# PRODUCT INFORMATION



# Compactron Dissimilar Double Pentode

**12AE10**

The 12AE10 is a compactron containing a sharp-cutoff, dual-control pentode (Section 2) and a power pentode (Section 1). The dual-control pentode is intended for use as an FM detector and the power pentode as an audio-frequency output amplifier in television receivers.

## GENERAL

### ELECTRICAL

Cathode - Coated Unipotential

Heater Characteristics and Ratings

| | | |
|---|---|---|
| Heater Voltage, AC or DC* | 12.6 | Volts |
| Heater Current‡ | 0.45±0.03 | Amperes |
| Heater Warm-up Time, Average§ | 11 | Seconds |

Direct Interelectrode Capacitances¶

**Section 1**

| | | |
|---|---|---|
| Grid-Number 1 to Plate: (1g1 to 1p) | 0.2 | pf |
| Input: 1g1 to (h + 1k + 2k + 1g2 + b.p. + i.s.) | 9.5 | pf |
| Output: 1p to (h + 1k + 2k + 1g2 + b.p. + i.s.) | 10 | pf |

**Section 2**

| | | |
|---|---|---|
| Grid-Number 1 to Plate: (2g1 to 2p) | 0.036 | pf |
| Grid-Number 3 to Plate: (2g3 to 2p) | 3.2 | pf |
| Grid-Number 1 to All Except Plate: 2g1 to (h + 2k + 2g2 + 2g3 + i.s.) | 6.5 | pf |

**Section 2 (Cont'd)**

| | | |
|---|---|---|
| Grid-Number 3 to All: 2g3 to (h + 2k + 2g1 + 2g2 + 2p + i.s.) | 8.0 | pf |
| Grid-Number 1 to Grid-Number 3: (2g1 to 2g3) | 0.14 | pf |

**Coupling**

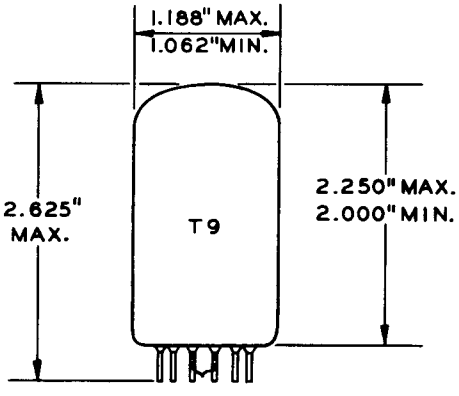
| | | |
|---|---|---|
| Plate (Section 1) to Plate (Section 2): (1p to 2p) | 0.15 | pf |

### MECHANICAL

Operating Position - Any
Envelope - T-9, Glass
Base - E12-70, Button 12-Pin
Outline Drawing - EIA 9-59

| | | |
|---|---|---|
| Maximum Diameter | 1.188 | Inches |
| Minimum Diameter | 1.062 | Inches |
| Maximum Over-all Length | 2.625 | Inches |
| Maximum Seated Height | 2.250 | Inches |
| Minimum Seated Height | 2.000 | Inches |

### PHYSICAL DIMENSIONS

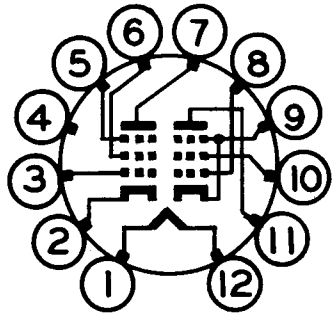



EIA 9-59

### TERMINAL CONNECTIONS

Pin 1 - Heater
Pin 2 - Cathode (Section 2) and Internal Shield
Pin 3 - Grid Number 1 (Section 2)
Pin 4 - No Connection
Pin 5 - Grid Number 3 (Suppressor) (Section 2)
Pin 6 - Grid Number 2 (Screen) (Section 2)
Pin 7 - Plate (Section 2)
Pin 8 - Grid Number 1 (Section 1)
Pin 9 - Cathode and Beam Plates (Section 1)
Pin 10 - Grid Number 2 (Screen) (Section 1)
Pin 11 - Plate (Section 1)
Pin 12 - Heater

### BASING DIAGRAM




EIA 12EZ

# MAXIMUM RATINGS

## DESIGN-MAXIMUM VALUES

**Section 1**

| | | |
|---|---|---|
| Plate Voltage | 165 | Volts |
| Screen Voltage | 150 | Volts |
| Plate Dissipation | 6.0 | Watts |
| Screen Dissipation | 1.25 | Watts |
| DC Cathode Current | 60 | Milliamperes |
| 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 Cathode Bias | 1.0 | Megohms |

**Section 2**

| | | |
|---|---|---|
| Plate Voltage | 330 | Volts |
| Suppressor Voltage | 28 | Volts |
| Screen Supply Voltage | 330 | Volts |
| Screen Voltage - See Screen Rating Chart | | |
| Positive DC Grid-Number 1 Voltage | 0 | Volts |
| Plate Dissipation | 1.7 | Watts |
| Screen Dissipation | 1.1 | 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 |

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

## CLASS $A_1$ AMPLIFIER

**Section 1**

| | | |
|---|---|---|
| Plate Voltage | 145 | Volts |
| Screen Voltage | 110 | Volts |
| Grid-Number 1 Voltage | -7.0 | Volts |
| Peak AF Grid-Number 1 Voltage | 7.0 | Volts |
| Plate Resistance, approximate | 33000 | Ohms |
| Transconductance | 5600 | Micromhos |
| Zero-Signal Plate Current | 34 | Milliamperes |
| Maximum-Signal Plate Current | 39 | Milliamperes |
| Zero-Signal Screen Current | 6.5 | Milliamperes |
| Maximum-Signal Screen Current | 9.3 | Milliamperes |
| Load Resistance | 2500 | Ohms |
| Total Harmonic Distortion, approximate | 12 | Percent |
| Maximum-Signal Power Output | 1.45 | Watts |

# CHARACTERISTICS AND TYPICAL OPERATION (Cont'd)

## AVERAGE CHARACTERISTICS

**Section 2**

| | | |
|---|---|---|
| Plate Voltage | 150 | Volts |
| Suppressor Voltage | 0 | Volts |
| Screen Voltage | 100 | Volts |
| Cathode-Bias Resistor | 560 | Ohms |
| Plate Resistance, approximate | 0.15 | Megohms |
| Grid-Number 1 Transconductance | 1000 | Micromhos |
| Grid-Number 3 Transconductance | 400 | Micromhos |
| Plate Current | 1.3 | Milliamperes |
| Screen Current | 2.0 | Milliamperes |
| Grid-Number 1 Voltage, approximate Ib = 10 Microamperes | -4.5 | Volts |
| Grid-Number 3 Voltage, approximate Ib = 10 Microamperes | -4.5 | Volts |

## NOTES

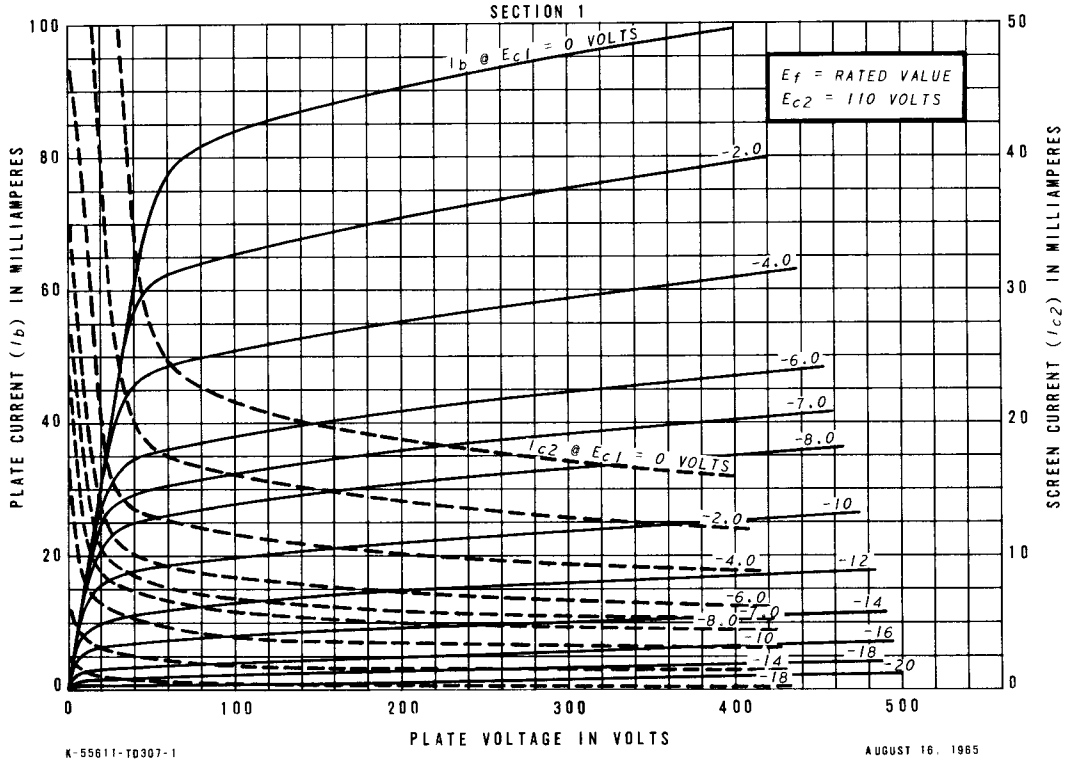
* Heater voltage for a bogey tube at If = 0.45 amperes.

‡ 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.

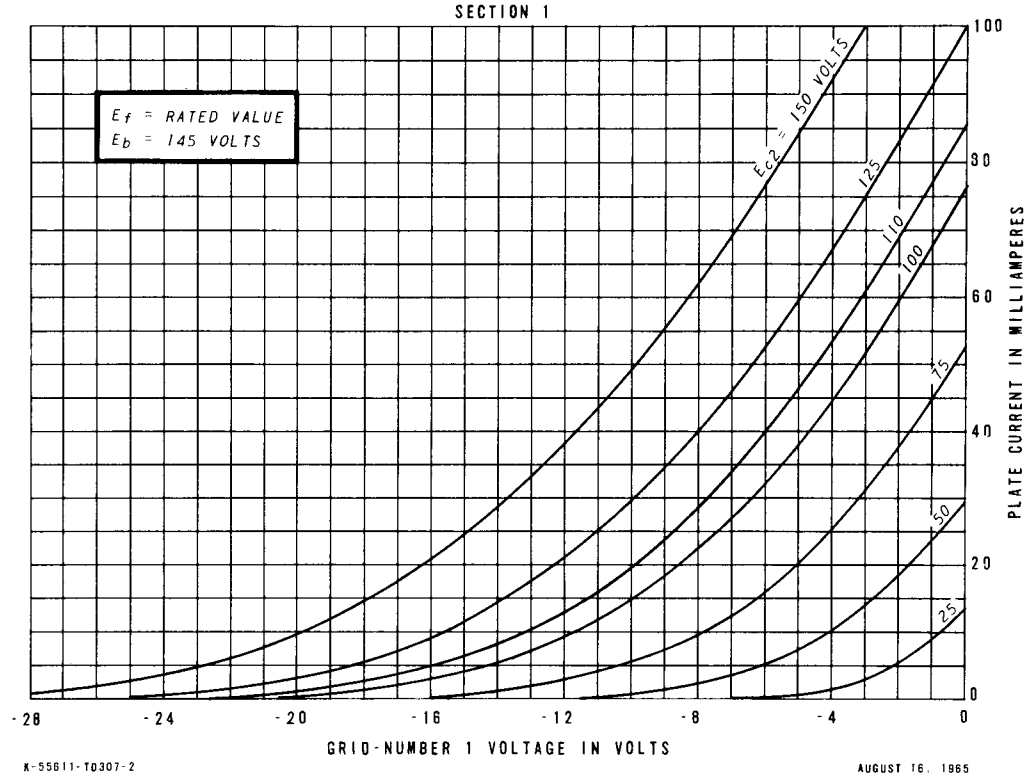
¶ Without external shield.

## AVERAGE PLATE CHARACTERISTICS



## AVERAGE TRANSFER CHARACTERISTICS

SECTION 1

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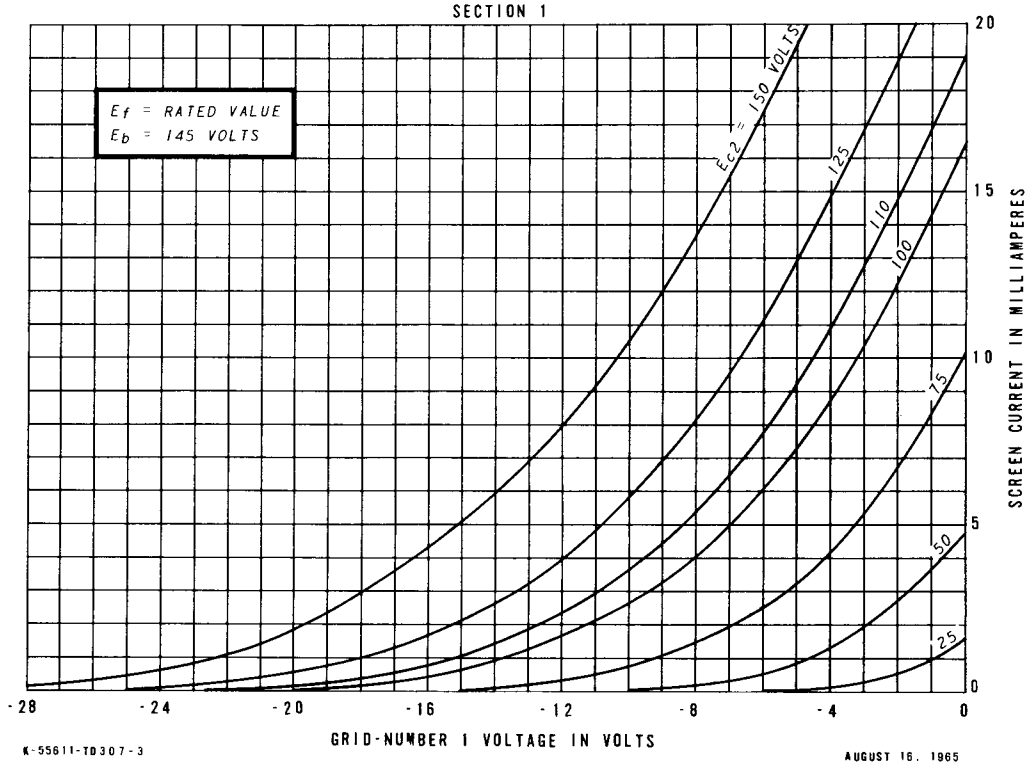
AUGUST 16, 1965

## AVERAGE TRANSFER CHARACTERISTICS

SECTION 1

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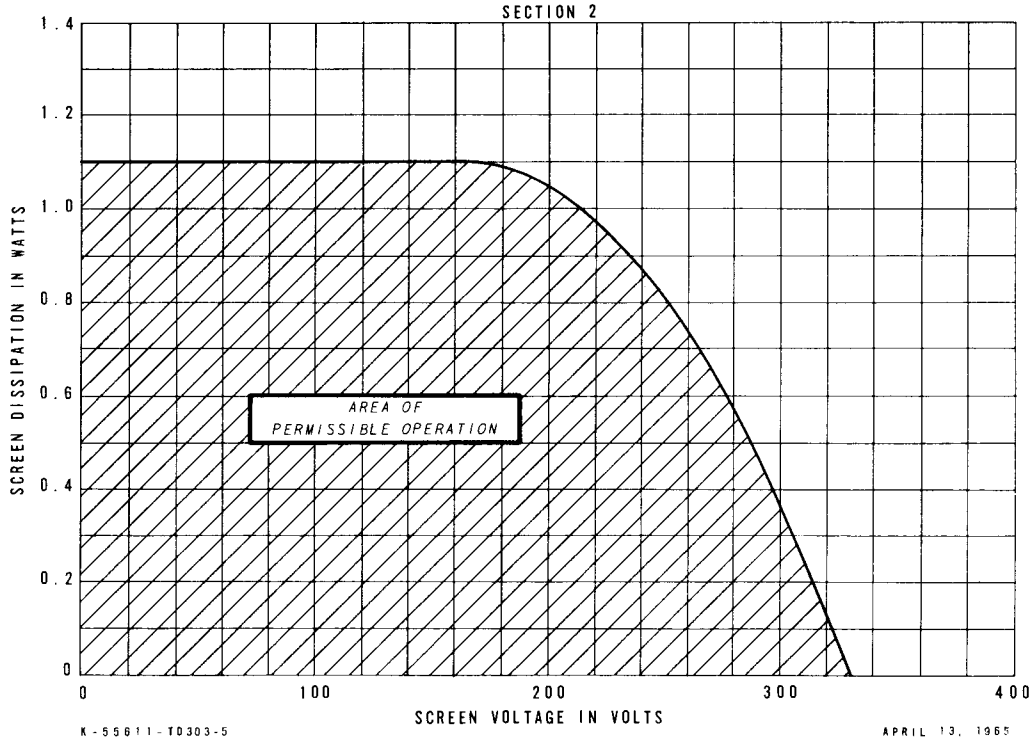
AUGUST 16, 1965

## SCREEN RATING CHART

SECTION 2

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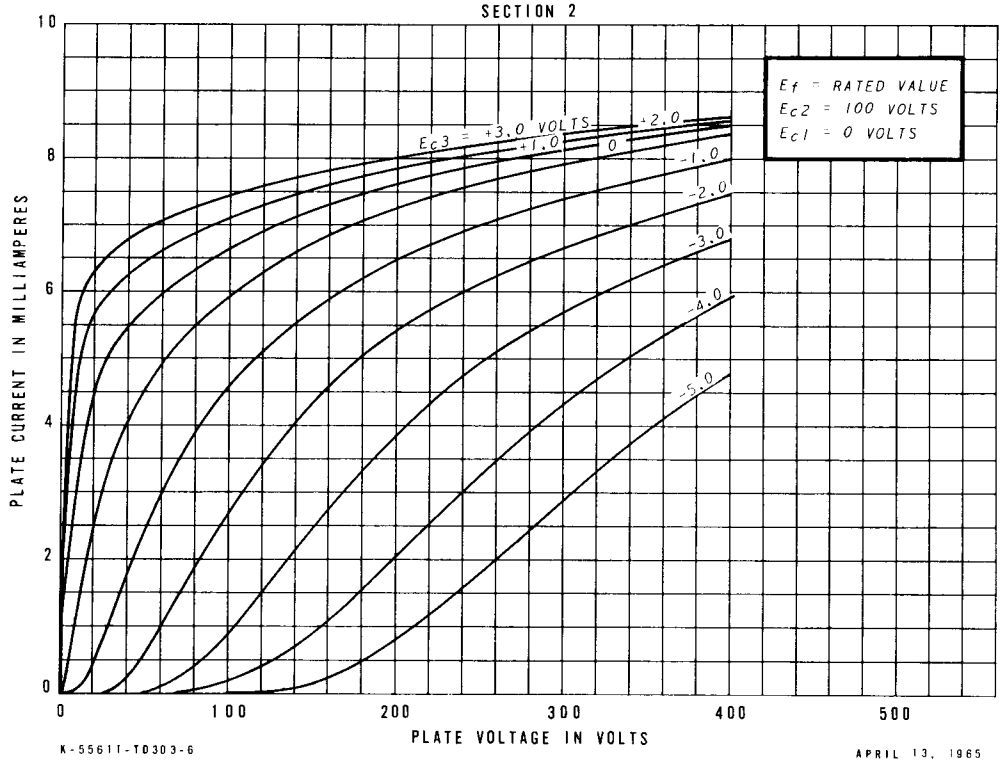
## AVERAGE PLATE CHARACTERISTICS

SECTION 2

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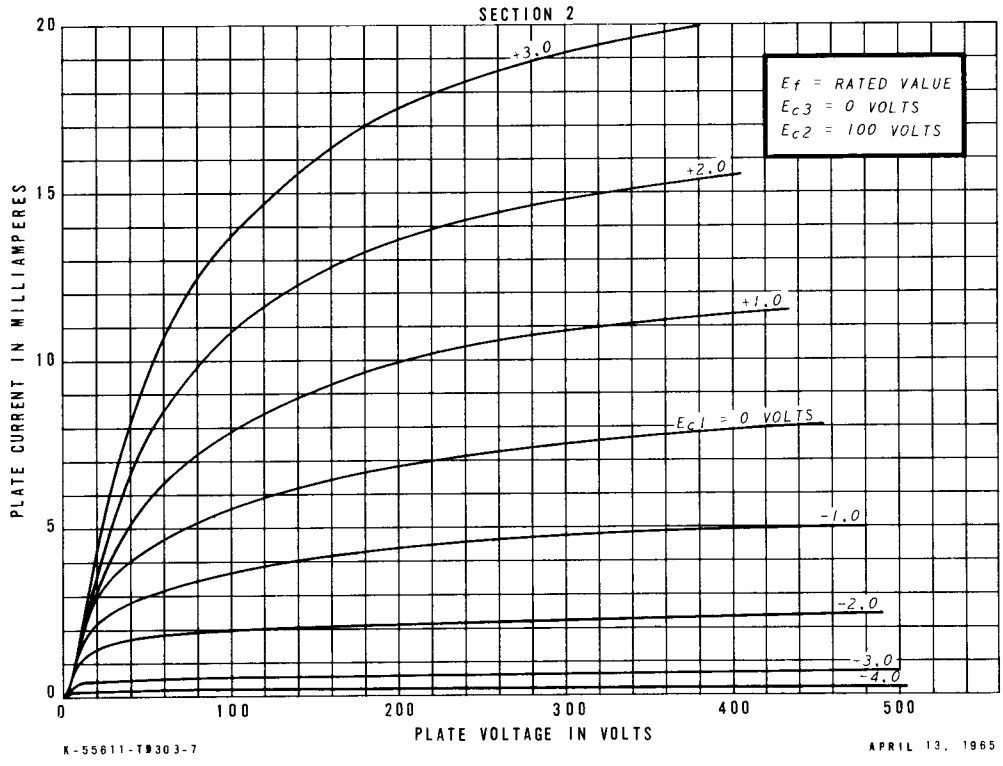
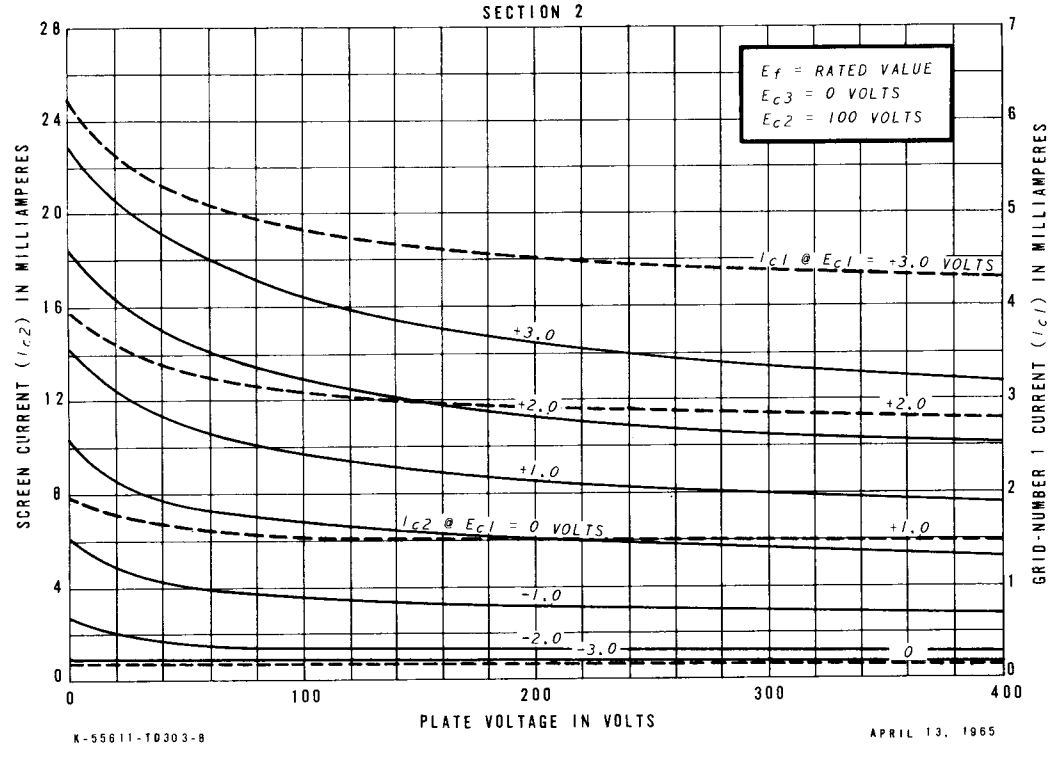
APRIL 13, 1965

## AVERAGE PLATE CHARACTERISTICS

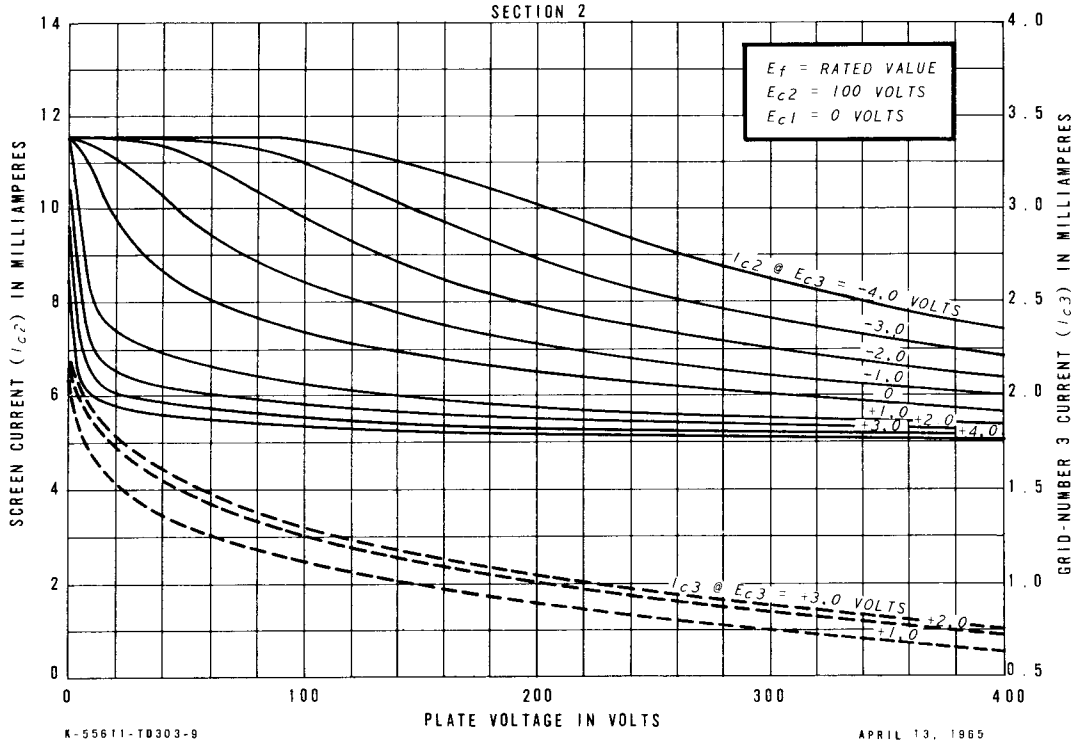



## AVERAGE CHARACTERISTICS



## AVERAGE CHARACTERISTICS

SECTION 2

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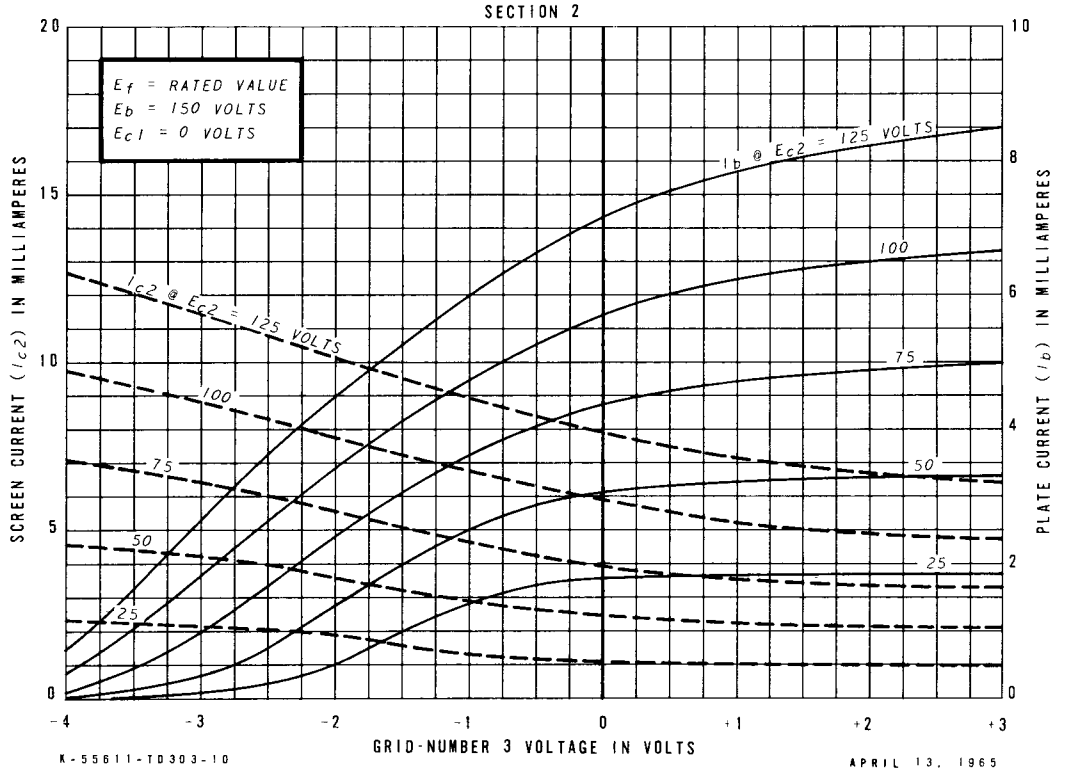
APRIL 13, 1965

## AVERAGE TRANSFER CHARACTERISTICS

SECTION 2

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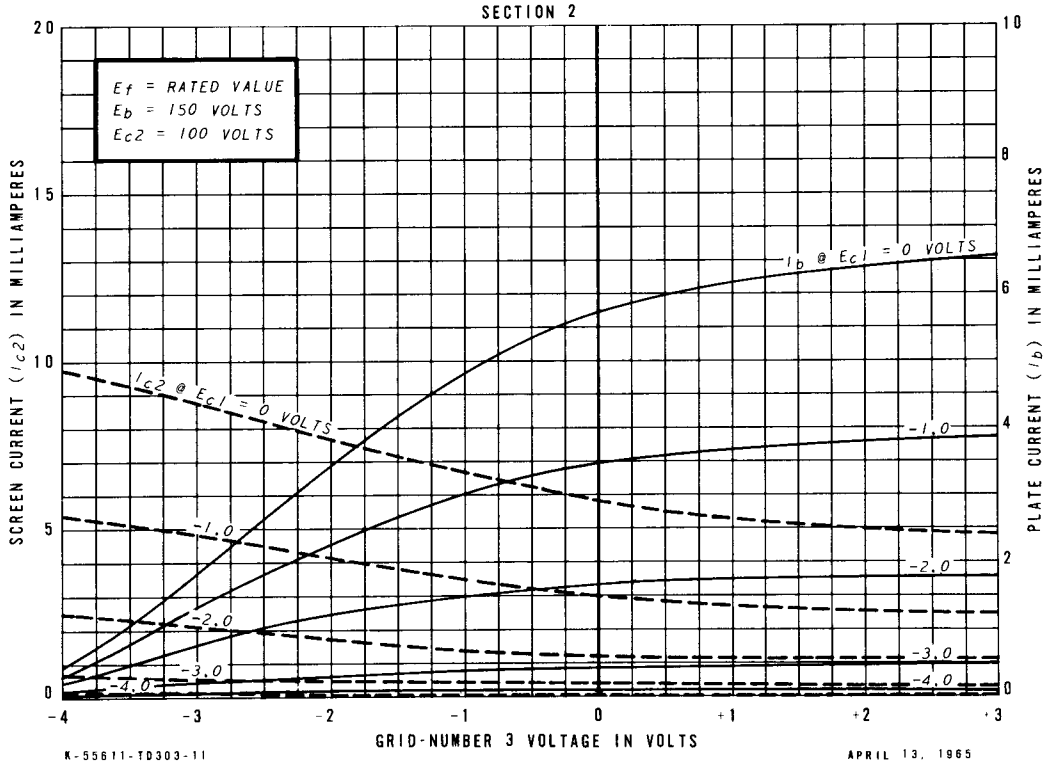
## AVERAGE TRANSFER CHARACTERISTICS

SECTION 2

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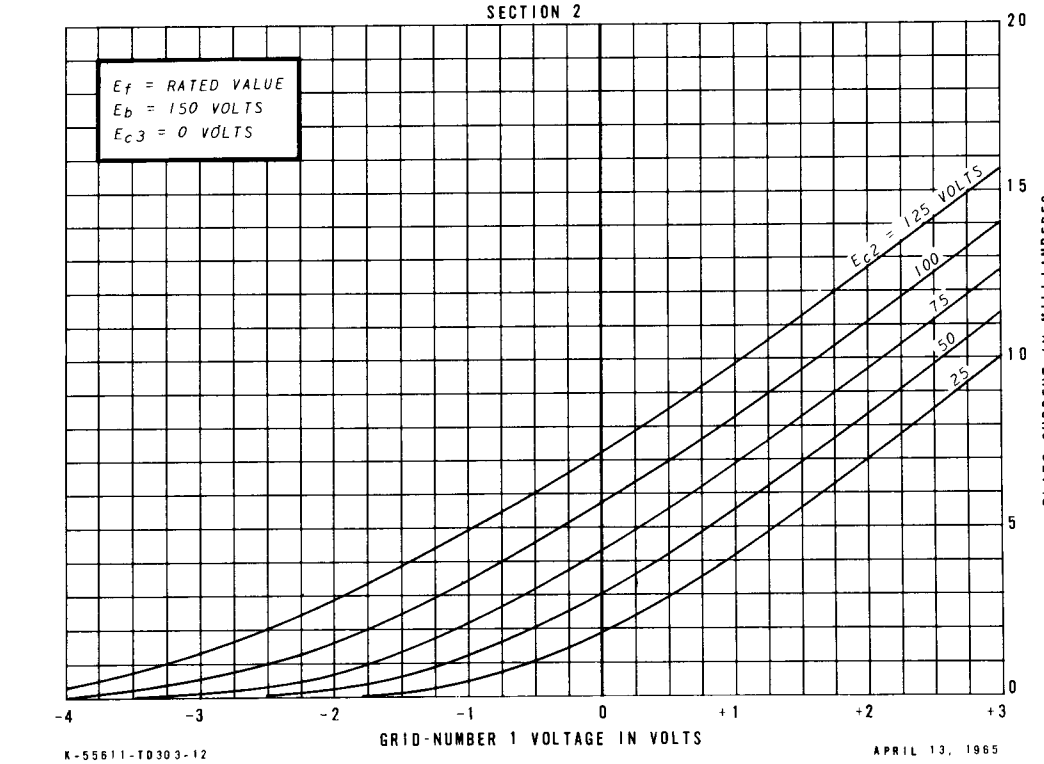
APRIL 13, 1965

## AVERAGE TRANSFER CHARACTERISTICS

SECTION 2

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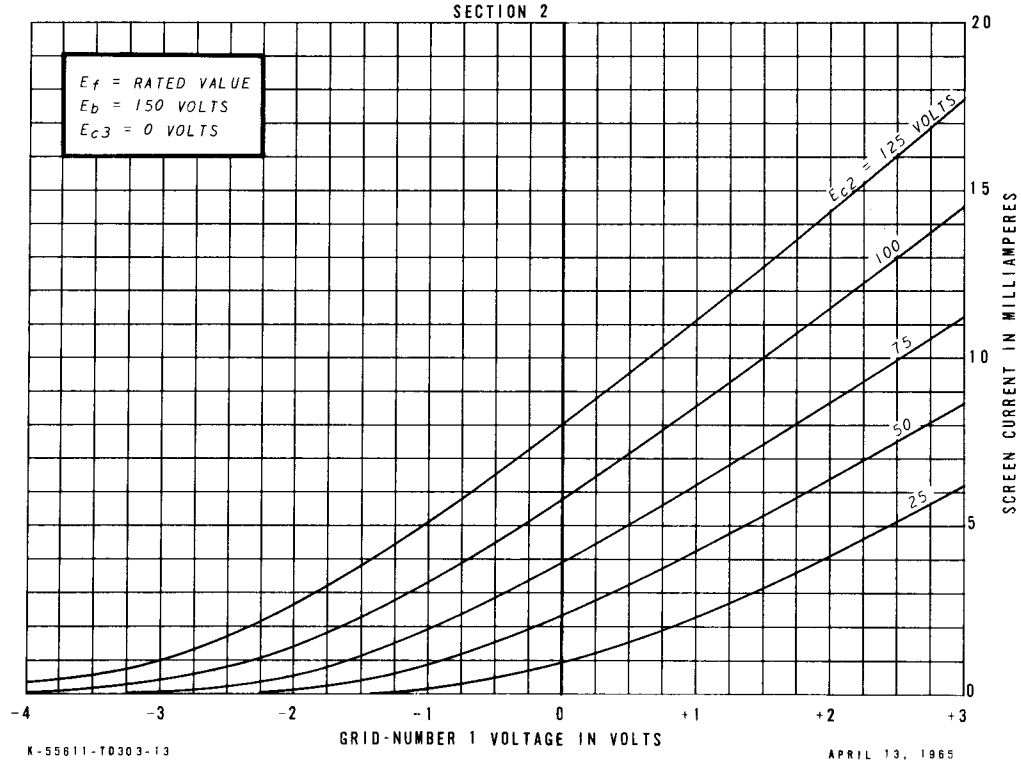
# AVERAGE TRANSFER CHARACTERISTICS



TUBE DEPARTMENT

GENERAL ELECTRIC

Owensboro, Kentucky