6166A/7007

Beam Power Tube

FORCED-AIR COOLED
CERAMIC-METAL SEALS — COAXIAL-ELECTRODE STRUCTURE
THORIATED-TUNGSTEN FILAMENT — INTEGRAL RADIATOR
12-KW PLATE DISSIPATION IN CW OR TV SERVICE UP TO 220 Mc

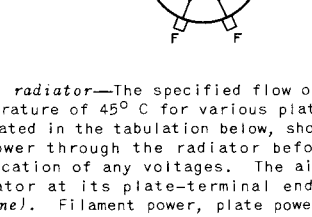
Electrical:

Filament, Multistrand Thoriated Tungsten:		
Voltage (AC or DC)▲	5 ± 5%	volts
Current at heater volts = 5	168	amp ←
Minimum heating time	15	sec
Cold resistance	0.0038	ohm
Mu Factor, Grid No.2 to Grid No.1 for plate volts = 2000, grid-No.2 volts = 1000, and plate amperes = 2	10	
Direct Interelectrode Capacitances:		
Grid No.1 to plate●	0.6 max.	pf
Grid No.1 to filament	42	pf
Plate to filament●	0.08 max.	pf
Grid No.1 to grid No.2	65	pf ←
Grid No.2 to plate	22	pf ←

Mechanical:

Operating Position	Vertical, filament end up or down
Maximum Overall Length	11.50"
Maximum Diameter	6.38"
Weight (Approx.)	15 lbs
Radiator	Integral part of tube

Terminal Diagram (See *Dimensional Outline*):



G_1 – Grid No.1
G_2 – Grid No.2

P – Plate
F – Filament

Thermal:

Air Flow:

Through radiator—The specified flow of incoming air at a temperature of 45° C for various plate dissipations, as indicated in the tabulation below, should be delivered by a blower through the radiator before and during the application of any voltages. The air should enter the radiator at its plate-terminal end (See *Dimensional Outline*). Filament power, plate power, grid-No.2 power, and air flow may be removed simultaneously.

Percentage of maximum-rated plate dissipation for each class of service	100	83	67	50	%
Minimum air flow	550	350	230	175	cfm
Static pressure	6.6	3	1.6	1	in. of water

← Indicates a change.

To grid-No.2 terminal	50 min.	cfm
To grid-No.1 terminal and filament terminals	50 min.	cfm
Incoming-Air Temperature	50 max.	°C
Radiator Temperature (Measured on the core at end away from incoming air)	180 max.	°C
Terminal Temperature:		
Filament, grid No.1, grid No.2, and plate	180 max.	°C

RF POWER AMPLIFIER — Class B Television Service

Synchronizing-level conditions per tube unless otherwise specified

(Voltages are referred to cathode unless otherwise specified)

Maximum CCS* Ratings, *Absolute-Maximum Values:*

	Up to 220 Mc	
DC PLATE VOLTAGE	7500 max.	volts
DC GRID-No.2 VOLTAGE	2000 max.	volts
DC PLATE CURRENT	4 max.	amp
PLATE INPUT	24000 max.	watts
GRID-No.2 INPUT	400 max.	watts
PLATE DISSIPATION	12000 max.	watts
GRID-No.1 DISSIPATION	300 max.	watts

Typical Operation in Grid-Drive Circuit at 216 Mc:

	Bandwidth♦ of 8.5 Mc	
DC Plate Voltage	5800	volts
DC Grid-No.2 Voltage	1200	volts
DC Grid-No.1 Voltage	−130	volts
Peak RF Grid-No.1 Voltage:		
Synchronizing level	375	volts
Pedestal level	290	volts
DC Plate Current:		
Synchronizing level	3.45	amp
Pedestal level	2.6	amp
DC Grid-No.2 Current (Pedestal Level)	0.207	amp
DC Grid-No.1 Current (Approx.):		
Synchronizing level	0.175	amp
Pedestal level	0.085	amp
Driver Power Output (Approx.):♦		
Synchronizing level	800♦	watts
Pedestal level	450	watts
Useful Power Output (Approx.):		
Synchronizing level	12000	watts
Pedestal level	6800	watts

Typical Operation in Cathode-Drive Circuit at 216 Mc:

	Bandwidth♦ of 8.5 Mc	
DC Plate-to-Grid-No.1 Voltage	6400	volts
DC Grid-No.2-to-Grid-No.1 Voltage	800	volts
DC Cathode-to-Grid-No.1 Voltage	90	volts

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

Peak RF Cathode-to-Grid-No.1 Voltage:		
Synchronizing level	360	volts
Pedestal level	285	volts
DC Plate Current:		
Synchronizing level	3.65	amp
Pedestal level	2.75	amp
DC Grid-No.2 Current (Pedestal Level)	0.175	amp
DC Grid-No.1 Current (Approx.):		
Synchronizing level	0.24	amp
Pedestal level	0.16	amp
Driver Power Output (Approx.)♣:		
Synchronizing level	1500●	watts
Pedestal level	850	watts
Useful Power Output (Approx.):		
Synchronizing level	14000	watts
Pedestal level	7900	watts

GRID-MODULATED RF POWER AMPLIFIER
Class C Television Service

Synchronizing-level conditions per tube unless otherwise specified

Maximum CCS* Ratings, *Absolute-Maximum Values:*

	Up to 220 Mc	
DC PLATE VOLTAGE	7500 max.	volts
DC GRID-No.2 VOLTAGE	2000 max.	volts
DC GRID-No.1 VOLTAGE (White Level)	-1000 max.	volts
DC PLATE CURRENT	4 max.	amp
PLATE INPUT	24000 max.	watts
GRID-No.2 INPUT	400 max.	watts
PLATE DISSIPATION	12000 max.	watts
GRID-No.1 DISSIPATION	300 max.	watts

Typical Operation in Grid-Drive Circuit at 216 Mc:

	Bandwidth♦ of 8.5 Mc	
DC Plate Voltage	5800	volts
DC Grid-No.2 Voltage	1200	volts
DC Grid-No.1 Voltage:		
Synchronizing level	-130	volts
Pedestal level	-195	volts
White level	-350	volts
Peak RF Grid-No.1 Voltage	375	volts
DC Plate Current:		
Synchronizing level	3.45	amp
Pedestal level	2.42	amp
DC Grid-No.2 Current (Pedestal Level)	0.148	amp
DC Grid-No.1 Current (Approx.):		
Synchronizing level	0.175	amp
Pedestal level	0.095	amp
Driver Power Output (Approx.):♣		
Synchronizing level	800♦	watts
Pedestal level	425	watts

Bandwidth♦ of 8.5 Mc

Useful Power Output (Approx.):		
Synchronizing level	12000	watts
Pedestal level	6800	watts

LINEAR RF POWER AMPLIFIER

Single-Sideband Suppressed-Carrier Service

Maximum CCS* Ratings, *Absolute-Maximum Values:*

	Up to 220 Mc	
DC PLATE VOLTAGE	7500 max.	volts
DC GRID-No.2 VOLTAGE	2000 max.	volts
MAX.-SIGNAL DC PLATE CURRENT	2.8 max.	amp
MAX.-SIGNAL DC GRID-No.1 CURRENT	0.6 max.	amp
MAX.-SIGNAL PLATE INPUT	20000 max.	watts
MAX.-SIGNAL GRID-No.2 INPUT	400 max.	watts
PLATE DISSIPATION	12000 max.	watts

Typical CCS Class AB_2 "Single-Tone" Operation at 60 Mc:#

DC Plate Voltage	7000	volts
DC Grid-No.2 Voltage	1200	volts
DC Grid-No.1 Voltage*	−125	volts
Zero-Signal DC Plate Current	0.200	amp
Zero-Signal DC Grid-No.2 Current	0	amp
Effective RF Load Resistance	1350	ohms
Max.-Signal DC Plate Current	2.750	amp
Max.-Signal DC Grid-No.2 Current	0.26	amp
Max.-Signal DC Grid-No.1 Current	0.080	amp
Max.-Signal Peak RF Grid-No.1 Voltage	305	volts
Max.-Signal Driving Power (Approx.)	25	watts
Max.-Signal Power Output (Approx.)	12000	watts

PLATE-MODULATED RF POWER AMPLIFIER — Class C Telephony

Carrier conditions per tube for use with a maximum modulation factor of 1

Maximum CCS* Ratings, *Absolute-Maximum Values:*

	Up to 220 Mc	
DC PLATE VOLTAGE	5500 max.	volts
DC GRID-No.2 VOLTAGE	2000 max.	volts
DC GRID-No.1 VOLTAGE	−1000 max.	volts
DC PLATE CURRENT	2 max.	amp
DC GRID-No.1 CURRENT	0.6 max.	amp
PLATE INPUT	10000 max.	watts
GRID-No.2 INPUT	270 max.	watts
PLATE DISSIPATION	8000 max.	watts

Typical Operation in Grid-Drive Circuit:

	At 60 Mc	
DC Plate Voltage	4800	volts
DC Grid-No.2 Voltage (Modulated 100%)*	800	volts
DC Grid-No.1 Voltage†	−300	volts

Peak RF Grid-No.1 Voltage	550	volts
DC Plate Current	1.8	amp
DC Grid-No.2 Current	0.16	amp
DC Grid-No.1 Current (Approx.)	0.18	amp
Driver Power Output (Approx.)♦	125‡	watts
Useful Power Output (Approx.)	6000	watts

RF POWER AMPLIFIER & OSCILLATOR — Class C Telegraphy§ and RF POWER AMPLIFIER — Class C FM Telephony

Maximum CCS★ Ratings, *Absolute-Maximum Values:*

	Up to 220 Mc	
DC PLATE VOLTAGE	7500 max.	volts
DC GRID-No.2 VOLTAGE	2000 max.	volts
DC GRID-No.1 VOLTAGE	-1000 max.	volts
DC PLATE CURRENT	3 max.	amp
DC GRID-No.1 CURRENT	0.6 max.	amp
PLATE INPUT	20000 max.	watts
GRID-No.2 INPUT	400 max.	watts
PLATE DISSIPATION	12000 max.	watts

Typical Operation in Grid-Drive Circuit:

	At 60 Mc	*At 216 Mc*	
DC Plate Voltage	6600	7000	volts
DC Grid-No.2 Voltage□	1200	1200	volts
DC Grid-No.1 Voltage◊	-310	-310	volts
Peak RF Grid-No.1 Voltage	560	560	volts
DC Plate Current	2.75	2.75	amp
DC Grid-No.2 Current	0.3	0.3	amp
DC Grid-No.1 Current (Approx.)	0.14	0.14	amp
Driver Power Output (Approx.)♦	95▽	750▲▲	watts
Useful Power Output (Approx.)	12000	10000	watts

▲ Full rated filament voltage can be applied safely to the cold filament. It is not necessary to provide means for limiting the filament starting current.

● With external flat metal shield 12" square having center hole 4-5/16" diameter. Shield is located in plane of the grid-No.2 terminal, perpendicular to the tube axis, and is connected to grid No.2.

★ Continuous Commercial Service.

♦ Computed between half-power points and based on tube output capacitance only.

‡ The driver stage is required to supply tube losses and rf-circuit losses. The driver stage should be designed to provide an excess of power above the indicated value to take care of variations in line-voltages, in components, in initial tube characteristics, and in tube characteristics during life.

♠ This value includes 700 watts of rf-circuit loss at 216 Mc.

♣ The driver stage is required to supply tube losses, rf-circuit losses, and rf power added to plate circuit. The driver stage should be designed as indicated in footnote (♦).

⊕ This value includes 470 watts of rf-circuit loss at 216 Mc and 1030 watts added to plate circuit.

"Single-Tone" operation refers to that class of amplifier service in which the grid-No.1 input consists of a monofrequency rf signal having constant amplitude. This signal is produced in a single-sideband suppressed-carrier system when a single audio frequency of constant amplitude is applied to the input of the system.

* Adjusted to give indicated zero-signal plate current.

⊕ Obtained preferably from a separate source.

† Obtained preferably from a combination of 365-ohm grid-No.1 resistor and −170-volt fixed bias.

‡ This value includes 25 watts of rf-circuit loss.

§ Key-down conditions per tube without amplitude modulation. 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.

□ 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 not be used if the 6166A/7007 or a preceding stage is keyed. In this case, the regulation of the source should be sufficient to prevent the grid-No.2 voltage from rising above 2000 volts under key-up conditions; and additional fixed grid-No.1 bias must be provided to limit the plate current.

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

▽ This value includes 20 watts of rf-circuit loss.

▲▲ This value includes 675 watts of rf-circuit loss.

CHARACTERISTICS RANGE VALUES

	Note	*Min.*	*Max.*	
→ Filament Current	1	165	183	amp
Direct Interelectrode Capacitances:				
Grid No.1 to plate	2	–	0.6	pf
Grid No.1 to filament	3	39	47	pf
→ Grid No.1 to grid No.2	3	61.4	73.4	pf
→ Grid No.2 to plate	3	21.0	23.0	pf
Plate to filament	2	–	0.08	pf
DC Grid-No.1 Voltage	1,4	–	−225	volts
Peak Grid-No.1 Current	1,5	–	1.5	amp
Peak Grid-No.1 Voltage	1,5	–	315	volts

Note 1: With 5 volts ac or dc on filament.

Note 2: With external, flat, metal shield 12" square having center hole 4-5/16" diameter. Shield is located in plane of the grid-No.2 terminal, perpendicular to the tube axis, and is connected to grid-No.2. All other electrodes are grounded.

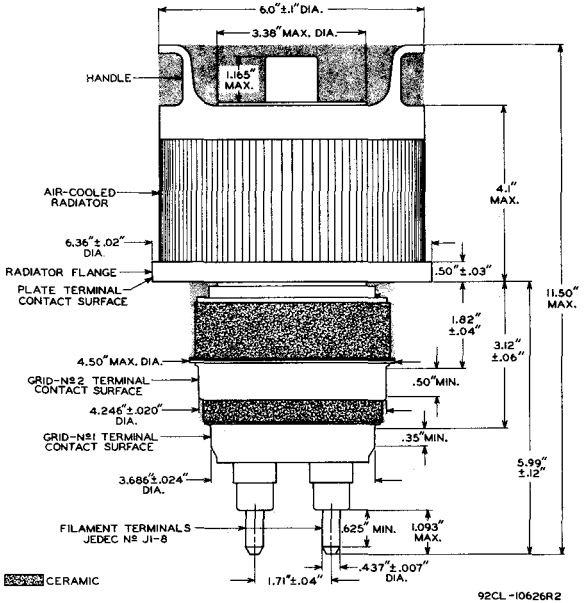
Note 3: Without shield and all other electrodes grounded.

Note 4: With dc plate voltage of 6000 volts, dc grid-No.2 voltage of 1200 volts, and dc plate current of 20 ma.

Note 5: With dc plate voltage of 1500 volts, dc grid-No.2 voltage of 1200 volts, and instantaneous grid-No.1 voltage adjusted to give peak plate current of 11 amp.

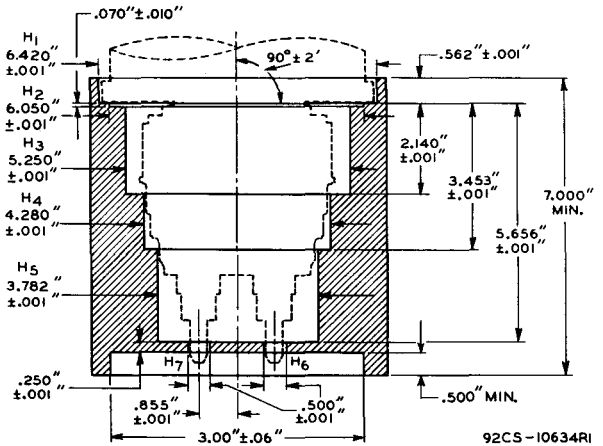
→ Indicates a change.

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



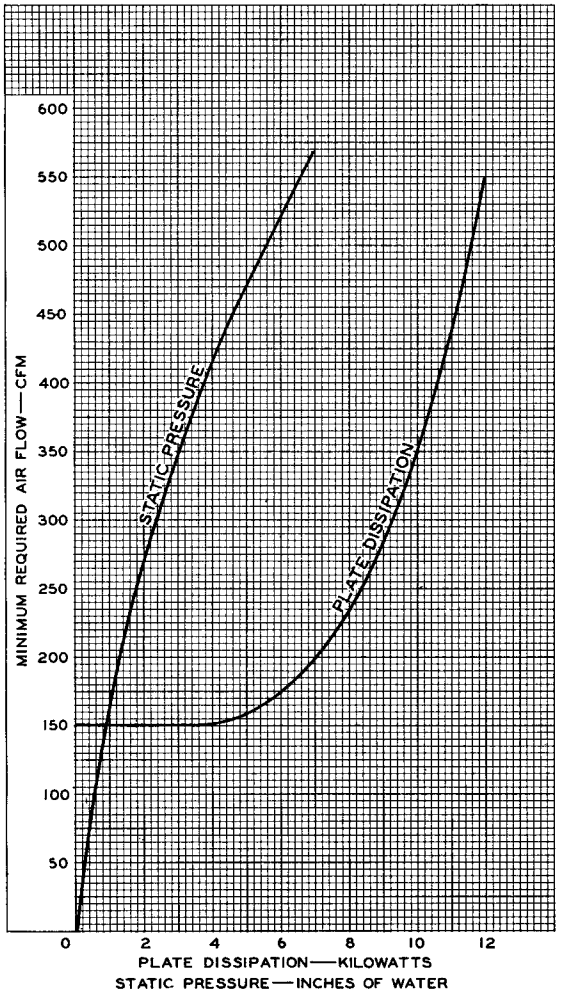
NOTE: WITH THE CYLINDRICAL SURFACES OF THE PLATE TERMINAL, GRID-No.2 TERMINAL, GRID-No.1 TERMINAL, AND FILAMENT TERMINALS CLEAN, SMOOTH, AND FREE OF BURRS, THE TUBE WILL ENTER A GAUGE AS SHOWN IN SKETCH G_1. PROPER ENTRY OF THE TUBE IN THE GAUGE IS OBTAINED WHEN THE PLATE TERMINAL IS ENTIRELY ENGAGED BY HOLE H_1 AND WILL SEAT ON THE SHOULDER BETWEEN H_1 AND H_2. THE PLANE SURFACE OF THIS SHOULDER IS AT RIGHT ANGLES TO THE AXES OF THE HOLES WITHIN $0^{\circ} \pm 2'$. SEATING IS DETERMINED BY FAILURE OF A 0.020"-THICKNESS GAUGE TO ENTER MORE THAN 1/16" BETWEEN SHOULDER SURFACE AND PLATE TERMINAL. SLOTS ARE PROVIDED TO PERMIT THIS MEASUREMENT. KEEP ALL STIPPLED REGIONS CLEAR. DO NOT ALLOW CONTACTS OR CIRCUIT COMPONENTS TO PROTRUDE INTO THESE ANNULAR VOLUMES.

SKETCH G_1



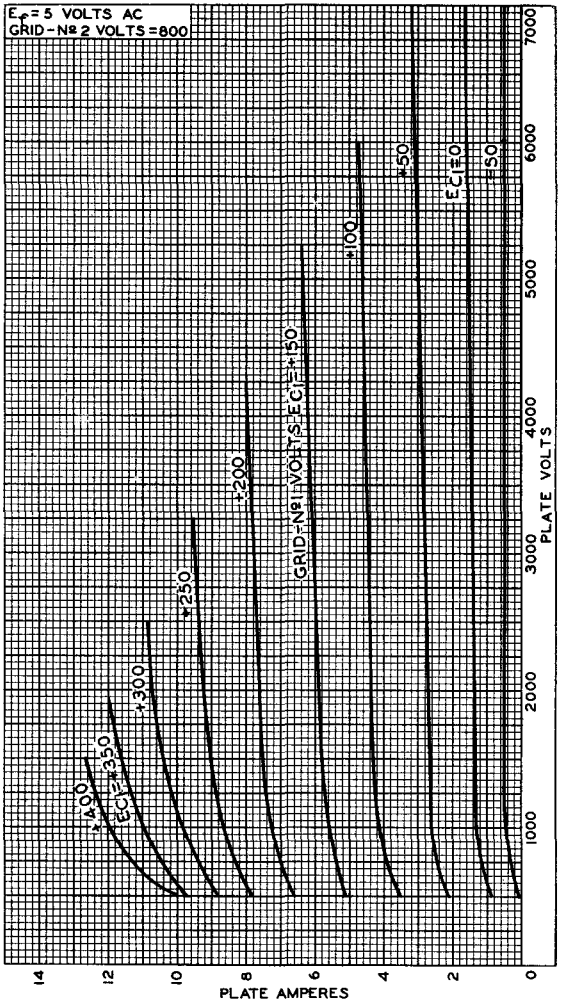
NOTE: THE FIVE CYLINDRICAL HOLES H_1, H_2, H_3, H_4 AND H_5 HAVE AXES COINCIDENT WITHIN 0.001". THE HOLES H_6 AND H_7 HAVE AXES PARALLEL TO THE AXES OF H_1, H_2, H_3, H_4 AND H_5 WITHIN $0^o \pm 2'$.

COOLING REQUIREMENTS



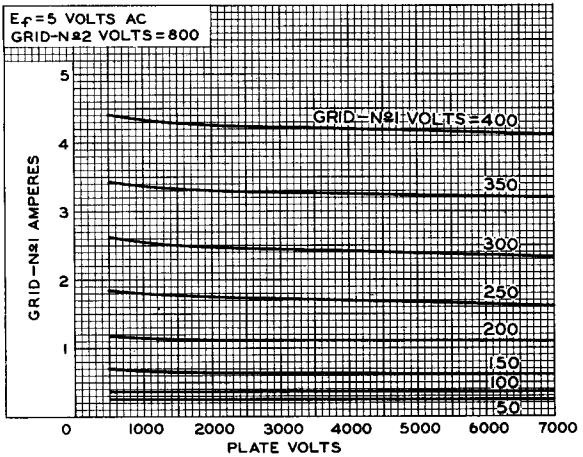
92CM-10785

AVERAGE PLATE CHARACTERISTICS

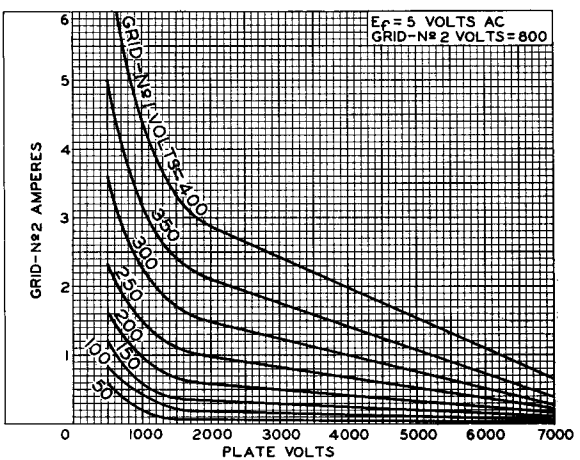


92CM-7736RI

AVERAGE CHARACTERISTICS



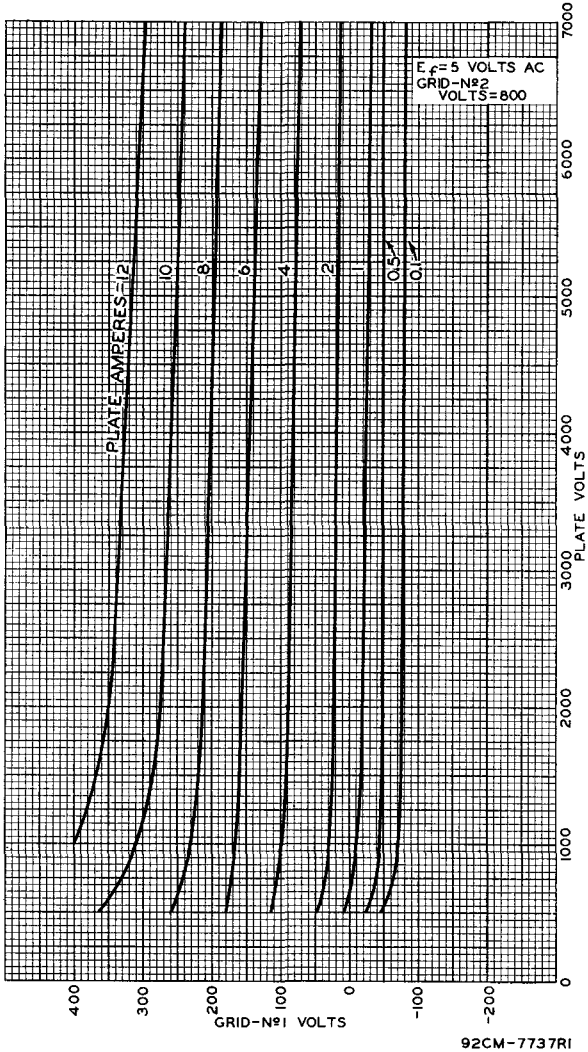
92CS-7744RI



92CS-7743RI

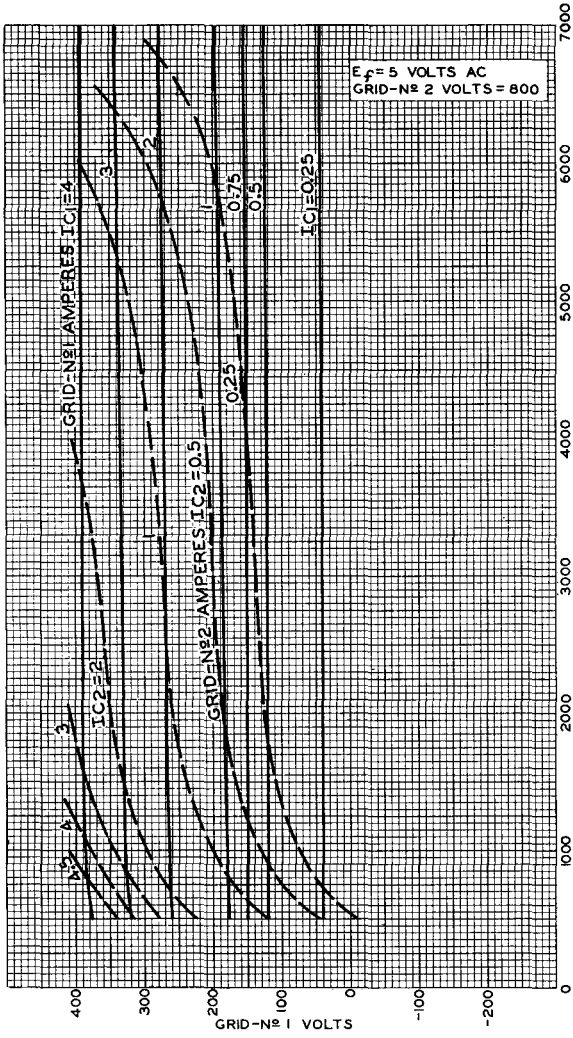
6166-A/7007

AVERAGE CONSTANT-CURRENT CHARACTERISTICS



92CM-7737RI

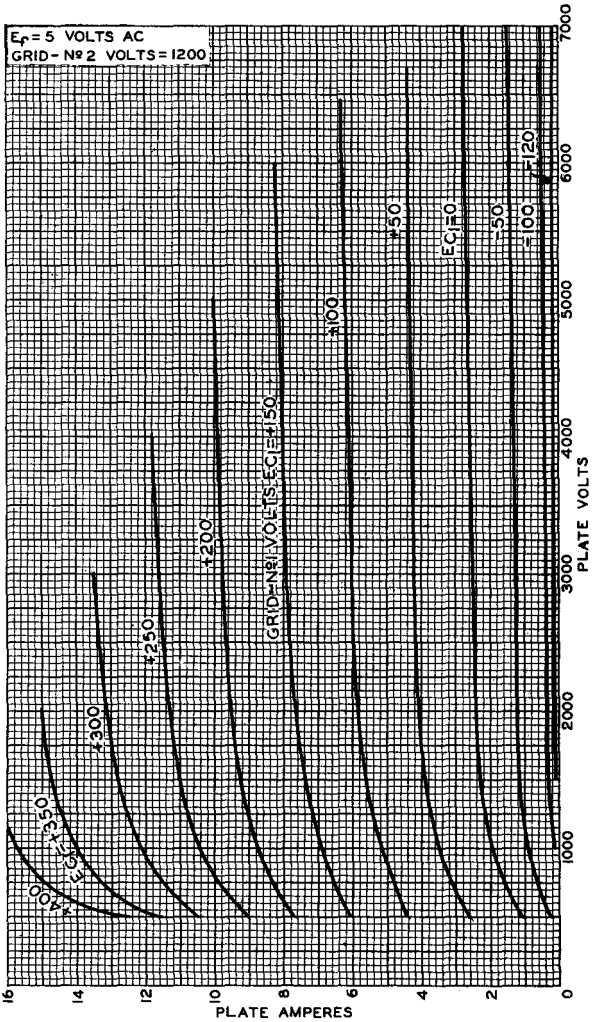
AVERAGE CONSTANT-CURRENT CHARACTERISTICS



92CM-7738R2

6166-A/7007

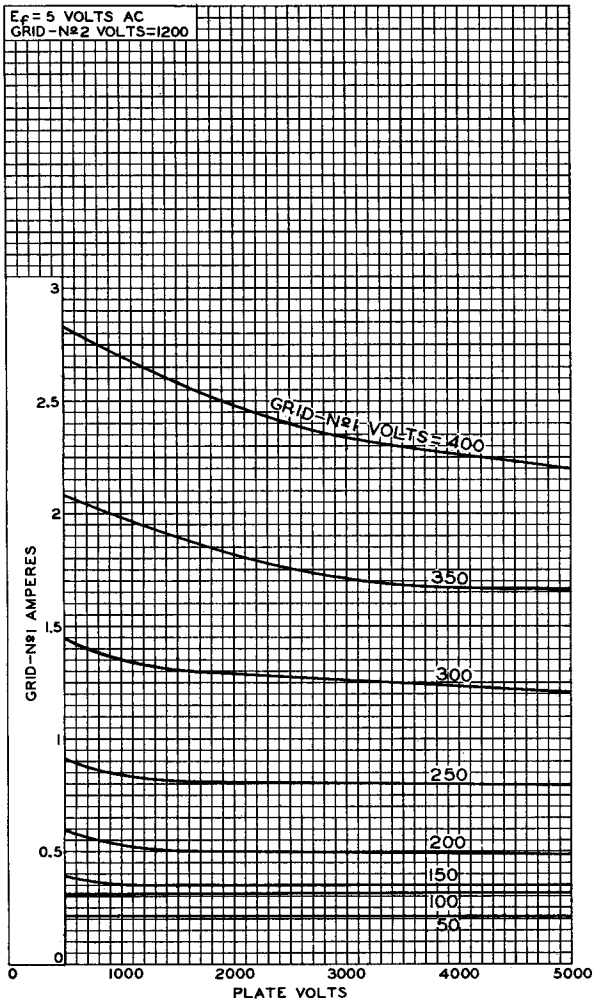
AVERAGE PLATE CHARACTERISTICS



92CM-7735RI

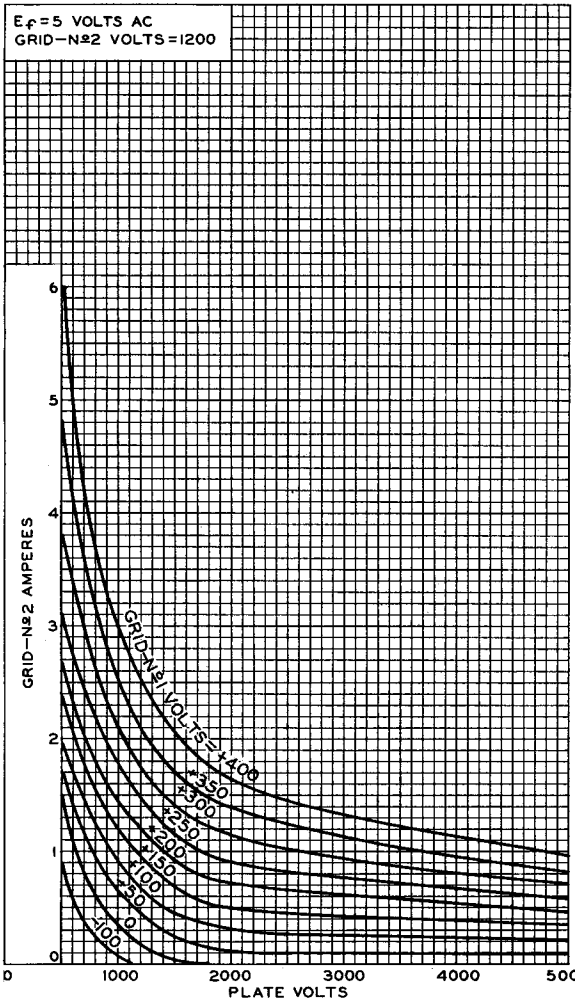
RADIO CORPORATION OF AMERICA
Electron Tube Division
Harrison, N. J.

AVERAGE CHARACTERISTICS



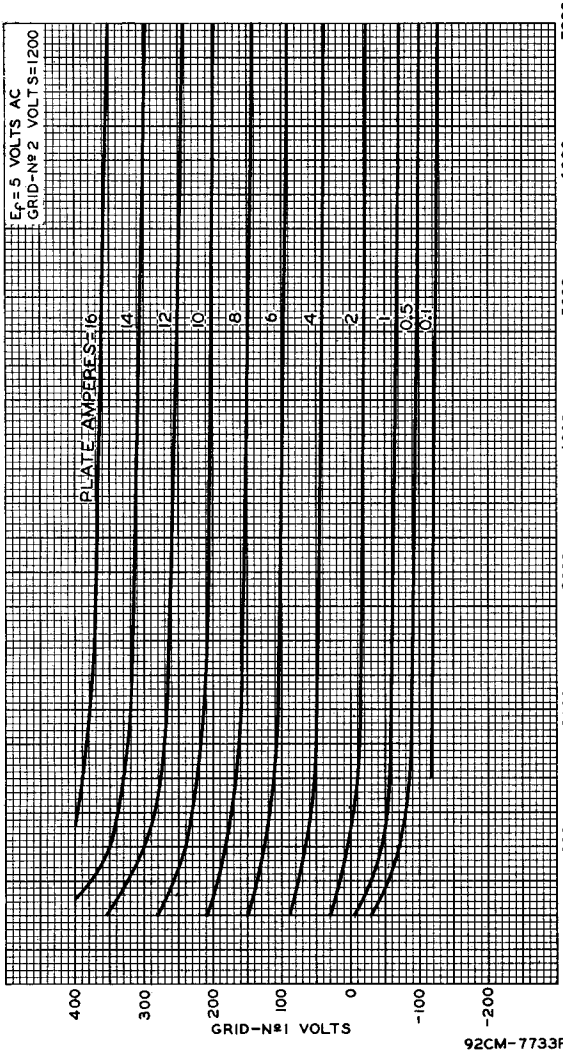
92CM-7740R2

AVERAGE CHARACTERISTICS

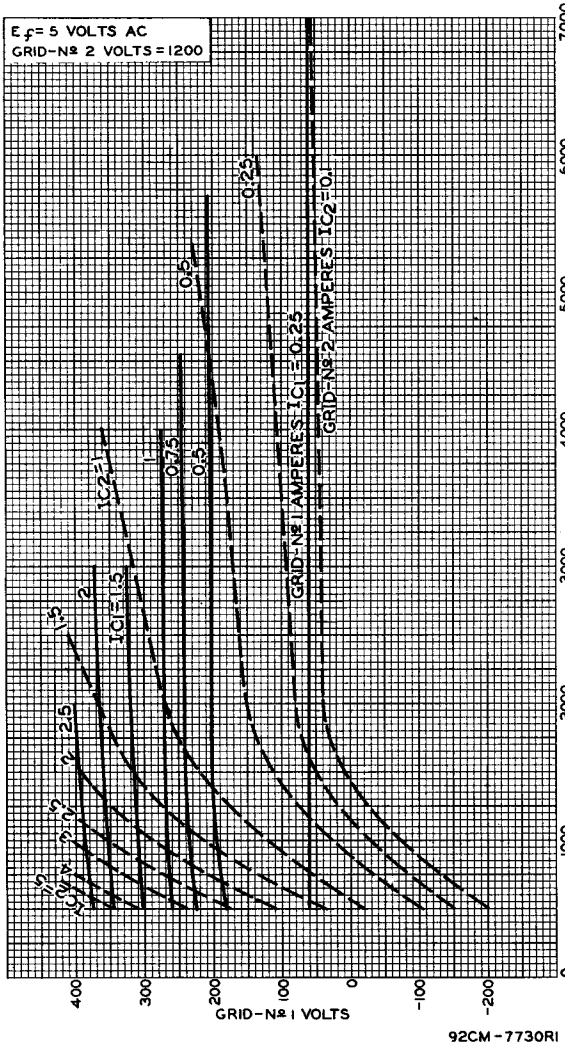


92CM-7739RI

AVERAGE CONSTANT-CURRENT CHARACTERISTICS



AVERAGE CONSTANT-CURRENT CHARACTERISTICS

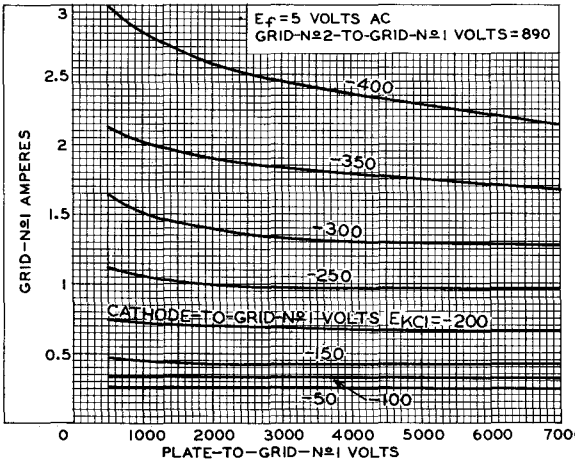


92CM-7730RI

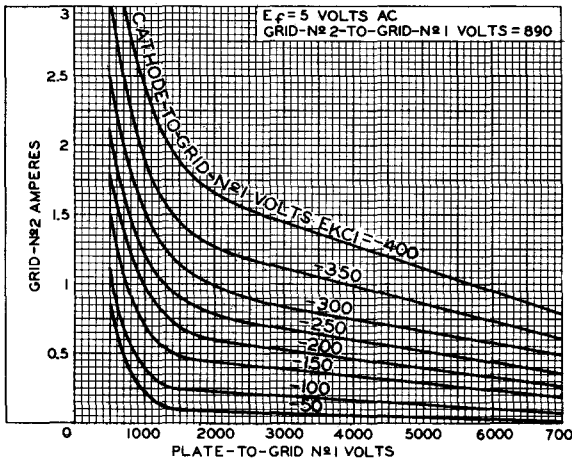
AVERAGE PLATE CHARACTERISTICS
Cathode-Drive Service

92CM-7750RI

AVERAGE CHARACTERISTICS
Cathode-Drive Service



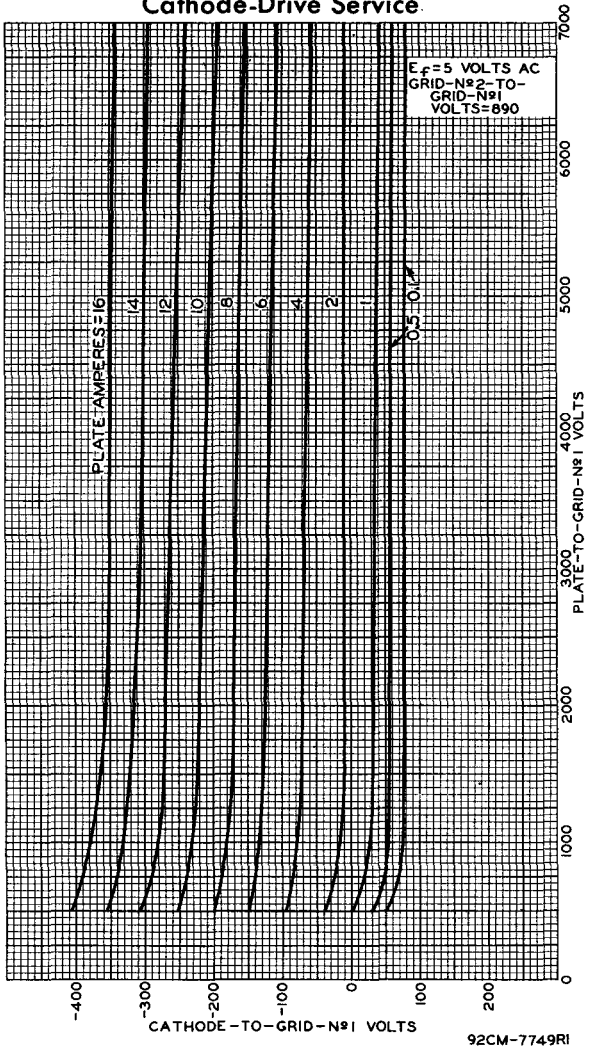
92CS-7746R1



92CS-7752R3

AVERAGE CONSTANT-CURRENT CHARACTERISTICS

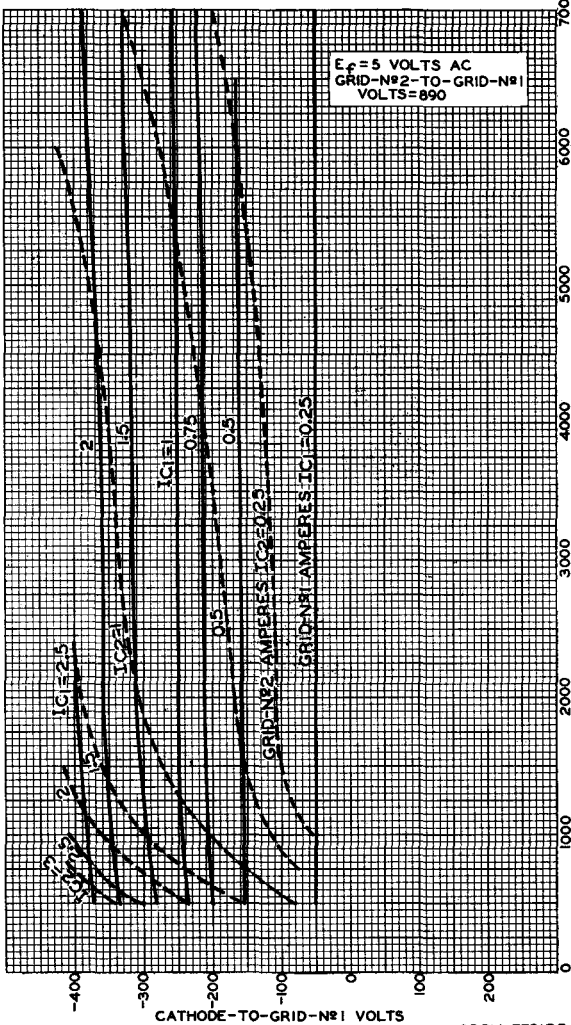
Cathode-Drive Service



92CM-7749R1

6166-A/7007

AVERAGE CONSTANT-CURRENT CHARACTERISTICS
Cathode-Drive Service



92CM-7751R2

RADIO CORPORATION OF AMERICA
Electron Tube Division Harrison, N. J.