

INCH POUND

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7 April, 1999
SUPERSEDING
MIL-E-1/385B
12 December 1974

PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, CATHODE RAY
TYPES 3DP1A AND 3DP1A+S2

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 with decalcomania inscription on tube type 3DP1A+S2

DIMENSIONS AND PIN CONNECTIONS: See figures 1 and 2

ABSOLUTE RATINGS:

Parameter:	Ef	Ec1	ed	Eb1	Eb2	Light output	Rg	Zd	Ehk	Alt
Unit:	V	V dc	v	V dc	V dc	fL	Meg	Meg	V dc	ft
Maximum:	6.9	0	550	1,100	2,200	---	1.5	1.0	-125	10,000
Minimum:	5.7	-200	---	---	1,500	7.5	---	---	---	---
Test Conditions:	6.3	Adj	---	Focus	1,500	---	---	---	---	---

GENERAL:

Qualification - Required

TABLE 1. Testing and inspection.

Inspection	Method	Notes	Conditions	Symbol	Limits Min	Limits Max	Units
<u>Qualification inspection</u>							
Neck and bulb alignment (electrostatic types)	5101	-		Diam	---	2.25	Inches
Cathode illumination	5216	-		---	---	---	---
Deflection-factor uniformity	5248	-		---	---	---	---
Direct-interelectrode capacitance	1331	-	Control grid to all	Cg1	---	10.5	pF
			Cathode to all	Ck	---	10.5	pF
			D1 to D2	C1D2	---	4.0	pF
			D3 to D4	C3D4	---	4.0	pF
			D1 to all	CD1	---	15.0	pF
			D3 to all	CD3	---	12.0	pF
			D1 to all, except D2	CD1	---	13.0	pF
			D2 to all, except D1	CD2	---	13.0	pF
			D3 to all, except D4	CD3	---	12.0	pF
			D4 to all, except D3	CD4	---	12.0	pF
D5 to anode 2	CD5	---	3.5	pF			
Base material insulating quality	1216	-	Zone 5 (min)	---	---	---	---
Pressure (implosion)	1141	-		---	---	---	---
<u>Conformance inspection, part 1</u>							
Voltage breakdown	5201	-		---	---	---	---
Voltage breakdown (electrostatic types)	5201	-		---	---	---	---
Gas "cross"	5206	1, 2	Light = 7.5 fL	---	---	---	---
Bulb, screen and faceplate quality	5106	-		---	---	---	---
Light output	5221	-		Light	7.5	---	fL
Modulation	5223	-	Light = 7.5 fL	ΔE_c	---	40	V dc
Spot position (electrostatic deflection)	5231	-		---	---	15	mm
Spot displacement (leakage)	5231	-		Displ	---	5	mm
Grid cutoff voltage	5241	-		Ecl	-22.5	-67.5	V dc
Grid No. 1 leakage current	5251	-		---	---	---	---
Anode No. 2 leakage current	5251	-		---	---	---	---

TABLE 1. Group A inspection -Continued.

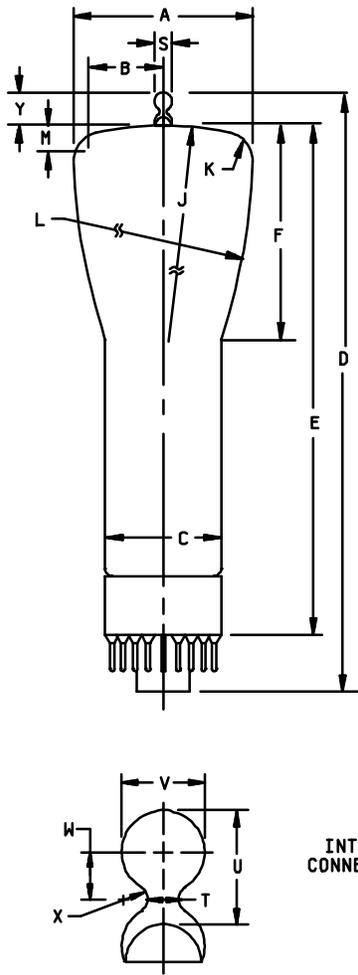
Inspection	Method	Notes	Conditions	Symbol	Limits Min	Limits Max	Units
<u>Conformance inspection, part 2</u>							
Heater current	1301	-		If	540	660	mA
Electrode current (anode No. 1)	5201	-	Ec1 = 0	Ib1	-50	10	μA dc
Electrode current (cathode)	5201	-	Light = 7.5 fL	Ik	---	1,000	μA dc
Base alignment (electrostatic types)	5101	-	+1D2, pin No. 5	---	---	---	---
Angle between traces	5101	-		---	---	---	---
Neck and base alignment (electrostatic types)	5101	-		---	---	---	---
Stray light emission (conventional types)	5216	-	Eb2 = 2,200 V dc	---	---	---	---
Line width "A" (electrostatic deflection)	5226	3, 5	Light = 7.5 fL	Width	---	0.60	mm
Line width "B" (electrostatic deflection)	5226	3, 6	Light = 7.5 fL	Width	---	0.80	mm
Focusing voltage at cutoff	5246	-		Eb1	345	515	V dc
Focusing voltage (zero bias)	5246	-		Eb1	300	515	V dc
Deflection factor	5248	-	1D2	DF	127	173	V dc/in.
Deflection factor	5248	-	3D4	DF	As recorded	As recorded	V dc/in.
Deflection factor	---	4	D5	Pk to Pk	50	84	V dc
Radial pattern width	---	4		Width	---	10	mm
Deflection ratio	---	-	1D2/3D4	Ratio	1.14	1.56	---
Heater-cathode leakage current	5251	-		---	---	---	---
Secureness of base, cap or insert	1101	-		---	---	---	---
Base pin solder depth	1111	-		---	---	---	---
Permanence of marking	1105	-		---	---	---	---

TABLE 1. Testing and inspection -Continued.

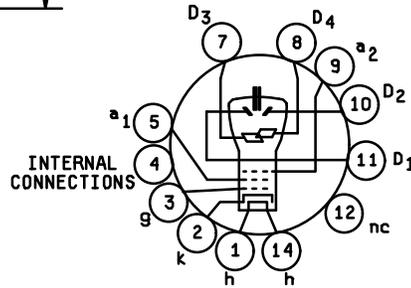
Inspection	Method	Notes	Conditions	Symbol	Limits Min	Limits Max	Units
<u>Conformance inspection, part 3</u>							
Life test	---	-	Group C; Light = 7.5 fL; Eb2 = 2,200 V dc; t = 500 hours	---	---	---	---
Life-test end points:	---						
Modulation	5223	-	Light = 7.5 fL	ΔE_c	---	50	V dc
Line width "A"	5226	-	Light = 7.5 fL	Width	---	0.70	mm
Line width "B"	5226	-	Light = 7.5 fL	Width	---	1.05	mm

NOTES:

1. The center of the "gas cross" appearing inside pattern will not appear due to presence of rod in tube face.
2. This test to be performed at the conclusion of the holding period.
3. Modify the regular procedure of line width measurements in the following manner: Adjustment shall be made for best focus at a point $\frac{1}{8}$ inch (12.70 mm) from the center of the radial deflecting electrode terminal along the line of the high-frequency scan.
4. Using mask centered with respect to tube face, set diameter of scanned circle to 1.375 inch (34.93 mm) and remove mask. Apply and adjust 35 KHz signal on D5 (rod) so that minimum width of annular pattern is 5 mm. The maximum radial width of same pattern shall be within the limit specified. The peak voltage shall be within the limits specified.
5. The tubes shall be observed for deflection defocusing, astigmatism and spot ellipticity observable to the eye, as evidenced by fuzziness due to lack of sharpness of trace (usually around the edges), bow-tying (irregular widths of any line when observed at different points) and bowing of trace other than that normally caused by curvatures of the bulb.
6. An examination for defocusing, astigmatism, or spot ellipticity shall be made as in note 5.
7. The following applies to tube type 3DP1A+S2.
 - (a) Before application of the inscription, the tube shall have passed all requirements of this specification sheet.
 - (b) The inscription outlined on figure 2 shall be secured to the tube and be positioned in the following manner:
 - (1) The trace produced by deflecting electrodes 1D2 shall not deviate by more than 2.5 degrees from a line passing through scale markings 0 and 2.5 on the inscription.
 - (2) The position of zero on the inscription shall be 64.28 degrees \pm 12.5 degrees clockwise from the centerline of the base lug key, looking at the tube face.
 - (3) The inscription shall be centered with respect to the tube face within .047 (1.19 mm) of an inch.
 - (4) Mask center electrode.
 - (5) After masking, the tube face shall be sprayed with a light coat of clear lacquer.



Dimensions				
Ltr	Inches		Millimeters	
	Min	Max	Min	Max
Conformance inspection, part 2				
A	2.937	3.063	74.60	77.80
B	See note 1			
C	1.937	2.063	49.20	52.40
D	10.063	10.750	255.60	273.08
S	See note 2			
U	.141		3.58	
V	.110	.116	2.79	2.95
Y	.313	.501	7.95	12.73
Reference dimensions (see note 6)				
E	9.250		234.95	
F	3.875		98.43	
J	8.000 R		203.20 R	
K	.250 R		6.35 R	
L	12.438 R		315.93	
M	.350		8.89	
T	.068 Dia		1.73 Dia	
W	.058		1.47	
X	.030 R		0.76 R	



NOTES:

1. The minimum useful screen radius shall not be less than 1.375 (34.93 mm)
2. The maximum diameter uncoated area around center of the radial deflecting electrode terminal shall not be more than .625 (15.88 mm).
3. The radial deflecting electrode terminal shall be eccentric with respect to the tube axis by not more than .063 (1.60 mm).
4. The base shall be a medium shell DIHEPTAL 12-pin (B12-37) type.
5. The bulb shall be a J24G type.
6. These dimensions are for information only and are not required for inspection purposes.

FIGURE 1. Outline drawing of electron tube 3DP1A and 3DP1A+S2.

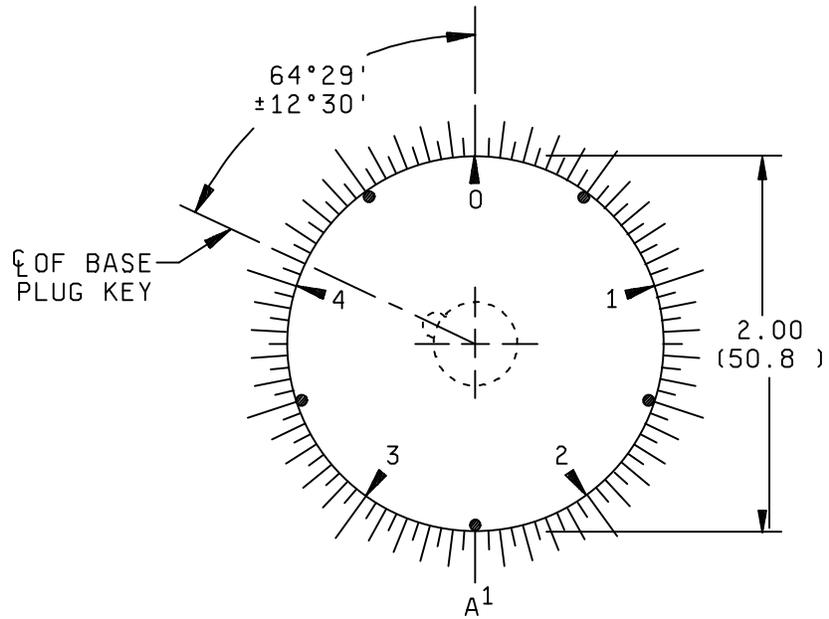


FIGURE 2. S2 scale.

Custodians:

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

Preparing activity:

DLA - CC

(Project 5960-3463)

Review activities:

Navy - AS, CG, MC, OS
Air Force - 99