8462

Beam Power Tube

LESS THAN 1-SECOND WARM-UP FOR USE IN LOW-VOLTAGE MOBILE EQUIPMENT UP TO 500 Mc

COAXIAL-ELECTRODE STRUCTURE CERAMIC-METAL SEALS CONDUCTION COOLED

For Use as an RF Power Amplifier, Oscillator, Regulator, Distributed Amplifier, or Linear RF Power Amplifier in Mobile or Stationary Equipment

Electrical:

Filamentary Cathode, Woven-Wire-Mesh Type, Oxide-Coated:		
Voltage (AC or DC)	2.9	volts
Current at 2.9 volts	4.6	amp
Minimum heating time	less than 1[a]	sec
Mu-Factor, Grid No.2 to Grid No.1 for plate volts = 250, grid-No.2 volts = 200, and plate amperes = 1.2	11	
Direct Interelectrode Capacitances:[b]		
Grid No.1 to plate	0.13 max.	pf
Grid No.1 to cathode	16	pf
Plate to cathode	0.03 max.	pf
Grid No.1 to grid No.2	22	pf
Grid No.2 to plate	7	pf
Grid No.2 to cathode	3	pf

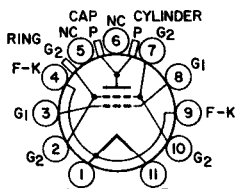
Mechanical:

Operating Position	Any
Maximum Overall Length	2.26"
Seated Length	1.920" ± 0.065"
Diameter	1.426" ± 0.010"
Weight (Approx.)	2 oz
Socket	E. F. Johnson Co.[c] No.124-311-100, Mycalex[d] No.CP464-2, or equivalent
Grid-No.2 Bypass Capacitor	E. F. Johnson Co.[c] No.124-113-1, or equivalent
Base	Large-Wafer Elevenar 11-Pin with Ring (JEDEC No.E11-81)

Terminal Connections *(See Dimensional Outline)*:

BOTTOM VIEW

Pin 1 - Filament-Cathode
Pin 2 - Grid No.2
Pin 3 - Grid No.1
Pin 4 - Same as Pin 1
Pin 5 - No Internal Connection
Pin 6 - No Internal Connection
Pin 7 - Grid No.2
Pin 8 - Grid No.1
Pin 9 - Same as Pin 1
Pin 10 - Grid No.2
Pin 11 - Filament
Cap - Plate-Terminal Connection
Cylinder - Plate-Terminal Contact Surface
Ring[e] - Grid No.2 Terminal Contact Surface



Thermal:

Terminal Temperature (All Terminals)	250 max.	°C
Plate Core Temperature (See *Dimensional Outline*)	250 max.	°C

Cooling, Conduction:

The plate terminal must be thermally coupled to a constant temperature device (heat sink—solid or liquid) to limit the plate terminal temperature to the specified maximum value of 250° C. The grid-No.2, grid-No.1, and filament terminals may also require coupling to the heat sink to limit their respective terminal temperature to the specified maximum value of 250° C.

LINEAR RF POWER AMPLIFIER

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:*

	Up to 500 Mc	
DC Plate Voltage	2200 max.	volts
DC Grid-No.2 Voltage	400 max.	volts
DC Grid-No.1 Voltage	-100 max.	volts
DC Plate Current at Peak of Envelope	450[f] max.	ma
DC Grid-No.1 Current	100 max.	ma
Plate Dissipation	100[g] max.	watts
Grid No.2 Input	8 max.	watts

Typical CCS Operation with "Two-Tone Modulation":

	At 30 Mc	
DC Plate Voltage	700	volts
DC Grid-No.2 Voltage[h]	250	volts
DC Grid-No.1 Voltage[h]	-20	volts
Zero-Signal DC Plate Current	100	ma
Effective RF Load Resistance	1420	ohms
DC Plate Current at Peak of Envelope	205	ma
Average DC Plate Current	150	ma
DC Grid-No.2 Current at Peak of Envelope	16	ma
Average DC Grid-No.2 Current	10	ma
Average DC Grid-No.1 Current	1.0[j]	ma
Peak-Envelope Driver Power Output (Approx.)[k]	0.3	watt
Output-Circuit Efficiency (Approx.)	95	%
Distortion Products Level:[m]		
Third order	30	db
Fifth order	35	db
Useful Power Output (Approx.):		
Average	40[n]	watts
Peak envelope	80[n]	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance Under Any Condition:		
With fixed bias	25000 max.	ohms
With fixed bias (In Class AB_1 operation)	100000 max.	ohms
With cathode bias	Not recommended	
Grid-No.2 Circuit Impedance	10000	ohms
Plate Circuit Impedance	[p]	

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

Maximum CCS Ratings, *Absolute-Maximum Values:*

	Up to 500 Mc	
DC Plate Voltage	2200 max.	volts
DC Grid-No.2 Voltage	400 max.	volts
DC Grid-No.1 Voltage	-100 max.	volts
DC Plate Current	300 max.	ma
DC Grid-No.1 Current	100 max.	ma
Grid-No.2 Input	8 max.	watts
Plate Dissipation	100[g] max.	watts

Typical CCS Operation:

In Grid-Drive Circuit at 50 Mc

DC Plate Voltage	500	700	volts
DC Grid-No.2 Voltage	160	175	volts
DC Grid-No.1 Voltage	-10	-10	volts
DC Plate Current	300	300	ma
DC Grid-No.2 Current	25	25	ma
DC Grid-No.1 Current	50	50	ma
Driver Power Output (Approx.)[q]	1.2	1.2	watts
Useful Power Output	85[n]	110[n]	watts

In Grid-Drive Circuit at 175 Mc

DC Plate Voltage	500	700	volts
DC Grid-No.2 Voltage	200	200	volts
DC Grid-No.1 Voltage	-30	-30	volts
DC Plate Current	300	300	ma
DC Grid-No.2 Current	30	20	ma
DC Grid-No.1 Current	40	40	ma
Driver Power Output (Approx.)[q]	3	3	watts
Useful Power Output	70[n]	105[n]	watts

In Grid-Drive Circuit at 470 Mc

DC Plate Voltage	700	volts
DC Grid-No.2 Voltage	200	volts
DC Grid-No.1 Voltage	-30	volts
DC Plate Current	300	ma
DC Grid-No.2 Current	10	ma
DC Grid-No.1 Current	20	ma

In Grid-Drive Circuit at 470 Mc

Driver Power Output (Approx.)[q]	5	watts
Useful Power Output	85[n]	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance Under Any Condition: With fixed bias	25000 max.	ohms
Grid-No.2 Circuit Impedance	10000 max.	ohms
Plate Circuit Impedance	[p]	

[a] The heating time required for adequate cathode emission is a function of the filament voltage and the impedance of the filament-voltage supply. It may be drastically reduced by employing a suitably designed overvoltage control circuit.

[b] Measured with special shield adapter.

[c] E.F.Johnson Co., 1921 10th Ave. S.W., Waseka, Minnesota.

[d] Mycalex Corp. of America, 125 Clifton Blvd. Clifton, N.J.

[e] For use at higher frequencies.

[f] The maximum rating for a signal having a minimum peak-to-average power ratio less than 2, such as is obtained in "Single-Tone" operation, is 300 ma. During short periods of circuit adjustment under "Single-Tone" conditions, the average plate current may be as high as 450 ma.

[g] Maximum plate dissipation is limited by the maximum plate core temperature and the cooling system to maintain tube operation below the specified maximum plate core temperature. With simple low-cost cooling techniques, maximum plate dissipation may be only about 100 watts; with more sophisticated cooling techniques, maximum plate dissipation may be as high as 300 watts.

[h] Obtained preferably from a separate well-regulated source.

[j] This value represents the approximate grid-No.1 current obtained due to initial electron velocities and contact-potential effects when grid-No.1 is driven to zero volts at maximum signal.

[k] 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.

[m] Referenced to either of the two tones, and without the use of feedback to enhance linearity.

[n] This value of useful power is measured at load of output circuit.

[p] The tube should see an effective plate supply impedance which limits the peak-current through the tube under surge conditions to 15 amperes.

[q] Driver power output includes circuit losses and is the actual power measured at the input to the grid circuit. It will vary depending upon the frequency of operation and the circuit used.

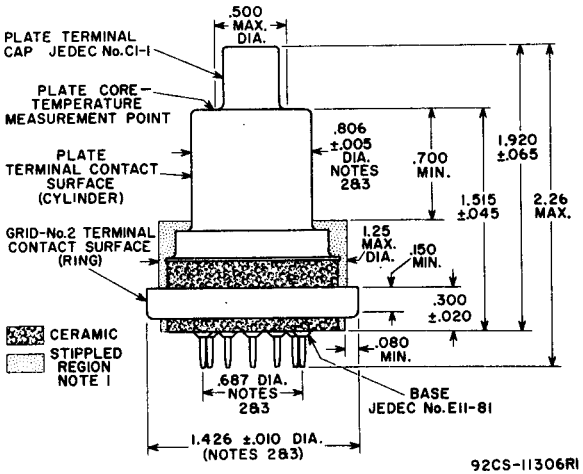
CHARACTERISTICS RANGE VALUES

	Note	*Min.*	*Max.*	
1. Filament Current	1	3.6	5.6	amp
2. Direct Interelectrode Capacitances:				
Grid No.1 to plate	2	–	0.13	pf
Grid No.1 to cathode	2	14	18.5	pf
Plate to cathode	2	–	0.03	pf
Grid No.1 to grid No.2	2	18	24	pf
Grid No.2 to plate	2	5.7	8.0	pf
Grid No.2 to cathode	2	2.0	4.0	pf
3. Grid-No.1 Voltage	1,3	-6	-24	volts
4. Grid-No.2 Current	1,3	-7	+8	ma

Note 1: With 2.9 volts (AC or DC) on filament.

Note 2: Measured with special shield adapter.

Note 3: With dc plate voltage of 700 volts, dc grid-No.2 voltage of 250 volts, and dc grid-No.1 voltage adjusted to give a dc plate current of 185 ma.



DIMENSIONS IN INCHES

Note 1: Keep all stippled regions clear. Do not allow contacts or circuit components to protrude into these annular volumes.

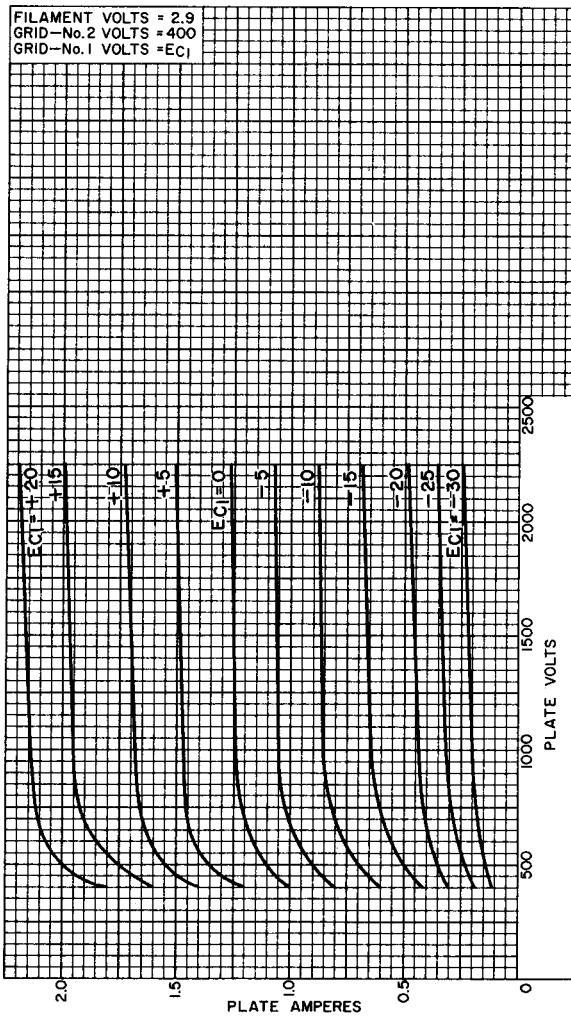
Note 2: The diameters of the plate terminal contact surface, grid-No.2 terminal contact surface, and pin circle to be concentric within the following values of maximum full indicator reading:

Plate terminal contact surface to grid-No.2 terminal contact surface.	0.030"
Plate terminal contact surface to pin circle.	0.040"
Grid-No.2 terminal contact surface to pin circle.	0.030"

Note 3: The full indicator reading is the maximum deviation in radial position of a surface when the tube is completely rotated about the center of the reference surface. It is a measure of the total effect of run-out and ellipticity.

8462

TYPICAL PLATE CHARACTERISTICS
At a Constant Grid-No.2 Voltage of 400 Volts



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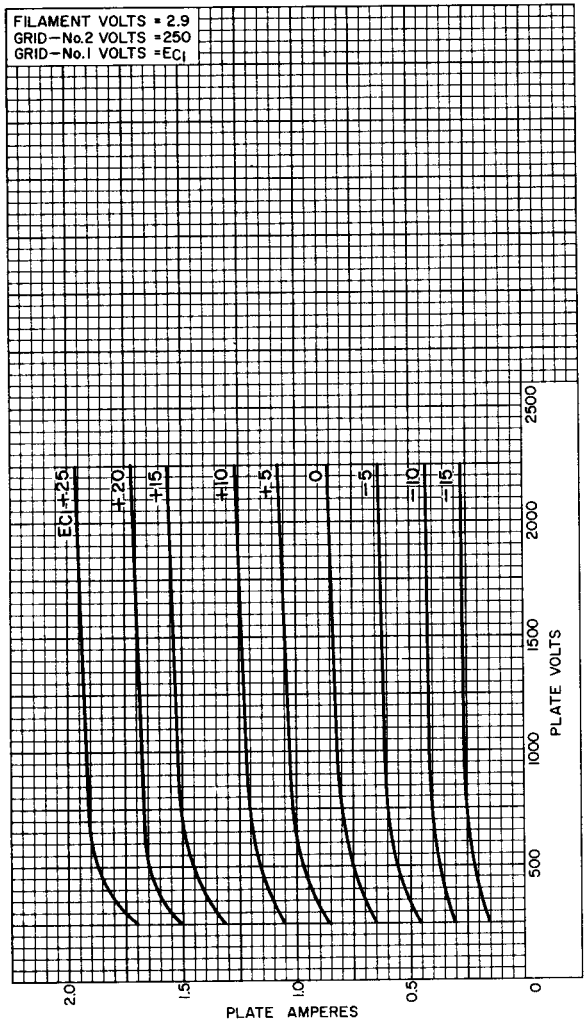
RADIO CORPORATION OF AMERICA
Electronic Components and Devices
Harrison, N. J.

TYPICAL PLATE CHARACTERISTICS
At a Constant Grid-No.2 Voltage of 250 Volts



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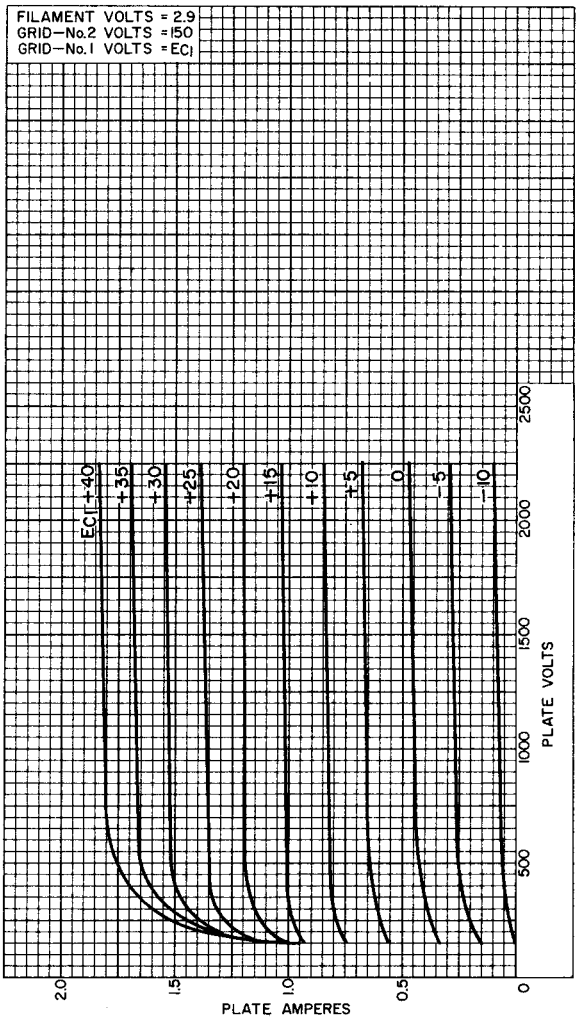
TYPICAL PLATE CHARACTERISTICS
At a Constant Grid-No.2 Voltage of 150 Volts



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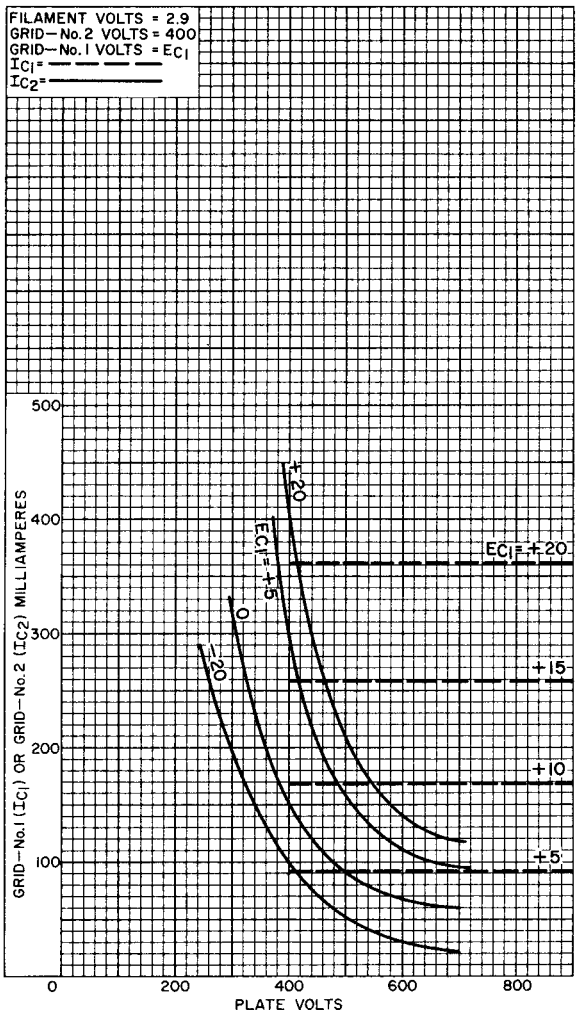
TYPICAL CHARACTERISTICS
At a Constant Grid-No.2 Voltage of 400 Volts



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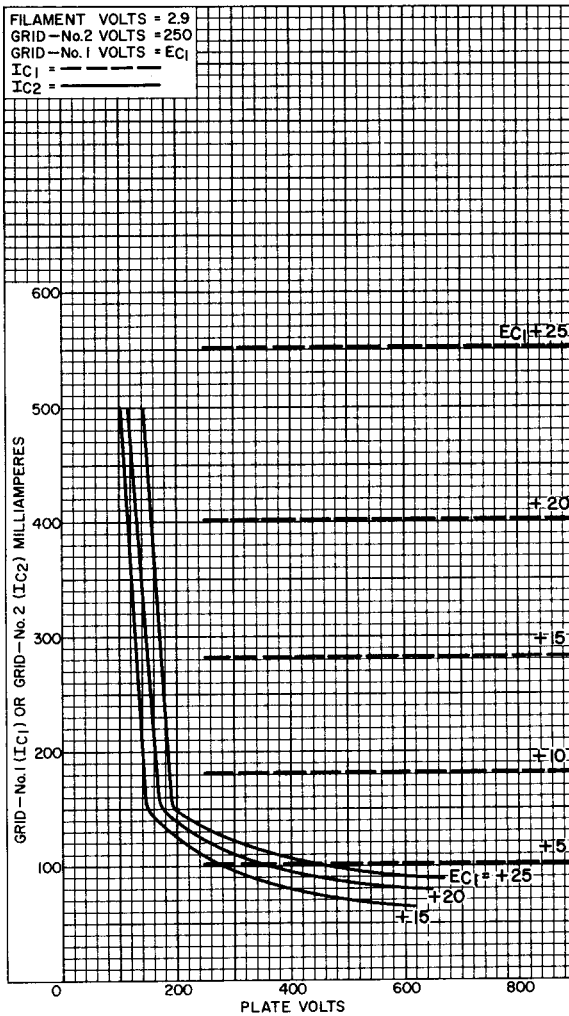
TYPICAL CHARACTERISTICS
At a Constant Grid-No.2 Voltage of 250 Volts



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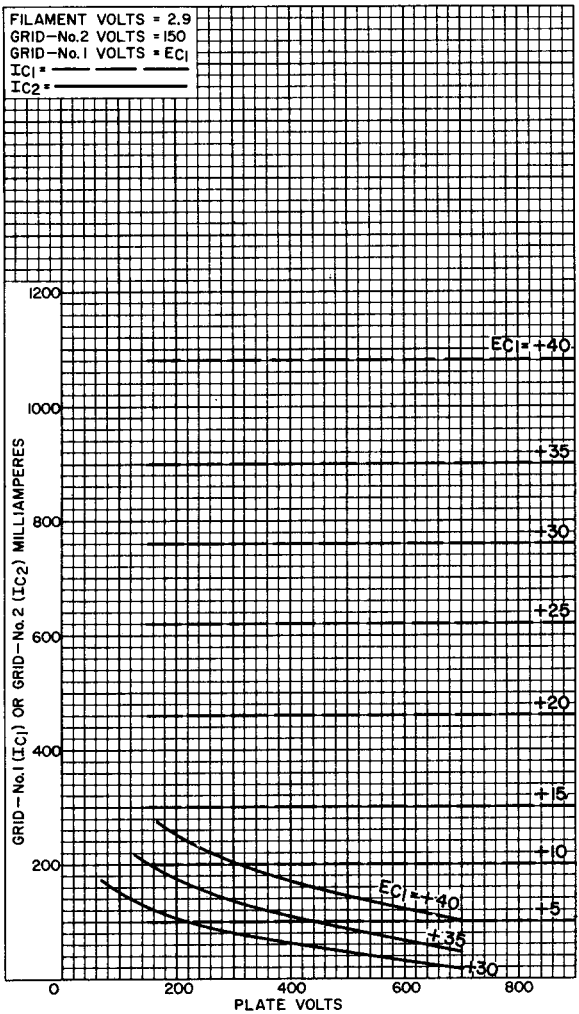
TYPICAL CHARACTERISTICS
At a Constant Grid-No.2 Voltage of 150 Volts



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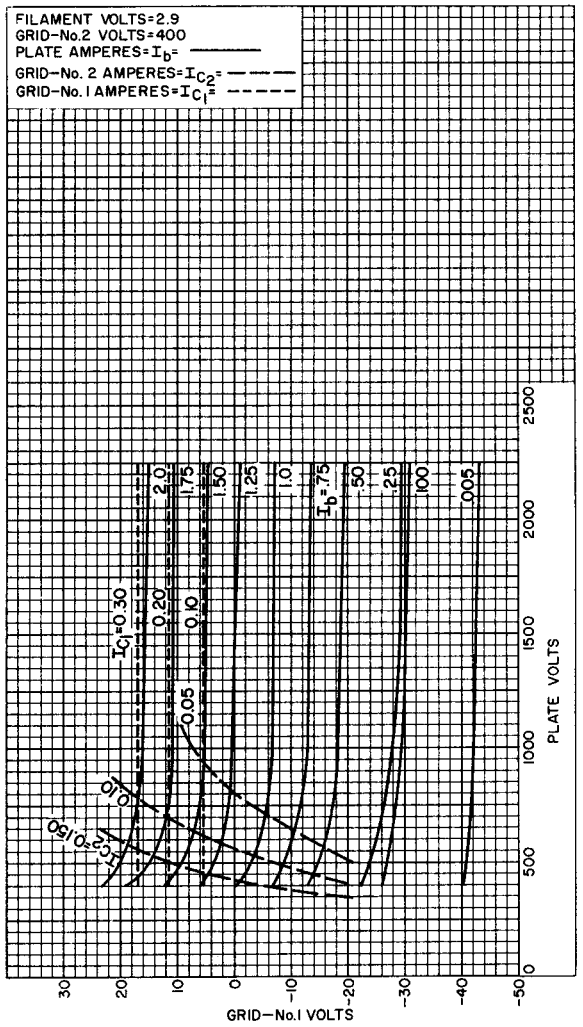
TYPICAL CONSTANT-CURRENT CHARACTERISTICS
At a Constant Grid-No.2 Voltage of 400 Volts



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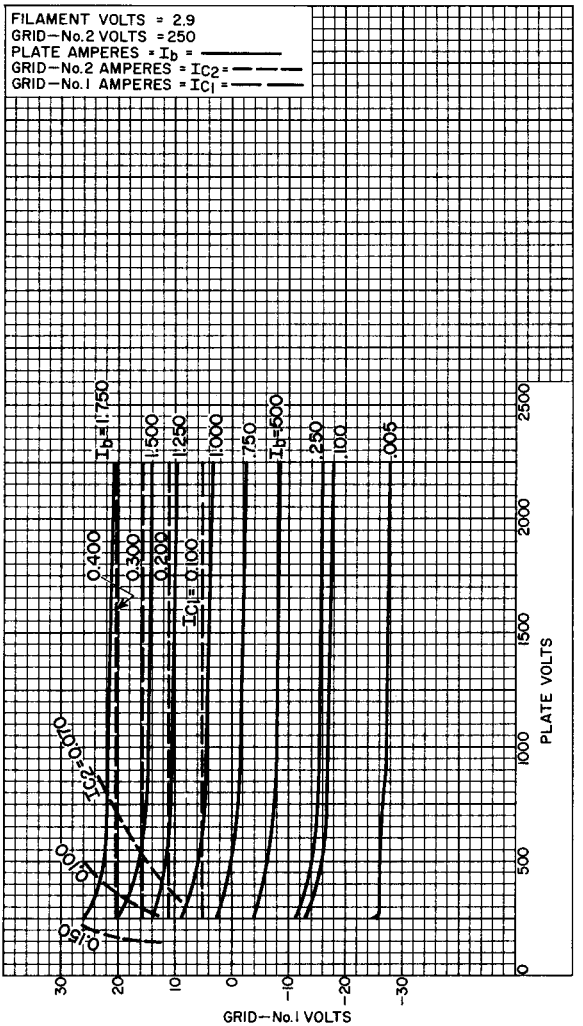
TYPICAL CONSTANT-CURRENT CHARACTERISTICS
At a Constant Grid-No.2 Voltage of 250 Volts



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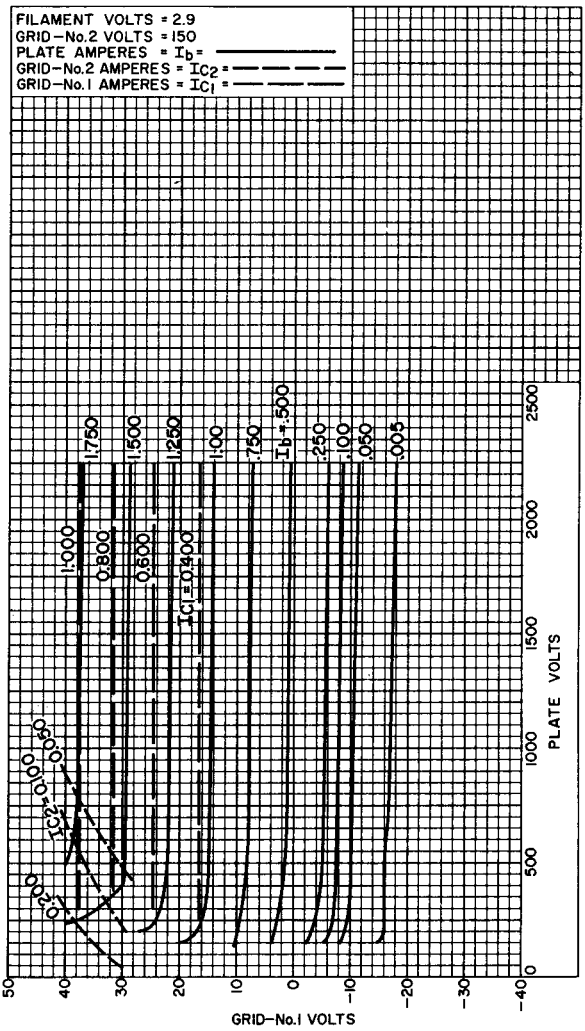
TYPICAL CONSTANT-CURRENT CHARACTERISTICS
At a Constant Grid-No.2 Voltage of 150 Volts



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