

Color Picture Tube

RECTANGULAR TUBE

90° MAGNETIC DEFLECTION

ALUMINIZED TRICOLOR PHOSPHOR-DOT "Hi-Lite" Screen
(Utilizing a Rare-Earth Red-Emitting Phosphor)

INTEGRAL FILTERGLASS PROTECTIVE WINDOW
(Treated to Minimize Specular Reflection)

MAGNETIC CONVERGENCE

ELECTROSTATIC-FOCUS GUNS

For Use in Color-TV Receivers

ELECTRICAL

Electron Guns, Three. Red, Blue, Green
Axes tilted toward tube axis

Heater, of Each Gun

Series connected within tube with each
of the other two heaters

Current at 6.3 volts^a 800 mA

Focusing Method Electrostatic

Focus Lens. Bipotential

Convergence Method. Magnetic

Deflection Method Magnetic

Deflection Angles (Approx.)

Diagonal. 89°

Horizontal. 78°

Vertical. 63°

Direct Interelectrode Capacitances (Approx.)

Grid No.1 of any gun to all other electrodes. 6 pF

All cathodes to all other electrodes. 15 pF

Grid No.3 to all other electrodes 6.5 pF

External conductive coating to anode. { 2000 max pF
1500 min pF

OPTICAL

Faceplate and Protective Window Filterglass

Light transmission at center (Approx.): 41%

Surface of Protective Window. Treated to minimize
specular reflection

Screen, on Inner Surface of Faceplate

Type. Aluminized, Tricolor, Phosphor-Dot

Phosphor (Three separate
phosphors, collectively)^b P22—Rare-Earth (Red),
Sulfide (Blue & Green) Type

Fluorescence and phosphorescence of
separate phosphors, respectively. Red, Blue, Green

Persistence of group phosphorescence. Medium Short

Dot arrangement Each triangular group consists of
a red, green, and blue dot

Spacing between centers of
adjacent dot trios (Approx.). 0.023 in



MECHANICAL

Tube Dimensions

Overall length.	18.048 ± .375 in
Neck length.	6.693 ± .188 in
→ Diagonal.	19.422 ± .093 in
Greatest width.	16.977 ± .093 in
Greatest height.	13.664 ± .093 in

Screen Dimensions, Minimum (Projected)

Diagonal.	18.075 in
Greatest width.	15.585 in
Greatest height.	12.185 in
Area.	180 sq in

Weight (Approx.). 24 lb

Operating Position. Anode Cap Contact on Top

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

Pin Position Alignment. . Pin 12 Aligns Approx. with Anode Cap

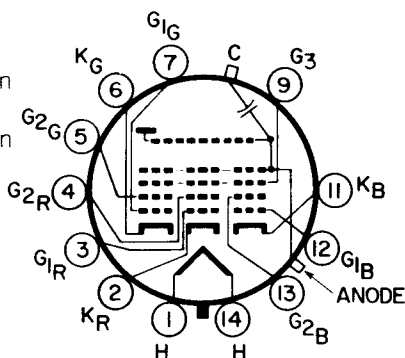
Base. Small-Button Diheptar 12-Pin (JEDEC No. B12-244)

Basing Designation for BOTTOM VIEW. 14BE

- Pin 1-Heater
 Pin 2-Cathode of Red Gun
 Pin 3-Grid No.1 of Red Gun
 Pin 4-Grid No.2 of Red Gun
 Pin 5-Grid No.2 of Green Gun
 Pin 6-Cathode of Green Gun
 Pin 7-Grid No.1 of Green Gun
 Pin 9-Grid No.3
 Pin 11-Cathode of Blue Gun
 Pin 12-Grid No.1 of Blue Gun
 Pin 13-Grid No.2 of Blue Gun
 Pin 14-Heater

Cap- Anode (Grid No.4,
 Grid No.5, Screen,
 Collector)

C- External Conductive
 Coating



MAXIMUM AND MINIMUM RATINGS, DESIGN-MAXIMUM VALUES

*Unless otherwise specified, values are for each gun
 and voltage values are positive with respect to cathode*

Anode Voltage.	27500 max	V
	20000 min	V
Total Anode Current, Long-Term Average.	750 max	μA
Grid-No.3 (Focusing Electrode) Voltage.	6000 max	V
Peak Grid-No.2 Voltage, Including		
Video Signal Voltage.	1000 max	V
Grid-No.1 Voltage		
Negative-bias value.	400 max	V
Negative operating cutoff value.	200 max	V
Positive-bias value.	0 max	V
Positive-peak value.	2 max	V

→ Indicates a change.

Heater Voltage (AC or DC)

Under operating conditions ^a	{ 6.9 max	V
	{ 5.7 min	V
Under standby conditions ^c	5.5 max	V

Peak Heater-Cathode Voltage (Each gun)

Heater negative with respect to cathode:

During equipment warm-up period

not exceeding 15 seconds. 450 max V

After equipment warm-up period. 200 max V

Heater positive with respect to cathode . . . 200 max V

EQUIPMENT DESIGN RANGES

Unless otherwise specified, values are for each gun and voltage values are positive with respect to cathode

For anode voltage between 20000 and 27500 V

Grid-No.3 Voltage 16.8% to 20% of anode V

Focusing electrode

Grid-No.2 and

Grid-No.1 Voltages . . . See accompanying Cutoff Design Chart

For visual extinction of focused spot

Maximum Ratio of Grid-No.2 Voltages 1.86

Highest gun to lowest gun in any tube

(At grid-No.1 spot cutoff voltage of -100 V)

Grid-No.3 Current (Total) -45 to +15 μ A

Grid-No.2 Current -5 to +5 μ A

To produce White of 9300° K + 27 M.P.C.D.

(CIE Coordinates $x = 0.281$, $y = 0.311$)

Percentage of total anode

current supplied by

	Red	Blue	Green	
each gun (Average).	37	26	37	%

Red to Blue

Red to Green

Ratio of	Min	Typ	Max	Min	Typ	Max
cathode currents.	1.00	1.40	2.00	0.75	1.00	1.80

Displacements, Measured at Center of Screen

Raster centering displacement:

Vertical. -0.45 to +0.45 in

Horizontal. -0.47 to +0.47 in

Lateral convergence displacement of

blue beam with respect to con-

verged red and green beams. -0.25 to +0.25 in

Radial convergence displacement

excluding effects of dynamic

convergence (Each beam) -0.37 to +0.37 in

Maximum Required Correction for Register^d

(Including Effect of Earth's Magnetic

Field when Using Recommended Components) . . 0.005 max in

Measured at center of screen

in any direction



EXAMPLES OF USE OF DESIGN RANGES

Unless otherwise specified, voltage values are for each gun and are positive with respect to cathode

Anode Voltage	25000	V
Grid-No.3 Voltage	4200 to 5000	V
Grid-No.2 Voltage	285 to 685	V
When circuit design utilizes grid-No.1 voltage of -150 V for visual extinction of focused spot		
Grid-No.1 Voltage	-95 to -190	V
For visual extinction of focused spot when circuit design utilizes grid-No.2 voltage of 400 V		
Heater Voltage		
Under operating conditions ^a	6.3	V
Under standby conditions.	5	V

LIMITING CIRCUIT VALUES

High-Voltage Circuits

Grid-No.3 Circuit Resistance. 7.5 max MΩ

In order to minimize the possibility of damage to the tube caused by a momentary internal arc, it is recommended that the high-voltage power supply and the grid-No.3 power supply be of the limited-energy type.

Low-Voltage Circuits

Effective Grid-No.1-to-Cathode-Circuit Resistance (Each gun) 0.75 max MΩ

The low-voltage circuits, including all heater circuits, should be analyzed by assuming the color picture tube heater is connected directly to the receiver chassis ground. Under these conditions the circuits to the elements of all tubes, including the color picture tube, operating from the same heater winding and all connections of any other circuits to the heater winding should each have an impedance such that their respective power sources in combination will not supply a continuous short circuit current of more than 750 milliamperes total in the assumed picture tube heater ground connection. The leads from all other circuits must be separated from the picture tube leads by a minimum distance of 1/4 inch to prevent energy transfer to the picture tube circuits. Such current limitation will help prevent picture tube damage in case of momentary cascade arcing.

^a For maximum cathode life, it is recommended that the heater supply be regulated at 6.3 volts.

^b For curve, see Group Phosphor P22—Rare-Earth (Red), Sulfide (Blue & Green) at front of this section.

^c For "instant on" applications, a maximum heater voltage of 5.5 volts (design-maximum value) may be maintained on the color picture tube when the receiver is in the "off" (standby) position. All other voltages normally applied to the tube must be removed during standby operation.

^d Register is defined as the relative position of the beam trios with respect to the associated phosphor-dot trios.



GENERAL CONSIDERATIONS

X-Radiation Warning. Because the 19EYP22 is designed to be operated at anode voltages as high as 27.5 kilovolts (design-maximum value), shielding of the 19EYP22 for X-radiation may be needed to protect against possible injury from prolonged exposure at close range.

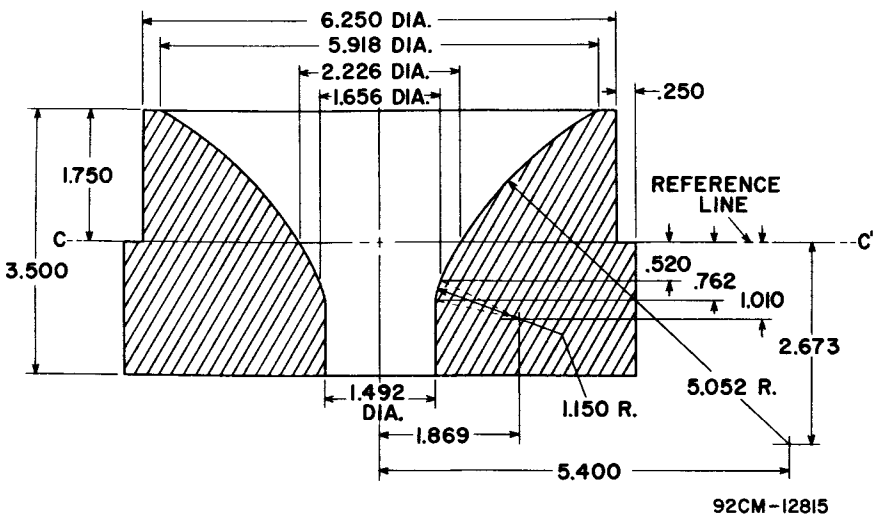
Orientation. The 19EYP22 must be operated with tube axis in a horizontal position and with the blue gun uppermost (i.e., anode cap on top).

The deflecting yoke should not be used for supporting the picture tube because it should be centered on the neck and be free to move along the neck for a distance of approximately 1/2 inch from its most forward position for adjustment purposes. The yoke mount should also provide for a small amount of rotational adjustment.

Contact to the external conductive coating should be made by multiple fingers in order to prevent overheating and possible damage to the tube.

Misregister Compensation. Proper operation of the 19EYP22 requires compensation for the effects of extraneous magnetic fields, the earth's magnetic field, and other causes which may produce misregister. Compensation for these effects may be accomplished by the use of a purifying magnet.

REFERENCE-LINE AND NECK-FUNNEL-CONTOUR GAUGE



DIMENSIONS IN INCHES

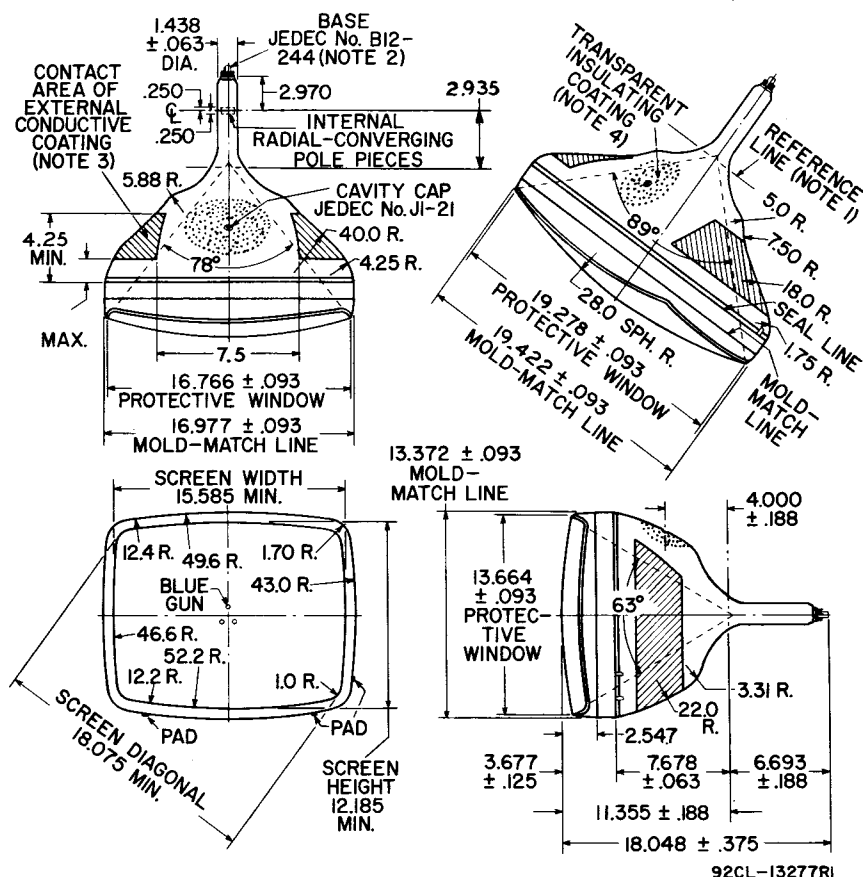
Reference line is determined by plane C-C' when gauge is seated.

LOCATION OF RADIAL-CONVERGING POLE PIECES VIEWED FROM SCREEN END OF GUNS

for Type 19EYP22 is the same as that shown for Type 25AP22A



DIMENSIONAL OUTLINE



DIMENSIONS IN INCHES

Note 1: With tube neck inserted through flared end of reference-line and neck-funnel-contour gauge and with tube seated in gauge, the reference line is determined by the intersection of the plane C-C' of the gauge with the glass funnel.

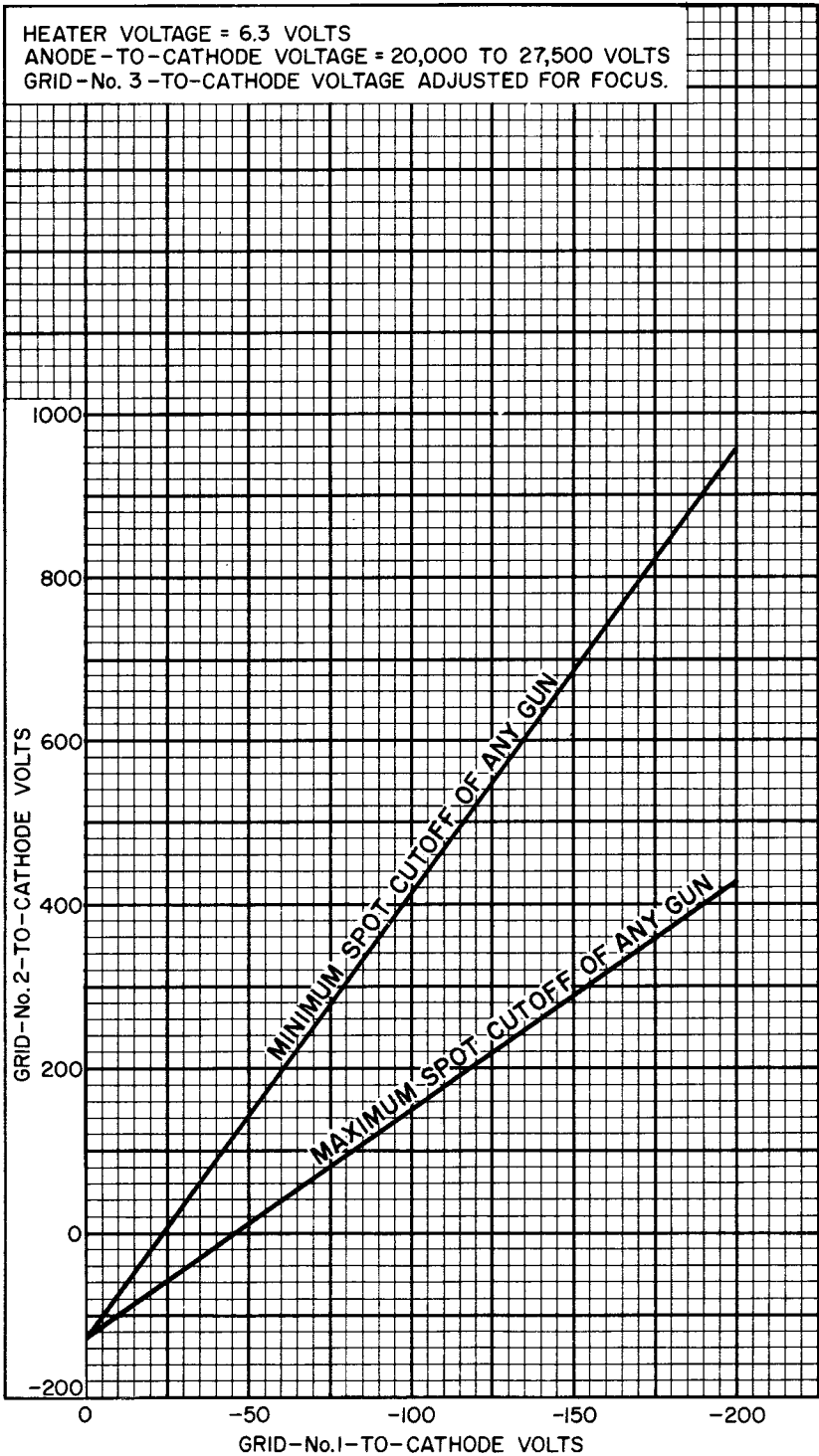
Note 2: Socket for this base should not be rigidly mounted; it should have flexible leads and be allowed to move freely. Bottom circumference of base will fall within a circle concentric with bulb axis and have a diameter of 2 inches.

Note 3: The drawing shows the size and location of the contact area of the external conductive coating. The actual area of this coating will be greater than that of the contact area so as to provide the required capacitance.

Note 4: To clean this area, wipe only with soft, dry lintless cloth.

→ Indicates a change.

Cutoff Design Chart

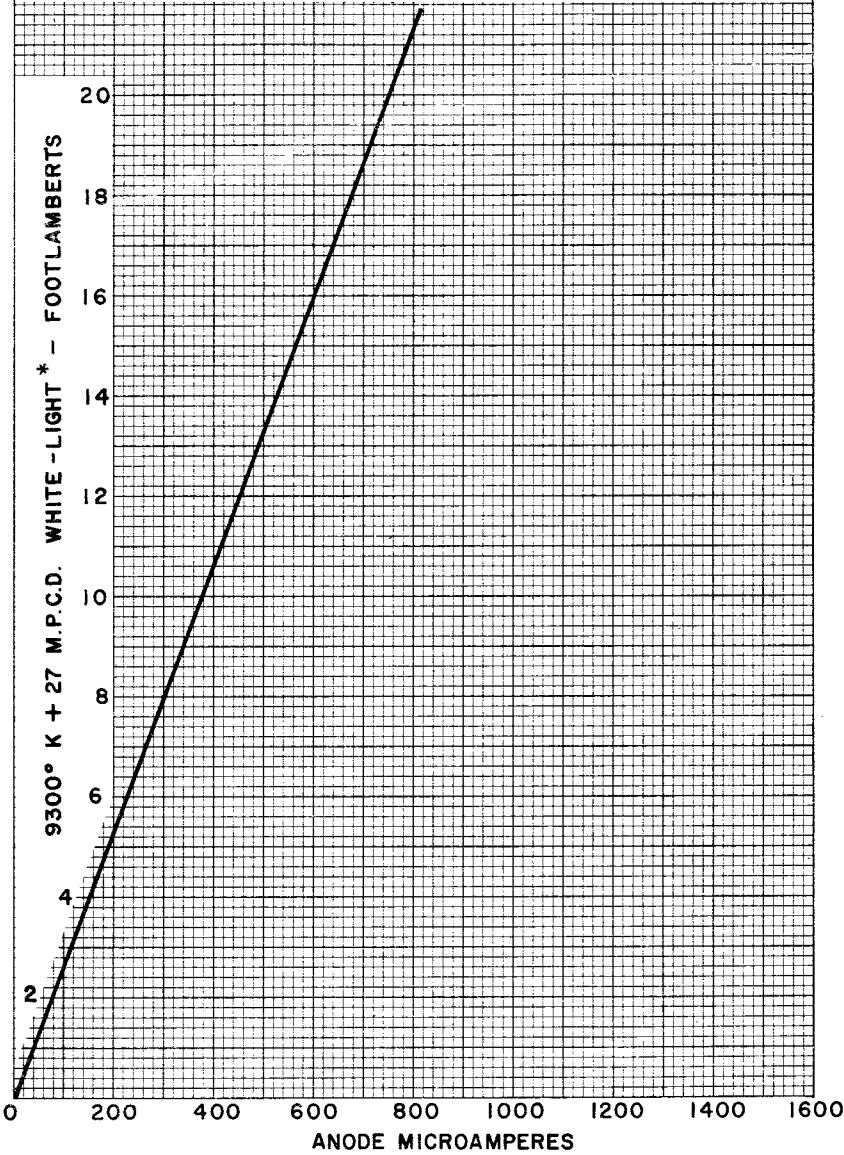


92CM-12803



Typical Light-Output Characteristic

HEATER VOLTAGE = 6.3 VOLTS
ANODE-TO-CATHODE VOLTAGE = 25,000 VOLTS
GRID-No.3-TO-CATHODE VOLTAGE ADJUSTED FOR FOCUS.
DRIVE OF EACH GUN IS ADJUSTED TO GIVE COMPOSITE ANODE
CURRENT TO PRODUCE 9300° K + 27 M.P.C.D. WHITE-LIGHT OUTPUT.
PERCENTAGE OF TOTAL ANODE CURRENT SUPPLIED BY EACH GUN
TO PRODUCE 9300° K + 27 M.P.C.D. WHITE:
RED GUN : 37 %
BLUE GUN : 26 %
GREEN GUN : 37 %
RASTER SIZE: 15.585" X 12.185"
* MEASURED WITHIN 4"-DIAMETER AREA CENTERED ON TUBE FACE.



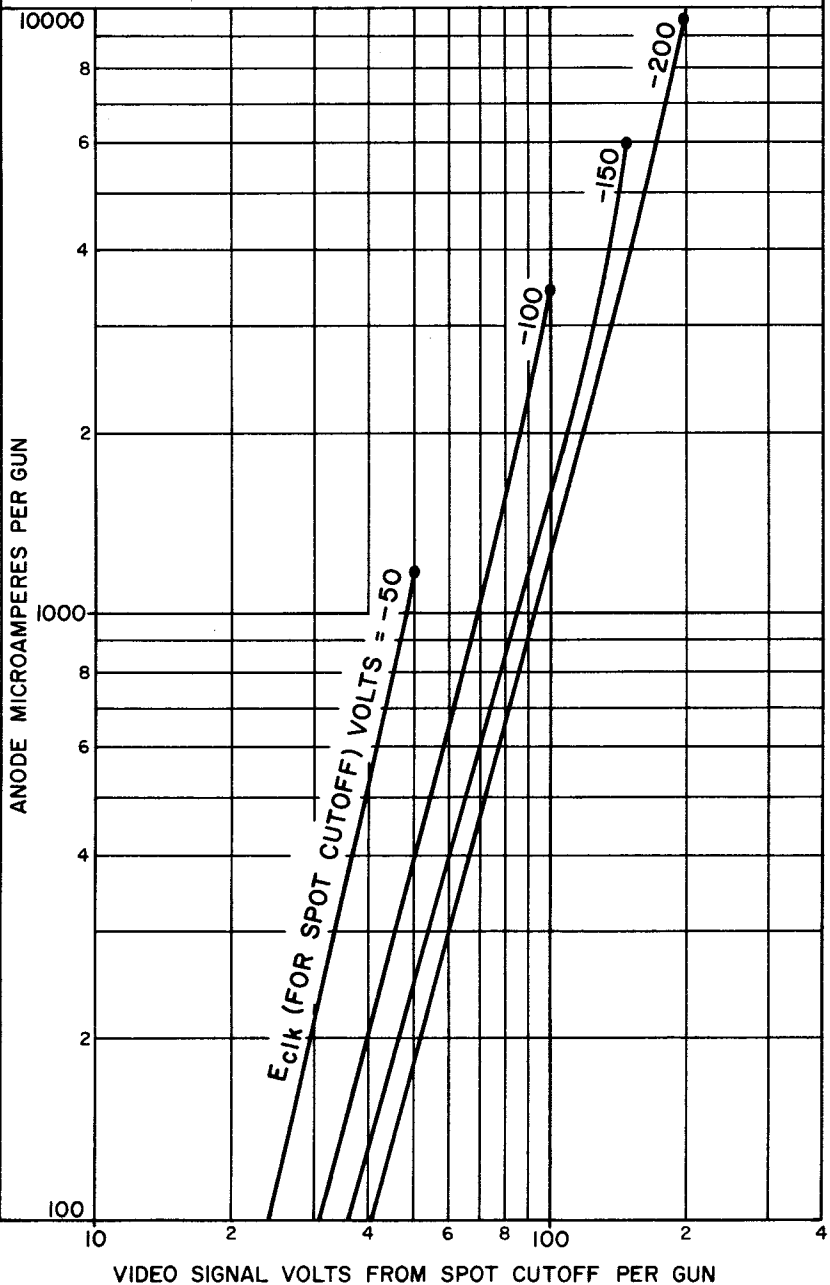
92LM-1020



Typical Drive Characteristics

Grid-Drive Service

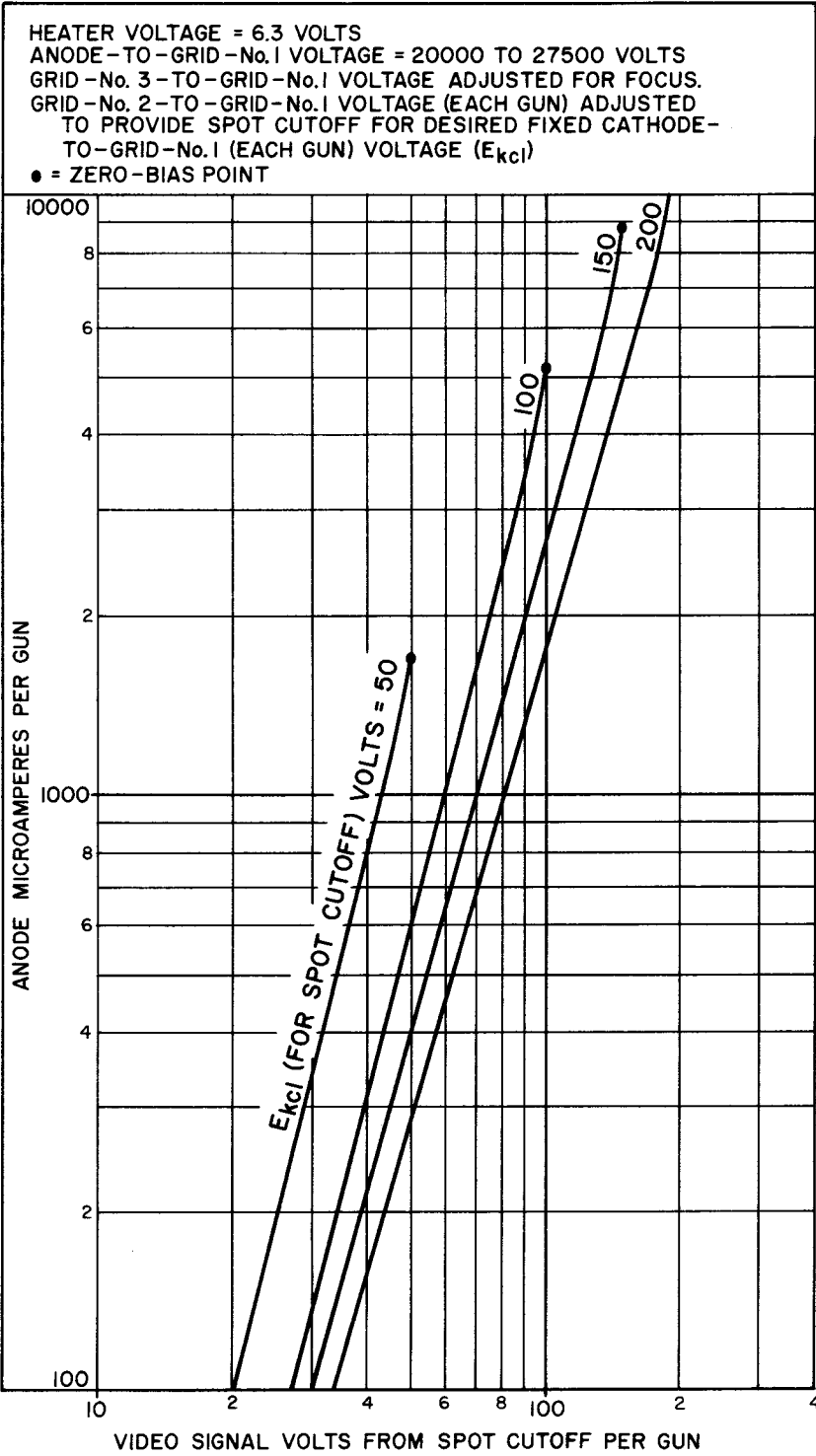
HEATER VOLTAGE = 6.3 VOLTS
 ANODE-TO-CATHODE VOLTAGE = 20000 TO 27500 VOLTS
 GRID-No. 3-TO-CATHODE VOLTAGE ADJUSTED FOR FOCUS.
 GRID-No. 2-TO-CATHODE VOLTAGE (EACH GUN) ADJUSTED
 TO PROVIDE SPOT CUTOFF FOR DESIRED FIXED GRID-No. 1-
 TO-CATHODE (EACH GUN) VOLTAGE (E_{c1k})
 • = ZERO-BIAS POINT



92CM-12807



Typical Drive Characteristics
Cathode-Drive Service



92CM-12806

