

PERFORMANCE SPECIFICATION SHEET
ELECTRON TUBE, CATHODE RAY
TYPES 3ADP1, 3ADP2, 3ADP7, AND 3ADP11

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 with 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	1,100	3,300	6,600	600	1.5	1.0 <u>1/</u>	±180	2.0 <u>2/</u>	50,000
Minimum:	5.7	-200	---	1,000	1,000	---	---	---	---	---	---
Test conditions:	6.3	Adj	Focus	2,000	4,000	---	---	---	---	---	---

See footnotes at end of table I.

GENERAL:

Qualification: Required.

TABLE I. Testing and inspection.

Inspection	Method	Type	Notes	Conditions	Symbol	Limits		Unit
						Min	Max	
<u>Qualification inspection</u>								
Pressure (implosion)	1141	All	---		---	---	---	---
Barometric pressure, reduced	1002	All	5/	87 ± 4 mmHg	---	---	---	---
Vibration	5111	All	---		Width	---	1.0	mm
Direct-interelectrode capacitance	1331	All	---	k to all	Ck	---	4.5	pF
				g1 to all	Cg1	---	7.2	pF
				D1 to D2	C1D2	---	2.0	pF
				D3 to D4	C3D4	---	1.6	pF
				D1 to all	CD1	---	4.6	pF
				D2 to all	CD2	---	4.6	pF
				D3 to all	CD3	---	3.6	pF
D4 to all	CD4	---	3.6	pF				
Neck and bulb alignment (electrostatic types)	5101	All	---		Dia	---	1.87	Inch
Cathode illumination	5216	All	---		---	---	---	---
Deflection factor	5248	All	---	1D2, Eb3 = Eb2 = 2,000 V dc	DF	108	132	V dc/inch
Deflection factor	5248	All	---	3D4, Eb3 = Eb2 = 2,000 V dc	DF	49	60	V dc/inch
Deflection-factor uniformity	5248	All	---	1D2	---	---	---	---
Base material insulating quality	1216	All	---		---	---	---	---
<u>Conformation inspection part 1</u>								
Light output	5221	P1 P11	g/ g/	Ib3 = 25 µA dc Ib3 = 25 µA dc	Light	25	---	fL
					Light	14	---	fL
Voltage breakdown	5201	All	---		---	---	---	---
Voltage breakdown (electrostatic types)	5201	All	---		---	---	---	---
Gas "cross"	5206	All	4/	Ib3 = 25 A dc	---	---	---	---
Screen and faceplate blemishes	5106	All	---		---	---	---	---
Modulation	5223	All	---	Ib3 = 25 µA dc	ΔEc1	---	38	V dc
Spot position (electrostatic deflection)	5231	All	---		---	---	10	mm
Spot displacement (leakage)	5231	All	---		Displ	---	8	mm

See footnotes at end of table.

TABLE I. Testing and inspection - Continued.

Inspection	Method	Type	Notes	Conditions	Symbol	Limits		Unit
						Min	Max	
<u>Conformance inspection, part 1</u> - Continued								
Grid cutoff voltage	5241	All	---		Ec1	-87	-52	V dc
Minimum useful scan	---	All	<u>6/</u>		---	---	---	---
Pattern distortion	5103	All	<u>7/</u>		---	---	2.0	%
Grid No. 1 leakage current	5251	All	---		---	---	---	---
Anode No. 1 leakage current	5251	All	---		---	---	---	---
Anode No. 2 leakage current	5251	All	---		---	---	---	---
<u>Conformance inspection, part 2</u>								
Electrode current (cathode)	5201	All	---	lb3 = 25 μ A dc	lk	---	500	μ A dc
Electrode current (anode No. 1)	5201	All	---		lb1	-15	+5	μ A dc
Heater current	1301	All	---		lf	540	660	mA dc
Angle between traces	5101	All	---		---	89	91	Degrees
Stray light emission (conventional types)	5216	All	---	Eb2 = 3,300 V dc; Eb3 = 6,600 V dc	---	---	---	---
Line width "A" (electrostatic deflection)	5226	All	---	lb3 = 25 μ A dc	Width	---	0.35	mm
Focusing voltage at cutoff	5246	All	---		Eb1	---	490	V dc
Base alignment (electrostatic types)	5101	All	---	1D2; Pin No. 5	---	---	---	---
Side terminal alignment (electrostatic types)	5101	All	---	1D2	---	---	---	---
Side terminal and base alignment	5101	All	---	Pin No. 5	---	---	---	---
Neck and base alignment (electrostatic types)	5101	All	---		---	---	---	---
Screens	5221	P7 P2	---		---	---	---	---
			<u>9/</u>		cb1	360	---	cb
Line width "B" (electrostatic deflection)	5226	All	<u>10/</u>	lb3 = 25 μ A dc	Width	---	0.50	mm
Focusing voltage at modulation condition	5246	All	---		Eb1	320	---	V dc

See footnotes at end of table.

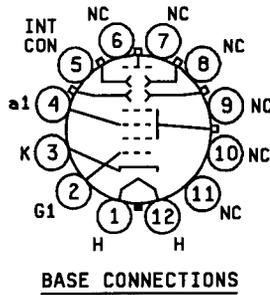
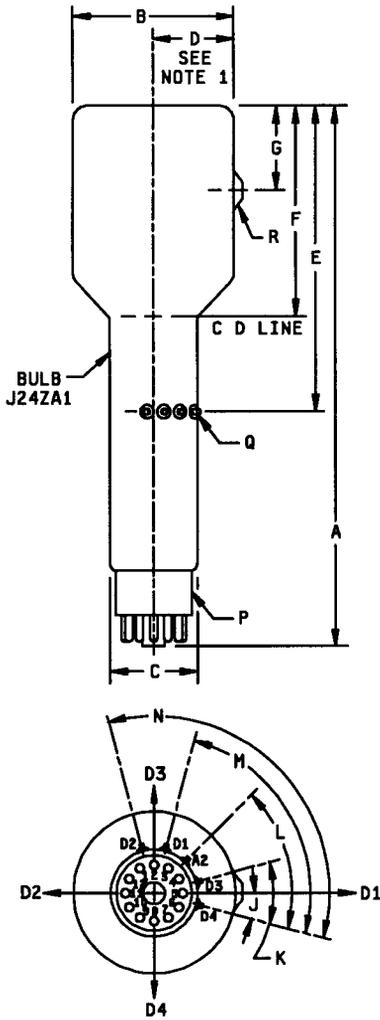
TABLE I. Testing and inspection - Continued.

Inspection	Method	Type	Notes	Conditions	Symbol	Limits		Unit
						Min	Max	
<u>Conformance inspection, part 2</u> - Continued								
Deflection factor (1D2)	5248	All	---		DF	133	163	V dc/inch
Deflection factor (3D4)	5248	All	---		DF	59	73	V dc/inch
Trace distortion	---	All	11/		---	---	.020	Inch
Heater-cathode leakage current	5251	All	---		lhc	---	15	μ A dc
Secureness of base, cap, or insert	1101	All	---		---	---	---	---
Base pin solder depth	1111	All	---		---	---	---	---
Permanence of marking	1105	All	---		---	---	---	---
<u>Conformance inspection, part 3</u>								
Life test	---	All	---	Group C; Ib3 = 25 A dc; t = 500 hours (min)	---	---	---	---
Life-test end points:	---							
Modulation	5223	All	---	Ib3 = 20 μ A dc	Δ Ec1	---	38	V dc
Line width "A"	5226	All	---	Ib3 = 20 μ A dc	Width	---	0.35	mm
Line width "B"	5226	All	---	Ib3 = 20 μ A dc	Width	---	0.50	mm

- 1/ It is recommended that the deflection electrode circuit resistances be approximately equal.
- 2/ This tube is designed for optimum performance when operating at an Eb3/Eb2 ratio of 2.0. Operation at other ratios of Eb3/Eb2 may result in changes in deflection uniformity and pattern distortion.
- 3/ All tests are to be performed with the tube shielded.
- 4/ This test to be performed at the conclusion of the holding period.
- 5/ This test is to be made with a maximum rated voltage (Eg1 maximum negative voltage) applied to the base pins.
- 6/ Useful scan.
 - a. The useful scan in the 1D2 direction is ± 1.3125 inch (33.34 mm) from the tube face center.
 - b. The useful scan in the 3D4 direction is ± 0.75 inch (19.05 mm) from the tube face center.
- 7/ All portions of a raster pattern, adjusted so its widest points just touch the sides of a 2.295 inches (58.29 mm) by 1.530 inch (38.86 mm) rectangle, will fall within the area bounded by the 2.295 inches (58.29 mm) by 1.530 inch (38.86 mm) rectangle and an inscribed 2.205 inches (56.01 mm) by 1.470 inch (37.34 mm) rectangle.
- 8/ Use a raster size of 2.25 inches (57.15 mm) by 1.50 inch (38.10 mm), and a type 3 photronic cell without eye correction calibrated in foot candles of illumination from a light source having a color temperature of 2,700°K.

TABLE I. Testing and inspection - Continued.

- 9/ Use a raster size of 2.25 inches (57.15 mm) by 1.50 inch (38.10 mm) and a beam current of 26.1 μ A dc.
- 10/ The line width "B" shall be measured at ± 0.75 inch (19.05 mm) from the tube face center.
- 11/ The focused sides of a raster pattern, centered with respect to the tube face and whose mean dimensions are 2.25 inches (57.15 mm) by 1.50 inch (38.10 mm), shall not deviate from straight lines passing through the corners by more than the indicated value.



Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
Qualification inspection				
P	Base: B12-43			
Q	Bulb contact: J1-25			
R	Bulb contact: J1-22			
Conformance inspection, part 2				
A	9.750	10.250	247.65	260.35
B	2.938	3.063	74.63	77.80
C	1.563	1.688	39.70	42.88
D	1.313	---	33.35	---
E	5.188	5.563	131.78	141.30
F	3.688	4.063	93.68	103.20
G	1.313	1.688	33.35	42.88
J	10°	20°	10°	20°
K	25°	35°	25°	35°
L	55°	65°	55°	65°
M	85°	95°	85°	95°
N	115°	125°	115°	125°

NOTE: Minimum useful screen radius.

FIGURE 1. Outline drawing of electron tube types 3ADP1, 3ADP2, 3ADP7, and 3ADP11.

Custodians:

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

Preparing activity:

DLA - CC

(Project 5960-3551-16)

Review activities:

Army - CR4
Navy - AS, CG, MC, OS