

## Color Picture Tube

Hi-Lite Matrix Screen

Perma-Chrome

90° Rectangular

High-Resolution Gun

New Green Phosphor

Unity Current Ratios

Antiglare Integral Protective Window

### ELECTRICAL

Electron Guns, Three with Axes

Tilted Toward Tube Axis . . . . . Red, Blue, Green

Heater, of Each Gun Series

Connected within Tube with

Each of the Other two Heaters:

Current at 6.3 V<sup>a</sup> . . . . . 900 mA

Focusing Method . . . . . Electrostatic

Focus Lens . . . . . Bipotential

Convergence Method . . . . . Magnetic

Deflection Method . . . . . Magnetic

Deflection Angles:

Diagonal . . . . . 89 deg.

Horizontal . . . . . 78 deg.

Vertical . . . . . 63 deg.

Direct Interelectrode Capacitances (Approx.):

Grid No.1 of any gun  
to all other electrodes . . . . . 7.5 pF

Grid No.3 to all other electrodes . . . . . 6.5 pF

All cathodes to all other electrodes . . . . . 15 pF

External conductive coating  
to anode . . . . .  $\left\{ \begin{array}{l} 2500 \text{ max. pF} \\ 2000 \text{ min. pF} \end{array} \right.$

### OPTICAL

Faceplate and Protective Window . . . . . Filterglass

Light transmission at center (Approx.) . . . . . 67.5%

Surface of Protective Window . . . . . Treated to minimize  
specular reflection

Screen . . . . . Aluminized

Matrix . . . . . Black opaque material

Phosphor, rare-earth (red),  
sulfide (blue & green) . . . . . P22

Persistence . . . . . Medium-Short

Array . . . . . 422,550 Dot trios

Spacing between centers of  
adjacent dot trios (approx.) . . . . . 0.029 in (0.74 mm)

# 25BCP22

## MECHANICAL

Minimum Screen Area (Projected) . . . . .	295 sq. in (1905 sq. cm)
Bulb Funnel Designation . . . . .	JEDEC No.J195-1/2
Bulb Panel Designation . . . . .	JEDEC No.FP196-1/2
Protective Window Designation . . . . .	JEDEC No.SP196-1/2
Base <sup>b</sup> . . . . .	Small-Button Diheptar 12-pin
Pin Position Alignment . . . . .	Pin No.12 Aligns Approx. with Anode Bulb Contact
Operating Position . . . . .	Anode Bulb Contact on Top
Weight (Approx.) . . . . .	42 lb (19.1 kg)

## 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 . . . . .	{ 27,500 max. V 20,000 min. V
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Total Anode Current, Long-Term Average . . . . .	1000 max. $\mu$ A
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Grid-No.3 (Focusing Electrode) Voltage . . . . .	6000 max. V
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Peak-Grid-No.2 Voltage, Including Video Signal Voltage . . . . .	1000 max. V
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Grid-No.1 Voltage:

Negative bias value . . . . .	400 max. V
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Negative operating cutoff value . . . . .	200 max. V
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Positive bias value . . . . .	0 max. V
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Positive peak value . . . . .	2 max. V
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Heater Voltage (ac or dc):

Under operating conditions <sup>a</sup> . . . . .	5.7 min. — 6.9 max. V
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Under standby conditions <sup>d</sup> . . . . .	5.5 max. V
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Peak Heater-Cathode Voltage:

Heater negative with respect to cathode:

During equipment warm-up period not exceeding 15 seconds . . . . .	450 max. V
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After equipment warm-up period:

Combined AC and DC value . . . . .	200 max. V
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DC component value . . . . .	200 max. V
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Heater positive with respect to cathode:

AC component value . . . . .	200 max. V
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DC component value . . . . .	0 max. V
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## EQUIPMENT DESIGN RANGES

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

For anode voltages between 20,000 and 27,500 V

Grid-No.3 (Focusing Electrode) Voltage . . . . .	16.8% to 20% of Anode voltage
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Grid-No.2 and Grid-No.1 Voltages for  
Visual Extinction of Focused

Spot . . . . . See CUTOFF DESIGN CHART

Maximum Ratio of Grid-No.2 Voltages,  
Highest Gun to Lowest Gun in Any

Tube (At grid-No.1 spot cutoff  
voltage of -100 V) . . . . . 1.86

Heater Voltage:

Under operating conditions:<sup>a</sup>

When standby operation is not  
utilized . . . . . 6.3 V

When 5.0-V standby operation  
is utilized . . . . . 6.0 V

Under standby conditions<sup>d</sup> . . . . . 5.0 V

Grid-No.3 Current (Total) . . . . . -45 to +15  $\mu$ A

Grid-No.2 Current . . . . . -5 to +5  $\mu$ A

To Produce White of 9300<sup>o</sup> K + 27  
M.P.C.D. (CIE Coordinates  $x = 0.281$ ,  
 $y = 0.311$ ):

Percentage of total anode current supplied by each gun (average) . . . . .	<i>Red</i>	<i>Blue</i>	<i>Green</i>	
	34	32	34	%

Ratio of cathode currents:	<i>Min.</i>	<i>Typ.</i>	<i>Max.</i>
Red/blue . . . . .	0.75	1.10	1.50
Red/green . . . . .	0.65	1.00	1.50
Blue/green . . . . .	0.60	0.91	1.30

Displacements, Measured at Center of Screen:

Raster centering displacement:

Horizontal . . . . .  $\pm 0.45$  in ( $\pm 11.4$  mm)

Vertical . . . . .  $\pm 0.45$  in ( $\pm 11.4$  mm)

Lateral distance between  
the blue beam and the con-  
verged red and green beams . . . . .  $\pm 0.25$  in ( $\pm 6.4$  mm)

Radial convergence displacement  
excluding effects of dynamic  
convergence (each beam) . . . . .  $\pm 0.37$  in ( $\pm 9.4$  mm)

Maximum Required Correction for  
register<sup>e</sup> (Including Effect of  
Earth's Magnetic Field when  
Using Recommended Components)  
as Measured at the Center of the  
Screen in any Direction . . . . . 0.005 in (0.13 mm) max.

### LIMITING CIRCUIT VALUES

High-Voltage Circuits:

Grid-No.3 circuit resistance . . . . . 7.5 max. M $\Omega$

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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, in which the short-circuit current does not exceed 20 milliamperes.

## Low-Voltage Circuits:

Effective grid-No.1-to-cathode-circuit resistance (each gun) . . . . . 0.75 max. M $\Omega$

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 0.25 inch (6.4 mm) 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. The series impedance to any chassis connection in the dc biasing circuit for the heater should be between 100,000 ohms and 1 megohm.
- b The mating socket, including its associated, physically-attached hardware and circuitry, must not weigh more than one pound.
- d The use of a 5-volt standby condition in conjunction with 6-volt operating condition is recommended to improve the reliability of the color picture tube by extending the emission wear-out life and reducing other gun-related defects. 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.
- e Register is defined as the relative position of the beam trios with respect to the associated phosphor-dot trios.

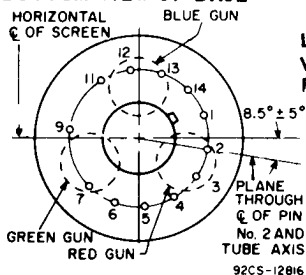
**X-RADIATION WARNING:** Because the 25BCP22 is designed to be operated at anode voltages as high as 27.5 kilovolts (Design-Maximum value), shielding of the 25BCP22 for X-radiation may be needed to protect against possible injury from prolonged exposure at close range.



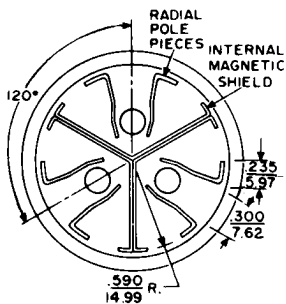
## BASE SPECIFICATION - JEDEC No. 14BE

Pin 1: Heater	Pin 11: Cathode of Blue Gun
Pin 2: Cathode of Red Gun	Pin 12: Grid No.1 of Blue Gun
Pin 3: Grid No.1 of Red Gun	Pin 13: Grid No.2 of Blue Gun
Pin 4: Grid No.2 of Red Gun	Pin 14: Heater
Pin 5: Grid No.2 of Green Gun	Cap: Anode (Grid No.4, Screen, Collector)
Pin 6: Cathode of Green Gun	C: External Conductive Coating
Pin 7: Grid No.1 of Green Gun	
Pin 9: Grid No.3	

## BOTTOM VIEW OF BASE



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



92CS-12835R4

## NOTES FOR DIMENSIONAL OUTLINE

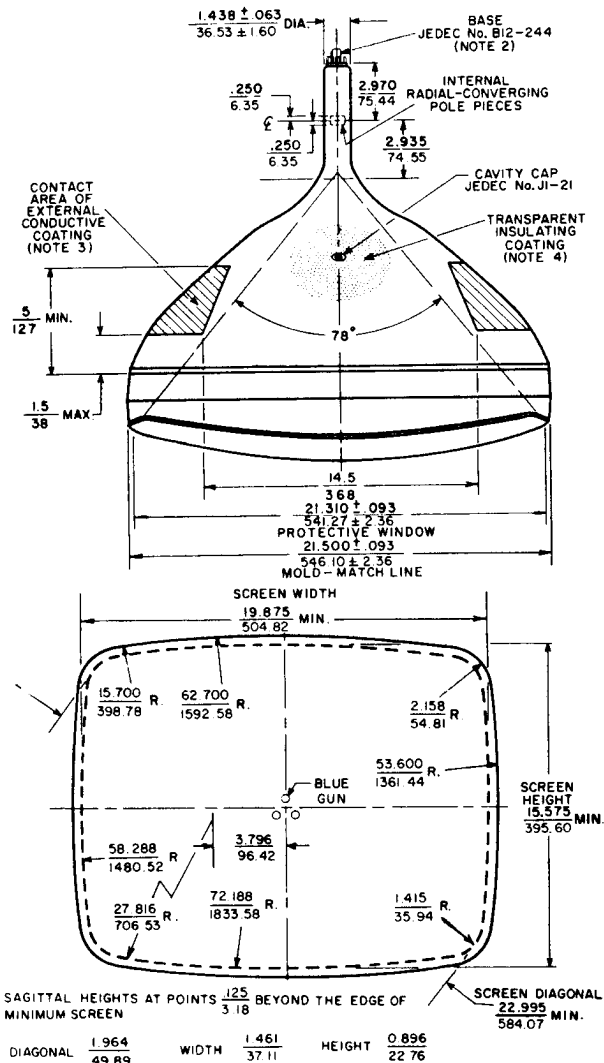
**Note 1:** With tube neck inserted through flared end of reference-line and neck-funnel-contour gauge (JEDEC No.G162) and with tube seated in gauge, the reference line is determined by the intersection of the plane C-C' of the gauge with the glass funnel.

**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 2-inch (51-mm) circle concentric with bulb axis.

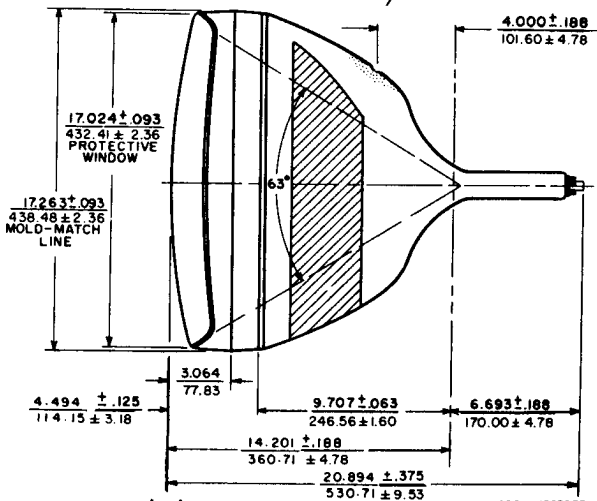
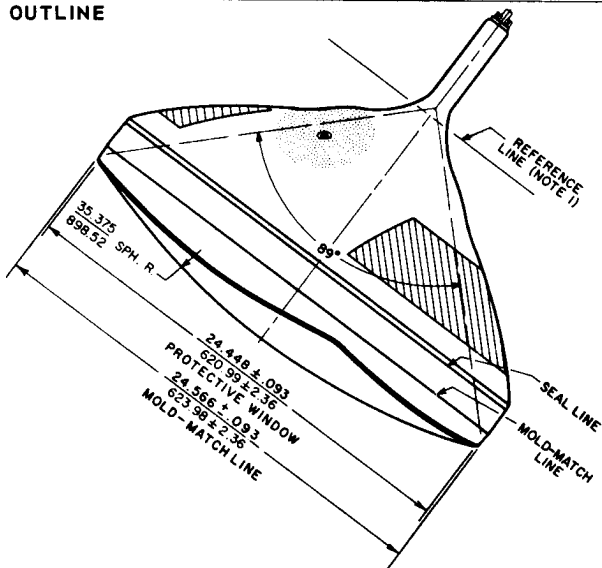
**Note 3:** The drawing shows the size and location of the contact area of the external conductive coating. The actual area of this coating will be greater than that of the contact area so as to provide the required capacitance. External conductive coating must be grounded with multiple contacts.

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

## DIMENSIONAL



## OUTLINE



Dimensions in  $\frac{\text{Inches}}{\text{mm}}$  unless otherwise shown

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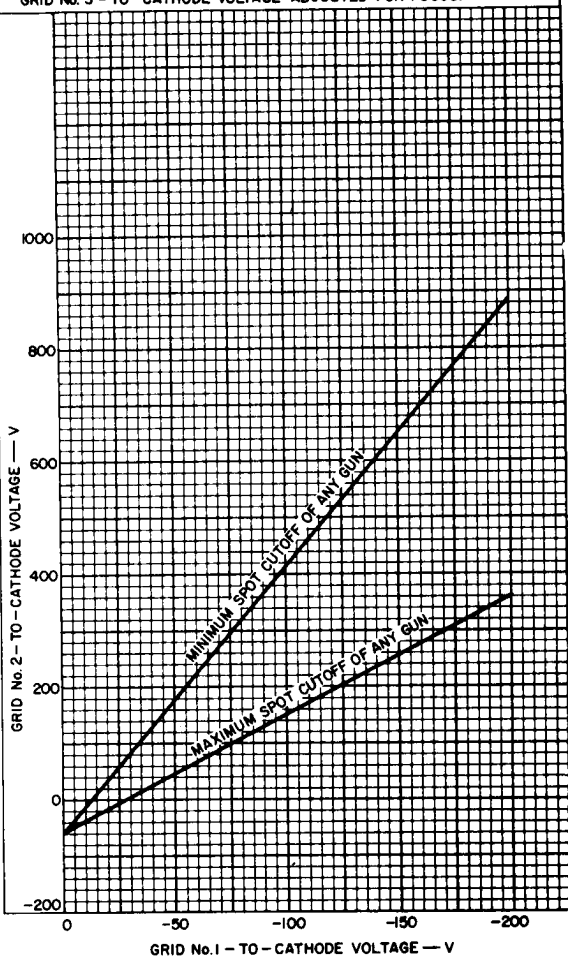
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## CUTOFF DESIGN CHART

HEATER VOLTAGE = 6.3 V

ANODE-TO-CATHODE VOLTAGE = 20,000 TO 27,500 V

GRID No. 3 - TO-CATHODE VOLTAGE ADJUSTED FOR FOCUS.



92LM-3181



Electronic  
Components

DATA 4