INCH POUND
MIL-PRF-1/311L
1 October 2009
SUPERSEDING
MIL-PRF-1/311K
10 July 1998

PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, CATHODE RAY
TYPES 3ACP1A, 3ACP2A, 3ACP7A

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.

DIMENSIONS AND PIN CONNECTIONS: See figure 1.

ABSOLUTE RATINGS:

Parameter:	Ef	Ec1	Eb1	Eb2	Eb3	ed	Rg	Zd	Ehk	Eb3/Eb2	Barometric pressure, reduced
Unit:	V	V dc	V dc	V dc note 1	V dc	v	MegΩ	MegΩ note 2	V dc	Ratio note3	mmHG
Maximum:	6.9	-200	1,500	2,200	6,600	550	1.5	1.0	± 180	3.0	87.0
Minimum:	5.7	0	- - -	1,000	1,000	- - -	- - -	- - -	- - -	1.0	- - -
Test conditions:	6.3	Adjust	Focus	2,000	4,000	- - -	- - -	- - -	- - -	2.0	- - -

GENERAL:

Qualification - Required.

TABLE I. Testing and inspection.

Inspection	Method MIL-STD-1311	Type	Notes	Conditions	Symbol	Limits Min	Limits Max	Unit
Qualification inspection								
Pressure (implosion)	1141	All	- - -		- - -	- - -	- - -	- - -
Barometric pressure, reduced	1002	All	- - -	87.0 mmHg	- - -	- - -	- - -	- - -
Vibration	5111	All	- - -		Width	- - -	1.0	mm
Direct-interelectrode capacitance	1331	All	- - -	k to all	Ck	- - -	4.2	pF
				g1 to all	Cg1	- - -	5.5	pF
				D1 to D2	C1D2	- - -	2.1	pF
				D3 to D4	C3D4	- - -	1.5	pF
				D1 to all	CD1	- - -	5.8	pF
				D2 to all	CD2	- - -	5.8	pF
				D3 to all	CD3	- - -	4.5	pF
				D4 to all	CD4	- - -	4.5	pF
Electrode current (anode No. 3)	5201	All	- - -	Ec1 = 0	Ib	500	- - -	μA dc
Neck and bulb alignment (electrostatic types)	5101	All	- - -		- - -	- - -	2.25	inch
Cathode illumination	5216	All	- - -		- - -	- - -	- - -	- - -
Stray light emission (conventional types)	5216	All	- - -	Eb2 = 2,200 V dc; Eb3 = 6,600 V dc	- - -	- - -	- - -	- - -
Deflection factor	5248	All	- - -	1D2; Eb3 = Eb2 = 2,000 V dc	DF	142	163	V dc/in.
				3D4; Eb3 = Eb2 = 2,000 V dc	DF	110	132	V dc/in.
Deflection-factor uniformity	5248	All	- - -		- - -	- - -	2.0	%
Deflection-factor uniformity	5248	All	- - -	Eb3 = Eb2 = 2,000 V dc	- - -	- - -	3.0	%
Shock	5115	All	- - -		- - -	- - -	- - -	- - -
Base material insulating quality	1216	All	- - -		- - -	- - -	- - -	- - -

See notes at end of table I.

TABLE I. Testing and inspection - Continued.

Inspection	Method MIL-STD-1311	Type	Notes	Conditions	Symbol	Limits Min	Limits Max	Unit
Conformance inspection, part 1								
Voltage breakdown	5201	All	- - -		- - -	- - -	- - -	- - -
Gas "cross"	5206	P1A P2A P7A	4 4 4	Ib3 = 50 μA dc Ib3 = 200 μA dc Ib3 = 200 μA dc	- - - - - - - - -	- - - - - - - - -	- - - - - - - - -	- - - - - - - - -
Screen and faceplate blemishes	5106	All	- - -		- - -	- - -	- - -	- - -
Modulation	5223	All	- - -	Ib3 = 25 μA dc Ib3 = 200 μA dc	ΔEc1 ΔEc1	- - - - - -	21 45	V dc V dc
Spot position (electrostatic deflection)	5231	All	- - -		- - -	- - -	10	mm
Spot displacement (leakage)	5231	All	- - -		- - -	- - -	5	mm
Grid cutoff voltage	5241	All	- - -		Ec1	-75	-45	V dc
Pattern distortion	5103	All	- - -		- - -	- - -	2	%
Grid No. 1 leakage current	5251	All	- - -		- - -	- - -	- - -	- - -
Anode No. 1 leakage current	5251	All	- - -		- - -	- - -	3	μA dc
Anode No. 2 leakage current	5251	All	- - -		- - -	- - -	- - -	- - -
Light output	5251	P1A	- - -	Ib3 = 100 μA dc	Light	80	- - -	fL
Conformance inspection, part 2								
Heater current	1301	All	-		If	540	660	mA
Electrode current (anode No. 1)	5201	All	-	Ib3 = 500 μA dc	Ib1	-15	+5	μA dc
Electrode current (cathode)	5201	P1A P2A P7A	- - -	Ib3 = 50 μA dc Ib3 = 200 μA dc Ib3 = 200 μA dc	Ik Ik Ik	- - - - - - - - -	125 600 600	μA dc μA dc μA dc
Base alignment (electrostatic types)	5101	All	-	1D2, pin No. 5	- - -	- - -	- - -	- - -

See notes at end of table I.

TABLE I. Testing and inspection - Continued.

Inspection	Method MIL-STD-1311	Type	Notes	Conditions	Symbol	Limits Min	Limits Max	Unit
Conformance inspection, part 2 -Continued.								
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	- - -		- - -	- - -	- - -	- - -
Base pin solder depth	1111	All	- - -		- - -	- - -	- - -	- - -
Screens	5221	All	- - -		- - -	- - -	- - -	- - -
Line width “A” (electrostatic deflection)	5226	All	- - -	Ib3 = 50 μA dc Ib3 = 200 μA dc	Width Width	- - - - - -	0.4 0.7	mm mm
Angle between traces	5101	All	- - -		- - -	89	91	Degrees
Line width “B” (electrostatic deflection)	5226	All	- - -	Ib3 = 50 μA dc Ib3 = 200 μA dc	Width Width	- - - - - -	0.6 0.8	mm mm
Focusing voltage at cutoff	5246	All	- - -		Eb1	390	- - -	V dc
Focusing voltage (zero-bias)	5246	All	- - -		Eb1	- - -	550	V dc
Deflection factor	5248	All	- - -	1D2	DF	175	200	V dc/in.
Deflection factor	5248	All	- - -	3D4	DF	138	158	V dc/in.
Heater-cathode leakage current	5251	All	- - -		Ihk	- - -	15	μA dc
Secureness of base, cap, or insert	1101	All	- - -		- - -	- - -	- - -	- - -
Permanence of marking	1105	All	- - -		- - -	- - -	- - -	- - -
Conformance inspection, part 3								
Life test	-	All	- - -	Group C; Ib3 = 30 μA dc t = 500 hours (min)	- - -	- - -	- - -	- - -
Life-test end points	-							
Modulation	5223	All	- - -	Ib3 = 150 μA dc	ΔEc1	- - -	45	V dc
Line width “A”	5226	All	- - -	Ib3 = 150 μA dc	Width	- - -	0.8	mm
Line width “B”	5226	All	- - -	Ib3 = 150 μA dc	Width	- - -	0.9	mm

See notes at end of table I.

NOTES:

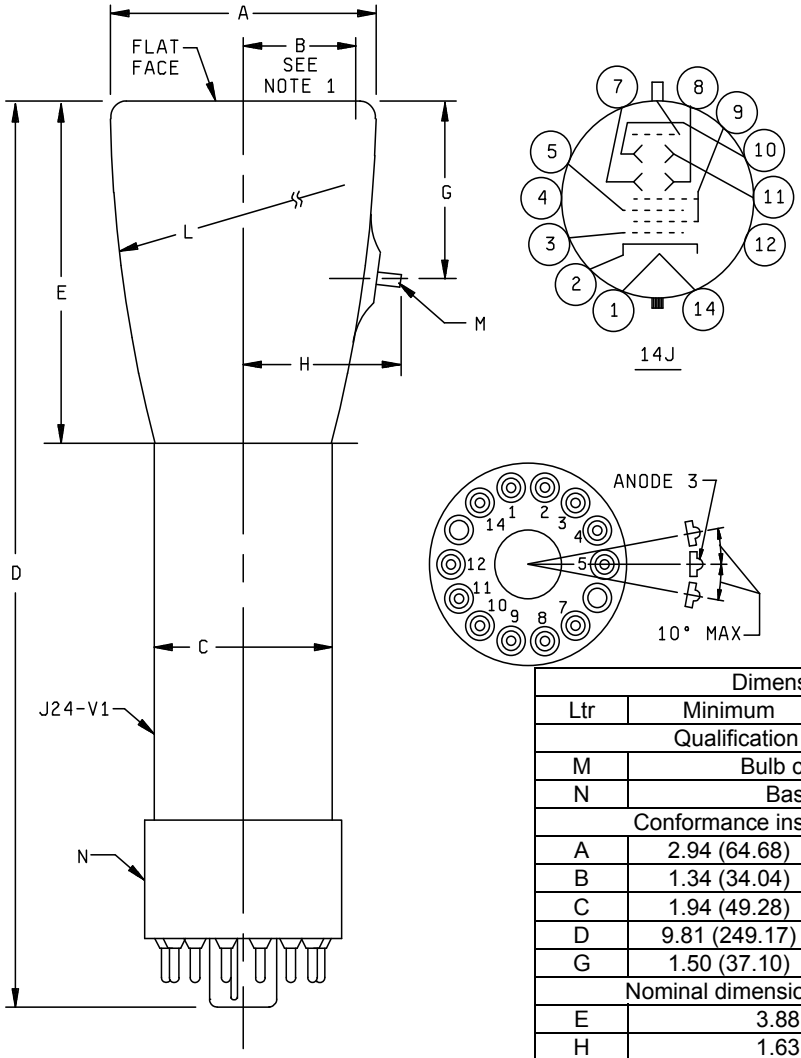
1. Accelerator power input (average) should be limited to 6 watts.

2. The deflection electrode circuit resistance should be approximately equal. Higher resistance values up to 5.0 Megohms may be used for low-beam current operation.

3. This tube shall be 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.

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

5. This specification sheet uses accept on zero defect sampling in accordance with MIL-PRF-1, table III.



Dimensions		
Ltr	Minimum	Maximum
Qualification Inspection		
M	Bulb contact: J1-22	
N	Base: B12-37	
Conformance inspection, part 2		
A	2.94 (64.68)	3.06 (77.72)
B	1.34 (34.04)	
C	1.94 (49.28)	2.06 (52.32)
D	9.81 (249.17)	10.19 (258.83)
G	1.50 (37.10)	2.00 (50.80)
Nominal dimensions (see note 2)		
E	3.88 (98.55)	
H	1.63 (41.40)	
L	12.44 (315.98) R	

Pin connections												
Pin No.	1	2	3	4	5	7	8	9	10	11	12	14
Elements	h	k	g1	int con	a1	D3	D4	a2	D2	D1	nc	h

NOTES:

1. Minimum useful screen radius.
2. Nominal dimensions are for information only and are not required for inspection purposes.

FIGURE 1. Outline drawing of electron tube types 3ACP1A, 3ACP2A, 3ACP7A.

Referenced documents. In addition to MIL-PRF-1, this document references the following:
MIL-STD-1311

Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Custodians:
Army - CR
Navy - EC
Air Force - 85
DLA - CC

Preparing activity:
DLA - CC

(Project 5960-2009-007)

Review activities:
Army - AV, CR4
Navy - AS, CG, MC, OS
Air Force - 99

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at http://assist.daps.dla.mil.