

Beam Power Tube

CERMOLOX®
THORIATED-TUNGSTEN MESH FILAMENT

INTEGRAL LOUVERED-FIN RADIATOR
FORCED-AIR COOLED

For Single-Sideband Service in Stationary and Portable Equipment. Rated as a Linear RF Power Amplifier in Class AB₁ Suppressed Carrier Service. Also Useful as AF Amplifier or Modulator, RF Power Amplifier and Oscillator in Class-C Telephony and Telegraphy and Other Special Services.

ELECTRICAL

Filamentary Cathode, Thoriated-Tungsten Mesh Type

Voltage (ac or dc) ^a	{ 4.5 to 4.75 typ	V
	5.0 max	V

Current:

Typical value at 4.5 V	125	A
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Maximum value for starting, even momentarily.	300	A
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Cold Resistance.	0.005	Ω
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Minimum heating time	15	s
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**Mu-Factor, Grid No.2 to Grid No.1 for plate
 volts = 2000, grid-No.2 volts = 1375, and dc
 plate amperes = 9**

10

Direct Interelectrode Capacitances

Grid No.1 to plate ^b	0.60	max pF
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Grid No.1 to filament.	60	pF
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Plate to filament ^{bc}	0.11	max pF
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Grid No.1 to grid No.2	65	pF
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Grid No.2 to plate	13	pF
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Grid No.2 to filament ^c	3.3	max pF
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MECHANICAL

Operating Position	Vertical, either end up
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Maximum Overall Length	5.65 in
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Maximum Diameter	6.17 in
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Terminal Connections	See Dimensional Outline
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Radiator	Integral part of tube
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Weight (Approx.)	10 lb
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THERMAL

Terminal Temperature	250 max °C
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Plate, grid No.2, grid No.1,
 cathode-filament and filament

Plate-Core Temperature	250 max °C
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See Dimensional Outline for temperature-measurement points

Forced-Air Cooling^f

Air Flow

Through Radiator — Adequate air flow to limit the plate-core temperature to 250° C should be delivered by a blower through the radiator before and during the application of filament, plate, grid-No.2, and grid-No.1 voltages.



Air Flow (Cont'd)

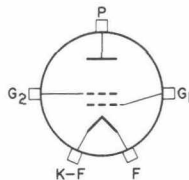
To Plate, Grid-No.2, Grid-No.1, Cathode-Filament, and Filament Terminals — A sufficient quantity of air should be allowed to flow past each of these terminals so that their temperature does not exceed the specified maximum value of 250° C.

During Standby Operation — Cooling air is required when only filament voltage is applied to the tube.

During Shutdown Operation — Air flow should continue for a few minutes after all electrode power is removed.

TERMINAL DIAGRAM (Bottom View)

- G₁ — Grid-No.1-Terminal Contact Surface
 G₂ — Grid-No.2-Terminal Contact Surface
 F — Filament-Terminal Contact Surface
 K,F — Cathode-Filament-Terminal Contact Surface
 P — Plate-Terminal Contact Surface

**LINEAR RF POWER AMPLIFIER⁹****SINGLE-SIDEBAND SUPPRESSED-CARRIER SERVICE**

Peak envelope conditions for a signal having a minimum peak-to-average power ratio of 2

Maximum CCS Ratings, Absolute-Maximum Values

DC Plate Voltage	7500	V
DC Grid-No.2 Voltage	1650	V
DC Grid-No.1 Voltage	-750	V
DC Plate Current at Peak of Envelope	4.0	A
DC Grid-No.1 Current	500	mA
Grid-No.2 Input ^h	150	W
Plate Dissipation	10	kW

Maximum Circuit Values**Grid-No.1-Circuit Resistance (Under any Condition)**

Fixed bias	5000	Ω
Fixed bias (In Class AB ₁ operation).	25,000	Ω
Cathode bias	Not recommended	
Grid-No.2 Circuit Impedance	See footnote ^h	
Plate Circuit Impedance	See footnote ^l	

Typical Class AB₁ CCS Operation with "Two-Tone" Modulation

In a grid-drive circuit, at 30 Mc/s

DC Plate Voltage	7000	V
DC Grid-No.2 Voltage	1500	V
DC Grid-No.1 Voltage	-200	V
Zero-Signal DC Plate Current	0.5	A
Effective RF Load Resistance	1200	Ω
DC Plate Current at Peak of Envelope	3	A
Average DC Plate Current	2.15	A
DC Grid-No.2 Current at Peak of Envelope	0.1	A

Average DC Grid-No.2 Current	0.07	A
Peak-Envelope Driver Power Output (Approx.).	See footnote ^d	
Output Circuit Efficiency (Approx.).	90	%
Useful Power Output (Approx.)		
Average.	5000	W
Peak Envelope.	10	kW

LINEAR RF POWER AMPLIFIER^f AM TELEPHONY SERVICE

Carrier conditions for use with a maximum modulation factor of 1

Maximum CCS Ratings, Absolute-Maximum Values

DC Plate Voltage	7500	V
DC Grid-No.2 Voltage	1650	V
DC Grid-No.1 Voltage	-750	V
DC Plate Current	2	A
DC Grid-No.1 Current	500	mA
Grid-No.2 Input.	150	W
Plate Dissipation.	10	kW

Typical Class AB₁ CCS Operation

In a cathode drive circuit, at 400 Mc/s

DC Plate Voltage	6500	V
DC Grid-No.2 Voltage	1250	V
DC Grid-No.1 Voltage	-160 ^e	V
DC Plate Current	1.4	A
DC Grid-No.2 Current	0.005	A
Driver Power Output.	75	W
Output Circuit Efficiency (Approx.).	90	%
Useful Power Output.	2000	W

^a Measured at tube terminals.

^b With external flat metal shield 8 inches in diameter having a center hole 3 inches in diameter. Shield is located in plane of the grid-No.2 terminal, perpendicular to the tube axis, and is connected to grid No.2.

^c With external flat metal shield 8 inches in diameter having a center hole 2-3/8 inches in diameter. Shield is located in plane of the grid-No.1 terminal, perpendicular to the tube axis, and is connected to grid No.1.

^d Driver power output represents circuit losses and is the actual power measured at input to grid-No.1 circuit. The actual power required depends on the operating frequency and the circuit used. The tube driving power is approximately zero watts.

^e Typical value for 1 ampere of DC plate current with carrier turned off.

The following footnotes apply to the RCA Transmitting Tube Operating Considerations given at front of this section.

^f See *Cooling Considerations*—Forced-Air Cooling.

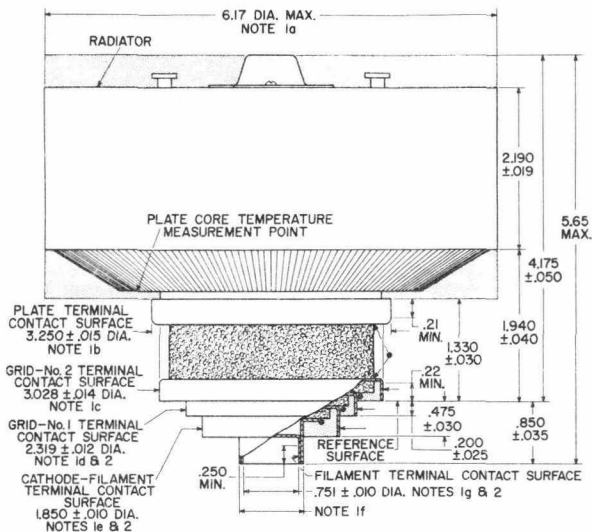
^g See *Classes of Service*.

^h See *Electrical Considerations*—Grid-No.2 Voltage Supply

^j See *Electrical Considerations*—Plate Voltage Supply



DIMENSIONAL OUTLINE



□ STIPPLED REGION NOTE 3

◻ CERAMIC INSULATOR

• TERMINAL TEMPERATURE
MEASUREMENT POINT

92CL-13039

DIMENSIONS IN INCHES

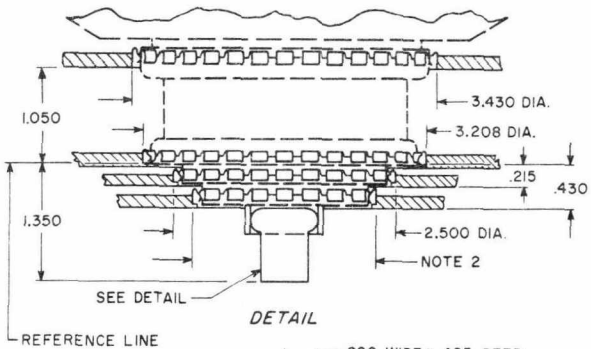
Note 1: Concentricity between the various diameters is such that the tube will enter a gauge having suitably spaced concentric apertures and posts of the following diameters:

- a. Radiator - 6.241
- b. Plate Terminal - 3.288
- c. Grid-No. 2 Terminal - 3.061
- d. Grid-No. 1 Terminal - 2.338
- e. Cathode-Filament Terminal - 1.878
- f. Filament Terminal (OD) - 0.908
- g. Filament Terminal (ID) - 0.722

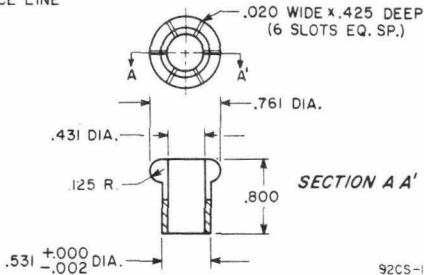
Note 2: The diameter of the terminal is held to the indicated value only over the contact surface length. The contact surface length of the cathode-filament and grid-No. 1 terminals extends from the edge of its terminal to the plane coincident with the edge of the adjacent larger terminal.

Note 3: Keep all stippled regions clear. Do not allow contacts or circuit components to protrude into these annular regions.

PREFERRED MOUNTING ARRANGEMENT



DETAIL



92CS-1249OR2

Note 1: Finger stock is No.97-360 made by Instrument Specialties Co., Little Falls, N.J.

Note 2: Cathode ring dia. is 2.030 inches when using No.97-360 finger stock or 2.080 inches when using No.97-135 finger stock. Made by Instrument Specialties Co., Little Falls, N.J.

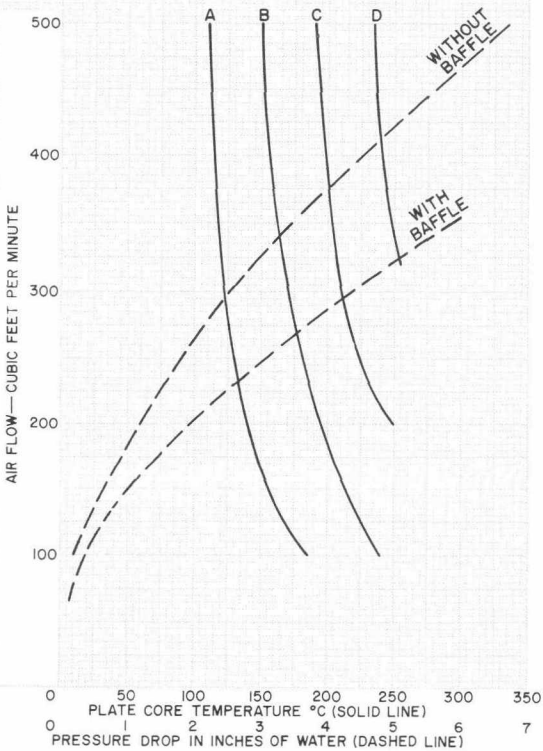
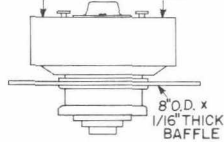


Typical Cooling Characteristics

INCOMING AIR TEMPERATURE — 25° C

CURVE	PLATE DISSIPATION WATTS
A	4000
B	6000
C	8000
D	10000

DIRECTION OF AIR FLOW

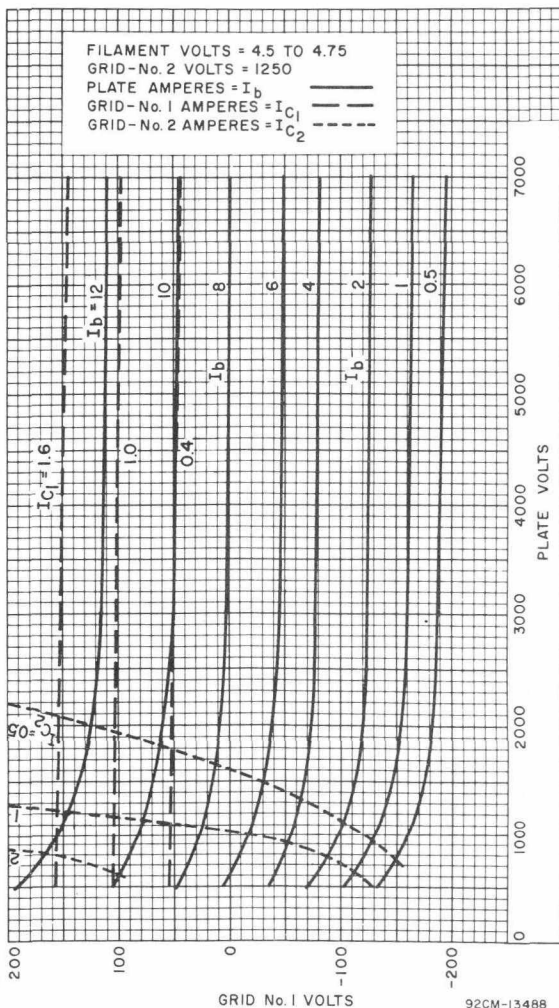


92CM-13104



Typical Constant-Current Characteristics

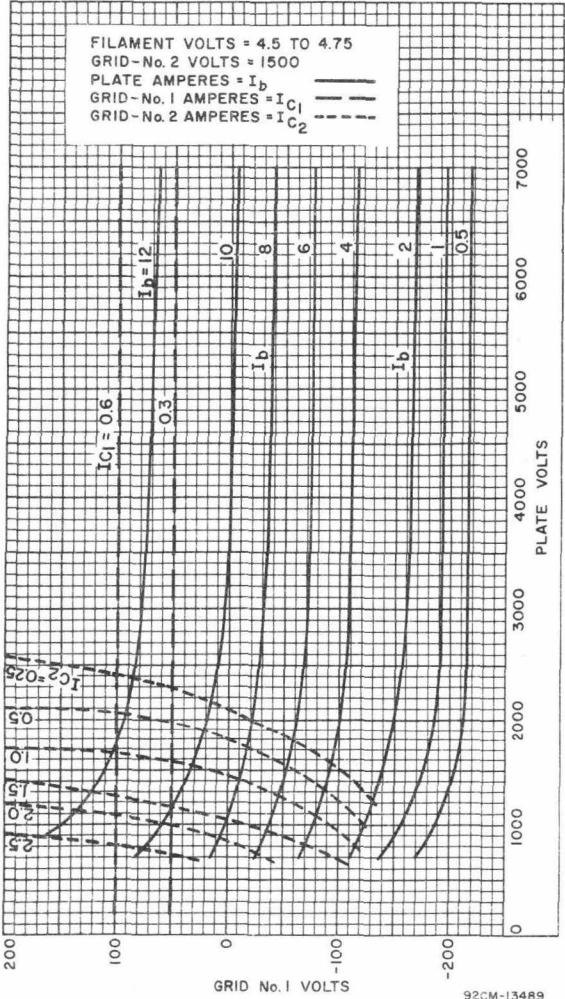
For Grid-No.2 Voltage = 1250 Volts



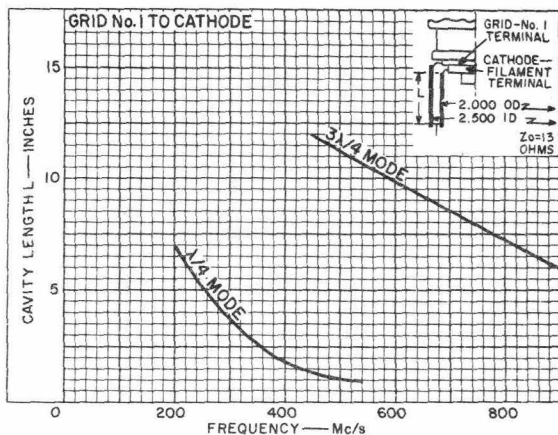
92CM-13488



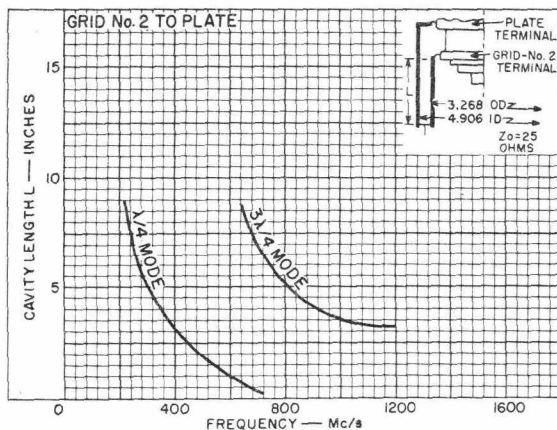
Typical Constant-Current Characteristics
For Grid-No.2 Voltage = 1500 Volts



Cavity Tuning Characteristics



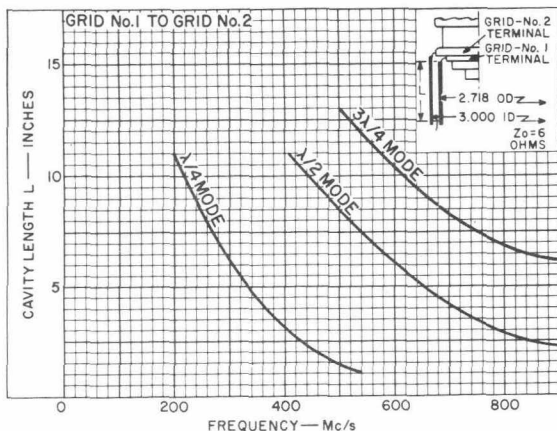
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92CS-13709



Cavity Tuning Characteristics



92CS-13710