

April 10, 1958

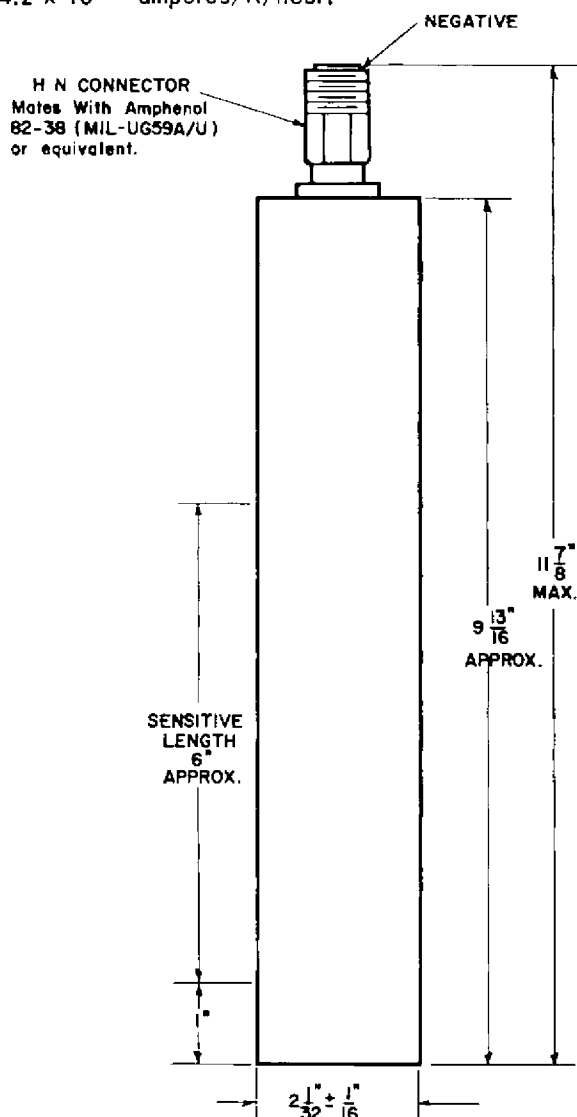
DUAL RANGE FISSION CHAMBER TYPES WL-6376 AND WL-6376A

The WL-6376 and WL-6376A are aluminum-cased dual-range thermal neutron detectors. 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. These types are extremely rugged* and will operate in any position.

The WL-6376 may be operated or stored in ambient temperatures not exceeding 175°F similarly, the maximum ambient temperature for the WL-6376A is 300°F.

The WL-6376 and WL-6376A may be operated either as fission counters in a flux range of 2.5 to 2.5×10^5 neutrons/cm²/second or as ionization chambers in a flux range of 5×10^5 to 1×10^{10} neutrons/cm²/second.

In atypical operation as fission counters, they have a neutron sensitivity of approximately 0.7 counts/neutron/cm² with an operating voltage of 300 volts. An incident gamma flux of 10^{10} photons/cm²/second (3.8×10^4 R/hour) results in a maximum loss in sensitivity of 1%. When connected for service as an ionization chamber, the neutron sensitivity is approximately 1.4×10^{-13} amperes/neutron/cm²/second and the gamma sensitivity is approximately 4.2×10^{-11} amperes/R/hour.



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 ₃ O ₈ enriched to more than 90% in U-235
Thickness	2 mg/cm ²
Total Amount of U-235	1.72 gm
Gas Filling	Nitrogen and Argon at 76 cm Hg
Output Impedance:	
Resistance (greater than)	10 ⁹ ohms
Capacity	190 uuf

MAXIMUM RATINGS:

Absolute Maximum Values

Voltage Between Electrodes	800	Volts
Thermal Neutron Flux	2.5×10^{10}	n/cm ² /sec
Total Integrated Neutron Flux	2×10^{17}	n/cm ² (nvt)
Temperature:		
WL-6376	175	°F
WL-6376A	300	°F

TYPICAL OPERATION AS A FISSION COUNTER:

Operating Voltage	300	Volts
Operating Voltage Plateau @	200 to 800	Volts
Neutron Flux Range	2.5 to 2.5×10^5	n/cm ² /sec
Sensitivity □	0.7	count/n/cm ²

Output Pulse Characteristics:

Magnitude	2×10^{-4}	Volts
Inherent Rise Time	2×10^{-7}	Seconds

TYPICAL OPERATION AS AN IONIZATION CHAMBER:

Operating Voltage	300 to 800*	Volts
Neutron Flux Range	5×10^5 to 1×10^{10} †	n/cm ² /sec
Neutron Sensitivity	1.4×10^{-13}	amp/n/cm ² /sec
Gamma Sensitivity	4.2×10^{-11}	amp/R/hr

Neutron & Radiation Detector Section

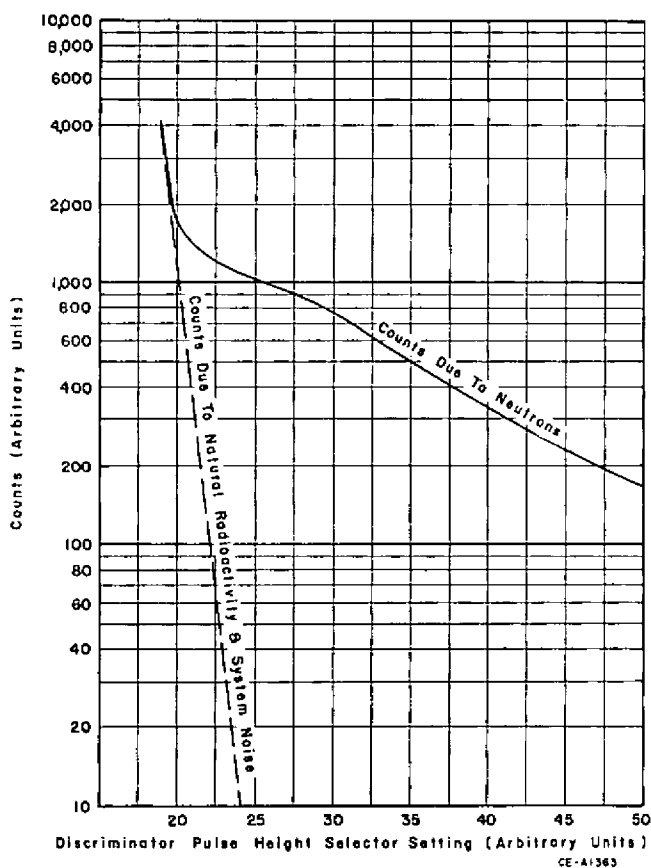
- The WL-6376 and WL-6376A have passed Military Specifications MIL-S-901 for shock and MIL-Std-167 (Type I) for vibration.
- Counting Rate at different operating voltages is shown in CE-A1362.
- The sensitivity is 0.7 count/m/cm² for an alpha background counting rate of 5 counts/sec. By varying the pulse-height selector setting, other counter sensitivities are obtainable for different background counting rates as shown in CE-A1363.

* Depending on incident neutron flux level.

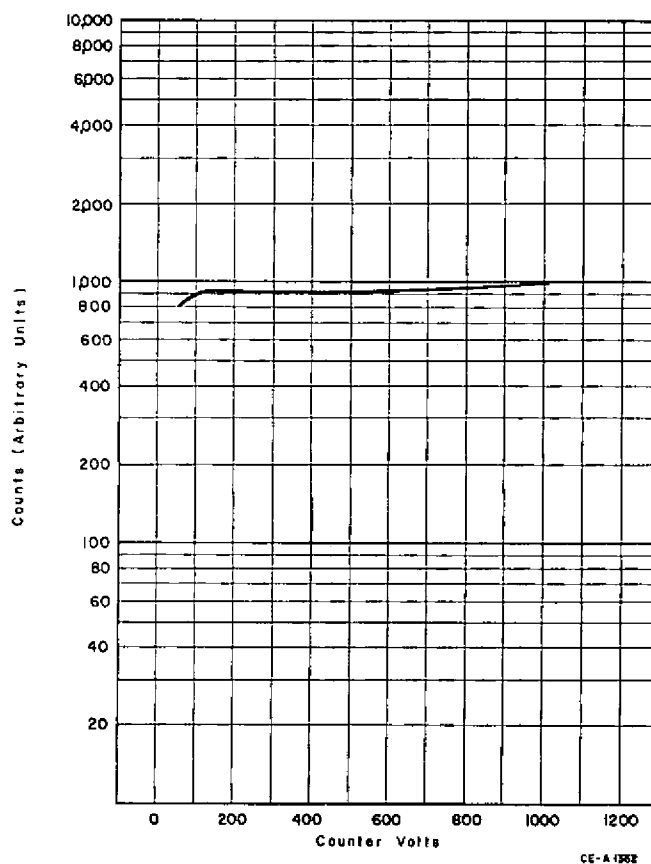
† Lower limit of range is determined by alpha background current of approximately 1.6×10^{-8} amperes.

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

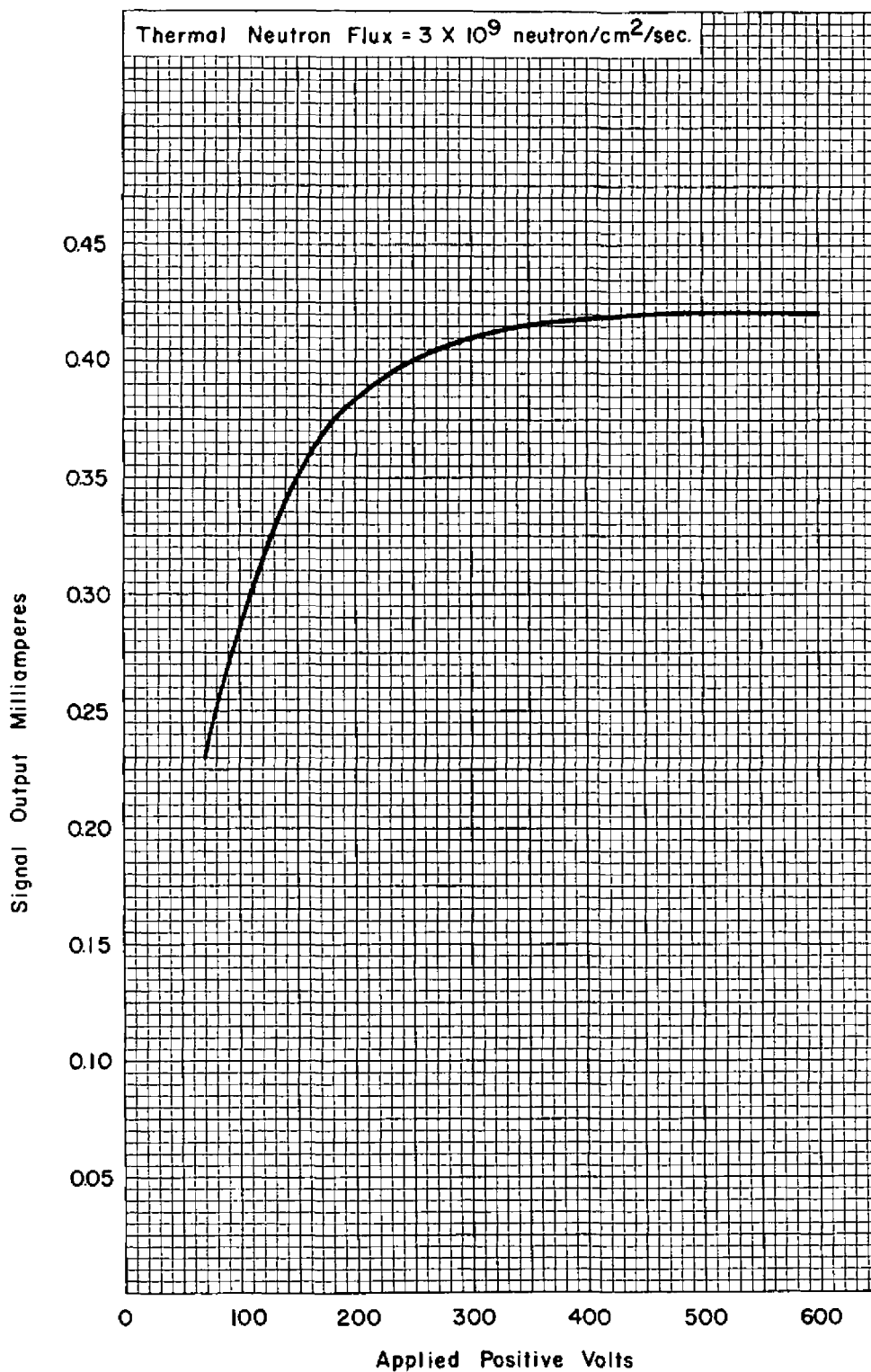
COUNTER SENSITIVITY AS FUNCTION OF PULSE HEIGHT SETTING



COUNTING RATE CHARACTERISTIC



TYPICAL SATURATION CHARACTERISTICS
Ion Chamber Operation



CE-A1325