditions	Acceptance Level <u>10/</u>	Symbol	Limits		Unit
					Min	Max	
<u>Conformance inspection, part 3 - Continued</u>							
Deflection-factor uniformity	5248		---	---	---	2	%
Deflection defocusing	---	6/	---	---	---	1:2	Ratio
Magnetization	5256		---	---	---	---	---
Direct-interelectrode capacitance	1331	8/ g1 to all k to all D1 to D2 D3 to D4 D1 to all D2 to all D3 to all D4 to all	---	Cg1 Ck C1D2 C3D4 CD1 CD2 CD3 CD4	---	5.0 4.1 2.2 1.5 5.4 6.1 4.5 3.9	pF pF pF pF pF pF pF pF
Pressure (implosion)	1141		---	---	---	---	---
Vibration	5111		---	Width	---	1.0	mm

- 1/ Accelerator to final intensifier electrode voltage equally divided over the three intensifier electrodes by 25 megohm resistors connected between each intensifier and the accelerator.
- 2/ It is recommended that the deflection electrode circuit resistances be 1 megohm, or less, and approximately equal, otherwise beam shift at high drives can be expected. Higher resistance values up to 5 megohms may be used for low-beam current operation.
- 3/ This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 4.5. Operation at other ratios of Eb3/Eb2 may result in changes in deflection uniformity and pattern distortion.
- 4/ Accelerator power input (average) shall be limited to 6 watts.
- 5/ ID2 deflection factor shall be within 8 volts of 3D4. The useful scan in the ID2 and 3D4 directions is plus or minus 2 inches (50.8 mm) from tube face center.
- 6/ The ratio of the line width of a 4 inch (101.6 mm) long trace, adjusted for best center focus, to the line width measured on the faceplate axis when the trace is deflected perpendicularly plus or minus 2 inches (50.8 mm) from the face center by a balanced dc voltage, shall not be greater than the value specified.
- 7/ All portions of a raster pattern, adjusted so its widest points just touch the sides of a 3.040 inch (77.22 mm) square, will fall within the area bounded by the 3.040 inch (77.22 mm) square and an inscribed 2.960 inch (75.18 mm) square.
- 8/ All other electrodes contained within the envelope shall be tied together.
- 9/ This test to be performed at the conclusion of the holding period.
- 10/ This specification uses an acceptance zero ($c = 0$) sampling plan, in accordance with MIL-PRF-1, Table III.



Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
Conformance inspection, part 2				
A	5.156	5.344	130.96	135.74
B	4.500	---	114.30	---
C	1.250	1.625	31.75	41.28
D	2.375	2.750	60.33	69.85
E	3.500	3.875	88.90	98.43
F	7.812	8.812	198.42	223.82
G	10.750	11.250	273.05	285.75
H	10.062	10.437	255.57	265.10
J	1.937	2.062	49.20	52.37
K	16.500	17.000	419.10	431.80
L	35°		55°	
M	25°		35°	
N	55°		65°	

Pin connections	
Pin No.	Element
1	Heater
2	Cathode
3	Grid No. 1
4	Internal connection
5	Focusing electrode
7-12	No connection
14	Heater

NOTES:

1. Minimum useful screen diameter.
2. Reference line, point where ring gauge $2.063 +.0011$ inch ($52.40 +.03$ mm) ID, .500 inch (12.70 mm) long will stop.

FIGURE 1. Outline drawing of electron tube type 5AWP2.

Custodians:

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

Preparing activity:

DLA - CC

(Project 5960-3558-02)

Review activities:

Army - CR4
Navy - AS, CG, MC, OS
Air Force - 19, 99