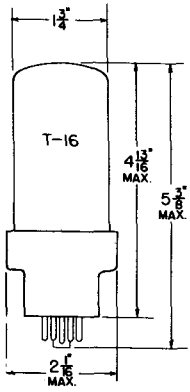
TUNG-SOL

FULL WAVE RECTIFIER



GLASS BULB
HARD GLASS

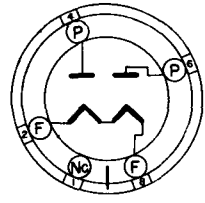
FILAMENT

5.0 VOLTS 2.0 AMP.

AC OR DC

VERTICAL MOUNTING POSITION

TUBE MAY BE OPERATED IN HORIZONTAL POSITION IF PINS #1 AND #4 ARE IN VERTICAL PLANE.



BOTTOM VIEW
SPECIAL SKIRTED
5 PIN OCTAL
5T

THE 5R4WGB IS A LONG LIFE, RUGGEDIZED, RELIABLE FULL WAVE RECTIFIER TUBE. WHILE SIMILAR IN CONSTRUCTION TO THE POPULAR 5R4WGA, THIS TUBE IS SUBJECTED TO MORE EXACTING REQUIREMENTS IN MANUFACTURE. THIS INCLUDES A 100% CHECK OF WELDS UNDER MAGNIFICATION. EVERY TUBE IS ELECTRICALLY STABILIZED WITH REPEATED COLD STARTS TO WEED OUT TUBES THAT ARE PRONE TO ARCING. THE 5R4WGB IS MADE IN "LOTS" WITH AN ENTIRE LOT BEING REJECTED UPON THE REJECTION OF SAMPLE TUBES. THIS IS OF PARTICULAR IMPORTANCE ON DESTRUCTIVE TESTS.

ONE OF THE DESIGN FEATURES IS THE SHOCK MOUNTING OF THE BULB IN A SKIRTED TYPE BASE BY A RESILIENT SILICONE RUBBER. THUS, ALTHOUGH THE BASE MAY BE SECURELY CLAMPED TO THE CHASSIS, THE TUBE PROPER IS INSULATED AGAINST SHOCKS. THIS TYPE OF BASING ALSO PERMITS OPERATION AT HIGH ALTITUDES WITHOUT FLASH OVER. ANOTHER DESIGN FEATURE IS THE "CROSS PRESS" STEM WHICH KEEPS ELECTROLYSIS TO A MINIMUM WHILE OFFERING A STABLE SUPPORT FOR THE MOUNT STRUCTURE. THE USE OF A HARD GLASS BULB PERMITS THE TUBE TO BE PROCESSED AT HIGH TEMPERATURES DURING MANUFACTURE SO THAT IT WILL REMAIN GAS FREE UNDER THE HIGH TEMPERATURES ENCOUNTERED IN OPERATION. THE LOW DRAIN, FAST HEATING, RUGGED FILAMENT PERMITS INSTANT APPLICATION OF PLATE VOLTAGE OVER A LARGE PORTION OF THE OPERATING CHARACTERISTICS. (SEE CURVES).

ELECTRICAL DATA

FILAMENT VOLTAGE (± 10%) A.C.	5.0	VOLTS
FILAMENT CURRENT A.C.	2.0	AMPS.

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TUNG-SOL

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TYPICAL OPERATION

	INPUT TO FILTER CHOKE	INPUT TO FILTER CAPACITOR	
AC PLATE VOLTAGE RMS PER PLATE	900	700	VAC
INPUT CONDENSER	---	4	Mfd
INPUT CHOKE	10	---	H
EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE	---	100	OHMS
DC OUTPUT CURRENT	165	275	MA.
DC OUTPUT VOLTAGE AT FULL LOAD	840	730	VDC
DC OUTPUT VOLTAGE AT HALF LOAD	860	800	VDC
REGULATION, HALF LOAD TO FULL LOAD	20	70	VDC

MECHANICAL DATA

MOUNTING POSITION	VERTICAL	
MAXIMUM OVERALL HEIGHT	5.31	INCHES
MAXIMUM SEATED HEIGHT	4.75	INCHES
MAXIMUM DIAMETER	2.06	INCHES
BULB, HARD GLASS	T-16	
BASE: SPECIAL SKIRTED OCTAL 5 PIN, GLASS FILLED ALKYD, INSULATION ZONE 5 OR BETTER.	SEE OUTLINE	

MAXIMUM RATING CHART

ALTITUDE	FILTER INPUT	PEAK INV. VOLTAGE	VOLTS RMS PER PLATE	MIN. SUPPLY IMPEDANCE PER PLATE
UP TO 30,000 FT.	4 μf	3050v⊕	1070v	575Ω⊕
UP TO 40,000 FT.	4 μf	2150⊕	760	---
	5 HENRIES	2300⊕	815	---
	4 μf	2800⊕	990	575⊕
UP TO 60,000 FT.	4 μf	1850⊕	655	---

ALTITUDE	PEAK PLATE CURRENT	CURRENT	FULL LOAD VOLTAGE
UP TO 30,000 FT.	0 MA.⊕	0 MA.⊕	1525v
UP TO 40,000 FT.	700⊕	275⊕	770
	---	275⊕	650
	550	165⊕	1100
UP TO 60,000 FT.	700⊕	275⊕	620

⊕INDICATES MAXIMUM RATINGS; ALL OTHERS INDICATE APPROXIMATE VALUES.

ALL VALUES ARE FOR E_f = 5.0 V. AND 10 SECONDS PREHEATING (NO PREHEATING IS NECESSARY FOR NO LOAD CONDITIONS). HIGHER VALUES OF FILTER CONDENSER CAPACITY MAY BE USED IF PLATE SUPPLY IMPEDANCE IS INCREASED TO KEEP PEAK PLATE CURRENT WITHIN RATINGS. FILTER VALUES ARE FOR 60 CYCLE OPERATION.

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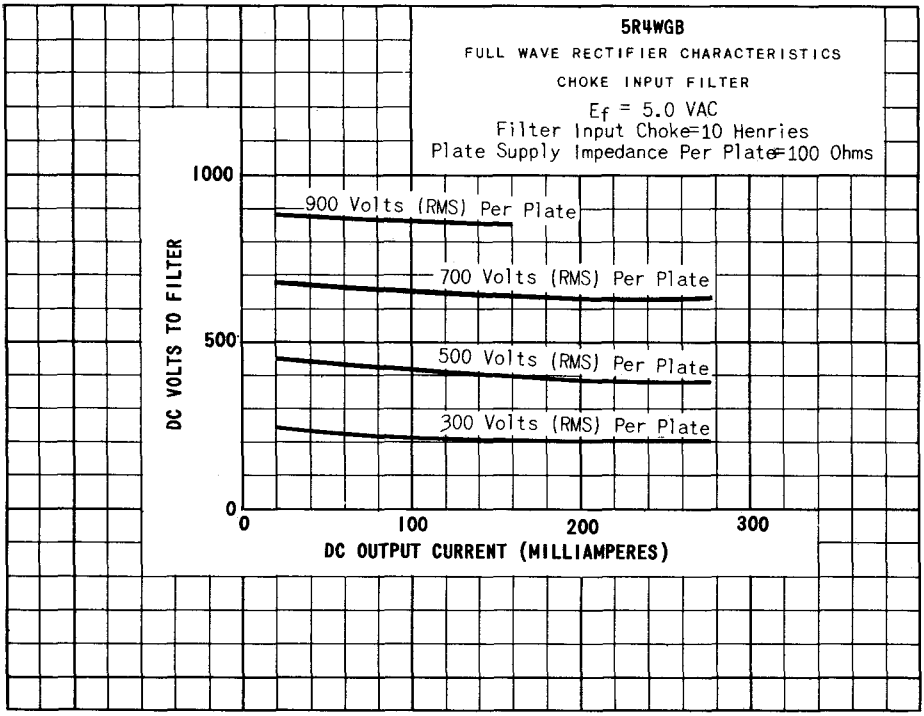

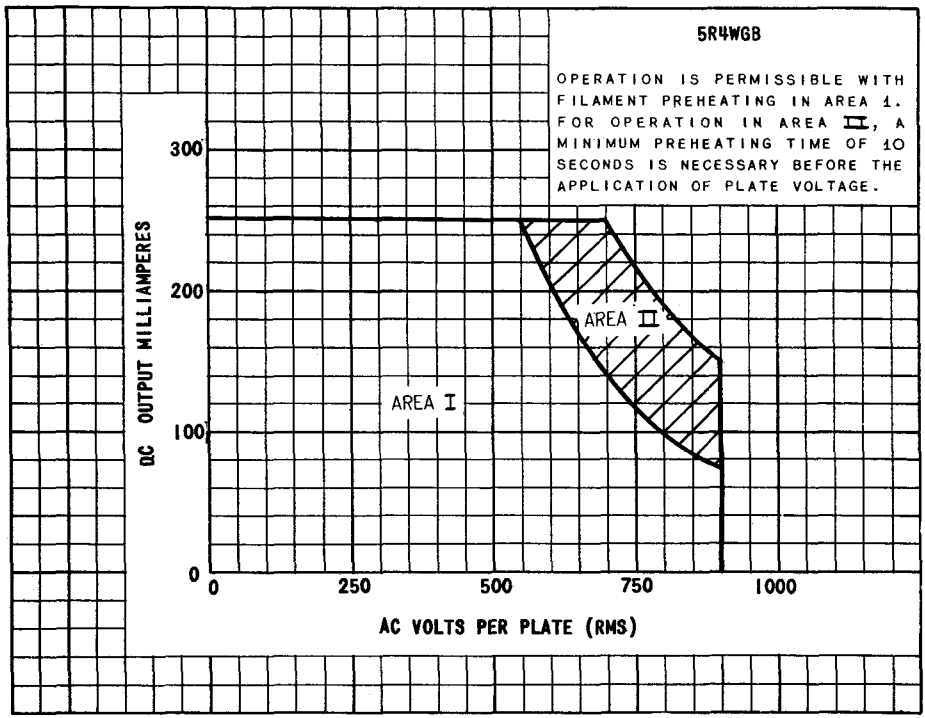

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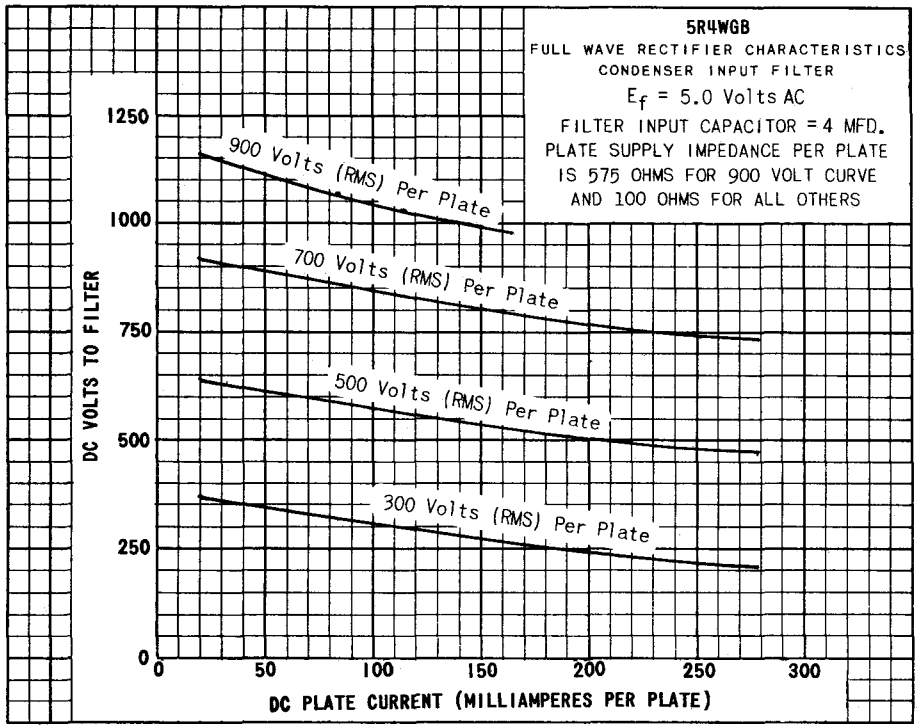
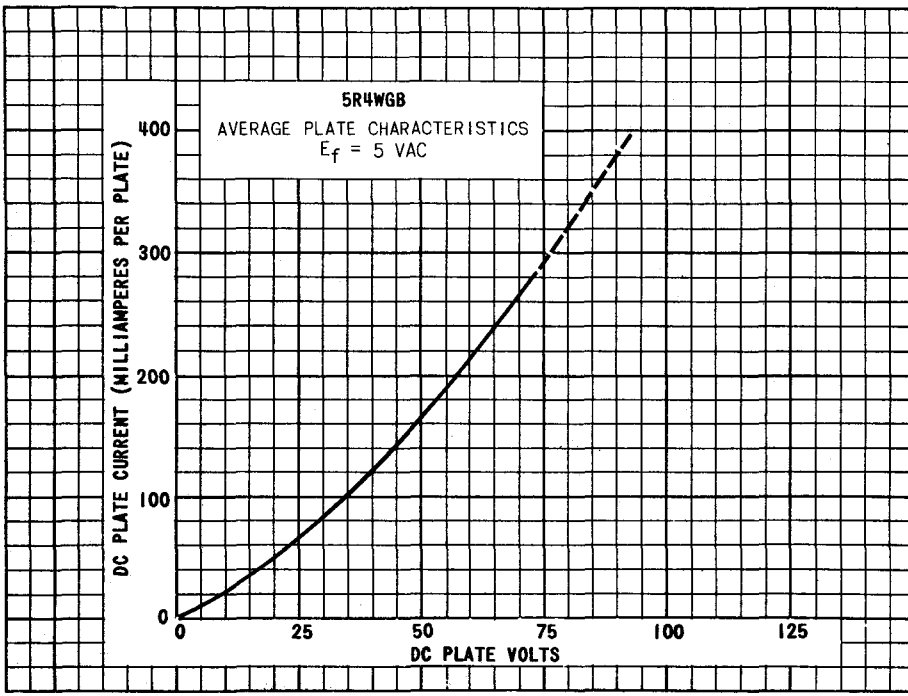

5R4WGB
FULL WAVE RECTIFIER CHARACTERISTICS
CONDENSER INPUT FILTER
Ef = 5.0 Volts AC
FILTER INPUT CAPACITOR = 4 MFD.
PLATE SUPPLY IMPEDANCE PER PLATE
IS 575 OHMS FOR 900 VOLT CURVE
AND 100 OHMS FOR ALL OTHERS
900 Volts (RMS) Per Plate
700 Volts (RMS) Per Plate
500 Volts (RMS) Per Plate
300 Volts (RMS) Per Plate
DC VOLTS TO FILTER
0
250
500
750
1000
1250
0
50
100
150
200
250
300
DC PLATE CURRENT (MILLIAMPERES PER PLATE)


5R4WGB
AVERAGE PLATE CHARACTERISTICS
Ef = 5 VAC
DC PLATE CURRENT (MILLIAMPERES PER PLATE)
0
100
200
300
400
0
25
50
75
100
125
DC PLATE VOLTS

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ADDITIONAL TESTS TO INSURE RELIABILITY

ALL TUBES: OPERATION (1): e_{px} = 2800 Vac; FULL WAVE; $Z_{p/p}$ = 500; C_L = 4 mfd; R_L = 7000 OHMS; t_k = 10 I_o > 140 mAdc

OPERATION (2): $E_{pp/p}$ = 850 Vac, FULL WAVE; C_L = 4mfd; R_L = 3500 OHMS, t_k = 10; $Z_{p/p}$ ADJUSTED FOR A BOGIE TUBE TO READ 260 mAdc, AND I_b NOT LESS THAN 630 mA PER PLATE. (A BOGIE TUBE IS A TUBE WITH A DROP OF 75Vdc AT 320 mAdc PER PLATE) I_o > 245 mA.

STABILIZATION: 6 HOURS AT E_F = 5.0Vac; $E_{pp/p}$ = 800 Vac; I_o = 300 mAdc; R_L = 3000; t_k = 0 (CYCLED 15 MINUTES ON 5 MINUTES OFF)

RANDOM SAMPLE TESTED FOR THE FOLLOWING:

LOW PRESSURE VOLTAGE BREAKDOWN:

1). $E_{pp/p}$ = 1050Vac; FULL WAVE; R_L/I_o = 165 mAdc; t_k = 10SEC; C_L = 4 mfd, $Z_{ptotal/p}$ = 500 Ω: PRESSURE 140 mm (40000ft.)

2). e_{px} = 1850 Vac; R_L/I_o = 275 mAdc; t_k = 10 SEC; C_L = 4 mfd; $Z_{ptotal/p}$ = 200Ω: FULL WAVE; PRESSURE = 55 mm (60000 ft.)

SHOCK: 60° HAMMER ANGLE IN NAVY FLYWEIGHT, HIGH IMPACT MACHINE (900G/mSEC).

FATIGUE: 25 CPS, 0.80" TOTAL DISPLACEMENT, FOR 32 HOURS IN EACH OF THESE MUTUALLY PERPENDICULAR PLANES (2.5 G).

POST SHOCK AND FATIGUE TEST END POINT:
OPERATION (2) I_o > 240 mAdc.

LIFE TEST:

FILAMENT CYCLING: 2000 CYCLES; E_f = 5.5 Vac; 1 MINUTE ON, 1 MINUTE OFF PER CYCLE. (FILAMENT VOLTAGE REGULATION 3% NO LOAD TO FULL LOAD).

INTERMITTENT LIFE TEST

OPERATION (2)	100 HOURS	I_o > 245 mAdc.
OPERATION (2)	500 HOURS	I_o > 240 mAdc.
OPERATION (2)	1000 HOURS	I_o > 240 mAdc.

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