

INCH POUND

MIL-PRF-1/272F
 20 May 2014
 SUPERSEDING
 MIL-PRF-1/272E
 26 June 1998

PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, CATHODE RAY
 TYPES 2BP1 AND 2BP11

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:	Type phosphor	Ef	Ec1	ed	Eb1	Eb2	Light output	Rg	Zd	Ehk	Alt
Unit:		V	V dc	v	V dc	V dc	ftL	MegΩ	MegΩ	V dc	ft
Maximum:	P1, P11	6.9	-200	550	1,100	2,750	---	1.5	1.0	± 125	30,000
Minimum:	P1	5.7	0	---	---	500 Note 2	4.0	---	---	---	---
Minimum:	P11	5.7	0	---	---	1,100	2.25	---	---	---	---
Test conditions:	P1, P11	6.3	Adj	---	Focus	1,000	---	---	---	---	---

GENERAL:

Qualification - Required (see Note 1 at end of Table I).

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

MIL-PRF-1/272F

TABLE I. Testing and inspection.

Inspection	Method MIL-STD-1311	Types	Notes	Conditions	Symbol	Limits		Unit	
						Min	Max		
<u>Qualification inspection</u>									
Vibration	5111	P1, P11	---		Width	---	1.0	mm	
Barometric pressure, reduced	1002	P1, P11	6		---	---	---	---	
Neck and bulb alignment (electrostatic types)	5101	P1, P11	---		Diameter	---	1.63	Inch	
Cathode illumination	5216	P1, P11	---		---	---	---	---	
Focusing voltage atmodulation condition	5246	P1, P11	---		Eb1	150	280	V dc	
Deflection-factor uniformity	5248	P1, P11	---		---	---	---	---	
Direct-interelectrode capacitance	1331	P1, P11	---	g1 to all	Cg1	---	11.0	pF	
					D1 to D2	C1D2	---	4.0	pF
					D3 to D4	C3D4	---	4.0	pF
					D1 to all	CD1	---	15.0	pF
					D2 to all	CD2	---	11.0	pF
					D3 to all	CD3	---	10.0	pF
					D4 to all	CD4	---	11.0	pF
Pressure (implosion)	1141	P1, P11	---		---	---	---	---	
Base material insulating quality	1216	P1, P11	---		---	---	---	---	
<u>Conformance inspection, part 1</u>									
Voltage breakdown	5201	P1, P11	---		---	---	---	---	
Voltage breakdown (electrostatic types)	5201	P1, P11	---		---	---	---	---	
Gas "cross"	5206	P1 P11	7	Light = 4.0 ftL	---	---	---	---	
			7		---	---	---	---	
Bulb, screen, and faceplate quality	5106	P1, P11	---		---	---	---	---	
Light output	5221	P1 P11	7	Light = 4.0 ftL	Light	4.0	---	ftL	
			5, 7		Light	2.25	---	ftL	
Modulation	5223	P1 P11	---	Light = 4.0 ftL	$\Delta Ec1$	---	48	V dc	
			---		$\Delta Ec1$	---	48	V dc	
Spot position (electrostatic deflection)	5231	P1, P11	---		---	---	10	mm	
Spot displacement (leakage)	5231	P1, P11	---		Displ	---	6	mm	
Grid cutoff voltage	5241	P1, P11	---		Ec1	---	-67.5	V dc	

See notes at end of Table I.

MIL-PRF-1/272F

TABLE I. Testing and inspection - Continued.

Inspection	Method MIL-STD-1311	Types	Notes	Conditions	Symbol	Limits		Unit
						Min	Max	
<u>Conformance inspection, part 2</u>								
Heater current	1301	P1, P11	---		If	540	660	mA
Electrode current (anode No. 1)	5201	P1, P11	---	Ec1 = 0	Ib1	-15	10	μA dc
Electrode current (cathode)	5201	P1	---	Light = 4.0 ftL	Ik	---	1,000	μA dc
		P11	---	Light = 2.25 ftL	Ik	---	1,000	μA dc
Base alignment (electrostatic types)	5101	P1, P11	---	3D4; pin No. 1	---	---	---	---
Angle between traces	5101	P1, P11	---		Angle	87	93	Degrees
Neck and base alignment (electrostatic types)	5101	P1, P11	---		---	---	---	---
Stray light emission	5216	P1, P11	---		---	---	---	---
Line width "A" (electrostatic types)	5226	P1	3	Light = 4.0 ftL	Width	---	0.45	mm
		P11	---	Light = 2.25 ftL	Width	---	0.45	mm
Line width "B" (electrostatic deflection)	5226	P1	4	Light = 4.0 ftL	Width	---	0.45	mm
		P11	4	Light = 2.25 ftL	Width	---	0.45	mm
Focusing voltage	---	P1	---	Light = 4.0 ftL	Eb1	150	280	V dc
		P11	---	Light = 2.25 ftL	Eb1	150	280	V dc
Deflection factor (1D2)	5248	P1,P11	---		DF	115	155	V dc/in.
Base pin solder depth	1111	P1, P11	---		---	---	---	---
Deflection factor (3D4)	5248	P1, P11	---		DF	74	100	V dc/in.
Heater-cathode leakage current	5251	P1, P11	---		---	---	---	---
Grid No. 1 leakage current	5251	P1, P11	---		---	---	---	---
Anode No. 2 leakage current	5251	P1, P11	---		---	---	---	---
Secureness of base, cap, or insert	1101	P1, P11	---		---	---	---	---
Permanence of marking	1105	P1, P11	---		---	---	---	---

See notes at end of Table I.

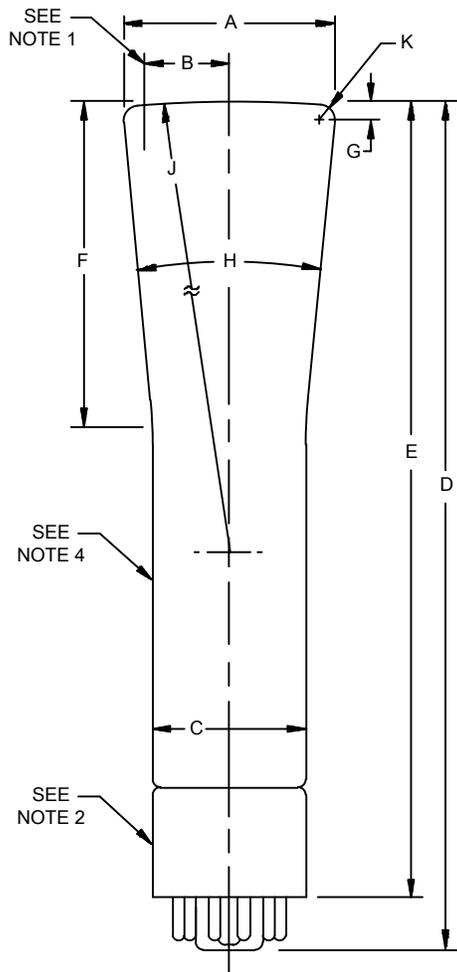
MIL-PRF-1/272F

TABLE I. Testing and inspection - Continued.

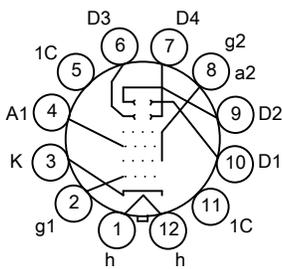
Inspection	Method MIL-STD-1311	Types	Notes	Conditions	Symbol	Limits		Unit
						Min	Max	
<u>Conformance inspection, part 3</u>								
Life test	---	P1	---	Group C; t = 500 hours (min); light = 4.0 ftL; Eb2 = 2,750 V dc	---	---	---	---
		P11	---	Group C; t = 500 hours (min); light = 2.25 ftL; Eb2 = 2,750 V dc	---	---	---	---
Life-test end points:								
Line width "A"	5226	P1	---	Light = 3.4 ftL	Width	---	0.45	mm
Line width "B"	5226	P1	---	Light = 3.4 ftL	Width	---	0.45	mm
Modulation	5223	P1	---	Light = 3.4 ftL	ΔEc	---	48	V dc
Life-test end points:								
Line width "A"	5226	P11	---	Light = 2.25 ftL	Width	---	0.45	mm
Line width "B"	5226	P11	---	Light = 2.25 ftL	Width	---	0.45	mm
Modulation	5223	P11	---	Light = 2.25 ftL	ΔEc	---	48	V dc

1. The construction of this gun shall be of the zero Ib1 type. The following information and material are to be forwarded with the four regular samples when application for qualification approval is made:
 - 1 each gun drawings with significant dimensions.
 - 1 each sample of gun to be used in manufacture of tubes.
2. This value is recommended only for low-velocity deflecting and low-ambient light levels.
3. The deflecting plates shall be returned to anode No. 2 through a minimum of 2.5 m Ω resistors. Ib3, the beam current, shall be set at 50 μ A dc. The high-frequency scanning shall be applied to the deflecting plates nearest the screen and the amplitude shall be adjusted to give a line length of approximately 90 percent of the maximum tube diameter. The low-frequency scanning amplitude shall be expanded to approximately 90 percent of the maximum tube diameter in the direction perpendicular to the direction of high-frequency scanning. Readjustment may be made for best overall focus. The tube shall be observed for deflection defocusing, astigmatism, or spot ellipticity observable to the eye as evidenced by fuzziness due to lack of sharpness of trace (usually around edges), bow-tying (irregular widths of any single line when observed at different points), bowing of trace other than that normally caused by curvature of bulb. This test for focus is to be made in addition to the line width measurements.
4. The same conditions shall be set up as described in note 3 except that the connection of deflecting elements to the low- and high-frequency scanning supplies shall be interchanged and the amplitudes adjusted to 90 percent of the maximum tube diameter in both directions without any adjustment of focus from conditions in note 3. An examination for defocusing, astigmatism, or spot ellipticity shall be made as in note 3.
5. As measured by a 2 x 2-inch (50.8 x 50.8 mm) raster using a type 3 photronic cell without eye correction, calibrated in footcandles of illumination from a light source having color temperature of 2,700°K.
6. The test is made with maximum voltage (Egl maximum negative voltage) applied to the base pins, and deflection electrodes if applicable, only; and pressure of 30,000 feet (225 mmHg). Connections should be made in a manner that does not degrade the tube's electrical voltage breakdown characteristics. Satisfactory operation is the absence of arc-over and corona.
7. This test to be performed at the conclusion of the holding period.

MIL-PRF-1/272F



Ltr	Minimum		Maximum	
	in	mm	in	mm
Conformance inspection, part 2				
A	1.938	49.23	2.063	52.40
B	0.875	22.23		
C	1.312	33.43	1.438	36.53
D	7.438	188.93	7.812	198.42
E	6.938	176.23	7.312	185.72
Reference dimensions (see note 3)				
	in		mm	
F	3.062		77.77	
G	0.225		5.72	
H	12° 37'			
J	8.00 R			
K	0.188 R		4.78 R	



NOTES:

1. The minimum useful screen radius.
2. The base shall be a small shell duodecal 12 pin or small shell duodecal minus pins 5 and 11 (JEDEC B10-75).
3. Reference dimensions are for information only and are not required for inspection purposes.
4. The bulb shall be a J16A type. Either clear or filter glass may be used.

FIGURE 1. Outline drawing of electron tube types 2BP1, 2BP11.

MIL-PRF-1/272F

Referenced documents. In addition to MIL-PRF-1, this specification sheet references MIL-STD-1311.

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DLA - CC

(Project 5960-2014-003)

Review activities :
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