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## IMAGE-CONVERTER TUBE

MONOVOLTAGE TYPE HAVING S-21 RESPONSE

For use, in combination with suitable optical systems, in viewing an object or specimen irradiated with near-ultraviolet radiation

## DATA

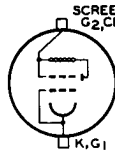
## General:

Spectral Response . . . . .	S-21
Wavelength of Maximum Response. . . . .	4400 ± 500 angstroms
Photocathode, Semitransparent:	
Shape . . . . .	Circular
Minimum useful diameter . . . . .	0.75"
Fluorescent Screen:	
Shape . . . . .	Circular
Minimum useful diameter . . . . .	0.57"
Phosphor. . . . .	P20 <sup>■</sup> , Aluminized
Fluorescence. . . . .	Yellow-Green
Phosphorescence . . . . .	Yellow-Green
Persistence . . . . .	Medium-Short
Focusing Method (Self-focusing) . . . . .	Electrostatic
Overall Length. . . . .	2.28" ± 0.05"
Greatest Diameter (Excluding side tip). . . . .	1.35" ± 0.03"
Maximum Radius (Including side tip) . . . . .	0.75"
Weight (Approx.). . . . .	1.5 oz
Operating Position. . . . .	Any
Terminal Connections (See Dimensional Outline):	

DIRECTION OF INCIDENT RADIATION:  
PERPENDICULAR TO  
PHOTOCATHODE END OF TUBE

CL - Collector

G<sub>1</sub> - Grid No. 1  
(Focusing  
Electrode)



G<sub>2</sub> - Grid No. 2  
(Focusing &  
Accelerating  
Electrode)

K - Photocathode

## Maximum Ratings, Absolute-Maximum Values:

FLUORESCENT-SCREEN VOLTAGE: <sup>□</sup>		
Peak instantaneous. . . . .	13000 max.	volts
Average (DC). . . . .	12500 max.	volts
AVERAGE PHOTOCATHODE CURRENT		
(Continuous operation)* . . . . .	0.35 max.	μa
AMBIENT TEMPERATURE . . . . .	75 max.	°C

## Characteristics:

At Ambient Temperature of 25° C

Fluorescent-Screen Voltage (DC) <sup>□</sup> . . . . .	12000	volts
Median Paraxial Magnification Factor <sup>↓</sup> . . . . .	0.75	
Median Conversion Efficiency <sup>†</sup> . . . . .	6000	lumens/watt
Minimum Resolution <sup>▲</sup> . . . . .	25	line pairs per mm



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Median Equivalent Screen-Background

Input at 2537 angstroms. . . . .  $1 \times 10^{-10}$  watt/cm<sup>2</sup>

■ For Curves, see front of Cathode-Ray Tube, Storage Tube, & Monoscope Section. See also Operating Considerations.

□ Referred to photocathode.

\* Averaged over any interval of 10 seconds maximum.

↓ 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 0.08" from the tube axis. Size of the image on the fluorescent screen is determined by measuring the spacing between the two parallel lines.

† Defined as the quotient of luminous flux output to incident radiant flux at 2537 angstroms.

▲ The resolution, both horizontally and vertically in a 0.15-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".

§ Defined as that value of incident radiation required to cause an increase in screen brightness equal to the screen-background brightness.

## OPERATING CONSIDERATIONS

The curves giving the *spectral-energy emission characteristic* and the *persistence characteristics* of phosphor P20 are located in the front of the Cathode-Ray Tube, Storage Tube, & Monoscope Section. Only persistence-characteristic curve A applies to the 7404.

Subjecting the 7404 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.

Support for the 7404 may be provided at the photocathode end by a cushioned arrangement and at the screen end by a suitable fixture which will exert adequate but not excessive pressure to hold the tube firmly against the cushion.

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 the 7404 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.

The high voltage at which the 7404 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 7404, it should always be



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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 connected to ground.

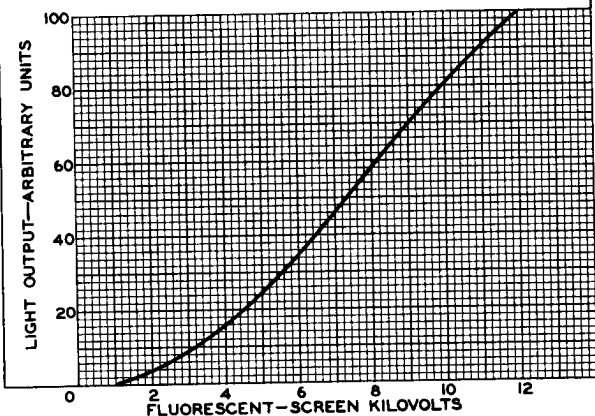
The curve showing the Tentative Spectral-Sensitivity Characteristic of Photosensitive Device having S-21 Response located at the front of this Section applies to the 7404

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DATA 2

### AVERAGE CHARACTERISTIC

LIGHT INPUT OF 0.01 LUMEN FROM 2870°-K TUNGSTEN SOURCE INCIDENT ON THE PHOTOCATHODE.  
IRRADIATED PHOTOCATHODE AREA HAS DIAMETER OF 3/4 INCH.



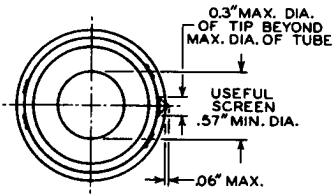
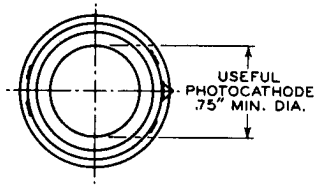
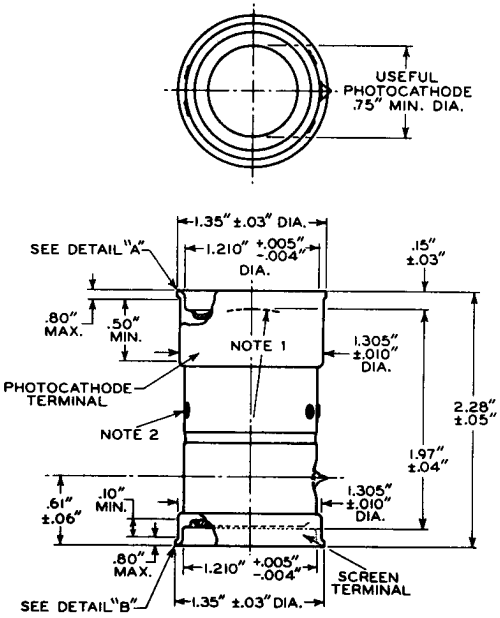
92CS-10030

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92CM-9978

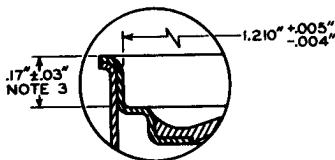


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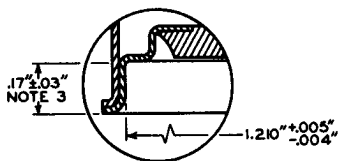
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## IMAGE-CONVERTER TUBE

DETAIL A



DETAIL B



**NOTE 1:** RADIUS OF CURVATURE OF FACEPLATE IS  $1.230'' \pm 0.005''$ ; FACEPLATE THICKNESS AT CENTER IS  $0.030'' \pm 0.005''$ .

**NOTE 2:** FIVE INSULATED LEAD TIPS WILL NOT EXTEND BEYOND MAXIMUM OUTSIDE DIAMETER OF TUBE. LEADS ARE USED ONLY DURING TUBE MANUFACTURE.

**NOTE 3:** DEPTH IS MEASURED TO TANGENT OF THE TWO RADII.

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## AVERAGE CHARACTERISTICS

$$\text{PINCUSHION DISTORTION (PER CENT)} = \left( \frac{M_x}{M_c} - 1 \right) \times 100$$

WHERE:

$M_x$  = MAGNIFICATION AT DISTANCE "x" FROM  
CENTER OF PHOTOCATHODE

$M_c$  = MAGNIFICATION AT CENTER OF  
PHOTOCATHODE

