



**ELECTRONIC  
INNOVATIONS**  
IN ACTION

**TUBES**

**— PRODUCT INFORMATION —**

**11BT11**

**Compactron  
Dissimilar-Double-Triode Pentode**

The 11BT11 is a compactron containing a high- $\mu$  triode, a medium- $\mu$  triode, and a sharp-cutoff, frame-grid pentode. The pentode is intended for video amplifier service and the triodes for general-purpose applications.

**GENERAL**

**ELECTRICAL**

Cathode - Coated Unipotential

Heater Characteristics and Ratings

Heater Voltage, AC or DC*	10.7	Volts
Heater Current†	0.6±0.04	Amperes
Heater Warm-up Time, Average§	11	Seconds
Direct Interelectrode Capacitances¶		

**Triode (Section 1)**

Grid to Plate: (1Tg to 1Tp)	1.9	pf
Input: 1Tg to (1Tk + Pg3 + h + i.s.)	2.8	pf
Output: 1Tp to (1Tk + Pg3 + h + i.s.)	2.0	pf

**Triode (Section 2)**

Grid to Plate: (2Tg to 2Tp)	2.6	pf
Input: 2Tg to (2Tk + 1Tk + Pg3 + h + i.s.)	4.6	pf
Output: 2Tp to (2Tk + 1Tk + Pg3 + h + i.s.)	3.6	pf

**Pentode Section**

Grid-Number 1 to Plate: (Pg1 to Pp)	0.13	pf
Input: Pg1 to (Pk + 1Tk + Pg2 + Pg3 + h + i.s.)	13	pf
Output: Pp to (Pk + 1Tk + Pg2 + Pg3 + h + i.s.)	4.6	pf

**Coupling**

Pentode Plate to Triode Plate (Section 2): (Pp to 2Tp), maximum	0.08	pf
Triode Plate (Section 1) to Triode Plate (Section 2): (1Tp to 2Tp), maximum	0.19	pf

**MECHANICAL**

Operating Position - Any

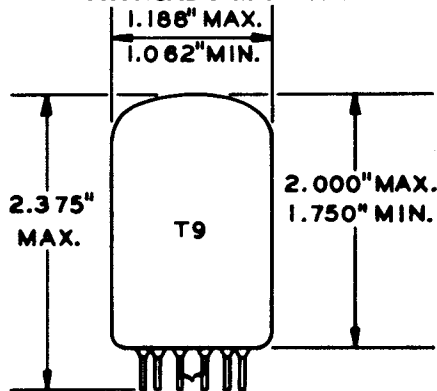
Envelope - T-9, Glass

Base - E12-70, Button 12-Pin

Outline Drawing - EIA 9-58

Maximum Diameter	1.188	Inches
Minimum Diameter	1.062	Inches
Maximum Over-all Length	2.375	Inches
Maximum Seated Height	2.000	Inches
Minimum Seated Height	1.750	Inches

**PHYSICAL DIMENSIONS**

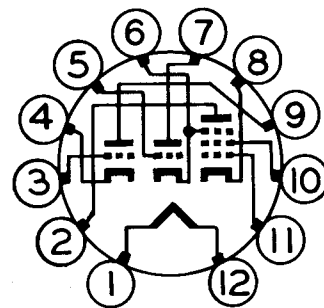


EIA 9-58

**TERMINAL CONNECTIONS**

- Pin 1 - Heater
- Pin 2 - Pentode Plate
- Pin 3 - Triode Grid (Section 2)
- Pin 4 - Triode Cathode (Section 2)
- Pin 5 - Triode Grid (Section 1)
- Pin 6 - Triode Cathode (Section 1), Pentode Grid Number 3, and Internal Shield
- Pin 7 - Triode Plate (Section 1)
- Pin 8 - Pentode Cathode
- Pin 9 - Triode Plate (Section 2)
- Pin 10 - Pentode Grid Number 2 (Screen)
- Pin 11 - Pentode Grid Number 1
- Pin 12 - Heater

**BASING DIAGRAM**



EIA 12GS

The tubes and arrangements disclosed herein may be covered by patents of General Electric Company or others. Neither the disclosure of any information herein nor the sale of tubes by General Electric Company conveys any license under patent claims covering combinations of tubes with other devices or elements. In the absence of an

express written agreement to the contrary, General Electric Company assumes no liability for patent infringement arising out of any use of the tubes with other devices or elements by any purchaser of tubes or others.

## MAXIMUM RATINGS

### DESIGN-MAXIMUM VALUES

#### Pentode Section

Plate Voltage . . . . .	165	Volts
Screen Voltage . . . . .	165	Volts
Positive DC Grid-Number 1 Voltage . . . . .	0	Volts
Plate Dissipation . . . . .	3.5	Watts
Screen Dissipation . . . . .	1.5	Watts
Heater-Cathode Voltage		
Heater Positive with Respect to Cathode		
DC Component . . . . .	100	Volts
Total DC and Peak . . . . .	200	Volts
Heater Negative with Respect to Cathode		
Total DC and Peak . . . . .	200	Volts
Grid-Number 1 Circuit Resistance		
With Fixed Bias . . . . .	50000	Ohms
With Cathode Bias . . . . .	100000	Ohms

#### Triode (Section 1)

Plate Voltage . . . . .	330	Volts
Positive DC Grid Voltage . . . . .	0	Volts
Plate Dissipation . . . . .	1.5	Watts
Heater-Cathode Voltage		
Heater Positive with Respect to Cathode		
DC Component . . . . .	100	Volts
Total DC and Peak . . . . .	200	Volts
Heater Negative with Respect to Cathode		
Total DC and Peak . . . . .	200	Volts
Grid-Circuit Resistance		
With Fixed Bias . . . . .	0.5	Megohms
With Cathode Bias . . . . .	1.0	Megohms

#### Triode (Section 2)

Plate Voltage . . . . .	330	Volts
Positive DC Grid Voltage . . . . .	0	Volts
Plate Dissipation . . . . .	2.0	Watts
Heater-Cathode Voltage		
Heater Positive with Respect to Cathode		
DC Component . . . . .	100	Volts
Total DC and Peak . . . . .	200	Volts
Heater Negative with Respect to Cathode		
Total DC and Peak . . . . .	200	Volts
Grid-Circuit Resistance		
With Fixed Bias . . . . .	0.5	Megohms
With Cathode Bias . . . . .	1.0	Megohms

Design-Maximum ratings are limiting values of operating and environmental conditions applicable to a bogey electron tube of a specified type as defined by its published data and should not be exceeded under the worst probable conditions.

The tube manufacturer chooses these values to provide acceptable serviceability of the tube, making allowance for the effects of changes in operating conditions due to variations in the characteristics of the tube under consideration.

The equipment manufacturer should design so that initially and throughout life no design-maximum value for the intended service is exceeded with a bogey tube under the worst probable operating conditions with respect to supply-voltage variation, equipment component variation, equipment control adjustment, load variation, signal variation, environmental conditions, and variations in the characteristics of all other electron devices in the equipment.

## CHARACTERISTICS AND TYPICAL OPERATION

### AVERAGE CHARACTERISTICS

#### Pentode Section

Plate Voltage . . . . .	35	150	Volts
Screen Voltage . . . . .	100	100	Volts
Grid-Number 1 Voltage . . . . .	0	---	Volts
Cathode-Bias Resistor . . . . .	---	82	Ohms
Plate Resistance, approximate . . . . .	---	51000	Ohms
Transconductance . . . . .	---	19000	Micromhos
Plate Current . . . . .	54	17.4	Milliamperes
Screen Current . . . . .	13.5	3.2	Milliamperes
Grid-Number 1 Voltage, approximate I <sub>b</sub> = 100 Microamperes . . . . .	---	-6.6	Volts

#### Triode (Section 1)

Plate Voltage . . . . .	. 200	Volts
Cathode-Bias Resistor . . . . .	. 270	Ohms
Amplification Factor . . . . .	. 69	
Plate Resistance, approximate . . . . .	. 12500	Ohms
Transconductance . . . . .	. 5500	Micromhos
Plate Current . . . . .	. 7.1	Milliamperes
Grid Voltage, approximate I <sub>b</sub> = 50 Microamperes . . . . .	. -5.5	Volts

#### Triode (Section 2)

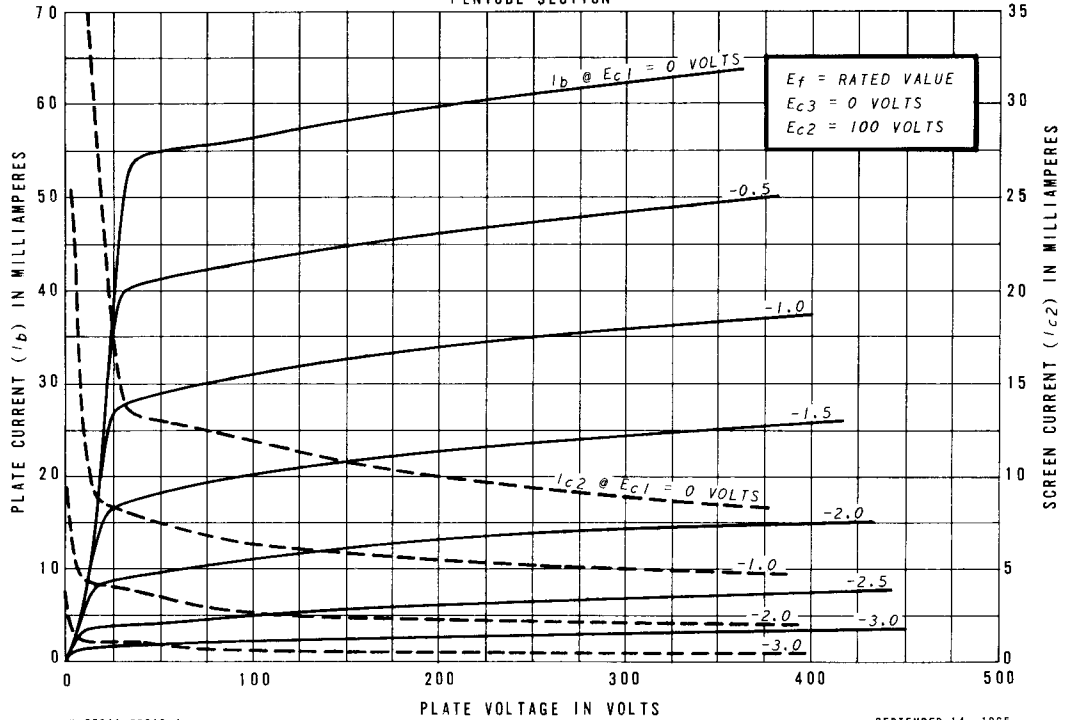
Plate Voltage . . . . .	. 200	Volts
Cathode-Bias Resistor . . . . .	. 470	Ohms
Amplification Factor . . . . .	. 40	
Plate Resistance, approximate . . . . .	. 7600	Ohms
Transconductance . . . . .	. 5300	Micromhos
Plate Current . . . . .	. 7.2	Milliamperes
Grid Voltage, approximate I <sub>b</sub> = 100 Microamperes . . . . .	. -8	Volts

### NOTES

- \* Heater voltage for a bogey tube at I<sub>f</sub> = 0.6 amperes.
- ‡ The equipment designer should design the equipment so that heater current is centered at the specified bogey value, with heater supply variations restricted to maintain heater current within the specified tolerance.
- § The time required for the voltage across the heater to reach 80 percent of the bogey value after applying 4 times the bogey heater voltage to a circuit consisting of the tube heater in series with a resistance equal to 3 times the bogey heater voltage divided by the bogey heater current.
- ¶ Without external shield.

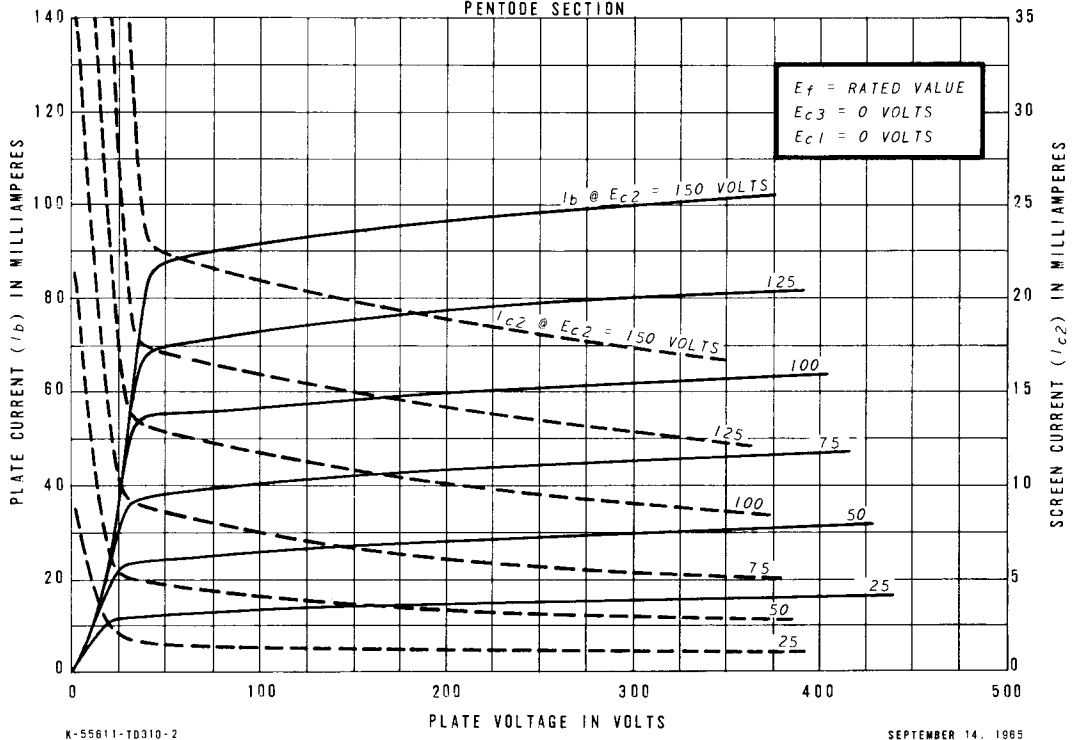
AVERAGE PLATE CHARACTERISTICS

PENTODE SECTION



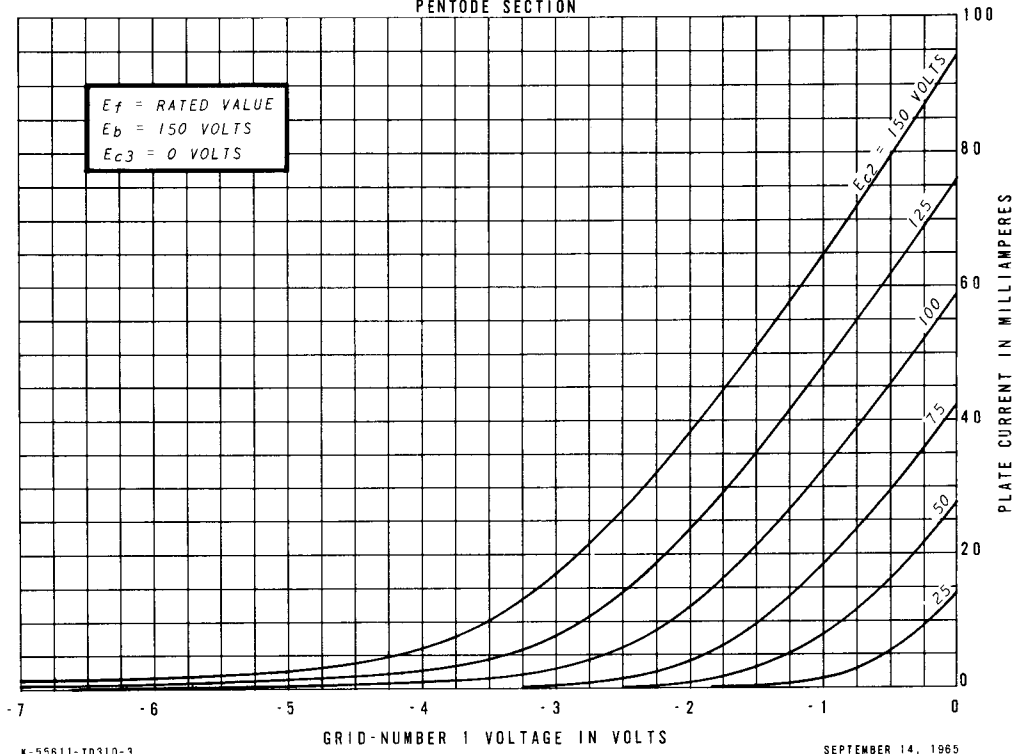
AVERAGE PLATE CHARACTERISTICS

PENTODE SECTION



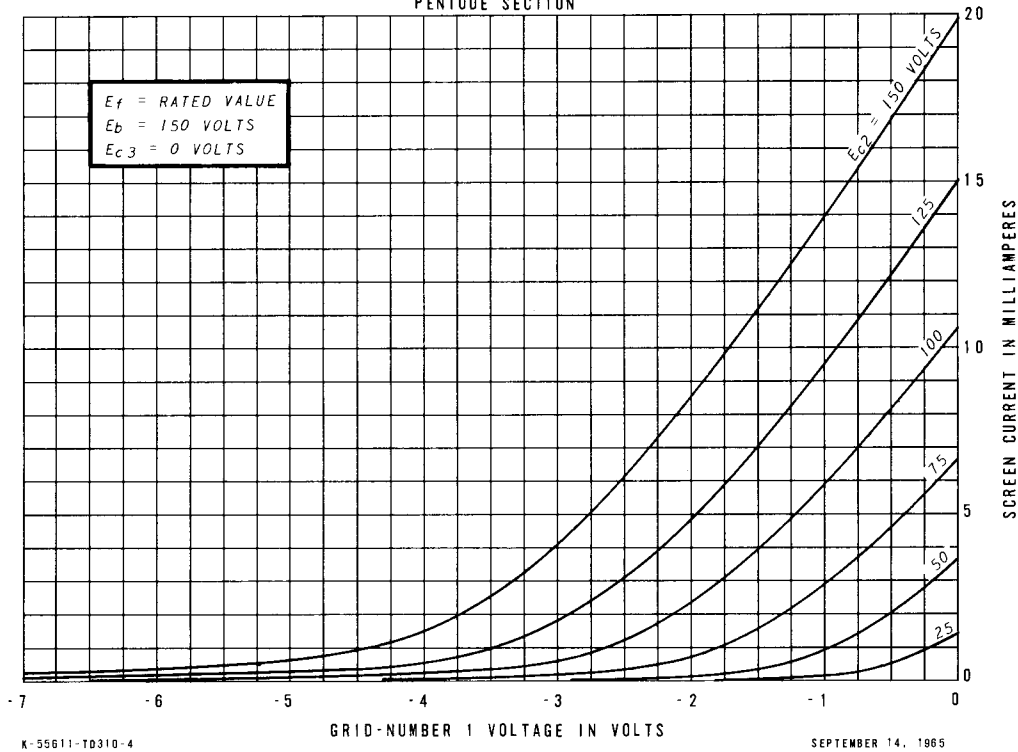
### AVERAGE TRANSFER CHARACTERISTICS

PENTODE SECTION



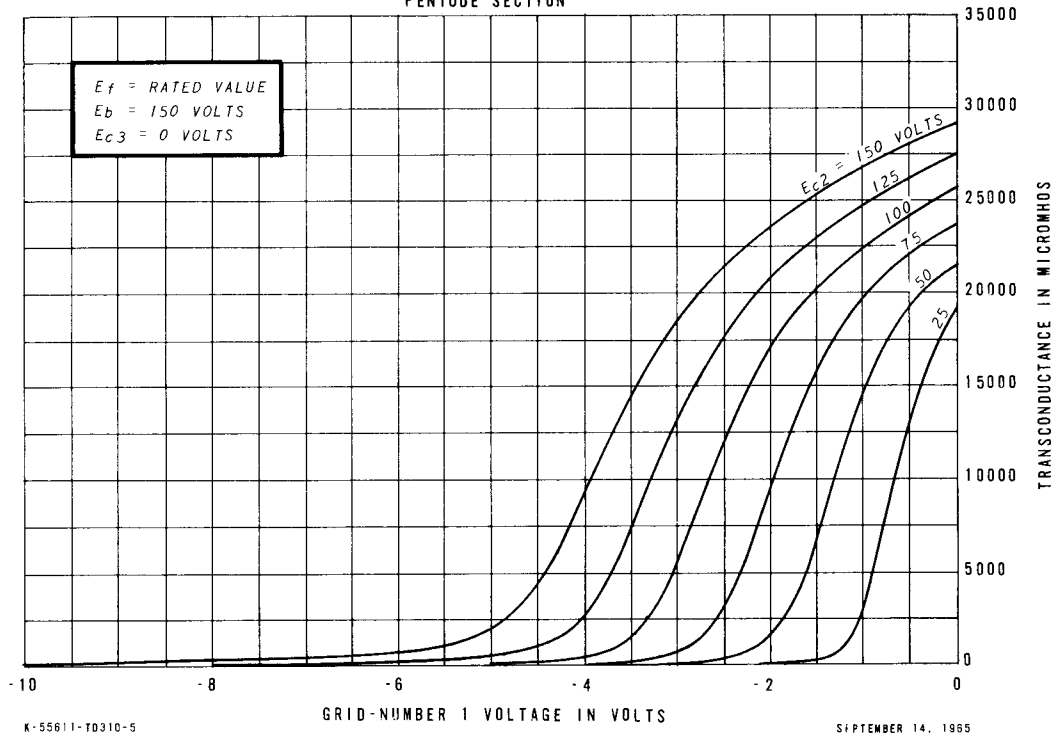
### AVERAGE TRANSFER CHARACTERISTICS

PENTODE SECTION



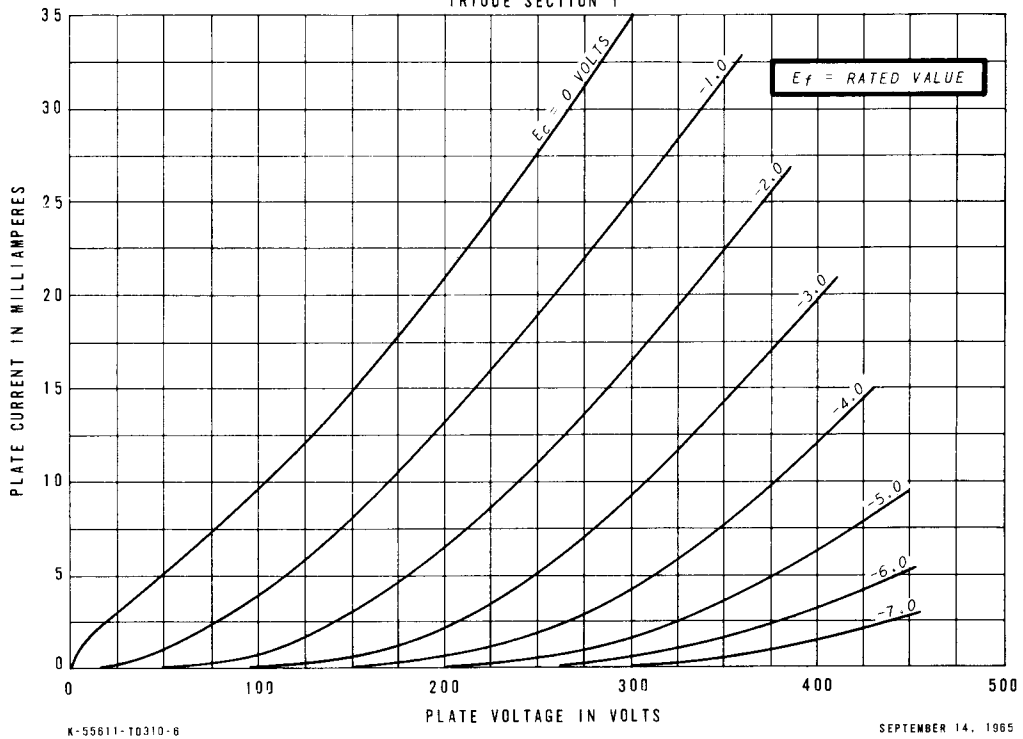
### AVERAGE TRANSFER CHARACTERISTICS

PENTODE SECTION

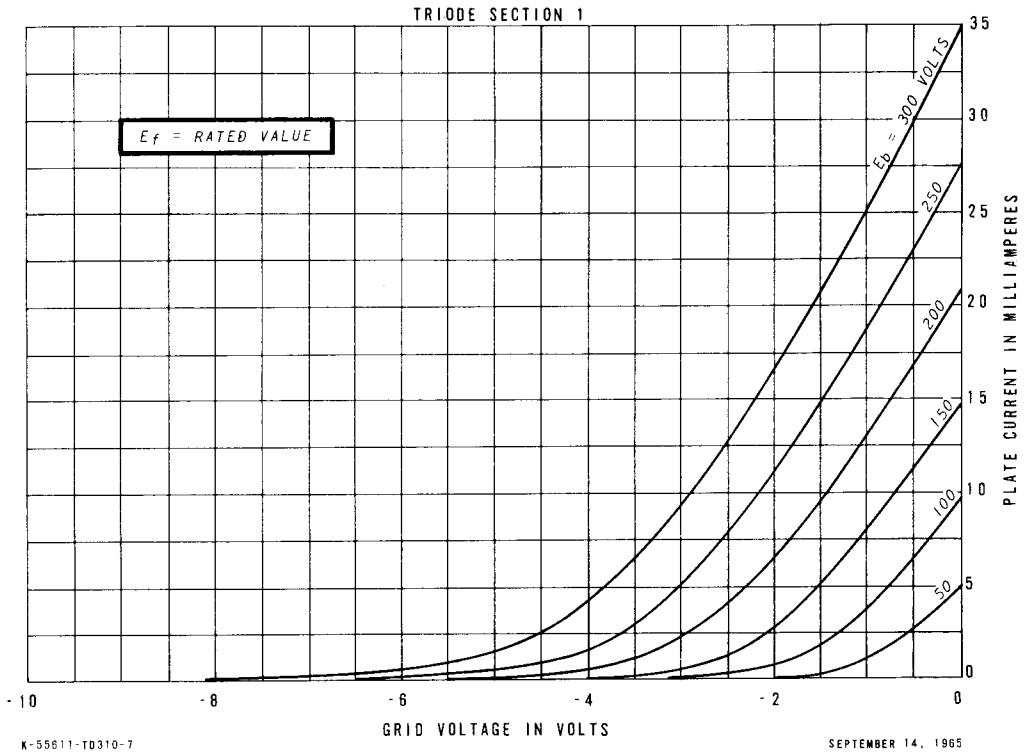


### AVERAGE PLATE CHARACTERISTICS

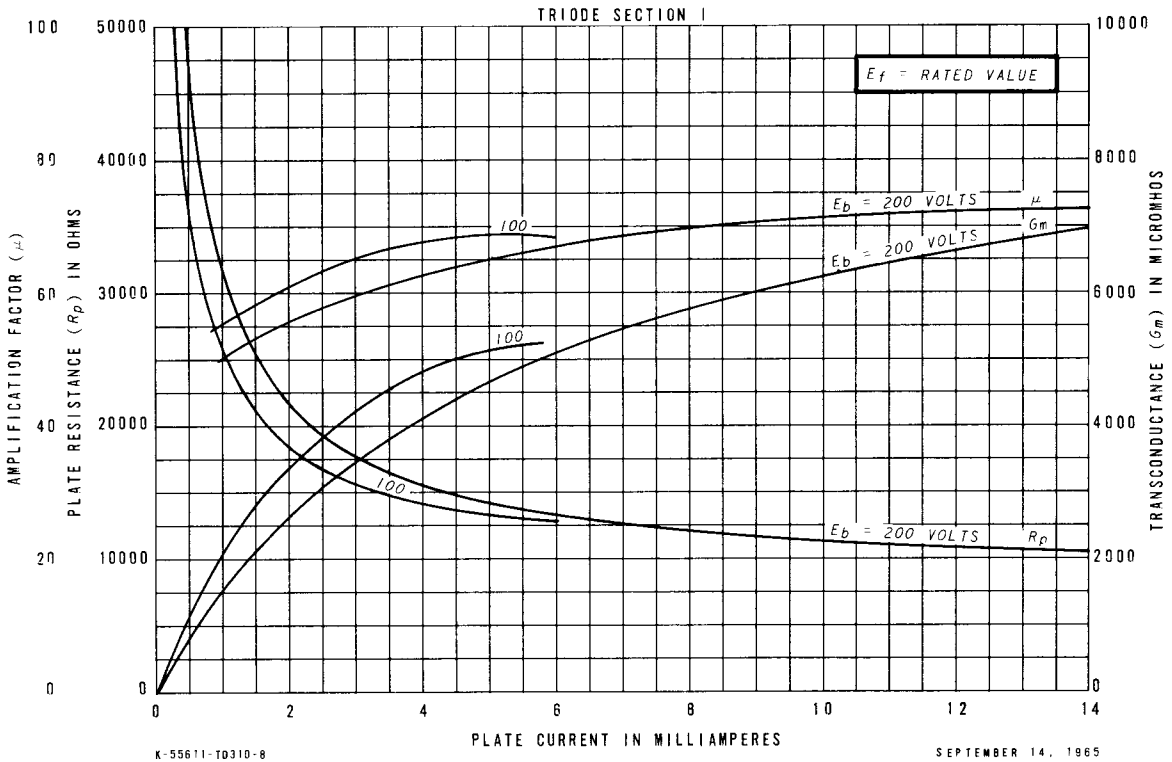
TRIODE SECTION 1



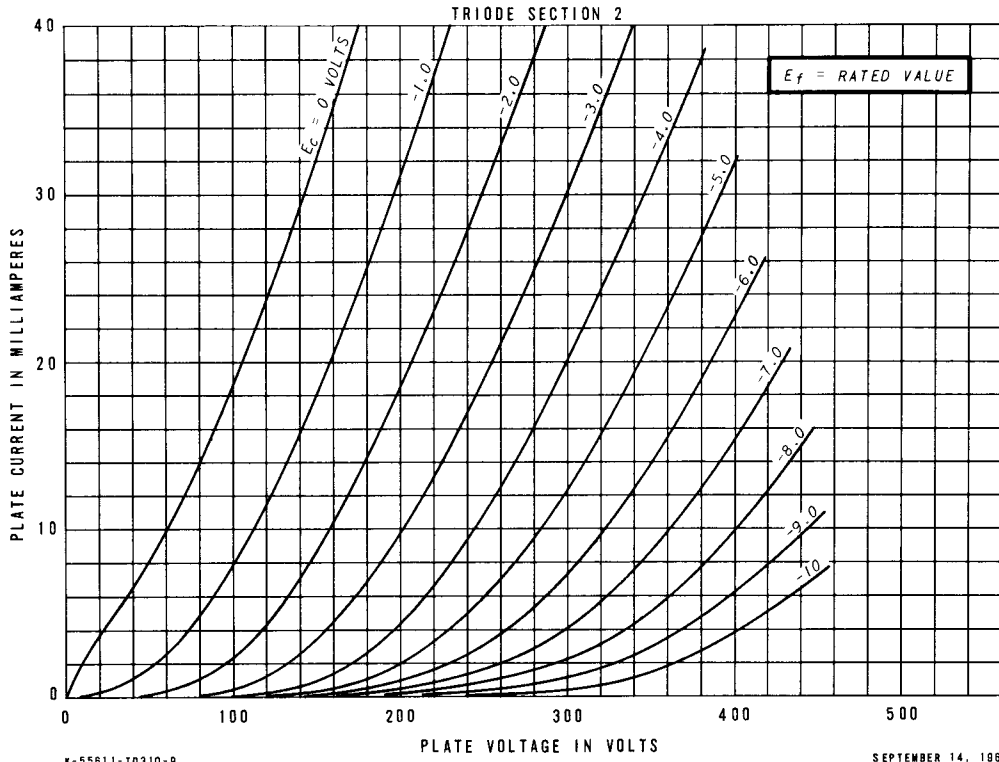
AVERAGE TRANSFER CHARACTERISTICS



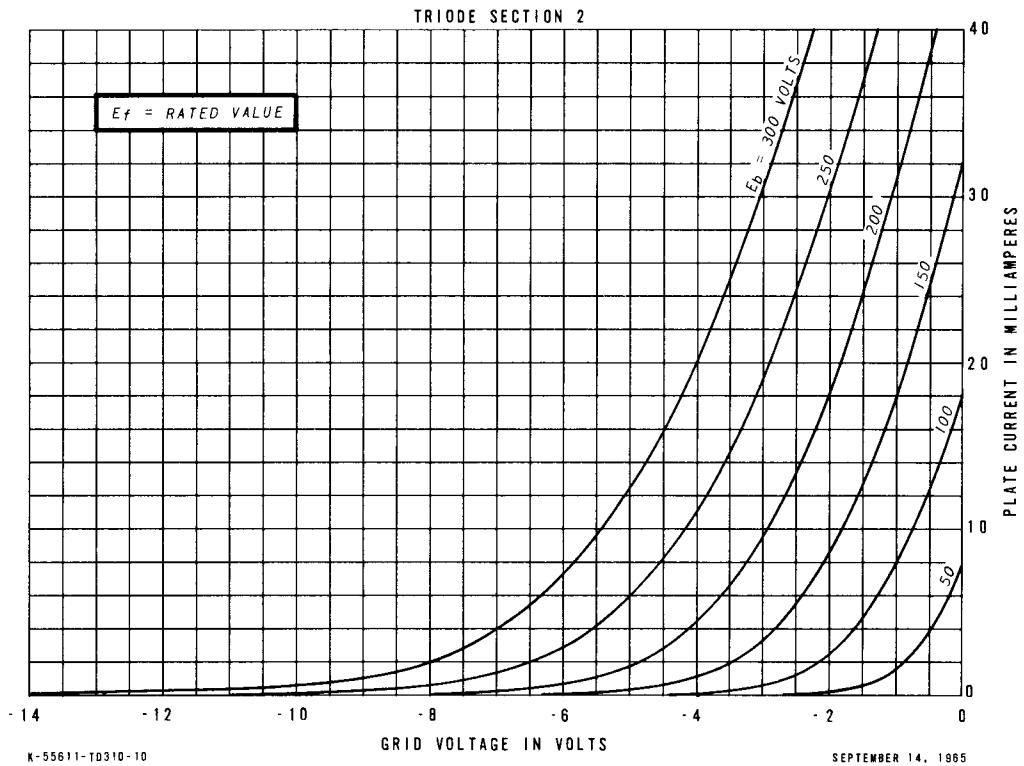
AVERAGE CHARACTERISTICS



### AVERAGE PLATE CHARACTERISTICS



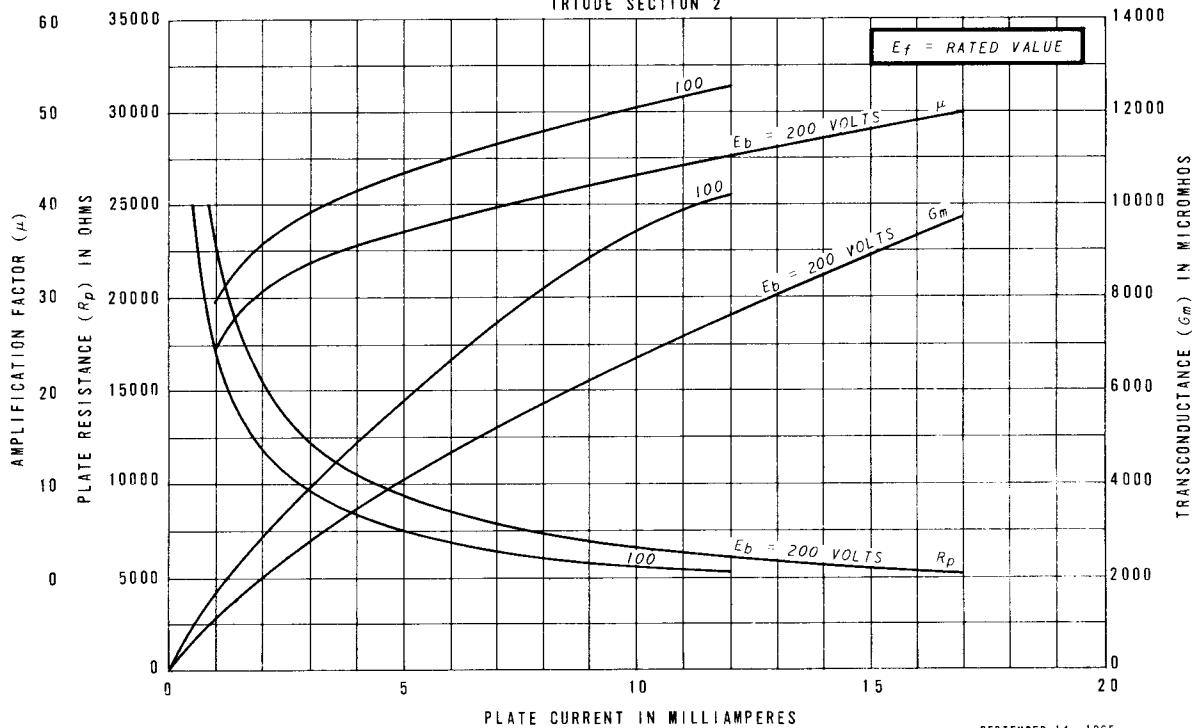
### AVERAGE TRANSFER CHARACTERISTICS





### AVERAGE CHARACTERISTICS

TRIODE SECTION 2



K-55611-TD310-11

SEPTEMBER 14, 1965

TUBE DEPARTMENT  
**GENERAL**  **ELECTRIC**  
Owensboro, Kentucky