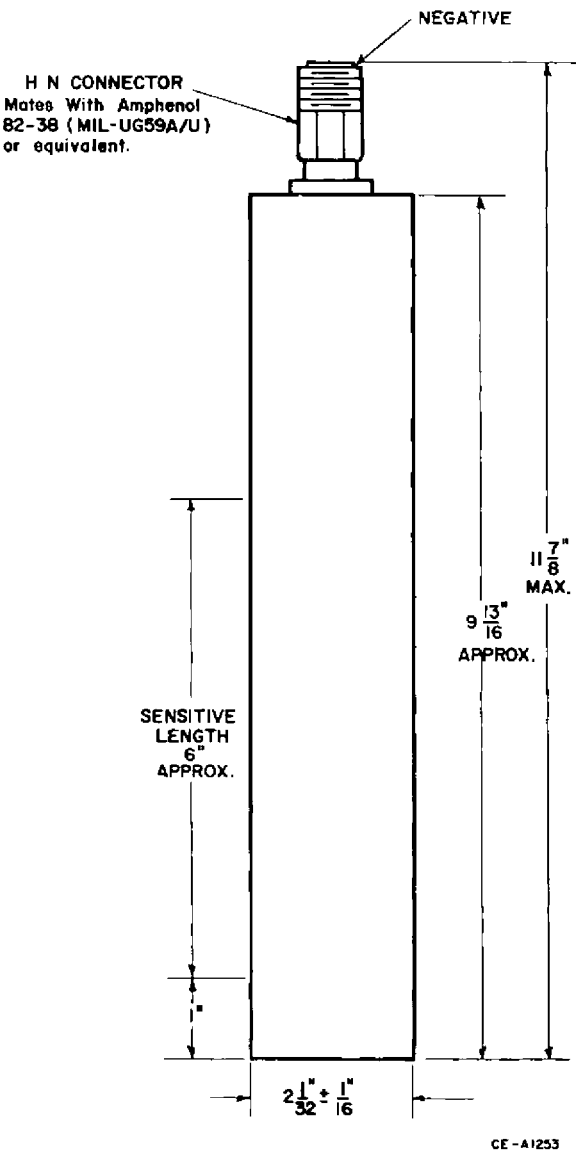
April 10, 1958

FISSION COUNTER TYPES WL-6971 AND WL-6971A

The WL-6971 and WL-6971A are fission counters designed to detect thermal neutrons in the flux range from 1.25 x 10 to 1.25 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 enriched to 20% in U-235 isotope. These types are extremely rugged ♦ and will operate in any position.

The WL-6971 may be operated or stored in ambient temperatures not exceeding 175°F; similarly, the maximum ambient temperature for the WL-6971A is 300°F.

The sensitivity of the WL-6971 and WL-6971A is 1.4 x 10^{-1} counts/neutrons/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 20% in U-235	
Thickness	2.0	mg/cm^2
Total Amount of U-235	0.37	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 x 10^{10} max.	n/cm^2/sec
Total Integrated Neutron Flux	1 x 10^{17} max.	n/cm^2
Temperature:		
WL-6971	175 max.	°F
WL-6971A	300 max.	°F
TYPICAL OPERATING CHARACTERISTICS:		
Operating Voltage	300	Volts
Operating Voltage Plateau ⊕	200 to 800	Volts
Neutron Flux Range	1.25 x 10 to 1.25 x 10^6	n/cm^2/sec
Sensitivity □	1.4 x 10^{-1}	count/n/cm^2
Output Pulse Characteristics:		
Magnitude	2 x 10^{-4}	Volts
Inherent Rise Time	2 x 10^{-7} max.	Seconds
Leakage Resistance	10^9 min.	ohms
Capacitance-Signal Electrode to Case	190	uuf

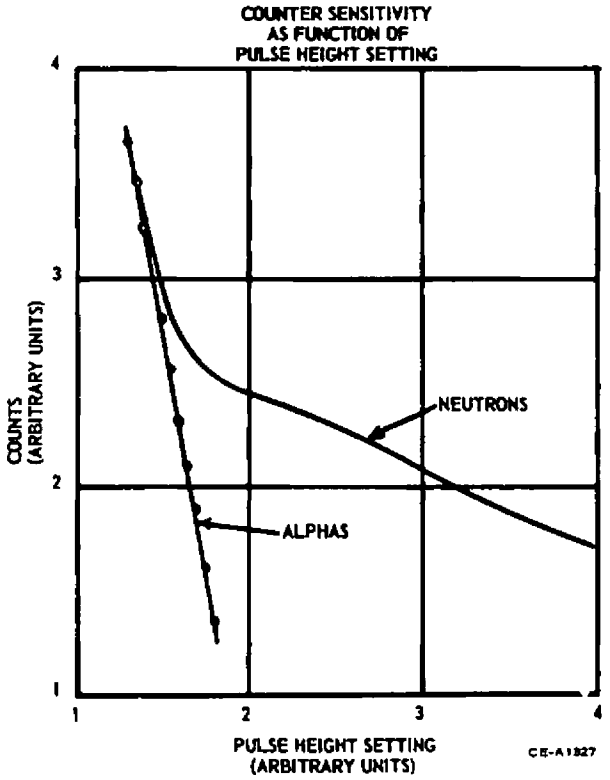
♦ The WL-6971 and WL-6971A have passed Military Specifications MIL-S-901 for shock and MIL-Std-167 (Type 1) for vibration.

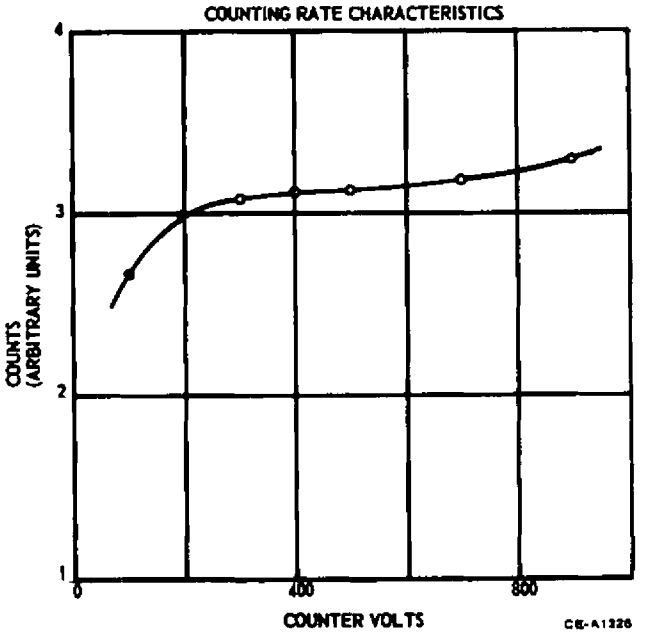
⊕ Counting Rate at different operating voltages is shown in CE-A1326.

□ The sensitivity is 1.4 x 10^{-1} 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: These tubes may not be immersed in water and high humidity environments should be avoided since they may impair performance.

from JETEC release #2175, May 5, 1958


COUNTER SENSITIVITY
AS FUNCTION OF
PULSE HEIGHT SETTING
COUNTS
(ARBITRARY UNITS)
4
3
2
1
NEUTRONS
ALPHAS
1
2
3
4
PULSE HEIGHT SETTING
(ARBITRARY UNITS)
CE-A1327


COUNTING RATE CHARACTERISTICS
COUNTS
(ARBITRARY UNITS)
4
3
2
1
0
400
800
COUNTER VOLTS
CE-A1326