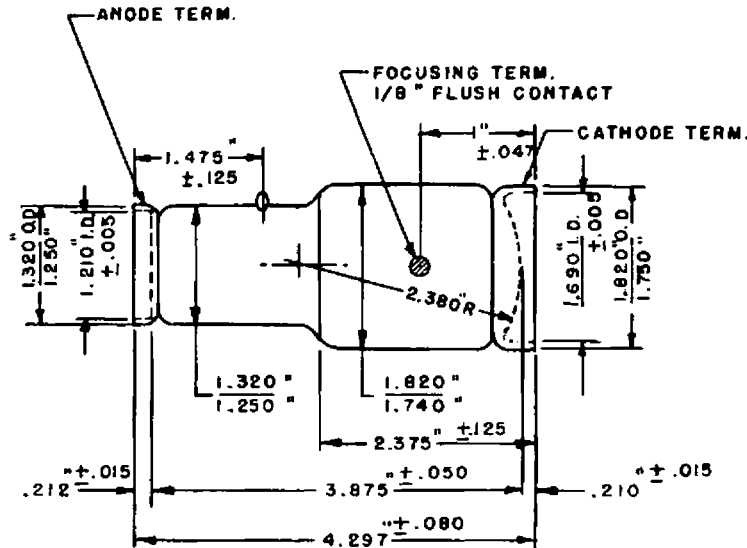


# FARNSWORTH IC-16-3 IMAGE CONVERTER TUBE

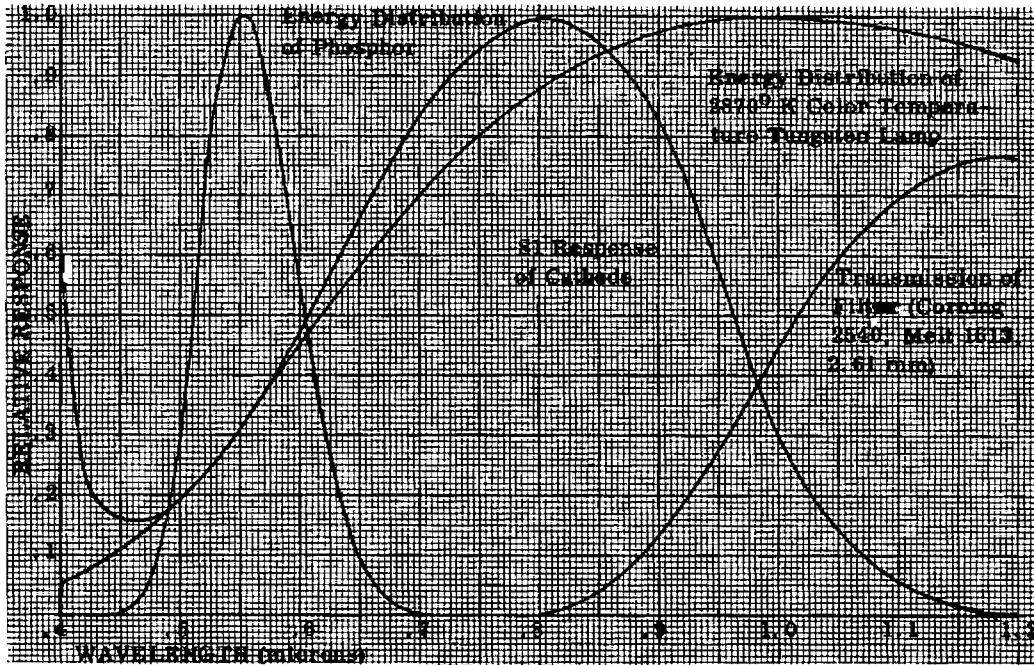


### DESIGN DATA

Cathode to anode voltage (maximum) (1)	-----	18,000 volts
Cathode to grid (focus) voltage (2)	-----	2,000 to 3,000 volts
Useful cathode diameter	-----	0.970 inches
Useful phosphor screen diameter	-----	0.750 inches
Image magnification (paraxial)	-----	0.68
Image distortion 0.362 inches from center of cathode (3)	-----	10%
Resolution (paraxial)	-----	20 line pairs/mm at cathode
Ambient temperature (maximum)	-----	50°C
Cathode surface	-----	RMA-S1 (see characteristic curve)
Phosphor screen	-----	Zn CdS (aluminized)
Conversion index (4)	-----	15.0

Note: Incident flux during operation of the tube should be limited to approximately 0.1 lumen.

1. The maximum working voltage is specified on the basis of a suitable margin of safety regarding internal glow or flashover. Such glow or flashover invariably causes loss in stability or cathode sensitivity.
2. Current consumption of the focus electrode is sufficiently small so that it may be disregarded in the design of a voltage divider for electrical focusing.
3. Distortion is defined as  $\frac{M_m - M_p}{M_p}$  where  $M_m$  = marginal magnification and  $M_p$  = paraxial magnification.
4. Conversion index is defined as  $C.I. = F_e / F_i T$ , where  $F_e$  and  $F_i$  are the emitted and incident fluxes respectively, under conditions (A) and (B). T is the integrated transmission of the RETMA-2540 test filter using (A) as the source and a receiver with RETMA-S1 response.
  - A. Lead or lime glass lamp envelope, coiled or coiled coil tungsten filament operated at a color temperature of 2870°K. Nonfiltered light on cathode must not exceed 0.1 lumen.
  - B. Corning RETMA-2540 filter. (Melt 1613, thickness-2.61 mm.)



**AUXILIARY DATA**

1. The image tube normally is used in conjunction with an objective lens and magnifying eyepiece. The inverted image on the cathode is reinverted by the electron optics of the tube so that the image as it appears on the screen or is seen through the eyepiece is erect. The objective may be either refractive or reflective (Schmidt), and should be designed with proper consideration given to the spherical cathode surface. Usually a field flattener lens is used in conjunction with the objective. The eyepiece should be a good quality achromat with a field slightly in excess of the useful phosphor screen area (0.750 inches diameter). A seven power Hastings triplet will be found reasonably satisfactory for most applications.
2. For the majority of viewing applications, a filtered tungsten lamp is used for irradiating the subject. The visible component is suitably suppressed with one of the readily available filters or with several in combination. (Written 87C, 88A, Corning #2540, and others.)
3. It is recommended that the precise internal dimensions of the cathode and anode terminals, indicated in the outline drawing, be used in the tube mounting. This will aid in maintaining alignment of the tube with respect to the optical system when servicing. The glass "tip-off" point is used as an index for location of the focusing terminal.
4. In order to prevent the deleterious effect of corona and surface leakage, it is recommended that the IC-16-3 always be operated in a dry atmosphere. This is best realized by enclosing the tube in a reasonably air-tight jacket or envelope provided with a suitable desiccant, such as silica-gel.
5. Consideration should also be given to necessary safety measures associated with operation of high voltage equipment. It is advisable that the tube be housed in a grounded metal envelope. The voltage lead to the tube should be a small coaxial cable; the external conductor in the cable is grounded to both tube housing and power supply. It will be found advantageous in most applications to include the voltage divider within the grounded metal tube housing.
6. While the tube is normally operated with the cathode at ground potential, this is not necessarily a requirement.