



21EP4-A KINESCOPE

RECTANGULAR GLASS TYPE

MAGNETIC FOCUS

MAGNETIC DEFLECTION

21EP4-A

DATA

General:

Heater, for Unpotential Cathode:

Voltage 6.3 ac or dc volts

Current $0.6 \pm 10\%$ amp

Direct Interelectrode Capacitances:

Grid No.1 to all other electrodes 6 μf

Cathode to all other electrodes 5 μf

External conductive coating to ultor^{*} $\begin{cases} 750 \text{ max.} \\ 500 \text{ min.} \end{cases}$ μf

Faceplate, Cylindrical Filterglass

Light transmission (Approx.) 71%

Phosphor (For curves, see front of this section) . . P4—Sulfide Type

Fluorescence White

Phosphorescence White

Persistence Short

Focusing Method Magnetic

Deflection Method Magnetic

Deflection Angles (Approx.):

Diagonal 70°

Horizontal 65°

Vertical 50°

Ion-Trap Gun Requires External Single-Field Magnet

Tube Dimensions:

Overall length $23" \pm 3/8"$

Greatest width $20-1/4" \pm 1/8"$

Greatest height $15-9/16" \pm 1/8"$

Diagonal $21-7/32" \pm 1/8"$

Screen Dimensions (Minimum):

Greatest width $19-1/8"$

Greatest height $13-7/8"$

Diagonal $20-1/16"$

Projected area 238 sq. in.

Weight (Approx.) 29 lbs

Mounting Position Any

Cap Recessed Small Cavity (JETEC No.J1-21)

Bulb J170

Base Small-Shell Duodecal 5-Pin (JETEC No.B5-57)

Basing Designation for BOTTOM VIEW 12N

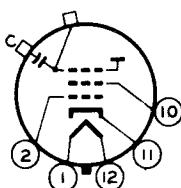
Pin 1 - Heater

Pin 2 - Grid No.1

Pin 10 - Grid No.2

Pin 11 - Cathode

Pin 12 - Heater



Cap - Ultor

(Grid No.3,
Collector)

C - External
Conductive
Coating

* The "ultor" in a cathode-ray 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 21EP4-A, the ultor function is performed by grid No.3. Since grid No.3 and collector are connected together within the 21EP4-A, they are collectively referred to simply as "ultor" for convenience in presenting data and curves.

← Indicates a change.

NOV. 1, 1955

TUBE DIVISION

DATA 1

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



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KINESCOPE

Maximum Ratings, Design-Center Values:

ULTOR VOLTAGE.	18000 max.	volts
GRID-No.2 VOLTAGE.	500 max.	volts
GRID-No.1 VOLTAGE:		
Negative bias value.	125 max.	volts
Positive bias value.	0 max.	volts
Positive peak value.	2 max.	volts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode:		
During equipment warm-up period		
not exceeding 15 seconds.	410 max.	volts
After equipment warm-up period	180 max.	volts
Heater positive with respect to cathode.	180 max.	volts

→ Equipment Design ranges:

For any ultor voltage (E_{c3}) between 14000* and 18000 volts
and grid-No.2 voltage (E_{c2}) between 200 and 500 volts

Grid-No.1 Voltage for		
Visual Extinction of		
Focused Raster	-9.3% to -24% of E_{c2}	volts
Grid-No.2 Current.	-15 to +15	μ amp
Focusing-Coil Current (DC) ⁰⁰	$\left[\sqrt{\frac{E_{c2}}{16000}} \times 110 \right] \pm 20\%$	ma
Ion-Trap Magnet Current		
(Average)**	$\sqrt{\frac{E_{c3}}{16000}} \times 30$	ma
Minimum Field Strength of		
PM Ion-Trap Magnet§.	$\sqrt{\frac{E_{c3}}{16000}} \times 33$	gausses
Field Strength of Adjustable		
Centering Magnet	0 to 8	gausses

→ Examples of Use of Design Ranges:

For ultor voltage of and grid-No.2 voltage of	14000	16000	volts
	300	300	volts
Grid-No.1 Voltage for			
Visual Extinction of			
Focused Raster	-28 to -72	-28 to -72	volts
Focusing-Coil Current (DC) . . .	103 $\pm$ 20%	110 $\pm$ 20%	ma
Minimum Field Strength of			
PM Ion-Trap Magnet	31	33	gausses

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	1.5 max.	megohms
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* Brilliance and definition decrease with decreasing ultor voltage. In general, the ultor voltage should not be less than 14000 volts.

** For JETEC Ion-Trap Magnet No.117, or equivalent, located with the trailing edge of the pole pieces located over the gap between grid No.1 and grid No.2 and rotated to give maximum brightness.

⁰⁰§: see next page.

→ Indicates a change.



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- ∞ For specimen focusing coil similar to JETEC Focusing Coil No. 109 positioned with air gap toward kinescope screen and center line of air gap 3 inches from Reference Line (*See Dimensional Outline*). The indicated current is for condition with sharp focus at center of picture area and combined grid-No. 1 voltage and video-signal voltage adjusted to produce a highlight brightness of 30 foot-lamberts measured on an Indian Head Test Pattern set for a 19-1/8" x 13-7/8" picture size.
- § For specimen PM ion-trap magnet, such as Heppner Model No. E437, or equivalent, located in optimum position and rotated to give maximum brightness. For a given equipment application, the tolerance range for the strength of the PM ion-trap magnet should be added to the minimum value. The maximum strength of this magnet should not exceed the specified minimum value by more than 6 gaussess. This procedure will insure use of a PM ion-trap magnet allowing adequate adjustment to permit satisfactory performance without loss of highlight brightness.

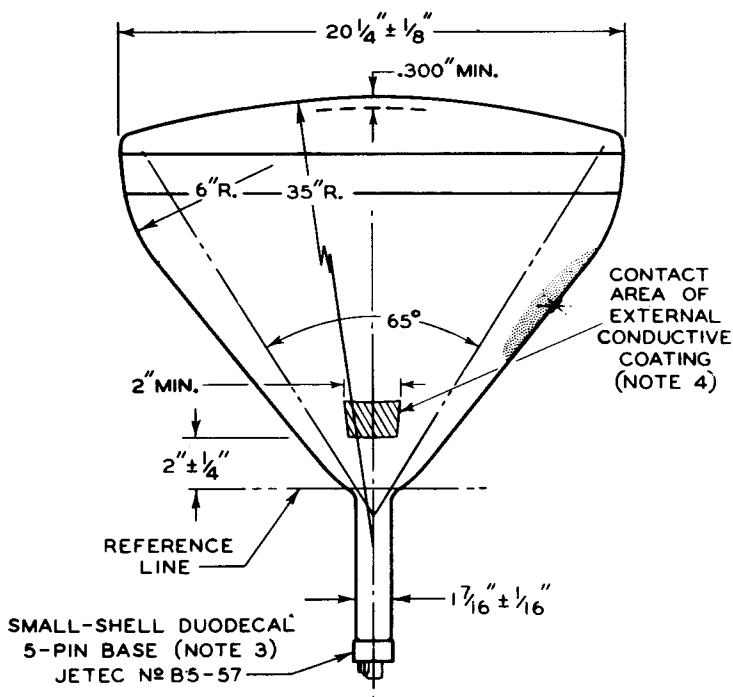
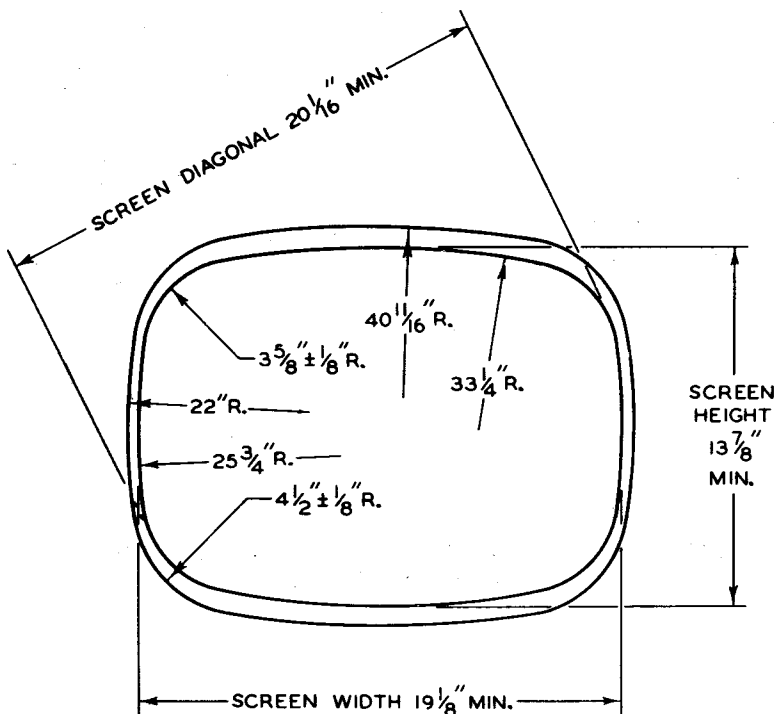
*For X-ray shielding considerations, see sheet
X-RAY PRECAUTIONS FOR CATHODE-RAY TUBES
at front of this Section*

AVERAGE GRID-DRIVE CHARACTERISTICS
for Type 21EP4-A are the same as those shown for
Type 21AVP4/21AUP4

21EP4-A



21EP4-A KINESCOPE



NOV. 1, 1955

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

CE-7903R1A



23 $\frac{3}{8}$ "

15 $\frac{17}{32}$ " $\pm$ $\frac{3}{16}$ "

7 $\frac{15}{32}$ " $\pm$ $\frac{3}{16}$ "

7 $\frac{5}{32}$ " $\pm$ $\frac{3}{8}$ "

7 $\frac{1}{16}$ " R.

19 $\frac{1}{2}$ " R.

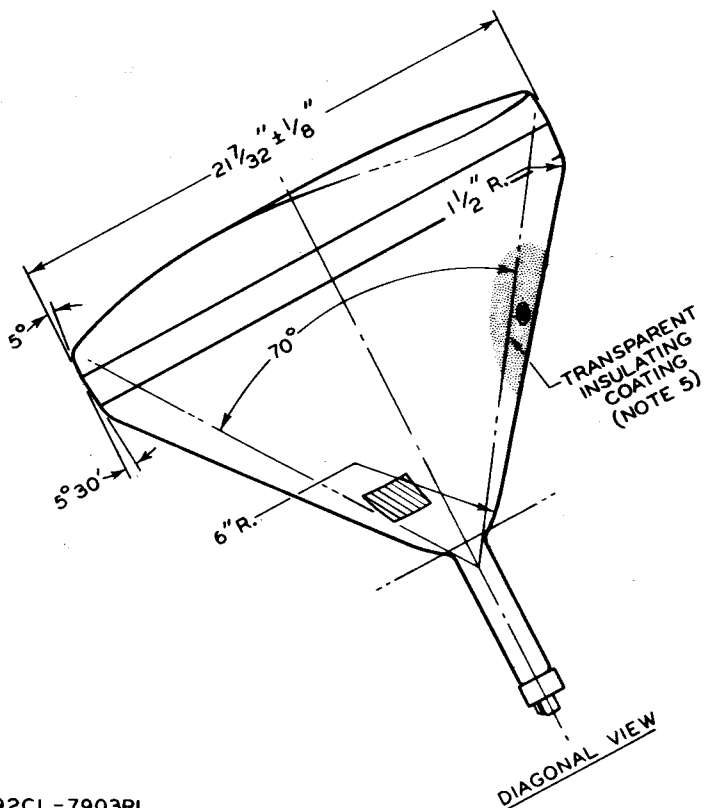
50°

2" MIN.

REFERENCE LINE (NOTE 2)

ULTRASONIC TRANSDUCER

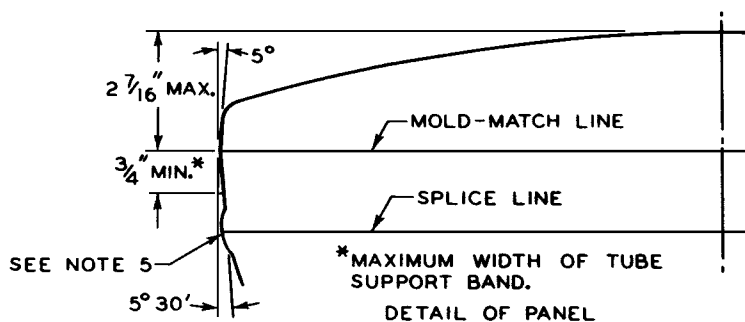
JETEC NO. J1-21 (NOTE 1)



CE-7903R1B



2IEP4-A KINESCOPE



NOTE 1: THE PLANE THROUGH THE TUBE AXIS AND VACANT PIN POSITION No.6 MAY VARY FROM THE PLANE THROUGH THE TUBE AXIS AND ULTOR TERMINAL BY ANGULAR TOLERANCE (MEASURED ABOUT THE TUBE AXIS) OF $\pm 30^\circ$. ULTOR TERMINAL IS ON SAME SIDE AS VACANT PIN POSITION No.6.

NOTE 2: WITH TUBE NECK INSERTED THROUGH FLARED END OF REFERENCE-LINE GAUGE JETEC No. 110 (SHOWN AT FRONT OF THIS SECTION) AND WITH TUBE SEATED IN GAUGE, THE REFERENCE LINE IS DETERMINED BY THE INTERSECTION OF THE PLANE CC' OF THE GAUGE WITH THE GLASS FUNNEL.

NOTE 3: SOCKET FOR THIS BASE SHOULD NOT BE RIGIDLY MOUNTED: IT SHOULD HAVE FLEXIBLE LEADS AND BE ALLOWED TO MOVE FREELY. BOTTOM CIRCUMFERENCE OF BASE SHELL WILL FALL WITHIN A CIRCLE CONCENTRIC WITH BULB AXIS AND HAVING A DIAMETER OF 3".

NOTE 4: THE DRAWING SHOWS THE MINIMUM SIZE AND LOCATION OF THE CONTACT AREA OF THE EXTERNAL CONDUCTIVE COATING. THE ACTUAL AREA OF THIS COATING WILL BE GREATER THAN THE CONTACT AREA SO AS TO PROVIDE THE REQUIRED CAPACITANCE. EXTERNAL CONDUCTIVE COATING MUST BE GROUNDING.

NOTE 5: TO CLEAN THIS AREA, WIPE ONLY WITH SOFT DRY LINTLESS CLOTH.

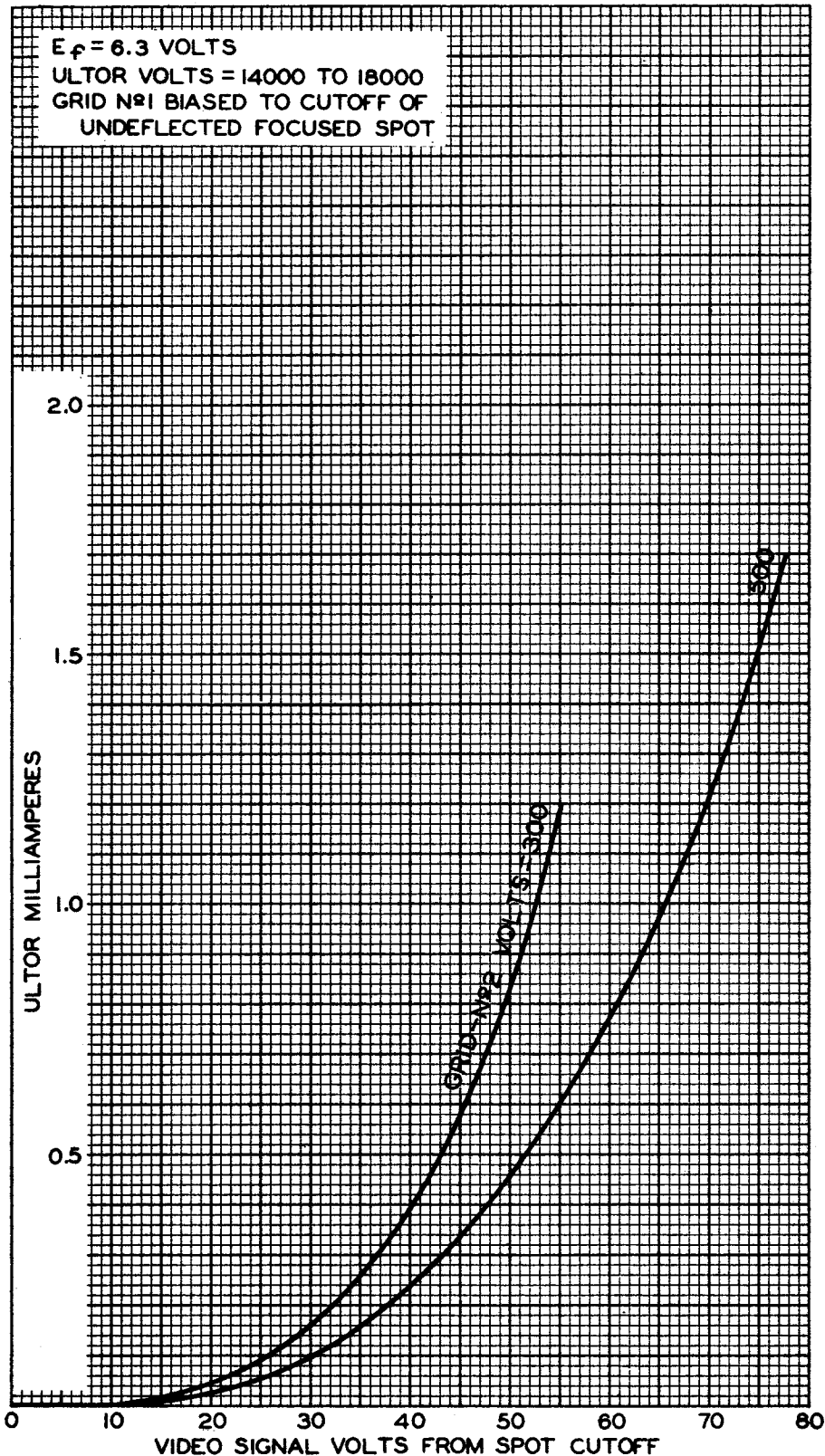
NOTE 6: BULGE AT SPLICE-LINE SEAL MAY INCREASE THE INDICATED MAXIMUM VALUE FOR ENVELOPE WIDTH, DIAGONAL, AND HEIGHT BY NOT MORE THAN $\frac{1}{8}$ ", BUT AT ANY POINT AROUND THE SEAL, THE BULGE WILL NOT PROTRUDE MORE THAN $\frac{1}{16}$ " BEYOND THE ENVELOPE SURFACE AT THE MOLD-MATCH LINE.



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AVERAGE GRID-DRIVE CHARACTERISTICS



JAN. 22, 1953

TUBE DEPARTMENT

92CM-7904

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY



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AVERAGE GRID-DRIVE CHARACTERISTICS

$E_f = 6.3$ VOLTS
ULTOR VOLTS = 16000
GRID N₂ BIASED TO CUTOFF OF
UNDEFLECTED FOCUSED SPOT
RASTER FOCUSED AT AVERAGE BRIGHTNESS
RASTER SIZE = $19\frac{1}{8}'' \times 13\frac{7}{8}''$

