Beam Power Tube

CERMOLOX® — **INTEGRAL LOUVERED-FIN RADIATOR**
THORIATED-TUNGSTEN MESH FILAMENT — **FORCED-AIR COOLED**

For Single-Sideband Service in Stationary and Portable Equipment. Rated as a Linear RF Power Amplifier in Class AB_1 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 5.0 max		V V
Current:			
Typical value at 4.5 V	125		A
Maximum value for starting, even momentarily	300		A
Cold Resistance	0.005		Ω
Minimum heating time	15		s
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
Grid No.1 to filament	60		pF
Plate to filament[b,c]	0.11	max	pF
Grid No.1 to grid No.2	65		pF
Grid No.2 to plate	13		pF
Grid No.2 to filament[c]	3.3	max	pF

MECHANICAL

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

THERMAL

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

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)

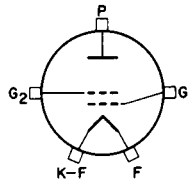
To Plate, Grid-No.2, Grid-No.1, Cathode-Filament, and Filament Terminals — A sufficient quantity of air should be allowed to flow past each of these terminals so that their temperature does not exceed the specified maximum value of 250° C.

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)

G_1 – Grid-No.1–Terminal Contact Surface
G_2 – 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 AMPLIFIER[g]

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[j]	

Typical Class AB_1 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

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

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.

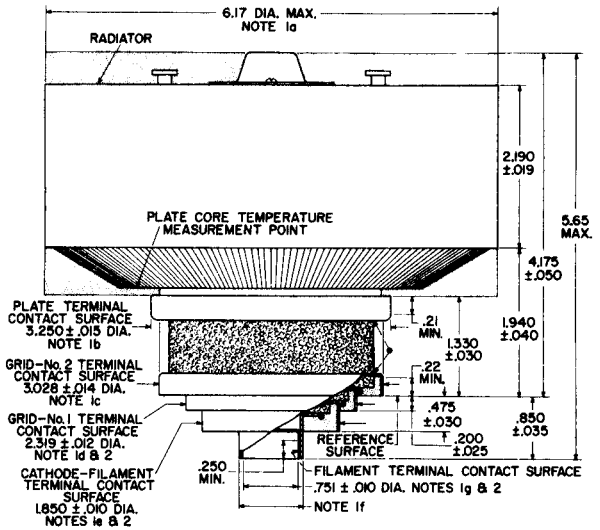
[f] See *Cooling Considerations*—Forced-Air Cooling.

[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:

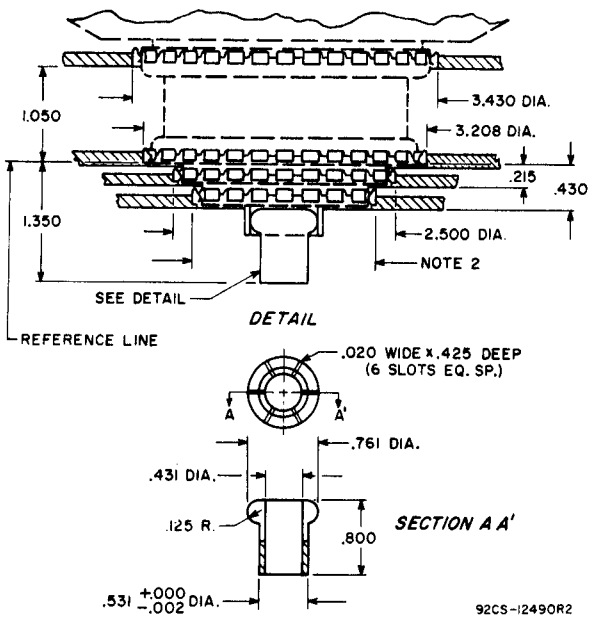
a. Radiator - 6.241
b. Plate Terminal - 3.288
c. Grid-No.2 Terminal - 3.061
d. Grid-No.1 Terminal - 2.338
e. Cathode-Filament Terminal - 1.878
f. Filament Terminal (OD) - 0.908
g. Filament Terminal (ID) - 0.722

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.

RADIO CORPORATION OF AMERICA
Electronic Components and Devices Harrison, N. J.

PREFERRED MOUNTING ARRANGEMENT



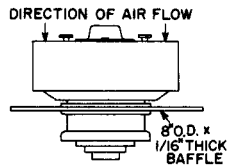
Note 1: Finger stock is No. 97-360 made by Instrument Specialties Co., Little Falls, N.J.

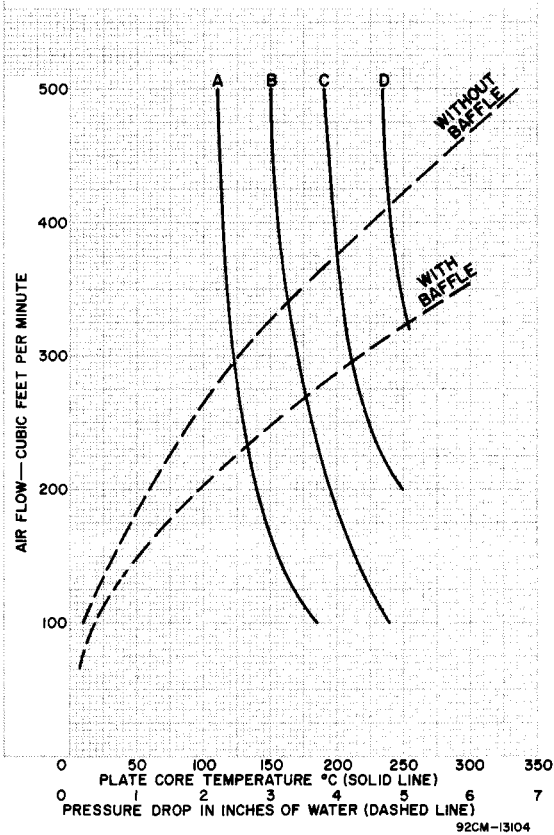
Note 2: Cathode ring dia. is 2.030 inches when using No. 97-360 finger stock or 2.080 inches when using No. 97-135 finger stock. Made by Instrument Specialties Co., Little Falls, N.J.

Typical Cooling Characteristics

INCOMING AIR TEMPERATURE—25° C

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

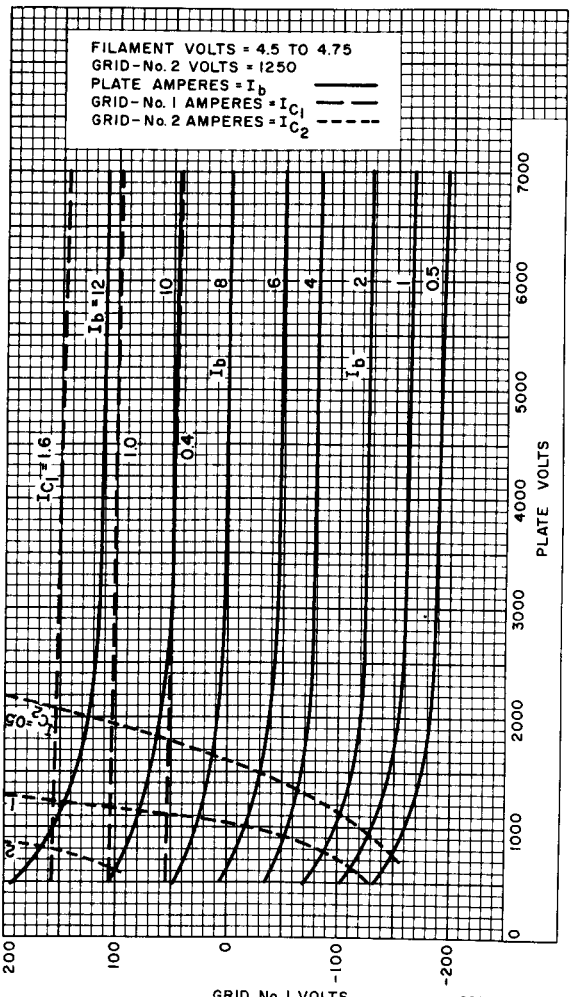




RADIO CORPORATION OF AMERICA
Electronic Components and Devices
Harrison, N. J.

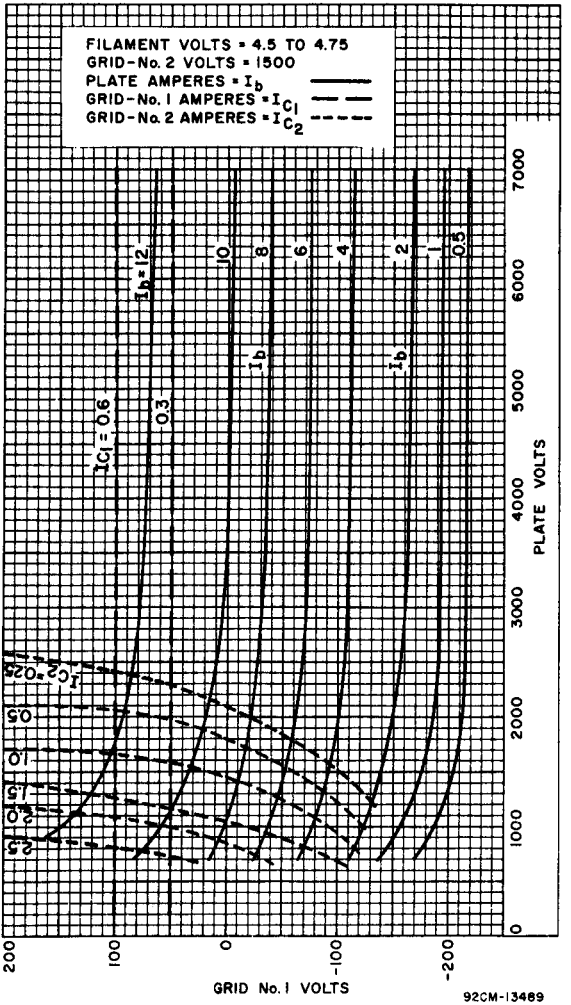
Typical Constant-Current Characteristics

For Grid-No. 2 Voltage = 1250 Volts



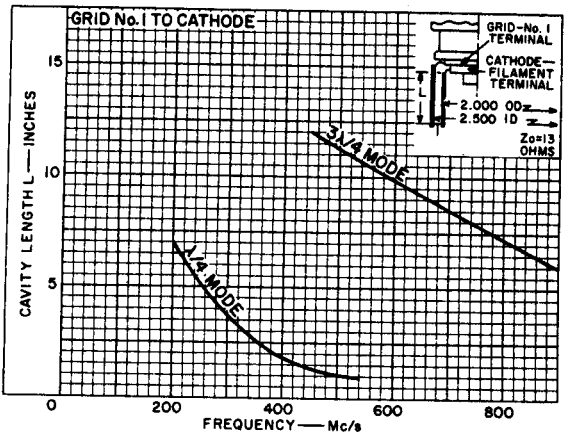
Typical Constant-Current Characteristics

For Grid-No.2 Voltage = 1500 Volts

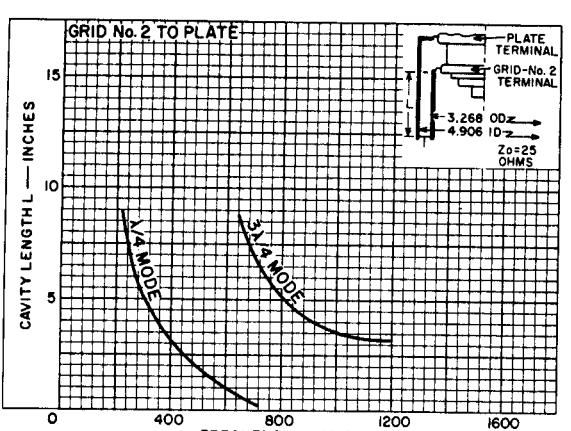


RADIO CORPORATION OF AMERICA
Electronic Components and Devices
Harrison, N. J.

Cavity Tuning Characteristics

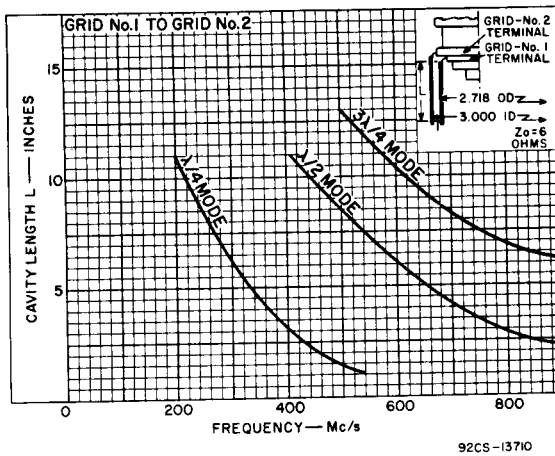


92CS-13708



92CS-13709

Cavity Tuning Characteristics



RADIO CORPORATION OF AMERICA
Electronic Components and Devices
Harrison, N. J.