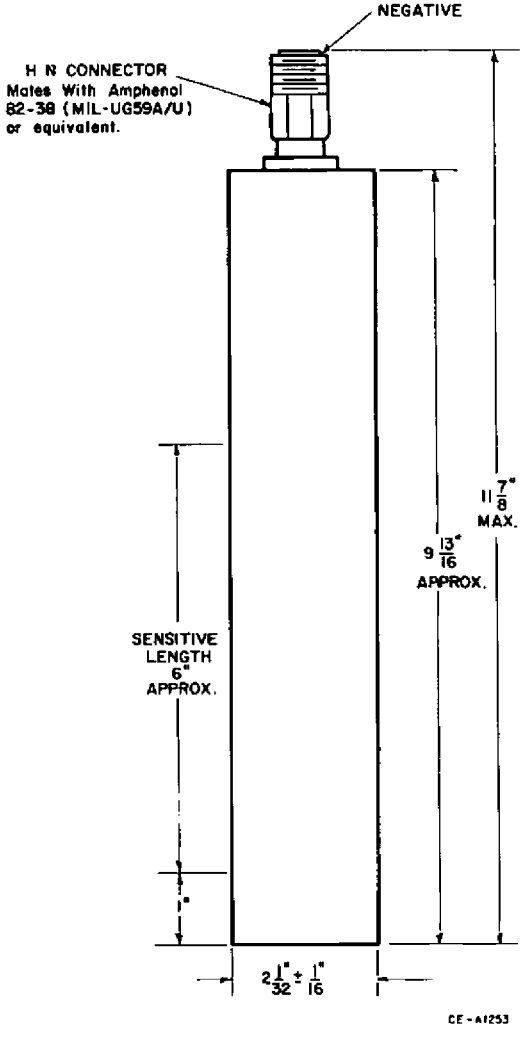
June 12, 1958

FISSION COUNTER TYPE WL-7188

The WL-7188 is a fission counter designed to detect thermal neutrons in the flux range from 2.5 x 10 to 2.5 x 10^6 neutrons/cm^2/second. Ionization pulses are produced in the nitrogen argon atmosphere by fission fragments resulting from thermal neutrons incident on the sensitive coating. The sensitive coating consists of uranium oxide highly enriched in U-235 isotope. The WL-7188 is extremely rugged ♦ and can be stored or operated in any position at temperatures up to 300° F.

The characteristics of the WL-7188 are such that sensitivity to changes in the setting of the pulse height selector is minimized. This attribute makes the tube desirable in critical facilities. In this application, the WL-7188 permits good day-to-day reproduceability of readings.

The sensitivity of the WL-7188 is 7 x 10^{-2} counts/neutron/cm^2 when the pulse amplifier discriminator is adjusted for a background counting rate of 1 count/second for the naturally radioactive uranium. An incident gamma flux of 10^{10} photons/cm^2/second results in a maximum decrease in sensitivity of 1% up to 10^5 counts/second.



MECHANICAL:

Maximum Diameter	2-3/32	Inches
Maximum Overall Length	11-7/8	Inches
Approx. Sensitive Length	6	Inches
Net Weight	1-3/4	Pounds
Shipping Weight	12	Pounds

MATERIALS:

Body and Electrodes		Aluminum
Insulation		Polystyrene & Alumina
Neutron Sensitive Coating:		
Content	U_3O_8 enriched to more than 90% in U-235	
Thickness	0.2	mg/cm^2
Total Amount of U-235	.086	gm
Gas Filling	Argon-Nitrogen Mixture at 76 cm Hg	

MAXIMUM RATINGS:

Absolute Maximum Values

Voltage Between Electrodes	800 max.	Volts
Thermal Neutron Flux	2.5×10^{10} max.	$n/cm^2/sec$
Total Integrated Neutron Flux	1×10^{17} max.	n/cm^2
Temperature	300 max.	° F

TYPICAL OPERATION AS A FISSION COUNTER:

Operating Voltage	300	Volts
Operating Voltage Plateau ⊖	200 to 800	Volts
Neutron Flux Range	2.5 x 10 to 2.5 x 10^6	$n/cm^2/sec$
Sensitivity □	.07	count/n/cm^2
Output Pulse Characteristics:		
Magnitude	2×10^{-4}	Volts
Inherent Rise Time	2×10^{-7} max.	Seconds
Leakage Resistance	10^9 min.	ohms
Capacitance-Signal Electrode to Case	190	uuf

♦ The WL-7188 has passed Military Specification MIL-S-901 for shock and MIL-Std-167 (Type 1) for vibration.

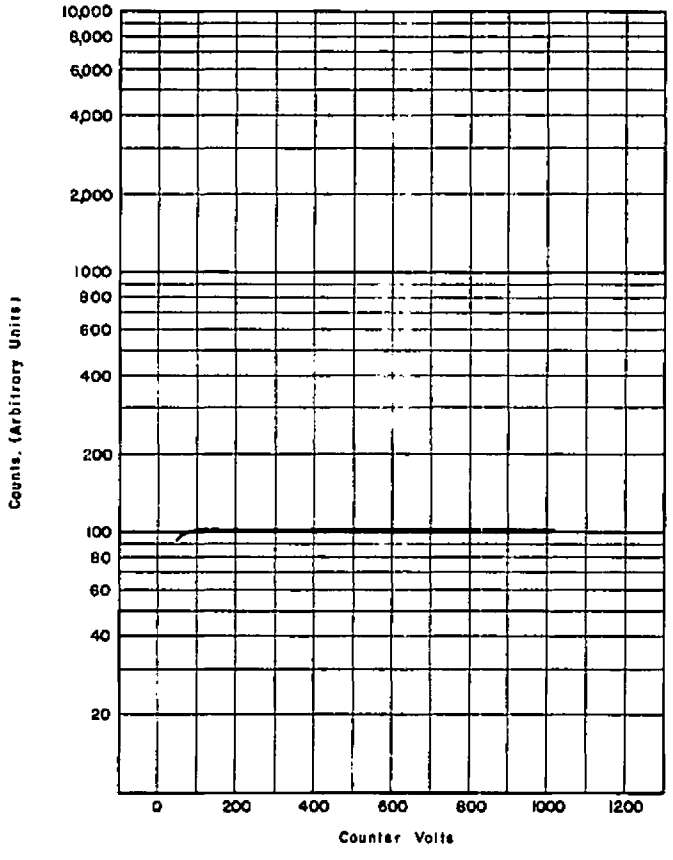
⊕ Counting Rate at different operating voltages is shown in CE-A1326.

□ The sensitivity is .07 counts/n/cm^2 for an alpha background counting rate of 1 count/sec. By varying the pulse-height selector setting, other counter sensitivities are obtainable for different background counting rates as shown in CE-A1327.

NOTE: This tube may not be immersed in water and high humidity environments should be avoided since they may impair performance.

Neutron & Radiation Detector Section

COUNTING RATE CHARACTERISTIC



COUNTER SENSITIVITY AS FUNCTION OF PULSE HEIGHT SETTING