



6499

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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" ± 3/8"

Greatest Diameter of Tube 3.30" ± 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 Connections to Backing-Electrode. Only One Need be Used
 Pin 6 }
 Pin 10 }
 Pin 14 }
 Pin 18 }

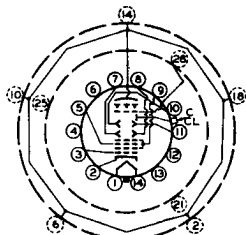
Pin 21 - No Connection

Pin 25 - No Connection

Pin 28 - Grid No.5

PINS 2, 6, 10, 14, 18: ON 1-7/8" DIA. PIN CIRCLE

PINS 21, 25, 28: ON 7/8" DIA. PIN CIRCLE



SOLID-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 Electrode DJ ₂ |
| Pin 2 - Cathode | Pin 11 - Deflecting Electrode DJ ₁ |
| Pin 3 - Grid No.1 | Pin 12 - No Connection |
| Pin 4 - Internal Con- nection-Do Not Use | Pin 13 - Same as Pin 4 |
| Pin 5 - Grid No.3 | Pin 14 - Heater |
| Pin 6 - No Connection | C, CL - External Con- ductive Coating, Collector, In- ternal Shield, Flange between Neck and Large Part of Tube |
| Pin 7 - Deflecting Electrode DJ ₄ | |
| Pin 8 - Deflecting Electrode DJ ₃ | |
| 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 .

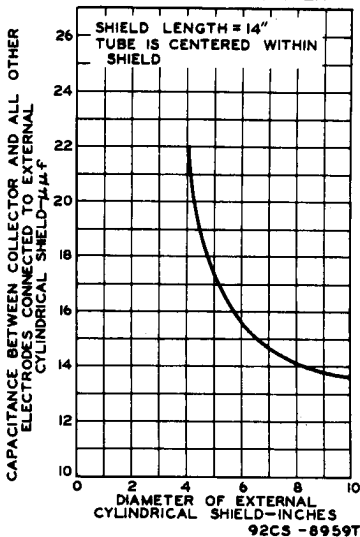
Spot Position in % of Storage-Surface Diameter

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

Note 3: With voltages as specified in Note 2, and with a signal writer 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.

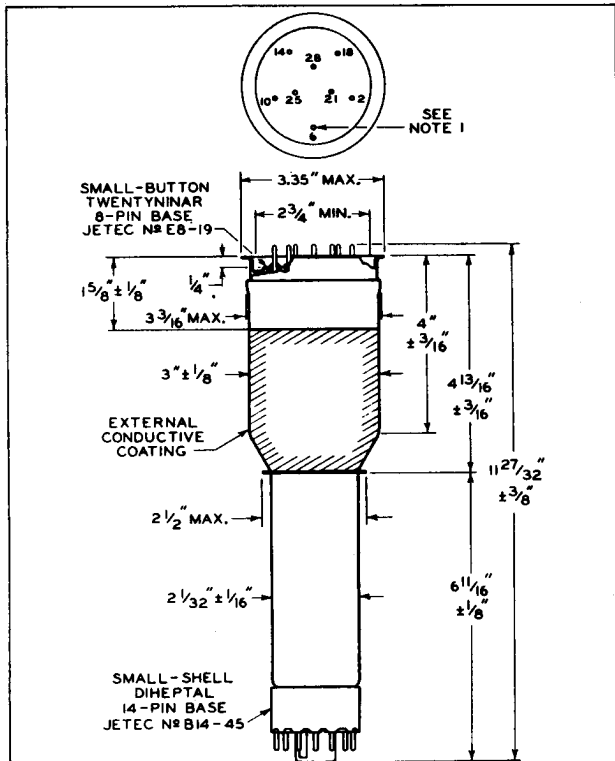
INDICATED CAPACITANCE
VS. SHIELD DIAMETER



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92CM-8891

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 DJ_1 & DJ_2 ARE NEARER THE TARGET. DEFLECTING ELECTRODES DJ_3 & DJ_4 ARE NEARER THE DIHEPTAL BASE.

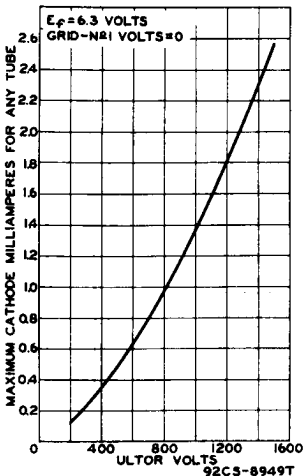
NOTE 3: ANGLE BETWEEN DJ_1 & DJ_2 DEFLECTION PATH AND DJ_3 & DJ_4 DEFLECTION PATH IS $90^\circ \pm 30^\circ$.



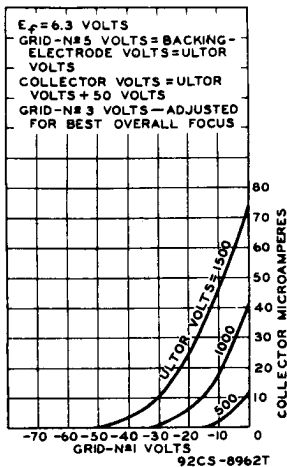
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MAXIMUM CATHODE CURRENT



AVERAGE TRANSFER CHARACTERISTICS

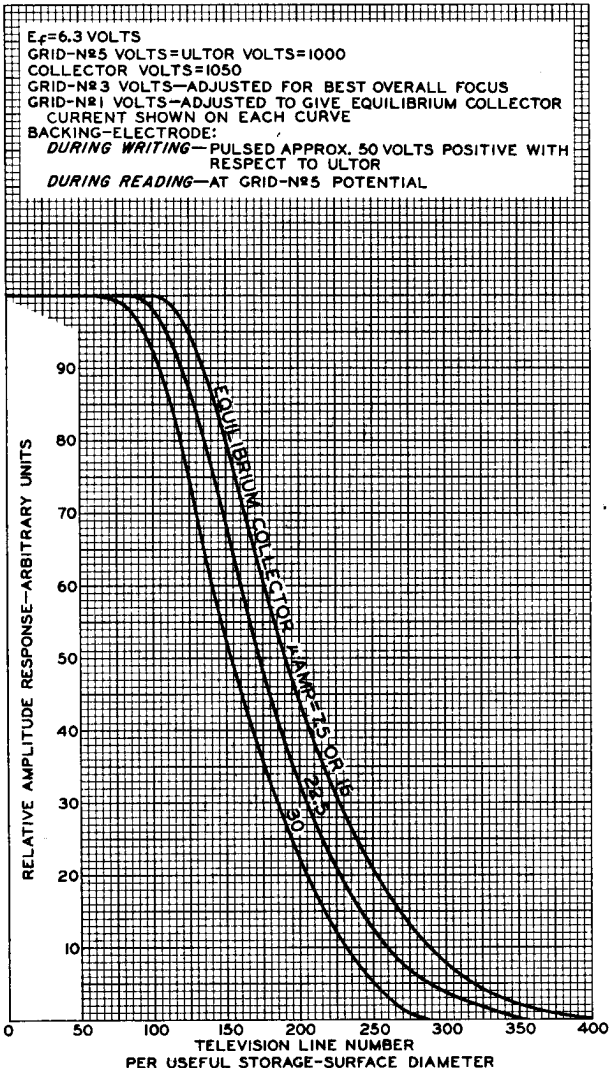




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RESOLUTION CHARACTERISTICS



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RESOLUTION CHARACTERISTICS

$E_f = 6.3$ VOLTS

GRID-N^o5 VOLTS=ULTOR VOLTS

COLLECTOR VOLTS=ULTOR VOLTS +50 VOLTS

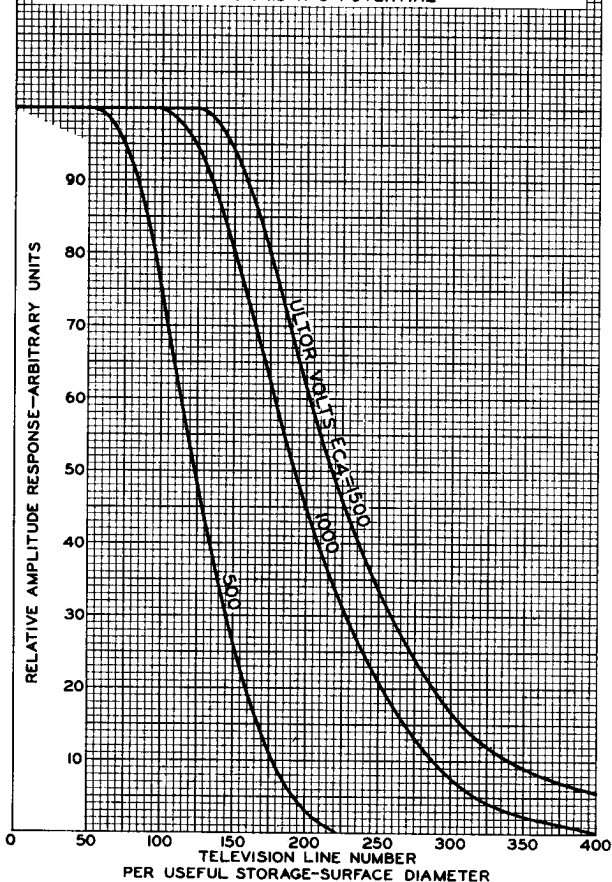
GRID-N^o3 VOLTS—ADJUSTED FOR BEST OVERALL FOCUS

GRID-N^o1 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-N^o5 POTENTIAL



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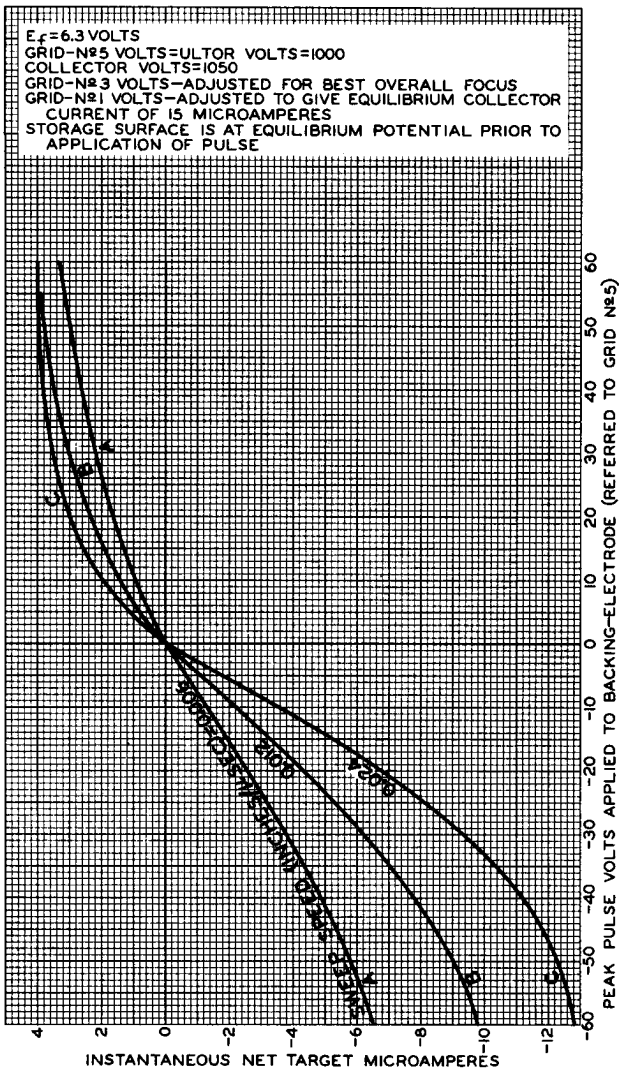
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TYPICAL TARGET CHARACTERISTICS



INSTANTANEOUS NET TARGET MICROAMPERES

PEAK PULSE VOLTS APPLIED TO BACKING-ELECTRODE (REFERRED TO GRID NR5)

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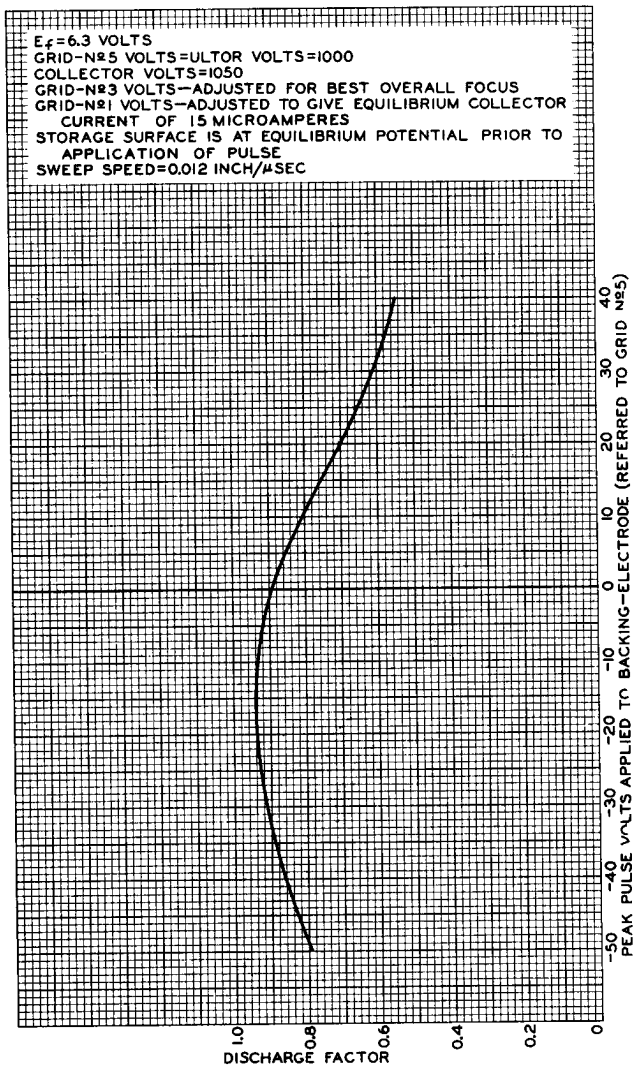
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APPROXIMATE DISCHARGE-FACTOR CHARACTERISTIC



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