



4-65A

4-65A

BEAM POWER TUBE

*Useful at maximum ratings with natural cooling
at frequencies up to 50 Mc; at maximum ratings
with forced-air cooling from 50 to 150 Mc;
and with reduced ratings at higher frequencies*

GENERAL DATA

Electrical:

Filament, Thoriated Tungsten:

Voltage $6 \pm 5\%$ ac or dc volts ←

Current 3.5 amp

Transconductance, for plate volts =

500, grid-No.2 volts = 250,

and plate ma. = 125 4000 μ mhos ←

Mu-Factor, Grid No.2 to Grid No.1 5

Direct Interelectrode Capacitances:^oGrid No.1 to plate. 0.12 max. μ ff

Grid No.1 to filament

and grid No.2 8 μ ff

Plate to filament and

grid No.2 2.1 μ ff

Mechanical:

Operating Position. Vertical, base down or up

Maximum Overall Length. 4-3/8"

Seated Length 3-11/16" $\pm$ 3/16"

Maximum Diameter. 2-3/8"

Weight (Approx.). 3 oz ←

Cap Skirted Small (JETEC No.C1-22) ←

Heat-Radiating Plate Connector. Eimac HR-6, or equivalent

Socket. Johnson No.122-101, or equivalent

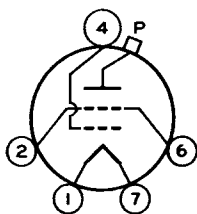
Base. Special-Button Septar 5 Pin ←

BOTTOM VIEW

Pin 1-Filament

Pin 2-Grid No.2

Pin 4-Grid No.1



Pin 6-Grid No.2

Pin 7-Filament

Cap-Plate

Bulb and Seal Temperatures:

Continuous Service. 225 max. °C ←

Adequate ventilation around the tube must be provided
to prevent the temperature of the bulb and seals from
exceeding the specified maximum value.

^o: See next page.

← Indicates a change.

4-65A



4-65A

BEAM POWER TUBE

Intermittent Service ("On" period does not exceed 5 minutes and is followed by "off" period of the same or greater duration).

250 max. °C

When ambient temperature does not exceed 30° C and the operating frequency is below 50 Mc, it will not usually be necessary to provide forced-air cooling of the bulb and seals to prevent exceeding the specified maximum temperature value provided a heat-radiating plate connector is used and adequate ventilation is provided.

AF POWER AMPLIFIER & MODULATOR — Class AB₁*

Maximum CCS* Ratings, Absolute Values:

DC PLATE VOLTAGE	3000 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE . . .	600 max.	volts
MAX.-SIGNAL DC PLATE CURRENT**	150 max.	ma
MAX.-SIGNAL GRID-No.2 INPUT**	10 max.	watts
PLATE DISSIPATION**	65 max.	watts

Typical Operation:

Values are for 2 tubes

DC Plate Voltage	1000	1500	1750	volts
DC Grid-No.2 Voltage■	500	500	500	volts
DC Grid-No.1 (Control-Grid) Voltage▲	-85	-90	-90	volts
Peak AF Grid-No.1-to-Grid-No.1 Voltage.	170	180	180	volts
Zero-Signal DC Plate Current	60	60	60	ma
Max.-Signal DC Plate Current	170	180	170	ma
Zero-Signal DC Grid-No.2 Current.	0	0	0	ma
Max.-Signal DC Grid-No.2 Current.	30	20	23	ma
Effective Load Resistance (Plate to plate)	9000	15000	20000	ohms
Max.-Signal Driving Power (Approx.).	0	0	0	watts
Max.-Signal Power Output (Approx.).	80	145	175	watts

Maximum Circuit Values:

Effective Grid-No.1-Circuit Resistance 0.25 max. megohm

AF POWER AMPLIFIER & MODULATOR — Class AB₂†

Maximum CCS* Ratings, Absolute Values:

DC PLATE VOLTAGE	3000 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE . . .	600 max.	volts

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4-65A

4-65A

BEAM POWER TUBE

MAX.-SIGNAL DC PLATE CURRENT**	150 max.	ma
MAX.-SIGNAL DC GRID-No.2 INPUT**	10 max.	watts
PLATE DISSIPATION**	65 max.	watts

Typical Operation:

Values are for 2 tubes

DC Plate Voltage.	600	1000	1500	1800	volts
DC Grid-No.2 Voltage.	250	250	250	250	volts
DC Grid-No.1 (Control-Grid) Voltage:▲▲					
From fixed supply of.	-40	-40	-45	-50	volts
Peak AF Grid-No.1-to- Grid-No.1 Voltage	240	210	200	180	volts
Zero-Signal DC Plate Current.	60	60	60	50	ma
Max.-Signal DC Plate Current.	300	300	250	220	ma
Zero-Signal DC Grid-No.2 Current.	0	0	0	0	ma
Max.-Signal DC Grid-No.2 Current	80	60	40	30	ma
Effective Load Resistance (Plate to plate).	3600	6800	14000	20000	ohms
Max.-Signal Average Driving Power (Approx.)	3.7	3	1.9	1.3	watts
Max.-Signal Peak Driving Power (Approx.)§	7.4	6	3.8	2.6	watts
Max.-Signal Power Output (Approx.)	90	170	250	270	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 Values:

DC PLATE VOLTAGE.	2500 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE.	400 max.	volts
DC GRID-No.1 (CONTROL-GRID) VOLTAGE	-500 max.	volts
DC PLATE CURRENT.	120 max.	ma
GRID-No.1 INPUT	5 max.	watts
GRID-No.2 INPUT	10 max.	watts
PLATE DISSIPATION	45 max.	watts

Typical Operation:

DC Plate Voltage.	600	1000	1500	2000	2500	volts
DC Grid-No.2 Voltage ^{oo} .	250	250	250	250	250	volts
DC Grid-No.1 Voltage [®]	-120	-125	-125	-130	-135	volts
Peak AF Grid-No.2 Voltage (For 100% modulation)	250	250	250	250	250	volts
Peak RF Grid-No.1 Voltage.	215	220	220	225	215	volts
DC Plate Current.	120	120	120	120	110	ma
DC Grid-No.2 Current.	40	40	40	40	25	ma

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4-65A



4-65A

BEAM POWER TUBE

DC Grid-No.1 Current (Approx.)	15	16	16	16	12	ma
Driving Power (Approx.)	3.2	3.5	3.5	3.6	2.6	watts
Power Output (Approx.)	45	90	140	195	230	watts

RF POWER AMPLIFIER & OSCILLATOR — Class C Telegraphy[#]
and
RF POWER AMPLIFIER — Class C FM Telephony
Maximum CCS^o Ratings, Absolute Values:

DC PLATE VOLTAGE.	3000 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE.	400 max.	volts
DC GRID-No.1 (CONTROL-GRID) VOLTAGE	-500 max.	volts
DC PLATE CURRENT.	150 max.	ma
GRID-No.1 INPUT	5 max.	watts
GRID-No.2 INPUT	10 max.	watts
PLATE DISSIPATION	65 max.	watts

→ Typical Operation:

DC Plate Voltage.	600	1000	1500	2000	3000	volts
DC Grid-No.2 Voltage.	250	250	250	250	250	volts
DC Grid-No.1 Voltage.	-75	-80	-85	-90	-100	volts
Peak RF Grid-No.1 Voltage.	170	175	180	190	170	volts
DC Plate Current.	150	150	150	140	115	ma
DC Grid-No.2 Current.	40	40	40	40	22	ma
DC Grid-No.1 Current (Approx.)	18	17	18	11	10	ma
Driving Power (Approx.)	3.1	3	3.2	2.1	1.7	watts
Power Output (Approx.)	45	95	165	215	280	watts

→ LINEAR RF POWER AMPLIFIER — Class AB₁
Single-Sideband Suppressed-Carrier Service
Maximum CCS^o Ratings, Absolute Values:

Up to 60 Mc

DC PLATE VOLTAGE.	3000 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE.	600 max.	volts
MAX.-SIGNAL DC PLATE CURRENT.	150 max.	ma
GRID-No.2 INPUT	10 max.	watts
PLATE DISSIPATION	65 max.	watts

**Typical Operation for "Single-Tone Modulation" and/or
"Two-Tone Modulation":**

DC Plate Voltage.	1000	1500	2000	2500	3000	volts
DC Grid-No.2 Voltage.	510	480	450	405	360	volts
DC Grid-No.1 (Control- Grid) Voltage ^Δ	-110	-105	-100	-90	-85	volts
Zero-Signal DC Plate Current	45	30	22	17	15	ma

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4-65A

4-65A

BEAM POWER TUBE

Effective RF Load Resistance	3240	7500	12600	19000	24900	ohms
"Single-Tone Modulation":●						
Max.-Signal Peak RF Grid-No.1 Voltage	110	105	100	90	85	volts
Max.-Signal DC Plate Current	100	90	80	70	65	ma
Max.-Signal DC Grid-No.2 Current . . .	17	13	11	8.5	6.5	ma
Max.-Signal DC Grid-No.1 Current . . .	0	0	0	0	0	ma
Max.-Signal Power Output	40	75	100	115	130	watts
"Two-Tone Modulation":●●						
Average DC Plate Current	80	70	60	50	45	ma
Average DC Grid-No.2 Current . . .	6	4	3	2.5	1.5	ma

- without external shield.
- * subscript 1 indicates that grid-No.1 current does not flow during any part of the input cycle.
- continuous commercial service.
- ** Averaged over any audio-frequency cycle of sine-wave form.
- Obtained from a source having good regulation.
- ▲ Adjusted to give indicated value of zero-signal plate current.
- † subscript 2 indicates that grid-No.1 current flows during some part of the input cycle.
- ▲▲ Adjusted to give indicated value of zero-signal plate current. The dc resistance of the bias source should not exceed 250 ohms.
- § The driver stage should be capable of supplying the No.1 grids of the class AB₂ stage with the specified driving power at low distortion. The effective resistance per grid-No.1 circuit of the class AB₂ stage should be held at a low value.
- Modulation voltage for grid No.2 is obtained by supplying the dc grid-No.2 voltage from the modulated plate supply through a series dropping resistor or an af reactor, or from a separate winding on the modulation transformer.
- ⊕ The use of bias obtained partially from a grid resistor is recommended.
- * Key-down conditions per tube without amplitude modulation. Amplitude modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115% of the carrier conditions. When the 4-65A is used in the final amplifier or a preceding stage of a transmitter designed for break-in operation or oscillator keying, a small amount of fixed bias must be used to maintain the plate dissipation within the rated value. With 2000 volts on the plate, and 250 volts on grid No.2, a fixed bias of at least -40 volts should be used.
- "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.
- "Two-Tone" operation refers to the simultaneous amplification of the two equal-amplitude, radio-frequency signals resulting from modulation of a single-sideband, suppressed-carrier transmitter by two audio-frequency signals of equal amplitude. The data shown for "Two-Tone" modulation refer to the case in which the peak amplitude of the resultant rf grid signal is equal to "Max.-Signal) Peak RF Grid-No.1 Voltage" as specified under "Single-Tone" modulation.

4-65A

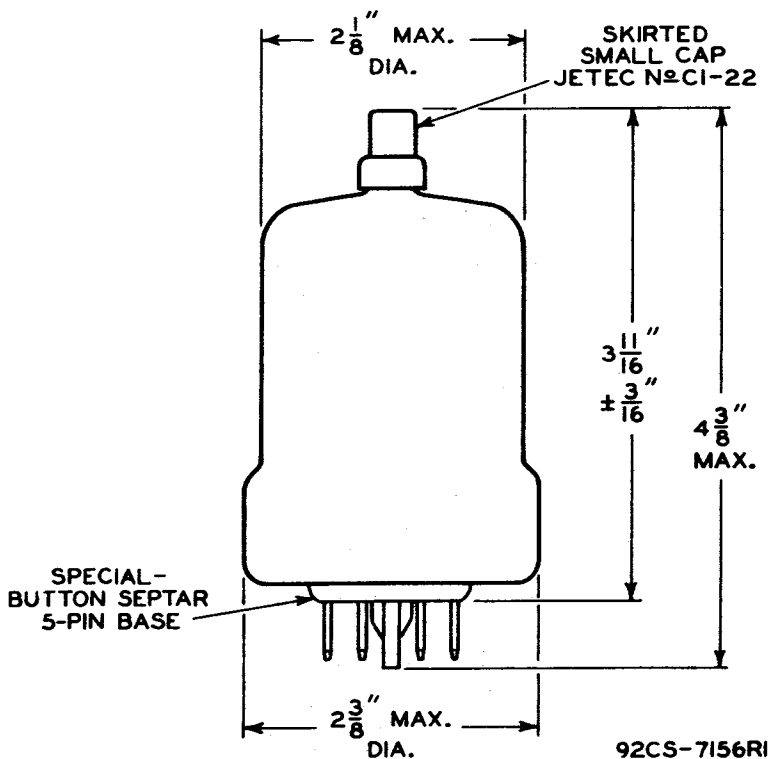


4-65A

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MAXIMUM RATINGS vs OPERATING FREQUENCY

FREQUENCY	50	Mc
MAXIMUM-PERMISSIBLE PERCENTAGE OF MAXIMUM-RATED PLATE VOLTAGE OR PLATE INPUT:		
Class C plate-modulated telephony	100	%
Class C telegraphy	100	%

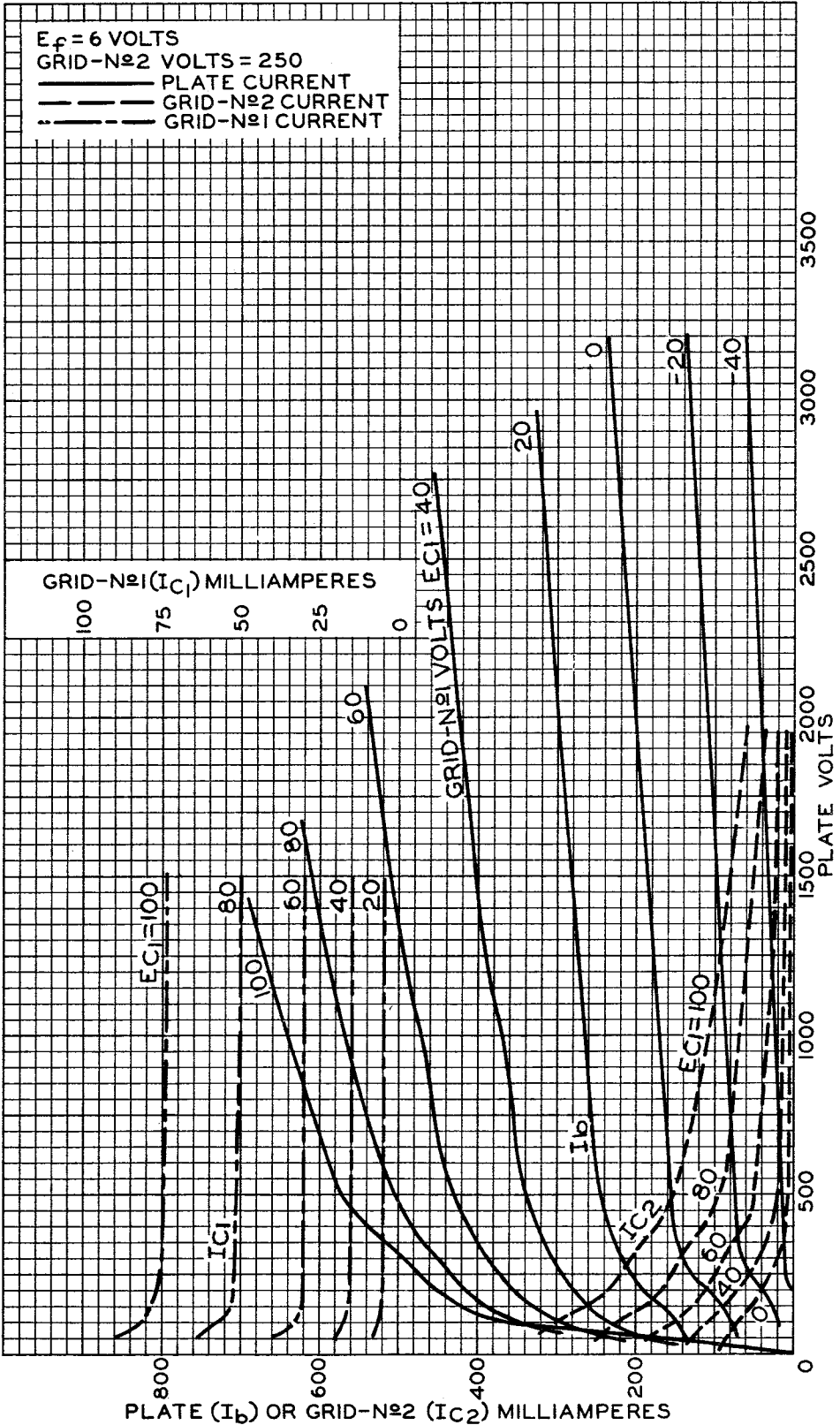




4-65A

4-65A

TYPICAL CHARACTERISTICS

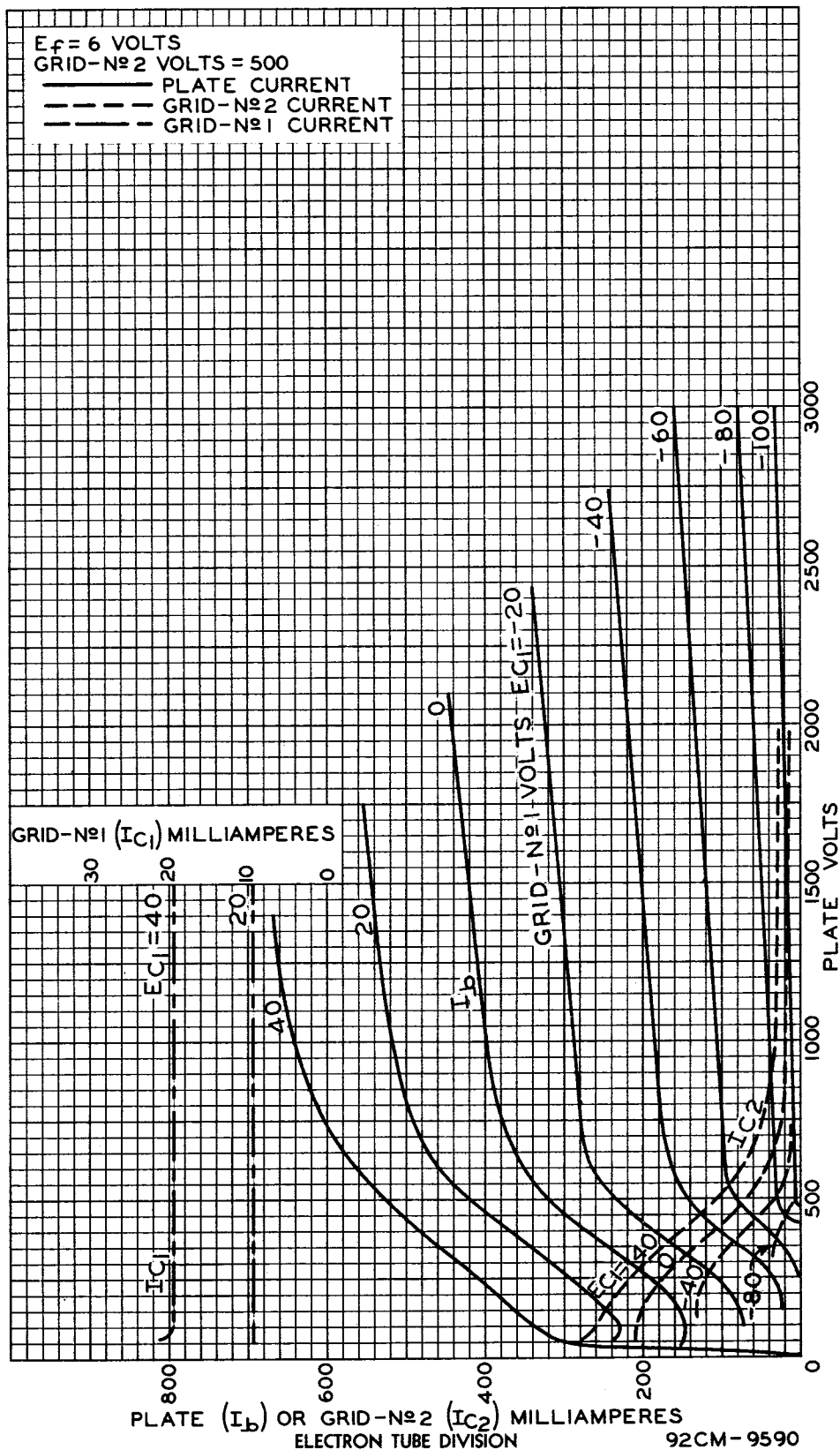


4-65A



4-65A

TYPICAL CHARACTERISTICS

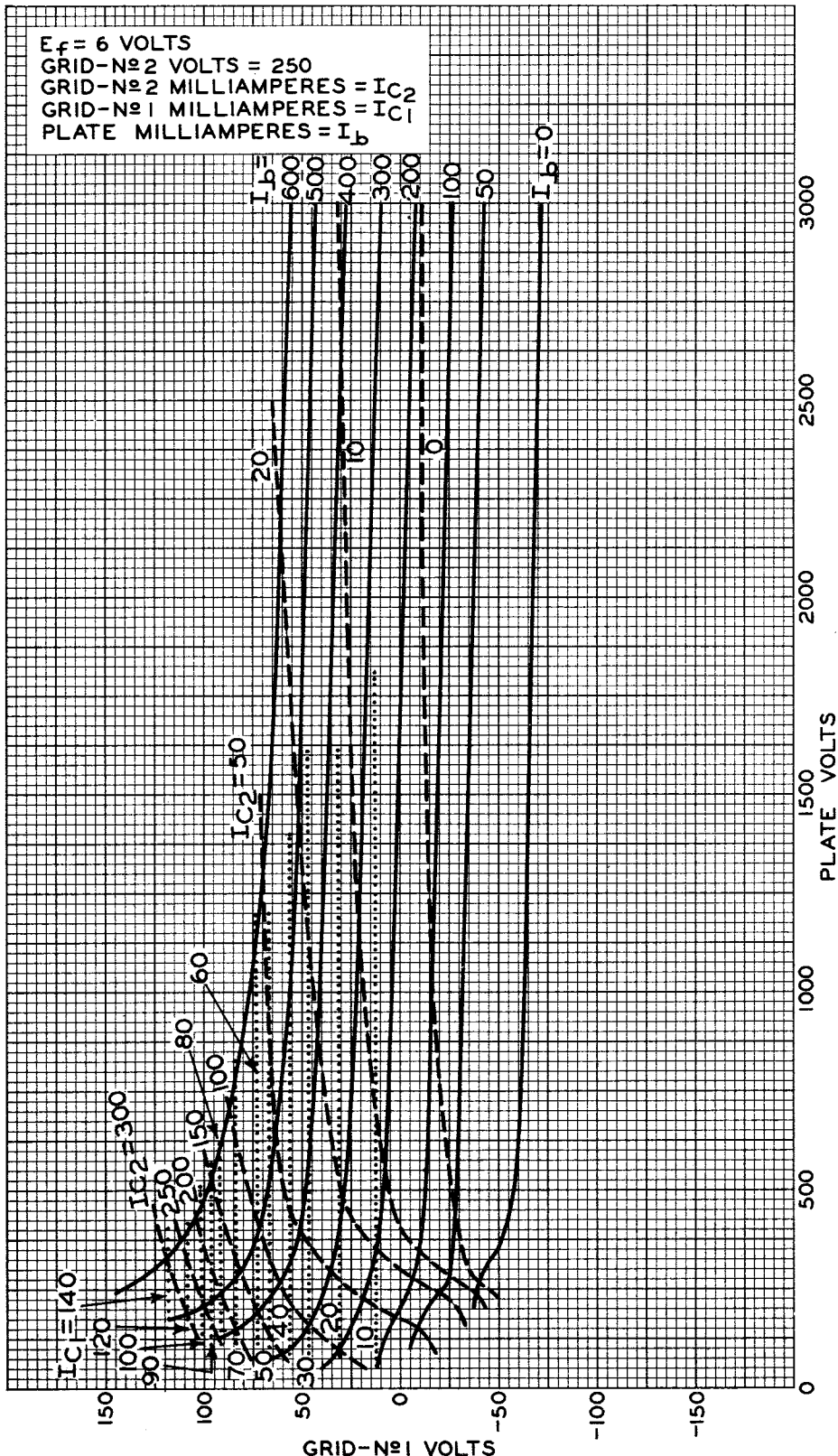




4-65A

4-65A

TYPICAL CONSTANT-CURRENT CHARACTERISTICS



GRID-No 1 VOLTS

ELECTRON TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7155R1