

DESCRIPTION AND RATING

THREE-GUN TRI-COLOR PICTURE TUBE

11 1/2 by 8 5/8-INCH PICTURE SIZE

15-INCH ROUND, GLASS	FACEPLATE - SPHERICAL, CLEAR
FOCUS - ELECTROSTATIC	CONVERGENCE - ELECTROSTATIC
DEFLECTION - MAGNETIC	EXTERNAL CONDUCTIVE COATING
45-DEGREE DEFLECTION ANGLE	METAL-BACKED PHOSPHOR-DOT SCREEN

The 15GP22 is a direct-view tri-color picture tube capable of reproducing either full-color or black-and-white transmissions. It has three separate electron guns and a phosphor-dot screen on which are deposited small dots of blue, green and red phosphor arranged in triangular groups. There are approximately 195,000 such groups or a total of 585,000 dots. A perforated mask between the guns and the screen permits the beam from any one gun to strike phosphor dots of only one color. Thus, the three guns produce independent pictures, in the three different colors, which appear to be superimposed because of the close spacing of the dots. Proper registration of the three pictures is achieved through electrostatic convergence of the beams. The screen provides an 11 1/2 by 8 5/8-inch picture with rounded sides and has a metal backing to prevent ion-spot blemish and to increase light output. An external conductive coating serves as a filter capacitor when grounded.

TECHNICAL INFORMATION

GENERAL

Electrical

Heater Voltage	6.3	Volts
Heater Current	1.8 ± 10%	Amperes
Focusing Method - Electrostatic		
Convergence Method - Electrostatic		
Deflecting Method - Magnetic		
Deflection Angle, approximate		
Horizontal	45	Degrees
Vertical	35	Degrees
Direct Interelectrode Capacitances, approximate		
Cathodes (of All Three Guns Tied Together Externally)		
To All Other Electrodes	17.5	uuf
Grid-No. 1 (of Any Gun) to All Other Electrodes		
Except No. 1 Grids of Other Two Guns	7.5	uuf
Grid-No. 3 (of All Three Guns Tied Together Internally)		
To All Other Electrodes	12	uuf
Grid-No. 4 (Common to the Three Guns) to All Other		
Electrodes	7	uuf
External Conductive Coating to Anode		
Maximum	3000	uuf
Minimum	1500	uuf

GENERAL (CONT'D)

Optical

Phosphor - P22, Three Phosphors Collectively
 Fluorescent Color of Separate Phosphors - Blue, Green, Red
 Phosphorescent Color of Separate Phosphors - Blue, Green, Red
 Persistence - Medium, Three Phosphors Collectively

Screen

Plate - Gray
 Light Transmission, approximate 70 Percent
 Type-Metal-backed Phosphor-dot
 Area 88 1/2 Square Inches

Faceplate - Clear

Mechanical

Over-all Length 26 1/8 Max Inches
 Greatest Bulb Diameter 14 5/8 ± 5/32 Inches
 Screen Dimensions, with rounded sides
 Horizontal 11 1/2 Inches
 Vertical 8 5/8 Inches
 Greatest Metal-flange Diameter 15 3/4 Max Inches
 Neck Length 10 3/8 Inches
 Anode Contact - Metal Flange
 Base - Small-shell Bidecal 14-Pin, B14-103
 Basing, JETEC Designation - 20A
 Mounting Position - Any
 Net Weight, approximate 25 Pounds

MAXIMUM RATINGS - Design-Center Values ◇

Anode Voltage † 20,000 Max Volts DC
 Anode Input Δ 15 Max Watts
 Grid-No. 4 (Converging Electrode) 11,000 Max Volts DC
 Grid-No. 3 (Focusing Electrode) 5,000 Max Volts DC
 Grid-No. 2 Voltage, Each Gun 500 Max Volts DC
 Grid-No. 1 Voltage, Each Gun
 Negative-bias Value 200 Max Volts DC
 Positive-bias Value 0 Max Volt DC
 Positive-peak Value 2 Max Volts
 Peak Heater-cathode Voltage, Each Gun
 Heater Negative with Respect to Cathode
 During Equipment Warm-up Period not to Exceed 15 Seconds 410 Max Volts
 After Equipment Warm-up Period 180 Max Volts
 Heater Positive with Respect to Cathode 180 Max Volts

CHARACTERISTIC RANGE VALUES FOR EQUIPMENT DESIGN

Anode Voltage 18,000 to 20,000 Volts, Anode Input
 15 Watts
 Grid-No. 4 (Converging Electrode) Voltage § 42.5 to 51 Percent of
 Anode Voltage
 Grid-No. 3 (Focusing Electrode) Voltage 12 to 19 Percent of
 Anode Voltage
 Grid-No. 2 Voltage for Visual Extinction of
 Focused Raster with Grid-No. 1 Voltage at
 a Fixed Value, Each Gun 2 to 4.5 Times Grid-No. 1
 Voltage

Grid-No. 1 Voltage for Visual Extinction of Focused Raster with Grid-No. 2 Voltage at a Fixed Value, Each Gun	22.5 to 50	Percent of Grid-No. 2 Voltage
Grid-No. 4 Current	-5 to +5	Microamperes
Grid-No. 3 Current, maximum	300	Microamperes
Grid-No. 2 Current	-15 to +15	Microamperes
Beam Current Ratio to Produce Illuminant C White (6740 K)		
Red Gun to Green Gun	4:1 to 1:1	
Blue Gun to Green Gun	1.5:1 to 0.5:1	
Maximum Raster Shift in Any Direction from Screen Center ‡	1 1/4	Inches

EXAMPLES OF USE OF RANGE VALUES

Anode Voltage 20,000 Volts

Grid-No. 4 (Converging Electrode) Voltage §	8500 to 10200	Volts
Grid-No. 3 (Focusing Electrode) Voltage	2400 to 3800	Volts
Grid-No. 2 Voltage for Visual Extinction of Focused Raster with Grid-No. 1 Voltage of -70 Volts, Each Gun	140 to 315	Volts
Grid-No. 1 Voltage for Visual Extinction of Focused Raster with Grid-No. 2 Voltage of 200 Volts, Each Gun	-45 to -100	Volts

CIRCUIT VALUES

Grid-No. 1 Circuit Resistance, Each Gun, maximum	1.5	Megohms
Dynamic Converging Voltage, approximate π	900	Volts
Dynamic Focusing Voltage, approximate π	225	Volts

◇ The maximum ratings provide a ten-percent safety factor in accordance with the standard design-center system of rating cathode-ray tubes; that is, the tube will withstand the combined effects of variations in line voltage and components provided the maximum design-center values are not exceeded by more than ten percent.

† The aquadag coating, aperture mask, and metal screen-backing, which are connected together within the tube, are referred to herein as the anode.

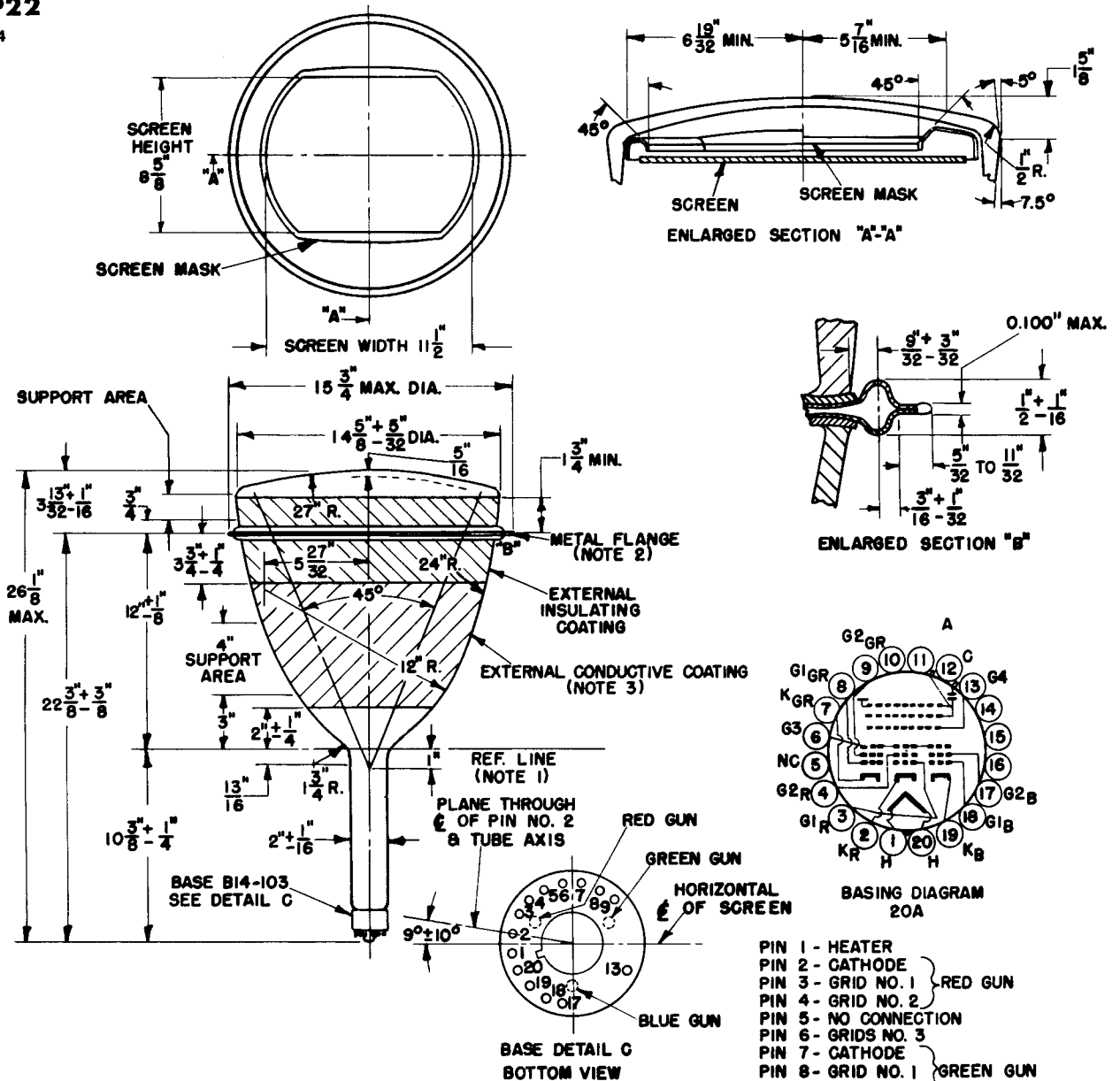
If this tube is operated at voltages in excess of 16,000 volts, x-ray radiation shielding may be necessary to avert possible danger of personal injury from prolonged exposure at close range. The protective face-viewing window of apparatus using tubes of this type may provide such a safeguard. If the radiation measured in contact with this window does not exceed 6.25 milliroentgens per hour, the window will normally provide adequate protection.

Δ Anode input equals the product of anode voltage and anode current, the latter being measured at the anode contact with a direct-current ammeter.

§ Does not include the d-c component of the dynamic converging voltage.

‡ Centering of the raster on the screen is accomplished by passing direct current of the required value through each pair of deflecting coils to compensate for the raster shift resulting from optimum adjustments for convergence, color purity, and concentricity.

π Peak to peak value. This a-c voltage, essentially parabolic in wave-form, is synchronized with scanning and does not include any voltage developed during the blanking time.



NOTES:

1. REFERENCE LINE IS DETERMINED BY THE POSITION WHERE A 2.400" \pm 0.001" DIAMETER RING GAGE WILL REST ON CONE.
2. ADEQUATE INSULATION MUST BE PROVIDED FOR METAL FLANGE WHICH IS AT ANODE POTENTIAL.
3. EXTERNAL CONDUCTIVE COATING MUST BE GROUNDED.

- PIN 1 - HEATER
- PIN 2 - CATHODE
- PIN 3 - GRID NO. 1 } RED GUN
- PIN 4 - GRID NO. 2
- PIN 5 - NO CONNECTION
- PIN 6 - GRIDS NO. 3
- PIN 7 - CATHODE
- PIN 8 - GRID NO. 1 } GREEN GUN
- PIN 9 - GRID NO. 2
- PIN 13 - GRID NO. 4
- PIN 17 - GRID NO. 2
- PIN 18 - GRID NO. 1 } BLUE GUN
- PIN 19 - CATHODE
- PIN 20 - HEATER
- A - ANODE (METAL FLANGE)
- C - CONDUCTIVE COATING

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Outline
15GP22

TUBE DEPARTMENT
GENERAL ELECTRIC
Schenectady 5, N. Y.