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/cm^2 mica window[7] 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 x 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.

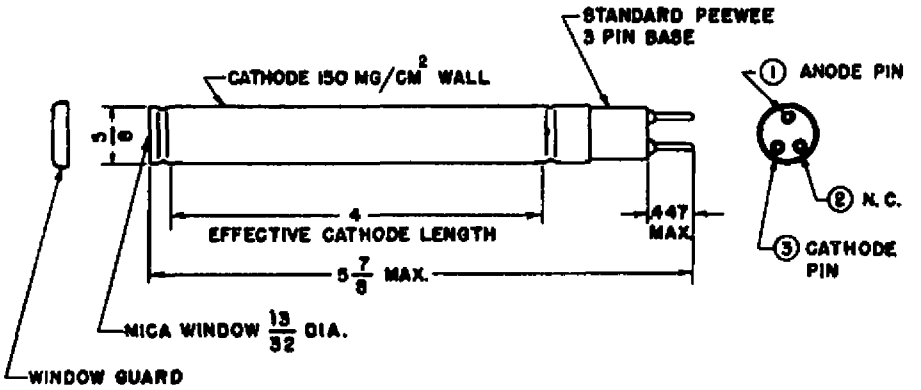
[5] At an average counting rate of 100 counts per second.

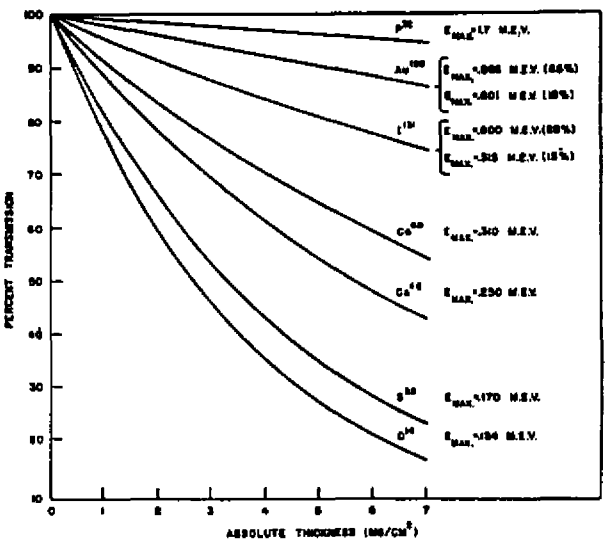
[6] For 20% dead time correction (approx.).

[7] 1.4 mg/cm^2 mica = .0002 inch = 5.08 microns.

[8] Calculated value based on radiocobalt gamma center value with 100KV to 3 M.E.V. extremes.

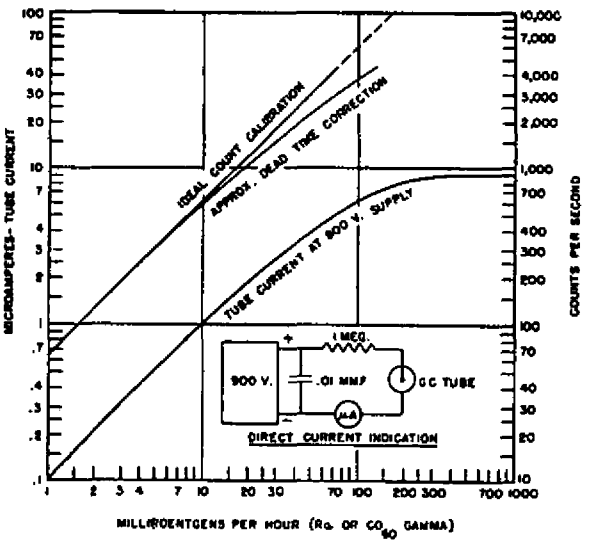
from RTMA release #1128, Jan. 30, 1953



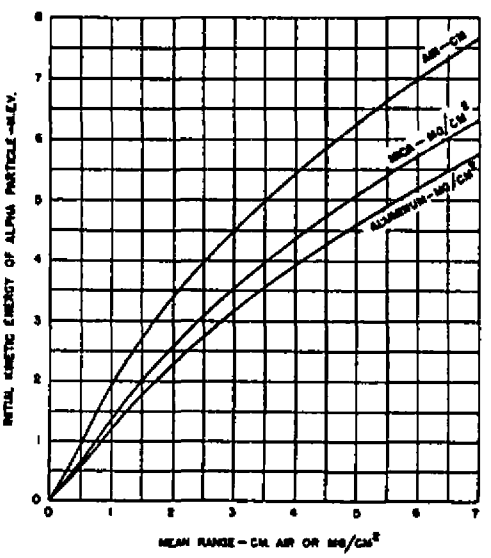
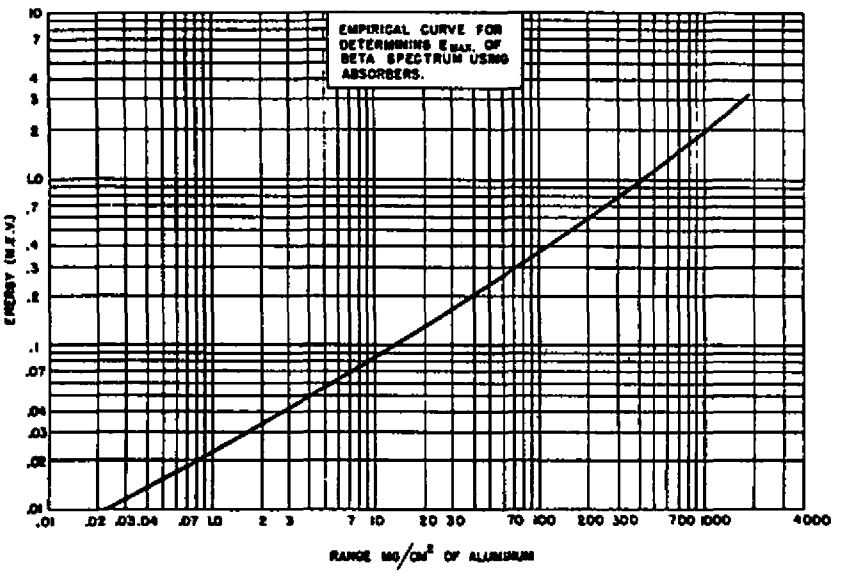


CALCULATED TRANSMISSION OF BETA SPECTRUM FROM SOME COMMON RADIOISOTOPES

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



TYPICAL OPERATION



ALPHA PARTICLE MEAN RANGES