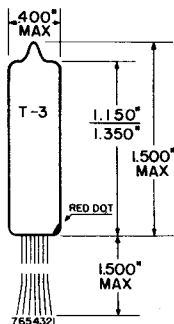


TUNG-SOL

PENTODE

SUBMINIATURE TYPE



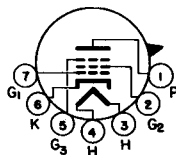
GLASS BULB

OUTLINE DRAWING
→ JEDEC 3-6

HEATER

6.3 VOLTS 0.20 AMP.

ANY MOUNTING POSITION



BOTTOM VIEW

0.016" TINNED
FLEXIBLE LEADS
0.048" CENTER-TO-CENTER
IN LINE

THE 5702 WB IS A HEATER-CATHODE TYPE SHARP-CUTOFF PENTODE OF SUBMINIATURE CONSTRUCTION CAPABLE OF OPERATION IN THE VHF REGION. IT IS DESIGNED FOR SERVICE WHERE SEVERE CONDITIONS OF HIGH TEMPERATURE AND MECHANICAL SHOCK OR VIBRATION ARE ENCOUNTERED. A SEPARATE TERMINAL CONNECTION IS PROVIDED FOR GRID #3 WHICH UNDER SELF-BIAS CONDITIONS CAN BE CONNECTED DIRECTLY TO GROUND, PERMITTING THE CATHODE BY-PASS CAPACITOR TO BE OMITTED FOR LOWER GRID LOADING. THE FLEXIBLE TERMINAL LEADS MAY BE SOLDERED OR WELDED DIRECTLY TO THE CIRCUIT COMPONENTS WITHOUT THE USE OF SOCKETS. STANDARD SUBMINIATURE SOCKETS MAY BE USED BY CUTTING THE LEADS TO A SUITABLE LENGTH

RATINGS

MECHANICAL

MAXIMUM IMPACT ACCELERATION (SHOCK TEST-NOTE 3)	450	G
MAXIMUM UNIFORM ACCELERATION (CENTRIFUGE TEST-NOTE 4)	1000	G
MAXIMUM VIBRATIONAL ACCELERATION (96HR. FATIGUE TEST-NOTE 5)	2.5	G
MAXIMUM BULB TEMPERATURE	220	°C

RATINGS

AND NORMAL OPERATION

	MIL-E-1 SYMBOL	DES. MAX	NORM. TEST CONDI- TIONS (NOTE 7)	NORM. OPER- ATION (NOTE 6)	DES. MAX	MIL-E-1 UNITS
HEATER VOLTAGE (NOTE 8)	Ef:	5.7	6.3	6.3	6.9	V
PLATE VOLTAGE	Eb:	---	120	120	165	Vdc
GRID #1 VOLTAGE	Ec1:	-55	0	0	---	Vdc
GRID #2 VOLTAGE	Ec2:	---	120	120	155	Vdc
GRID #3 VOLTAGE	Ec3:	---	0	0	0	Vdc
PLATE DISSIPATION	Pp:	---	---	0.9	1.10	W
GRID #2 DISSIPATION	Pg2:	---	---	0.3	0.40	W
GRID #1 CIRCUIT RES.	Rg1:	---	---	1.0	1.2	MEG.
HEATER-CATHODE VOLTAGE	Ehk:	-200	---	100	+200	v
CATHODE CURRENT	Ik:	---	---	---	16.5	mA _{dc}
CATHODE RESISTANCE	Rk:	---	200	200	---	OHMS
PLATE CURRENT (1)	Ip(1):	---	---	7.5	---	mA _{dc}
GRID #2 CURRENT	Ic2:	---	---	2.6	---	mA _{dc}
TRANSCONDUCTANCE (1)	Sm(1):	---	---	5000	---	μMHOS
PLATE RESISTANCE	rp:	---	---	0.34	---	MEG.

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CHARACTERISTICS AND QUALITY CONTROL TESTS¹ - cont'd.

TEST	AQL %	MIL-E-1 SYMBOL	MIN.	LAL	BOG	UAL	MAX.	ALD	MIL-E-1 UNITS
MEASUREMENTS ACCEPTANCE TESTS PART 1									
COMBINED AQL=1.0% EXCLUDING MECHANICAL AND INOPERATIVES									
HEATER CURRENT: HEATER-CATHODE	0.65	I _f :	190	---	200	---	210	---	mA
LEAKAGE: E _{hk} =100 Vdc E _{hk} =+100 Vdc	0.65	I _{bk} :	---	---	---	---	5	---	μAdc
GRID CURRENT (1):	0.65	I _{c1} (1):	---	---	---	---	-0.1	---	μAdc
PLATE CURRENT (1):	0.65	I _b (1):	5.5	6.9	7.5	8.1	9.5	2.3	mAdc
PLATE CURRENT (2): E _{c1} =-9.0 Vdc	0.65	I _b (2):	---	---	---	---	50	---	μAdc
SCREEN CURRENT: TRANSCONDUCTANCE (1):	0.65	I _{c2} :	1.7	---	2.6	---	3.5	---	mAdc
CONTINUITY AND SHORTS (INOPERATIVES):	0.4	---	---	---	---	---	---	---	---
MECHANICAL: ENVELOPE (8-7)									
MEASUREMENTS ACCEPTANCE TEST PART 2									
INSULATION OF ELECTRODES:									
E _f =6.3 V									
E _g -all=-100 Vdc	2.5	R _{g1} -all:	250	---	---	---	---	---	MEG.
E _p -all =-300 Vdc	2.5	R _p -all:	250	---	---	---	---	---	MEG.
TRANSCONDUCTANCE (2): E _f =5.7 V. (NOTE 9)	2.5	ΔE _f S _m (2)	---	---	---	---	5	---	PERCENT
GRID EMISSION: E _f =7.5 V; PREHEAT 5 MINUTES AT E _{c1} =0; TEST AT E _{c1} =-10 Vdc									
	6.5	I _c (2):	---	---	---	---	-0.5	---	μAdc
AF NOISE: E _{sig} =70 mVac; E _{c2} =25 Vdc; R _{g1} =0.1 MEG.; R _{g2} =1000 OHMS; R _p =0.2 MEG; C _k =1000 μf; R _k =4000 OHMS.									
	2.5	EB:	---	---	---	---	17	---	VU.
PLATE RESISTANCE:	6.5	r _p :	0.15	---	---	---	---	---	MEG.
CAPACITANCE:		C _{gp} :	---	---	---	---	0.03	---	μμf
CAPACITANCE: (NOT 2)	6.5	C _{in} :	4.1	---	---	---	5.5	---	μμf
CAPACITANCE:		C _{out} :	2.9	---	---	---	4.1	---	μμf
LOW PRESSURE VOLTAGE BREAKDOWN: PRESSURE=55±5mm Hg; VOLTAGE = 300 Vac									
	6.5	---	---	---	---	---	---	---	---
OPERATION TIME: (NOTE 10)									
	4.0	t:	---	---	---	---	20	---	sec.

→ INDICATES A CHANGE.

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CHARACTERISTICS AND QUALITY CONTROL TESTS¹ - cont'd.

TEST	AQL %	MIL-E-1 SYMBOL	MIN.	LAL	BOG.	UAL	MAX.	ALD.	MIL-E-1 UNITS
MEASUREMENTS ACCEPTANCE TEST PART 2 - cont'd.									
VIBRATION (2): F=40 cps; G=15; Rp= 10,000 OHMS									
	2.5	Ep:	---	---	---	---	50	---	mVac
VIBRATION (3): F=30-1000 cps; G=15; Rp =10,000 OHMS; t=3 MIN.; POSITIONS X ₁ AND X ₂ ONLY									
	4.0	Ep:	---	---	---	---	240 PEAK TO PEAK	---	mv
DEGRADATION RATE ACCEPTANCE TESTS									
SUBMINIATURE LEAD FATIGUE:									
	2.5	---	4.0	---	---	---	---	---	arcs
SHOCK (1): Ehk=+100 Vdc; Rg=0.1 MEG HAMMER ANGLE =30° (NOTE 3)									
	20	---	---	---	---	---	---	---	---
FATIGUE (1): 96 HRS; G=2.5; FIXED FREQUENCY; F=25 MIN. 60 MAX. (NOTE 5)									
	6.5	---	---	---	---	---	---	---	---
FATIGUE (2): 6 HOURS; G=10; FIXED FREQUENCY; F=25 MIN, 60 MAX. (NOTE 11)									
	---	---	---	---	---	---	---	---	---
POST SHOCK (1) AND FATIGUE TESTS (1) AND (2) END POINTS: VIBRATION (2): F=40 cps; G=15; Rp = 10,000 OHMS									
	---	Ep:	---	---	---	---	75	---	mVac
HEATER-CATHODE LEAKAGE: Ehk=+ 100 Vdc Ehk=-100 Vdc									
	---	lhc:	---	---	---	---	10	---	μAdc
CHANGE IN TRANSCONDUCTANCE (1) OF INDIVIDUAL TUBES: Ef = 6.3 V									
	---	Δ _c Sm(1):	---	---	---	---	10	---	PERCENT
GRID CURRENT (1):									
	---	Ic(1):	---	---	---	---	1.0	---	μAdc
SHOCK (2): Ehk=+100 Vdc; Rg=0.1 MEG.; G=75; (HAMMER ANGLE =120°+ RUBBER PAD); t=10 MILLISECONDS DURATION (NOTE 12)									
	---	---	---	---	---	---	---	---	---
POST SHOCK TEST (2) END POINTS: VIBRATION (2): F=40cps; G=15; Rp= 10,000 OHMS									
	---	Ep:	---	---	---	---	75	---	mVac

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CHARACTERISTICS AND QUALITY CONTROL TESTS¹ - cont'd.

TEST	AQL %	MIL-E-1 SYMBOL	MIN.	MAX.	MIL-E-1 UNITS
DEGRADATION RATE ACCEPTANCE TESTS -CONT'D.					
HEATER-CATHODE LEAKAGE: Ehk =+100 Vdc Ehk=-100 Vdc	---	ihk:	---	10	μ Adc
CHANGE IN TRANSCON- DUCTANCE (1) OF IN- DIVIDUAL TUBES: Ef = 6.3 V	---	$\Delta_t Sm(1)$:	---	10	PERCENT
GRID CURRENT (1):	---	ic(1):	---	-1.0	μ Adc
GLASS STRAIN (THERMAL SHOCK):	6.5	---	---	---	---
ACCEPTANCE LIFE TESTS					
HEATER CYCLE: Ef =7.5 V; Eb=Ec1=Ec2= Ec3=0V; Ehk=140 Vac; 1 MIN. ON, 1 MIN. OFF.	1.0	---	2000	---	CYCLES
HEATER CYCLING LIFE TEST END POINTS: HEATER-CATHODE LEAKAGE: Ehk=+ 100 Vdc Ehk=-100 Vdc	---	ihk:	---	20	μ Adc
1 HOUR STABILITY LIFE TEST: TA = ROOM; Ehk=+200 Vdc; Rg1 = 1.0 MEG.	---	---	---	---	---
1 HOUR STABILITY LIFE TEST END POINTS: CHANGE IN TRANSCON- DUCTANCE (1) OF IN- DIVIDUAL TUBES: (TYPICAL SAMPLE SIZE = 50 TUBES)	1.0	$\Delta_t Sm(1)$:	---	10	PERCENT
100 HOUR SURVIVAL RATE LIFE TEST: TA = ROOM; Ehk=+200 Vdc; Rg1 =1.0 MEG.	---	---	---	---	---
100 HOUR SURVIVAL RATE LIFE TEST END POINTS: (TYPICAL SAMPLE SIZE = 200 TUBES)	---	---	---	---	---
INOPERATIVES: TRANSCONDUCTANCE (1):	0.65	---	---	---	---
INTERMITTENT HIGH TEM- PERATURE LIFE TESTS: T BULB = 220° C; Ehk =+200 Vdc; Rg1 = 1.0 MEG.	1.0	Sm(1):	3800	---	μ MHOS
	---	---	---	---	---

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CHARACTERISTICS AND QUALITY CONTROL TESTS¹ - cont'd.

TEST	ALLOWABLE DEF. PER CHARACTER.		AQL %	MIL-E-1 SYMBOL	MIN.	MAX.	MIL-E-1 UNITS
	1st SAMPLE	COMB. SAMPLES					
ACCEPTANCE LIFE TEST - cont'd.							
500 HOUR INTERMITTENT HIGH TEMPERATURE LIFE TEST END POINTS: (TYPICAL SAMPLE SIZE = 20 TUBES 1st SAMPLE 40 TUBES 2nd SAMPLE)			---	---	---	---	---
INOPERATIVES:			---	---	---	---	---
GRID CURRENT (1):	1	3	---	Ic(1):	---	-0.5	μAdc
HEATER CURRENT:	1	3	---	If:	180	220	mA
CHANGE IN TRANSDUCTANCE (1) INDIVIDUAL TUBES:	1	3	---	Δ _t Sm(1):	---	20	PERCENT
TRANSDUCTANCE (2): (NOTE 9)	2	5	---	Δ _{EF} Sm(2):	---	15	PERCENT
HEATER-CATHODE LEAKAGE:							
Ehk=+ 100 Vdc Ehk=-100 Vdc	2	5	---	Ibk:	---	10	μAdc
INSULATION OF ELECTRODES:							
g1-all	2	5	---	Rg1-all:	50	---	MEG.
p-all	2	5	---	Rp-all:	50	---	MEG.
TRANSDUCTANCE (1): AVERAGE CHANGE:	---	---	---	Avg.Δ _t Sm(1):	---	15	PERCENT
TOTAL DEFECTIVES:	4	8	---	---	---	---	---
1000 HOUR INTERMITTENT HIGH TEMPERATURE LIFE TEST ENDPOINTS: (TYPICAL SAMPLE SIZE = 20 TUBES 1st SAMPLE 40 TUBES 2nd SAMPLE)	---	---	---	---	---	---	---
INOPERATIVES:	2	5	---	---	---	---	---
GRID CURRENT (1):	2	5	---	Ic(1):	---	-1.0	μAdc
HEATER CURRENT:	2	5	---	If:	177	223	mA
CHANGE IN TRANSDUCTANCE (1) OF INDIVIDUAL TUBES:	2	5	---	Δ _t Sm(1):	---	30	PERCENT
HEATER-CATHODE LEAKAGE:							
Ehk=±100 Vdc	2	5	---	Ibk:	---	15	μAdc
TOTAL DEFECTIVES	5	10	---	---	---	---	---

NOTES

NOTE 1: CHARACTERISTICS, QUALITY CONTROL TEST PROCEDURES, AND INSPECTION LEVELS ARE MADE ACCORDING TO THE APPROPRIATE PARAGRAPHS OF MIL-E-1 INSPECTION INSTRUCTIONS FOR ELECTRON TUBES' AND MIL-STD-105A.

NOTE 2: WITH A CYLINDRICAL SHIELD (0.405" I.D. - 1 7/8" LONG) CONNECTED TO LEAD 6.

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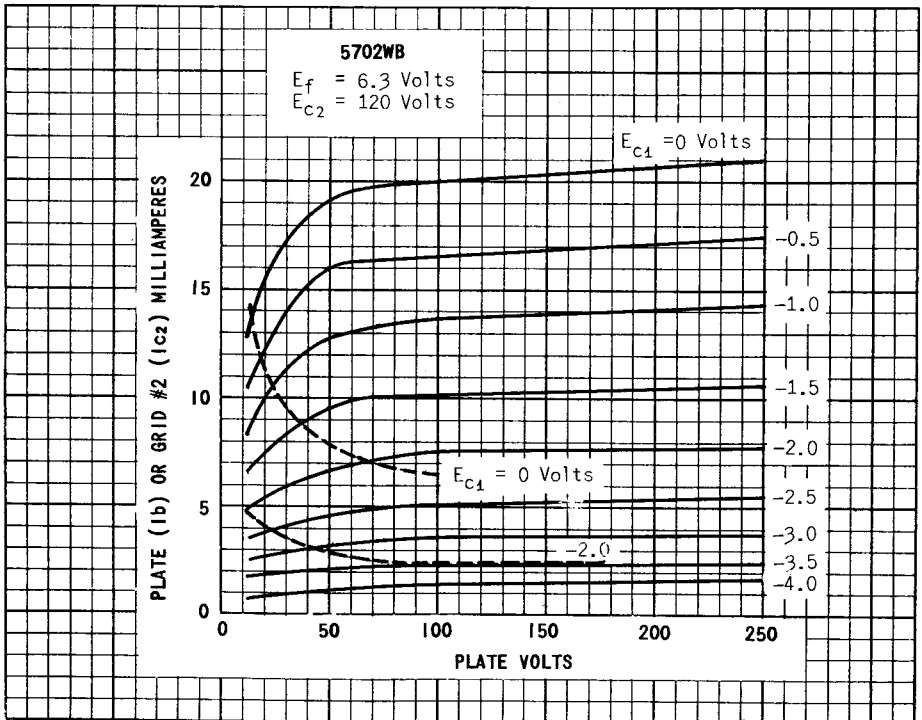
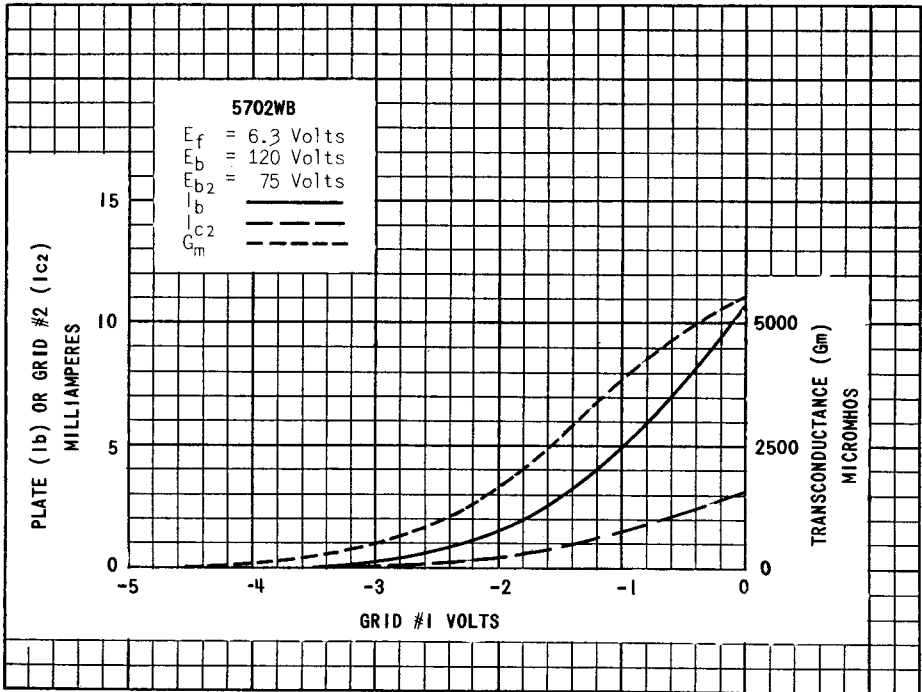
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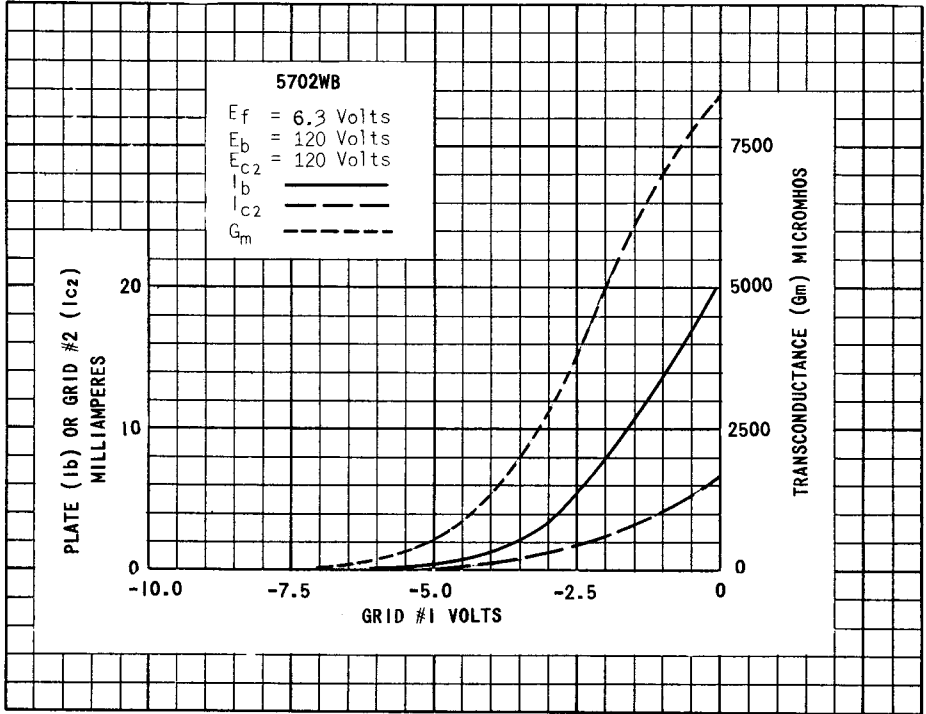
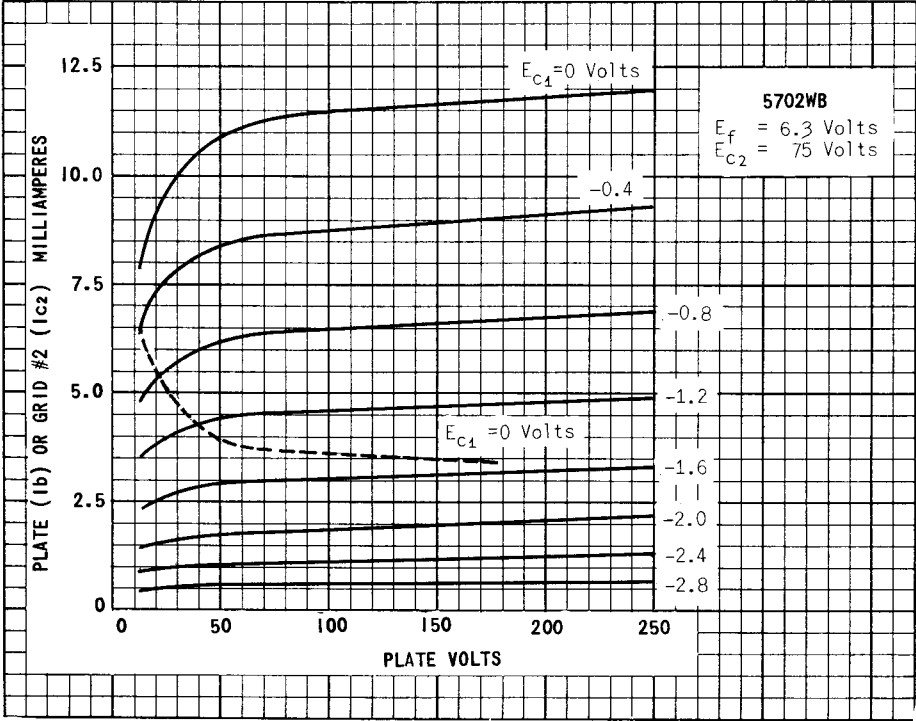
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NOTES - cont'd.

- NOTE 3: TEST CONDITIONS AND ACCEPTANCE CRITERIA PER SHOCK TEST PROCEDURES OF MIL-E-1 BASIC SPECIFICATION.
- NOTE 4: CENTRIFUGE TEST WITH FORCES IN ANY DIRECTION.
- NOTE 5: TEST CONDITIONS AND ACCEPTANCE CRITERIA PER FATIGUE TEST PROCEDURES OF MIL-E-1 BASIC SPECIFICATION.
- NOTE 6: THESE NORMAL VALUES REPRESENT CONDITIONS AT WHICH CONTROL OF RELIABILITY MAY BE EXPECTED.
- NOTE 7: THESE NORMAL TEST CONDITIONS ARE MADE FOR ALL CHARACTERISTIC TESTS UNLESS OTHER WISE STATED UNDER THE INDIVIDUAL TEST ITEM.
- NOTE 8: FOR MOST APPLICATIONS THE PERFORMANCE WILL NOT BE ADVERSELY AFFECTED BY $\pm 10\%$ HEATER VOLTAGE VARIATION, BUT WHEN THE APPLICATION CAN PROVIDE A CLOSER CONTROL OF HEATER VOLTAGE, AN IMPROVEMENT IN RELIABILITY WILL BE REALIZED.
- NOTE 9: CHANGE OF TRANSCONDUCTANCE FOR INDIVIDUAL TUBES FROM THAT VALUE MEASURED AT $Ef=6.3$ V TO THAT VALUE MEASURED AT $Ef=5.7$ V.
- NOTE 10: OPERATION TIME IS THE TIME IN SECONDS REQUIRED FOR THE PLATE CURRENT TO ATTAIN A VALUE WITHIN PLUS OR MINUS 10 PERCENT OF THE THREE MINUTE PLATE CURRENT (1) VALUE USING A COLD TUBE. NO PREHEATING BEFORE THIS TEST WILL BE ALLOWED.
- NOTE 11: THE TUBES SHALL BE RIGIDLY MOUNTED ON A TABLE VIBRATING WITH SIMPLE HARMONIC MOTION. THE TUBES SHALL BE VIBRATED FOR A TOTAL OF 6 HOURS, 2 HOURS IN EACH OF THREE POSITIONS, X1, X2, AND Y1. ONLY RATED HEATER VOLTAGE SHALL BE APPLIED. TUBES WHICH SHOW ONE OR MORE OF THE FOLLOWING DEFECTS SHALL BE CONSIDERED FAILURES.
- (A) TUBES WHICH SHOW PERMANENT OR TAP SHORTS OR OPEN CIRCUITS FOLLOWING FATIGUE TEST, WHEN TESTED AS SPECIFIED IN 4.7.2 AND 4.7.3.
 - (B) TUBES WHICH DO NOT COMPLY WITH POST FATIGUE LIMITS. THIS IS A DESTRUCTIVE TEST.
- NOTE 12: THE PROVISIONS OF PARAGRAPH 4.9.20.5 OF SPECIFICATION MIL-E-1 SHALL APPLY, EXCEPT FOR TEST CONDITIONS LISTED FOR SHOCK TEST (2).



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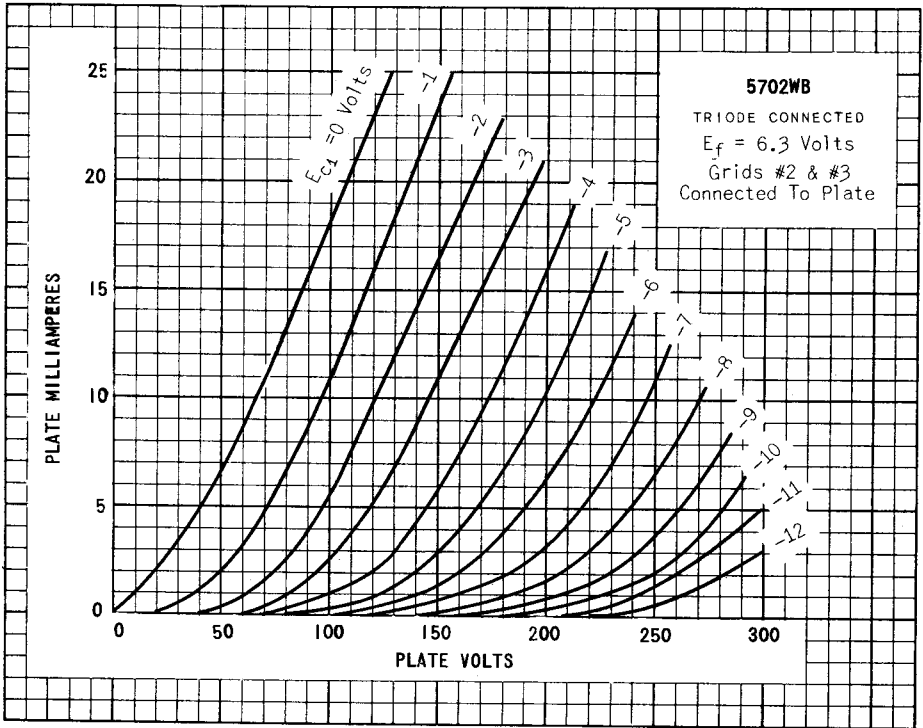


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