

## Image Converter Tubes

Monovoltage Types Having S-1 Spectral Response

### GENERAL

#### For Both Types

Spectral Response ..... S-1

Wavelength of Maximum Response .....  $800 \pm 100$  nm

#### Photocathode:

Material ..... Ag-O-Cs

Minimum useful diameter ..... 25 mm (1.000 in)

#### Image surface:

Shape ..... Convex

#### Window

Index of refraction at 589.3 nm ..... 1.48

#### Fluorescent Screen:

Minimum useful diameter ..... 21.8 mm (0.860 in)

Phosphor ..... P20, Aluminized

Fluorescence and phosphorescence ..... Yellow-Green

Persistence ..... Medium to Medium Short

#### Image surface:

Shape ..... Flat

#### Window

Index of refraction at 589.3 nm ..... 1.48

Focusing Method ..... Electrostatic

#### Tube Dimensions:

Overall length .....  $2.925 \text{ in} \pm 0.050 \text{ in}$

Maximum diameter .....  $1.880 \text{ in} \pm 0.025 \text{ in}$

Operating Position ..... Any

Weight ..... 3 oz

**MAXIMUM RATINGS, Absolute-Maximum Values for altitude up to 10,000 feet**

#### For Both Types

#### Anode Voltage:<sup>b</sup>

Average (DC) ..... 16000 max. V

Peak Instantaneous ..... 17000 max. V

#### Average Photocathode Current

(Continuous operation)<sup>c</sup> ..... 0.35 max.  $\mu\text{A}$

Peak Photocathode Current<sup>d</sup> ..... 3.5 max.  $\mu\text{A}$

Ambient-Temperature Range ..... -54 to +68 °C

# 6914, 6914A

## Characteristics at Ambient Temperature of 22° C

|                                                                                                   | Type 6914            | Type 6914A            |                    |
|---------------------------------------------------------------------------------------------------|----------------------|-----------------------|--------------------|
| Anode Voltage (DC) <sup>b</sup> . . . . .                                                         | 16000                | 16000                 | V                  |
| Typical Paraxial Magnification Factor <sup>e</sup> . . . . .                                      | 0.76                 | 0.76                  | —                  |
| Minimum Conversion Index <sup>f</sup> . . . . .                                                   | 15                   | 15                    | —                  |
| → Minimum Resolution <sup>g</sup> . . . . .                                                       | 50                   | 50                    | line-pairs/mm      |
| Maximum Quotient <sup>h</sup> of Screen Background by Conversion Index . . . . .                  | 2.5x10 <sup>-7</sup> | 2.5x10 <sup>-7</sup>  | lm/cm <sup>2</sup> |
| Maximum Luminous Equivalent of Infrared Radiation for Threshold Visibility <sup>j</sup> . . . . . | —                    | 4.1x10 <sup>-11</sup> | lm                 |
| Photocathode Sensitivity:                                                                         |                      |                       |                    |
| → Radiant <sup>k</sup> . . . . .                                                                  | 2.3                  | 2.3                   | mA/W               |
| → Luminous <sup>m</sup> . . . . .                                                                 | 25                   | 25                    | μA/lm              |

- b** Referred to photocathode.
- c** Averaged over any interval of 10 seconds maximum.
- d** The 6914 and the 6914A should not be subjected to this peak photocathode current value more than 10 times during the useful life of the tubes. No single time period during which this current is drawn should exceed 2 minutes.
- e** Defined as the ratio of the linear size of the image on the fluorescent screen to the linear size of the image on the photocathode. The image on the photocathode consists of two parallel lines 0.08" long, each located 0.10" from the tube axis. Size of the image on the fluorescent screen is determined by measuring the spacing between the two parallel lines.
- f** Ratio of luminous flux from fluorescent screen to the product of the luminous flux incident on Corning No.2540 infrared filter (Melt No.1613, 2.61 mm thick) or equivalent, and the filter factor of 10.8 per cent. The light source is a tungsten-filament lamp operated at a color temperature of 2854° K.
- g** The resolution, both horizontally and vertically in a 0.24-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".

→ Indicates a change or addition

- h The value of this quotient for any individual tube multiplied by the square of the magnification factor of the tube gives that value of the incident illumination from 2854° K source required to produce an increase in screen brightness equal to the screen background.
- j Radiation from a tungsten lamp operating at a color temperature of 2854° K is passed through a Corning No.2540 infrared filter and focused to a point on the photocathode. The resulting image on the fluorescent screen is viewed by a dark-adapted eye through a 10-power ocular. The amount of infrared radiation for threshold visibility is determined by reducing the incident radiation until the image on the screen can just be discerned. The luminous equivalent of this amount of infrared radiation is the product of the unfiltered luminous flux from the 2854° K source and the filter factor of the Corning No.2540 infrared filter.
- k For incident radiation at the wavelength of maximum response of the spectral sensitivity characteristic.
- m Under the following conditions: The light source is a tungsten-filament lamp having a lime-glass envelope. The lamp is operated at a color temperature of 2854° K. The value of light flux is  $1 \times 10^{-2}$  lumen and 200 volts are applied between the photocathode and anode.

## SAFETY PRECAUTIONS

### X-Radiation Warning

This tube in operation produces X-rays which can constitute a health hazard unless the tube is adequately shielded. Make sure the shielding provides the required protection against personal injury.

### High Voltage

The high voltage at which the tube 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.

### Operating Considerations

Handling. The tubes should be handled by the metal terminals. Fingerprints on the glass should be avoided since they cause leakage current, corona, and higher screen background. To minimize the possibility of leakage current and corona, the external surface of the glass side wall is coated with a transparent, non-hygroscopic film. This film should

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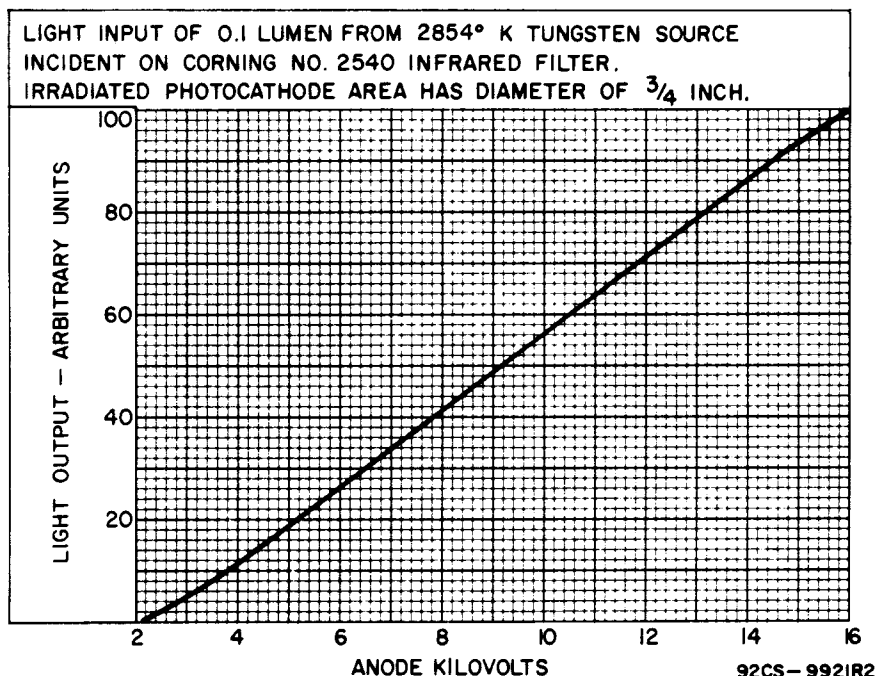
be cleaned only with a soft dry cloth.

Subjecting the tubes to intense incident-radiation levels may temporarily decrease the tube's sensitivity even though there is no voltage applied. The magnitude and duration of this decrease depend on the length of exposure. Permanent damage to the tube may result if it is exposed to radiant energy so great as to cause excessive heating of the photocathode.

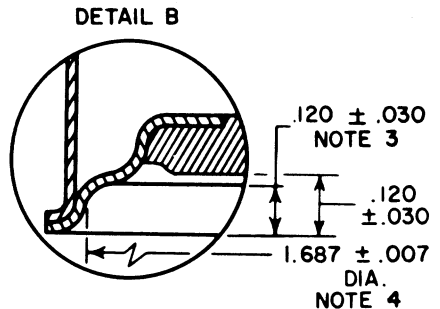
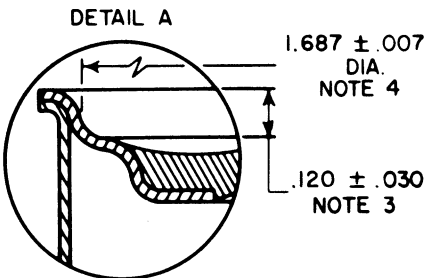
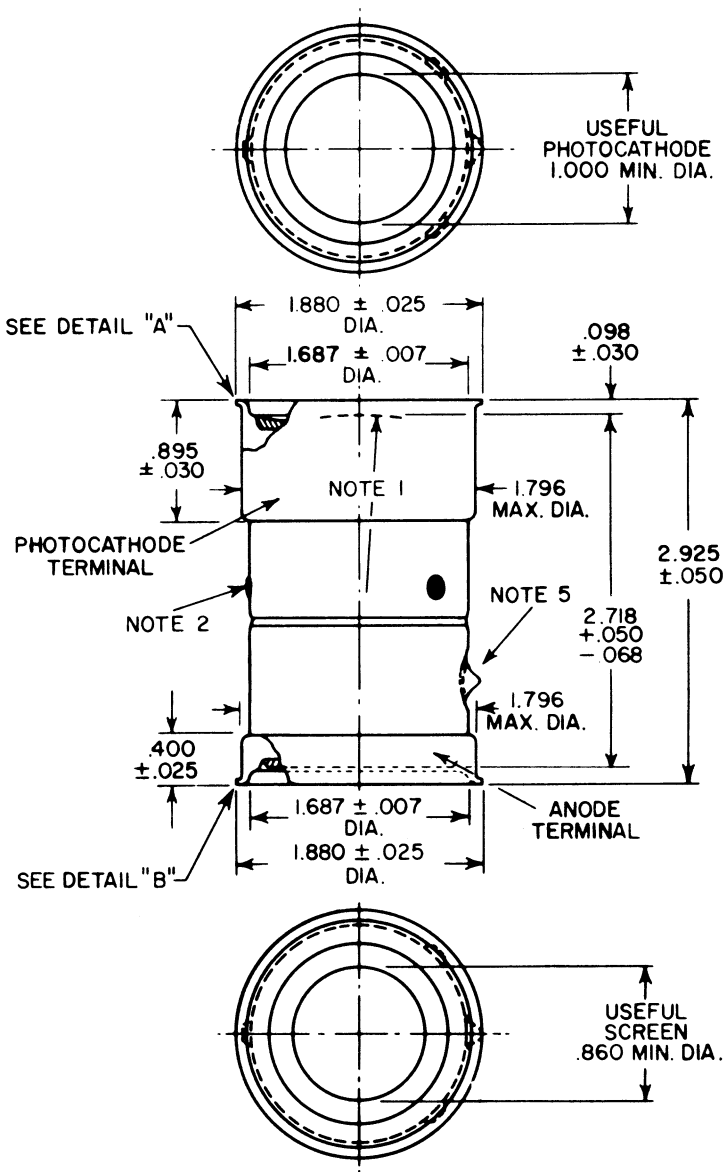
Connections to the two terminals of the tube, indicated on the Dimensional Outline, should not be soldered to the terminals. They may be made by spring fingers engaging the rim or the straight side of each terminal.

Magnetic shielding of these image tubes is required to minimize the effects of extraneous fields on tube performance. It is to be noted that ac magnetic fields are particularly objectionable in that they seriously impair tube resolution. If an iron or steel case is used, care should be taken in its construction to insure that the case is completely demagnetized.

## TYPICAL CHARACTERISTIC



## DIMENSIONAL OUTLINE



Dimensions in Inches

92CM-9922R1

# 6914, 6914A

## DIMENSIONAL OUTLINE NOTES

**Note 1:** Radius of curvature of faceplate is  $2.38'' \pm 0.05''$ . Faceplate thickness at center is  $0.065'' \pm 0.004''$ .

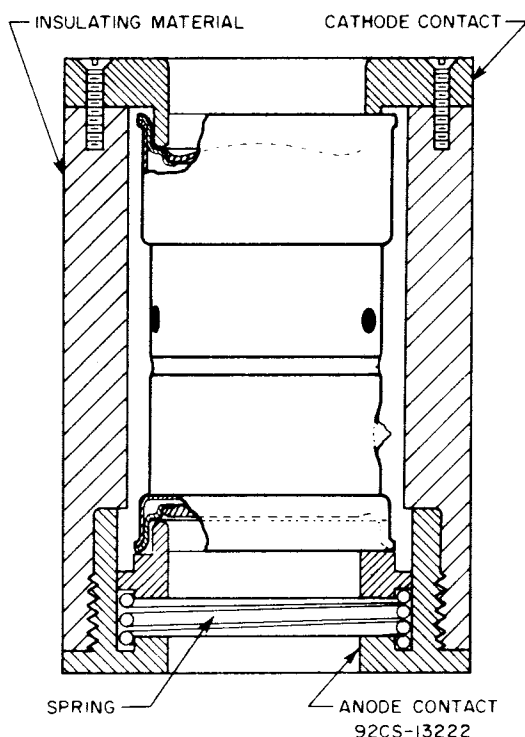
**Note 2:** Three insulated lead tips will not extend beyond maximum O.D. of tube. Leads are used only during tube manufacture.

**Note 3:** Depth is measured to tangent of the two radii.

**Note 4:** Diameter is measured to tangent of the two radii.

**Note 5:** The exhaust tip will not extend beyond max. dia. of tube.

## TYPICAL MOUNTING ARRANGEMENT



## TERMINAL CONNECTIONS

$C_L$ : Collector

$G_1$ : Grid No.1

(Focusing Electrode)

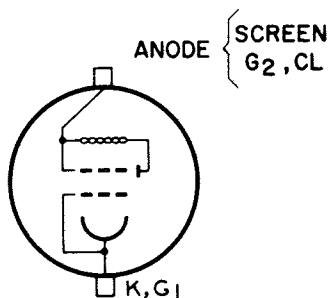
$G_2$ : Grid No.2

(Focusing & Accelerating Electrode)

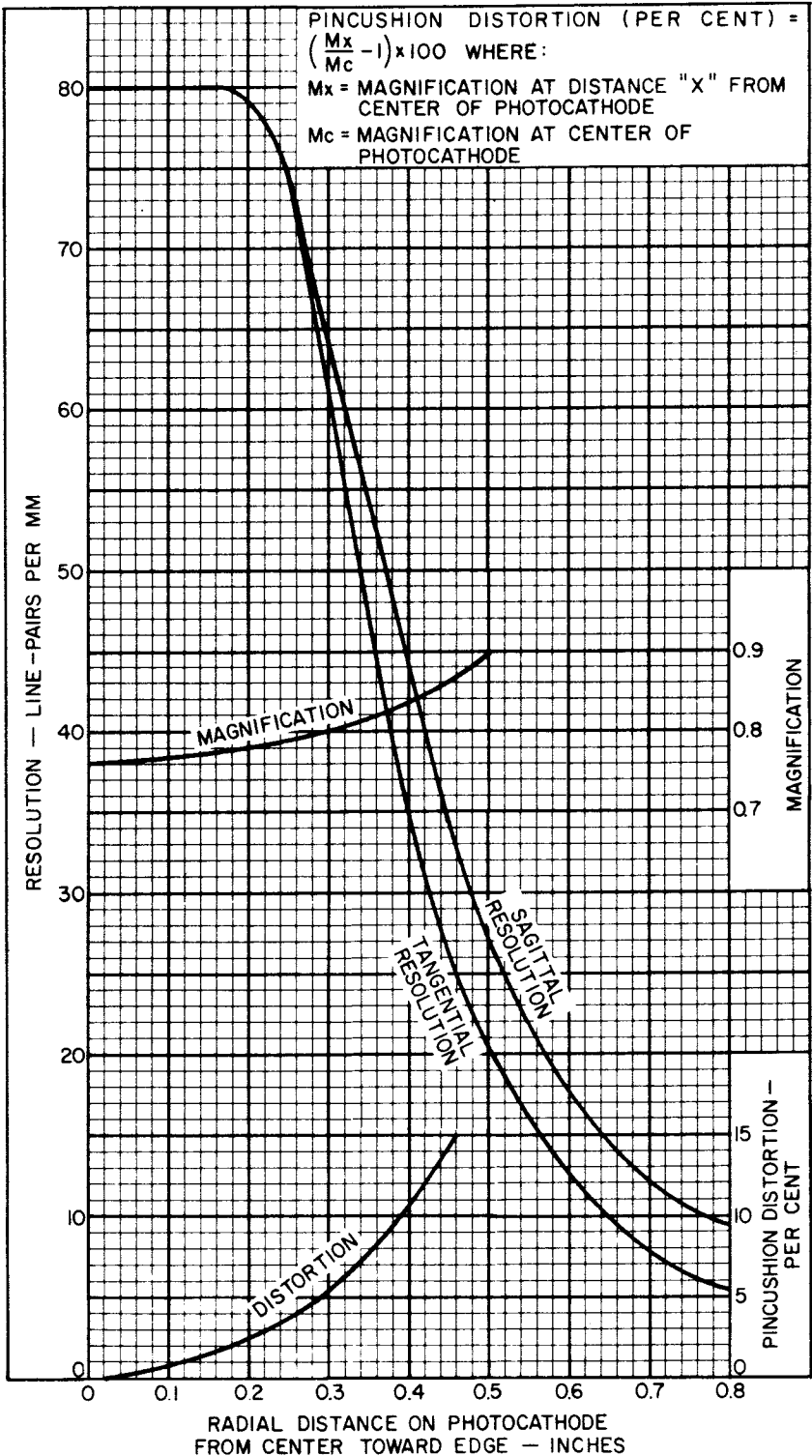
K: Photocathode

Direction of incident radiation:

Perpendicular to photocathode end of tube



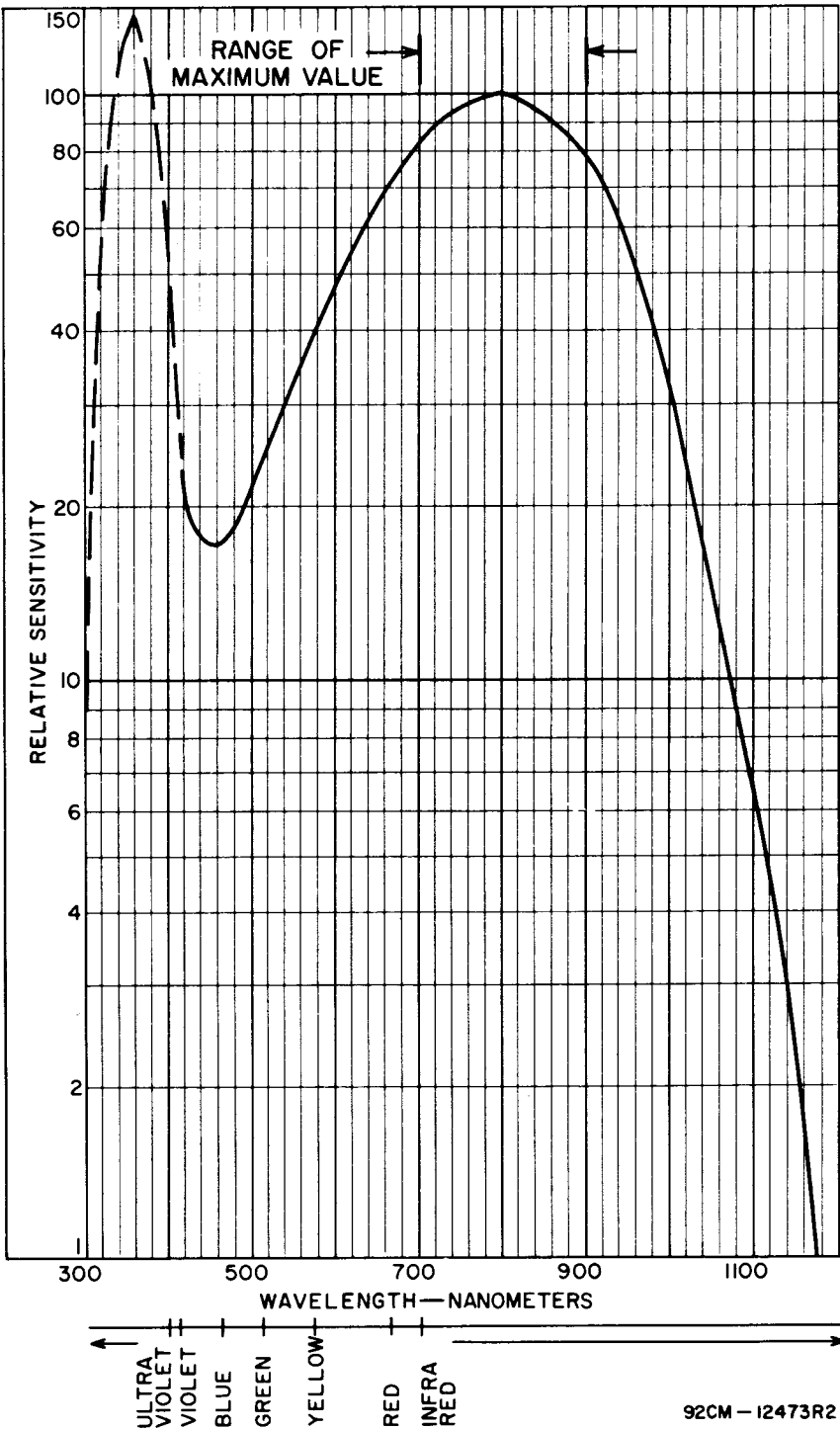
## TYPICAL CHARACTERISTICS



92CM-9920R2

# 6914, 6914A

## TYPICAL SPECTRAL RESPONSE CHARACTERISTICS



The dashed portion shown in the above curve of the spectral response is not controlled.