

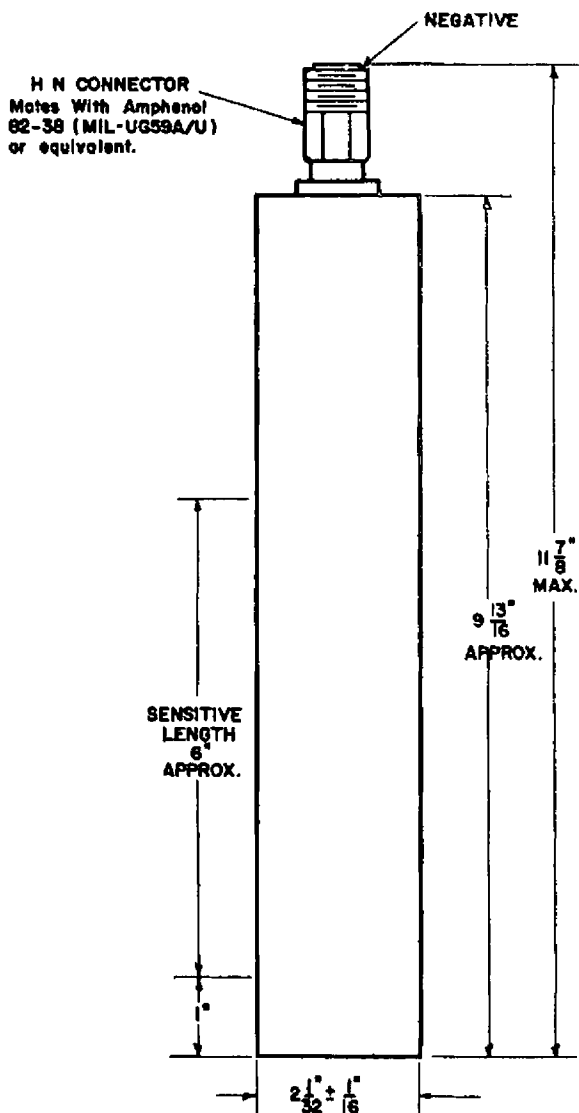
February 24, 1958

### FISSION COUNTER TYPE WL-7187

The WL-7187 is a fission counter designed to detect thermal neutrons in the flux range from  $1.25 \times 10^7$  to  $1.25 \times 10^8$  neutrons/cm<sup>2</sup>/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-7187 is extremely rugged. †

The characteristics of the WL-7187 are such that sensitivity to changes in the setting of the discriminator pulse height selector is minimized. This attribute makes the tube desirable in critical facilities where its high gamma sensitivity will not impair accuracy of readings. In this application, the WL-7187 permits good day-to-day reproducibility of readings.

The sensitivity of the WL-7187 is  $5.2 \times 10^{-1}$  counts/neutron/cm<sup>2</sup> when the pulse amplifier discriminator is adjusted for a background counting rate of 5 counts/second for the naturally radioactive uranium. An incident gamma flux of  $10^{10}$  photons/cm<sup>2</sup>/second results in a maximum decrease in sensitivity of 3% up to  $10^5$  counts/second.



CE-A1253

#### 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 <sub>3</sub> O <sub>8</sub> enriched to more than 90% in U-235
Thickness . . . . .	1.0 mg/cm <sup>2</sup>
Total Amount of U-235 . . . . .	0.86 gm
Gas Filling . . . . .	Argon-Nitrogen Mixture at 220 cm Hg

#### MAXIMUM RATINGS:

Absolute Maximum Values		
Voltage Between Electrodes . . . . .	800 max.	Volts
Thermal Neutron Flux . . . . .	$2.5 \times 10^{10}$ max.	n/cm <sup>2</sup> /sec
Total Integrated Neutron Flux . . . . .	$1 \times 10^{17}$ max.	n/cm <sup>2</sup>
Temperature . . . . .	300 max.	°F

#### TYPICAL OPERATING AS A FISSION COUNTER:

Operating Voltage . . . . .	300	Volts
Operating Voltage Plateau <sup>Ⓢ</sup> . . . . .	200 to 800	Volts
Neutron Flux Range . . . . .	$1.25 \times 10^7$ to $1.25 \times 10^8$	n/cm <sup>2</sup> /sec
Sensitivity <sup>□</sup> . . . . .	$5.2 \times 10^{-1}$	count/n/cm <sup>2</sup>
Output Pulse Characteristics:		
Magnitude . . . . .	$2 \times 10^{-4}$	Volts
Inherent Rise Time . . . . .	$2 \times 10^{-7}$ max.	Seconds
Leakage Resistance . . . . .	$10^9$ min.	ohms
Capacitance-Signal Electrode to Case . . . . .	190	uuf

† The WL-7187 has passed Military Specification MIL-S-901 for shock and MIL-Std-167 (Type I) for vibration.

Ⓢ Counting Rate at different operating voltages is shown in CE-A1358.

□ The sensitivity is  $5.2 \times 10^{-1}$  counts/n/cm<sup>2</sup> for an alpha background counting rate of 5 count/sec. By varying the pulse-height selector setting, other counter sensitivities are obtainable for different background counting rates as shown in CE-A1359.

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