

Beam Power Tube

QUICK-HEATING FILAMENT

90 WATTS CW INPUT (ICAS) UP TO 60 Mc

60 WATTS CW INPUT (ICAS) AT 175 Mc

For Use in Push-to-Talk Mobile and Emergency-Communications Equipment as an RF Power-Amplifier Tube

GENERAL DATA

Electrical:

Filament, Coated:

Voltage (AC or DC) 6.3 $\pm$ 10% volts

Current at 6.3 volts. 0.65 amp

Heating time. 1 sec

Transconductance, for plate volts = 200,

grid-No.2 volts = 200, and plate

ma. = 100 6000 μ hos

Mu-Factor, Grid No.2 to Grid No.1 for

plate volts = 200, grid-No.2 volts

= 200, and plate ma. = 100. 4

Direct Interelectrode Capacitances:

Grid No.1 to plate. 0.24 max. μ f

Grid No.1 to filament & grid No.3 &
internal shield, grid No.2, and
base sleeve 11 μ f

Plate to filament & grid No.3 &
internal shield, grid No.2, and
base sleeve 8.5 μ f

Mechanical:

Operating Position. Vertical, base down or up, or
Horizontal with pins 3 and 7 in vertical plane

Maximum Overall Length. 3-13/16"

Seated Length. 3-1/8" $\pm$ 1/8"

Maximum Diameter. 1-21/32"

Bulb. T12

Cap. Small (JEDEC No.C1-1)

Socket. Standard Octal 8-Contact

Base. Small Wafer Octal 8-Pin with "770" Sleeve

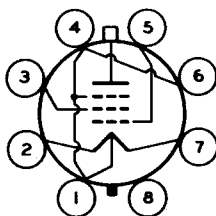
(JEDEC Group 1, No.B8-150)

Basing Designation for BOTTOM VIEW. 7CL

Pin 1-Filament Tap,
Grid No.3,
Internal
Shield

Pin 2-Filament

Pin 3-Grid No.2



Pin 4-Same as Pin 1

Pin 5-Grid No.1

Pin 6-Same as Pin 1

Pin 7-Filament

Pin 8-Base Sleeve

Cap-Plate



RF POWER AMPLIFIER & OSCILLATOR — Class C Telephony[▲] and

RF POWER AMPLIFIER — Class C FM Telephony

Maximum ICAS[®] Ratings, Absolute-Maximum Values:

	<i>Up to 60 Mc</i>	
DC PLATE VOLTAGE.	750 max.	volts
DC GRID-No.2 VOLTAGE.	250 max.	volts
DC GRID-No.1 VOLTAGE.	-150 max.	volts
DC PLATE CURRENT.	150 max.	ma
DC GRID-No.1 CURRENT.	4 max.	ma
PLATE INPUT.	90 max.	watts
GRID-No.2 INPUT.	3 max.	watts
PLATE DISSIPATION.	25 max.	watts
BULB TEMPERATURE (At hottest point on bulb surface)	220 max.	°C

Typical Operation:

As amplifier at 175 Mc

DC Plate Voltage.	400	volts
DC Grid-No.2 Voltage★.	190	volts
From a series resistor of	18000	ohms
DC Grid-No.1 Voltage♦.	-60	volts
From a grid resistor of	30000	ohms
DC Plate Current.	150	ma
DC Grid-No.2 Current.	11	ma
DC Grid-No.1 Current (Approx.).	2	ma
Driving Power (Approx.)	4.5	watts
Power Output (Approx.)	30	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance [♣]	30000 max.	ohms
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▲ Key-down conditions per tube without amplitude modulation. Amplitude modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.

● Intermittent Commercial and Amateur Service.

★ Obtained preferably from a separate source, or from the plate supply voltage with a voltage divider, or through a series resistor. A series grid-No.2 resistor should be used only when the 4604 is used in a circuit which is not keyed. Grid-No.2 voltage must not exceed 400 volts under key-up conditions.

♦ Obtained from fixed supply, by grid-No.1 resistor, or by combination methods.

♣ When grid No.1 is driven positive and the 4604 is operated at maximum ratings, the total dc grid-No.1-circuit resistance should not exceed the specified value of 30,000 ohms. If this value is insufficient to provide adequate bias, the additional required bias must be supplied by a fixed supply.

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	<i>Min.</i>	<i>Max.</i>	
Filament Current at 6.3 volts ac.	0.59	0.71	amp

Direct Interelectrode Capacitances:

Grid No.1 to plate.	—	0.24	$\mu\mu\text{f}$
Grid No.1 to filament & grid No.3 & internal shield, grid No.2, and base sleeve	9.5	12.5	$\mu\mu\text{f}$
Plate to filament & grid No.3 & internal shield, grid No.2, and base sleeve	7.3	9.5	$\mu\mu\text{f}$
Plate Current [♣]	46	94	ma
Grid-No.2 Current [♣]	—	5.5	ma
Useful Power Output [♣]	47	—	watts

♣ With 6.3 volts ac on filament, dc plate voltage of 300 volts, dc grid-No.2 voltage of 200 volts, and dc grid-No.1 voltage of -29 volts. ←

♣ In a single-tube, self-excited-oscillator circuit, and with 6.3 volts ac on filament, dc plate voltage of 600 volts, dc grid-No.2 voltage of 200 volts, grid-No.1 resistor of $30,000 \pm 10\%$ ohms, dc plate current of 100 to 112 ma., dc grid-No.1 current of 2 to 2.5 ma., and frequency of 15 Mc.

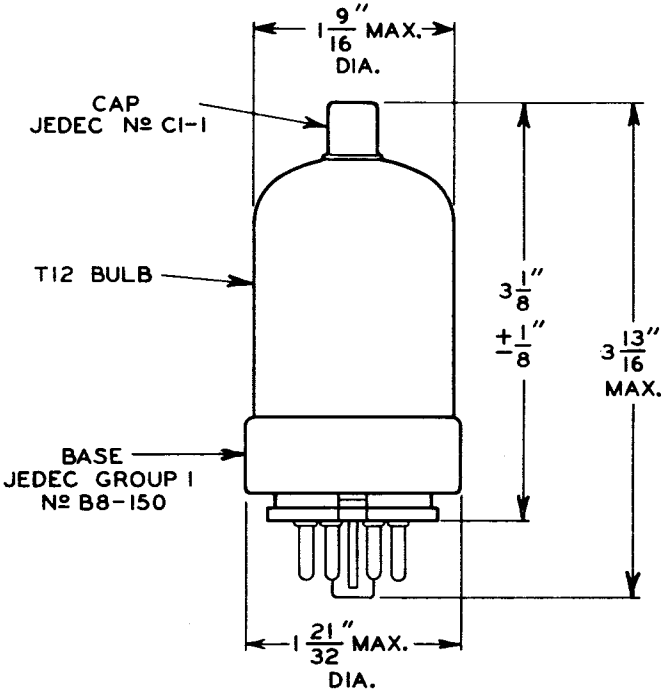
OPERATING CONSIDERATIONS

The *bulb* becomes hot during operation. To insure adequate cooling, therefore, it is essential that free circulation of air be provided around the 4604.

The *plate* shows no color when the 4604 is operated at full ratings under ICAS conditions. Connections to the plate should be made with a flexible lead to prevent any strain on the seal at the cap.

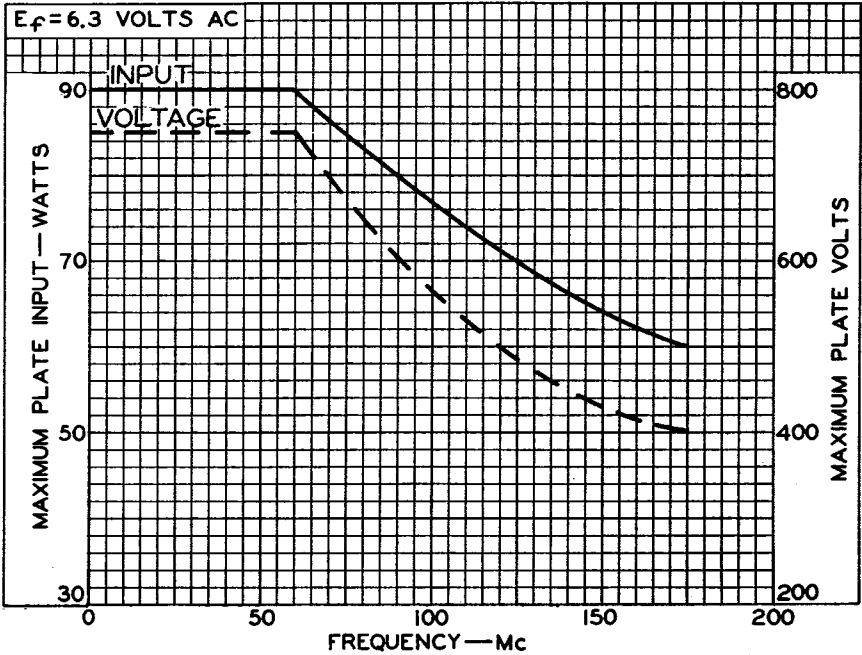
← Indicates a change.





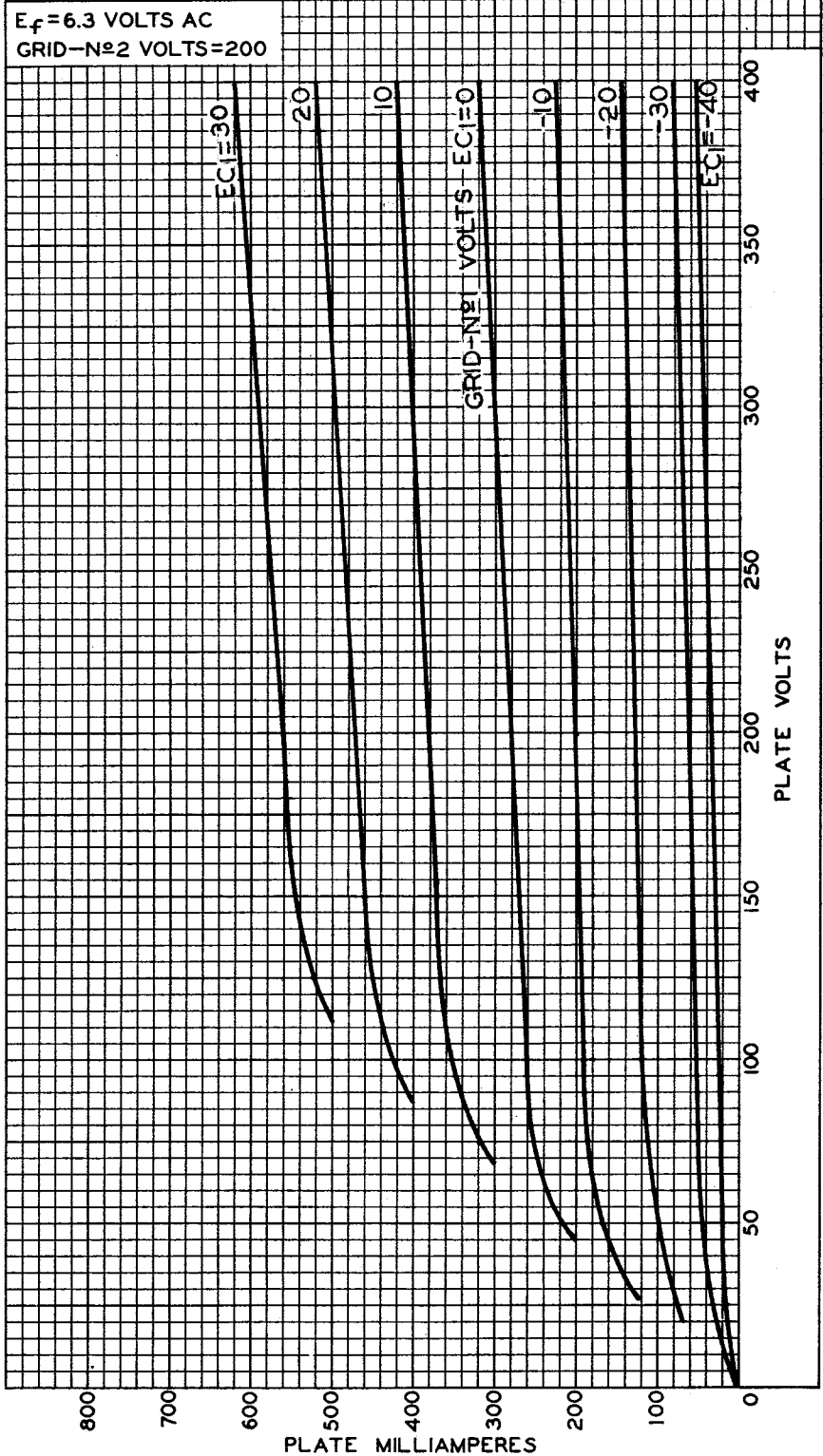
92CS-9625R4

RATING CHART
ICAS Class-C Telegraphy or Telephony Service



92CS-10817R1

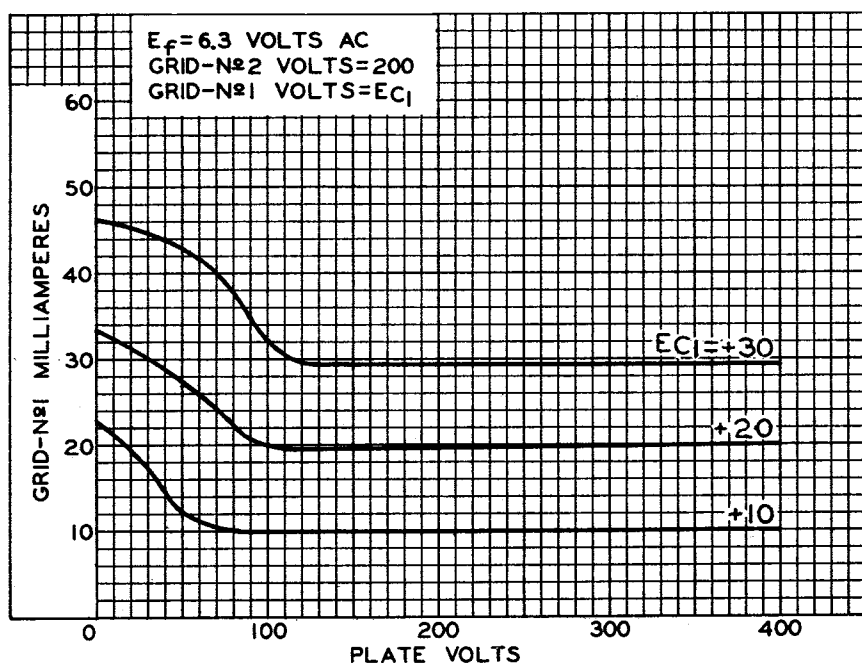
TYPICAL PLATE CHARACTERISTICS



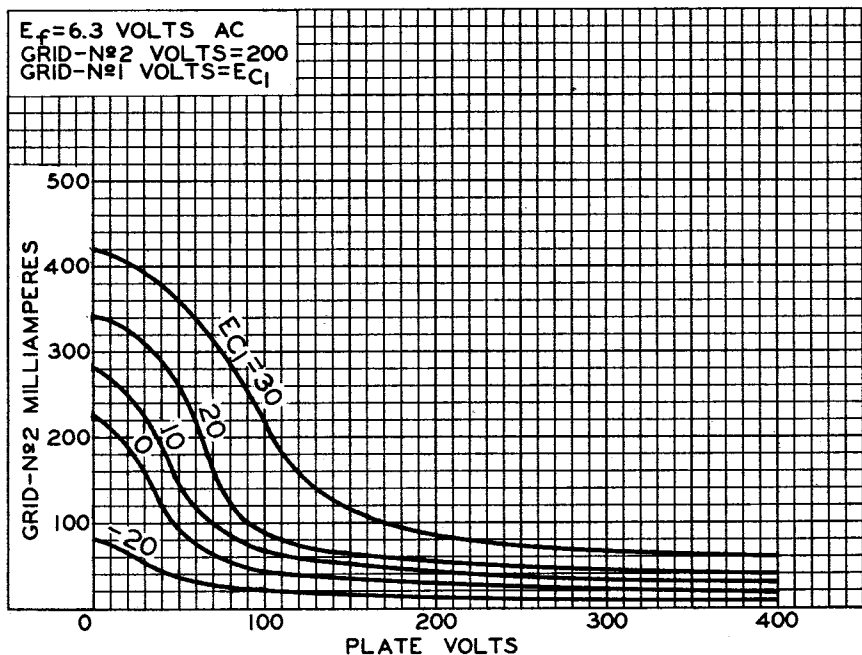
92CM-10813



TYPICAL CHARACTERISTICS



92CS-10814



92CS-10816