3WP1

OSCILLOGRAPH TUBE

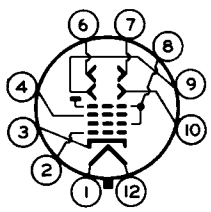
ELECTROSTATIC FOCUS ELECTROSTATIC DEFLECTION

DATA

General:

Heater, for Unipotential Cathode:		
Voltage	6.3	ac or dc volts
Current	0.6 ± 10%	amp
Direct Interelectrode Capacitances:		
Grid No.1 to all other electrodes	4.6 to 8.7	μμf
Cathode to all other electrodes	3 to 5.7	μμf
Deflecting electrode DJ_1 to deflecting electrode DJ_2	1.7 to 3.3	μμf
Deflecting electrode DJ_3 to deflecting electrode DJ_4	1 to 2	μμf
DJ_1 to all other electrodes	5.5 to 10.5	μμf
DJ_2 to all other electrodes	5.5 to 10.5	μμf
DJ_3 to all other electrodes	3.5 to 6.8	μμf
DJ_4 to all other electrodes	3.5 to 6.8	μμf
Faceplate, Flat		Clear Glass
Phosphor (For Curves, see front of this Section)		P1
Fluorescence		Green
Phosphorescence		Green
Persistence		Medium
Focusing Method		Electrostatic
Deflection Method		Electrostatic
Deflecting-electrode arrangement		*See Dimensional Outline*
Overall Length		11-1/2" ± 1/8"
Greatest Diameter of Bulb		3" ± 1/16"
Minimum Useful Screen Diameter		2-3/4"
Minimum Useful Scan (Centered with respect to tube face):		
By deflecting electrodes DJ_1 & DJ_2		2-1/2"
By deflecting electrodes DJ_3 & DJ_4		2-1/4"
Weight (Approx.)		1 lb
Mounting Position		Any
Bulb		J24R
Base	Small-Shell Duodecal 10-Pin (JETEC No.B10-75), or Small-Shell Duodecal 12-Pin (JETEC No.B12-43)	
Basing Designation for BOTTOM VIEW		12T

Pin 1 - Heater
Pin 2 - Grid No.1
Pin 3 - Cathode
Pin 4 - Grid No.3
Pin 6 - Deflecting Electrode DJ_1
Pin 7 - Deflecting Electrode DJ_2



Pin 8 - Ultor (Grid No.2, Grid No.4, Collector)
Pin 9 - Deflecting Electrode DJ_4
Pin 10 - Deflecting Electrode DJ_3
Pin 12 - Heater

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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	0 max.	volts
PEAK VOLTAGE BETWEEN ULTOR AND ANY DEFLECTING ELECTRODE	500 max.	volts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	180 max.	volts
Heater positive with respect to cathode	180 max.	volts

Equipment Design Ranges:

For any ultor voltage (E_{c_4}) between recommended minimum and 2500 volts*

Grid-No.3 Voltage for Focus	16.5% to 31% of E_{c_4}	volts
Grid-No.1 Voltage for Visual Extinction of Undeflected Focused Spot	-3% to -5% of E_{c_4}	volts
Grid-No.3 Current for Any Operating Condition	-15 to +10	μa
Deflection Factors:		
DJ_1 & DJ_2	41.5 to 50.5	v dc/in./kv of E_{c_4}
DJ_3 & DJ_4	28.5 to 35	v dc/in./kv of E_{c_4}
Spot Position	##	

Examples of Use of Design Ranges:

For ultor voltage of	*1000*	*1500*	*2000*	*volts*
Grid-No.3 Voltage for Focus	165 to 310	247 to 465	330 to 620	volts
Grid-No.1 Voltage for Visual Extinction of Undeflected Focused Spot	-30 to -50	-45 to -75	-60 to -100	volts
Deflection Factors:				
DJ_1 & DJ_2	41.5 to 50.5	62.3 to 75.8	83 to 101	v dc/in.
DJ_3 & DJ_4	28.5 to 35	42.8 to 52.5	57 to 70	v dc/in.

* Brilliance and definition decrease with decreasing ultor voltage. Recommended minimum for the 3WP1 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.

##: See next page.

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OSCILLOGRAPH TUBE

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	1.5 max.	megohms
Resistance in Any Deflecting-Electrode Circuit■	5 max.	megohms

SPECIAL PERFORMANCE DATA

For ultor voltage of 1500 volts

Line Width▲	0.026 max.	inch
Peak Grid-No.1 Drive from Spot Cutoff▲	50 max.	volts
Raster Shape	§	
Deflection Factor Uniformity	🌡	

With grid-No.1 voltage adjusted to give a spot that is just visible, and the tube shielded from all extraneous fields, the center of the undeflected focused spot will fall within a circle of 3/16-inch radius concentric with the center of the tube face.

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

▲ Under the following conditions: heater voltage of 6.3 volts, brightness of 7 foot-lamberts measured on a 2" x 2", 49-line raster with high-frequency scanning applied to deflecting electrodes DJ_1 and DJ_2. For *line-width measurement,* the high-frequency scanning is adjusted to give a raster width of 6.9 cm with the grid-No.3 voltage adjusted to give sharpest focus at center of tube face. Raster height is contracted until the individual scanning lines are just barely distinguishable. *Line width* is expressed as the quotient of the contracted raster height measured at the center line of the tube face divided by the number of scanning lines (49).

§ Under the following conditions: heater voltage of 6.3 volts, grid-No.3 voltage adjusted for focus, and grid-No.1 voltage adjusted to give visible raster. With 49-line raster centered with respect to the tube face and size adjusted to give mean dimensions of 1.875" in 1DJ2 direction and 1.688" in 3DJ4 direction, all points on the raster will lie within the area between the two rectangles also centered with respect to the tube face; the one, 1.920" in 1DJ2 direction by 1.730" in 3DJ4 direction; the other, 1.830" in 1DJ2 direction and 1.646" in 3DJ4 direction.

🌡 The deflection factor for either DJ_1 and DJ_2 electrodes or DJ_3 and DJ_4 electrodes for a deflection of less than 75 per cent of the respective useful scan will not differ from the deflection factor for the corresponding deflecting electrodes at 25 per cent of the useful scan by more than 2 per cent.

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3WPI

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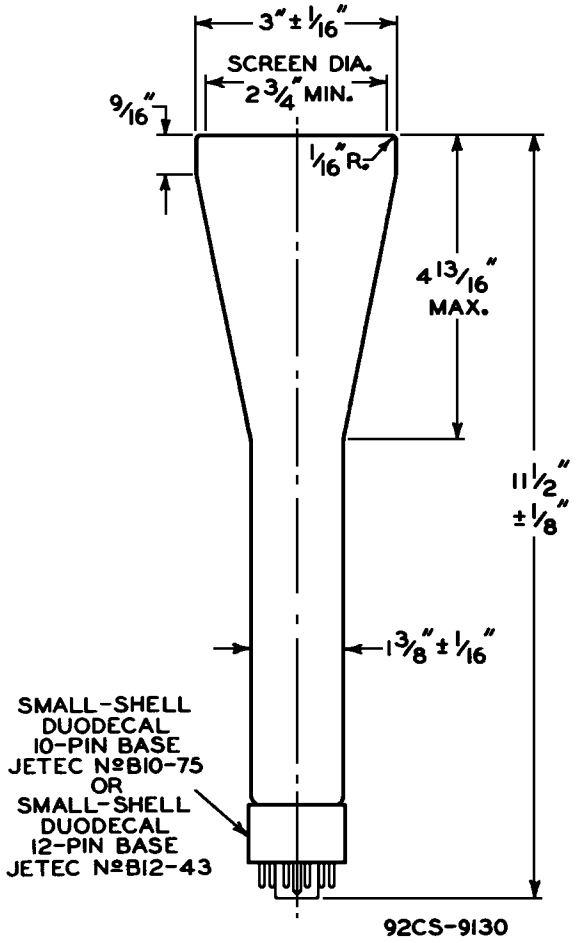

℄ OF BULB WILL NOT DEVIATE MORE THAN 2° IN ANY DIRECTION FROM PERPENDICULAR ERECTED AT CENTER OF BOTTOM OF BASE.

THE PLANE THROUGH THE TUBE AXIS AND PIN 3 MAY VARY FROM THE TRACE PRODUCED BY DJ_1 AND DJ_2 BY AN ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF ± 10°. ANGLE BETWEEN DJ_1 – DJ_2 TRACE AND DJ_3 – DJ_4 TRACE IS 90° ± 1°.

DJ_1 AND DJ_2 ARE NEARER THE SCREEN: DJ_3 AND DJ_4 ARE NEARER THE BASE. WITH DJ_1 POSITIVE WITH RESPECT TO DJ_2, THE SPOT WILL BE DEFLECTED TOWARD PIN 3: LIKEWISE, WITH DJ_3 POSITIVE WITH RESPECT TO DJ_4, THE SPOT WILL BE DEFLECTED TOWARD PIN 12.

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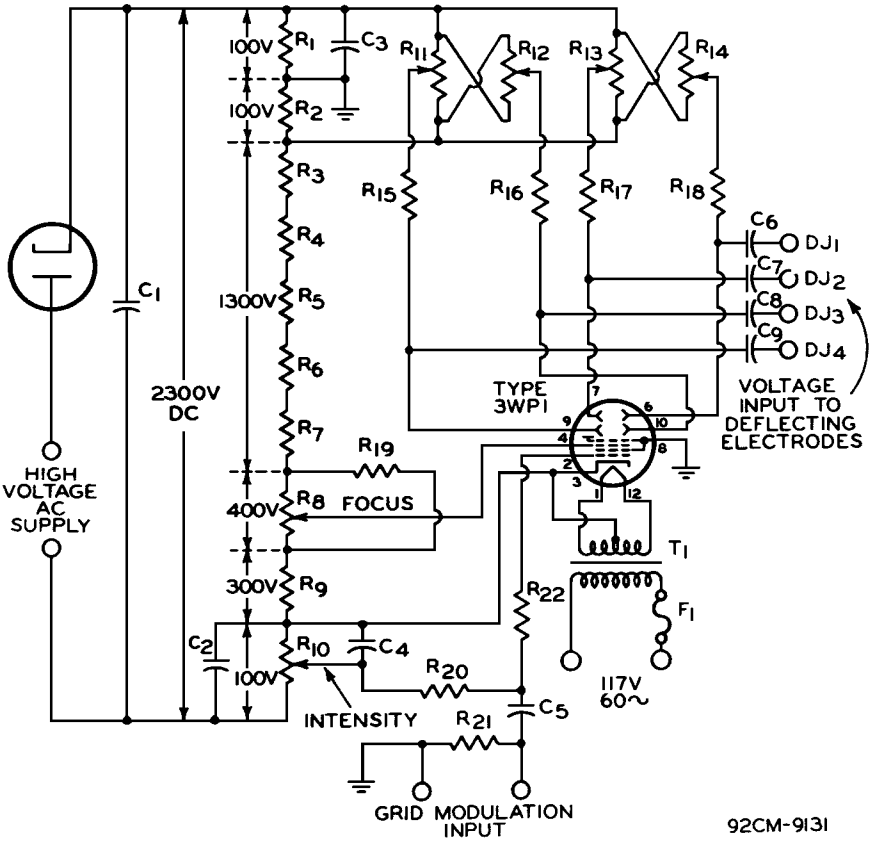
TYPICAL OSCILLOGRAPH CIRCUIT



C1: 0.5 μf, 3000 volts

C2: 8 μf, 250 volts

C3: 1 μf, 200 volts

C4: 1 μf, 200 volts

C5: 0.05 μf, 3000 volts

C6 C7 C8 C9: 0.05 μf, 600 volts

R1 R2: 510000 ohms, 1/2 watt

R3 R4 R5 R6: 270000 ohms, 1/2 watt

R7: 220000 ohms, 1/2 watt

R8: 500000-ohm potentiometer, 1/2 watt

R9: 300000 ohms, 1/2 watt

R10: 100000-ohm potentiometer, 1/2 watt

R11 R12: Dual 1-megohm potentiometer, 1/2 watt

R13 R14: Dual 1-megohm potentiometer, 1/2 watt

R15 R16 R17 R18: 1.5 megohms, 1/2 watt

R19: 2 megohms, 1 watt

R20: 510000 ohms, 1/2 watt

R21: 5 megohms, 1/2 watt

R22: 5100 ohms, 1/2 watt

T1: Transformer, with 6.3-volt/1-ampere secondary, insulated for at least 3000 volts, such as Thordarson T26F65.

F1: 1-ampere fuse

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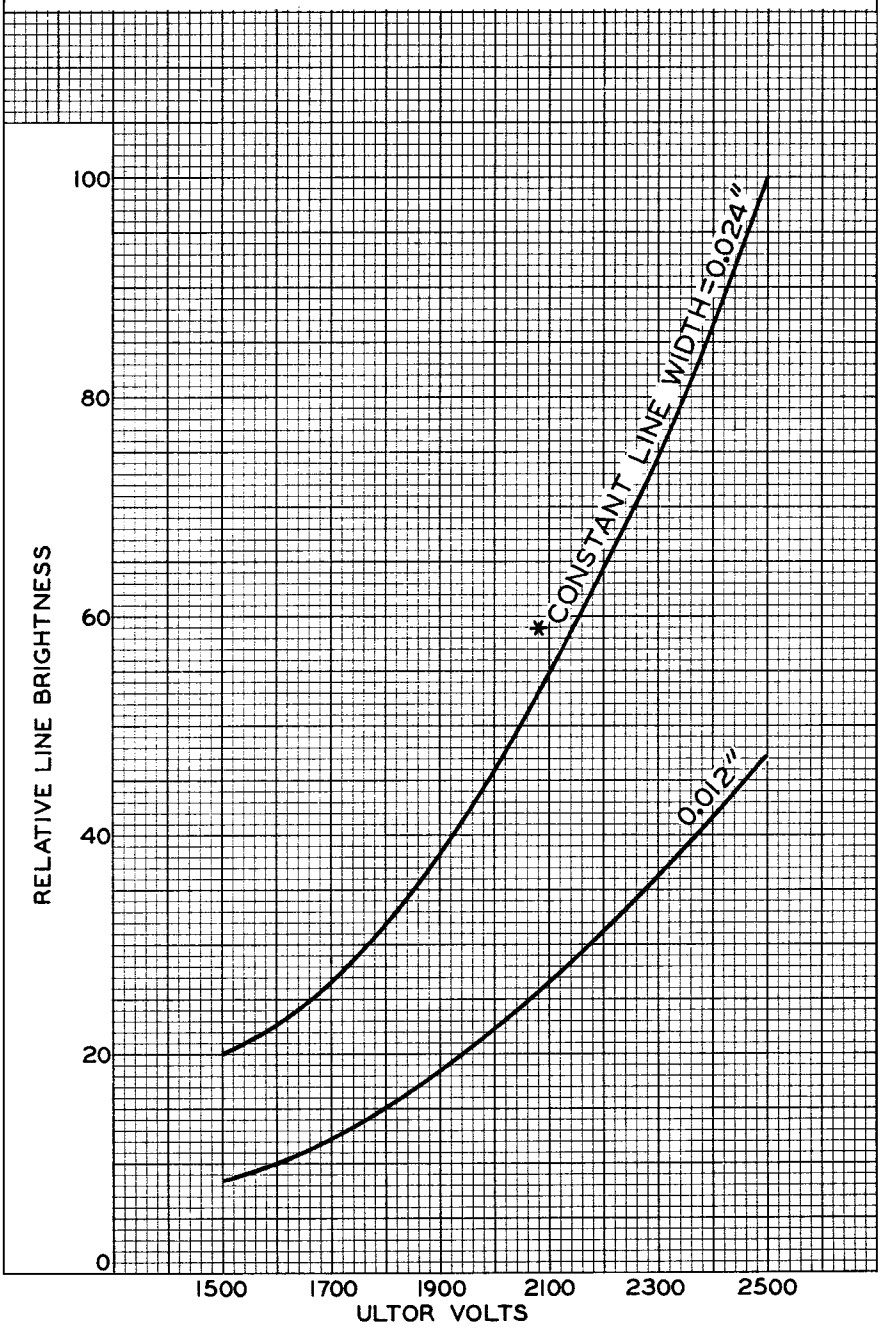
AVERAGE CHARACTERISTICS

E_f = 6.3 VOLTS

GRID-№3 VOLTS ADJUSTED FOR FOCUS.

GRID-№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.

* LINE WIDTH MEASURED BETWEEN POINTS WHERE BRIGHTNESS WAS APPROX. 1/2 THAT AT CENTER OF LINE.



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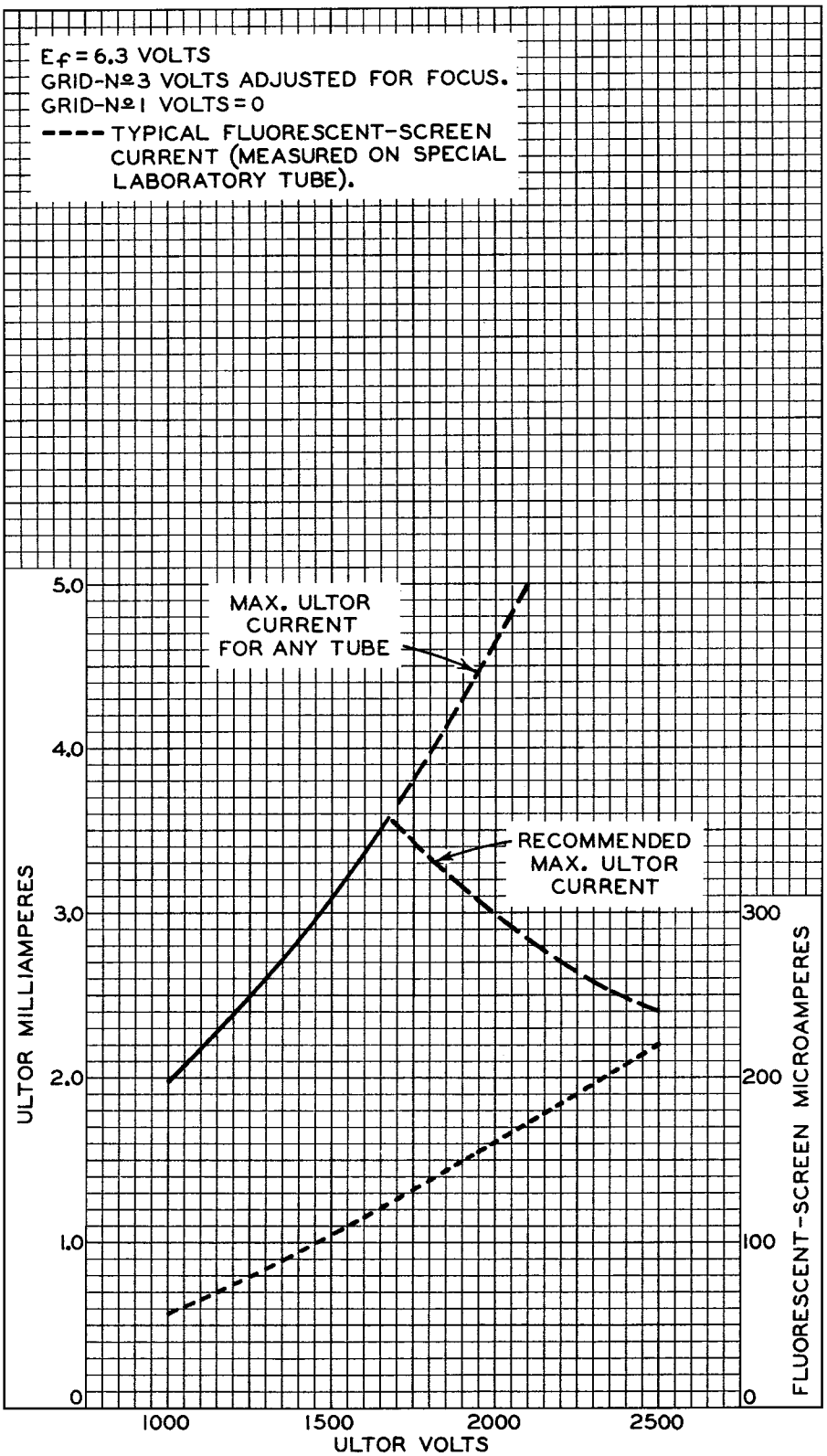
CHARACTERISTICS



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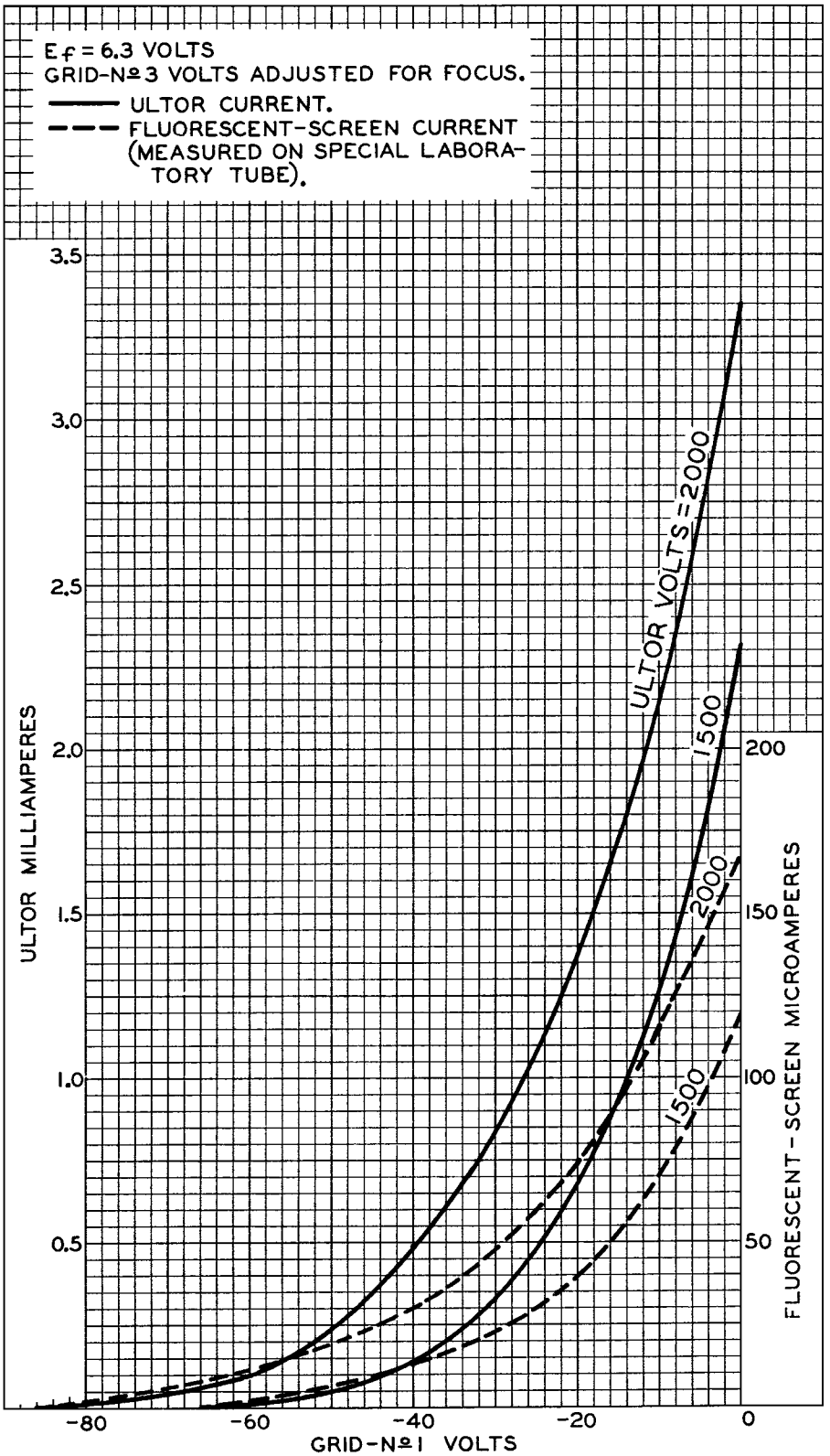
AVERAGE CHARACTERISTICS



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