INCH-POUND

MIL-PRF-1/1261H
21 June 2011
SUPERSEDING
MIL-PRF-1/1261G
22 July 1999

PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, CATHODE RAY
TYPES 12ABP1A, 12ABP7A, AND 12ABP19A

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: Magnetic deflection, electrostatic focus, aluminized screen.

PIN CONNECTIONS AND DIMENSIONS. See figure 1.

ABSOLUTE RATINGS:

Parameter: Unit:	Ef V	Ec1 V dc	Ec2 V dc	Eb2 V dc	Ehk V dc	Rg1 MegΩ	Eb1 V dc	Alt ft
Maximum: Minimum:	6.9 5.7	0, -200 ---	770 ---	13,200 7,000	±180 ---	1/ ---	1,100 -500	10,000 ---
Test conditions:	6.3	Adjust	300	10,000	---	---	Focus	---

See footnotes at end of table I.

GENERAL:

Qualification: Required.

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

TABLE I. Testing and inspection.

Inspection	Method MIL-STD-1311	Type	Conditions	Symbol	Limits		Unit
					Min	Max	
Qualification							
Base material insulating quality	1216	All	Zone 5 (minimum)	---	---	---	---
Pressure	1141	All		---	---	---	---
Cathode illumination	5216	All		---	---	---	---
Vibration (cathode-ray tubes)	5111	All		Width	---	2.0	mm
Direct interelectrode capacitance	1331	All	Ck to all Cg1 to all	C C	--- ---	6.0 10.0	pF pF
Face tilt	5101	All		---	---	---	---
Shock	---	All	2/	---	---	---	---
Conformance inspection, part 1							
Bulb, screen, and faceplate quality	5106	All		---	---	---	---
Voltage breakdown	5201	All		---	---	---	---
Voltage breakdown (magnetic type)	5201	All		---	---	---	---
Gas ratio	5206	All	7/	Gr	---	0.25	---
Neck straightness	5101	All	3/	---	---	---	---
Light output	5221	P1A	Ib = 100 μA dc	---	125	---	fL
Modulation	5223	P1A, P7A	Ib = 100 μA dc	ΔEc1	---	32	V dc
		P19A	Ib2 = 2 μA dc	ΔEc1	---	15	V dc
Spot position (magnetic deflection)	5231	All		---	---	15	mm
Zero-bias anode current (magnetic deflection)	5236	P1A, P7A		---	---	---	---
Grid cutoff voltage	5241	All		Ec1	-33	-77	V dc
Grid No. 1 leakage	5251	All		---	---	---	---

See footnotes at end of table.

TABLE I. Testing and inspection - Continued.

Inspection	Method MIL-STD-1311	Type	Conditions	Symbol	Limits		Unit
					Min	Max	
Conformance inspection, part 2							
Permanence of marking	1105	All		---	---	---	---
Secureness of base, base insert, and cap	1101	All		---	---	---	---
Heater current	1301	All		If	540	660	mA
Side terminal and base alignment	5101	All	Vacant pin position No. 3	---	---	---	---
Base pin solder depth	1111	All		---	---	---	---
Neck and bulb alignment (magnetic type)	5101	All		---	---	---	---
Focusing voltage at beam current condition	---	P1A, P7A	Ib2 = 100 μA dc 4/	---	0	300	V dc
		P19A	Ib2 = 2 μA dc 5/	---	0	400	V dc
Screens	5221	P7A, P19A		---	---	---	---
Stray emission (conventional types)	5216	All	Eb2 = 13,200 V dc; Ec2 = 770 V dc; Eb1 = 1,100 V dc	---	---	---	---
Line width A (magnetic deflection)	5226	P1A, P7A	Ib2 = 100 μA dc 6/	---	---	0.50	mm
		P19A	Ib2 = 2 μA dc 6/	---	---	0.35	mm
Heater-cathode leakage	5251	All		---	---	15	μA
Electrode currents (grid No. 2)	5251	All	Ec1 = 0	Ic2	-15	+15	μA dc
Grid No. 2 leakage	5251	All		---	---	---	---
Conformance inspection, part 3							
Life-test provisions	---	All	Group C; t = 500 hours; Eb2 = 13,200 V dc; Ec2 = 770 V dc; Eb1 focus	---	---	---	---
		P1A, P7A	Ib2 = 60 μA dc	---	---	---	---
		P19A	Ib2 = 2 μA dc	---	---	---	---

See footnotes at end of table.

TABLE I. Testing and inspection - Continued.

Inspection	Method MIL-STD-1311	Type	Conditions	Symbol	Limits		Unit
					Min	Max	
Conformance inspection, part 3 - Continued							
Cathode ray tubes, life-test end points:	---						
Line width A		P1A, P7A		---	---	0.50	mm
Line width A		P19A		---	---	0.35	mm
Modulation		P1A, P7A		---	---	32	V dc
Modulation		P19A		---	---	15	V dc
Grid No. 1 leakage		All		---	---	----	---
Heater-cathode leakage				---	---	----	---
Grid No. 2 leakage				---	---	----	---
Stray emission				---	---	----	---

1/ When Ec2 is greater than 330 V dc, Rgl shall not exceed 0.5 meg. When Ec2 is less than 330 V dc, Rg1 shall not exceed 1.5 MegΩ.

2/ The test shall be performed in accordance with method 205, test condition A, of MIL-STD-202.

(a) The following conditions apply:

(1) The tube shall be mounted to the elevator table by a suitable rigid assembly. Hardwood clamps shall be used at the face plate and near the neck to secure the tubes to the assembly.

(2) The assembly shall be such as to permit changes in tube orientation. A total of 10 shocks shall be applied to the tube in the following sequences:

Order	Number of drops	Direction
1	2	Base to face
2	2	x+
3	2	x-
4	2	y+
5	2	y-

(3) No potentials shall be applied during shock.

(b) After shock test, cathode-ray tubes shall meet the requirements specified and shall be subjected to the following tests:

(1) The change in position of the undeflected focused spot from its position noted before the test (see method 5231) shall not exceed 8 mm.

(2) The change in deflection factor for electrostatic tube types shall not exceed 5 percent (see method 5248).

(3) Starting with a tube with no loose particles, the maximum number of loose particles as a result of shocking shall be no more than a total of five loose particles greater than .016 inch (0.41 mm) in any one cathode-ray tube. Tubes having loose particles greater than .016 inch (0.41 mm) shall be vibrated with the face down in a horizontal plate at 5 G's for 1 minute. If the screen shows damage from such vibration, the tube shall be rejected.

(4) The change in grid cutoff voltage shall not exceed 10 percent (see method 5241).

(5) There shall be no damage to the external parts of the tube.

TABLE I. Testing and inspection - Continued.

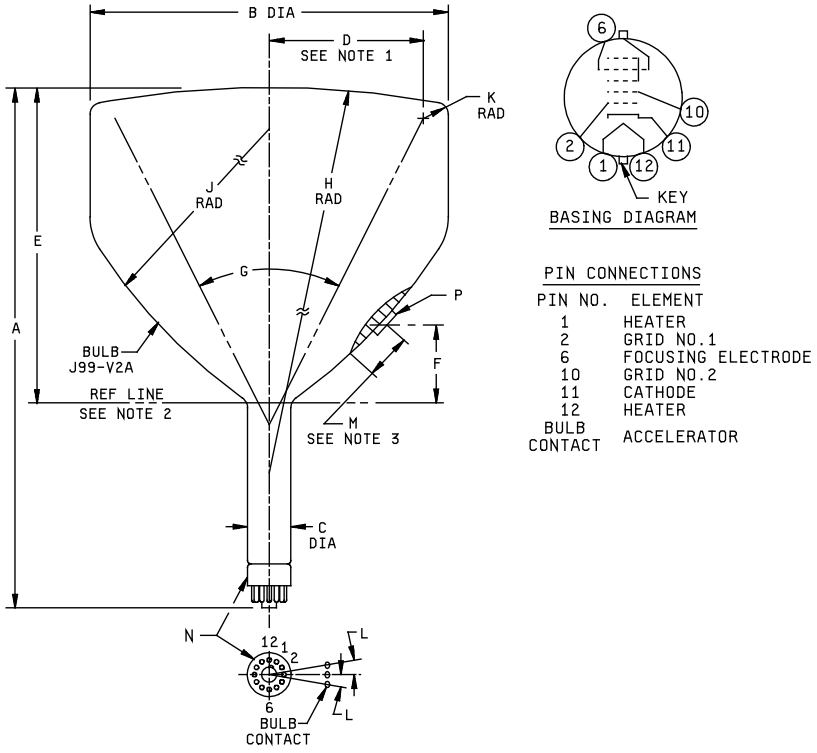
3/ The cylinder shall be 5 inches (127 mm) long and have a 1.503 inch (38.18 mm) maximum diameter.

4/ Focusing electrode voltage shall be measured as follows: With a standard 35-to-100-line raster, modulate grid 1 by 1 microsecond pulses to produce a polka dot pattern. Adjust the beam current to peak value of 100 microamperes. Adjust the focus voltage to obtain the best circular spot at the center of the tube face. A comparator fitted with a reticle having circles approximately the size of the spot facilitates focusing. The focusing voltage obtained in this manner is the focusing electrode voltage.

5/ Use an overscanned 35-to-105-line raster pattern with not less than .250 inch (6.35 mm) spacing between adjacent lines; then adjust for best focus at center of tube.

6/ Line width A shall be obtained at the tube orientation producing poorest line width at the center of the tube. The tube position which produces the poorest line width can be found by making the raster nonlinear. This can generally be accomplished by adjustment of vertical linearity control. Measurement of line width A shall be made as follows: Compress the raster until part is merged and part is expanded. Rotate the tube slowly through 180 degrees and note spacing of raster lines, for example: If portions of expanded raster become merged, line width has become poorer; if merged portion of raster becomes expanded, line width has improved.

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



Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
Qualification				
L	10°		10°	
N	Base: B6-63			
P	Bulb contact: J1-21			
Conformance inspection, part 2				
A	17.630	18.380	447.80	466.85
B	12.310	12.560	312.67	319.02
C	1.375	1.500	34.93	38.10
D	5.500	---	139.70	---
E	10.310	10.690	261.87	271.53
F	2.630	3.380	66.80	85.85
M	1.500	---	38.10	---
Reference dimensions (see note 4)				
G	55°		55°	
H	40		1016	
J	20		508	
K	.438		11.13	

NOTES:
1. Useful screen radius.
2. Reference line is determined by point where gauge G-112 will rest on bulb cone.
3. Anicorna coating. Tube should not be handled by this part of the bulb.
4. Reference dimensions are for information only and are not required for inspection purposes.
5. Metric equivalents (to the nearest 0.01 mm) are given for general information only and are based upon 1 inch = 25.4 mm.

FIGURE 1. Outline drawing of electron tube types 12ABP1A, 12ABP7A, and 12ABP19A.

Referenced documents. In addition to MIL-PRF-1, this specification sheet references MIL-STD-1311 and MIL-STD-202.

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(Project 5960-2010-020)

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