INCH-POUND

MIL-PRF-1/1296F
9 March 1998
SUPERSEDING
MIL-E-1/1296E
30 October 1974

PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, CATHODE RAY
TYPE 4MP1

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
Unit:	V	V dc	V dc	V dc	V dc	v	Meg	Meg	V dc	Ratio
Maximum	6.9	0	1,110	3,300	6,600	600	1.5	1.0 1/	±180	2.0 2/
Minimum	5.7	200	----	1,000	1,000	----	----	----	----	----
Test conditions:	6.3	Adjust	Focus	2,000	4,000	----	----	----	----	----

See footnotes at end of table I.

GENERAL:

Qualification - Required.

TABLE I. Testing and inspection.

Inspection	Method	Conditions	Symbol	Limits		Unit
				Min	Max	
Conformance inspection, part 1						
Voltage breakdown	5201		----	----	----	----
Voltage breakdown (electrostatic types)	5201		----	----	----	----
Gas “cross”	5206	Ib3 = 25 μA dc 7/	----	----	----	----
Bulb, screen, and faceplate quality	5106		----	----	----	----
Light output	5221	Ib3 = 25 μA dc	Light	25	----	ftL
Modulation	5223	Ib3 = 25 μA dc	ΔEc1	----	38	Volts
Spot position (electrostatic deflection)	5231		----	----	10	mm
Spot displacement (leakage)	5231		Displ	----	8	mm
Useful scan	----		----	2.875	----	Inch
Grid-cutoff voltage	5241		Ec	-87	-52	V dc
Trace distortion	----	4/	----	----	0.02	Inch
Grid No. 1 leakage current	5251		----	----	----	----
Anode No. 1 leakage current	5251		----	----	----	----
Anode No. 2 leakage current	5251		----	----	----	----
Pattern distortion	----	5/	----	----	2	%
Conformance inspection, part 2						
Heater current	1301		If	540	660	mA dc
Electrode current (anode No. 1)	5201		Ib1	-15	+10	μA dc
Electrode current (cathode)	5201	Ib3 = 25 μA dc	Ik		500	μA dc
Base alignment (electrostatic types)	5101	+1D2, pin No. 5	----	----	----	----
Side terminal alignment (electrostatic types)	5101	+1D2	----	----	----	----
Side terminal and base alignment	5101	Pin No. 5	----	----	----	----
Angle between traces	5101		----	89	91	Degrees
Trace and bulb alignment (rectangular electrostatic types)	5101		----	----	1.5	Degrees

See footnotes at end of table.

TABLE I. Testing and inspection - Continued.

Inspection	Method	Conditions	Symbol	Limits		Unit
				Min	Max	
Conformance inspection, part 2 - Continued						
Neck and base alignment (electrostatic types)	5101		----	----	----	----
Line width “A” (electrostatic deflection)	5226	Ib3 = 25 μA dc	Width	----	0.45	mm
Line width “B” (electrostatic deflection)	5226	Ib3 = 25 μA dc	Width	----	0.60	mm
Cathode illumination	5216		----	----	----	----
Focusing voltage at cutoff	5246		Eb1	----	510	V dc
Focusing voltage at modulation condition	5246		Eb1	340	----	V dc
Deflection factor	5248	1D2	DF	68	82	V dc/in.
Deflection factor	5248	3D4	DF	42	52	V dc/in.
Heater-cathode leakage current	5251		----	----	----	----
Grid emission	----	6/	----	----	----	----
Secureness of base, cap, or insert	1101		----	----	----	----
Base pin solder depth	1111		----	----	----	----
Permanence of marking	1105		----	----	----	----
Conformance inspection, part 3						
Life test	----	Group C; Ib3 = 25 μA dc; t = 500 hours	----	----	----	----
Life test end points:						
Modulation	5223	Ib3 = 20 μA dc	ΔEc1	----	38	V dc
Line width “A”	5226		Width	----	0.45	mm
Line width “B”	5226		Width	----	0.60	mm
Periodic-check tests						
Base material insulating quality	1216	Zone 5 (minimum)	----	----	----	----
Neck and bulb alignment (electrostatic types)	5101		Dia	----	1.87	Inch
Deflection-factor uniformity	5248		----	----	2	%

See footnotes at end of table.

TABLE I. Testing and inspection - Continued.

Inspection	Method	Conditions	Symbol	Limits		Unit
				Min	Max	
Periodic-check tests - Continued						
Direct-interelectrode capacitances	1331					
k to all			Ck	----	5.0	pF
g1 to all			Cg1	----	6.2	pF
D1 to D2			CD1	----	2.7	pF
D3 to D4			CD3	----	1.9	pF
D1 to all			CD1	----	5.8	pF
D2 to all			CD2	----	5.8	pF
D3 to all			CD3	----	4.3	pF
D4 to all			CD4	----	4.3	pF
Pressure	1141		----	----	----	----
Vibration	5111		Width	----	1.0	mm
Stray light emission (conventional types)	5216	Eb2 = 3,300 V dc Eb3 = 6,600 V dc	----	----	----	----

1/. It is recommended that the deflection electrode circuit resistances be approximately equal.

2/. This tube is 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.

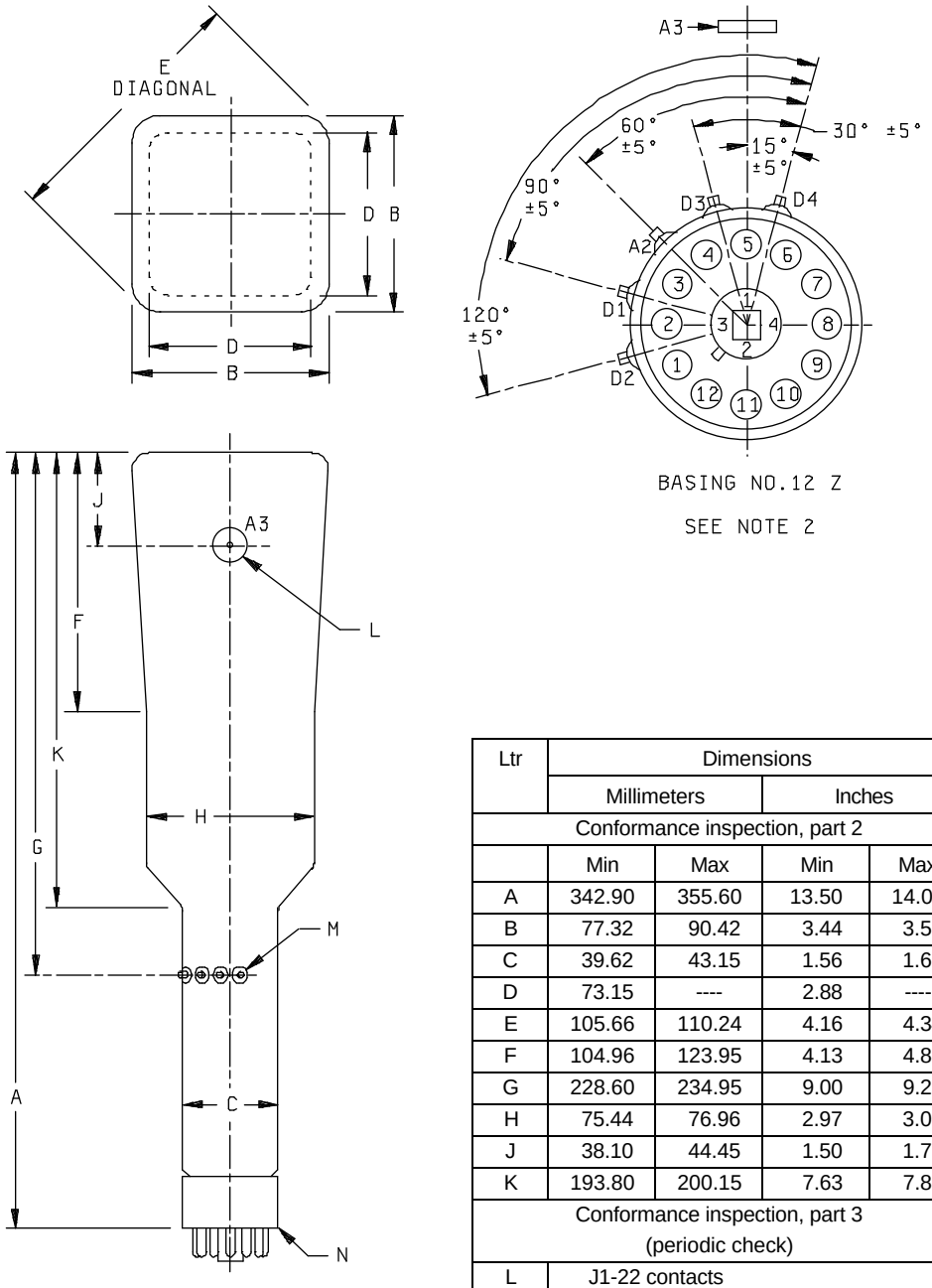
3/. All tests shall be performed with the tube shielded.

4/. The focused sides of a raster pattern centered with respect to the tube face and whose mean dimensions are 2.25 x 2.25 inches (57.15 x 57.15 mm), shall not deviate from straight lines passing through the corners by more than the value specified herein.

5/. All portions of a raster pattern, adjusted so its widest points just touch the sides of a 2.295-inch (58.29 mm) rectangle, will fall within the area bounded by the 2.295 x 2.295-inch (58.29 x 58.29 mm) rectangle and an inscribed 2.205 x 2.205-inch (56.01 x 56.01 mm) rectangle.

6/. The tube shall be operated for a minimum of 5 minutes with Ef = 6.9 V, Eb2 = 3,300 V, Eb3 = 6,600 V. Ec1 shall be maximum negative; positioning and deflection voltages shall be zero. Viewed under dark conditions with dark-adapted (5 minutes) eye, there shall be no evidence of fluorescent light when Eb1 is varied from 0 to 1,110 volts. This test shall be performed immediately following the completion of the other electrical tests.

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



Ltr	Dimensions			
	Millimeters		Inches	
Conformance inspection, part 2				
	Min	Max	Min	Max
A	342.90	355.60	13.50	14.00
B	77.32	90.42	3.44	3.56
C	39.62	43.15	1.56	1.69
D	73.15	----	2.88	----
E	105.66	110.24	4.16	4.34
F	104.96	123.95	4.13	4.88
G	228.60	234.95	9.00	9.25
H	75.44	76.96	2.97	3.03
J	38.10	44.45	1.50	1.75
K	193.80	200.15	7.63	7.88
Conformance inspection, part 3 (periodic check)				
L	J1-22 contacts			
M	J1-25 contacts			
N	Base: B12-43			

Pin connections	
Pin No.	Element
1	h
2	g1
3	k
4	a1
5	ic
6	nc
7	nc
8	nc
9	nc
10	nc
11	nc
12	h

NOTES:
1. Metric equivalents (to the nearest .01 mm) are given for general information only and are based on 1 inch = 25.4 mm.
2. +1D2 towards pin no.5.

FIGURE 1. Outline drawing of electron tube type 4MP1

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

Review activities:
Navy - AS, CG, MC, OS, SH
Air Force - 17, 19, 99

Preparing activity:
DLA - CC

(Project 5960-3466-39)