

PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, THYRATRON
 TYPE 5957

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: Hydrogen.
 See figure 1.
 Mounting position: Any.
 Weight: 3.5 ounces nominal.

ABSOLUTE RATINGS:

Parameter:	Ef	epy	epx	Ebb	Ecc	Ip	egx	egy
Unit:	V	kv	kv	V dc	V dc	A ac	v	v
Maximum:	6.9	8.0	8.0	—	—	2.9	200	—
Minimum:	5.7	— 1/	5 % epy 2/	2,500	—	—	—	3/
Test conditions: 5/	6.3	8.0	—	—	0	—	—	130 4/

ABSOLUTE RATINGS:

Parameter:	ib	lb	tk	$\frac{dik}{dt}$	Pb	TA	prr
Unit:	a	mA dc	sec	$\frac{a}{\mu s}$	—	°C	—
Maximum:	83	100	—	1,200	3.0×10^9	90	—
Minimum:	—	—	180	—	—	-50	—
Test conditions: 5/	—	—	180	—	—	—	4,500

See footnotes at end of table 1.

GENERAL:

Qualification: Required.

TABLE I. Testing and inspection.

Inspection	Method	Conditions	Acceptance Level <u>11/</u>	Symbol	Limits		Unit
					Min	Max	
<u>Conformance inspection, part 1</u>							
Heater current	3241		0.65	If	5.5	6.7	A ac
Instantaneous starting	3267	epy = 8.0 kv (min); Ef = 6.9 V ac <u>6/ 8/</u>	0.65	---	---	---	---
Operation (1)	3246	epy = 9.0 kv; Ef = 5.7 V ac; t = 300 <u>6/</u>	0.65	egy	---	130	v
DC anode voltage for conduction	3247	Ef = 5.7 V ac	0.65	Ebb	---	1,500	V dc
Operation (2)	3246	epy = 10.0 kv; t = 300; Ef = 5.7 V ac; prf = 2,800 <u>9/</u>	0.65	egy	---	130	v
Pulsing emission (method A)	3251	ik = 90a (min); prf = 60 ± 10 percent; tp = 5.0 μs ± 10 percent; tr = 0.5 μs (max); starting time of current pulse = 1.0 μs; specified time interval = 4.0 μs	0.65	egk	---	150	v
<u>Conformance inspection, part 2</u>							
Operation (1A)	3246	Operation (1) except Ef = 6.9 V ac	---	egy	---	130	v
Anode delay time	3256	Operation (1); t = 120	---	tad	---	0.5	μs
Anode delay time drift	3256	Anode delay time <u>5/</u>	---	Δtad	---	0.1	μs
Time jitter	3261	epy = 3.0 kv (max) <u>6/</u>	---	tj	---	0.01	μs
Operation (2A)	3246	Operation (2), except Ef = 6.9 V ac	---	egy	---	130	v

See footnotes at end of table.

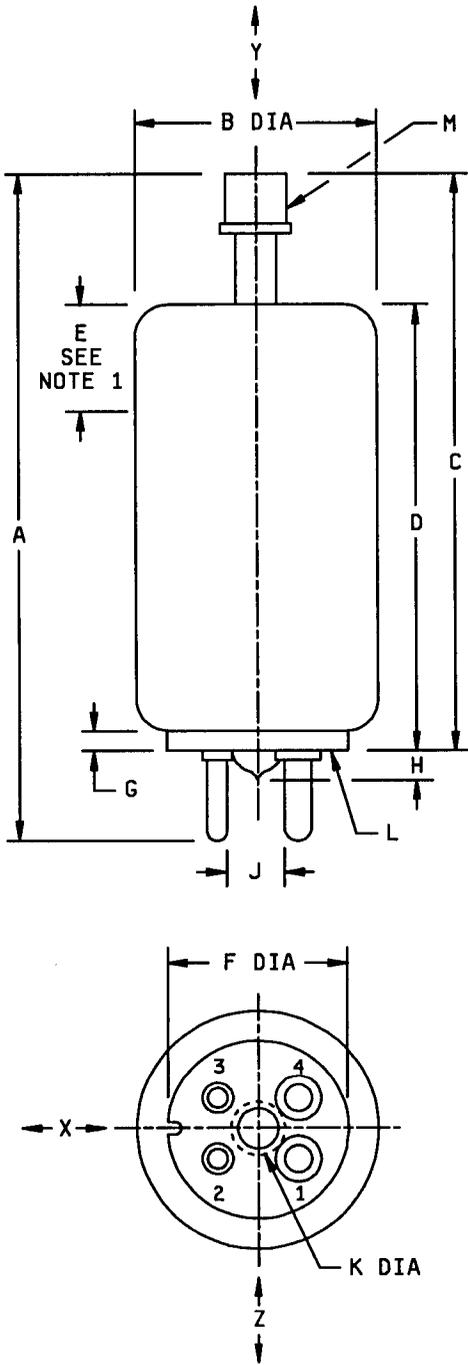
TABLE I. Testing and inspection - Continued.

Inspection	Method	Conditions	Acceptance Level <u>11/</u>	Symbol	Limits		Unit
					Min	Max	
<u>Conformance inspection, part 3</u>							
Life test	---	Group B <u>Z/</u> ; t = 96 hours "on" and 1 hour "off" (tube mounted in horizontal position); t = 500 hours	---	---	---	---	---
Life test end points:	---						
Operation (1) and (1A)	3246		---	egy	---	140	v
Time jitter	3261	Except egy = 140 v	---	tj	---	0.02	μs
DC anode voltage for conduction	3247		---	Ebb	---	2,000	V dc
Anode delay time	3256	Except egy = 140 v	---	tad	---	0.6	μs
Anode delay time drift	3256	Except egy = 140 v	---	Δtad	---	0.1	μs
<u>Periodic-check tests</u>							
Operation at elevated ambient temperature	3246	t = 5 hours; TA = 90°C; Ef = 6.9 V ac <u>6/</u>	---	egy	---	130	v
Vibration, mechanical	1032	No voltages Axes of application (see figure 1) Frequency range (10 to 50 Hz); Vibration level (.080 ± .005 inch double amplitude) <u>10/</u>	---	---	---	---	---
Shock, specified pulse	1042	Condition A	---	---	---	---	---
Shock, specified pulse end points:	---						
Operation (1)	3246		---	egy	---	130	v
DC anode voltage for conduction	3247		---	Ebb	---	1,500	V dc
Time jitter	3261		---	tj	---	0.01	μs

See footnotes at top of next page.

TABLE I. Testing and inspection - Continued.

- 1/ For instantaneous starting applications where anode voltage is applied instantaneously, the maximum permissible epy is 7 kv.
- 2/ In pulsed operation, the peak inverse voltage, exclusive of a spike of 0.05 μs maximum duration, shall not exceed 2.5 kv during the first 25 μs after the anode pulse.
- 3/ Driver pulse, measured at tube socket with thyatron grid disconnected; epy = 175 v minimum; time of rise = 0.5 μs maximum; grid pulse duration = 2 μs minimum. Impedance of drive circuit = 1,500-ohms maximum.
- 4/ Drive pulse measured at tube socket with thyatron grid disconnected.
- 5/ During the interval between 2 minutes and 7 minutes of the anode delay time test, the change in anode delay time drift (Δtad) relative to the tad value observed on the anode delay time test shall not exceed specified value.
- 6/ The anode circuit constants shall be chosen so that epy = 8.0 kv under resonant charging conditions; $\text{dik}/\text{dt} = 1,200 \text{ a}/\mu\text{s}$ minimum; $\text{ib} = 83 \text{ a}$; $\text{tp} = 0.25 \mu\text{s}$; $\text{pr} = 4,500$; inverse voltage due to mismatch = 400 volts maximum. The grid pulse characteristics shall be $\text{tp} = 2.0 \mu\text{s}$ maximum; $\text{tr} = 0.5 \mu\text{s}$ minimum; driver impedance = 1,500 ohms minimum.
- 7/ The anode circuit constants shall be chosen so that epy = 8.0 kv under resonant charging conditions; $\text{ib} = 83 \text{ a}$ minimum; $\text{dik}/\text{dt} = 1,200 \text{ a}/\mu\text{s}$ minimum; $\text{tp} = 0.25 \mu\text{s}$; $\text{pr} = 4,500$ inverse voltage due to mismatch = 1.9 kv minimum. The grid pulse characteristics shall be $\text{tp} = 2.0 \mu\text{s}$ maximum; $\text{tr} = 0.5 \mu\text{s}$ minimum; driver impedance = 1,500 ohms minimum.
- 8/ Any tube failing to start within three attempts will be considered a failure.
- 9/ The anode circuit constants shall be chosen so that epy = 8.0 kv under resonant charging conditions: $\text{dik}/\text{dt} = 1,000 \text{ a}/\mu\text{s}$ minimum; $\text{ib} = 90 \text{ a}$; $\text{tp} = 0.50 \mu\text{s}$ minimum; $\text{pr} = 3,000$. The grid pulse characteristics shall be $\text{tp} = 2.0 \mu\text{s}$ maximum; $\text{tr} = 0.50 \mu\text{s}$ minimum; driver impedance = 1,500 ohms minimum.
- 10/ There shall be no pronounced resonance over the range from 10 to 50 Hz.
- 11/ Acceptance is based upon accept on zero ($c = 0$) sampling plans, in accordance with Table III of MIL-PRF-1.



Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
Conformance inspection, part 2				
A	---	4.455	---	113.16
B	1.440	1.560	36.58	39.62
C	3.500	3.875	88.90	98.43
D	2.750	3.000	69.85	76.20
J	---	.260	---	6.60
Conformance inspection, part 3 (periodic check)				
F	---	1.312	---	33.32
G	.146	.166	3.71	4.22
H	---	.250	---	6.35
L	Base: See note 2			
M	Cap: C1-1 (EIA)			
Reference dimensions				
E	.750		19.05	
K	.312		7.92	

Pin connections	
Pin No.	Element
1	h
2	k
3	g
4	h,k
cap	a

NOTES:

1. Clamping area insulated from ground.
2. Pins and pin arrangement in accordance with A4-89(EIA).

FIGURE 1. Outline drawing of electron tube type 5957

Custodians::

Army - CR
Navy - EC
Air Force - 80
DLA - CC

Preparing activity:

DLA - CC

(Project 5960-3555-04)

Review activities:

Army - AR, AV, MI
Navy - AS, CG, MC, SH
Air Force - 11, 19