POWER PENTODE TYPES 6BQ5 and 8BQ5

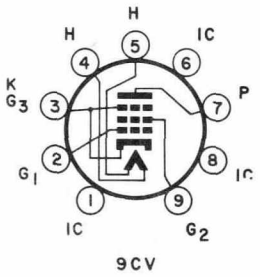
The 6BQ5 and 8BQ5 are 9-Pin miniature power pentodes designed for service as audio output amplifiers. They are intended for radio and television receivers and home music systems. The 6BQ5 and 8BQ5 combine high power sensitivity and plate efficiency with low distortion and driving voltage requirements.

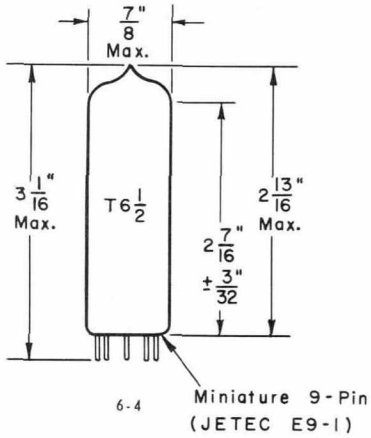
The 8BQ5 has been designed for use in receivers which employ series-connected heaters, especially in television receivers where the picture-tube heater is in series with other heaters. When it is employed in this type of circuit with other tubes having a heater current rating of 600 ma., heater voltage surges across individual tubes are minimized inasmuch as the heater warm-up characteristic is controlled.

ELECTRICAL:			
Cathode	Coated Unipotential		
Heater:	6BQ5	8BQ5	
Voltage	6.3	8.0	Volts
Current	0.76	0.60 ± 6%	Ampere
Warm-up Time♦	--	11	Seconds
Direct Interelectrode Capacitances:			
Grid 1 to Plate	0.5	max.	μμf
Grid 1 to Heater	0.25	max.	μμf
Plate to All Other Elements	6.5		μμf
Grid 1 to All Other Elements	10.8		μμf

MECHANICAL:	
Bulb	T-6-1/2
Base	Miniature 9-Pin (JEDEC E9-1)
Basing	9CV
Mounting Position	Any

MAXIMUM RATINGS	AC Line	Vibrator		
Design Center Values:	Power Supply	Power Supply		
Plate Voltage	300	250	max.	Volts
Grid 2 Voltage	300	250	max.	Volts
Plate Diesipation	12	9	max.	Watts
Cutoff Operation:				
Plate Voltage	550		max.	Volts
Grid 2 Voltage	550		max.	Volts
Grid 2 Dissipation	2		max.	Watts
Grid 1 Negative Voltage	100		max.	Volts
Grid 1 Voltage for				
Grid 1 Current of 0.3 μampere	-1.3		max.	Volts
Cathode Current	65		max.	Ma.
Heater Cathode Voltage	± 100		max.	Volts
Grid 1 Circuit Values:				
Fixed Bias	0.3		max.	Meghom
Cathode Resistor Bias	1.0		max.	Meghom





CLASS A AMPLIFIER
(one tube)

Typical Operating Characteristics:						
For: Plate Voltage	250	Volts				
Grid 2 Voltage	250	Volts				
Grid 1 Voltage	-7.3	Volts				
or Cathode Bias Resistor	135	Ohms				
Plate Load Impedance	5200	Ohms				
With RMS Input AF Voltage of	0	0.3	3.4	4.3	4.7	Volts
Plate Current	48	--	--	49.5	49.2	Ma.
Grid 2 Current	5.5	--	--	10.8	11.6	Ma.
Transconductance	11300	--	--	--	--	μmhos
Plate Resistance	38000	--	--	--	--	Ohms
Amplification Factor ▲	19	--	--	--	--	
Power Output ■	0	0.05	4.5	5.7	6.0□	Watts
Distortion ■						
Total Harmonic	--	--	6.8	10	--	Percent
Second Harmonic	--	--	3.0	2.0	--	Percent
Third Harmonic	--	--	5.8	9.5	--	Percent

Typical Operating Characteristics:						
For: Plate Voltage	250	Volts				
Grid 2 Voltage	250	Volts				
Grid 1 Voltage	-7.3	Volts				
or Cathode Bias Resistor	135	Ohms				
Plate Load Impedance	4500	Ohms				
With RMS Input AF Voltage of	0	0.3	3.5	4.4	4.8	Volts
Plate Current	48	--	--	50.6	50.5	Ma.
Grid 2 Current	5.5	--	--	10	11	Ma.
Transconductance	11300	--	--	--	--	μmhos
Plate Resistance	38000	--	--	--	--	Ohms
Amplification Factor ▲	19	--	--	--	--	
Power Output ■	0	0.05	4.5	5.7	6.0□	Watts
Distortion: ■						
Total Harmonic	--	--	7.5	10	--	Percent
Second Harmonic	--	--	5.7	5.0	--	Percent
Third Harmonic	--	--	4.5	8	--	Percent

Typical Operating Characteristics:						
For: Plate Voltage	250	Volts				
Grid 2 Voltage	250	Volts				
Grid 1 Voltage	-8.4	Volts				
or Cathode Bias Resistor	210	Ohms				
Plate Load Impedance	7000	Ohms				
With RMS Input AF Voltage of	0	0.3	3.5	5.5		Volts
Plate Current	36	--	36.8	36		Ma.
Grid 2 Current	4.1	--	8.5	14.6		Ma.
Transconductance	10000	--	--	--		μmhos
Plate Resistance	40000	--	--	--		Ohms
Amplification Factor ▲	19	--	--	--		
Power Output ■	0	0.05	4.2	5.6□		Watts
Distortion ■						
Total Harmonic	--	--	10	--		Percent
Second Harmonic	--	--	1.7	--		Percent
Third Harmonic	--	--	8.7	--		Percent

Typical Operating Characteristics:			
For: Plate Voltage	250	Volts	
Grid 2 Voltage	210	Volts	
Grid 1 Voltage	-6.4	Volts	
or Cathode Bias Resistor	160	Ohms	
Plate Load Impedance	7000	Ohms	

With RMS Input AF Voltage of	0	0.3	3.4	3.8	Volts
Plate Current	36	--	36.6	36.5	Ma.
Grid 2 Current	3.9	--	7.3	8.0	Ma.
Transconductance	10400	--	--	--	μmhos
Plate Resistance	40000	--	--	--	Ohms
Amplification Factor	19	--	--	--	
Power Output	0	0.05	4.3	4.7	Watts
Distortion					
Total Harmonic	--	--	10	--	Percent
Second Harmonic	--	--	1.8	--	Percent
Third Harmonic	--	--	9.3	--	Percent

PUSH-PULL CLASS AB AMPLIFIER

Typical Operating Characteristics for Two Tubes

For: Plate Voltage	250		Volts
Grid 2 Voltage	250		Volts
Common Cathode Bias Resistor	130		Ohms
Plate-to-Plate Load Impedance	8000		Ohms
With RMS Input AF Voltage of	0	8	Volts
Plate Current	62	75	Ma.
Grid 2 Current	7	15	Ma.
Power Output	0	11	Watts
Total Harmonic Distortion	--	3	Percent

Typical Operating Characteristics for Two Tubes

For: Plate Voltage	300		Volts
Grid 2 Voltage	300		Volts
Common Cathode Bias Resistor	130		Ohms
Plate-to-Plate Load Impedance	8000		Ohms
With RMS Input AF Voltage of	0	10	Volts
Plate Current	72	92	Ma.
Grid 2 Current	♦	22	Ma.
Power Output	0	17	Watts
Total Harmonic Distortion	--	4	Percent

PUSH-PULL CLASS B AMPLIFIER

Typical Operating Characteristics for Two Tubes

For: Plate Voltage	250		Volts
Grid 2 Voltage	250		Volts
Grid 1 Bias Voltage	-11.6		Volts
Plate-to-Plate Load Impedance	8000		Ohms
With RMS Input AF Voltage of	0	8	Volts
Plate Current	20	75	Ma.
Grid 2 Current	2.2	15	Ma.
Power Output	0	11	Watts
Total Harmonic Distortion	--	3	Percent

Typical Operating Characteristics for Two Tubes

For: Plate Voltage	300		Volts
Grid 2 Voltage	300		Volts
Grid 1 Bias Voltage	-14.7		Volts
Plate-to-Plate Load Impedance	8000		Ohms
With RMS Input AF Voltage of	0	10	Volts
Plate Current	15	92	Ma.
Grid 2 Current	1.6	22	Ma.
Power Output	0	17	Watts
Total Harmonic Distortion	--	4	Percent

TRIODE-CONNECTED CLASS A AMPLIFIER

(Grid 2 Connected to Plate)

Typical Operating Characteristics

Plate Voltage	250		Volts
Cathode Bias Resistor	270		Ohms
Plate Load Resistance	3500		Ohms
Input AF Voltage (RMS)	6.7		Volts
Zero Signal Plate Current	34		Ma.
Maximum Signal Plate Current	36		Ma.
Power Output	1.95		Watts
Total Harmonic Distortion	9		Percent
Input AF RMS Voltage for Power Output of Milliwatts	1.0		Volts

PUSH-PULL TRIODE CONNECTED CLASS A AMPLIFIER

(Grids No.2 Connected to Plates)

Typical Operating Characteristics for Two Tubes

Plate Voltage	250	300	Volts
Cathode Bias Resistor	270	270	Ohms
Plate-to-Plate Load Impedance	10000	10000	Ohms
Input AF Voltage (RMS)	8.3	10	Volts
Zero Signal Plate Current	40	48	Ma.
Maximum Signal Plate Current	43.4	52	Ma.
Power Output	3.4	5.2	Watts
Total Harmonic Distortion	2.5	2.5	Percent
Input AF RMS Voltage for Power Output of 50 Milliwatts	0.95	0.9	Volts

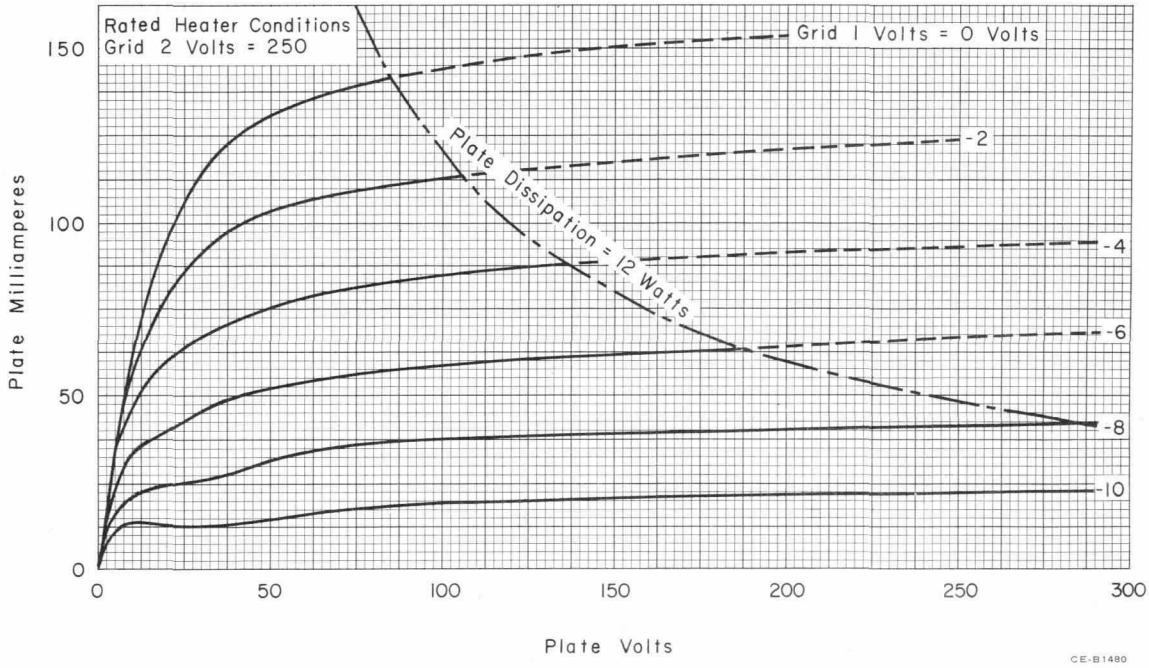
♦ Heater warm-up time is defined as the time required for the voltage across the heater to reach 80% of its rated value after applying 4 times rated heater voltage to a circuit consisting of the tube heater in series with a resistance equal to 3 times rated heater voltage divided by rated heater current.

▲ Amplification factor of grid 2 to grid 1.

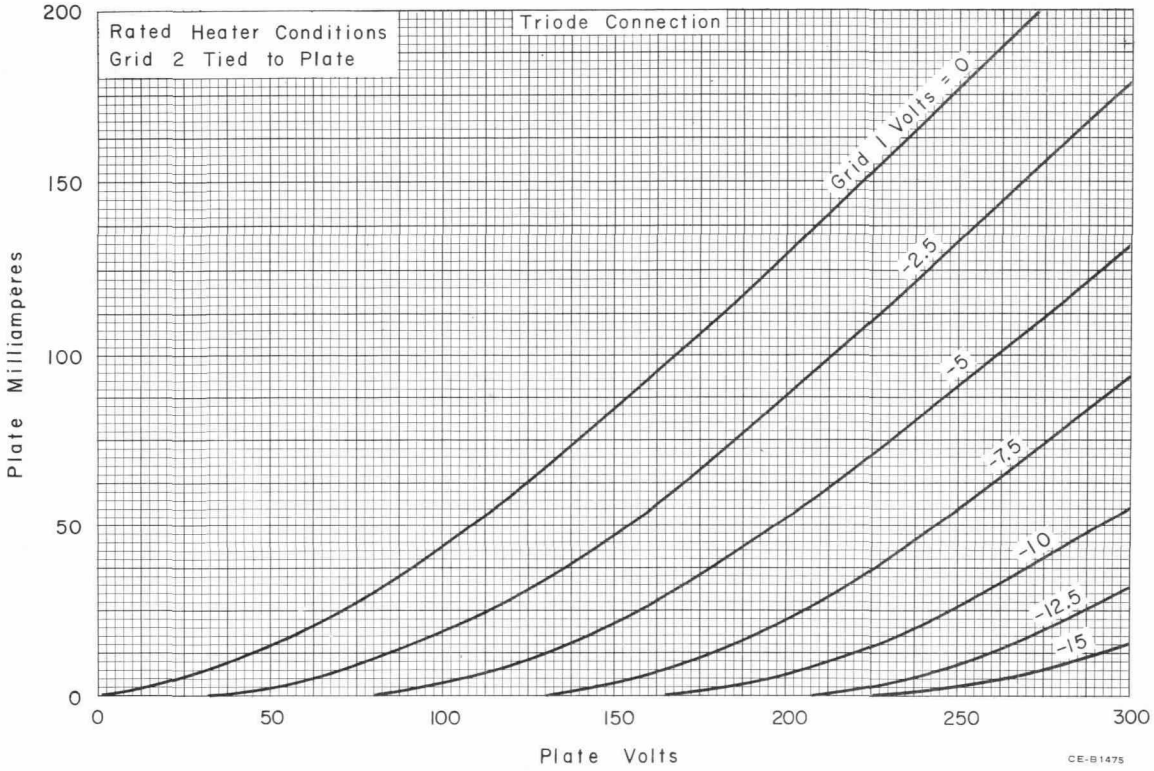
■ Measured with fixed bias.

□ Power output when grid starts to draw current.

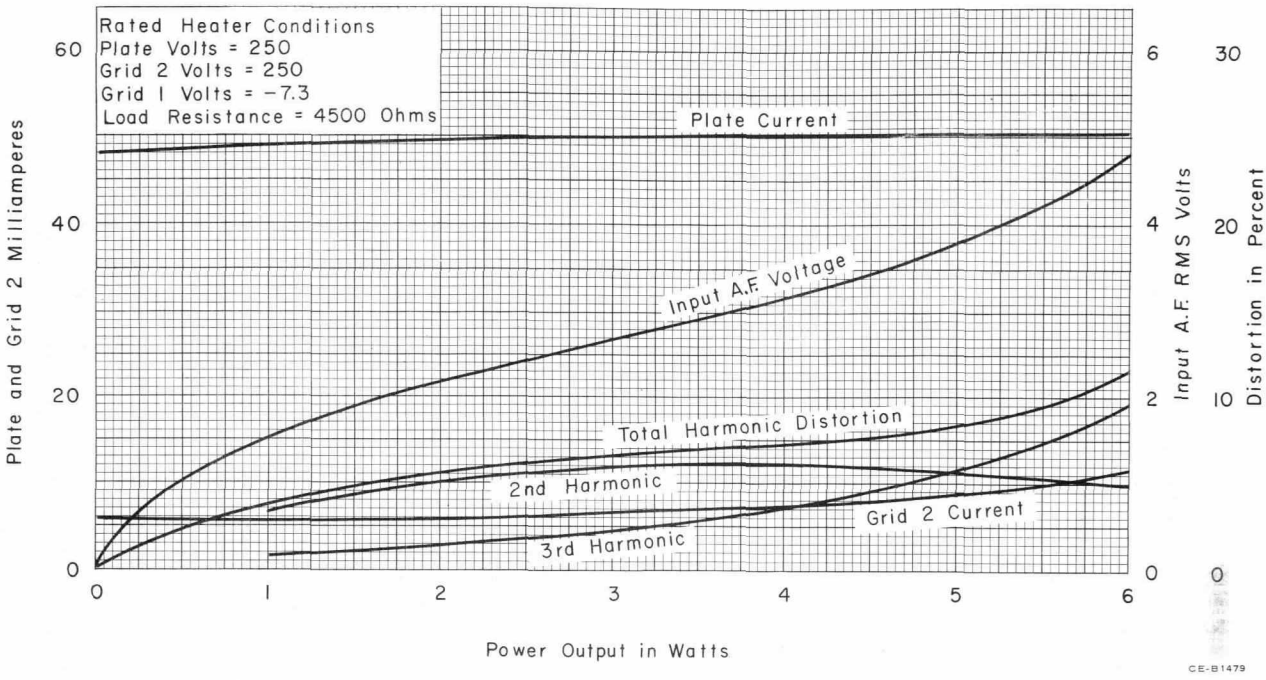
AVERAGE PLATE CHARACTERISTICS



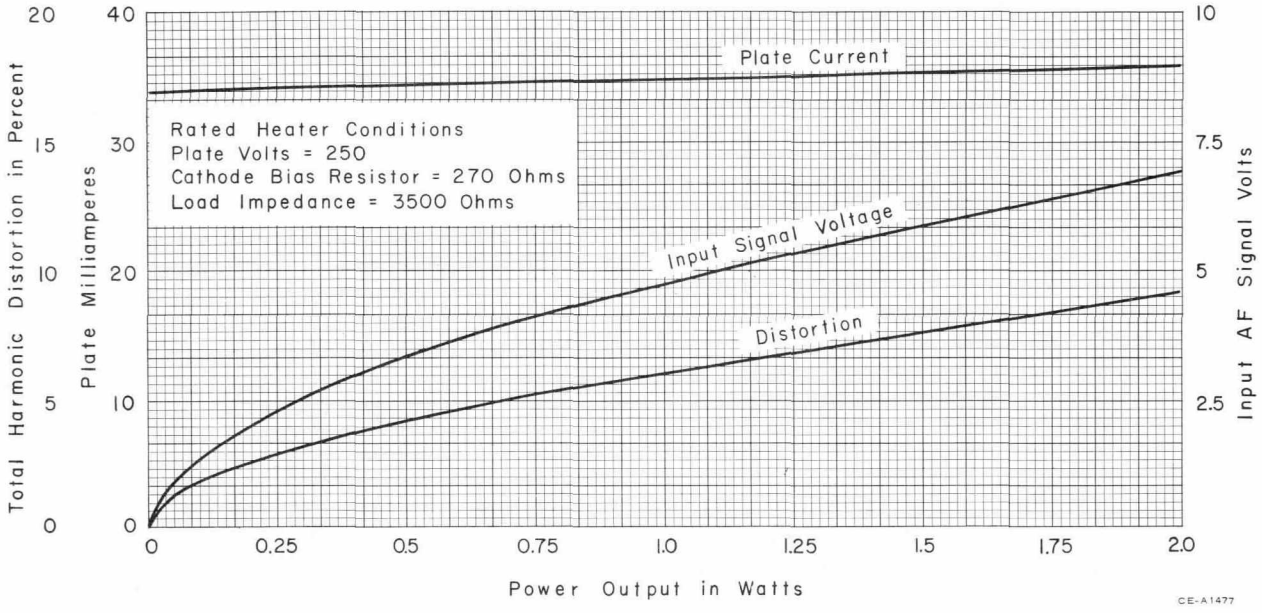
AVERAGE PLATE CHARACTERISTICS



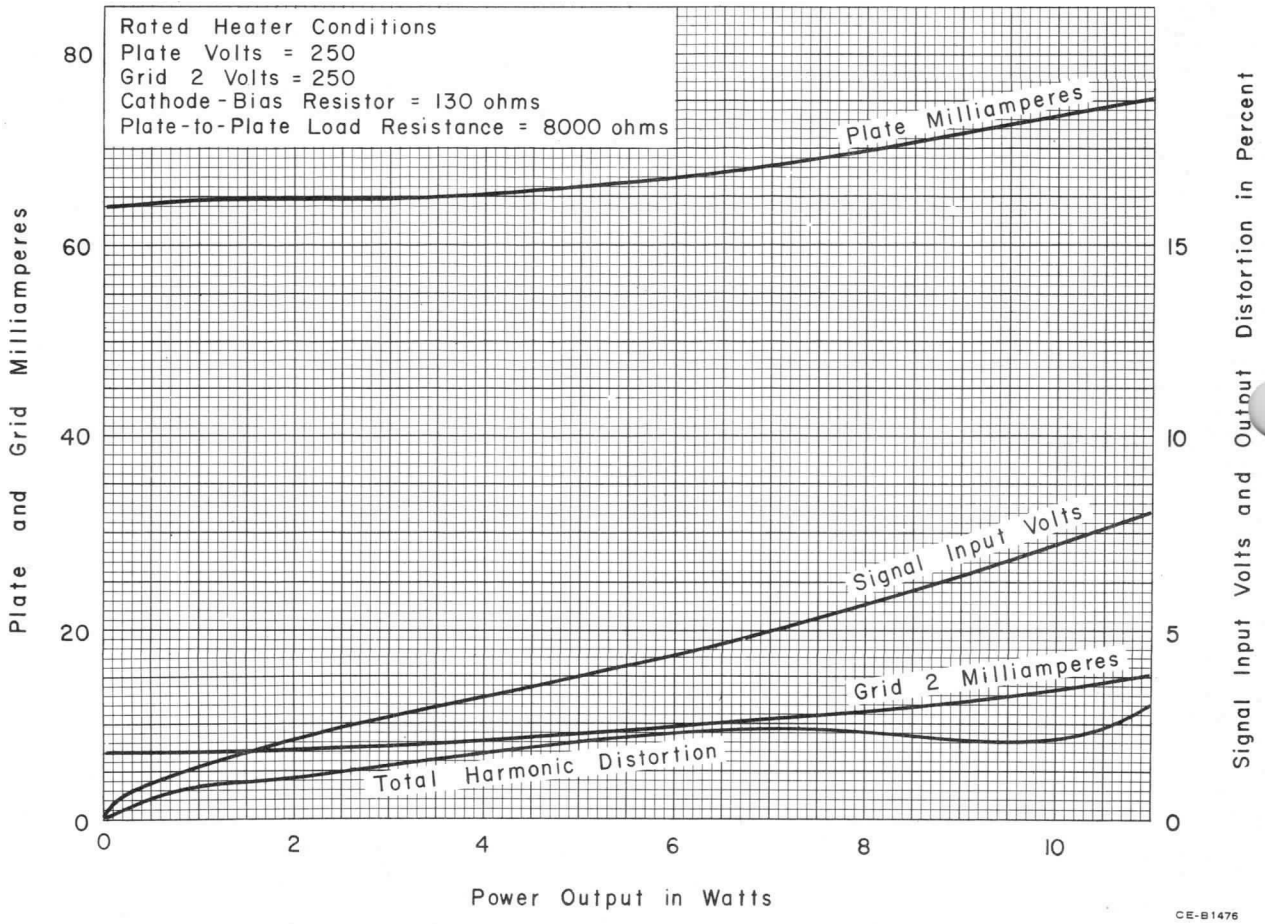
OPERATION CHARACTERISTICS



OPERATION CHARACTERISTICS
(TRIODE CONNECTION)



OPERATING CHARACTERISTICS
PUSH - PULL CLASS AB



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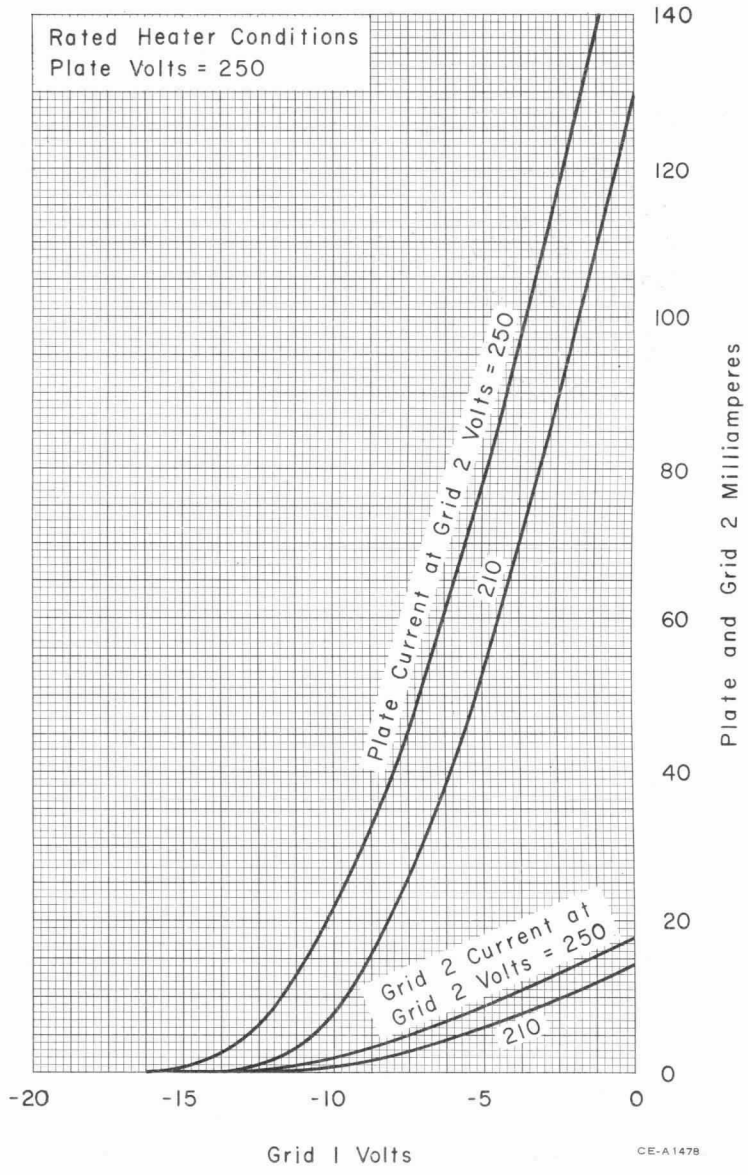
AVERAGE TRANSFER CHARACTERISTICS



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