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## VHF POWER TETRODE

FORCED-AIR COOLED

## GENERAL DATA

## Electrical:

Filament, Thoriated Tungsten:

Voltage\* . . . . . 5.0  $\pm$  5% . . . . . ac or dc volts

Current at 5 volts . . . . . 181 . . . . . 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.  $\mu\text{f}$ Grid No.1 to filament. . . . . 42  $\mu\text{f}$ Plate to filament\*\* . . . . . 0.08 max.  $\mu\text{f}$ Grid No.1 to grid No.2 . . . . . 60  $\mu\text{f}$ Grid No.2 to plate . . . . . 24  $\mu\text{f}$ 

## Mechanical:

Operating Position . . . . . Vertical, filament end up or down

Maximum Overall Length . . . . . 11-5/8"

Maximum Diameter . . . . . 6-13/32"

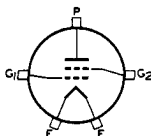
Weight (Approx.) . . . . . 15 lbs

Radiator . . . . . Integral part of tube

Terminal Connections (See Dimensional Outline):

G<sub>1</sub> - Grid No.1

P - Plate

G<sub>2</sub> - Grid No.2

F - Filament

## Air Flow:

**Through Radiator**--The specified flow of incoming air at a temperature of 45 °C for various plate dissipations, as indicated in the following tabulation, 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-contact-surface end (See Dimensional Outline). Filament power, plate power, and air flow may be removed simultaneously.

Percentage of maximum

rated plate dissipation

for each class of ser-

vice . . . . . 100 80 60 %

Minimum air flow . . . . . 350 270 200 cfm

Static pressure. . . . . 3 2.1 1.3 in. of water

\* 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.

\*\* : See next page.

← Indicates a change.



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*To Grid-No.2 Terminal:*

|                                  |             |
|----------------------------------|-------------|
| Plate-ring end . . . . .         | \$5         |
| Grid-No.1-terminal end . . . . . | 50 min. cfm |

*To Grid-No.1 Terminal and Filament Seals . . . . . 50 min. cfm*

*Incoming-Air Temperature . . . . . 45 max. °C*

*Radiator Temperature (Measured on the core at end away from incoming air) . . . . . 180 max. °C*

*Glass Temperature (At hottest part) . . . . . 180 max. °C*

*Seal Temperature:*

*Filament, grid No.1, grid No.2, and plate . . . . . 180 max. °C*

**Fittings:**

*Filament Connector (2 required) . . . . . RCA-216F1*

*Connector Wrench (2 required) . . . . . RCA-212F1*

**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 Values:**

54 to 216 Mc

|                                                |         |      |       |
|------------------------------------------------|---------|------|-------|
| DC PLATE VOLTAGE . . . . .                     | 6000\$  | max. | volts |
| DC GRID-No.2 (SCREEN-GRID) VOLTAGE . . . . .   | 2000    | max. | volts |
| DC PLATE CURRENT . . . . .                     | 4       | max. | amp   |
| PLATE INPUT . . . . .                          | 22000\$ | max. | watts |
| GRID-No.2 INPUT . . . . .                      | 400     | max. | watts |
| PLATE DISSIPATION . . . . .                    | 10000   | max. | watts |
| GRID-No.1 (CONTROL-GRID) DISSIPATION . . . . . | 300     | max. | watts |

**Typical Operation in Grid-Drive Circuit:**Bandwidth<sup>▲</sup> 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 . . . . .      | 2.60 | amp |

**\*\*** 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.

**\$5** A sufficient quantity of the air flow to the radiator should be directed onto the plate end of the grid-No.2 terminal so that its temperature does not exceed the specified value.

**6** For operation on VHF television channels 2 through 6, dc plate voltage may be increased to 6400 volts maximum and plate input may be increased to 24,000 watts maximum provided all other ratings are met.

**•,▲:** See next page.



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## VHF POWER TETRODE

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

## Typical Operation in Cathode-Drive Circuit:

Bandwidth<sup>▲</sup> of 8.5 Mc

|                                          |        |       |   |
|------------------------------------------|--------|-------|---|
| DC Plate Voltage . . . . .               | 5800   | volts | ← |
| DC Grid-No.2 Voltage . . . . .           | 800    | volts | ← |
| DC Cathode-to-Grid-No.1 Voltage. . . . . | 85     | volts |   |
| Peak RF Cathode-to-Grid-No.1 Voltage:    |        |       |   |
| Synchronizing level. . . . .             | 330    | volts |   |
| Pedestal level . . . . .                 | 260    | volts |   |
| DC Plate Current:                        |        |       |   |
| Synchronizing level. . . . .             | 3.45   | amp   |   |
| Pedestal level . . . . .                 | 2.60   | amp   |   |
| DC Grid-No.2 Current (Pedestal Level).   | 0.152  | amp   |   |
| DC Grid-No.1 Current (Approx.):          |        |       |   |
| Synchronizing level. . . . .             | 0.202  | amp   |   |
| Pedestal level . . . . .                 | 0.110  | amp   |   |
| Driver Power Output (Approx.):‡          |        |       | ← |
| Synchronizing level. . . . .             | 1300## | watts |   |
| Pedestal level . . . . .                 | 700    | watts |   |
| Power Output (Approx.):                  |        |       |   |
| Synchronizing level. . . . .             | 12000  | watts |   |
| Pedestal level . . . . .                 | 6800   | watts |   |

## GRID-MODULATED RF POWER AMPLIFIER --

## Class C Television Service

Synchronizing-level conditions per tube unless otherwise specified

Maximum CCS<sup>®</sup> Ratings, Absolute Values:

54 to 216 Mc

|                                                               |            |       |
|---------------------------------------------------------------|------------|-------|
| DC PLATE VOLTAGE . . . . .                                    | 6000 max.  | volts |
| DC GRID-No.2 (SCREEN-GRID) VOLTAGE . . . . .                  | 2000 max.  | volts |
| DC GRID-No.1 (CONTROL-GRID) VOLTAGE<br>(White Level). . . . . | -1000 max. | volts |
| DC PLATE CURRENT . . . . .                                    | 4 max.     | amp   |
| PLATE INPUT. . . . .                                          | 22000 max. | watts |

♦ 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 under (♦).

## This value includes 300 watts of rf-circuit loss at 216 Mc, and 900 watts added to plate circuit.

•, ▲, ♦, #: See next page.

← Indicates a change.



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## VHF POWER TETRODE

|                                 |            |       |
|---------------------------------|------------|-------|
| GRID-No.2 INPUT . . . . .       | 400 max.   | watts |
| PLATE DISSIPATION . . . . .     | 10000 max. | watts |
| GRID-No.1 DISSIPATION . . . . . | 300 max.   | watts |

## Typical Operation in Grid-Drive Circuit:

Bandwidth<sup>▲</sup> 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 <sup>#</sup> | watts |
| Power Output (Approx.):                         |                  |       |
| Synchronizing level . . . . .                   | 12000            | watts |
| Pedestal level. . . . .                         | 6800             | watts |

## PLATE-MODULATED RF POWER AMPLIFIER -- Class C Telephony

Carrier conditions per tube for use with a maximum modulation factor of 1.0

Maximum CCS<sup>®</sup> Ratings, Absolute Values:†

|                                               |            |       |
|-----------------------------------------------|------------|-------|
| DC PLATE VOLTAGE. . . . .                     | 5000 max.  | volts |
| DC GRID-No.2 (SCREEN-GRID) VOLTAGE. . . . .   | 2000 max.  | volts |
| DC GRID-No.1 (CONTROL-GRID) 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 . . . . .                   | 6600 max.  | watts |

## Typical Operation in Grid-Drive Circuit:

Up to 30 Mc

|                                                 |      |       |
|-------------------------------------------------|------|-------|
| DC Plate Voltage. . . . .                       | 4700 | volts |
| DC Grid-No.2 Voltage (Modulated 100%)♠. . . . . | 800  | volts |
| DC Grid-No.1 Voltage* . . . . .                 | -280 | volts |
| Peak RF Grid-No.1 Voltage . . . . .             | 485  | volts |
| DC Plate Current. . . . .                       | 1.56 | amp   |

▲ computed between half-power points and based on tube output capacitance only.

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

♠, ♦, †, \*, ♠: See next page.

→ Indicates a change.



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## VHF POWER TETRODE

|                                         |                  |       |
|-----------------------------------------|------------------|-------|
| DC Grid-No.2 Current. . . . .           | 0.217            | amp   |
| DC Grid-No.1 Current (Approx.). . . . . | 0.150            | amp   |
| Driver Power Output (Approx.). . . . .  | 180 <sup>#</sup> | watts |
| Power Output (Approx.). . . . .         | 5500             | watts |

RF POWER AMPLIFIER & OSCILLATOR -- Class C Telegraphy<sup>†</sup>  
and  
RF POWER AMPLIFIER -- Class C FM Telephony

Maximum CCS<sup>•</sup> Ratings, Absolute Values:†

|                                              |            |       |
|----------------------------------------------|------------|-------|
| DC PLATE VOLTAGE. . . . .                    | 6600 max.  | volts |
| DC GRID-No.2 (SCREEN-GRID) VOLTAGE. . . . .  | 2000 max.  | volts |
| DC GRID-No.1 (CONTROL-GRID) VOLTAGE. . . . . | -1000 max. | volts |
| DC PLATE CURRENT. . . . .                    | 2.75 max.  | amp   |
| DC GRID-No.1 CURRENT. . . . .                | 0.6 max.   | amp   |
| PLATE INPUT. . . . .                         | 18000 max. | watts |
| GRID-No.2 INPUT. . . . .                     | 400 max.   | watts |
| PLATE DISSIPATION. . . . .                   | 10000 max. | watts |

## Typical Operation in Grid-Drive Circuit:

|                                                      | At 216 Mc        |                  |       |
|------------------------------------------------------|------------------|------------------|-------|
| DC Plate Voltage. . . . .                            | 5800             | 5800             | volts |
| DC Grid-No.2 Voltage <sup>••</sup> . . . . .         | 1200             | 1200             | volts |
| DC Grid-No.1 Voltage <sup>▲▲</sup> . . . . .         | -130             | -175             | volts |
| Peak RF Grid-No.1 Voltage. . . . .                   | 230              | 370              | volts |
| DC Plate Current. . . . .                            | 1.8              | 2.6              | amp   |
| DC Grid-No.2 Current. . . . .                        | 0.1              | 0.267            | amp   |
| DC Grid-No.1 Current (Approx.). . . . .              | 0.05             | 0.110            | amp   |
| Driver Power Output (Approx.) <sup>♦</sup> . . . . . | 300 <sup>■</sup> | 750 <sup>®</sup> | watts |
| Power Output (Approx.). . . . .                      | 6000             | 9000             | watts |

• Continuous Commercial Service.

♦ 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 voltage, in components, in initial tube characteristics, and in tube characteristics during life.

† These ratings hold for operation up to 30 Mc; for ratings at higher frequencies, see Maximum Ratings vs Frequency Table.

• 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 50 watts of rf-circuit loss at 30 Mc.

□ 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% 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 6166 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 270 watts of rf-circuit loss.

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

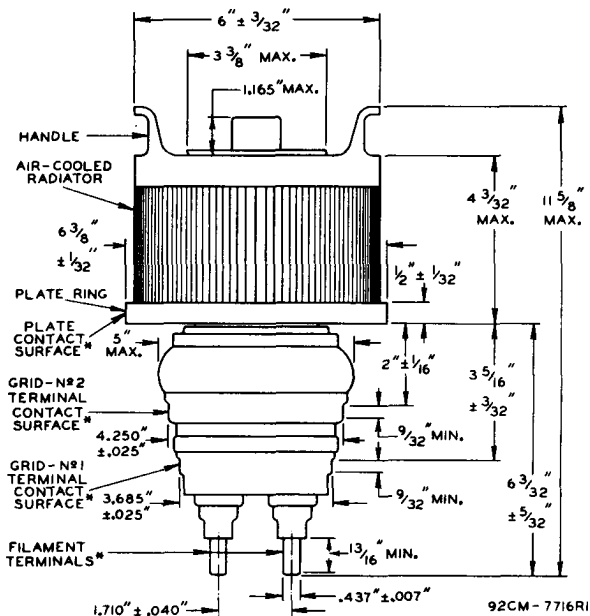
← Indicates a change.



## VHF POWER TETRODE

## MAXIMUM RATINGS vs OPERATING FREQUENCY

| FREQUENCY                                                                | 30                        | 220 | Mc |
|--------------------------------------------------------------------------|---------------------------|-----|----|
| MAX. PERMISSIBLE PERCENTAGE OF MAX. RATED PLATE VOLTAGE AND PLATE INPUT: |                           |     |    |
| Class B Television Service                                               | Full Ratings—54 to 216 Mc |     |    |
| Class C Television Service                                               | Full Ratings—54 to 216 Mc |     |    |
| Class C Telephony,<br>Plate-Modulated                                    | 100                       | 90  | %  |
| Class C Telegraphy and<br>FM Telephony                                   | 100                       | 90  | %  |



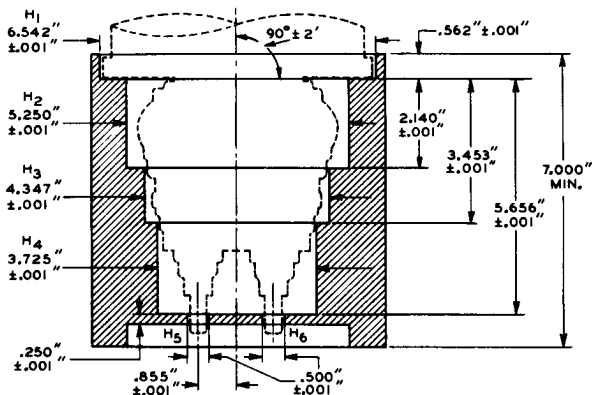
\* WITH THE CYLINDRICAL SURFACES OF THE PLATE RING, GRID-No. 2 TERMINAL, GRID-No. 1 TERMINAL, AND FILAMENT TERMINALS CLEAN, SMOOTH, AND FREE OF BURRS, THE TUBE WILL ENTER A GAUGE AS SHOWN IN SKETCH G<sub>1</sub>. PROPER ENTRY OF THE TUBE IN THE GAUGE IS OBTAINED WHEN THE PLATE RING IS ENTIRELY ENGAGED BY HOLE H<sub>1</sub>.



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## VHF POWER TETRODE

SKETCH G<sub>1</sub>

92CS-7725

THE FOUR CYLINDRICAL HOLES H<sub>1</sub>, H<sub>2</sub>, H<sub>3</sub>, AND H<sub>4</sub> HAVE AXES COINCIDENT WITHIN 0.001". THE HOLES H<sub>5</sub> AND H<sub>6</sub> HAVE AXES PARALLEL TO THE AXES OF H<sub>1</sub>, H<sub>2</sub>, H<sub>3</sub>, AND H<sub>4</sub>, WITHIN 0° ± 2'.

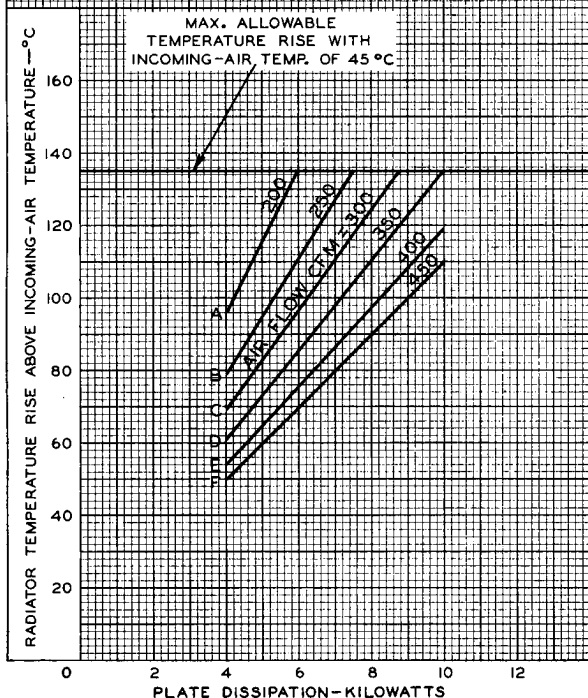


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## COOLING REQUIREMENTS

 $E_f = 5.0$  VOLTS ACMAXIMUM RADIATOR TEMPERATURE =  $180^{\circ}\text{C}$ 

| CURVE | PRESSURE DROP—<br>INCHES OF WATER | CURVES TAKEN ACCORD-<br>ING TO NAFM* STAND-<br>ARDS—BULLETIN N° 103            |
|-------|-----------------------------------|--------------------------------------------------------------------------------|
| A     | 1.3                               | *NATIONAL ASSOCIATION OF<br>FAN MFGS., GENERAL MOTORS<br>BLDG., DETROIT, MICH. |
| B     | 1.8                               |                                                                                |
| C     | 2.4                               |                                                                                |
| D     | 3.0                               |                                                                                |
| E     | 3.7                               |                                                                                |
| F     | 4.5                               |                                                                                |

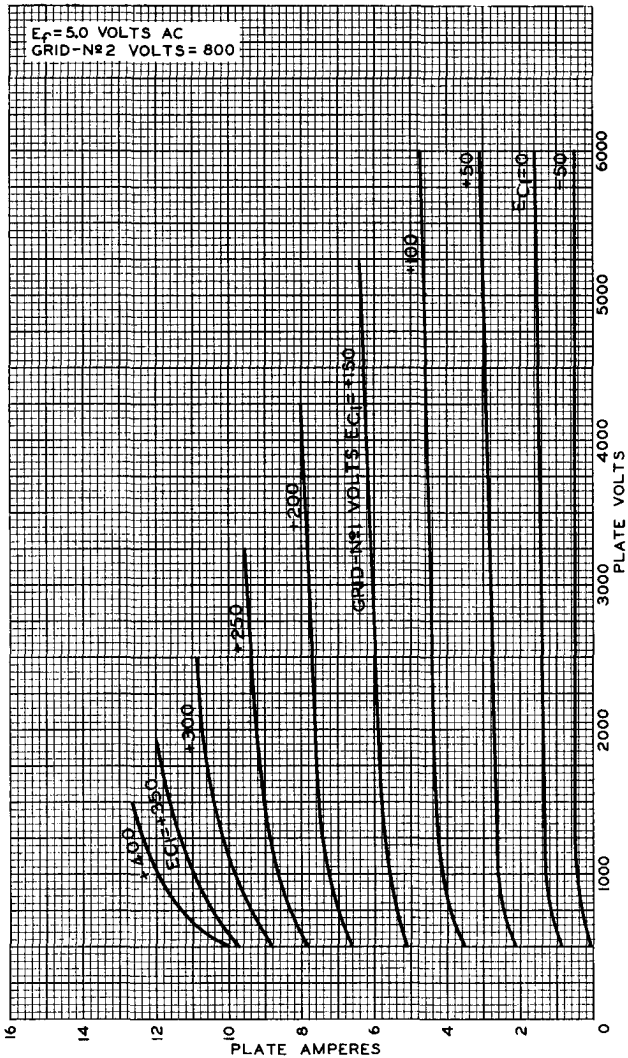




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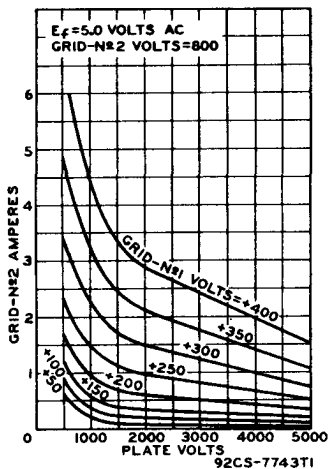
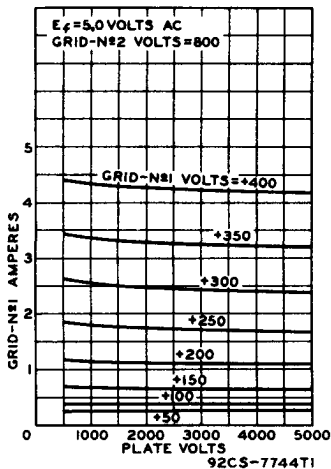
## AVERAGE PLATE CHARACTERISTICS





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## AVERAGE CHARACTERISTICS

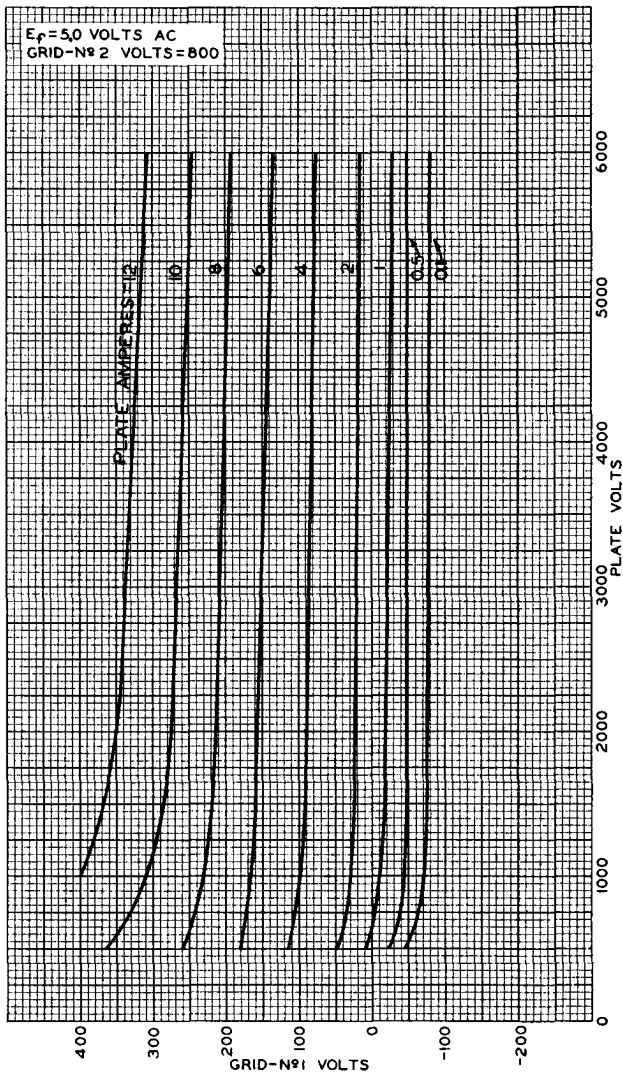




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## AVERAGE CONSTANT-CURRENT CHARACTERISTICS

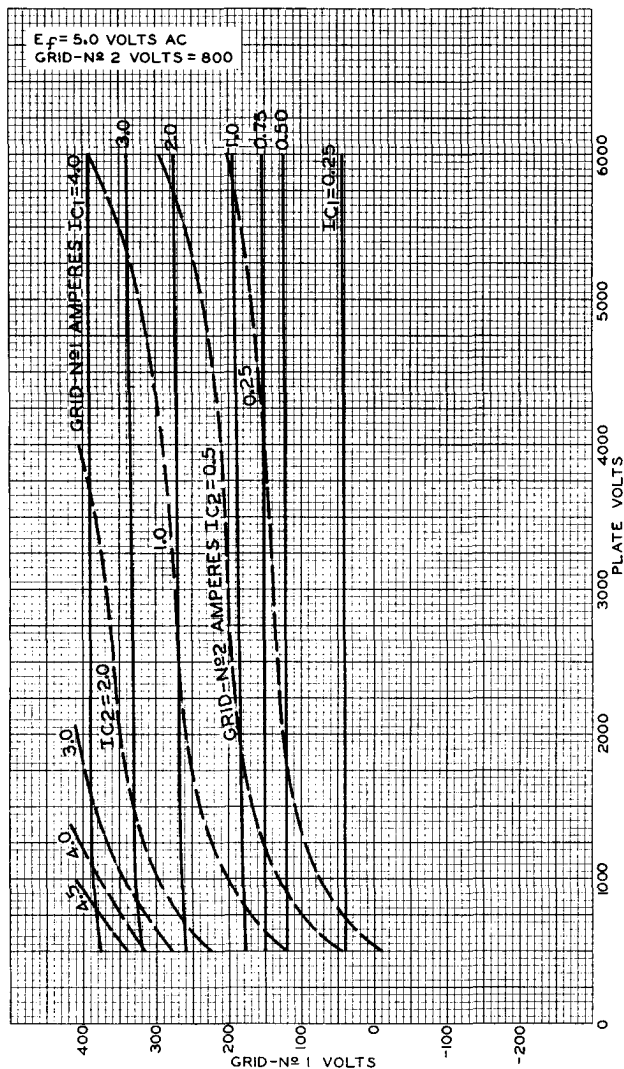


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## AVERAGE CONSTANT-CURRENT CHARACTERISTICS

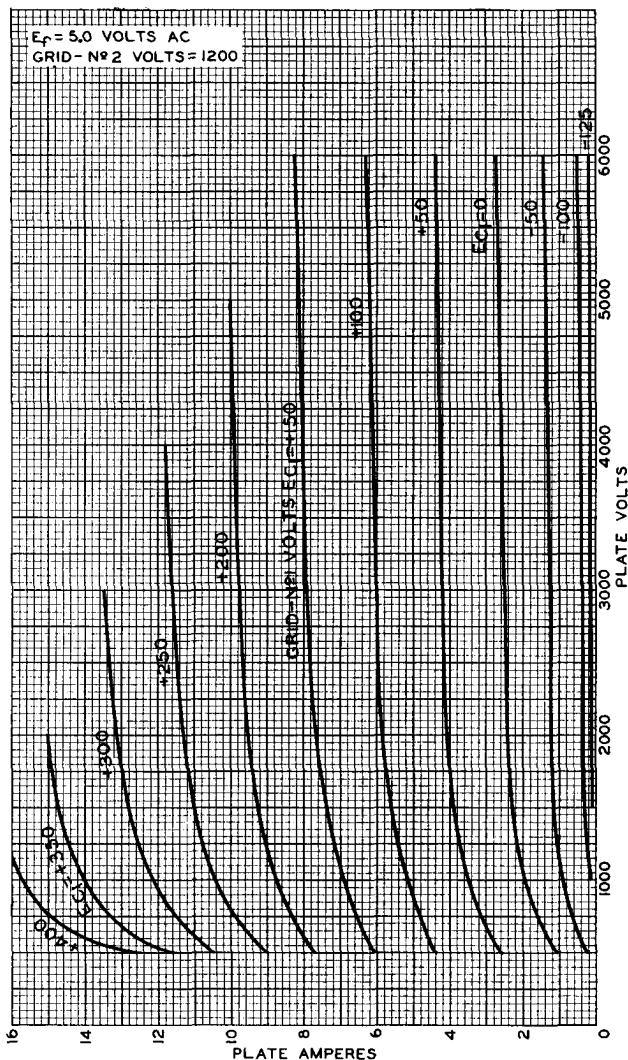




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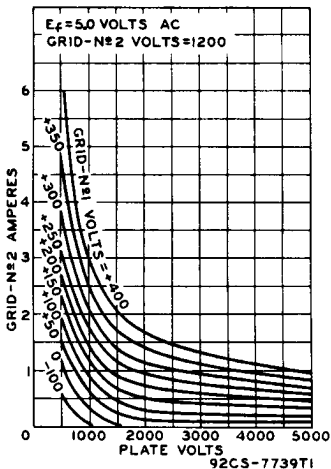
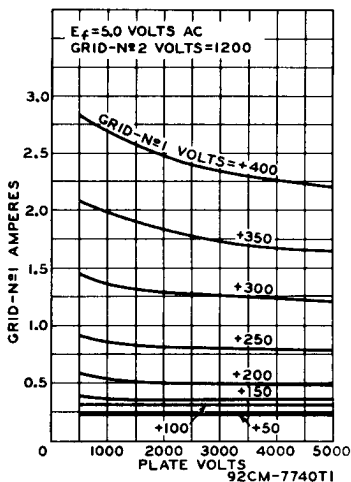
# AVERAGE PLATE CHARACTERISTICS





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## AVERAGE CHARACTERISTICS





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# AVERAGE CONSTANT-CURRENT CHARACTERISTICS

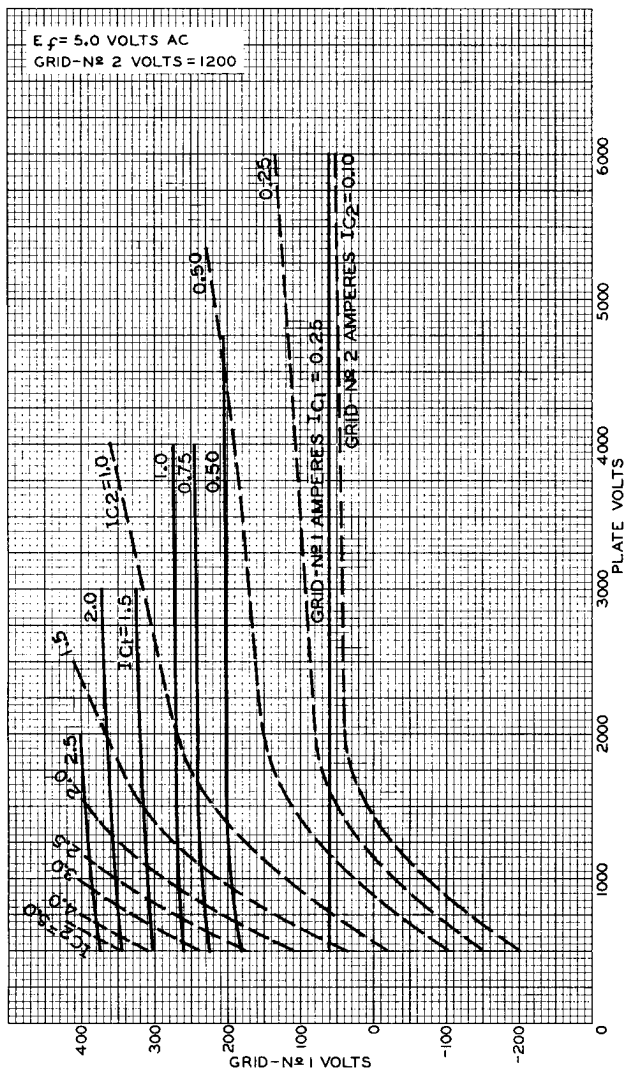


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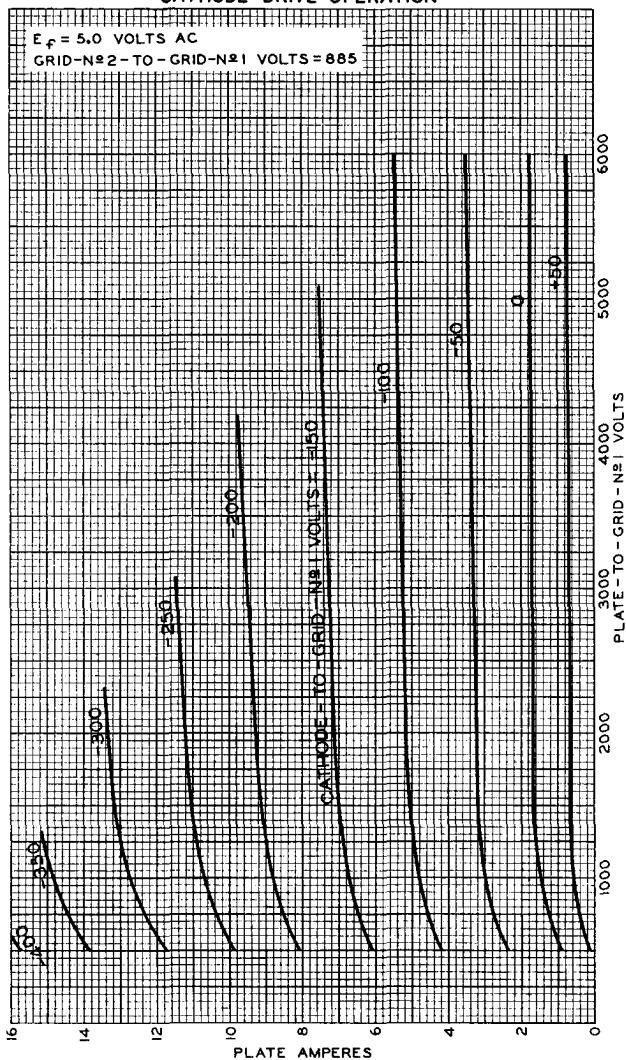
## AVERAGE CONSTANT-CURRENT CHARACTERISTICS





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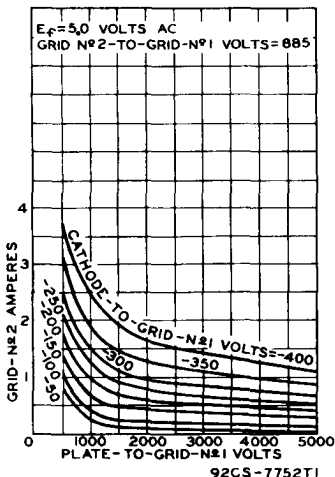
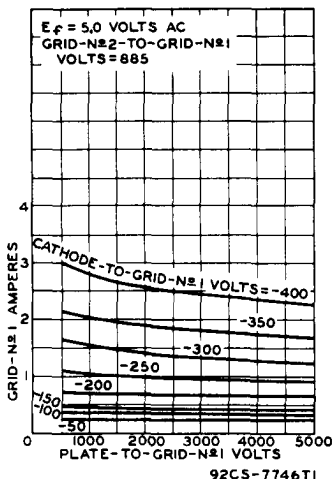
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AVERAGE PLATE CHARACTERISTICS  
CATHODE-DRIVE OPERATION



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# AVERAGE CHARACTERISTICS CATHODE-DRIVE OPERATION

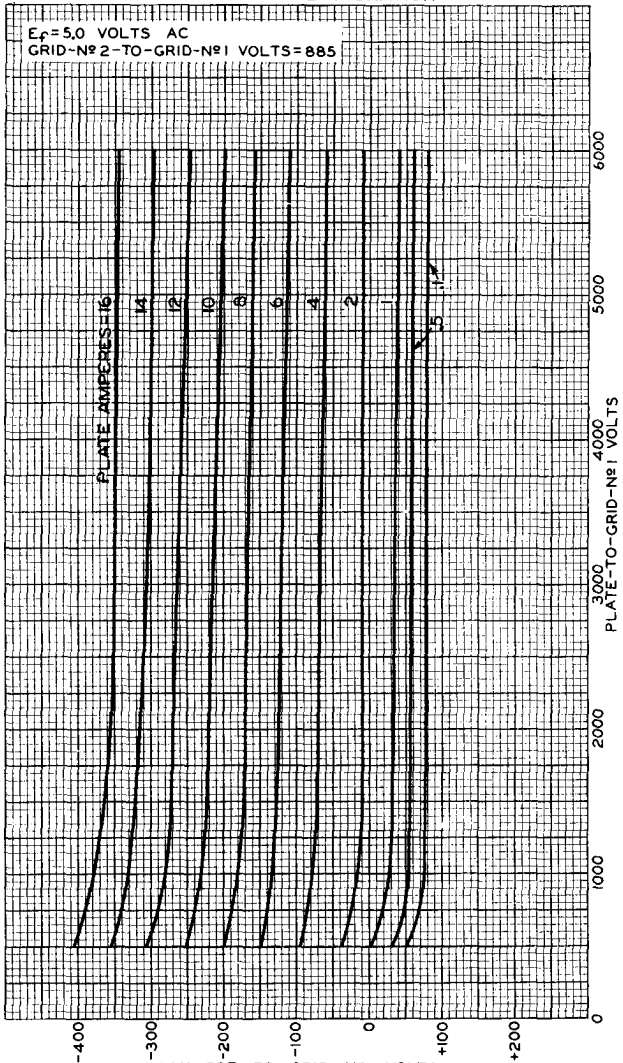




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# AVERAGE CONSTANT-CURRENT CHARACTERISTICS CATHODE-DRIVE OPERATION



ELECTRON TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

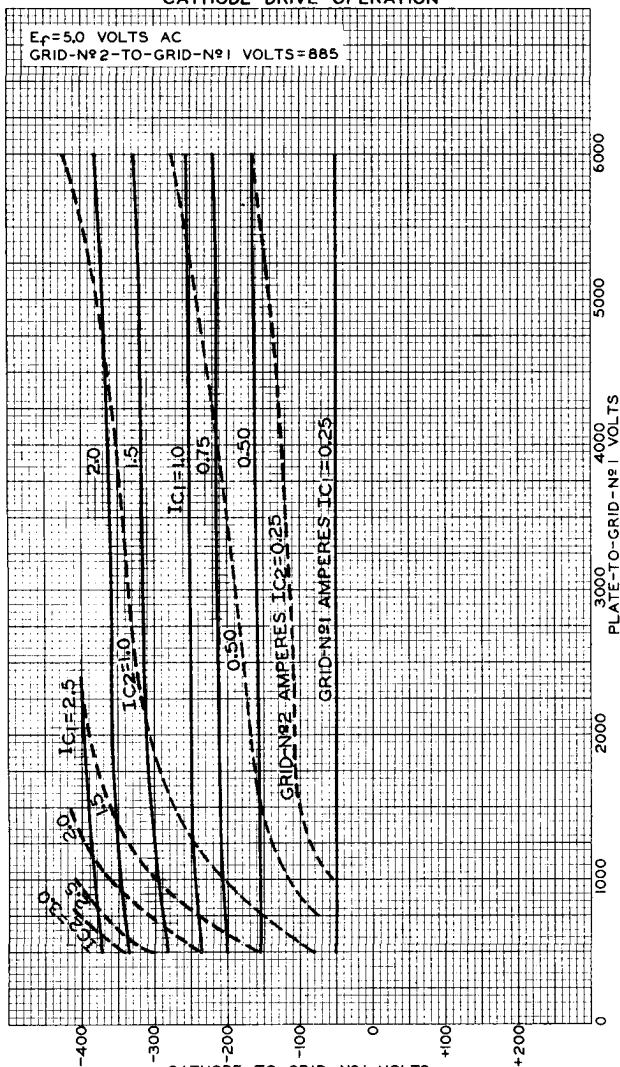
92CM-7749

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# AVERAGE CONSTANT-CURRENT CHARACTERISTICS CATHODE-DRIVE OPERATION



CATHODE-TO-GRID-Nº1 VOLTS  
ELECTRON TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7751R1

# Beam Power Tube

**FORCED-AIR COOLED  
THORIATED-TUNGSTEN FILAMENT  
10-KW PLATE DISSIPATION IN CW OR TV SERVICE UP TO 220 Mc**

**COAXIAL-ELECTRODE STRUCTURE  
INTEGRAL RADIATOR**

## GENERAL DATA

### Electrical:

Filament, Multistrand Thoriated Tungsten:

|                                           |        |       |
|-------------------------------------------|--------|-------|
| Voltage (AC or DC) <sup>a</sup> . . . . . | 5 ± 5% | volts |
| Current at 5 volts. . . . .               | 181    | 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 |

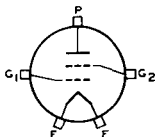
Direct Interelectrode Capacitances:

|                                           |           |    |
|-------------------------------------------|-----------|----|
| Grid No.1 to plate <sup>b</sup> . . . . . | 0.6 max.  | μf |
| Grid No.1 to filament . . . . .           | 42        | μf |
| Plate to filament <sup>b</sup> . . . . .  | 0.08 max. | μf |
| Grid No.1 to grid No.2. . . . .           | 60        | μf |
| Grid No.2 to plate. . . . .               | 24        | μf |

### Mechanical:

|                                                         |                                   |
|---------------------------------------------------------|-----------------------------------|
| Operating Position. . . . .                             | Vertical, filament end up or down |
| Maximum Overall Length. . . . .                         | 11.63"                            |
| Maximum Diameter. . . . .                               | 6.38"                             |
| Weight (Approx.). . . . .                               | 15 lbs                            |
| Radiator. . . . .                                       | Integral part of tube             |
| Terminal Connections (See <i>Dimensional Outline</i> ): |                                   |

G<sub>1</sub> - Grid No.1  
G<sub>2</sub> - Grid No.2



P - Plate  
F - Filament

### 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 | 80  | 60  | %            |
| Minimum air flow. . . . . | 350 | 270 | 200 | cfm          |
| Static pressure . . . . . | 3   | 2.1 | 1.3 | in. of water |

← Indicates a change.



|                                                                                  |          |     |
|----------------------------------------------------------------------------------|----------|-----|
| To grid-No.2 terminal . . . . .                                                  | 50 min.  | cfm |
| To grid-No.1 terminal<br>and filament terminals. . . . .                         | 50 min.  | cfm |
| Incoming-Air Temperature. . . . .                                                | 45 max.  | °C  |
| Radiator Temperature (Measured on the<br>core at end away from incoming air) . . | 180 max. | °C  |
| Glass Temperature (At hottest point). . .                                        | 180 max. | °C  |
| Seal Temperature:                                                                |          |     |
| Filament, grid No.1, grid<br>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<sup>c</sup> Ratings, Absolute-Maximum Values:**

|                                           |                         |       |
|-------------------------------------------|-------------------------|-------|
|                                           | 54 to 216 Mc            |       |
| DC PLATE VOLTAGE. . . . .                 | 6000 <sup>d</sup> max.  | volts |
| DC GRID-No.2 (SCREEN-GRID) VOLTAGE. . . . | 2000 max.               | volts |
| DC PLATE CURRENT. . . . .                 | 4 max.                  | amp   |
| PLATE INPUT . . . . .                     | 22000 <sup>d</sup> max. | watts |
| GRID-No.2 INPUT . . . . .                 | 400 max.                | watts |
| PLATE DISSIPATION . . . . .               | 10000 max.              | watts |
| GRID-No.1 (CONTROL-GRID) DISSIPATION. . . | 300 max.                | watts |

#### → Typical Operation in Grid-Drive Circuit at 216 Mc:

*Bandwidth<sup>e</sup> 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.): <sup>f</sup> |                  |       |
| Synchronizing level . . . . .               | 800 <sup>g</sup> | watts |
| Pedestal level. . . . .                     | 450              | watts |
| Useful Power Output (Approx.):              |                  |       |
| Synchronizing level <sup>1</sup> . . . . .  | 12000            | watts |
| Pedestal level. . . . .                     | 6800             | watts |

#### → Typical Operation in Cathode-Drive Circuit at 216 Mc:

*Bandwidth<sup>e</sup> of 8.5 Mc*

|                                           |      |       |
|-------------------------------------------|------|-------|
| DC Plate-to-Grid-No.1 Voltage . . . . .   | 5885 | volts |
| DC Grid-No.2-to-Grid-No.1 Voltage . . . . | 885  | volts |

→ Indicates a change.

|                                             |                   |       |
|---------------------------------------------|-------------------|-------|
| DC Cathode-to-Grid-No.1 Voltage . . . . .   | 85                | volts |
| Peak RF Cathode-to-Grid-No.1 Voltage:       |                   |       |
| Synchronizing level . . . . .               | 330               | volts |
| Pedestal level . . . . .                    | 260               | volts |
| DC Plate Current:                           |                   |       |
| Synchronizing level . . . . .               | 3.45              | amp   |
| Pedestal level . . . . .                    | 2.6               | amp   |
| DC Grid-No.2 Current (Pedestal level) . .   | 0.152             | amp   |
| DC Grid-No.1 Current (Approx.):             |                   |       |
| Synchronizing level . . . . .               | 0.202             | amp   |
| Pedestal level . . . . .                    | 0.11              | amp   |
| Driver Power Output (Approx.): <sup>h</sup> |                   |       |
| Synchronizing level . . . . .               | 1300 <sup>j</sup> | watts |
| Pedestal level . . . . .                    | 700               | watts |
| Useful Power Output (Approx.):              |                   |       |
| Synchronizing level . . . . .               | 12000             | watts |
| Pedestal level . . . . .                    | 6800              | watts |

### GRID-MODULATED RF POWER AMPLIFIER Class C Television Service

*Synchronizing-level conditions per  
tube unless otherwise specified*

#### Maximum CCSC Ratings, Absolute-Maximum Values:

|                                                                |                     |            |
|----------------------------------------------------------------|---------------------|------------|
|                                                                | <i>54 to 216 Mc</i> |            |
| DC PLATE VOLTAGE . . . . .                                     | 6000                | max. volts |
| DC GRID-No.2 (SCREEN-GRID) VOLTAGE . . .                       | 2000                | max. volts |
| DC GRID-No.1 (CONTROL-GRID) VOLTAGE<br>(White level) . . . . . | -1000               | max. volts |
| DC PLATE CURRENT . . . . .                                     | 4                   | max. amp   |
| PLATE INPUT . . . . .                                          | 22000               | max. watts |
| GRID-No.2 INPUT . . . . .                                      | 400                 | max. watts |
| PLATE DISSIPATION . . . . .                                    | 10000               | max. watts |
| GRID-No.1 DISSIPATION . . . . .                                | 300                 | max. watts |

#### Typical Operation in Grid-Drive Circuit at 216 Mc:

|                                           |                                        |       |
|-------------------------------------------|----------------------------------------|-------|
|                                           | <i>Bandwidth<sup>g</sup> of 8.5 Mc</i> |       |
| 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   |

← Indicates a change.



Bandwidth<sup>e</sup> of 8.5 McDriver Power Output (Approx.):<sup>f</sup>Synchronizing level . . . . . 800<sup>g</sup> watts

Pedestal level . . . . . 425 watts

Useful Power Output (Approx.):

Synchronizing level . . . . . 12000 watts

Pedestal level . . . . . 6800 watts

**LINEAR RF POWER AMPLIFIER****Single-Sideband Suppressed-Carrier Service****Maximum CCS<sup>c</sup> Ratings, Absolute-Maximum Values:***Up to 60 Mc*

DC PLATE VOLTAGE . . . . . 6900 max. volts

DC GRID-No.2 (SCREEN-GRID) VOLTAGE . . . . . 2000 max. volts

MAX.-SIGNAL DC PLATE CURRENT . . . . . 2.75 max. amp

MAX.-SIGNAL DC GRID-No.1

(CONTROL-GRID) CURRENT . . . . . 0.6 max. amp

MAX.-SIGNAL PLATE INPUT . . . . . 18000 max. watts

MAX.-SIGNAL GRID-No.2 INPUT . . . . . 400 max. watts

PLATE DISSIPATION . . . . . 10000 max. watts

**Typical CCS Class AB<sub>1</sub> and AB<sub>2</sub> "Single-Tone" Operation at 60 Mc:<sup>k</sup>***Class Class**AB<sub>1</sub>**AB<sub>2</sub>*

DC Plate Voltage . . . . . 6900 6500 volts

DC Grid-No.2 Voltage . . . . . 1200 1200 volts

DC Grid-No.1 Voltage<sup>m</sup> . . . . . -125 -125 volts

Zero-Signal DC Plate Current . . . . . 0.2 0.2 amp

Zero-Signal DC Grid-No.2 Current . . . . . 0 0 amp

Effective RF Load Resistance . . . . . 5400 1200 ohms

Max.-Signal DC Plate Current . . . . . 0.675 2.75 amp

Max.-Signal DC Grid-No.2 Current . . . . . 0.035 0.26 amp

Max.-Signal DC Grid-No.1 Current . . . . . 0 0.08 amp

Max.-Signal Peak RF Grid-No.1 Voltage . . . . . 125 305 volts

Max.-Signal Driving Power (Approx.) . . . . . 0 25 watts

Max.-Signal Power Output (Approx.) . . . . . 2920 10600 watts

**PLATE-MODULATED RF POWER AMPLIFIER — Class C Telephony***Carrier conditions per tube for use**with a maximum modulation factor of 1***Maximum CCS<sup>c</sup> Ratings, Absolute-Maximum Values:<sup>n</sup>**

DC PLATE VOLTAGE . . . . . 5000 max. volts

DC GRID-No.2 (SCREEN-GRID) VOLTAGE . . . . . 2000 max. volts

DC GRID-No.1 (CONTROL-GRID) 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 . . . . . 6600 max. watts

→ Indicates a change.



Typical Operation in Grid-Drive Circuit: ←

|                                                        | Up to 60 Mc      |       |
|--------------------------------------------------------|------------------|-------|
| DC Plate Voltage. . . . .                              | 4700             | volts |
| DC Grid-No.2 Voltage (Modulated 100%) <sup>p</sup> . . | 800              | volts |
| DC Grid-No.1 Voltage <sup>r</sup> . . . . .            | -280             | volts |
| Peak RF Grid-No.1 Voltage . . . . .                    | 485              | volts |
| DC Plate Current. . . . .                              | 1.56             | amp   |
| DC Grid-No.2 Current. . . . .                          | 0.217            | amp   |
| DC Grid-No.1 Current (Approx.) <sup>s</sup> . . . . .  | 0.15             | amp   |
| Driver Power Output (Approx.) <sup>t</sup> . . . . .   | 180 <sup>s</sup> | watts |
| Useful Power Output (Approx.) . . . . .                | 5500             | watts |

**RF POWER AMPLIFIER & OSCILLATOR — Class C Telegraphy<sup>t</sup>**  
**and**  
**RF POWER AMPLIFIER — Class C FM Telephony**

Maximum CCSC Ratings, Absolute-Maximum Values:<sup>n</sup> ←

|                               |       |      |       |
|-------------------------------|-------|------|-------|
| DC PLATE VOLTAGE. . . . .     | 6900  | max. | volts |
| DC GRID-No.2 VOLTAGE. . . . . | 2000  | max. | volts |
| DC GRID-No.1 VOLTAGE. . . . . | -1000 | max. | volts |
| DC PLATE CURRENT. . . . .     | 2.75  | max. | amp   |
| DC GRID-No.1 CURRENT. . . . . | 0.6   | max. | amp   |
| PLATE INPUT . . . . .         | 18000 | max. | watts |
| GRID-No.2 INPUT . . . . .     | 400   | max. | watts |
| PLATE DISSIPATION . . . . .   | 10000 | max. | watts |

Typical Operation in Grid-Drive Circuit: ←

|                                                       | Up to 60 Mc | At 216 Mc        |                  |       |
|-------------------------------------------------------|-------------|------------------|------------------|-------|
| DC Plate Voltage. . . . .                             | 6400        | 5800             | 5800             | volts |
| DC Grid-No.2 Voltage <sup>u</sup> . . . . .           | 1200        | 1200             | 1200             | volts |
| DC Grid-No.1 Voltage <sup>v</sup> . . . . .           | -310        | -130             | -175             | volts |
| Peak RF Grid-No.1 Voltage . . . . .                   | 560         | 230              | 370              | volts |
| DC Plate Current. . . . .                             | 2.75        | 1.8              | 2.6              | amp   |
| DC Grid-No.2 Current. . . . .                         | 0.3         | 0.1              | 0.267            | amp   |
| DC Grid-No.1 Current (Approx.) <sup>s</sup> . . . . . | 0.14        | 0.05             | 0.11             | amp   |
| Driver Power Output (Approx.) <sup>t</sup> . . . . .  | 75          | 300 <sup>w</sup> | 750 <sup>x</sup> | watts |
| Useful Power Output (Approx.) . . . . .               | 11600       | 6000             | 9000             | watts |

<sup>a</sup> 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.

<sup>b</sup> 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.

<sup>c</sup> Continuous Commercial Service.

<sup>d</sup> For operation on VHF television channels 2 through 6, DC plate voltage may be increased to 6400 max. volts and plate input may be increased to 24000 maximum watts provided all other ratings are met.

<sup>e</sup> Computed between half-power points and based on tube output capacitance only.

<sup>f</sup> 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 voltage, in components, in initial tube characteristics, and in tube characteristics during life.

<sup>g</sup> This value includes 700 watts of rf circuit loss at 216 Mc.

← Indicates a change.



- h 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 under (f).
- j This value includes 300 watts of rf circuit loss at 216 Mc. and 900 watts added to plate circuit.
- k "Single-Tone Modulation" 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.
- m Adjusted to give indicated zero-signal plate current.
- n These ratings hold for operation up to 60 Mc; for ratings at higher frequencies, see *Maximum Ratings vs Operating Frequency* table.
- p Obtained preferably from a separate source.
- r Obtained preferably from a combination of 365-ohm grid-No.1 resistor and -170-volt fixed bias.
- s This value includes 50 watts of rf circuit loss at 30 Mc.
- t 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.
- u 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 6166 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.
- v Obtained from fixed supply, by grid-No.1 resistor, by cathode resistor, or by combination methods.
- w This value includes 270 watts of rf circuit loss.
- x This value includes 675 watts of rf circuit loss.

### CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

|                                     | Note | Min. | Max. |                  |
|-------------------------------------|------|------|------|------------------|
| Filament Current. . . . .           | 1    | 172  | 190  | amp              |
| Direct Interelectrode Capacitances: |      |      |      |                  |
| Grid No.1 to plate. . . . .         | 2    | -    | 0.6  | $\mu\mu\text{f}$ |
| Grid No.1 to filament. . . . .      | 3    | 39   | 47   | $\mu\mu\text{f}$ |
| Grid No.1 to grid No.2. . . . .     | 3    | 52   | 64   | $\mu\mu\text{f}$ |
| Grid No.2 to plate. . . . .         | 3    | 21.2 | 25.8 | $\mu\mu\text{f}$ |
| Plate to filament. . . . .          | 2    | -    | 0.08 | $\mu\mu\text{f}$ |
| 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.

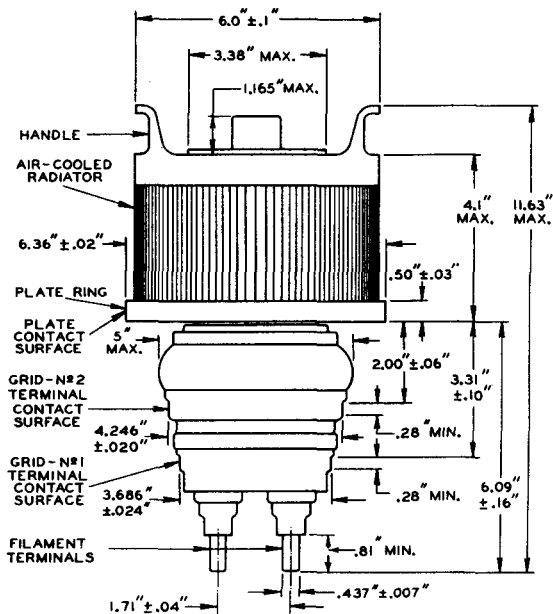
Note 4: With dc plate voltage of 6000 volts, dc grid-No.2 voltage of 1200 volts, and dc plate current of 20 ma.

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.

## MAXIMUM RATINGS vs OPERATING FREQUENCY

| FREQUENCY                                                                      | 60                        | 220 | Mc |
|--------------------------------------------------------------------------------|---------------------------|-----|----|
| MAXIMUM PERMISSIBLE PERCENTAGE OF MAXIMUM-RATED PLATE VOLTAGE AND PLATE INPUT: |                           |     |    |
| Class AB Single-Sideband Suppressed-Carrier Service                            | 100                       | 90  | %  |
| Class B Television Service                                                     | Full Ratings—54 to 216 Mc |     |    |
| Class C Television Service                                                     | Full Ratings—54 to 216 Mc |     |    |
| Class C Telephony, Plate-Modulated                                             | 100                       | 90  | %  |
| Class C Telegraphy and FM Telephony                                            | 100                       | 90  | %  |



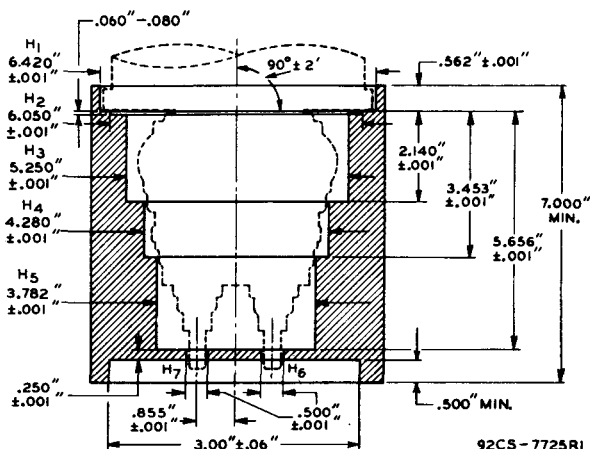
92CM-7716R2

← Indicates a change.



WITH THE CYLINDRICAL SURFACES OF THE GRID-NO.2 TERMINAL, GRID-NO.1 TERMINAL AND THE FILAMENT TERMINALS CLEAN, SMOOTH, AND FREE OF BURRS, THE TUBE WILL ENTER A GAUGE AS SHOWN IN SKETCH G<sub>1</sub>. THE FIVE CYLINDRICAL HOLES H<sub>1</sub>, H<sub>2</sub>, H<sub>3</sub>, H<sub>4</sub>, AND H<sub>5</sub> HAVE AXES THAT ARE COINCIDENT WITHIN 0.001" AND HAVE SUCCESSIVELY SMALLER DIAMETERS AS SHOWN. THE CENTER HOLES H<sub>6</sub> AND H<sub>7</sub> ARE LOCATED ON A DIAMETER WITHIN ± 0.001" AND THEIR AXES ARE PARALLEL TO THE AXES OF H<sub>1</sub>, H<sub>2</sub>, H<sub>3</sub>, H<sub>4</sub>, AND H<sub>5</sub> WITHIN 0° ± 2'.

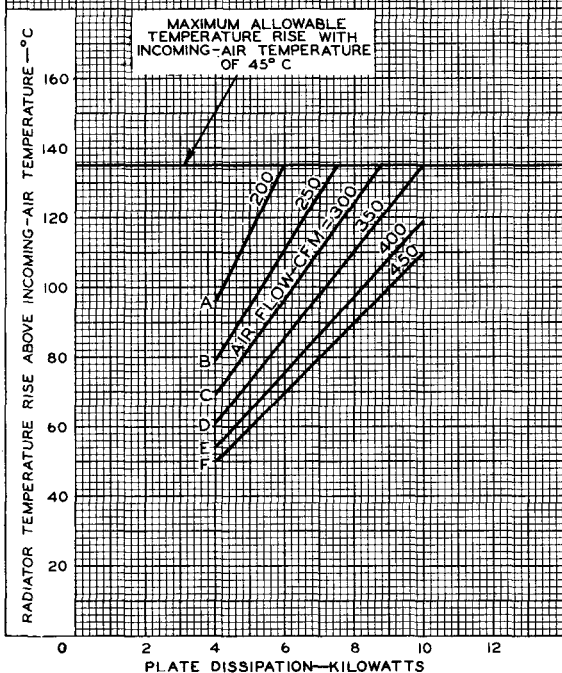
THE PLATE RING WILL BE ENTIRELY ENGAGED BY HOLE H<sub>1</sub> AND WILL SEAT ON THE SHOULDER BETWEEN H<sub>1</sub> AND H<sub>2</sub>. THE PLANE SURFACE OF THIS SHOULDER IS AT RIGHT ANGLES TO THE AXES OF THE HOLES WITHIN 0° ± 2'. SEATING IS DETERMINED BY FAILURE OF A 0.020" THICKNESS GAUGE TO ENTER MORE THAN 1/16" BETWEEN SHOULDER SURFACE AND PLATE RING. SLOTS ARE PROVIDED TO PERMIT THIS MEASUREMENT.

SKETCH G<sub>1</sub>

## COOLING REQUIREMENTS

 $E_f = 5$  VOLTS ACMAXIMUM RADIATOR TEMPERATURE  $= 180^\circ \text{C}$ 

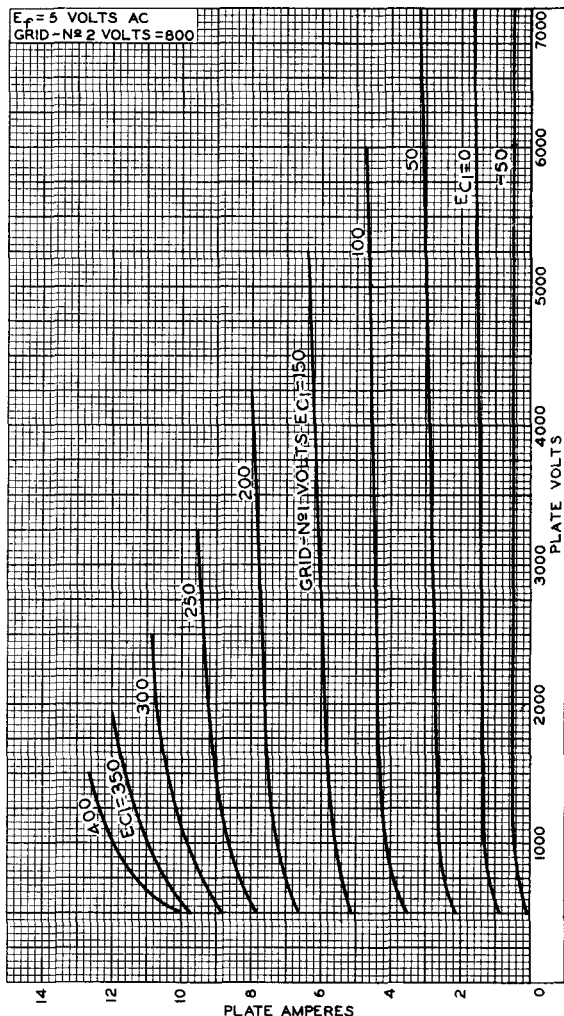
| CURVE | PRESSURE DROP—<br>INCHES OF WATER | CURVES TAKEN ACCORD-<br>ING TO NAFM* STAND-<br>ARDS—BULLETIN No 103            |
|-------|-----------------------------------|--------------------------------------------------------------------------------|
| A     | 1.3                               | *NATIONAL ASSOCIATION OF<br>FAN MFGS., GENERAL MOTORS<br>BLDG., DETROIT, MICH. |
| B     | 1.8                               |                                                                                |
| C     | 2.4                               |                                                                                |
| D     | 3                                 |                                                                                |
| E     | 3.7                               |                                                                                |
| F     | 4.5                               |                                                                                |



92CM-7728

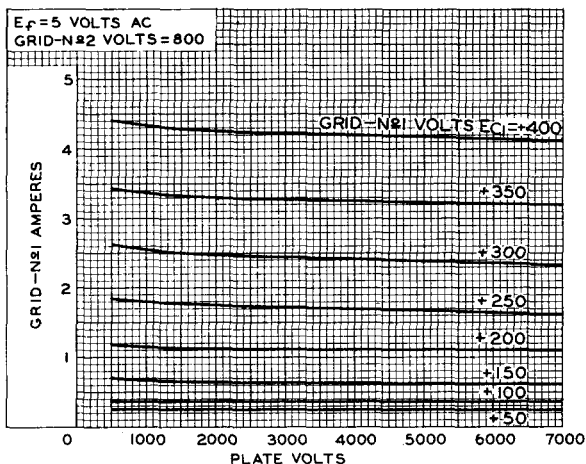


## AVERAGE PLATE CHARACTERISTICS

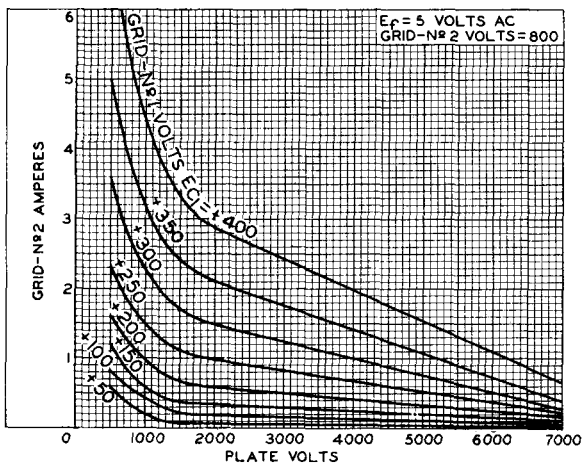


92CM-7736RI

## AVERAGE CHARACTERISTICS



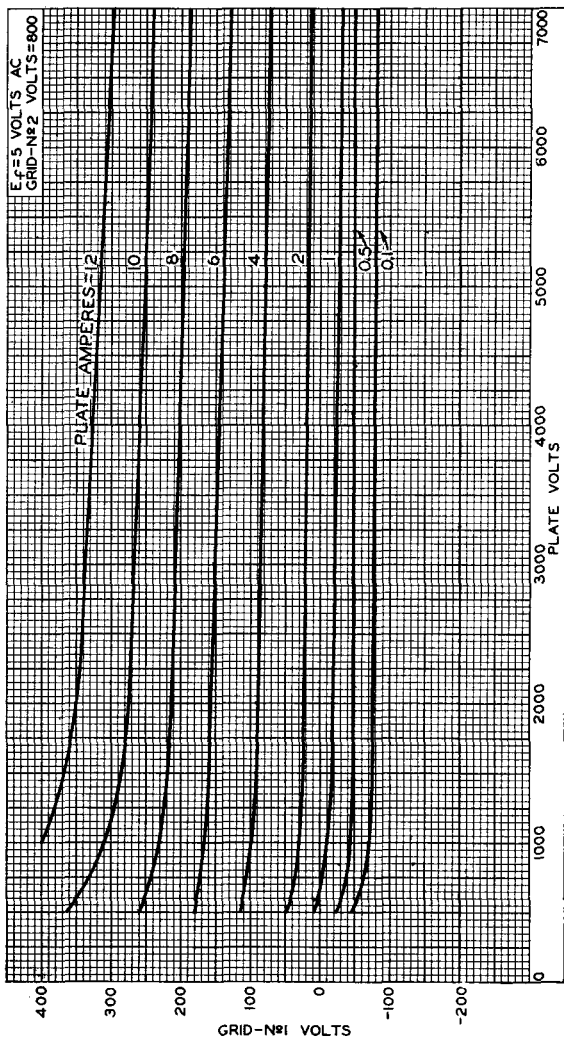
92CS-7744RI



92CS-7743RI



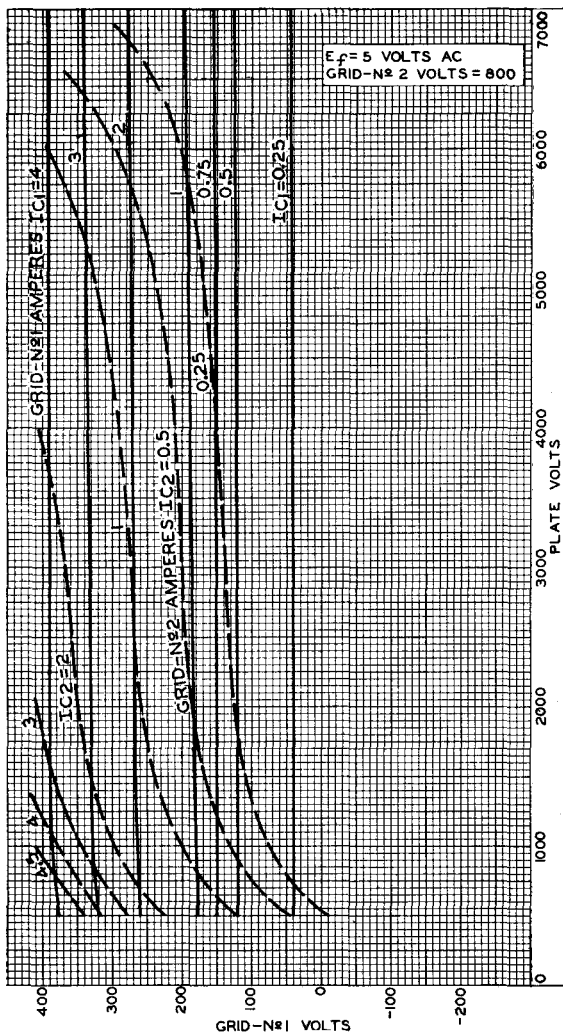
# AVERAGE CONSTANT-CURRENT CHARACTERISTICS



92CM-7737RI



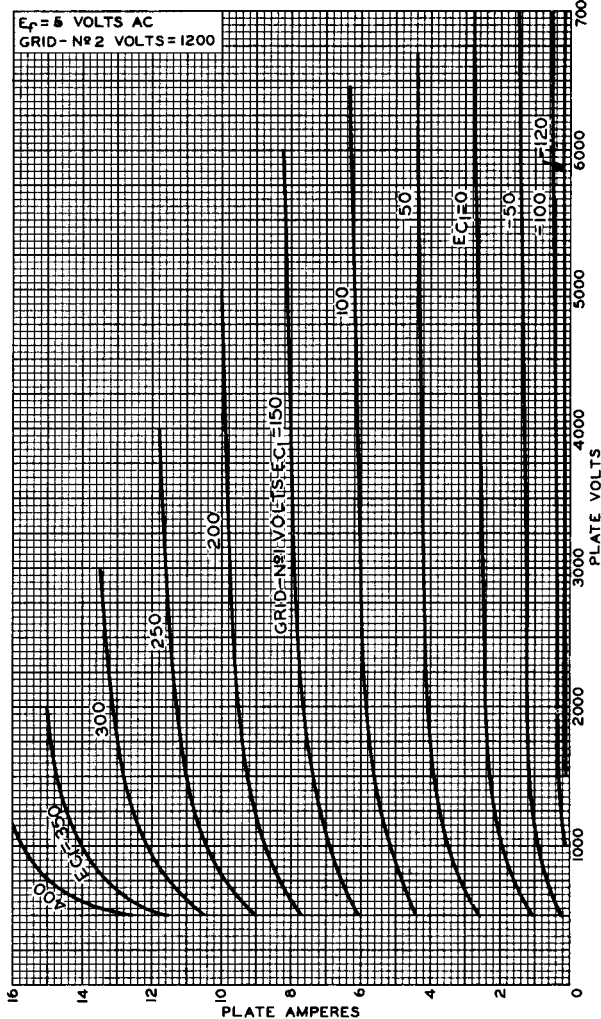
# AVERAGE CONSTANT-CURRENT CHARACTERISTICS



92CM-7738R2



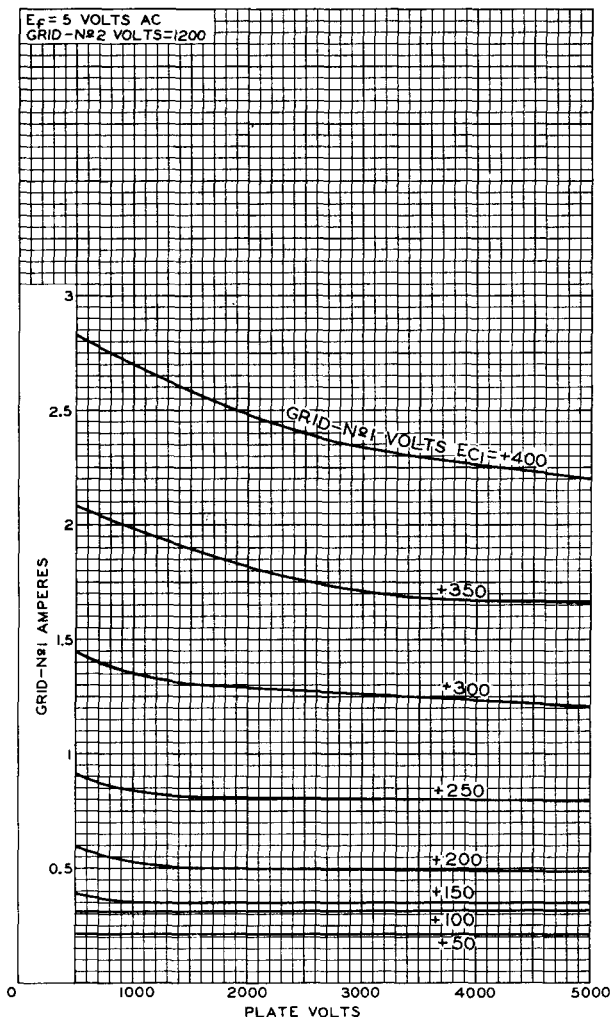
## AVERAGE PLATE CHARACTERISTICS



92CM-7735R1



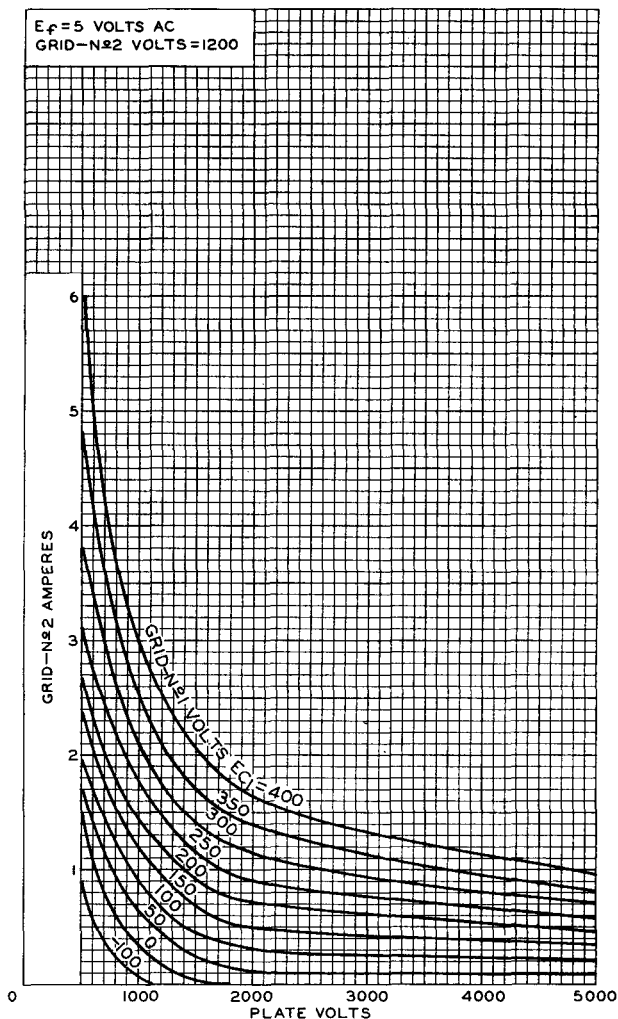
## AVERAGE CHARACTERISTICS



92CM-7740R2



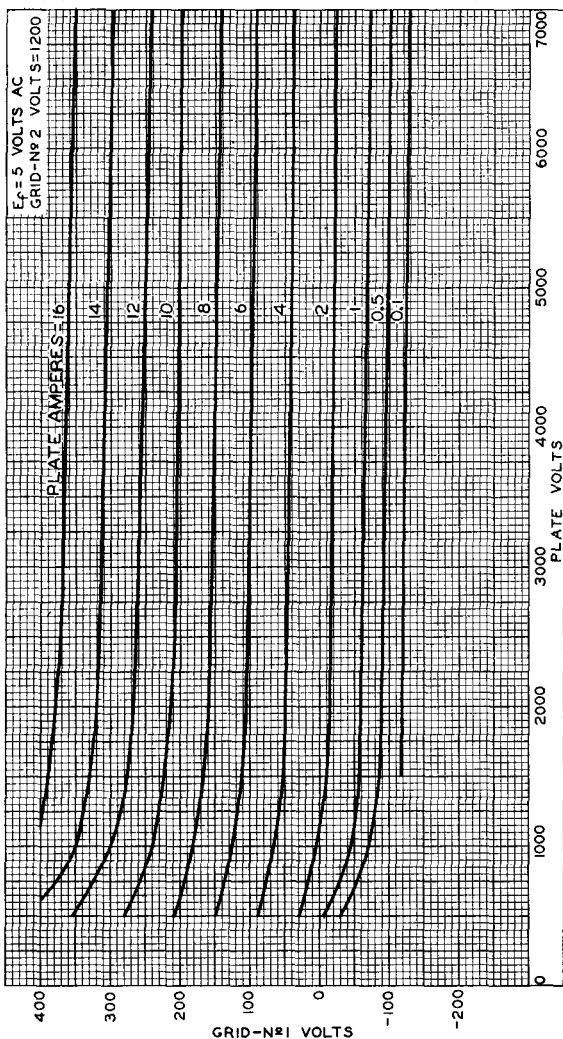
## AVERAGE CHARACTERISTICS



92CM-7739R1



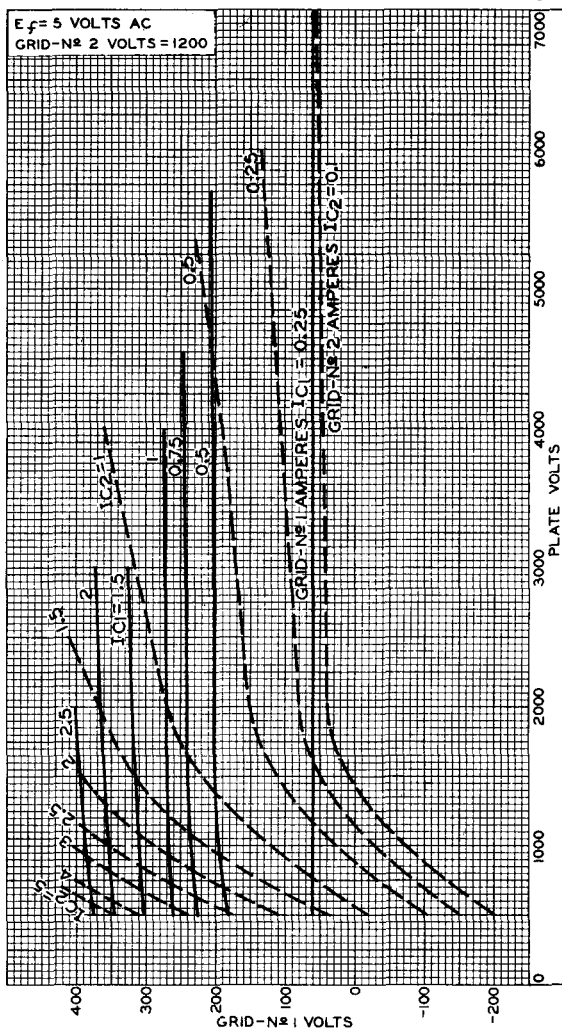
# AVERAGE CONSTANT-CURRENT CHARACTERISTICS



92CM-7733RI



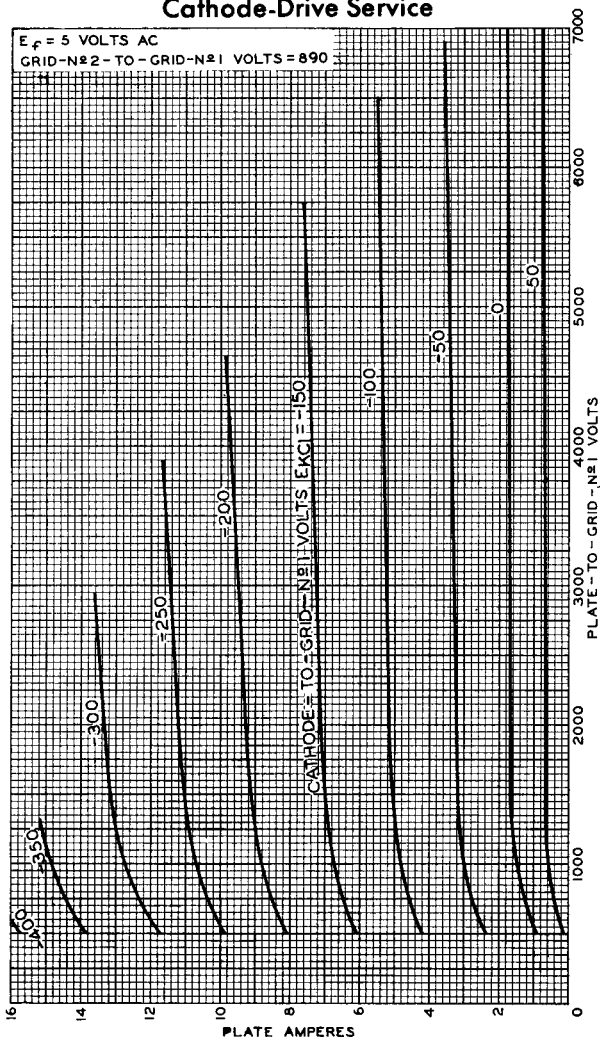
### AVERAGE CONSTANT-CURRENT CHARACTERISTICS



92CM-7730R2

# AVERAGE PLATE CHARACTERISTICS

## Cathode-Drive Service



92CM-7750RI



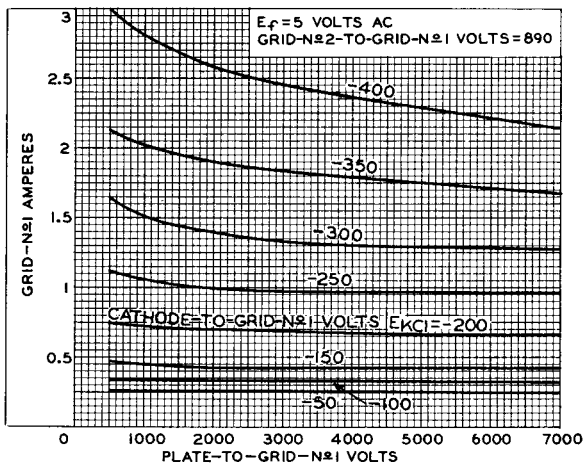
RADIO CORPORATION OF AMERICA  
Electron Tube Division

Harrison, N. J.

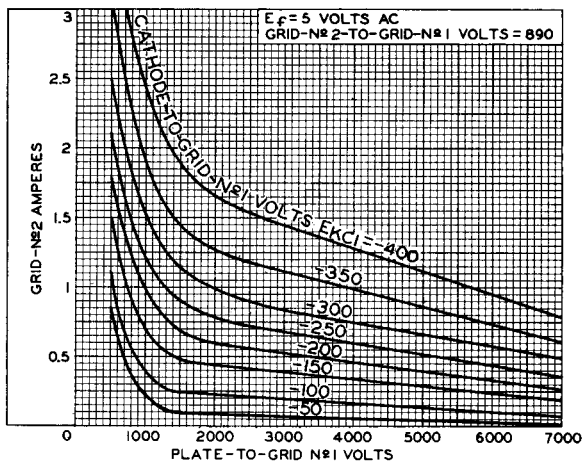
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1-62

# AVERAGE CHARACTERISTICS

## Cathode-Drive Service



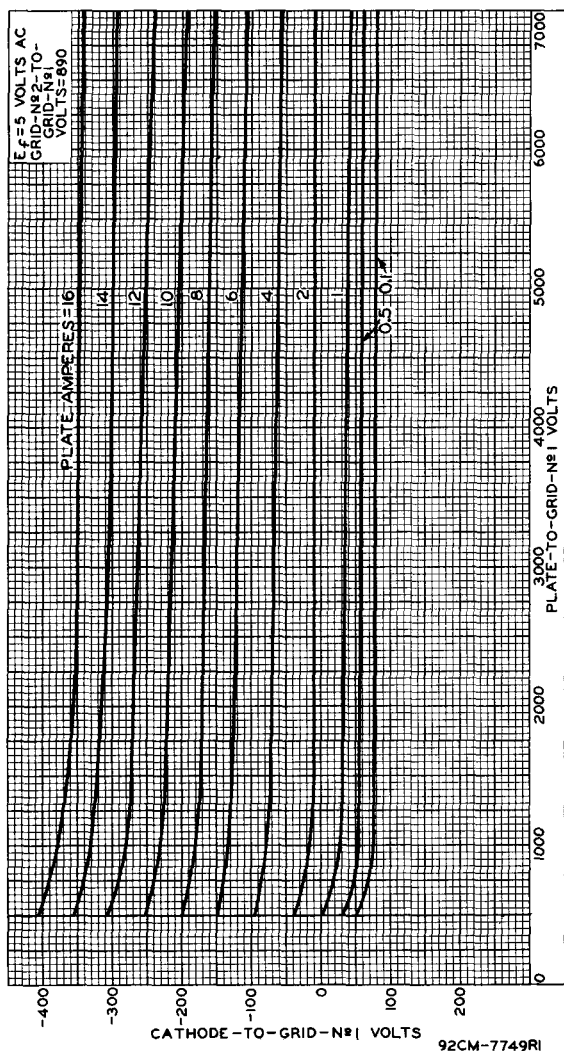
92CS-7746R1



92CS-7752R3

# AVERAGE CONSTANT-CURRENT CHARACTERISTICS

## Cathode-Drive Service

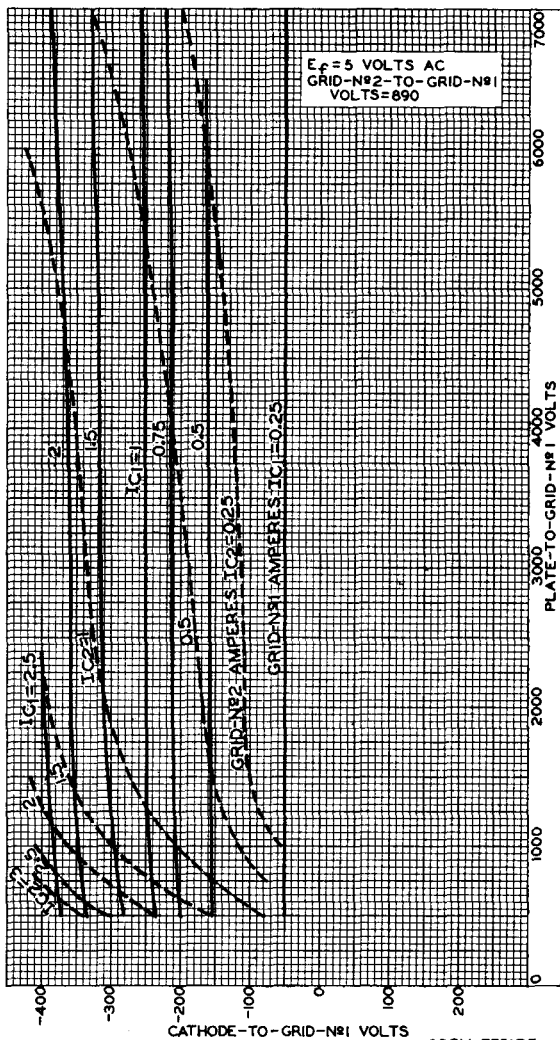


92CM-7749RI



# AVERAGE CONSTANT-CURRENT CHARACTERISTICS

## Cathode-Drive Service



92CM-7751R2

