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RADECHON

CHARGE STORAGE TUBE

SINGLE-BEAM, BARRIER-GRID TYPE

NON-EQUILIBRIUM WRITING CAPACITANCE-DISCHARGE READING

DATA

General:

Heater, for Unipotential Cathode:

Voltage. 6.3 ac or dc volts

Current. 0.6 amp

Direct Interelectrode Capacitances (Approx.):

Grid No.1 to all other electrodes. 9 μf Deflecting electrode DJ_1 to all
other electrodes 13 μf Deflecting electrode DJ_2 to all
other electrodes 13 μf Deflecting electrode DJ_3 to all
other electrodes 11.5 μf Deflecting electrode DJ_4 to all
other electrodes 11.5 μf DJ_1 to DJ_2 3 μf DJ_3 to DJ_4 3 μf Grid No.5 to backing-electrode 800 μf Grid No.5 and backing-electrode
to collector 4 μf Collector to all other electrodes &
external cylindrical shield. See Curve

Focusing Method. Electrostatic

Deflection Method. Electrostatic

Overall Length 11-27/32" $\pm$ 3/8"Greatest Diameter of Tube. 3.30" $\pm$ 0.05"

Minimum Useful Storage-Surface Diameter. 2-1/4"

Mounting Position. Any except those positions where
the diheptal base is up and the
tube axis is at an angle of less
than 60° from the vertical.

Weight (Approx.) 1 lb

Base:

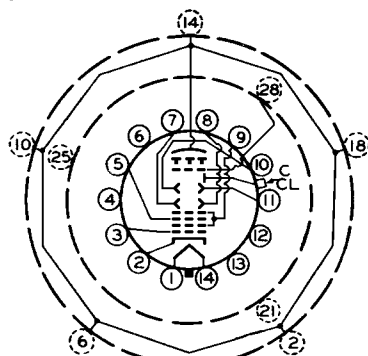
On large end of tube Small-Button Twentyninar 8-Pin
(JETEC No.E8-19)

VIEW OF TWENTYNINAR-BASE END OF TUBE

Pin 2 } Multiple Connec-
 Pin 6 } tions to Backing-
 Pin 10 } Electrode. Only
 Pin 14 } One Need be Used
 Pin 18 }

Pin 21 - No Connec-
tionPin 25 - No Connec-
tion

Pin 28 - Grid No.5

PINS 2,6,10,14,18: ON 1-7/8"
DIA. PIN CIRCLEPINS 21,25,28: ON 7/8" DIA.
PIN CIRCLESOLID-LINE CIRCLES DEPICT DIHEPTAL BASE
BROKEN-LINE CIRCLES DEPICT TWENTYNINAR BASE



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On small end of tube. Small-Shell Diheptal 14-Pin
(JETEC No.B14-45)

VIEW OF DIHEPTAL-BASE END OF TUBE

Pin 1 - Heater	Pin 10 - Deflecting
Pin 2 - Cathode	Electrode DJ_2
Pin 3 - Grid No.1	Pin 11 - Deflecting
Pin 4 - Internal Con- nection-Do Not Use	Electrode DJ_1
Pin 5 - Grid No.3	Pin 12 - No Connection
Pin 6 - No Connection	Pin 13 - Same as Pin 4
Pin 7 - Deflecting Electrode DJ_4	Pin 14 - Heater
Pin 8 - Deflecting Electrode DJ_3	C,CL - External Con- ductive Coating, Collector, In- ternal Shield, Flange between Neck and Large Part of Tube
Pin 9 - Ultor (Grids No.2 & No.4)	

*All voltages are with respect to cathode unless
otherwise specified*

Maximum Ratings, Absolute Values:**BACKING-ELECTRODE-TO-GRID-No.5**

(BARRIER-GRID) VOLTAGE:

Backing-electrode positive with
respect to grid No.5 100 max. volts

Backing-electrode negative with
respect to grid No.5 100 max. volts

COLLECTOR-TO-GRID-No.5 VOLTAGE:

Positive value 100 max. volts

Negative value 0 max. volts

ULTOR* VOLTAGE 1500 max. volts

GRID-No.3 VOLTAGE 500 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 HEATER-CATHODE VOLTAGE:

Heater negative with
respect to cathode 125 max. volts

Heater positive with
respect to cathode 10 max. volts

Equipment Design Ranges:

*For any ultor voltage (E_{c4}) between 1000 and 1500 volts**

Backing-Electrode-to-

Grid-No.5 Voltage. See Note 1

- * The "ultor" in a storage tube is the electrode to which is applied the highest dc voltage for accelerating the electrons in the beam prior to its deflection. In the 6499, the ultor function is performed by grid No.4. Since grid No.4 and grid No.2 are connected together within the 6499, they are collectively referred to simply as "ultor" for presenting data.

*: See next page.



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Collector-to-Grid-No.5 Voltage.	0 to 50	volts
Grid-No.3 Voltage for Focus with grid- No.1 volts = 0	14% to 26% of E_{c4}	volts
Grid-No.1 Voltage for collector-current cutoff	-2.5% to -4.7% of E_{c4}	volts
Collector Current for grid-No.1 volts = 0. . .	20 to 50	μ amp
Max. Cathode Current for grid-No.1 volts = 0.	See Curve	
Deflection Factors:		
DJ ₁ and DJ ₂	85 to 105 v dc/in./kv of E_{c4}	
DJ ₃ and DJ ₄	78 to 96 v dc/in./kv of E_{c4}	
Spot Position.	See Note 2	
Signal-Uniformity Ratio. .	See Note 3	

Examples of Use Design Ranges:

For ultor voltage of	1000	volts
Grid-No.3 Voltage for Focus with grid- No.1 volts = 0	140 to 260	volts
Grid-No.1 Voltage for collector-current cutoff	-25 to -47	volts
Deflection Factors:		
DJ ₁ and DJ ₂	85 to 105	v dc/in.
DJ ₃ and DJ ₄	78 to 96	v dc/in.

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	1.5 max.	megohms
Resistance in Any Deflecting- Electrode Circuit*	1.0 max.	megohm

* In general, the recommended minimum ultor voltage should not be less than 1000 volts. Signal output and resolution decrease with decreasing ultor voltage. Secondary emission characteristics of the dielectric layer limit the maximum ultor voltage to 1500 volts.

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

Note 1: The backing-electrode, grid No.5, and ultor are usually operated at the same dc potential. During the writing cycle, the backing-electrode may be pulsed to ± 60 volts with respect to grid No.5.

Note 2: The undeflected focused spot will fall within a circle having a diameter equal to 10% of the minimum storage-surface diameter and having its center coincident with the center of the storage surface.

Spot position is calculated as follows: With heater voltage of 6.3 volts, ultor voltage of 1000 volts, grid-No.5 voltage of 1000 volts, collector voltage of 1050 volts, grid-No.3 voltage adjusted to give focus, grid-No.1 voltage adjusted for 15 microamperes peak collector current, each deflecting electrode connected through a 1-megohm resistor to ultor, and the tube shielded from all extraneous fields, the voltages

Note 3: See next page.



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required to displace the beam from its undeflected position to the edge of the storage surface in the direction of each deflecting electrode are recorded as a for DJ_1 , b for DJ_2 , c for DJ_3 , and d for DJ_4 .

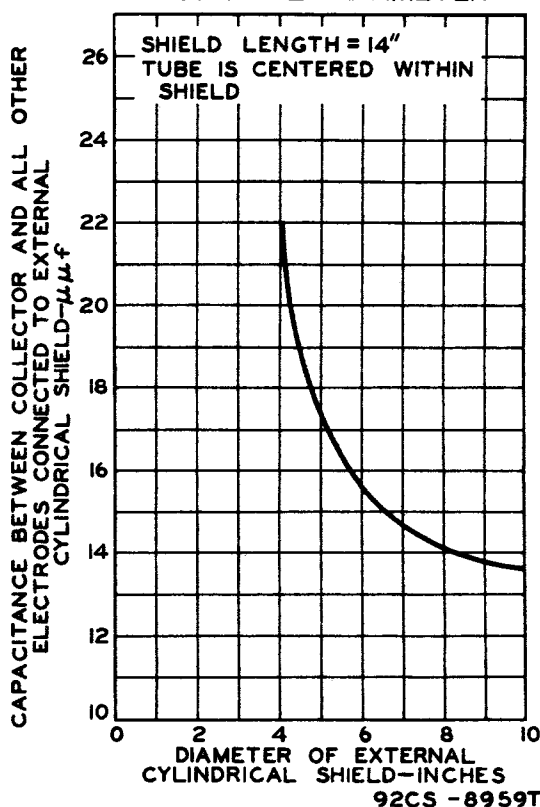
Spot Position in % of Storage-Surface Diameter

$$= 1/2 \sqrt{\left(\frac{b-a}{b+a}\right)^2 + \left(\frac{d-c}{d+c}\right)^2} \times 100$$

Note 3: With voltages as specified in Note 2, and with a signal written into storage by applying a series of well-formed symmetrical square waves to grid No.1 such that a series of 25 equally spaced stored elements are written across a single line scan, the ratio of the maximum to minimum signal amplitude observed as the single line scan is moved across the storage surface will not exceed 1.35.

OPERATING CONSIDERATIONS

Shielding. The use of a magnetic shield of high-permeability material surrounding the tube is recommended. This shield prevents the effect of stray fields in causing unwanted deflection of the electron beam.

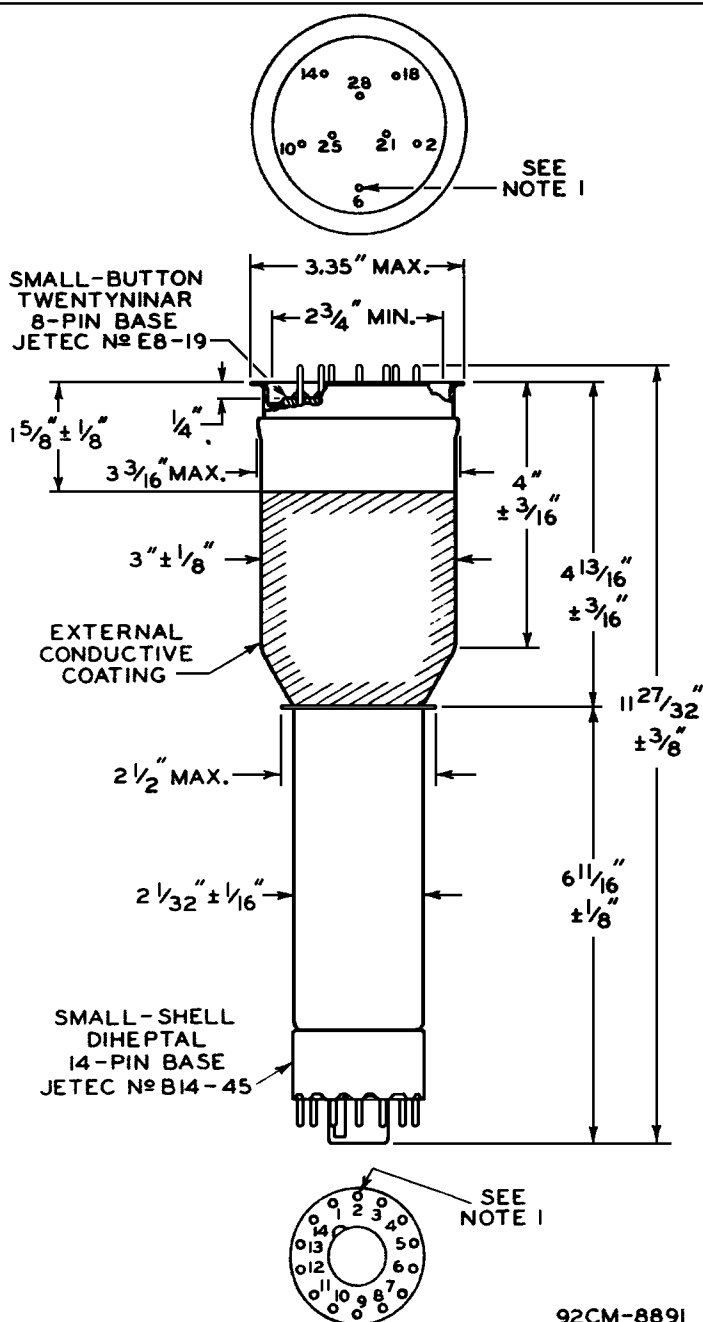
INDICATED CAPACITANCE
VS. SHIELD DIAMETER



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NOTE 1: THE ANGLE BETWEEN PLANE THROUGH PIN 6 OF TWENTYNINAR BASE AND TUBE AXIS, AND PLANE THROUGH PIN 2 OF DIHEPTAL BASE AND TUBE AXIS WILL NOT EXCEED 10°. THE INDICATED PINS ARE BOTH ON THE SAME SIDE OF THE TUBE.

NOTE 2: DEFLECTING ELECTRODES DJ₁ & DJ₂ ARE NEARER THE TARGET. DEFLECTING ELECTRODES DJ₃ & DJ₄ ARE NEARER THE DIHEPTAL BASE.

NOTE 3: ANGLE BETWEEN DJ₁ & DJ₂ DEFLECTION PATH AND DJ₃ & DJ₄ DEFLECTION PATH IS 90° ± 30°.

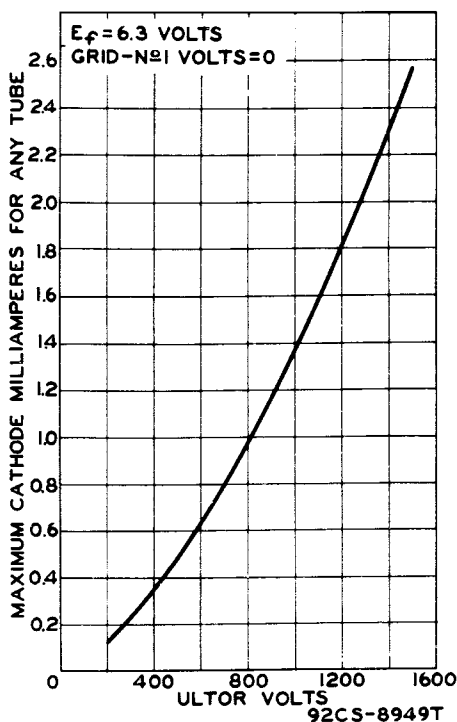
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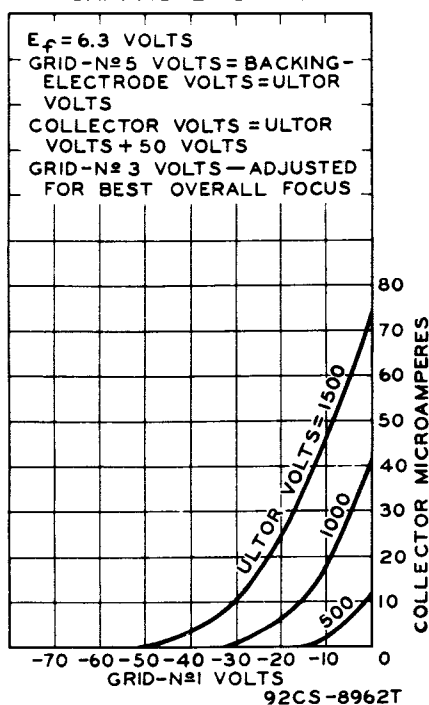
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MAXIMUM CATHODE CURRENT



AVERAGE TRANSFER CHARACTERISTICS





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RESOLUTION CHARACTERISTICS

 $E_f = 6.3$ VOLTS

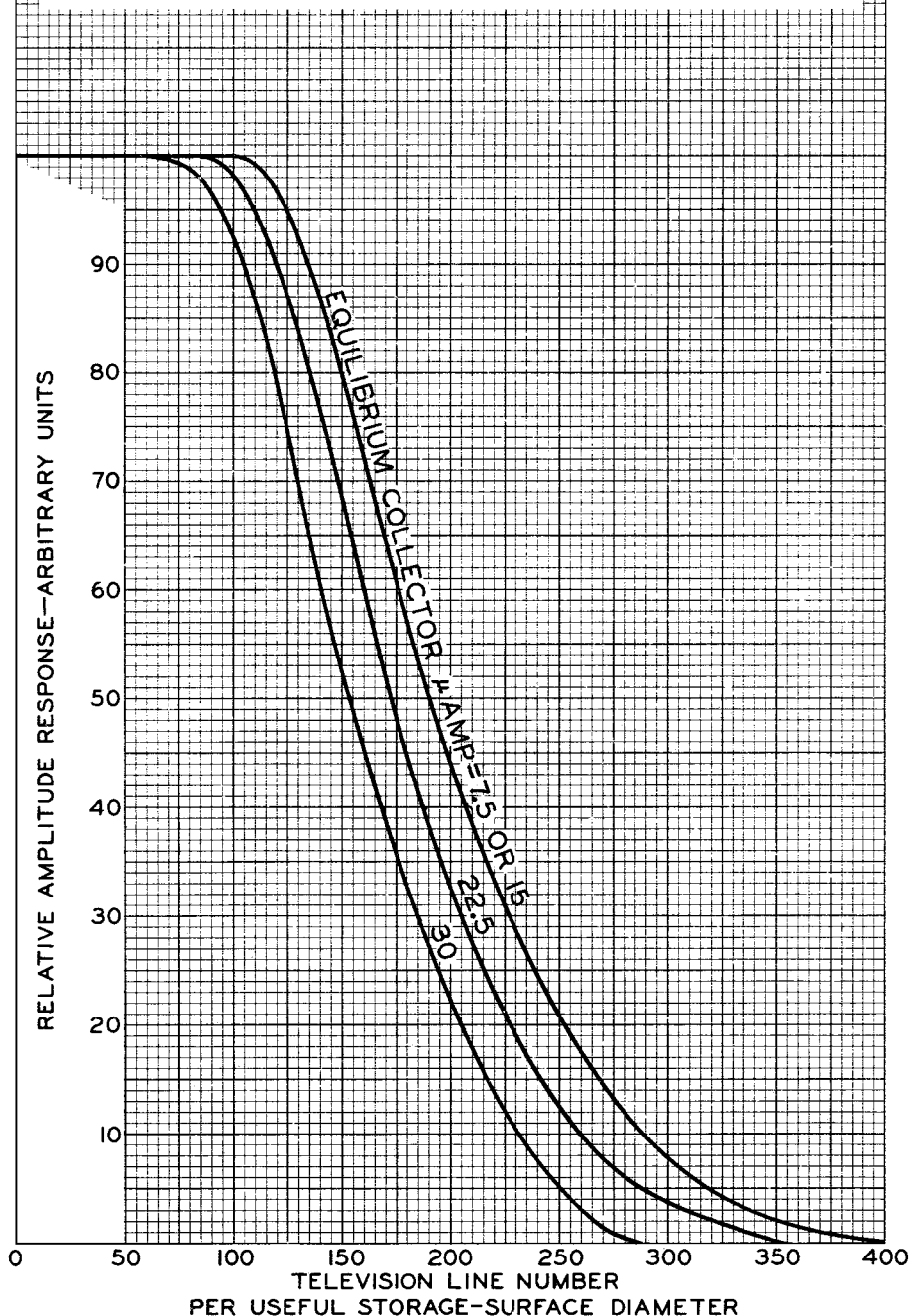
GRID-Nº5 VOLTS=ULTOR VOLTS=1000

COLLECTOR VOLTS=1050

GRID-Nº3 VOLTS—ADJUSTED FOR BEST OVERALL FOCUS

GRID-Nº1 VOLTS—ADJUSTED TO GIVE EQUILIBRIUM COLLECTOR
CURRENT SHOWN ON EACH CURVE

BACKING-ELECTRODE:

DURING WRITING—PULSED APPROX. 50 VOLTS POSITIVE WITH
RESPECT TO ULTOR*DURING READING*—AT GRID-Nº5 POTENTIAL

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RESOLUTION CHARACTERISTICS

$E_f = 6.3$ VOLTS

GRID-Nº5 VOLTS=ULTOR VOLTS

COLLECTOR VOLTS=ULTOR VOLTS +50 VOLTS

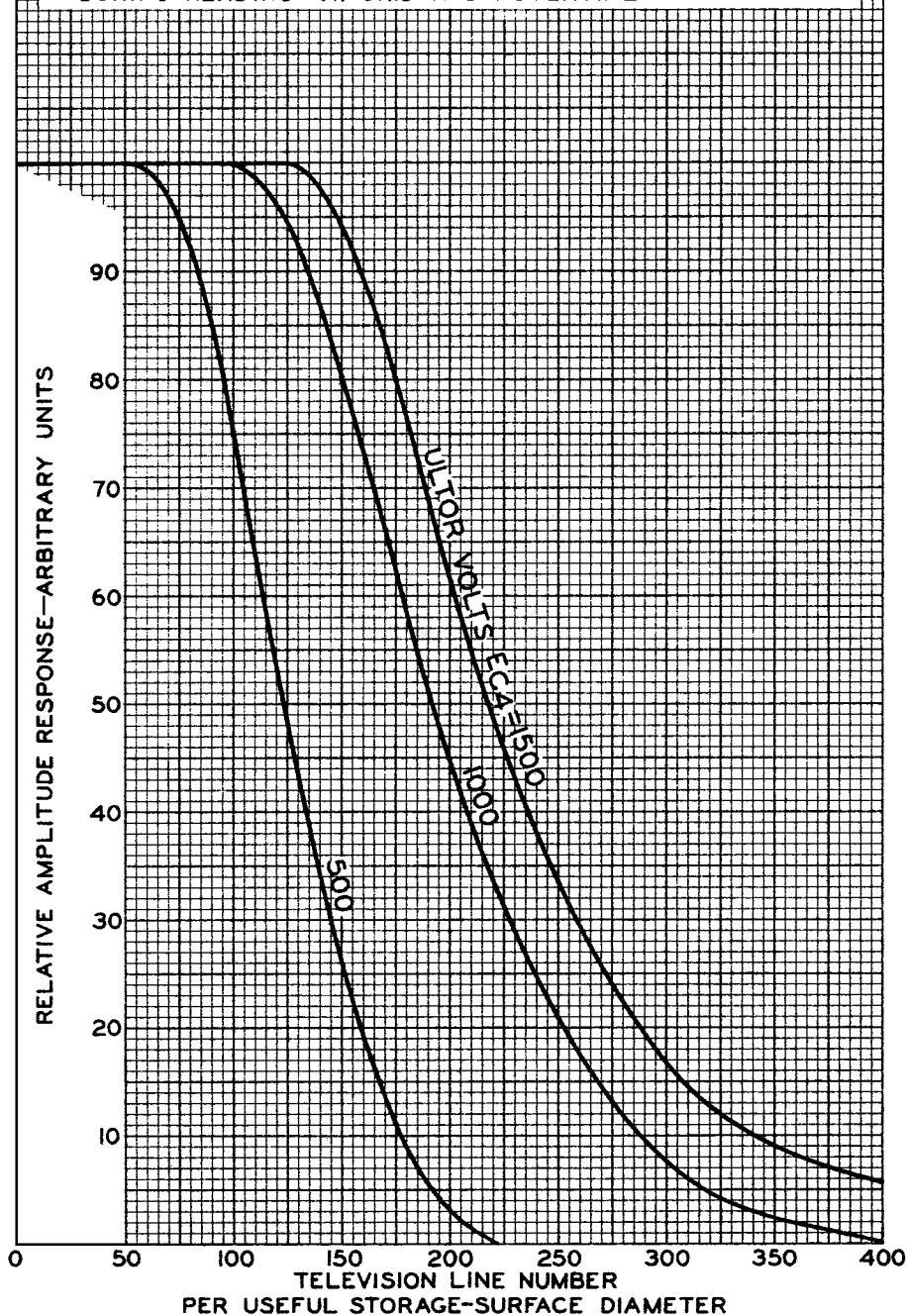
GRID-Nº3 VOLTS—ADJUSTED FOR BEST OVERALL FOCUS

GRID-Nº1 VOLTS—ADJUSTED TO GIVE EQUILIBRIUM COLLECTOR
CURRENT OF 7.5 MICROAMPERES

BACKING-ELECTRODE:

DURING WRITING—PULSED APPROX. 50 VOLTS POSITIVE WITH
RESPECT TO ULTOR

DURING READING—AT GRID-Nº5 POTENTIAL



TUBE DIVISION

92CM-8954

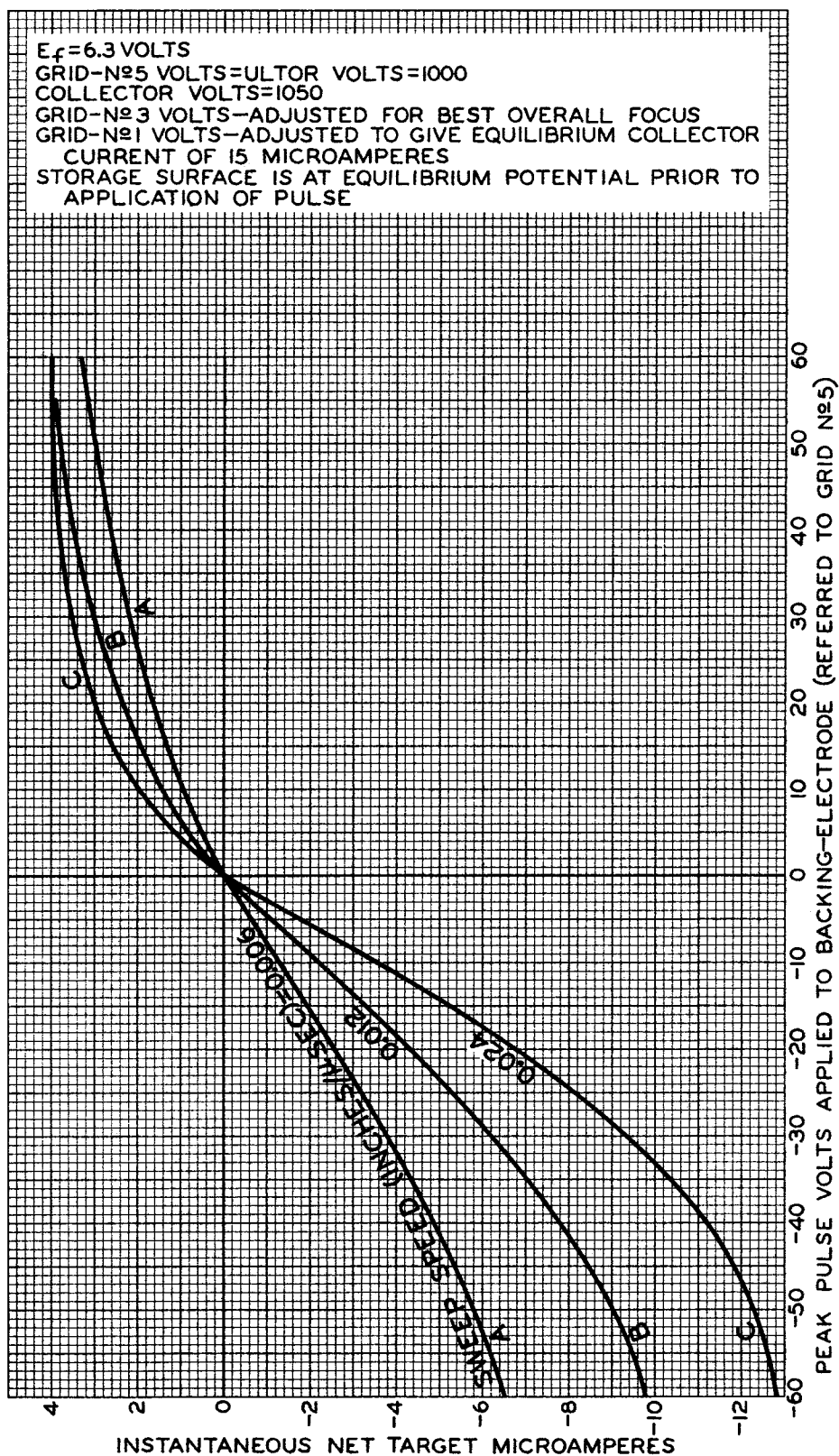
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TYPICAL TARGET CHARACTERISTICS



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APPROXIMATE DISCHARGE-FACTOR CHARACTERISTIC

$E_f = 6.3$ VOLTS

GRID-Nº5 VOLTS=ULTOR VOLTS=1000

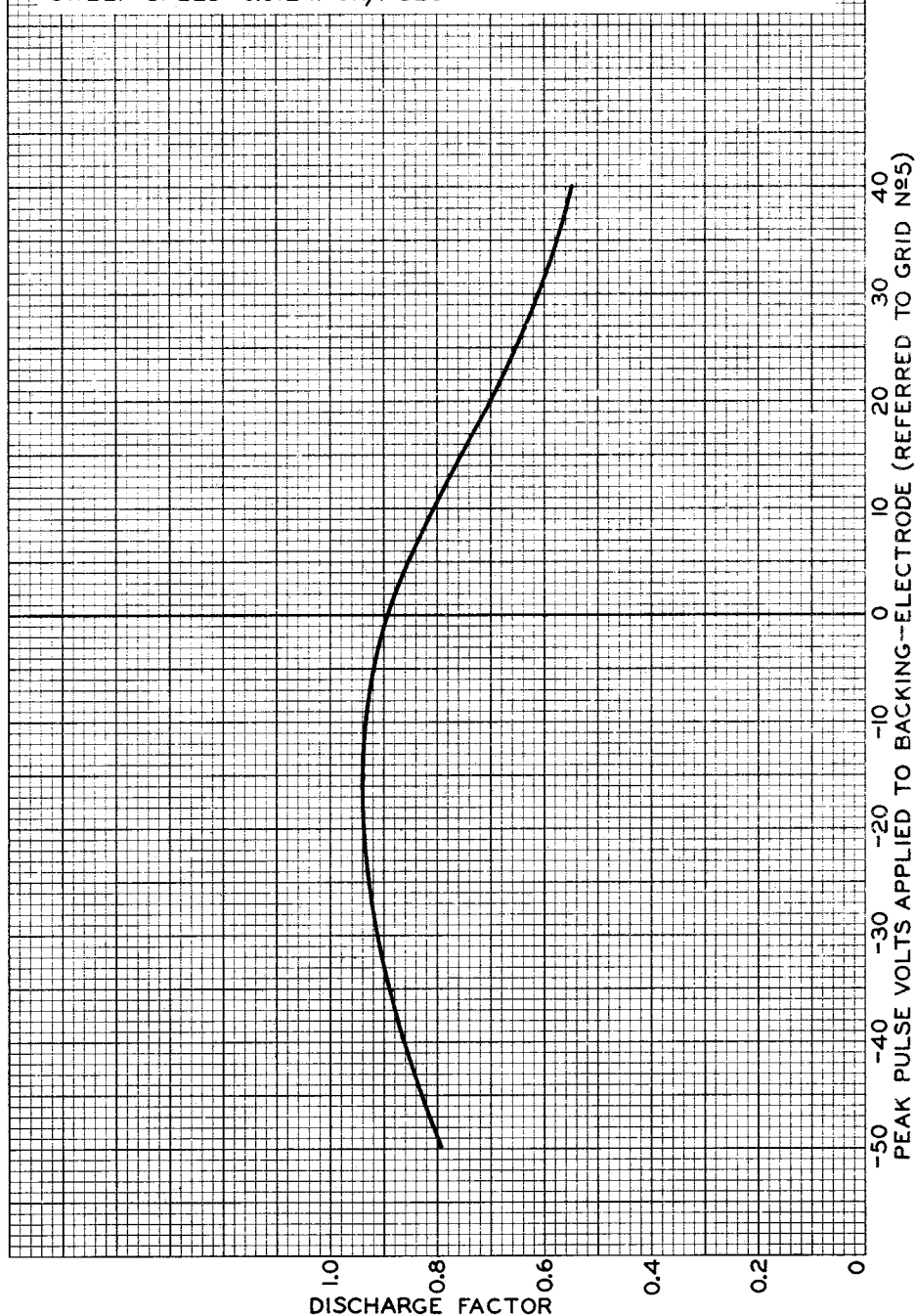
COLLECTOR VOLTS=1050

GRID-Nº3 VOLTS—ADJUSTED FOR BEST OVERALL FOCUS

GRID-Nº1 VOLTS—ADJUSTED TO GIVE EQUILIBRIUM COLLECTOR
CURRENT OF 15 MICROAMPERES

STORAGE SURFACE IS AT EQUILIBRIUM POTENTIAL PRIOR TO
APPLICATION OF PULSE

SWEEP SPEED=0.012 INCH/ μ SEC



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