

INCH-POUND

MIL-PRF-1/1056F
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SUPERSEDING
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PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, CATHODE RAY
TYPE 12SP7D

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 and focus.

DIMENSIONS AND PIN CONNECTIONS: See figure 1.

ABSOLUTE RATINGS:

Parameter:	Ef	Ec1	Ec2	Eb	Ehk	Rg1	Alt
Unit:	V	V dc	V dc	kV dc	V dc	Meg Ω	ft
Maximum:	6.9	0, -180	770	15	-125	1/	60,000
Minimum:	5.7	---	---	4	---	---	---
Test conditions:	6.3	Adjust	250	9	---	---	---

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.

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Inspection	Method MIL-STD-1311	Conditions	Symbol	Limits		Unit
				Min	Max	
<u>Qualification inspection</u>						
Base material insulating quality	1216		---	---	---	---
Barometric pressure, reduced	1002	54 mmHg	---	---	---	---
Cathode illumination	5216		---	---	---	---
Direct-interelectrode capacitance	1331	Ck to all Cg1 to all Cg2 to all	Ck Cg1 Cg2	---	8 10 10	pF pF pF
Pressure (implosion)	1141		---	---	---	---
Vibration (cathode-ray tubes)	5111		Width	---	2	mm
<u>Conformation inspection part 1</u>						
Bulb, screen, and faceplate quality	5106		---	---	---	---
Heater current	1301		If	540	660	mA
Voltage breakdown	5201		---	---	---	---
Voltage breakdown (magnetic types)	5201		---	---	---	---
Gas ratio	5206	<u>2/</u>	Gr	---	0.25	---
Neck straightness	---	<u>3/</u>	---	---	---	---
Cathode image	---	<u>4/</u>	---	---	20	%
Stray light emission (conventional types)	5216	Eb = 15,000 V dc; Ec2 = 770 V dc	---	---	---	---
Spot position (magnetic deflection)	5231	<u>5/</u>	---	---	20	mm
Zero-bias anode current (magnetic deflection)	5236		---	---	---	---
Grid cutoff voltage	5241		Eco	-27	-63	V dc
Grid No. 1 leakage current	5251		---	---	---	---
Grid No. 2 leakage current	5251		---	---	---	---
Aperture alignment	---	<u>6/</u>	Distance	---	8	mm

See footnotes at end of table.

TABLE I. Testing and inspection - Continued.

Inspection	Method MIL-STD-1311	Conditions	Symbol	Limits		Unit
				Min	Max	
<u>Conformance inspection, part 2</u>						
Electrode current (grid No. 2 current)	5201	Ec1 = 90	Ic2	---	50	μA dc
Side terminal and base Alignment	5101	Pin No. 3	---	---	---	---
Base pin solder depth	1111		---	---	---	---
Neck and bulb alignment (magnetic types)	5101		---	---	.25	Inch
Face tilt	5101		---	---	---	---
Modulation	5223	Ib = 200 μA dc	ΔEc1	---	35	V dc
Screen	5221		---	---	---	---
Line width A (magnetic deflection)	5226	Ib = 200 μA dc	Width	---	0.38	mm
Line width C (magnetic deflection)	5226	Ib = 200 μA dc	Width	---	0.60	mm
Focusing ampere turns	5246	Ib = 200 μA dc; D = 3.25 inches	AT	450	550	---
Heater-cathode leakage Current	5251		---	---	---	---
Secureness of base, cap, or insert	1101		---	---	---	---
Permanence of marking	1105		---	---	---	---
<u>Conformance inspection, part 3</u>						
Life-test provisions	---	Group C; t = 500 hours (min); Eb = 13,200 V dc; Ec2 = 770 V dc; Ib = 60 μA dc	---	---	---	---
Life-test end points	---	Ib = 200 μA dc; Line width A Line width B Modulation Heater-cathode leakage current Grid No. 1 leakage current Grid No. 2 leakage current Stray light emission (conventional types)	Width Width ΔEc --- --- --- ---	--- --- --- --- --- ---	0.38 0.60 35 --- --- ---	mm mm V dc --- --- ---

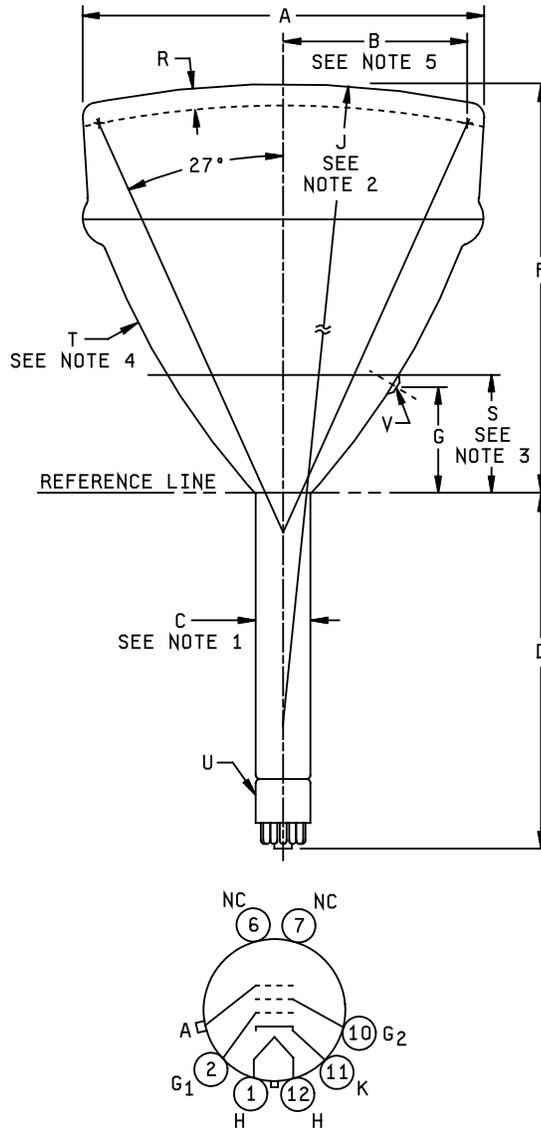
See footnotes at top of next page.

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TABLE I. Testing and inspection - Continued.

- 1/ When E_{c2} is greater than 330 V dc, R_{g1} shall not exceed 0.5 Meg. When E_{c2} is less than 330 V dc, R_{g1} shall not exceed 1.5 Meg.
- 2/ This test to be performed at the conclusion of the holding period.
- 3/ The neck and base straightness shall be determined by the insertion of the tube neck in a cylinder 5 inches (127.00 mm) long and 1.5 inches (38.10 mm) maximum inside diameter. This cylinder shall move freely between the reference line and the base of the assembled tube.
- 4/ The test conditions shall be $E_b = 7$ kV, $E_{c2} = 250$, focus coil current = 0, E_{c1} shall be varied until the focused image of the cathode is obtained. The percentage of dead area shall be that portion of the image which is black in respect to the general brilliant area.
- 5/ There shall be no displacement due to hand capacitance or external electrostatic field.
- 6/ The distance between the center of the unfocused, undeflected spot at low intensity (E_{c1} near cutoff) and the center of the image of the masking aperture observed at high intensity of the unfocused, undeflected spot shall not exceed the limit specified herein. E_{c1} shall not be held at zero for more than approximately 30 seconds to prevent damage to the screen.

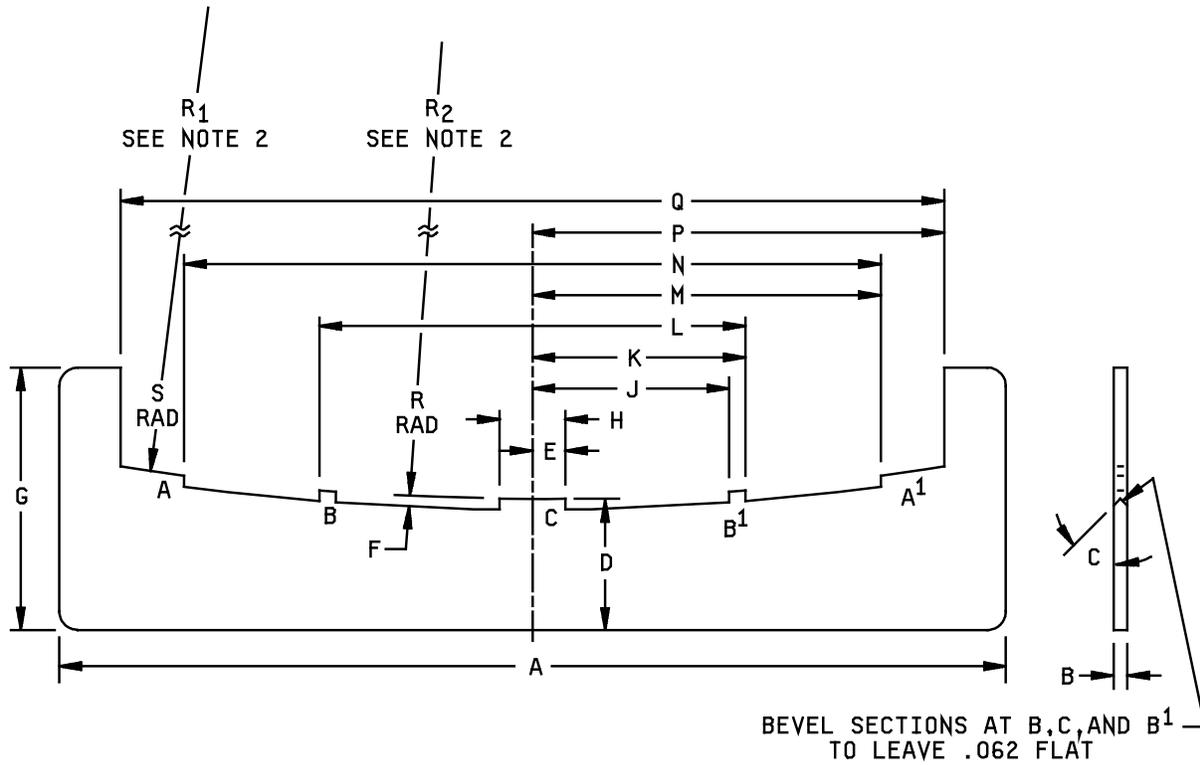
Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
Conformance inspection, part 2				
A	12.340	12.500	313.44	317.50
B	5.500	---	139.70	---
C	1.384	1.500	35.16	38.10
D	8.060	8.440	204.72	214.38
F	10.310	10.690	261.87	271.53
G	2.630	3.380	66.80	85.85
R	.300	.400	7.62	10.16
S	2.970	3.090	75.44	78.49
Conformance inspection, part 3 (periodic check)				
T	Bulb: J-99 1/2 A1, clear or filter glass			
U	Base: B7-51 or B5-57			
V	Contact: J1-21			
Reference dimensions (see note 6)				
J	40.000 R		1016.00 R	



NOTES:

1. Dimension C applies to the entire length of neck below reference line. Reference line shall be determined by position where gauge 1.500 inches (38.10 mm) ± .003 inch (0.08 mm) I. D. and 2.000 inches (50.80 mm) long will rest on bulb cone.
2. To meet the requirements of faceplate gauge as shown on figure 2.
3. Line established by ring gauge of I. D. 7.188 inches (182.58 mm) ± .016 inch (0.41 mm).
4. To meet the requirements of bulb contour gauge as shown on figure 3.
5. Useful screen radius.
6. Reference dimensions are for information only and are not required for inspection purposes.

FIGURE 1. Outline drawing of electron tube type 12SP7D.

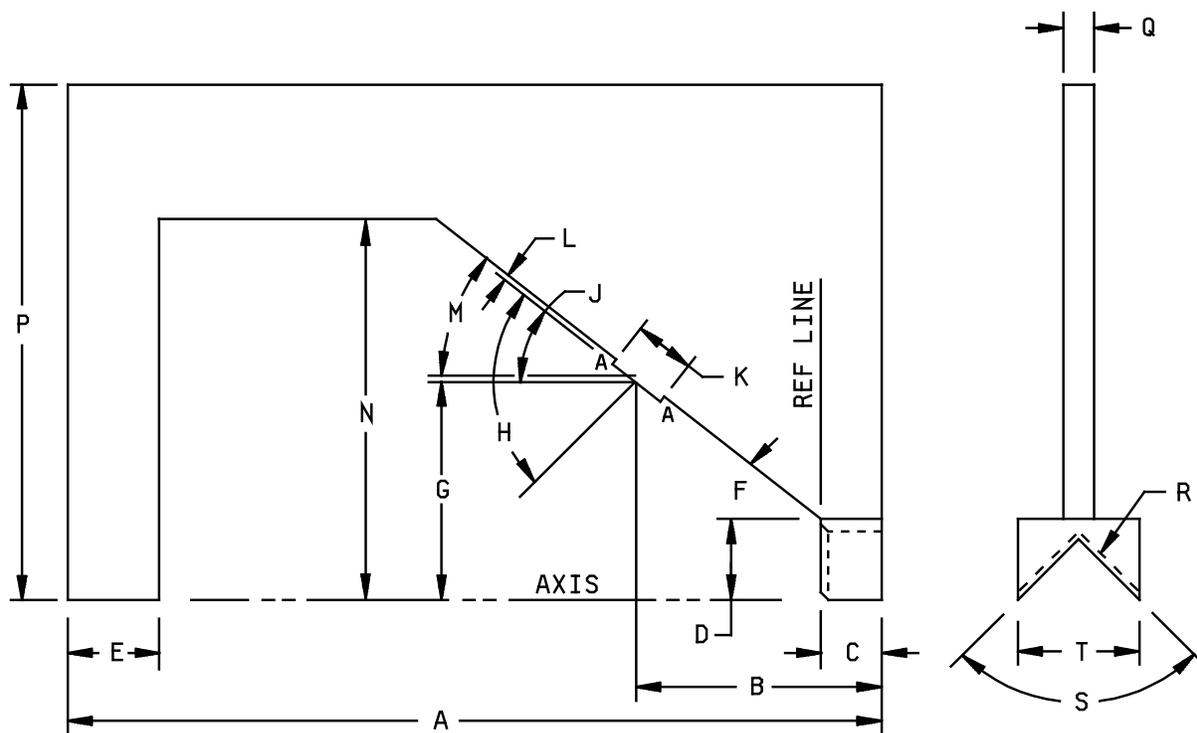


Dimensions									
Ltr	Inches		Millimeters		Ltr	Inches		Millimeters	
	Min	Max	Min	Max		Min	Max	Min	Max
A	14.187	14.687	360.35	373.05	K	3.242	3.258	82.35	82.75
B	.115	.135	2.92	3.43	L	6.484	6.516	164.69	165.51
C	44°30'	45°30'	44°30'	45°30'	M	5.304	5.320	134.72	135.13
D	1.750	2.250	44.45	57.15	N	10.609	10.641	269.47	270.28
E	.492	.508	12.50	12.90	P	6.273	6.289	159.33	159.74
F	.052	.072	1.32	1.83	Q	12.546	12.578	318.67	319.48
G	3.750	4.250	95.25	107.95	R	39.875 R	40.125 R	1012.83 R	1019.18 R
H	.984	1.016	24.99	25.81	S	39.875 R	40.125 R	1012.83 R	1019.18 R
J	2.992	3.008	76.00	76.40					

NOTE

1. All dimensions are in inches.
2. R2 shall be equal to the absolute value of R1 ± .050 inch (1.27 mm) ± .002 inch (0.05 mm).
3. Instructions for use: Contour of face shall be checked with gauge at two orientations approximately 90 degrees. Reject if gap between bulb face and gauge points B, B¹, or C is greater than .100 inch (2.54 mm). Reject if bulb does not seat on steps A and A¹.

FIGURE 2. Faceplate gauge.



Dimensions									
Ltr	Inches		Millimeters		Ltr	Inches		Millimeters	
	Min	Max	Min	Max		Min	Max	Min	Max
A	13.370	13.380	339.60	339.85	L	.092	.096	2.34	2.44
B	4.029	4.033	102.34	102.44	M	35°	35° 30'	35°	35° 30'
C	.995	1.005	25.27	25.53	N	6.271	6.291	159.28	159.79
D	1.015	1.019	25.78	25.88	P	8.495	8.505	215.77	216.03
E	1.495	1.505	37.97	38.23	Q	.495	.505	12.57	12.83
F	37° 30'	38° 30'	37° 30'	38° 30'	R	.120 x 44° 30' CHAM	.130 x 45° 30' CHAM	3.05 x 44° 30' CHAM	3.30 x 45° 30' CHAM
G	3.592	3.596	91.24	91.34	S	89° 30'	90° 30'	89° 30'	90° 30'
H	89° 30'	90° 30'	89° 30'	90° 30'	T	1.995	2.005	50.67	50.93
J	35° 30'	36° 30'	35° 30'	36° 30'					
K	.995	1.005	25.27	25.53					

NOTE

1. All dimensions are in inches.
2. Unless otherwise specified, tolerances shall be $\pm .016$ inch (0.041 mm) on fractions $\pm .005$ inch (0.13 mm) on decimals, and $\pm .5^\circ$ on angles.
3. Instructions for use: Reject if bulb does not rest on flat 'A-A' when bulb neck is seated in V block.

FIGURE 3. Bulb contour gauge.

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

The margins of this specification are marked with vertical lines to indicate where changes from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodians:

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

Preparing activity:

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Review activities:

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Air Force - 19, 99

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