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UHF BEAM POWER TUBE

WATER-COOLED ELECTRODES

GENERAL DATA

Electrical:

Filament*, 2-Section Multi-strand
 Thoriated Tungsten:

Voltage per section (AC or DC)	} 1.35 av. volts 1.50 max. volts
Current per section at 1.35 volts . . .	
Starting current per section	Must never exceed 1500 amperes, even momentarily
Cold resistance per section	0.0002 ohm
Minimum heating time	10 seconds
Supply circuits	See Circuits

Mu-Factor, Grid No.2 to Grid No.1 for plate
 volts = 3000, grid-no.2 volts = 800, and plate
 amperes = 4 6

Direct Interelectrode Capacitances:

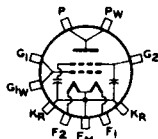
Grid No.1 to plate	0.1 max.	$\mu\mu\text{f}$
Input	335	$\mu\mu\text{f}$
Output	30	$\mu\mu\text{f}$

Internal Bypass Capacitors between
 Grid No.2 and Cathode (Total) 15000 $\mu\mu\text{f}$

Mechanical:

Terminal Connections:

- F₁ - Fil. Sect. No.1 & Water Conn.
- F₂ - Fil. Sect. No.2 & Water Conn.
- G₁ - RF Grid-No.1 Term. Contact Surface
- G_{1W} - DC Grid-No.1 & Water Conn.
- G₂ - DC Grid-No.2 & Water Conn.



- K_R - RF Cath. Term. Contact Surface For Circuit Returns
- F_M - Common Point of Fil. Sections & Water Conn.
- P - RF Plate Term. Contact Surface
- P_W - DC Plate & Water Conn.

For location of respective terminals, see Dimensional Outline

Mounting Position Tube axis vertical, with plate terminal either up or down

Overall Length 7-11/32" + 3/8" - 1/2"

Maximum Diameter 11-3/8"

Air Cooling:

Forced-air cooling of the ceramic bushing at the grid-No.1 seal and at the plate seal is required only if the temperature of the ceramic bushing at either seal exceeds the specified maximum value of 150°C. Under such conditions, provision should be made for blowing air at the ceramic bushings through suitable openings in the coaxial-cylinder cavity circuit.

*: See operating notes on conserving filament life.

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Water Cooling:

Water cooling of the filament-section blocks, rf cathode terminals, grid-No.1 block, grid-No.2 block, and plate is required. The water flow must start before application of any voltage and preferably should continue for several seconds after removal of all voltages. Interlocking of the water flow through each of the cooled elements with all power supplies is recommended to prevent tube damage in case of failure of adequate water flow.

Water Flow:

	Min. gpm	Typical gpm	Pressure Drop* psi
To Filament-Section- No.1 Block	0.5	0.5	2
		1.2	11
To Filament-Section- No.2 Block	0.5	0.5	2
		1.2	11
To Filament Mid-Tap Block . .	0.5	0.5	2
		1.2	10
To Grid-No.1 Block	0.5	0.5	1
		1.2	6
To Grid-No.2 Block	0.5	0.5	3
		1.2	15

To Plate:

For plate dissipation of 10 kw	4.5	-	3.5
For plate dissipation of 15 kw	7.5	-	8.5
For plate dissipation of 20 kw	11	-	16
For plate dissipation of 26 kw	14	-	25

Gauge Pressure at Any Inlet	70 max.	psi
Ceramic Bushing Temperature	150 max.	°C
Outlet Water Temperature (Any outlet)	70 max.	°C
Weight (Approx.)	25	lbs

RF POWER AMPLIFIER--Class B Television Service

Synchronizing-level conditions per tube unless otherwise indicated

Maximum CCS* Ratings, Absolute Values:

	Up to 1000 Mc	
DC PLATE VOLTAGE	7000 max.	volts
DC PLATE-SUPPLY VOLTAGE	8000 max.	volts
DC GRID-No.2 (SCREEN) VOLTAGE	1000 max.	volts
DC GRID-No.2-SUPPLY VOLTAGE	1100 max.	volts

* Directly across cooled element for the indicated flow.

• See next page.

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TUBE DIVISION

TENTATIVE DATA 1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



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DC PLATE CURRENT	7 max.	amp
DC GRID-No.1 (CONTROL-GRID) CURRENT	0.5 max.	amp
PLATE INPUT	49000 max.	watts
GRID-No.2 INPUT (Pedestal Level)	600 max.	watts
PLATE DISSIPATION	26000 max.	watts

Typical Operation:

	At 500 Mc	At 900 Mc	
<i>Bandwidth[▲] of</i>	7	7	Mc
DC Plate Voltage	6000	6500	volts
DC Grid-No.2 Voltage	950	950	volts
DC Grid-No.1 Voltage	-140	-140	volts
Peak RF Grid-No.1 Voltage:			
Synchronizing level	160	160	volts
Pedestal level	100	100	volts
DC Plate Current:			
Synchronizing level	6.9	6.8	amp
Pedestal level	5.3	5.2	amp
DC Grid-No.2 Current:			
Synchronizing level	0.75	0.6	amp
Pedestal level	0.35	0.3	amp
DC Grid-No.1 Current (Approx.):			
Synchronizing level	0.13	0.1	amp
Pedestal level	0	0	amp
Driver Power Output (Approx.): [♣]			
Synchronizing level	600	1000	watts
Pedestal level	350	560	watts
Output-Circuit Efficiency (Approx.)	85	80	per cent
Useful Power Output (Approx.):			
Synchronizing level	15000 ^{••}	12000 ^{••}	watts
Pedestal level	8400 ^{••}	6700 ^{••}	watts

PLATE-MODULATED RF POWER AMP.--Class C Telephony

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

Maximum CCS[®] Ratings, Absolute Values:

	Up to 1000 Mc	
DC PLATE VOLTAGE	4500 max.	volts
DC GRID-No.2 (SCREEN) VOLTAGE	1000 max.	volts
PEAK GRID-No.2 VOLTAGE (DC + AC Component)	1200 max.	volts
DC GRID-No.1 (CONTROL-GRID) VOLTAGE	-300 max.	volts
DC PLATE CURRENT	4.5 max.	amp
DC GRID-No.1 CURRENT	1 max.	amp
PLATE INPUT	22500 max.	watts

▲ Between the half-power points as measured in the output circuit.

•, ♣, ••: See next page.

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TENTATIVE DATA 2

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UHF BEAM POWER TUBE

GRID-No.2 INPUT	400 max.	volts
PLATE DISSIPATION	16500 max.	watts

Typical Operation:	At 400 Mc	At 900 Mc	
DC Plate Voltage	4000	4250	volts
DC Grid-No.2 Voltage*	600	600	volts
DC Grid-No.1 Voltage	-200	-200	volts
Peak RF Grid-No.1 Voltage	210	210	volts
DC Plate Current	4.25	4	amp
DC Grid-No.2 Current	0.65	0.6	amp
DC Grid-No.1 Current (Approx.)	0.3	0.2	amp
Driver Power Output (Aprox.)*	700	1000	watts
Output-Circuit Efficiency (Approx.)	80	75	per cent
Useful Power Output (Approx.)	7250**	4500**	watts

RF POWER AMPLIFIER--Class C Telegraphy[□]
and
RF POWER AMPLIFIER--Class C FM Telephony

Maximum CCS* Ratings, Absolute Values:

	Up to 1000 Mc	
DC PLATE VOLTAGE	7000 max.	volts
DC PLATE-SUPPLY VOLTAGE	8000 max.	volts
DC GRID-No.2 (SCREEN) VOLTAGE	1000 max.	volts
DC GRID-No.2-SUPPLY VOLTAGE	1100 max.	volts
DC GRID-No.1 (CONTROL-GRID) VOLTAGE	-300 max.	volts
DC PLATE CURRENT	6.5 max.	amp
DC GRID-No.1 CURRENT	0.5 max.	amp
PLATE INPUT	45500 max.	watts
GRID-No.2 INPUT	600 max.	watts
PLATE DISSIPATION	26000 max.	watts

Typical Operation:	At 400 Mc	At 900 Mc	
DC Plate Voltage	6500	6500	volts
DC Grid-No.2 Voltage†	800	800	volts
DC Grid-No.1 Voltage††	-140	-140	volts
Peak RF Grid-No.1 Voltage	160	160	volts
DC Plate Current	6	6.3	amp
DC Grid-No.2 Current	0.5	0.4	amp
DC Grid-No.1 Current (Approx.)	0.2	0.15	amp
Driver Power Output (Approx.)*	400	800	watts
Output-Circuit Efficiency (Approx.)	85	77	per cent
Useful Power Output (Approx.)	14000**	11000**	watts

* Continuous Commercial Service.

† obtained preferably from a separate source.

□, **, †, ††: See next page.

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TENTATIVE DATA 2

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UHF BEAM POWER TUBE

- 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.
- * 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.
- ** This value of useful power is measured at load of output circuit having indicated efficiency.
- † 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 6448 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 1100 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.

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Filament Current per Section	1	900	1100	amp
Filament Current per Section	2	960	1160	amp
Grid-No.1 Voltage	1,3	-	-160	volts
Useful Power Output	1,4	11000	-	watts
Power Gain	1,4,5	10	-	

Note 1: With 1.35 volts ac per section.

Note 2: With 1.5 volts ac per section.

Note 3: With 2-phase excitation of the filament sections, dc plate voltage of 6500 volts, dc grid-No.2 voltage of 800 volts, and dc grid-No.1 voltage adjusted to give a dc plate current of 0.5 ampere.

Note 4: With 2-phase excitation of the filament sections. In rf power amplifier circuit having bandwidth of 7 Mc as defined by the half-power points and with dc plate voltage of 7000 volts, dc grid-No.2 voltage of 800 volts, dc grid-No.1 voltage of -130 volts, drive adjusted to give dc plate current of 6.75 amperes, and frequency of 900 Mc.

Note 5: With driving power measured at input to input-cavity circuit fed by transmission line having voltage-standing-wave ratio not greater than 2. Power gain is ratio of useful power output to driving power.

OPERATING NOTES

Instructions for conserving filament life of the 6448 and for the use of high-speed electronic protective devices with it are given in the technical bulletin. A copy of the technical bulletin for the 6448 will be supplied on request to Commercial Engineering, RCA, Harrison, N.J.



FILAMENT-SUPPLY CIRCUITS

WITH SINGLE-PHASE AC EXCITATION	SECTIONS IN SERIES	<p>V=2.7 VOLTS RMS A=1000 AMPERES</p>
	SECTIONS IN PARALLEL	<p>V=1.35 VOLTS RMS A=2000 AMPERES</p>
WITH TWO-PHASE (QUARTER PHASE) AC EXCITATION		<p>Center Tap For Circuit Returns V=1.35 VOLTS RMS A=1000 AMPERES</p>
WITH DC EXCITATION	SECTIONS IN SERIES	<p>V=2.7 VOLTS DC A=1000 AMPERES</p>
	SECTIONS IN PARALLEL	<p>V=1.35 VOLTS DC A=2000 AMPERES</p>
		<p>F₁ = FILAMENT SECTION N°1 F₂ = FILAMENT SECTION N°2 F_M = COMMON POINT OF FILAMENT SECTIONS</p>

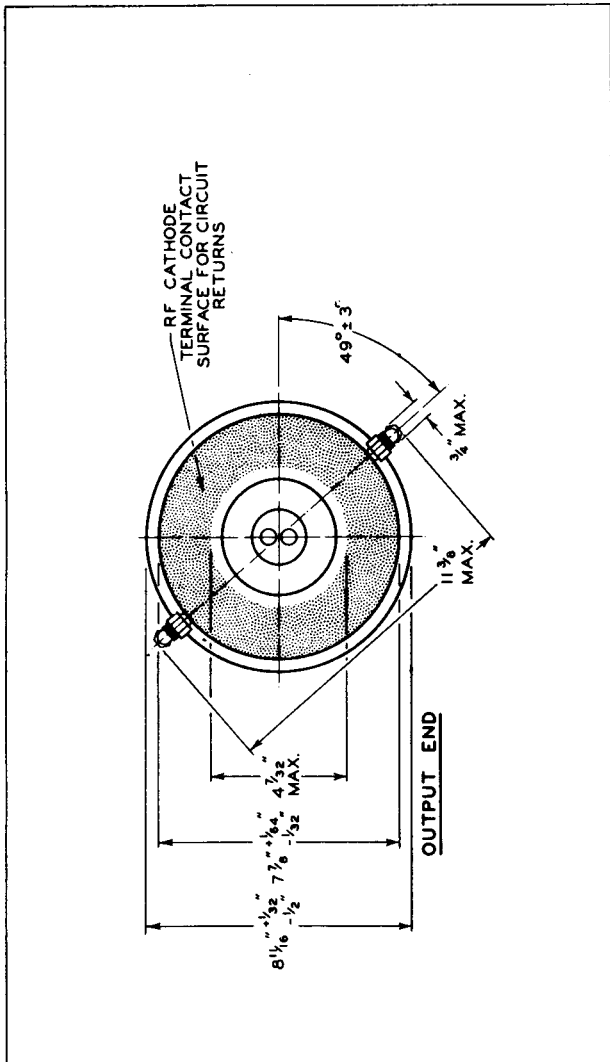
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UHF BEAM POWER TUBE



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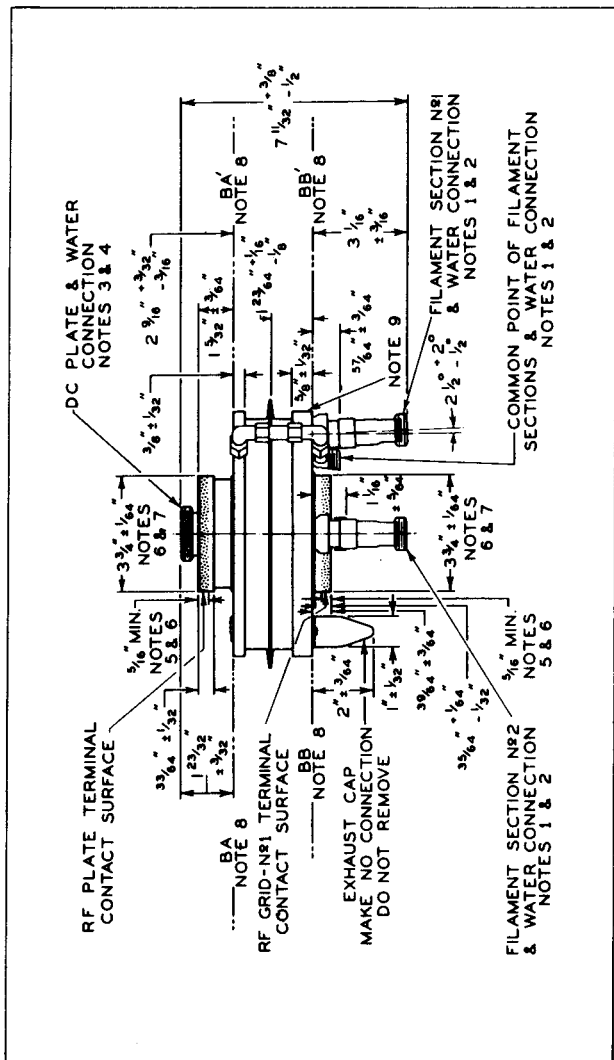
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UHF BEAM POWER TUBE



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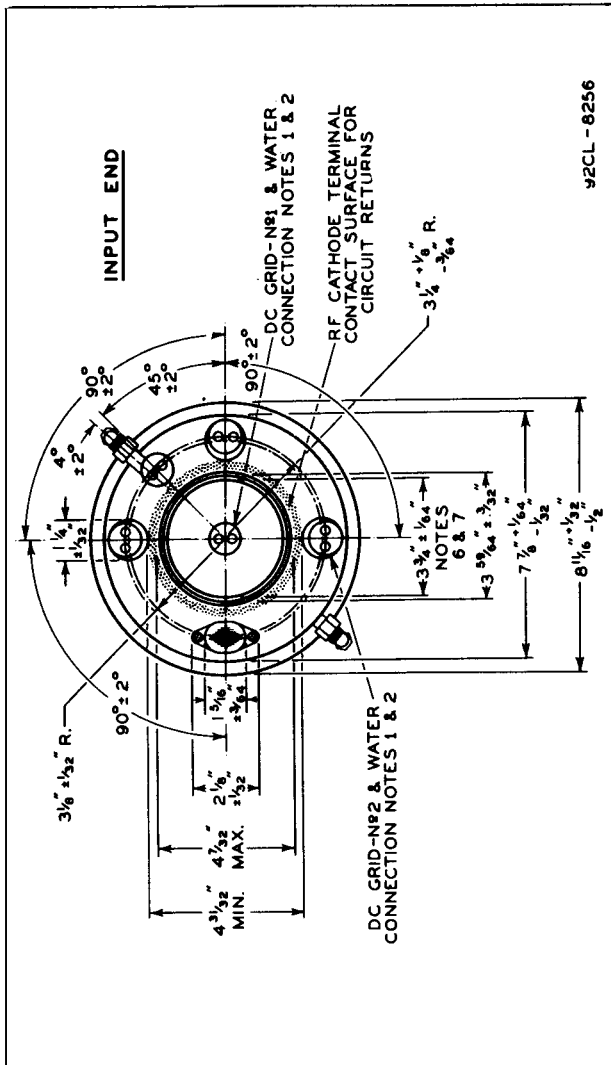
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UHF BEAM POWER TUBE

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UHF BEAM POWER TUBE

NOTE 1: WATER CONNECTIONS FOR FILAMENT SECTIONS No.1 AND No.2, COMMON POINT OF FILAMENT SECTIONS, GRID No.1, AND GRID No.2 HAVE 1" -16 AMERICAN STANDARD THREAD, FREE FIT (CLASS 2), 3/8" LONG, AND 2 HOLES 0.257" - 0.270" DIAMETER SPACED 7/16" ON CENTERS.

NOTE 2: THE HOLES IN THE INDICATED WATER CONNECTIONS OF NOTE 1 WILL ACCEPT THE PINS OF THE PLUG-AND-CYLINDER COMBINATION GAUGE SHOWN IN SKETCH G₁.

NOTE 3: WATER CONNECTION FOR THE PLATE HAS 1-3/4"-16 AMERICAN STANDARD THREAD, FREE FIT (CLASS 2), 3/8" LONG, AND 2 HOLES 0.508"-0.522" DIAMETER SPACED 11/16" ON CENTERS.

NOTE 4: THE HOLES IN THE PLATE WATER CONNECTION WILL ACCEPT THE PINS OF THE PLUG-AND-CYLINDER COMBINATION GAUGE SHOWN IN SKETCH G₂.

NOTE 5: CONTACT LENGTH OF CIRCUIT CONNECTOR IS 5/16" MAX.

NOTE 6: THIS DIAMETER DIMENSION IS HELD ONLY OVER A LENGTH OF 5/16"; OVER REMAINDER OF LENGTH, THE DIAMETER MAY INCREASE TO 3-7/8" MAX.

NOTE 7: THE AXIS OF THE RF PLATE CONTACT SURFACE IS COINCIDENT WITH THE AXIS OF THE RF GRID-NO.1 CONTACT SURFACE WITHIN 3/32".

NOTE 8: THE CONTACT SURFACES BA-BA' AND BB-BB' ARE PARALLEL WITHIN 1/16".

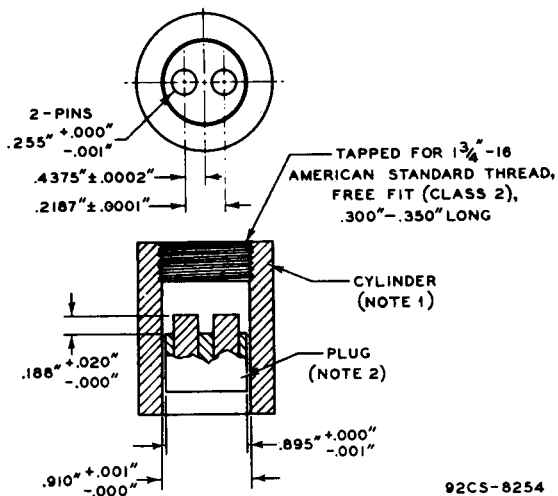
NOTE 9: SERIAL NUMBER IS LOCATED ON THIS SURFACE BETWEEN DC GRID-NO.2 AND FILAMENT SECTION No.1 CONNECTIONS.



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UHF BEAM POWER TUBE

GAUGE SKETCH G₁

NOTE 1: TAPPED SECTION OF CYLINDER MUST BE CONCENTRIC WITH UNTAPPED SECTION OF CYLINDER WITHIN .002"

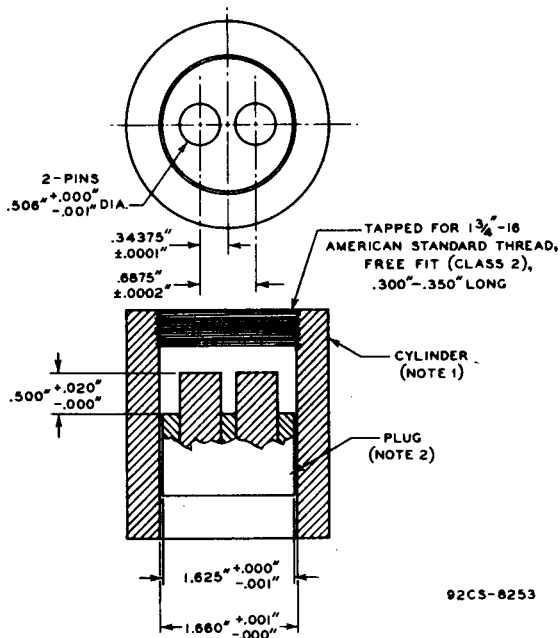
NOTE 2: PLUG SIDES & PIN SIDES MUST BE PARALLEL WITHIN .001"

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UHF BEAM POWER TUBE

GAUGE SKETCH G₂

92CS-8253

NOTE 1: TAPPED SECTION OF CYLINDER MUST BE CONCENTRIC WITH UNTAPPED SECTION OF CYLINDER WITHIN $.002$ "

NOTE 2: PLUG SIDES & PIN SIDES MUST BE PARALLEL WITHIN $.001$ "

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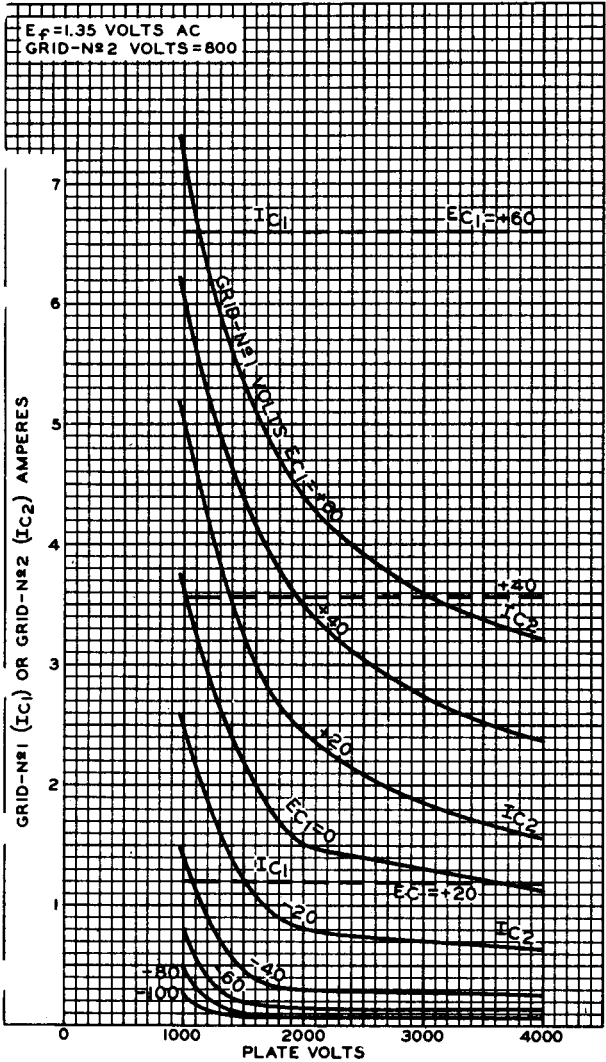
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AVERAGE CHARACTERISTICS

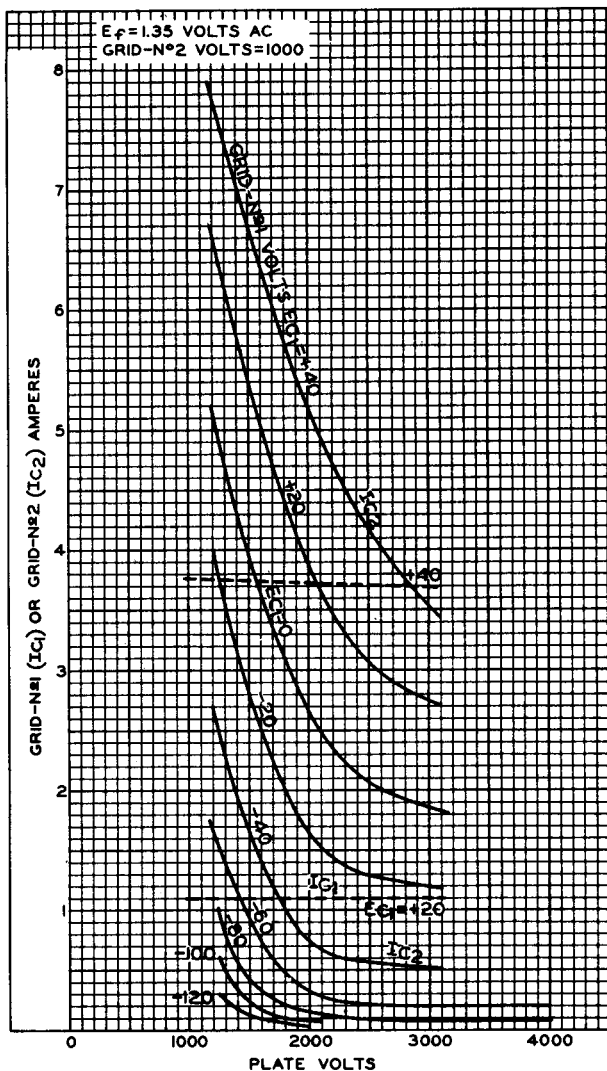


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AVERAGE CHARACTERISTICS



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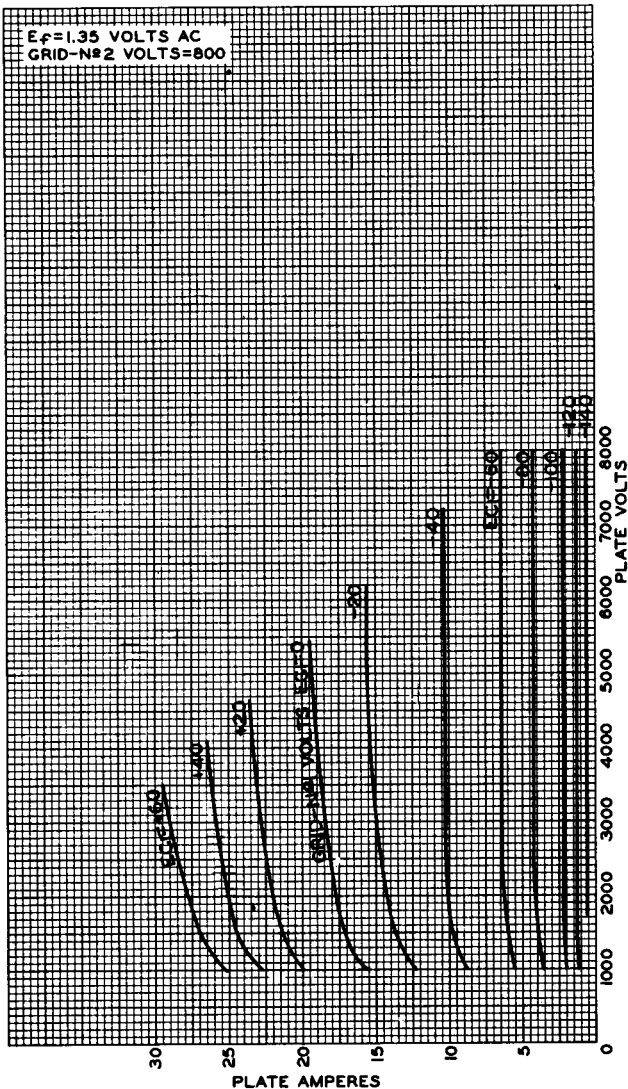
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AVERAGE PLATE CHARACTERISTICS



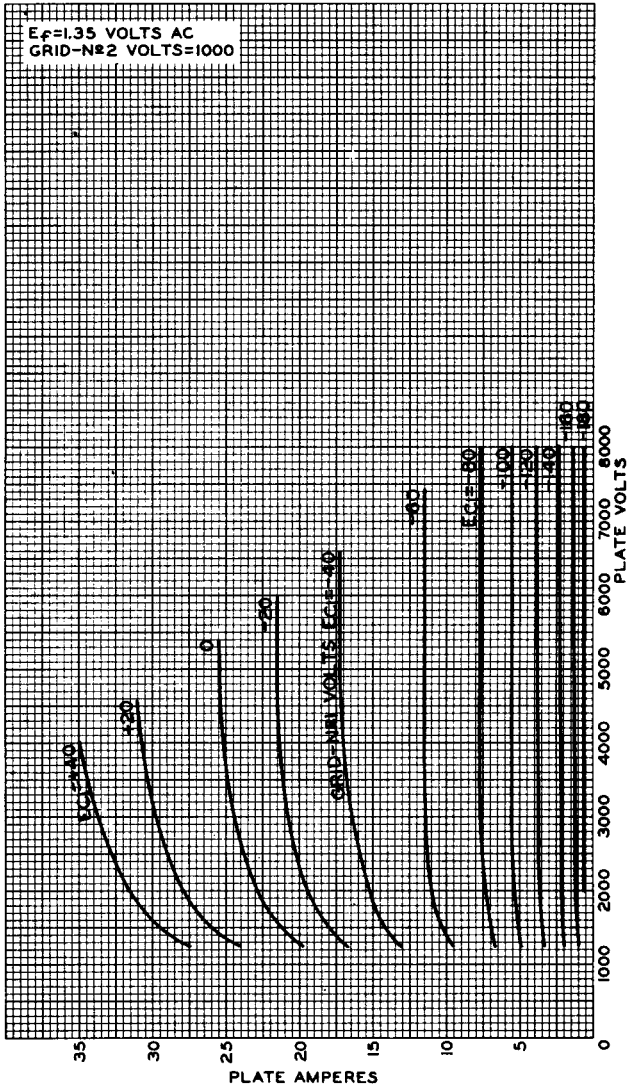
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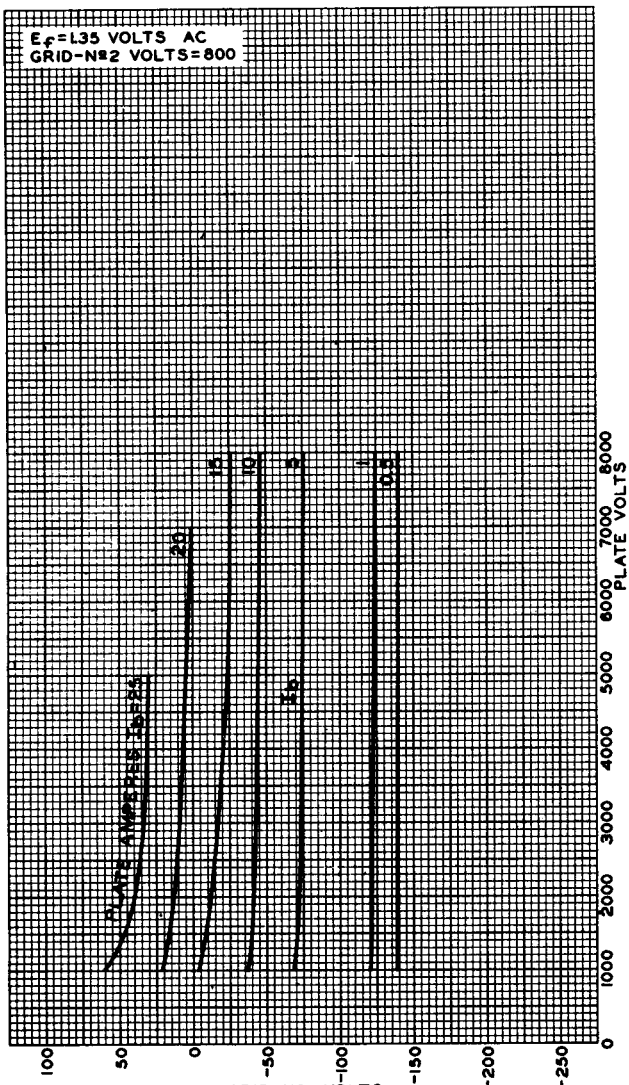
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AVERAGE PLATE CHARACTERISTICS



AVERAGE CONSTANT-CURRENT CHARACTERISTICS



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GRID-N#1 VOLTS
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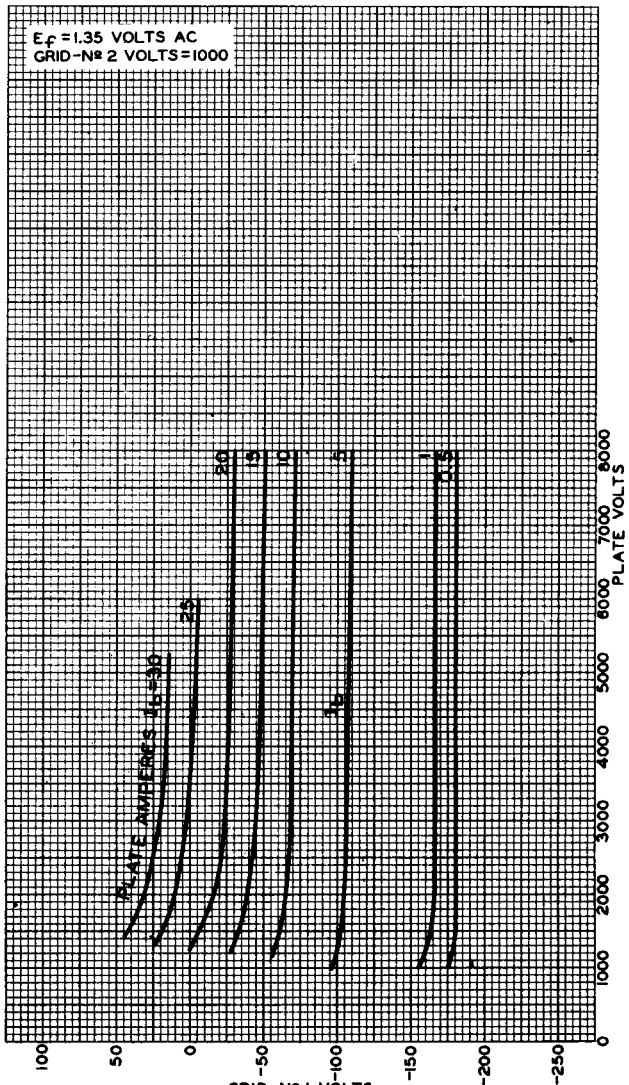
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AVERAGE CONSTANT-CURRENT CHARACTERISTICS



FEB. 24, 1954

GRID-N^o 1 VOLTS
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