

Permanent Sensitivity ALPHA-BETA GAMMA, X-RAY COUNTERS

TENTATIVE DATA

Description

The type 240N is a probe tube with a long cathode that makes it sensitive to Gamma radiation at tolerance dosage levels. The 1.4 to 2 mg/cm² mica window⁷ on a tube of this general size and shape gives Alpha and Beta sensitivity to survey instruments using this tube in place of similar Gamma tube types. The 3 pin base fits into a standard socket and makes the tube readily interchangeable with other types.

The type 240C is a small diameter X-Ray counter. The long sensitive volume and thin window gives high total soft X-Ray efficiency, and the short dead time expands the sensitivity range for which linear response is possible. Since there are no external flanges the tubes can be bundled in multiple arrangements for higher sensitivity to wide beams.

General Data

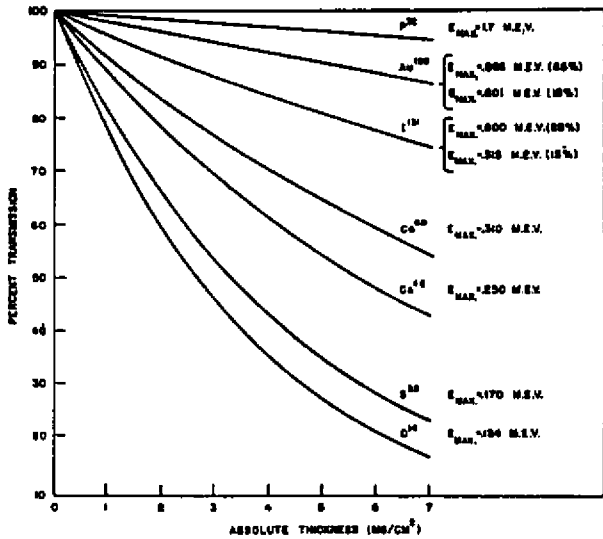
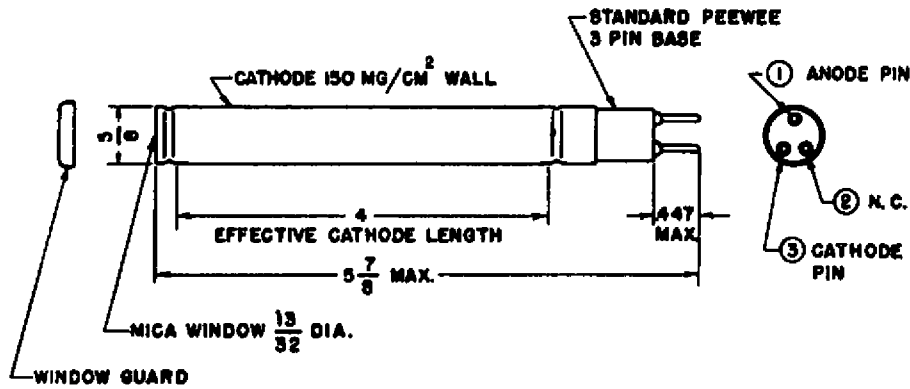
Operating temperature range.....	-55° to +75°C
Gas filling —240N.....	Neon plus halogen admixture
—240C.....	Argon plus halogen admixture
Cathode material.....	stainless steel (28% chromium, 72% iron)
Mica window ⁷	1.4 to 2 mg/cm ²
Mica window diameter.....	13/32"
Effective cathode dimensions.....	4" long x .605" I.D. x .010" wall

Performance Data

	(240N)	240C)
Operating voltage ^{1,3,4}	850-900 volts D.C.	1200 volts D.C.
Plateau length ¹	in excess of 150 volts	in excess of 200 volts
Slope of plateau ^{1,5}	less than 15% per 100 volts	less than 10% per 100 volts
Starting voltage (0.3 volt pulses) ¹	800 volts max.	1100 volts max.
Capacity at terminals.....	2.4 mmf	2.4 mmf
Radial sensitivity, beta or X-Ray (through window).....	99%	99%
Radial sensitivity, gamma (approx.).....	80%	80%
Photosensitivity & hysteresis.....	none	none
Dead time (approx.).....	100 microseconds	100 microseconds
Maximum counting rate ⁶	1700 counts per second	1700 counts per second
Background (Shielded with 2" lead and 1/8" aluminum).....	50 counts per minute max.	50 counts per minute max.
Roentgen energy dependence ⁸	±20%
Life expectancy in counts ²	unlimited by use	unlimited by use

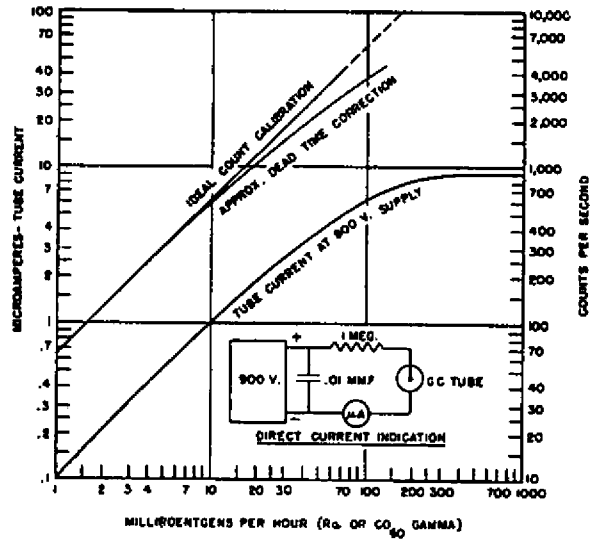
Notes

- ¹ This data is obtained from an automatic plateau trace run on each tube. A print of this trace is shipped with each tube.
- ² Guaranteed 5×10^{10} counts minimum.
- ³ These tubes will operate satisfactorily anywhere on the plateau.
- ⁴ Also available at 700 volts operating voltage upon special request.
- ⁵ At an average counting rate of 100 counts per second.
- ⁶ For 20% dead time correction (approx.).
- ⁷ 1.4 mg/cm² mica = .0002 inch = 5.08 microns.
- ⁸ Calculated value based on radiocobalt gamma center value with 100KV to 3 M.E.V. extremes.



CALCULATED TRANSMISSION OF BETA SPECTRUM FROM SOME COMMON RADIONUCLIDES

Adapted from G. I. Gleason, et al - *Nucleonics*, Vol. 8, No. 5, 18 (1951)



TYPICAL OPERATION

