



3KPI

## OSCILLOGRAPH TUBE

ELECTROSTATIC FOCUS

ELECTROSTATIC DEFLECTION

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## DATA

## General:

Heater, for Unipotential Cathode:

Voltage . . . . . 6.3 . . . . . ac or dc volts

Current . . . . .  $0.6 \pm 10\%$  . . . . . amp

Direct Interelectrode Capacitances (Approx.):

Grid No.1 to all other electrodes . . . . . 8  $\mu\text{f}$ Deflecting electrode DJ<sub>1</sub> todeflecting electrode DJ<sub>2</sub> . . . . . 2.5  $\mu\text{f}$ Deflecting electrode DJ<sub>3</sub> todeflecting electrode DJ<sub>4</sub> . . . . . 2.5  $\mu\text{f}$ DJ<sub>1</sub> to all other electrodes . . . . . 11  $\mu\text{f}$ DJ<sub>2</sub> to all other electrodes . . . . . 8  $\mu\text{f}$ DJ<sub>3</sub> to all other electrodes . . . . . 7  $\mu\text{f}$ DJ<sub>4</sub> to all other electrodes . . . . . 8  $\mu\text{f}$ 

Faceplate . . . . . Clear Glass

Phosphor (For Curves, see front of this Section) . . . . . P1

Fluorescence . . . . . Green

Phosphorescence . . . . . Green

Persistence . . . . . Medium

Focusing Method . . . . . Electrostatic

Deflection Method . . . . . Electrostatic

Overall Length . . . . .  $11\frac{1}{2}'' \pm \frac{1}{4}''$ Greatest Diameter of Bulb . . . . .  $3'' \pm \frac{1}{16}''$ Minimum Useful Screen Diameter . . . . .  $2\frac{3}{4}''$ 

Weight (Approx.) . . . . . 9 oz

Mounting Position . . . . . Any

Bulb . . . . . J-24

Base . . . . . Medium-Shell Magnal 11-Pin (JETEC No. B11-66)

Basing Designation for BOTTOM VIEW . . . . . 11M

Pin 1 - Heater

Pin 2 - Grid No.1

Pin 3 - Cathode

Pin 4 - Grid No.3

Pin 5 - Deflecting

Electrode

DJ<sub>3</sub>

Pin 6 - Deflecting

Electrode

DJ<sub>4</sub>

Pin 7 - Ultor

(Grid No.2,

Grid No.4,

Collector)

Pin 8 - Deflecting

Electrode

DJ<sub>2</sub>

Pin 9 - Deflecting

Electrode

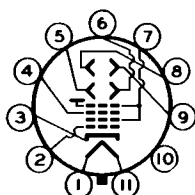
DJ<sub>1</sub>

Pin 10 - Internal

Connection-

Do Not Use

Pin 11 - Heater

*DJ<sub>1</sub> and DJ<sub>2</sub> are nearer the screen**DJ<sub>3</sub> and DJ<sub>4</sub> are nearer the base*

← Indicates a change.



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With DJ<sub>1</sub> positive with respect to DJ<sub>2</sub>, the spot is deflected toward pin 4. With DJ<sub>3</sub> positive with respect to DJ<sub>4</sub>, the spot is deflected toward pin 1.

The plane through the tube axis and pin 1 may vary from the trace produced by DJ<sub>3</sub> and DJ<sub>4</sub> by  $\pm 10^\circ$  (measured about the tube axis).

The angle between DJ<sub>1</sub> - DJ<sub>2</sub> trace and DJ<sub>3</sub> - DJ<sub>4</sub> trace is  $90^\circ \pm 3^\circ$ .

**Maximum Ratings, Design-Center Values:**

|                                           |           |       |
|-------------------------------------------|-----------|-------|
| ULTOR VOLTAGE . . . . .                   | 2500 max. | volts |
| → ULTOR INPUT (AVERAGE) . . . . .         | 6 max.    | watts |
| GRID-No.3 VOLTAGE . . . . .               | 1000 max. | volts |
| GRID-No.1 VOLTAGE:                        |           |       |
| Negative bias value . . . . .             | 200 max.  | volts |
| Positive bias value . . . . .             | 0 max.    | volts |
| Positive peak value . . . . .             | 2 max.    | volts |
| PEAK VOLTAGE BETWEEN ULTOR AND            |           |       |
| ANY DEFLECTING ELECTRODE. . . . .         | 500 max.  | volts |
| PEAK HEATER-CATHODE VOLTAGE:              |           |       |
| Heater negative with respect to cathode . | 125 max.  | volts |
| Heater positive with respect to cathode . | 125 max.  | volts |

**Equipment Design Ranges:**

For any ultor voltage ( $E_{c4}$ ) between  
recommended minimum\* and 2500 volts

|                                             |                          |                         |
|---------------------------------------------|--------------------------|-------------------------|
| Grid-No.3 Voltage                           |                          |                         |
| for Focus . . . . .                         | 16% to 30% of $E_{c4}$   | volts                   |
| → Grid-No.1 Voltage for                     |                          |                         |
| Visual Extinction of                        |                          |                         |
| Undelected Focused                          |                          |                         |
| Spot. . . . .                               | 1.9% to 4.5% of $E_{c4}$ | volts                   |
| Grid-No.3 Current for                       |                          |                         |
| Any Operating Condi-                        |                          |                         |
| tion. . . . .                               | -15 to +10               | $\mu$ amp               |
| Deflection Factors:                         |                          |                         |
| DJ <sub>1</sub> & DJ <sub>2</sub> . . . . . | 50 to 68                 | v dc/in./kv of $E_{c4}$ |
| DJ <sub>3</sub> & DJ <sub>4</sub> . . . . . | 38 to 52                 | v dc/in./kv of $E_{c4}$ |
| Spot Position . . . . .                     | ##                       |                         |

**Examples of Use of Design Ranges:**

|                      |            |            |       |
|----------------------|------------|------------|-------|
| For ultor voltage of | 1000       | 2000       | volts |
| Grid-No.3 Voltage    |            |            |       |
| for Focus . . . . .  | 160 to 300 | 320 to 600 | volts |

\* Brilliance and definition decrease with decreasing ultor voltage. Recommended minimum for the 3KP1 in general service is 1000 volts but a value as low as 500 volts may be used under conditions of low-velocity deflection and low ambient-light levels.

## The center of the undeflected focused spot will fall within a circle having 7.5-mm radius concentric with the center of the tube face.

→ Indicates a change.



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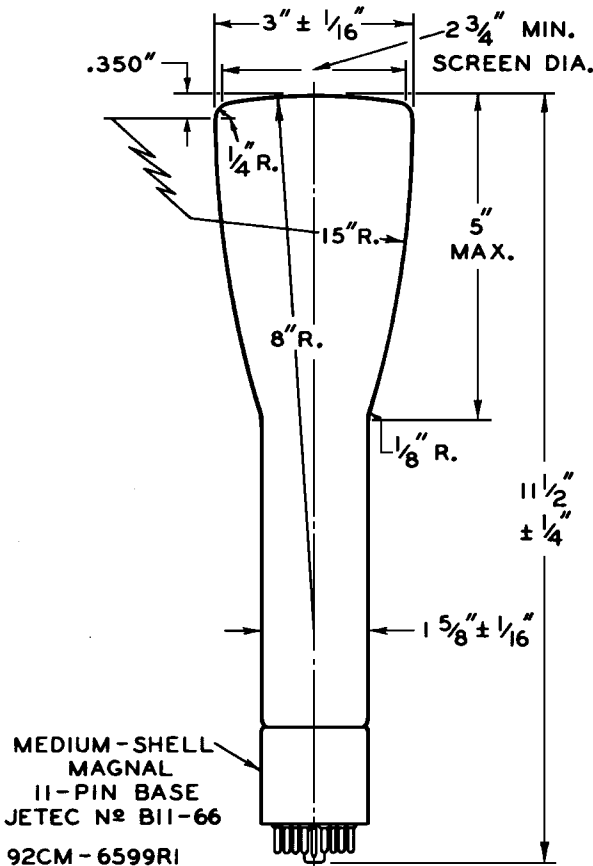
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| For ultor voltage of                                                                  | 1000       | 2000       | volts        |
|---------------------------------------------------------------------------------------|------------|------------|--------------|
| Grid-No.1 Voltage for<br>Visual Extinction of<br>Undelected Focused<br>Spot . . . . . | -19 to -45 | -38 to -90 | volts ←      |
| Deflection Factors:                                                                   |            |            |              |
| DJ <sub>1</sub> & DJ <sub>2</sub> . . . . .                                           | 50 to 68   | 100 to 136 | volts dc/in. |
| DJ <sub>3</sub> & DJ <sub>4</sub> . . . . .                                           | 38 to 52   | 76 to 104  | volts dc/in. |

**Maximum Circuit Values:**

|                                                                          |          |         |
|--------------------------------------------------------------------------|----------|---------|
| Grid-No.1-Circuit Resistance . . . . .                                   | 1.5 max. | megohms |
| Resistance in Any Deflecting<br>Electrode Circuit <sup>■</sup> . . . . . | 5 max.   | megohms |

■ It is recommended that the deflecting-electrode-circuit resistances be approximately equal.



⊥ OF BULB WILL NOT DEVIATE MORE THAN  $2^\circ$  IN ANY DIRECTION FROM PERPENDICULAR ERECTED AT CENTER OF BOTTOM OF BASE.

← Indicates a change.

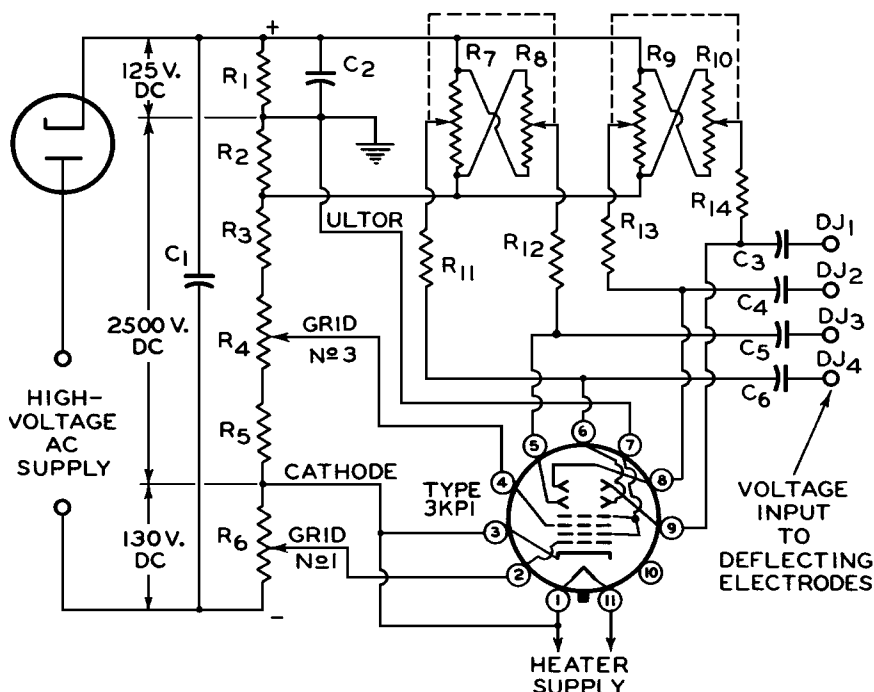
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## OSCILLOGRAPH TUBE

## TYPICAL OSCILLOGRAPH CIRCUIT



92CS-6690R2

C1: 0.1  $\mu$ f, 3000 VoltsC2: 1.0  $\mu$ f, 200 VoltsC3 C4 C5 C6: 0.05- $\mu$ f Blocking Capacitors\*

R1 R2: 2 Megohms, 0.5 Watt

R3: 6 Megohms, 0.5 Watt

R4: 2-Megohm Potentiometer, 0.5 Watt

R5: 1.0 Megohm, 0.5 Watt

R6: 0.5-Megohm Potentiometer, 0.5 Watt

R7 R8: Dual 5-Megohm Potentiometer, 0.5 Watt

R9 R10: Dual 5-Megohm Potentiometer, 0.5 Watt

R11 R12 R13 R14: 2 Megohms, 0.5 Watt

\* When cathode is grounded, capacitors should have high voltage rating (3000 volts); when ultor is grounded, they may have low voltage rating (200 volts). For dc amplifier service, deflecting electrodes should be connected direct to amplifier output. In this service, it is preferable usually to remove deflecting-electrode resistors to minimize loading effect on amplifier. In order to minimize spot defocusing, it is essential that ultor be returned to a point in the amplifier system which will give the lowest possible potential difference between ultor and the deflecting electrodes.

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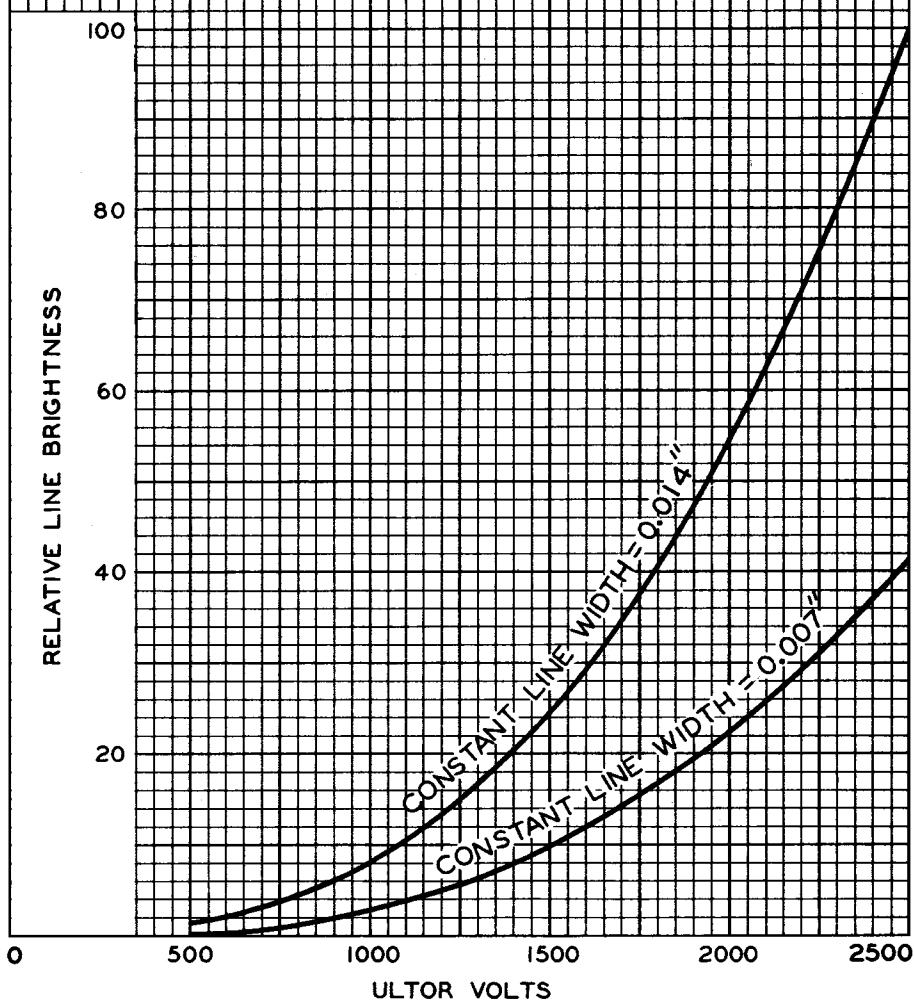
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## CHARACTERISTICS

$E_f = 6.3$  VOLTS

GRID-N $\phi$ 3 VOLTS ADJUSTED FOR FOCUS

GRID-N $\phi$ 1 VOLTS ADJUSTED TO GIVE ULTOR-CURRENT VALUE REQUIRED TO MAINTAIN CONSTANT LINE WIDTH AT DIFFERENT ULTOR VOLTAGES. FOR A GIVEN ULTOR VOLTAGE, LINE WIDTH AND RELATIVE LINE BRIGHTNESS INCREASE WITH INCREASE IN ULTOR CURRENT



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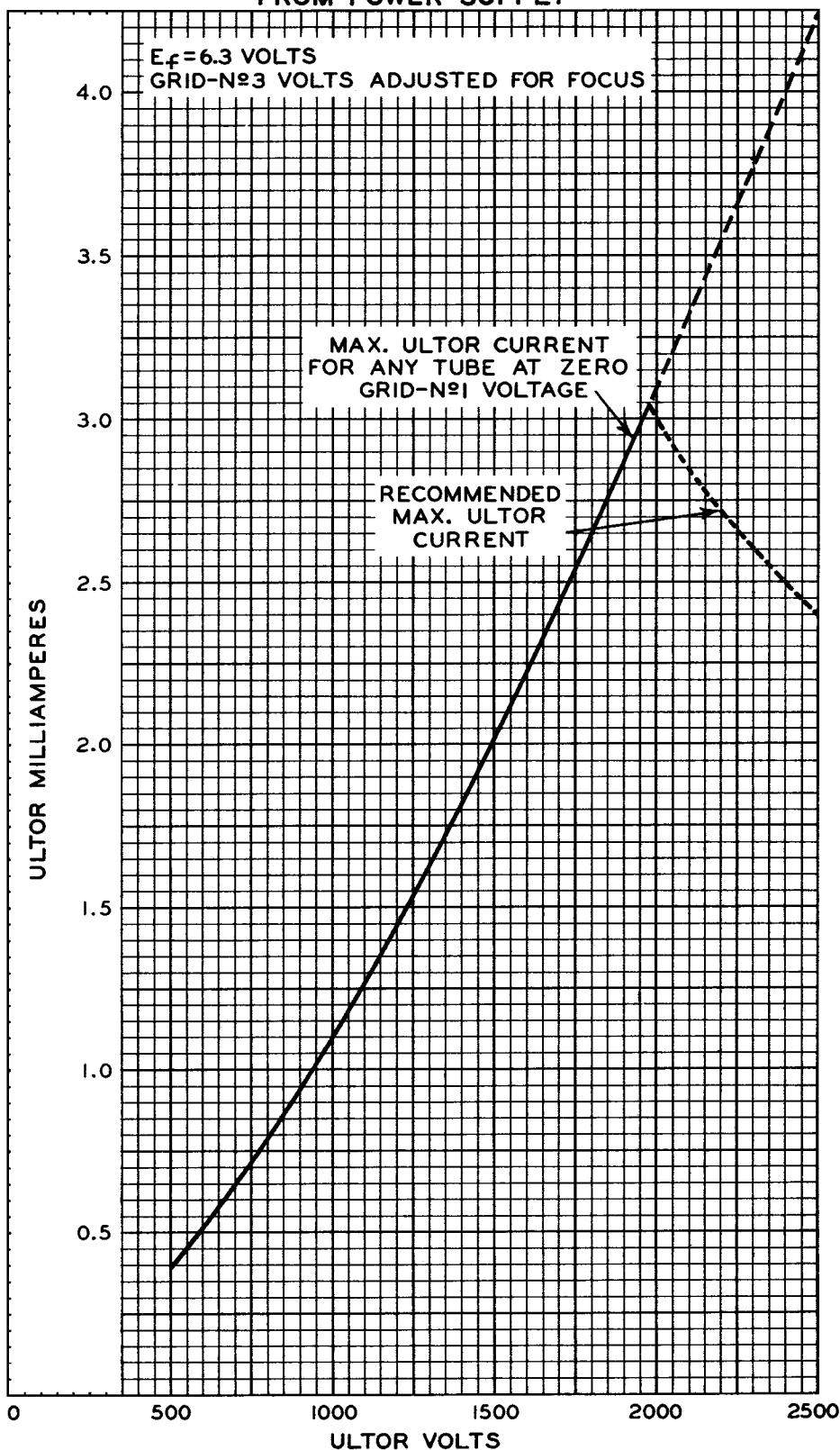
92CM-7191R2

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# MAXIMUM ULTOR-CURRENT REQUIREMENTS FROM POWER SUPPLY



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92CM-7192RI

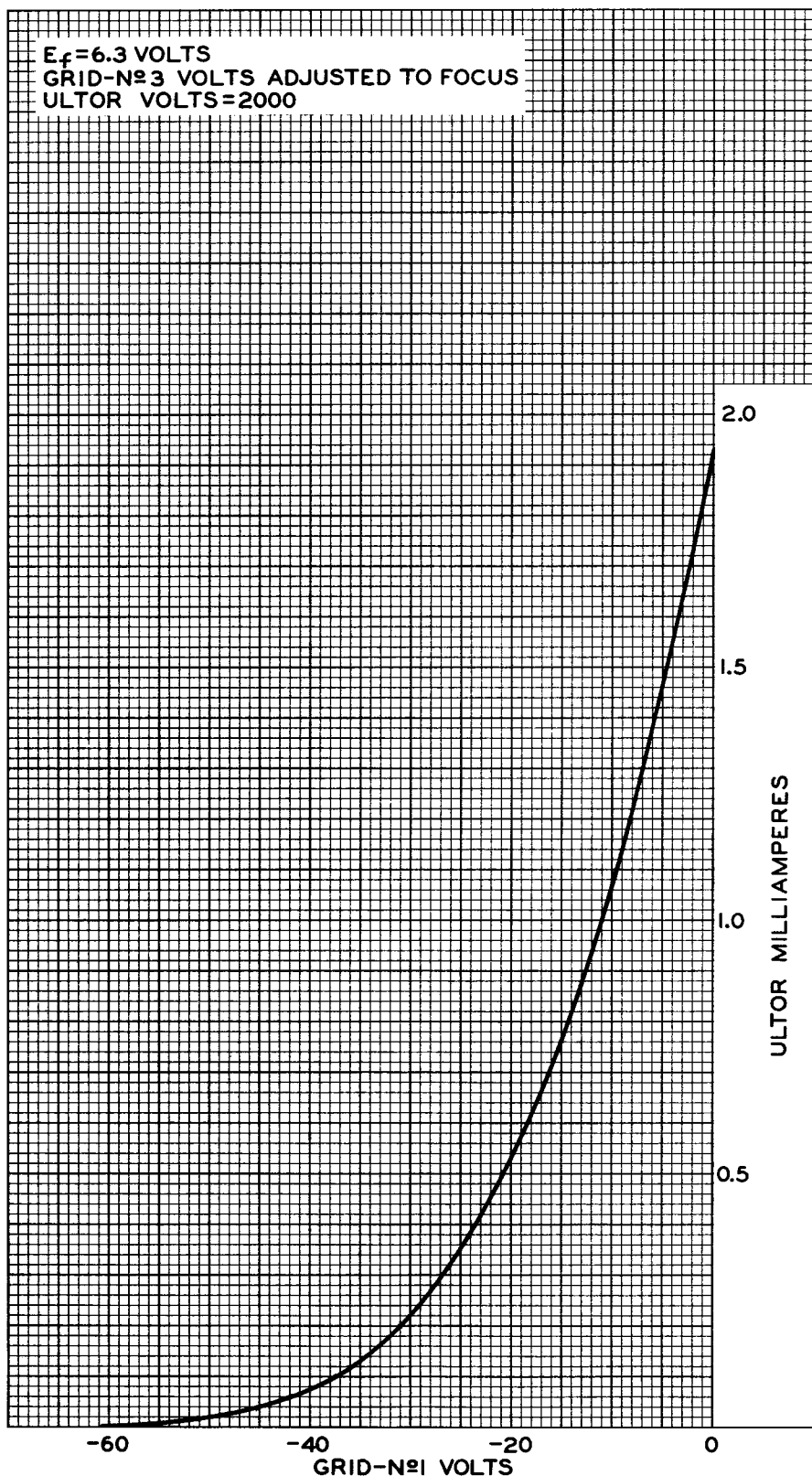
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## AVERAGE CHARACTERISTIC



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92CM-6658R2