



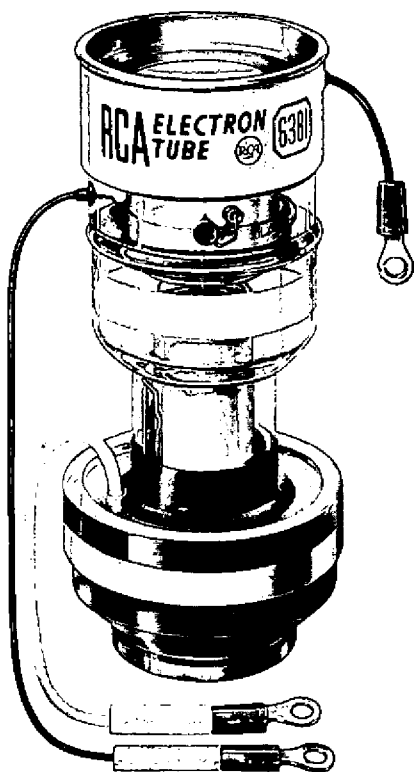
# 6381

## IMAGE-CONVERTER TUBE

Electrostatic Focus  
Good Resolution Capability

4-25/32" Max. Length  
2.115" Max. Diameter

RCA-6381 is a three-electrode tube of the image-converter type which, in combination with suitable optical systems, permits the viewing of a scene with near infrared radiation.



The 6381 is supplied with semiflexible leads for making electrical connection to the tube electrodes and has an integral optical lens coupled to the phosphor screen.

### DATA

#### General:

Spectral Response . . . . . S-1  
Wavelength of Maximum Response . . . 8000 ± 1000 angstroms  
Photocathode, Semitransparent:  
Shape . . . . . Circular  
Minimum Window Area (Approx.) . . . . . 0.74 sq. in.  
Minimum Window Diameter . . . . . 0.970 in.

Phosphor . . . . . P20  
Fluorescence . . . . . Yellow-Green  
Phosphorescence . . . . . Yellow-Green  
Persistence . . . . . Medium-Short  
Fluorescent Screen:  
Shape . . . . . Circular  
Minimum Diameter . . . . . 0.73"  
Focusing Method . . . . . Electrostatic  
Overall Length . . . . . 4-11/16" ± 3/32"  
Maximum Diameter . . . . . 2.115"  
Terminals . . . . . See *Dimensional Outline*  
Operating Position . . . . . Any  
Weight (Approx.) . . . . . 4 oz

#### Maximum Ratings, Absolute-Maximum Values:<sup>a</sup>

DC GRID-NO.2 VOLTAGE<sup>bc</sup> . . . . . 16000 max. volts  
GRID-NO.1 VOLTAGE<sup>c</sup> . . . . . 3000 max. volts  
PEAK PHOTOCATHODE CURRENT<sup>d</sup> . . . . . 3.5 max.  $\mu$ amp  
AVERAGE PHOTOCATHODE CURRENT  
(Continuous Operation) . . . . . 0.35 max.  $\mu$ amp  
AMBIENT TEMPERATURE RANGE . . . . . -54 to +68 °C

#### Characteristics:

Grid-No.2 Voltage<sup>bc</sup> . . . . . 16000 volts  
Grid-No.1 (Focusing Electrode)  
Voltage<sup>c</sup> — 13.25% to 16.25%  
of grid-No.2 voltage . . . . . 2120 to 2600 volts  
Max. Grid-No.2 Dark Current  
at 25° C . . . . . 1.0  $\mu$ amp  
Paraxial Magnification  
Factor<sup>e</sup> . . . . . 0.58  
Sensitivity:  
Radiant, at 8000 angstroms . . . . . 0.0019 amp/watt  
Infrared<sup>f</sup> . . . . . 5  $\mu$ amp/lumen  
Minimum Conversion Index<sup>fg</sup> . . . . . 10  
Minimum Resolution (In central  
area of photocathode)<sup>h</sup> . . . . . 25 line-pairs/mm

<sup>a</sup> The maximum ratings in the tabulated data are established in accordance with the following definition of the Absolute-Maximum Rating System for rating electron devices.

Absolute-Maximum ratings are limiting values of operating and environmental conditions applicable to any electron device of a specified type as defined by its published data, and should not be exceeded under the worst probable conditions.

The device manufacturer chooses these values to provide acceptable serviceability of the device, taking no responsibility for equipment variations, environment variations, and the effects of changes in operating conditions due to variations in device characteristics.

The equipment manufacturer should design so that initially and throughout life no Absolute-Maximum value for the intended service is exceeded with any device under the worst probable operating conditions with respect to supply voltage variation, equipment component variation, equipment control adjustment, load variation, signal variation, environmental conditions, and variations in device characteristics.

<sup>b</sup> Grid No.2 serves the dual function of high-voltage electrode for accelerating the electron beam and of collector through which the electrons leave the tube after their energy has been transformed within the tube.

<sup>c</sup> Referred to photocathode.



- d The 6381 should not be subjected to this peak photocathode current value more than 10 times during the useful life of the tube. No single time period during which this current is drawn should exceed 2 minutes.
- e Defined as the ratio of the separation of two diametrically opposite image points on the screen to the separation of the corresponding image points on the photocathode.
- f Under the following conditions: 2870° K tungsten light source; light flux of 0.1 lumen incident on Corning No. 2540 Infrared Filter (Melt 1613, 2.61 mm thick), or equivalent; irradiated area of photocathode is 3/4 inch in diameter
- g Ratio of light flux from fluorescent screen to the product of the light flux incident on the infrared filter multiplied by the filter factor.
- h Under the conditions shown in (f) except the entire photocathode is irradiated. The resolution, both horizontally and vertically, in a 0.150 inch diameter circle centered on the photocathode is determined with a pattern consisting of alternate black and white lines of equal width. Any two adjacent lines are designated as a "line-pair".

### OPERATING CONSIDERATIONS

The high voltage at which the 6381 is operated may be very dangerous. Great care should be taken in the design of apparatus to prevent the user from coming in contact with the high voltage. Precautions must include safeguards which eliminate all hazards to operating personnel. In the use of high-voltage tubes, such as the 6381, it should always be remembered that high voltage may appear at normally low-potential points in the circuit because of capacitor breakdown or incorrect circuit connections. Before any part of the circuit is touched, the voltage-supply switch should be turned off and both terminals of any capacitors grounded.

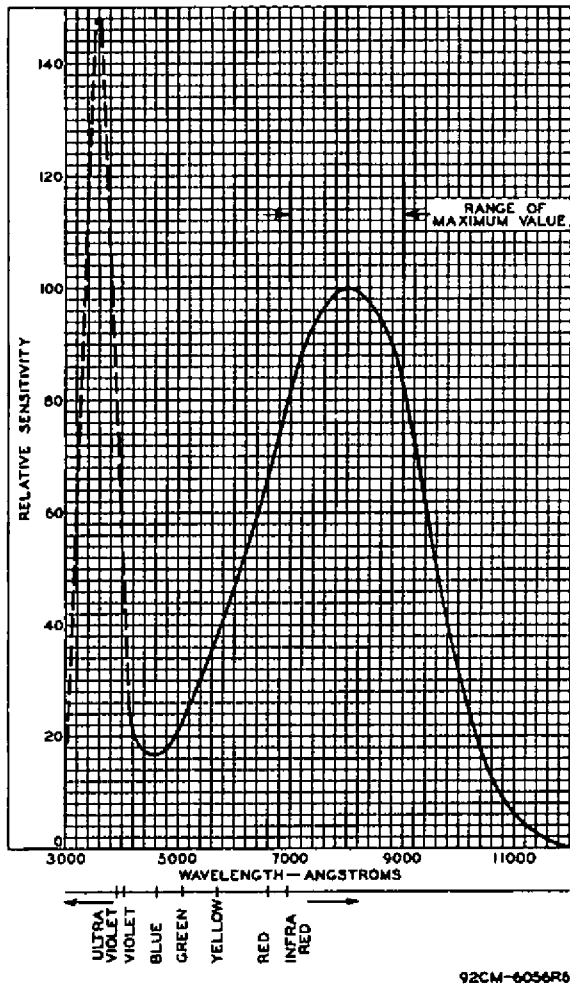


Fig. 1 - Spectral Sensitivity Characteristic of Type 6381 which has S-1 Response. Curve is shown for Equal Values of Radiant Power at All Wavelengths.

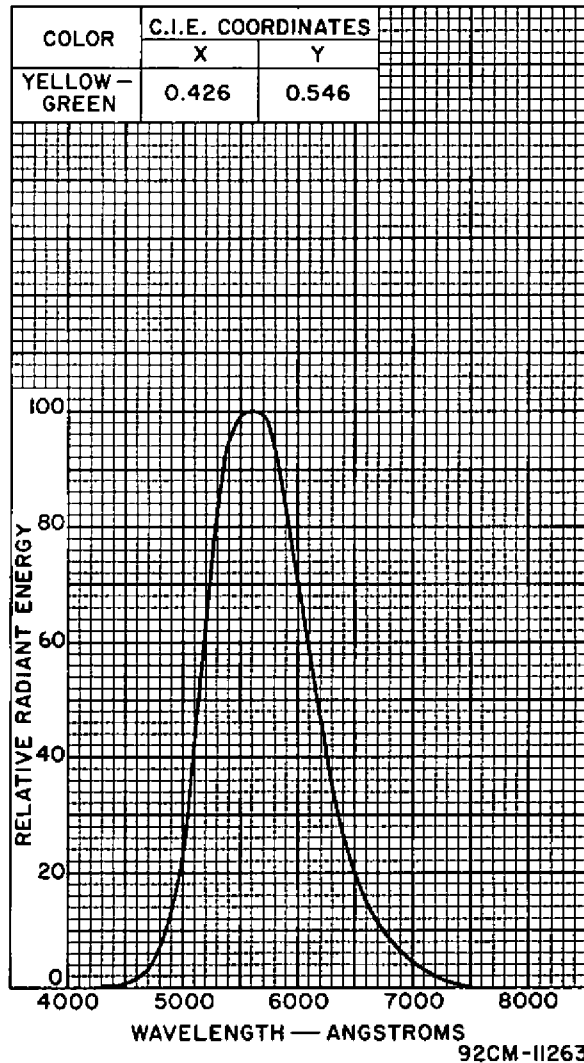
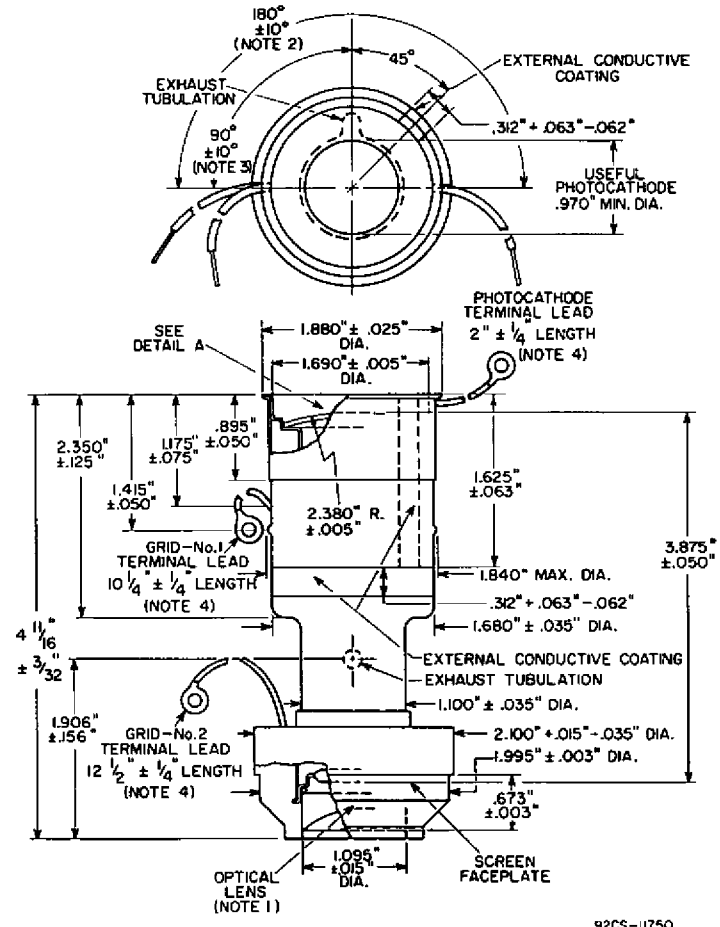


Fig. 2 - Spectral-Energy Emission Characteristic of Phosphor P20.



### DIMENSIONAL OUTLINE

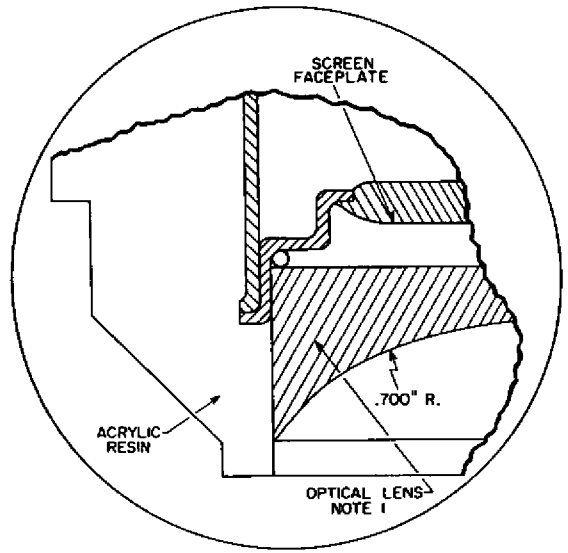
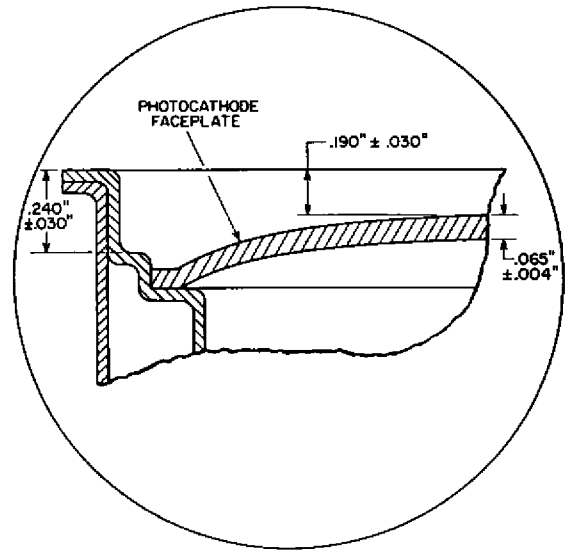


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- NOTE 1:** AXIAL THICKNESS OF LENS IS  $0.180'' \pm 0.030''$ . BACK FOCAL LENGTH IS  $1.354'' \pm 0.027''$ .
- NOTE 2:** TERMINAL LEAD ORIENTATION.
- NOTE 3:** EXHAUST TUBULATION ORIENTATION.
- NOTE 4:** TERMINAL LEAD HOLE-DIAMETER IS  $0.145'' \pm 0.005''$ .

DETAIL A

DETAIL B

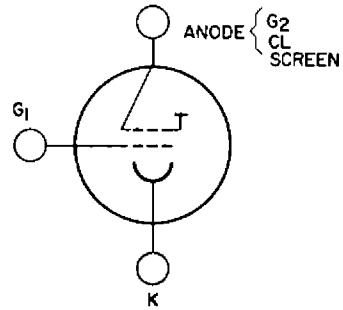




### TERMINAL CONNECTIONS

(See Dimensional Outline)

DIRECTION OF INCIDENT RADIATION:  
PERPENDICULAR TO  
PHOTOCATHODE END OF TUBE



G<sub>1</sub>: GRID No.1  
K : PHOTOCATHODE—  
At photocathode  
end of tube

ANODE: (Grid No.2,  
Collector,  
Screen)—  
At phosphor screen  
end of tube

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